LNG Masterplan for Rhine-Main-Danube

Sub-activity 4.1 Provisions for harmonised European regulations

D 4.1.1. Report on regulatory work (CCNR and ADN)
Integral Coordination Group for Regulatory Adjustments LNG
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Integral Coordination Group for Regulatory Adjustments LNG

Version: 1.0
Date: 01.09.2015
Status: Final / Public

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Introductory note

The Report on regulatory work and legal support for the Integral Coordination Group for Regulatory Adjustments LNG was subcontracted to Mr. A.C. (Claire) Groenewegen after a tendering procedure. The final deliverable was approved by involved beneficiaries and contractor(s) in September 2015.
Final Report
Integral Coordination Group for Regulatory Adjustments LNG

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

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1 September 2015
Project Name: LNG Masterplan

Report Title: Final Report Integral Coordination Group for Regulatory Adjustments LNG

Date of issue: 1 September 2015

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Final Report
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Introduction
In order to facilitate the development of the use of Liquefied Natural Gas (LNG) as marine fuel for the inland waterways, the LNG Masterplan for Rhine-Main-Danube was created. The Masterplan consists of different work packages and activities. Under sub-activity 2.4 the activities of the Integral Coordination Group for Regulatory Adjustments LNG (ICGR) took place. The objective of the activities of the ICGR was to deliver input for relevant regulatory bodies such as the European Commission (EC), the Central Commission for Navigation on the Rhine (CCNR), the United Nations Economic Commission for Europe (UN/ECE) and national authorities addressing the technical, operational and safety aspects related to the transportation of LNG, the use of LNG as fuel, as well as the storage and handling operations with LNG. This document describes the different activities that took place within the framework of the ICGR.

Within the framework of the LNG Masterplan, the following studies\(^1\) have been carried out that covered several safety related aspects of LNG operations in the inland waterway transport (IWT) sector:

- LNG bunkering - regulatory framework
- LNG bunker procedures
- LNG loading and unloading - regulatory framework
- Standardized installations for loading and unloading LNG
- Standardized scenarios and procedures for loading and unloading LNG
- Case study Port of Switzerland
- Operational safety and nautical conditions
- A risk comparison of different bunker scenarios
- Comparison of risk assessment tools
- Emergency and Incident Response study
- Guidelines for Port regulations and best practice LNG bunkering Gap study on regulations for LNG activities in a seaport
- LNG bunkering map: local conditions and spatial planning (not public)
- Incompatibility of inter-modal LNG activities
- Impact on terminals
- Impact on passing vessels

The goal of the ICGR was to feed the findings of these studies into the several expert groups that were charged with the task to adjust the relevant regulations of CCNR. The process of

\(^1\) See: [http://www.lngmasterplan.eu/download/deliverables](http://www.lngmasterplan.eu/download/deliverables)
amending the CCNR regulations started well before the foundation of the ICGR and to put the work of the ICGR into perspective, a short overview of the work of each of the working groups is drafted. In this Report the following topics will be addressed:

Chapter 1: Proposal for amendment of Technical Regulations
Description of the activities, which took place in the framework of the amendment of the technical requirements for inland waterway vessels operating on LNG on the Rhine corridor (Rhine Vessel Inspection Regulations)

Chapter 2: Realisation of amendment of Rhine Police Regulations
Description of the activities, which took place in the framework of the amendment of the existing police regulations for inland waterway vessels operating on LNG, including special provisions for LNG bunkering on the Rhine corridor (Rhine Police Regulations)

Chapter 3: Guidelines and Recommendations for Port Regulations
An overview of the guidelines and recommendations developed for Port Regulations to ensure safe LNG operations within ports.

Chapter 4: Other ICGR-activities
Next to the specific contributions of the ICGR to meetings of the respective working/expert groups, the ICGR also met during dedicated meetings in April 2014 and October 2014 and will have a closing meeting in October 2015. The aim and conclusions of these meetings are summarized in the final chapter (chapter 4) of this document. Chapter 4 concludes with the handover of the results of the ICGR.

