

Tender specifications
Attached to the Invitation to tender

Invitation to tender N° 2015/EMSA/OP/27/2015 for a study on the development of LNG bunkering facilities for the LNG fuelled ships in the SAFEMED and TRACECA beneficiary countries

1. Introduction

The European Maritime Safety Agency (EMSA) was established under Regulation 1406/2002/EC for the purpose of ensuring a high, uniform and effective level of maritime safety. Among its tasks, “the Agency may, upon the request of the Commission, provide technical assistance, including the organisation of relevant training activities, as regard relevant legal acts of the Union, to States applying for accession to the Union, and where applicable, to European Neighbourhood partner countries and to countries taking part in the Paris MoU”.

Therefore, the Agency can be and is currently involved in the provision of technical assistance to Mediterranean and Eastern partner countries which are beneficiaries of the SAFEMED and TRACECA projects. Mediterranean partner countries currently provided by EMSA with technical assistance are Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria (currently suspended) and Tunisia. Eastern partners countries currently provided with technical assistance by EMSA are Armenia, Azerbaijan, Georgia, Kazakhstan, Moldova, Turkmenistan and Ukraine.

The objectives of the technical assistance provided by EMSA is the enhancement of the overall standards of partner countries in the fields of maritime safety, maritime security, the prevention of and the response to oil pollution caused from ships. An additional objective is the reduction of the capacity gap between the application of the international regulatory framework and the EU legislative framework, in order to ensure a coherent, effective and uniform implementation of the international rules for maritime safety, security and prevention of pollution from ships in the Mediterranean, Black and Caspian seas between the European Union and its neighboring partner countries.

Technical assistance can be provided both on regional and bilateral basis in order to take into account the differences between partner countries as well as to meet as much as possible the individual needs of each country.

The present tender aims to provide SAFEMED and TRACECA beneficiary countries with the necessary study to promote the deployment and the development of the alternative fuels infrastructures, and in particular of Liquefied Natural Gas (LNG) as fuel for ships. The fundamental aspects covered by the scope of the present tender are essentially related to Risk & Safety, both from a regulatory and technological perspective, aiming to provide a wide coverage of all possible needs regarding the analysis and assessment of risk in LNG bunkering facilities and operations within the port areas. Risk, risk perception and mitigation are essential for a successful development of the LNG bunkering facilities for LNG fuelled ships in the SAFEMED and TRACECA beneficiary countries.

2. Objective, scope and description of the contract

The global shipping industry faces a challenge as new legislation in force since the beginning of 2015 is imposing significant limitations with regards to air emissions from ships. One of the ways to be compliant is to use alternative cleaner fuel such as LNG.

In this context, the EU is promoting the use of LNG in shipping as bunker fuel. A number of projects have been financed by the EU in this respect and, notably, with regard to the Northern Europe and Eastern Mediterranean.

LNG as bunker fuel faces a number of challenges, namely the investment required in ships propulsion and fuel handling systems as well as in bunkering facilities. The uptake of LNG at a wider regional/global scale, already in place, needs sound safety foundations, with the identification of the main aspects contributing to safety, regulations and standards, hazard characterization (HAZID), and risk assessment.

In the light of the above, EMSA would like to provide the relevant SAFEMED or TRACECA beneficiary countries with the detailed description of its regulatory/standardization context, and consequent identification of gaps (technological and/or regulatory) and, on the other hand, with port-specific Risk Analysis & Assessment and, when they haven't been defined at national level, with the development of the relevant risk acceptance criteria. For these reasons, the Agency has decided to launch the present open call for tender.

2.1 Objective

The main objective of the contract is to provide SAFEMED and TRACECA beneficiary countries with the necessary study on LNG bunkering infrastructures and/or small storage siting facilities in order to support a safe development of the LNG facilities of the relevant ports or port areas, thus promoting the development LNG bunkering in the region.

The study to be performed by the contractor shall address safety risk assessment issues regarding LNG bunkering of the gas-fuelled ships in the relevant ports of the SAFEMED and TRACECA beneficiary countries both from a regulatory and technological perspective.

2.2 Definition of the study

The aim of the contract resulting from this tender is twofold:

1. Describe the existing standards/regulations/guidelines related to LNG bunkering and those currently under development, affecting the ports on a national, regional and global scale. Provide a gap analysis identifying, documenting and comparing the differences between the existing requirements of current/on-going LNG bunkering related regulations. Provide recommendations how to overcome the identified gaps.
2. Develop Individual Quantitative Risk Assessments for LNG as fuel bunkering operations, for the identified port(s), taking into consideration specific features of each port such as number and type of

ships calling at ports, type of operations, port location and surrounding infrastructures as well as other relevant variables for the establishment of each ports safety/risk profile.

The first point specified above is intended to address the policy and regulatory framework at international, regional and national levels, to define the policy and regulatory context of the relevant port(s).

The second point focuses on the study and analysis of specific features of each port in order to assess the risks involved in LNG bunkering on a given port, against specific risk acceptance criteria, taking into consideration geo-morphological and meteorological characteristics affecting the ports, their operational profiles, e.g. types of trade, number of passengers, containers, total number of port calls.

According to the technical nature of the study the two points identified above are further subdivided in the present Tender specifications into different Tasks ranging from Task 1 to Task 8 as per table below. Each task covers a study or a particular aspect of the general study related to the development of LNG bunkering facilities for ships.

Task	Description
1	Gap Analysis Study of the Regulatory Frame and Evaluation of Applicable Standards to LNG as fuel for shipping
2	Feasibility Study
3	Definition of Risk Acceptance Criteria Study
4	Site Specific Data Description and Analysis Study
5	Nautical Analysis and Collision Risk Analysis Study
6	Hazard Identification – HAZID Study
7	Quantitative Risk Assessment (QRA) Study
8	Ship Collision Risk Study

Each Task, its technical description and expected deliverables, is described in the Appendix I attached to these Tender specifications.

The Tasks consist of both generic and port-specific studies, targeting different needs regarding the state of development of the LNG bunkering infrastructures and operations in the relevant port(s). The Tasks are independent amongst each other and are non-overlapping. All the Tasks are related to Regulations, Standards, and Risk & Safety, consisting essentially of studies assisting the development and implementation of LNG bunkering facilities within the existing port areas. No engineering implementation studies or works are considered as part of these Tasks.

The contractor may be assigned to complete one of the Tasks or several Tasks at the same time. The Task(s) to be assigned to the contractor will depend on the actual needs of the relevant SAFEMED or TRACECA beneficiary country, target port(s) and the relevant LNG facilities. The decision of the Task(s) to be assigned to the contractor will be based on the Case/Site/Country Specific Information (Appendix II) and considerations/objectives to be taken into account for each relevant Task as defined in the Appendix III. The contractor shall keep in mind the objectives of each assigned Task as specified in the Appendix III when conducting the study.

The Appendix II will be filled in by the relevant SAFEMED or TRACECA beneficiary country before the attribution of the Task(s) to the contractor and will be made available to the contractor upon the assignment of the Task(s).

The port(s)/port area(s) of the SAFEMED or TRACECA beneficiary country where the study is to be conducted; the Tasks to be accomplished, the date of delivery and the language of the Study will be specified in each Order Form.

2.3 Language

The final study delivered by the contractor shall be either in English or in French depending on the linguistic environment of the relevant SAFEMED or TRACECA beneficiary country.

2.4 Meetings with the relevant administrations in SAFEMED or TRACECA countries

When necessary to complete the Study, the contractor and the relevant beneficiary country may agree to organise up to two meetings, including technical visits of the relevant port/port areas.

Objectives of the first meeting to be held in the SAFEMED or TRACECA country are the following:

- to gather all the relevant information about country's specific needs in relation to the Task(s) to be completed;
- to visit the site(s) foreseen for the development of the LNG facilities;
- to gather all the relevant information with regard to the studies/works already performed in relation to the facilities to be developed;
- to meet all the relevant for the Task(s)' stakeholders;
- to undertake any other relevant action in line with the objectives of each specific Task assigned to the contractor.

Objectives of the second meeting to be held in the SAFEMED or TRACECA country are the following:

- to present the outcome of the work to the relevant authorities;
- to reply to the questions related to the Task(s);
- to ensure that the final outcome is in line with the expectations of the relevant authorities;
- to fine-tune if necessary according to the relevant authorities' needs;
- to undertake any other relevant action in line with the objectives of each specific Task assigned to the contractor.

EMSA shall be informed about the dates on which the meetings are arranged. The contractor will take care of all the travel and accommodation arrangements. All related to the meetings costs (accommodation, travel, etc.) should be included into the price specified for each of the Task(s). Therefore the contractor will not be reimbursed on a separate basis of any expenses incurred for the purpose and in course of such meetings.

The contractor shall inform EMSA by e-mail on the main outcome of each meeting within 10 working days after the conclusion of the meeting.

3. Contract management responsible body.

The European Maritime Safety Agency – Department B Safety and Standards, in charge of Training and Cooperation – will be responsible for managing the contract.

4. Project Planning

The final deliverable for the assigned study shall be produced at the final date of delivery or performance as specified by the Order Form.

5. Timetable

The estimated date for signature of the contract is mid December 2015.

6. Estimated Value of the Contract

The maximum budget available for this contract is of 450.000 (four hundred fifty thousand) Euros excluding VAT over the duration of the service framework contract (4 years).

The above maximum budget is expected to be distributed among the Tasks as indicated below. Therefore, within the limit of the maximum budget available for the contract, some of the tasks may be contracted for several ports/port areas and others may not be assigned at all to the contractor.

The price for each Task comprises the fulfilment of a relevant to the Task study as well as travel/accommodation expenses for the meetings foreseen in the § 2.4.

Task 1 amounts to a maximum of 20.000 Euros.

Task 2 amounts to a maximum of 15.000 Euros

Task 3 amounts to a maximum of 15.000 Euros.

Task 4 amounts to a maximum of 10.000 Euros.

Task 5 amounts to a maximum of 15.000 Euros.

Task 6 amounts to a maximum of 20.000 Euros

Task 7 amounts to a maximum of 30.000 Euros.

Task 8 amounts to a maximum of 20.000 Euros.

7. Terms of payment

Payments shall be issued in accordance with the provisions of the multiple **draft service framework contract** in cascade available on the Procurement Section under the call to tender EMSA/OP/27/2015 on the EMSA website at the following address: www.emsa.europa.eu

8. Terms of contract

This tender will result in a signature of a multiple framework service contract in cascade with EMSA and successful tenderer(s), to be implemented by order forms that will define the assigned Task(s) to the contractor. EMSA aims at concluding the Multiple Framework Service Contract with 3 contractors.

Multiple framework service contract is a long term relationship with one or more service provider(s). This contract is concluded following a procurement procedure between the contracting authority and the economic operators for the purpose of laying down the essential terms governing a series of Tasks to be assigned during a given period, in particular as regards the duration, subject, prices, conditions of performance and the quantities envisaged. The multiple framework service contract sets out the conditions for subsequent contracts (order forms) but place no direct obligations on the contracting authority to buy anything. Thus, service orders are formed only when services are purchased under the order forms.

In drawing up a bid, the tenderer should bear in mind the terms of the draft multiple framework service contract in cascade.

EMSA may, before the contract is signed, either abandon the procurement or cancel the award procedure without the tenderers being entitled to claim any compensation.

9. Financial guarantees

N.A.

10. Sub-contracting

If the tenderer intends to either sub contract part of the work or realise the work in co-operation with other partners he shall indicate in his offer which part will be subcontracted, as well as the name and qualifications of the subcontractor or partner. (NB: overall responsibility for the work remains with the tenderer).

The tenderer must provide required evidence for the exclusion and selection criteria on its own behalf and when applicable on behalf of its subcontractors. The evidence for the selection criteria on behalf of subcontractors must be provided where the tenderer relies on the capacities of subcontractors to fulfil selection criteria¹. The exclusion criteria will be assessed in relation to each economic operator individually. Concerning the selection criteria, the evidence provided will be checked to ensure that the tenderer and its subcontractors as a whole fulfil the criteria.

11. Requirements as to the tender

Bids can be submitted in any of the official languages of the EU. The working language of the Agency is English. Bids must include an English version of the documents requested under point 14.5 & 15.1 of the present tender specifications.

The tenderer shall complete Tenderer's checklist.

¹ To rely on the capacities of a subcontractor means that the subcontractor will perform the works or services for which these capacities are required.

If the tenderer intends to either sub contract part of the work or realise the work in co-operation with other partners (Joint Offers) he shall indicate in his offer by completion of the form – Information regarding joint offers and subcontracting.

The tender must be presented as follows and must include:

Signed cover letter indicating the name and position of the person authorised to sign the contract and the bank account on which payments are to be made.

Financial Form completed, signed and stamped; available on the Procurement Section (Financial Form) on the EMSA Website at the following address: www.emsa.europa.eu

Legal Entity Form completed, signed and stamped and requested accompanying documentation, available on the Procurement Section (Legal Entity Form) on the EMSA Website at the following address: www.emsa.europa.eu

Tenderers are exempt from submitting the Legal Entity Form and Financial Form requested if such a form has already been completed and sent either to EMSA or any EU Institution previously. In this case the tenderer should simply indicate on the cover letter the bank account number to be used for any payment in case of award.

Part A: all the information and documents required by the contracting authority for the appraisal of tenders on the basis of the points **13, 14.2-14.3** of these specifications (part of the Exclusion criteria)

Part B: all the information and documents required by the contracting authority for the appraisal of tenders on the basis of the **Economic and Financial capacity** (part of the Selection criteria) set out under point **14.4** of these specifications;

Part C: all the information and documents required by the contracting authority for the appraisal of tenders on the basis of the **Technical and professional capacity** (part of the Selection Criteria) set out under point **14.5** of these specifications.

Part D: all the information and documents required by the contracting authority for the appraisal of tenders on the basis of the **Award Criteria** set out under point **15.1** of these specifications;

Part E: setting out **prices** in accordance with **point 12** of these specifications.

12. Price

- **Prices for a study on the development of LNG bunkering facilities for the LNG fuelled ships** shall include all the relevant expenses to be engaged by the contractor in order to properly perform the assigned Task(s), including travel and accommodation expenses related to the meetings foreseen in § 2.4 of the present Tender specifications.
- Prices must be quoted in Euro.
- **The tenderer shall provide quotation for each of the Task(s)** specified in the Appendix I bearing in mind that the quotation shall not exceed the maximum amount foreseen for each Task in the § 6 of the present Tender specifications, i.e.
 - Maximum of 20.000 Euros for the Task 1
 - Maximum of 15.000 Euros for the Task 2
 - Maximum of 15.000 Euros for the Task 3
 - Maximum of 10.000 Euros for the Task 4
 - Maximum of 15.000 Euros for the Task 5
 - Maximum of 20.000 Euros for the Task 6
 - Maximum of 30.000 Euros for the Task 7
 - Maximum of 20.000 Euros for the Task 8.

The price per each task will be comprised of two parts that together cannot exceed the maximum value per Task as indicated above:

1. Price for the service under the Task and
2. Price for travel and daily subsistence allowances expenses for one person to be borne by the contractor in respect to the meetings to be held in the SAFEMED and TRACECA beneficiary countries as per § 2.4.