Now the ICGR is completing its activities, the enormous amount of work that has been put in this project by all the participants is remarkable. A lot of know-how on LNG has been shared, and there have been several fruitful international meetings. All the activities have led to concrete text proposals for the amendment of international Rhine regulations. The followed timeline has enabled the use of LNG as fuel for vessels in the inland waterway transport sector, as these amendments are available now, at the end of the LNG Masterplan. The ICGR deliver the proposals for amendment to facilitate the creation of a harmonized European regulatory framework for LNG as fuel and cargo in inland navigation. The ICGR likes to promote the introduction of LNG as a fuel and cargo for inland shipping and a regulatory framework will give a sufficiently secure basis for investment decisions of the IWT sector. The adoption of all regulatory work should become feasible in the year 2015/2016.

We look back on a successful and fruitful project and it is with great satisfaction that we can complete the project.
Chapter 1. Proposal for amendment of Technical Regulations

a. Introduction

Until now, LNG as fuel for inland vessels requires special authorization. The special authorization can be given for a limited period of time by the CCNR and in case of transport of dangerous goods, additionally by the ADN Safety Committee. Authorizations are granted based on proof of sufficient safety. The request for derogation of the existing rules must be filed by a national authority and, in the case of a safety related issue as LNG as a fuel, requires a safety study (HAZID) elaborated by a classification society, a list of the deviations from the IMO\(^2\) International Code for Gas as Ship Fuel (IGF-Code)), procedures for LNG bunkering and several other documents.

In 2013 an LNG Expert Group on technical requirements was installed, as a participant of the Masterplan, to develop technical requirements for inland waterway vessels operating on LNG. The work carried out in the Expert Group facilitated the inclusion of a dedicated LNG chapter in the Rhine Vessel Inspection Regulations (RVIR), enabling the transition from exemption procedures to standard procedures for the authorization of LNG as fuel for the propulsion installation. Three major classification societies namely DNV - GL\(^3\), Lloyds Register and Bureau Veritas contributed with their experts to the elaboration of this LNG chapter and supported the experts from the national authorities. DNV-GL scrutinized the then existing draft IGC Code and from it drafted a first version with relevant text for Inland Navigation. The ICGR then continued to support the work in an ad hoc working group for the Joint Working Group, resulting in the public discussion of the final draft in the hearing of February 2015 in Strasbourg. The work has been executed in coordination with the CCNR, guided and chaired by the Delegation of the Netherlands to the CCNR.

\(^2\) International Maritime Organisation

\(^3\) Det Norske Veritas (DNV)- Germanischer Lloyd (GL).
These technical specifications in the RVIR make clear to everyone which requirements are applicable for the design and construction of the LNG systems for propulsion of inland waterway vessels. This regulatory framework also provides a reference framework to certification institutes.

b. Results/products
- Proposal for amendment of the Rhine Vessel Inspection Regulations (RVIR)
- Provision of public access to the database for the application of the technical provisions

c. The proposed amendments of the Rhine Vessel Inspection Regulations
The proposal is divided into three parts:

- A new Chapter 8b, Special provisions applicable to vessels equipped with propulsion or auxiliary systems operating on fuels with a flashpoint equal to or lower than 55 °C. The key provision of Chapter 8b is that propulsion and auxiliary systems be built and installed under the supervision of a competent authority. The competent authority may employ a technical service. The technical service shall comply with the European standard on general criteria for the operation of various types of bodies performing inspection (this still is subject of discussion, which is expected to be settled before the end of this year) (art. 8b.01)
  - Testing (art. 8b.02)
  - Safety organisation (art. 8b.03)
  - Environmental requirements (art. 8b.04)
  - Marking (art. 8b.05)
  - Operating spaces and system components shall be appropriately labelled in order to indicate clearly for which fuels they are used (art. 8b.06)
  - Independent propulsion: Appropriate measures shall ensure that, in the event of an automatic shutdown of the propulsion system or parts of the propulsion system, the vessel can continue to make steerageway under its own power