Per each meeting the price for travel expenses should not exceed 800 euro and the daily subsistence allowance should not exceed the maximum of 3 overnights stay multiplied by the PerDiem value for the relevant country as indicated at the following webpage:

<https://ec.europa.eu/europeaid/node/96684>.

Example:

	Price for the Task	Price for Travel + DSAs	Total (\leq Maximum per Task)
Task 1	X	Y	X+Y (\leq maximum per Task)

- **The tenderers shall also provide an overall quotation equivalent to the sum of the prices for the eight (8) Tasks (Travel and Daily Subsistence Allowances excluded).** Prices must be fixed amounts, non-revisable and remain valid for the duration of the contract.
- Under Article 3 and 4 of the Protocol on the privileges and immunities of the European Union, EMSA is exempt from all duties, taxes and other charges, including VAT. This applies to EMSA pursuant to the Regulation 1406/2002/EC. These duties, taxes and other charges can therefore not enter into the calculation included in the bid. The amount of VAT must be shown separately.

13. Joint Offer

Groupings, irrespective of their legal form, may submit bids. Tenderers may, after forming a grouping, submit a joint bid on condition that it complies with the rules of competition. Such groupings (or consortia) must specify the company or person heading the project and must also submit a copy of the document authorising this company or person to submit a bid.

Each member of the consortium must provide the required evidence for the exclusion and selection criteria. The exclusion criteria will be assessed in relation to each economic operator individually. Concerning the selection criteria the evidence provided by each member of the consortium will be checked to ensure that the consortium as a whole fulfils the criteria.

If awarded, the contract will be signed by the person authorised by all members of the consortium.

Tenders from consortiums of firms or groups of service providers, contractors or suppliers must specify the role, qualifications and experience of each member or group.

14. Information concerning the personal situation of the service provider and information and formalities necessary for the evaluation of the minimum economic, financial and technical capacity required

14.1 Legal position – means of proof required

When submitting their bid, tenderers are requested to complete and enclose the **Legal Entity Form** and requested accompanying documentation, available on the Procurement Section (Legal Entity Form) on the EMSA Website at the following address: www.emsa.europa.eu

14.2 Grounds for exclusion - Exclusion criteria

To be eligible for participating in this contract award procedure, tenderers must not be in any of the following exclusion grounds:

- a) they are bankrupt or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations;
- b) they have been convicted of an offence concerning their professional conduct by a judgement which has the force of res judicata;
- c) they have been guilty of grave professional misconduct proven by any means which the contracting authority can justify;
- d) they have not fulfilled obligations relating to the payment of social security contributions or the payment of taxes in accordance with the legal provisions of the country in which they are established or with those of the country of the contracting authority or those of the country where the contract is to be performed;
- e) they have been the subject of a judgement which has the force of res judicata for fraud, corruption, involvement in a criminal organisation or any other illegal activity detrimental to the Union financial interests;
- f) they have been the subject of the administrative penalty for being guilty of misrepresentation in supplying the information required by the contracting authority as a condition of participation in the procurement procedure or failing to supply an information, or being declared to be in serious breach of his obligation under contract covered by the budget.

14.3 Evidence to be provided by the tenderers

For this purpose the Declaration on Honour available on the Procurement Section on the EMSA Website (www.emsa.europa.eu) shall be completed and signed.

Please note that the tenderer to whom the contract is to be awarded shall provide additional proof evidencing eligibility.

For situations described in (a), (b) and (e), production of a recent extract from the judicial record is required or, failing that, a recent equivalent document issued by a judicial or administrative authority in the country of origin or provenance showing that those requirements are satisfied. Where the tenderer is a legal person and the national legislation of the country in which the tenderer is established does not allow the provision of such documents for legal persons, the documents should be provided for natural persons, such as the company directors or any person with powers of representation, decision making or control in relation to the tenderer.

For the situation described in point (d) above, recent certificates or letters issued by the competent authorities of the State concerned are required. These documents must provide evidence covering all taxes and social security contributions for which the tenderer is liable, including for example, VAT, income tax (natural persons only), company tax (legal persons only) and social security contributions.

For any of the situations (a), (b), (d) or (e), where any document described in two paragraphs above is not issued in the country concerned, it may be replaced by a sworn or, failing that, a solemn statement made by the interested party before a judicial or administrative authority, a notary or a qualified professional body in his country of origin or provenance.

If the tenderer is a legal person, information on the natural persons with power of representation, decision making or control over the legal person shall be provided only upon request by the contracting authority.

When the tenderer to be awarded the contract has already submitted relevant evidence to EMSA, it remains valid for 1 year from its date of submission. In such a case, the reference of the relevant project(s) should be mentioned and the Contractor is required to submit a statement of confirmation that their situation has not changed.

14.4 Economic and financial capacity – Selection criteria

Requirements:

- The tenderer must be in stable financial position and the economic and financial capacity to perform the contract

Evidence:

- Financial statements for the last three years for which accounts have been closed.
- Statement of overall turnover and turnover relating to the relevant services for the last three financial years.
- Tenderers are exempt from submitting the documentary evidence if such evidence has already been completed and sent to EMSA for the purpose of another procurement procedure and still complies with the requirements. In this case the tenderer should simply indicate on the cover letter the procurement procedure where the evidence has been provided.
- If, for some exceptional reason which EMSA considers justified, a tenderer is unable to provide one or other of the above documents, he may prove his economic and financial capacity by any other document which EMSA considers appropriate. In any case, EMSA must at least be notified of the exceptional reason and its justification in the tender. EMSA reserves the right to request any other document enabling it to verify the tenderer's economic and financial capacity.

14.5 Technical and professional capacity – Selection criteria

Requirements:

The tenderers shall have knowledge and experience in the following areas:

1. Shipping related concepts and principles, namely those related to different ship types, propulsion systems, typical operational profiles and alternative fuels for ships;
2. Alternative Fuels for shipping, more importantly LNG, accounting for all the life-cycle, from extraction to utilization, covering transport and storage related aspects.
3. Certification related procedures, permitting and specific regulation regarding onboard and onshore LNG related operations.
4. Safety aspects in relation to the setting up of the LNG bunkering facilities, with evidence of experience from previous LNG safety related projects;

5. Risk Analysis and Risk Assessment techniques, especially those involved in the Quantitative Risk Assessment (QRA) procedures, having demonstrated experience and competences with relevant software to conduct QRA's.
6. Safety and technical aspects regarding different types of LNG bunkering. Knowledge of modern technology solutions, risk analysis and operational limitations due to safety.
7. International/European standards/guidelines/regulations regarding LNG as an alternative fuel for shipping;
8. Excellent written and communication skills in the following languages: English and French.

Evidence:

To evidence all the above, tenderers shall provide with their bid the following:

1. Detailed *curriculum vitae* of each member of the team/consultant responsible to carrying out the work, including his or her educational background, degrees and diplomas, professional experience (including references to previous studies and projects), research work, publications and linguistic skills.
2. Extract(s) from a study or business case or a description of the practical case the tenderer was involved in illustrating the approach/methodology the tenderer (or member of his team) adopted to address key milestones in the areas related to LNG bunkering facilities for the LNG fuelled ships.
3. Evidence that the project leader has a minimum of 5 years of professional experience related to shipping sector and marine fuels.
4. Evidence (references) of at least two projects the tenderers were involved in the past which covered at least two of the following three fields:
 1. International/European standards/guidelines/regulations for LNG as an alternative fuel for ships;
 2. Safety Risk Analysis and Assessment related to the establishment and operation of LNG bunkering port facilities;
 3. Research in the field of alternative fuels, including LNG, and the encountered challenges in the area.

15. Award criteria

Only the tenders meeting the requirements of the exclusion and selection criteria will be evaluated in terms of quality and price.

The contract will be awarded to the tenderer who submits the most economically advantageous bid (the one with highest score) based on the following quality criteria and their associated weightings:

1. Quality criterion 1 ($W_1 = 35\%$)

Quality of the proposed team, based on the professional merit, structure and distribution of the tasks within the team (to be assessed with regard to the relevant evidence provided as per requirements of the § 14.5 of the Tender specifications (diplomas and professional background)).

2. Quality criterion 2 ($W_1 = 35\%$)

Quality of the proposed methodology for each of the following Tasks: Task 1, Task 2 and Task 5. The proposed methodology must include detailed proposals of how the project as a whole would be carried out, including key milestones.

and the price criterion and associated weighting:

3. Price of the bid ($W_{Price} = 30\%$).

The overall quotation equivalent to the sum of the prices for the 8 Tasks (Travel and daily subsistence allowances excluded) as specified in § 12 “Price” will be considered for evaluation of the tenderer’s proposal.

For all bids evaluators will give marks between 0-10 (half points are possible) for each quality criterion.

The score is calculated as

$$S = SQ + SP$$

where:

The average quality for quality criterion i is

$$Q_i = \frac{1}{\text{number of evaluators}} * \sum_{\text{evaluator}} \text{mark of the evaluator for quality criterion } i$$

The overall weighted quality is

$$Q = \sum_i Q_i * W_i$$

The score for quality is

$$SQ = \frac{Q}{Q \text{ of the bid with highest } Q} * 100 * \sum_i W_i$$

The score for price is

$$SP = \sum_i \frac{\text{lowest Price}_i \text{ of all bids}}{\text{Price}_i} * 100 * W_{Price_i}$$

Only bids that have reached a minimum of 60 % for Q_1 , a minimum of 60 % for Q_2 , will be taken into consideration when calculating the score for quality SQ , score for price SP and score S .

Only bids that have reached a minimum of 70 % for the score S will be taken into consideration for awarding the contract.

16. Contracts will not be awarded to tenderers who, during the procurement procedure:

- a) are subject to a conflict of interest
- b) are guilty of misrepresentation in supplying the information required by the contracting authority as a condition of participation in the contract procedure or fail to supply this information.

17. False declarations

Without prejudice to the application of penalties laid down in the contract, tenderers and contractors who have been guilty of making false declarations concerning situations referred to in points 14 and 15 above or have been found to have seriously failed to meet their contractual obligations in an earlier procurement or grant shall be subject to administrative and financial penalties set out in Article 145 of Commission Delegated Regulation of 29.10.2012 on the rules of application of Regulation (EU) No 966/2012 of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union.

18. Intellectual Property Right (IPR)

Please consult the contract for IPR related clauses.

If the results are not fully created for the purpose of the contract this should be clearly pointed out by the tenderer in the tender. Information should be provided about the scope of pre-existing rights, their source and when and how the rights to these rights have been or will be acquired.

In the tender all quotations or information originating from other sources and to which third parties may claim rights have to be clearly marked (source publication including date and place, creator, number, full title etc.) in a way allowing easy identification.

Appendix - I
Technical Specifications of the Tasks

TASK 1	Gap Analysis Study of the Regulatory Frame and Evaluation of Applicable Standards to LNG as fuel for shipping
Introductory Note	<p>The very first step to be given, with regards to a future Risk Assessment, would be the comprehensive description of the regulatory environment, existing standards and relevant procedures affecting the LNG business, in particular the LNG as fuel for shipping.</p> <p>One of the key aspects in the regulatory description in LNG as a fuel for shipping, is that the bunkering will encompass both shore-side and ship-side regulatory environment. The same applies for land-based LNG standards, emergency procedures and other key aspects.</p> <p>Following the previous point, a “gap analysis” is an essential exercise in order to realize what has to be done. It is important to identify the different areas where “gaps” exist. These may be of a regulatory nature, but also regarding standards, safety procedure, etc.</p> <p>A comparison with other LNG related business activities (land based or LNG cargo shipping) is advisable.</p> <p>In the specific case of the ENP partner countries the “gap” analysis should include all aspects related to the LNG bunkering for different segments of the shipping business, both cargo and passengers.</p> <p>The safety and regulatory frames may vary significantly depending on the shipping segments considered and this should be considered.</p>
Task technical Description	<p>The overall objective of this Task is to analyse, further evaluate and propose solutions to the identified gaps and barriers, at regulatory level, taking into account:</p> <ul style="list-style-type: none"> (a) on-going work and preliminary results at the International Standardisation Organisation (ISO) and the International Maritime Organization (IMO) (b) work and initiatives that have been already undertaken at local and national level (c) findings from relevant projects, namely at EU level (EU research projects), including necessarily the EU LNG Study 2014/2015 “<i>Study on the completion of an EU framework on LNG-fuelled ships and its relevant fuel infrastructure</i>” and EMSA 2012 “<i>Study on Standards and Rules for bunkering of gas-fuelled Ships</i>”. <p>It should also identify key measure pursuing a strategic and operational harmonization with EU-wide LNG as an alternative fuel for shipping approach (beyond local rules and procedures already in place), including safety and security aspects of LNG storage, bunkering and handling (ports/supply side and ships). It is here important to note that LNG as fuel for shipping, in the wider Mediterranean, will benefit from the integration of lessons learnt at European level. The integration and alignment of regulatory initiatives, wherever possible, should be pursued in order to favour business environment with a fair regulatory playing field.</p> <p>More specific objectives are:</p> <ul style="list-style-type: none"> • Further analyse the remaining gaps and barriers for a consolidated framework for LNG distribution, bunkering and in view of the most recent developments at international and European level (such as IMO, ISO and relevant existing EU legislation and EN standards) • Specific attention shall go out to quantitative risk assessment, risk acceptance criteria, permitting processes, incident reporting • The analysis for all gaps and barriers shall provide relevant data on key parameters such as costs and benefits for the affected parties etc. • The contractor shall identify and elaborate possible policy actions, rules, standards and guidelines, in line with the timeframes of the relevant international regulations at IMO level (IGF Code, IC Code revision and other relevant related

	<p>documents such as the STCW code, whereas LNG as fuel for shipping related elements are encountered.</p> <ul style="list-style-type: none"> • The contractor shall identify and assess potential impacts of actions in economic, environmental and social terms. The contractor shall discuss and validate results with all relevant stakeholders.
Expected Deliverables	<ol style="list-style-type: none"> 1. List and description of all national legislation and specific regulations affecting or influencing the development of LNG bunkering facilities at ports. 2. Identification of regional/international regulations influencing ENP partner country's LNG bunkering development (important to realise all relevant conventions to which the relevant ENP partner country is a contracting party). 3. Elaborate a Gap Analysis matrix, concerning three different Gap types: a) Technological, b) Regulatory, c) Harmonization 4. Propose measures to close the identified gaps.

TASK 2	Feasibility Study
Introductory Note	<p>A Feasibility Study of LNG bunkering for the intended port(s) has the objective to bridge the gap between the perception of LNG advantages and opportunities as an alternative fuel for shipping, and the actual operational measures to develop and implement LNG bunkering infrastructure projects.</p> <p>An important figure to determine whether LNG bunkering will represent a feasible business case is the estimated demand for LNG as fuel. For this estimation it is important to bear in mind several factors related not only to the regulatory environment (as addressed by Task 1) but also to the predictable trends in shipping (number of LNG fuelled vessels, trade patterns, etc.).</p> <p>Having the demand estimated, based on a number of relevant assumptions, it is important to draw the possible logistic chains which will include inputs from the LNG demand estimation and from site-specific particulars.</p>
Task technical Description	<ul style="list-style-type: none"> • Market study: forecast LNG bunkering demand for the intended port(s) based on shipping forecasts & energy market forecast, with particular highlight to the Mediterranean shipping. • Market characterization to be considered, taking into account the Mediterranean short-sea shipping and possible deep-sea shipping routes should be explored, in particular for taking into account possible establishment of new market tendencies for LNG cargo supply • The following factors shall be taken into account: <ul style="list-style-type: none"> ✓ Regulatory frame both at regional, European and international levels, ✓ LNG market relevant forecasts, ✓ number of estimated LNG ships trading in the Mediterranean ✓ number of LNG ship orders ✓ Social aspects • Perform, at least, 3 (three) Cost-Benefit Analysis studies with existing relevant LNG bunkering facilities. • Logistics model: model different supply chain options to provide LNG as bunker fuel. • Interpretation and analysis of the main motivating and conditioning factors for LNG bunkering in the intended port(s). • Draft recommendations for optimization of potential project and implementation of LNG bunkering facilities and operations.
Expected Deliverables	<ol style="list-style-type: none"> 1. An integrated report addressing all aspects of providing LNG as bunker fuel 2. A list of concrete recommendations 3. An excel spreadsheet allowing ports to simulate, compare and calculate costs of future LNG supply chains, depending on different concept options for delivery.