- A new Annex (Annex T), listing specific technical regulations for such vessels. The provisions laid down in Annex T are all based on the IGF Code (but the IGF Code was not taken up in its entirety). Annex T chooses an approach based on goal based regulations rather than detailed technical prescriptions like the IGF Code. Since vessels must be built under the supervision of a technical service - most likely a classification society - it is expected that these technical services will apply their own rules additional to the provisions of Chapter 8b and Annex T and therefore an equal level of safety will be guaranteed. This approach means to facilitate new innovations since it will not be necessary to amend the regulations with every new technical development.

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4 EN ISO/IEC 17020: 2012
A proposal for an amendment to administrative instruction 26. According to this instruction, the expert may be either a recognised classification society or an inspection body or an expert approved as such by the competent authority (this depends on the outcome of the discussion about article 8b.01)

d. Process of realisation

This table contains the process of realisation of the proposed amendments of the RVIR.

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kick off project. Determining DoW and timeframe</td>
<td>15 February 2013</td>
<td></td>
</tr>
<tr>
<td>CCNR/EC Ad hoc Expert Group LNG. First discussion on work process, research, workload, deliverables and timeframe</td>
<td>25 March 2013</td>
<td></td>
</tr>
<tr>
<td>Desk research on the new IGF Code and comparison with various class rules and technical provisions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First proposal DNV-GL in Expert Group of Regulations</td>
<td>April 2013</td>
<td>Den Haag</td>
</tr>
<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>May 2013</td>
<td>Haren</td>
</tr>
<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>June 2013</td>
<td>Hamburg</td>
</tr>
<tr>
<td>Report state of affairs Dutch Delegation in RV/G of Findings Expert Group</td>
<td>June 2013</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Presentation RV/G and redraft on basis of comments</td>
<td>Sept 2013</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>October 2013</td>
<td>Antwerpen</td>
</tr>
<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>November 2013</td>
<td>Rotterdam</td>
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<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>January 2014</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Presentations of findings in JWG: First discussion.</td>
<td>February 2014</td>
<td>Strasbourg</td>
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<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>July 2014</td>
<td>Schiphol, A'dam</td>
</tr>
<tr>
<td>Discussion and redraft on basis of comments by JWG</td>
<td>June/Sept/Dec 2014</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>January 2015</td>
<td>Schiphol, A'dam</td>
</tr>
<tr>
<td>Hearing about the proposed regulations. Stakeholders can agree with the proposed regulations.</td>
<td>February 2015</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Presentation in JWG of the impact assessment Technical Regulation</td>
<td>February 2015</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Meeting of Expert Group: discussion and redraft</td>
<td>March 2015</td>
<td>Antwerp</td>
</tr>
<tr>
<td>Final Draft in JWG</td>
<td>June 2015</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Decision by plenary CCNR</td>
<td>December 2015</td>
<td>Strasbourg</td>
</tr>
<tr>
<td>Entry into force (as temporary regulations)</td>
<td>December 2016</td>
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</tbody>
</table>

The hearing about the proposal for amendment of the requirements for vessels that use LNG as a fuel, that took place in February 2015, has shown that stakeholders are positive about this proposal. Some suggestions were done for the improvement of the proposal, which suggestions were adopted. The amendments of the RVIR are scheduled to be adopted in the CCNR in December 2016.

e. Provision of public access to the database for the application of the technical provisions

Without an input of the ICGR, but worth to mention, next to the activities as described above, also the public access to the database for the application of the technical provisions...
has been realised. An initial operational version of the database was unveiled in 2008 within the CCNR. Its primary objective was to incorporate exchanges of information on the application of the revised chapter 15 of the RVIR. Subsequent work by the Joint Working Group and the Rhine Regulations Working Group enabled information concerning the various chapters of the RVIR to be fed into the database. More and more it became clear how useful the database was.