TASK 3	Definition of Risk Acceptance Criteria Study
Introductory Note	<p>Task 3 is only necessary if Risk Acceptance Criteria needs to be defined by the specific ENP partner country. This would only be the case if the ENP partner country has no such criteria available within its legislative frame.</p> <p>Risk Acceptance criteria is important to validate the results from the Risk Assessment. Without this a Risk Assessment exercise would have no effect whatsoever. Acceptable risk limits, for individual and societal risks need to be defined, should they not be in place already in the subject port national regulatory/legislative framework.</p> <p>It is however always possible, for the specific port subject of the study, to consider reference to existing risk acceptance criteria, such as the UK HSE Risk Acceptance Criteria.</p>
Task technical Description	<p>The objective of Task 3 is to evaluate the availability of Risk Acceptance criteria to be used for Risk Assessment and:</p> <ul style="list-style-type: none"> • Where these are available: to evaluate the applicability of the existing criteria to the case of LNG bunkering small infrastructures within the wider port area, considering different bunkering modes (ship/barge-to-ship, truck-to-ship and terminal-to-ship). • Where no criteria are in place: to propose adequate requirements for risk acceptance, preferably referring to existing accepted examples applied within the international frame. <p>As a reference for this study, the concepts of Individual and Societal risks, as defined in the UK HSE shall preferably be followed:</p> <ul style="list-style-type: none"> • <u>Location Specific Individual Risk contours (LSIR)</u> • <u>Societal risk curves (FN curves)</u> <p>LSIR shows the geographical distribution of risk to an individual outdoors on a map of the quay and its surroundings. From these contours, the average individual risk at specified locations can then be determined. FN curves show the cumulative frequency (F) distribution of accidents causing different numbers (N) of fatalities, usually shown for convenience on a log-log plot.</p> <p>The LSIR contours shall be calculated and plotted on a map for all three locations. Similarly, FN curves for the societal risk shall be produced for each location.</p> <p><u>Requirements to risk metrics</u></p> <ul style="list-style-type: none"> • Need to be a good measure of the parameter we are interested in measuring: <ul style="list-style-type: none"> – Risk to human life, to the environment, or economical risk? – Does the measure give the answer to how the risk level changes? • Must be possible to observe and quantify with reasonable certainty to enable us to record data and thereby observe changes and trends • Must be sensitive to changes in risk, to allow us to detect changes early and thereby take actions • Must be easy to understand and use for decision makers and other users • Must be robust against manipulation <p><u>Factors to consider when setting acceptance criteria:</u></p> <ul style="list-style-type: none"> • Criterion must be possible to meet. • Should be able to reflect changes in activity level. • Risk must be measurable. • Acceptability by society. • Acceptance criteria shall be easy to communicate to stakeholders and made public.
Expected Deliverables	<ul style="list-style-type: none"> • Report with brief description of the relevant existing Risk Acceptance criteria used (taking 3 relevant ENP partner countries as a minimum to be included in the report) • Propose Risk Assessment Criteria, to be used a later stages to evaluate the risk arising from different LNG bunkering configurations • Propose adequate form of risk presentation for assessment and

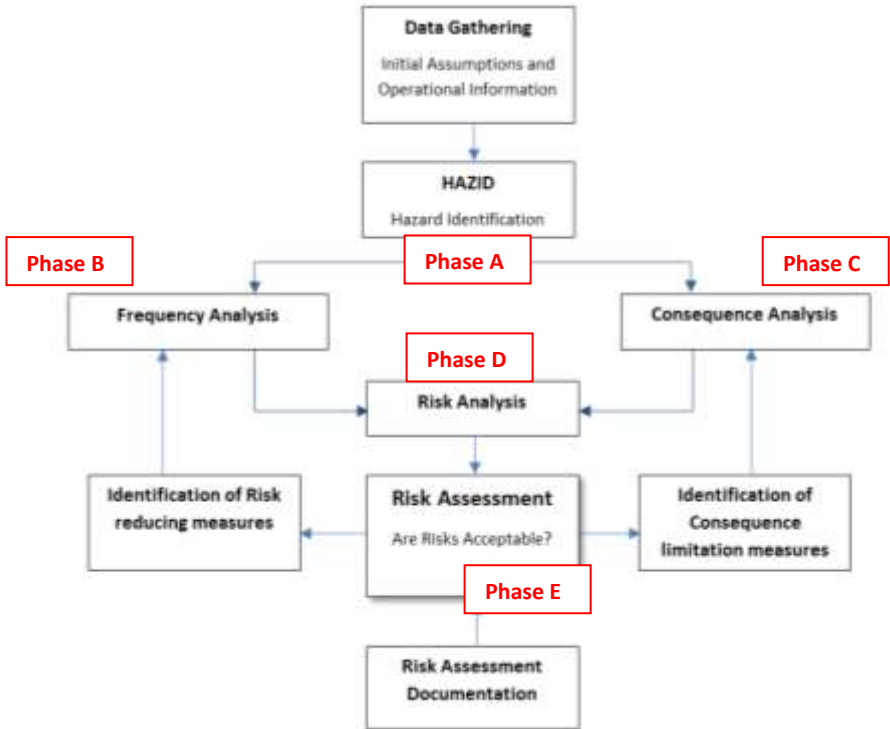
	<p>internal/external information, allowing the verification/validation of risk results</p> <ul style="list-style-type: none">• Define bandwidth for ALARP (As Low as Reasonably Possible) in log-log graph, reflecting the risk acceptance criteria developed.• Develop a power-point presentation to assist informative sessions on the implementation of the risk assessment criteria at national level.
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TASK 4	Site Specific Data Description and Analysis Study
Introductory Note	<p>Task 4 aims at the compilation of all the available and necessary information on the port area and its surroundings, and the relevant modelling assumptions. The Data & Assumptions need to be described in a separate document and will serve as input for the actual siting study.</p> <p>The present task will likely require the following documentation, when available, to be submitted to the contractor:</p> <ul style="list-style-type: none"> • Process Flow Diagrams (PFDs) • General operating philosophy (operating parameters and process conditions) • Safety concept • Material Safety Datasheet (MSDS) • Plot Plans; • Layout of the proposed LNG bunkering installation • Layout of surroundings (location specific) • Meteorological data (average ambient temperature, average humidity, average wind speed and distribution of wind direction) (location specific) • Local population both onshore and offshore if relevant (cruise ship population) <p>It is important that the intended modes for LNG bunkering are described:</p> <ul style="list-style-type: none"> • Ship-to-Ship (STS) • Truck-to-Ship (TTS) • Port-to-Ship (PTS) <p>The Process Flow Diagrams should reflect the total chain for the delivery of LNG to potential receiving vessels. The affected port areas must be identified, not only those designated for storage but also the ones where operational work is foreseen.</p>
Task technical Description	<ol style="list-style-type: none"> 1. Integration of all the site-specific information. 2. Integration of all intended process-specific information 3. Produce an LNG bunkering map, with the intended options for LNG supply to potential receiving vessels on any of the listed methods: <ul style="list-style-type: none"> • Ship-to-Ship (STS) • Truck-to-Ship (TTS) • Port-to-Ship (PTS) 4. Draw all safety limits related to other port area activities (dangerous goods, packed cargo, traffic, heliport, etc.). Use all relevant references for the definition of the safety zones. All references (international, national or port-specific guidance) must be presented and related. 5. Scenario characterization, including the identification of different LNG refuelling profiles, both in form and volume of demand/supply. 6. Provide an informative characterization of different refuelling profiles, identifying key-stakeholders, inter-relating with the above identified regulatory frame, listing the specific infrastructure needs and performing SWOT analysis for different types of LNG Bunkering: 1) Shore-to-Ship; 2) Ship (barge)-to-Ship and 3) Truck-to-Ship.
Expected Deliverables	<ol style="list-style-type: none"> 1. Produce and propose a reference initial document/report with all the site-specific conditions to be completed and validated by the contracting part. 2. Produce and propose a reference final document/report with all the site-specific conditions to be accepted by the contracting part.

TASK 5	Nautical Analysis and Collision Risk Analysis Study
Introductory Note	<p>Due to nautical conditions, not all locations in the port are suitable for LNG bunker activities without extra precautions. This is especially relevant where ship/barge-to-ship LNG bunkering is considered.</p> <p>LNG bunkering on main waterways with an intense density of passing vessels should be regarded to see if a LNG bunkering on the planned location can be permitted.</p> <p>It is important to consider that possible location for LNG bunkering infrastructure will have to take into consideration two central project drivers:</p> <ul style="list-style-type: none"> ✓ Proximity to (L)NG storage and the possible installation of a reliquefaction unit/plant. ✓ Protective location berth to avoid passing traffic within the port area (for instance, need to avoid proximity to ferry routes). <p>Recommendations following these two drivers will have to be considered.</p> <p>The main question for the nautical safety part of this study is : <u>“Where in the port are restrictions necessary on LNG activities due to nautical circumstances”</u></p> <p>For the one location with the floating storage solution, a collision risk analysis will also have to be executed. The following additional data will be provided by the relevant ENP country to the contractor in addition to the Case/Site/Country Specific Information (Appendix II):</p> <ul style="list-style-type: none"> – Nautical chart(s) of the port – Characteristics (type, size) of the LNG carriers and LNG fuelled ships that visit the location – Expected number of LNG fuelled ships visits and average presence time per call – The annual number of ships that pass the considered location – Subdivision of the passing traffic in ship types and sizes – Representative passing speeds of ships along the LNG bunkering intended location, with LNG fuelled ships/barges alongside – Representative passing distances of ships – Mitigating measures planned to be in place (escort tugs, pilots, speed restriction, other restrictions while unloading of carrier, etc.) – Any other relevant port information
Task technical Description	<ul style="list-style-type: none"> • Perform a desk study with input from above mentioned documents and develop in the scope of external safety and nautical safety, a port specific LNG bunker location suitability report, presented in a map. • Develop possible Hazard Scenarios, taking into account the specific characteristics of the nautical traffic characteristics of the port and LNG bunkering site surroundings. • For all cases where LNG floating storage units, or LNG bunker barges, are considered, perform a study of the potential preferred locations for LNG bunkering operations taking into account the necessary protective measures for avoidance of port passing traffic. • Develop risk mitigation measures and safety guidance to assist project decision-making regarding protective location for port LNG bunkering infrastructures, whether at berth, ashore, or afloat.
Expected Deliverables	<ol style="list-style-type: none"> 1. Report with the identification of all nautical related possible hazards and presentation of HAZID risk matrices for nautical related hazards. 2. Identify within an updated map of the wider port area and vicinity (within 5nm) the preferred LNG bunkering locations for: <ul style="list-style-type: none"> ✓ Ship-to-Ship (STS) ✓ Truck-to-Ship (TTS) ✓ Port-to-Ship (PTS)

TASK 6	Hazard Identification – HAZID Study
Introductory Note	<p>Hazard identification (HAZID) is the process of identifying hazards, which forms the essential first step of a risk assessment.</p> <p>During the hazard identification stage, the criteria used for the screening of the hazards will be established and possible hazards and accidents will be reviewed. For this purpose, the wider port area and intended/projected LNG bunkering facilities will be divided into several sections. Furthermore, the identified hazards will be classified into critical and non-critical hazards. It is of great importance that the hazards considered non-critical are clearly documented in order to demonstrate that the events in question could be safely disregarded.</p> <p>Based on the facts compiled in the HAZID stage, the major hazard scenarios can be identified. Usually the hazard scenarios include <u>loss-of-containment/release, fire, explosion and dispersion situations</u></p>
Task technical Description	<p>Hazard Identification (HAZID) of LNG bunkering for a range of specific (market/ technical/ climatic) conditions. Both LNG bunkering of Cargo and Passenger Ships to be considered</p> <p>Perform a Hazard Identification (HAZID), taking into account different LNG bunkering scenarios, LNG identifying and qualitatively evaluate the risks from those safety hazards considered to be the most critical events. This analysis shall be presented and summarised in a risk matrix where the most critical events will be evaluated in terms of likelihood of occurrence and consequence. This analysis, while considering safety procedures as well as training and qualification/ certification of all staff engaged in ships' operations (e.g. bunkering, maintenance, loading/unloading, etc.),</p> <p>The HAZID exercise shall involve:</p> <ol style="list-style-type: none"> 1. Technical visit to the port facilities and surrounding related areas At least a two day site visit shall be foreseen. The purpose of this visit is: <ol style="list-style-type: none"> i. Familiarization with the different locations ii. Data collection – completion of the input for the Data & Assumptions Register iii. High level hazard identification session (HAZID) with local stakeholders 2. Brainstorming expert discussion regarding initiating events, sources, hazards, element criticality, safety measures, ignition/fire/explosion risks and, amongst others, dispersion cases. <p>The HAZID shall ensure that the risks of the actual system and the risks or issues with the potential locations are identified and discussed. Both the risk inherent to the system and thus applicable for all locations and the risks specific to each location shall be assessed in this activity.</p> <p>Together with the technical site visit, this must ensure a full understanding of the location specific issues, the hazards involved and peculiarities that cannot be captured in the QRA.</p> <p>The technical team that is going to deliver the study, coordinated by the contractor, shall be composed of the following elements:</p> <ul style="list-style-type: none"> • the design engineer in charge for the respective facility • project manager (for new installations) • plant engineer in charge • maintenance engineer • foreman/technician • facilitator and minute taker (<u>one provided by the contractor</u>) <p>NOTE:</p> <p>The HAZID may have to be performed for generic installations, in the context of site-specific particulars. In practice, where no effective LNG bunkering</p>

	<p>infrastructure is in place, the HAZID exercise will take the shape of a study following all the steps described above, but for a generic LNG bunkering site. All the LNG bunkering modes shall be covered (ship-to-ship, truck-to-ship, port/pipeline-to-ship and LNG ISO-container embarkation).</p>
Expected Deliverables	<ol style="list-style-type: none"> 1. A listing of the major hazards, consequences as well as all the safeties (instrumental and operational) in place to prevent or mitigate them. 2. Location specific risks 3. Hazard Identification tables 4. Global risk matrix, following the HAZID table. 5. Recommendations