In practice this database provides useful background information about the technical provisions. It contributes to ensure the uniform and simultaneous application of the technical provisions. The status of the database is identical to that of the minutes of meetings or working documents. It is a commentary on the technical provisions, without legal effect.

At its meeting held in December 2014, the Joint Working Group highlighted how very useful the database was and stated their wish for it to assume a fully European dimension. and mandated the Secretariat to refer this issue to the Inspection Regulations Committee. At its meeting held on 22 April 2015, the Inspection Regulations Committee decided to open the database to public access as regards the application of the technical requirements and for this reason do away with access codes.

Following the adoption of the ES-TRIN Standard and the modifications to the regulatory frameworks, the competent bodies of the CCNR and of the European Union are expected to decide to give the database a European dimension and consequently to add the English language in the database and to update the article references in the light of the new structure of the ES-TRIN Standard.

Chapter 2. Realisation of amendment of Rhine Police Regulations

a. Introduction

The introduction of LNG into inland navigation required an analysis of adaptation needs of existing police regulations. The Police Regulation Working Group of the CCNR suggested in its meeting on 7 February 2013 that the experts of the LNG Masterplan should provide support with regard to the subjects of mooring, locking and bunkering of LNG vessels as well as with regard to the need for risk based safety requirements. The provision of input derived from safety-related technical studies added special value to this analysis. The goal of the work of the experts was to support the authorities to identify and implement those measures which ensure the high safety standards without creating unnecessary administrative burden to the vessel operators and the people working in the sector.

9 http://rvfaq.ccr-zkr.org/10-de.html
10 European Standard - Technical Requirements for Inland Navigation
The work that took place under this sub-activity addressed in particular the Rhine Police Regulations (RPR) but usually feeds into regulations of other river commissions such as Danube Commission, Moselle Commission, Sava Commission, (etc.) as well as into national navigation police regulations, as well as the UNECE/CEVNI\textsuperscript{11}.

b. Products
- Realisation of the amendment of the Rhine police regulations
- Realisation of new LNG-bunkering regulations

c. The proposed amendments of the Rhine Police Regulations
The main proposed requirements for vessels that use LNG as a fuel are:
- The documents that shall be available on board a vessel (article 1.10).
- Vessels shall bear the LNG identification mark, which shall be so placed as to be clearly visible on boarding the vessel (article 2.06).
- Requirements for the passage through locks (article 6.28).
- Berthing rules (article 7.08).
- General obligation to exercise vigilance during bunkering (article 15.07).
The main requirements of the general obligations are: The LNG bunkering may take place exclusively at designated locations such use by the competent authorities:
- the designated locations that have been approved for bunkering;
- the bunkerzone (20 meter from the manifold);
- checks to be made before, during and after the bunker operations;
- the checklist that must be followed and completed before, during and after the bunker operations.

d. Process of realisation
This timetable contains the process of realisation of the proposed amendments of the RPR:

<table>
<thead>
<tr>
<th>Event</th>
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<tbody>
<tr>
<td>Presentation Risk-Assessment RP/G\textsuperscript{12}</td>
</tr>
<tr>
<td>Discussion RP/G and decision that the LNG-experts should provide support with regard to developing requirements</td>
</tr>
<tr>
<td>Discussion in RP/G</td>
</tr>
<tr>
<td>First text Proposal RP/G and discussion</td>
</tr>
<tr>
<td>Meeting of Ad hoc LNG-Expertgroup. Discussion on research, regulations, technical details, and the bunkerchecklist</td>
</tr>
<tr>
<td>Text Proposal and bunkerchecklist of the LNG-Expert Group finalized</td>
</tr>
<tr>
<td>Hearing about the proposed regulations. Stakeholders can agree with the proposed regulations.</td>
</tr>
</tbody>
</table>