TASK 7	Quantitative Risk Assessment (QRA) Study
<p>Introductory Note</p>	<p>A quantitative risk analysis (QRA) is a formalised specialist method for calculating individual, environmental, employee and public risk levels for comparison with regulatory risk criteria.</p> <p>The risk analysis (calculation) itself consists of the following phases</p> <ul style="list-style-type: none"> A. Hazard Identification B. Frequency estimation C. Consequence calculation D. Risk analysis E. Risk Assessment <p>NOTE: All the phases are described in the present Task with each of them containing specific indications with regards to technical details. Phase “A” is somewhat related to the HAZID study (Task 6) however here the modelling of the failure, following the HAZID, is also important. It will set the initial assumptions and physical circumstances for the Consequence calculation.</p> <p>It is important to note that the QRA work is expected to be highly determined by the Risk Analysis software and modelling techniques to be used. Other aspects are also to be considered as contributing significantly to this Task, namely the demonstrated experience of the contractor in modelling specific loss-of-containment scenarios with LNG.</p> <p>The following simplified scheme identifies the necessary inter-relations between all the stages that need to be observed:</p>  <pre> graph TD DG["Data Gathering Initial Assumptions and Operational Information"] --> HAZID["HAZID Hazard Identification"] HAZID --> FA["Frequency Analysis"] HAZID --> CA["Consequence Analysis"] FA --> RA["Risk Analysis"] CA --> RA RA --> IRRM["Identification of Risk reducing measures"] RA --> ICLM["Identification of Consequence limitation measures"] IRRM --> RA_Assessment["Risk Assessment Are Risks Acceptable?"] ICLM --> RA_Assessment RA_Assessment --> RAD["Risk Assessment Documentation"] </pre> <p>Figure – Quantitative Risk Assessment</p> <p>The Risk Assessment is to be performed against the specified criteria by the contracting party. If the Risk Assessment criteria are also part of the contracted work (as defined in Task 3) this should here be used to assess the Risk Analysis results.</p>

Task technical Description	<p>A. Hazard Identification</p> <ul style="list-style-type: none"> Identify the potential accidents that could result in loss of containment and subsequent LNG release. Identification of the hazards and subsequent derivation of failure case scenarios for analysis against a standard release modelling methodology. To define the LNG release events applying to each accident release scenario, representative loss of containment scenarios shall be modelled. <p>B. Frequency estimation</p> <ul style="list-style-type: none"> Estimate the event frequency per year for credible accident scenarios based on relevant historical failure frequencies (need to assume where no data exists, based on relevant empirical formulations). Tabulate the results. Provide references for the failure data and indicate the applicability of the historical failure data to the actual items being considered. The failure frequency/probability of proposed safety systems / mitigation measures shall be tabulated. For each release scenario, a frequency of occurrence must be estimated. NOTE: The dataset used for UK studies is the hydrocarbon release database (HCRD) which has been compiled by the UK Health and Safety Executive (HSE) over a 20 year period. It is considered the most extensive dataset of its type. Generic failure frequencies derived from the HCRD can be used. <p>C. Consequence Calculation</p> <ul style="list-style-type: none"> Assess the consequences for each of the identified loss of containment scenarios. The analysis of the LNG bunkering infrastructure, within the wider port area, shall be conducted on a sectional basis, grouping the processes within the facility into a series of sections where the various release sources have similar characteristics, and hence consequences. Proposed consequence modelling techniques, methodology and software must be presented to the contracting party. Validation of software consequence modelling shall be presented against experimental results and/or real life observations. Validation for gas dispersion and pool fire modelling are important aspects to be demonstrated. The following impacts are relevant to consider in the risk study: <ul style="list-style-type: none"> ✓ gas or LNG jet ✓ cold gas cloud ✓ heat radiation in case of fire ✓ overpressure in case of explosion Reporting of consequences shall be done as required by the UK HSE in siting studies, i.e. effects of the most important scenarios will be reported for two representative weather types (F2 and D5). Where a different Dispersion results for small leaks shall be presented in the report. Small leaks typically have smaller effects than larger leaks but they occur more often. As such, it is important to understand the behaviour of an LNG cloud and consequences of ignition following a small release that can occur in daily operations (f.e. resulting from flange leaks). Therefore, dispersion graphs and effect zone visualisations will be provided for small leaks, to illustrate the extent of potential flammable clouds. <p>D. Risk Analysis</p> <p><u>Risk Calculation:</u></p> <ul style="list-style-type: none"> The risk analysis stage of work shall involve combination of the previous stages / studies, together with the relevant background data (populations, meteorological data, impact criteria, etc.) to determine the risks to people both on and off site. Specific risk analysis software shall be proposed, providing evidence of experience, adequacy and validation from experimental work and/or similar previous projects. Besides the dispersion and fire/blast modelling, several other sets of inputs
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	<p>are to be considered by the suggested software such as ignition probabilities, population data and meteorological data (weather condition, wind direction, etc.).</p> <ul style="list-style-type: none"> • Risk calculations shall consider each release in turn and apply the above data to calculate risks to people outdoors. NOTE: Modelling of flammable impacts can be quite complex, with many possible final outcomes from a single release and ignition taking place at several locations. The calculations shall the required risk measures, calculating both individual risk at grid points and the societal group risk of each incident outcome. • All risks shall be summed to allow the presentation of the risk levels associated with the proposed LNG bunkering facilities/operations in an adequate way to assess a risk level (Location specific Individual risk contours, Societal risk (FN) curves, ...). Typically this shall be performed according to the risk acceptance criteria accepted/contracted. NOTE: If the contractor has taken also Task 3, the calculation and presentation of results need to be put together in such a way that allows the assessment to me made against the proposed/developed (and accepted) criteria. <p><u>Risk Presentation:</u> The risk analysis stage of work shall involve combination of the previous stages / studies.</p>
Expected Deliverables	<ul style="list-style-type: none"> • Complete Risk Analysis report with the detailed findings, assumptions and calculations for each identified phase (A to E). • Risk Contours/Iso-curves for <ul style="list-style-type: none"> a) Location specific Individual risk contours (LSIR) b) Societal risk curves (FN curves) • Risk Assessment Report • Recommendations • Presentation of results to local authorities, identifying all stakeholders involved within possible Recommendation action items.

TASK 8	Ship Collision Risk Study
Introductory Note	<p>A Ship Collision Risk study is a possible need where LNG bunkering barges, or floating storage units, are intended for the specific LNG bunkering operations.</p> <p>The objective of the ship collision study is to determine the risk of a Loss of Containment (spill) of one of the cargo tanks of the power barge and/or unloading LNG carrier, caused by a ship collision. The same standard QRA approach is followed to calculate the risk; only the estimation of the frequency of a release of LNG due to a ship collision is assessed differently.</p> <p>The estimation of a spill frequency is typically based on special modelling by dedicated software, integrating both estimation of spill frequencies and damages.</p> <p>Task 8 differs from Task 5 by providing a quantitative estimation of the collision risk, where the later was aimed at the definition of LNG bunkering location, based on the qualitative analysis of vessel traffic within the port area.</p>
Task technical Description	<ul style="list-style-type: none"> Assess the collision risk involving LNG bunkering barge (LNG-bb) and/or LNG storage floating unit (LNG-FSU), with the vessel traffic passing by within the port area. Different vessel types must be considered (at least 5 different types of vessels, depending on the port specific operational profile). Vessel types can be taken from information provided in Task 5. Dedicated software for ship collision risk estimation shall be used where an Impact Energy Modelling approach shall be applied. The different ship types considered shall be grouped according to specific criteria (bow shape, length, displacement, or other) in order to cover an adequate and representative set of vessels characteristic of the given port activity. Impact energy shall be estimated for each group and then summarized to a weighted "average impact energy" for the vessel class. The methodology applied shall assume different failure modes and, as a minimum, the following shall be considered: 1) Steering Gear Failure and 2) Blackout. Estimated frequencies for these failure modes shall be based on relevant international failure statistics. The probability for one of the considered failure modes leading to an actual impact with the LNG-bb, or LNG-FSU shall be assumed to be function of the geometric probability of hitting these craft and the time available to implement mitigating actions: <ul style="list-style-type: none"> ✓ <u>Geometric probability of hitting a passing carrier</u>: The geometric probabilities are a function of the length of the potentially struck LNG-bb or FSU, the distance to passing shipping lanes and physical obstacles such as breakwaters or shallows. ✓ <u>Time to implement mitigating actions</u>: It shall be assumed that the probability of having time to implement mitigating action has a "Weibull" distribution. Different impact speeds and impact angles shall be studied for all the vessel types considered. For each of the selected striking ship sizes the resulting damage to the LNG-bb or LNG-FSU shall be determined by structural analysis for a series of impact cases where the apparent striking angles and the ship speeds have been varied. The damage is to be expressed as "indentation" levels: how many meters does the bow of the colliding ship penetrate the collided ship. For each combination of ship size, bow shape and impact angle a function shall be determined relating the indentation to the impact energy. As such for every scenario the expected indentation can be calculated. Indentation sizes will then correlate to different "Loss of Containment" scenarios. Consequence calculations are to be carried out for different expected hole/indentation sizes following collision. Calculate Risk following a standard QRA approach (as the one described in

	Task 6)
Expected Deliverables	<ol style="list-style-type: none"> 1. Ship Collision risk analysis report 2. Recommendations for Collision Risk reduction

Appendix - II
Case/Site/Country Specific Information

Case/Site/Country Specific Information			
<p>The present document identifies ENP partner country and port(s) particulars in relation to the tender N° EMSA/OP/27/2015 for a study on the development of LNG bunkering facilities for the LNG fuelled ships</p> <ul style="list-style-type: none"> The information provided in the present document is intended to draw the general context for the contracted study. 			
ENP Partner Country			
Port (1)			
Geo-Climate Characteristics of the Port (2)	Coordinates		
	Climate		
	Surrounding Geomorphology		
	Surrounding Geography/ Populated Centres		
Trade Characteristics of the Port (3)	Containers (TEU)		
	General cargo		
	Cruise (Nr.		
	Ferries (passengers and		
	Other		
Intermodal characteristics of the Port (4)	Road		
	Rail		
	Sea		
Intended LNG Bunkering Operations (5)	Expected LNG bunkering volumes (m ³)		
	LNG bunkering modes	Ship to ship	
		Barge-to-Ship	
		Truck-to-ship	
		Port/Pipeline-to-ship	
		other	
	Storage Areas (nr. and capacity)		
	Refrigeration plant		
	LNG plant already in the port area?		
Bunker barge characteristics			

NOTES/Instructions:

- (1). Indicate port(s) for which the study is intended.
- (2). Characterize the climate and terrain characteristics of the port.
- (3). To define the operational profile of the specific port(s) activities.
- (4). Comment on the available multi-modal links converging in the port
- (5). Characterize the LNG operations intended for the specified port and, if operations and infrastructure already developed, to provide indication of the existing LNG plant characteristics in the port, both in capacity and operational profile.

Appendix - III
Objectives of the Tasks

The table below recapitulates the objectives of each of the 8 Tasks and highlights the main considerations to be taken into account for each relevant Task. The table aims to assist in the choice of the relevant Task(s) to be performed for a given port/port area of the ENP partner country.

Task	Description	Objectives	When should it be considered
1	Gap Analysis Study of the Regulatory Framework and Evaluation of Applicable Standards to LNG as fuel for shipping	<ul style="list-style-type: none"> – Evaluate different needs regarding development and deployment of LNG as fuel for shipping: <ul style="list-style-type: none"> ✓ Regulations ✓ Standards ✓ Regulatory harmonization ✓ Administrative barriers ✓ Guidance and Procedures – Gap analysis to identify specific recommendations. 	<ul style="list-style-type: none"> – At the very first stage of development of LNG as fuel for shipping, typically where there are no infrastructures yet in place. – Where regulations and standards need to be addressed prior to development of infrastructure. – For those countries which have had no experience with LNG as fuel for shipping and small scale LNG bunkering installations this is the advised tasks.
2	Feasibility Study	<ul style="list-style-type: none"> – Estimate the demand of LNG for a given port, based on-, <ul style="list-style-type: none"> ✓ Shipping forecasts ✓ Energy market forecast – Logistic model to provide LNG as bunker fuel 	<ul style="list-style-type: none"> – At the very first stage of development of LNG as fuel for shipping, typically where there are no infrastructures yet in place – To understand whether LNG as bunker fuel is a feasible business case. – To estimate LNG volume demands.
3	Definition of Risk Acceptance Criteria Study	<ul style="list-style-type: none"> – Develop Risk Acceptance criteria to assess risk analysis studies. – To provide reference values for statutory reference – To define “Acceptable/Tolerable Risk”. 	<ul style="list-style-type: none"> – When no national risk acceptance criteria is defined and incorporated within national legislative frame. – International criteria already exist and can be used in contracts. National framework should however, at least, be addressed to check for consistency.
4	Site Specific Data Description and Analysis Study	<ul style="list-style-type: none"> – To develop site specific documentation with all relevant information for Hazard Identification and risk studies. 	<ul style="list-style-type: none"> – For every risk study it is important to define clearly the assumptions. <ul style="list-style-type: none"> – Task 3 is relevant where the amount of information is of such volume that the involvement of the contractor is necessary. Otherwise the

			information can also be put together by the ENP partner country, filling in the table in Appendix II "Case/Site/Country Specific Information".
5	Nautical Analysis and Collision Risk Analysis Study	<ul style="list-style-type: none"> – Study performed to address the risks posed to LNG bunkering operations by passing vessel traffic within the wider port area. 	<ul style="list-style-type: none"> – When the location for LNG bunkering operations is deemed to be exposed to normal port seaborne traffic. – When operation of LNG bunker barges or floating storage units is envisaged.
6	Hazard Identification – HAZID Study	<ul style="list-style-type: none"> – Identification of possible Hazards related to LNG bunkering, transfer and transport operations. – To take an up-to-date picture of the present hazards and their possible effects – To analyse adequacy of existing safety measures and develop these to meet tolerable residual risk. 	<ul style="list-style-type: none"> – Can be considered in all stages of the project, either before or after installation and development of infrastructures/ operational concept. – <u>When there is the need to understand the risks</u> and to develop adequate safety measures to mitigate them. – <u>Where hazards and their escalation need to be understood on a qualitative approach.</u>
7	Quantitative Risk Assessment (QRA) Study	<ul style="list-style-type: none"> – To quantify the Risk, following an accepted risk analysis methodology. – To assess the calculated Risk against reference Risk Assessment criteria – Prioritization of risks and development of safety measures for risk mitigation. 	<ul style="list-style-type: none"> – <u>When there is the need to quantify the risks</u> and to implement cost-effective adequate safety measures to mitigate them to ALARP (As Low AS Reasonably Possible) levels. – <u>Where hazards and their escalation need to be understood on a quantitative approach.</u> To be assess – Typically where a statutory requirement is in place to demonstrate Risk levels acceptance.
8	Ship Collision Risk Study	<ul style="list-style-type: none"> – To identify and quantify the risk of ship collision events involving LNG bunker barge or other LNG floating storage unit. – To define safety measures for risk mitigation, including area definition for LNG bunkering operations 	<ul style="list-style-type: none"> – Relevant when LNG bunker barge or LNG FSU is envisaged and/or intense traffic in the vicinity of the LNG bunker operation area. – <u>When there is the need to quantify the risks</u> and to implement cost-effective adequate safety to mitigate the risk of LNG incident resulting from <u>ship collision</u> within the port area and its vicinity.