\textsuperscript{12} RP/G: Police Regulations Working Group (CCNR)
The hearing about the proposal for amendment of the requirements for vessels that use LNG as a fuel, that took place in February 2015, has shown that the IWT sector is positive about this proposal. Some provisions were discussed but there was no need to amend the draft based on comments during the hearing. After a last redrafting in RP/G in February 2015 and in RP in April 2015, the final text of the proposal has been presented in the plenary session of the CCNR on June 3rd and were then adopted.

Chapter 3. Guidelines and Recommendations for Port Regulations

Operating inland vessels with LNG and transporting LNG on inland vessels generate the need to extend existing regulations for seaports and inland ports regarding vessel operations and vessel bunkering in order to ensure safe port operation. The experts of the LNG Masterplan, in particular those from participating ports together with stakeholders from the barging companies, technology providers and administrations, have elaborated relevant guidelines and recommendations which are disseminated into the network of inland ports and barging companies with the help of the Advisory Group of the LNG Masterplan. The guidelines and recommendations also include concrete checklists to be used by the involved/authorised personnel, guidelines for accreditation of LNG bunker companies, guidelines for spatial planning, requirements for LNG terminals as well as guidelines for vessels passing bunker stations and vessels under bunkering.

The guidelines and recommendations are described in Safety Study LNG Masterplan, SuAc 2.4A, and are divided into 3 parts. The subject “external safety” is described in Safety Study LNG Masterplan, SuAc 4.1. The main points are:

a. Operational bunker procedures
The main findings and recommendations are:

- It is recommended that ports require that operational procedures are developed by the bunker company as part of the permitting and/or accreditation process for the specific bunker operation. Operation-specific LNG bunkering procedures for truck-to-ship operations have been developed for bunkering of LNG fuelled ships in cooperation with the inland shipping companies, charterers, LNG tank truck operators, class and LNG owners
- Harmonisation is important to make sure that bunker operations are standardised as much as possible.

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13 RP: Police Regulations Committee (CCNR)
14 SuAc 2.4A: Operational, Safety and Nautical Conditions, DNV-GL, Rhine Port Group, page 43-45
15 Guidelines for Port regulations and best practice LNG bunkering, DNV-GL, page 15
- In order to facilitate harmonisation of LNG bunkering operations in the Rhine Corridor, it is recommended that a set of harmonised (mandatory) checklists is established.
- It is recommended that port authorities publish their own LNG bunkering operating requirements in their port bye-laws which should reflect the local conditions, operations and procedures within the port area.
- It is recommended to align the authority requirements as much as possible, by implementing the same mandatory checklists for inland vessels.

b. Nautical aspects of LNG bunkering
The following general nautical aspects are identified:
- Sailing STS (LNG bunker) operations on the Rhine Corridor are not foreseen on the short term.
- The LNG bunker location should ideally not be located near high vessel traffic intensity levels.
For the establishment of safe passing and berthing distances during LNG bunkering activities the following main aspects are relevant:
- It is undesirable to moor any vessels alongside or in the direct vicinity of a vessel being bunkered.
- A safety zone, based on a location-specific risk assessment, should be established which should reduce the likelihood of ignition and protect personnel on board vessels in the vicinity of the LNG bunker activity.
- It should be evaluated during a HAZID session, whether it is required to establish a security zone for the considered bunker activity that aims at reducing the risk of a collision during bunkering.

c. Competence and training requirements for personnel
With regards to the crews of LNG-fuelled inland vessels, the recently adopted update of CCNR RPN now includes a new Chapter 4bis on crew expertise requirements. The Chapter includes requirements stipulating that the skipper and crew members involved in the bunkering procedure shall be subject to an obligation of expertise, and laying down the content of training courses and examinations.

It is recommended that also other types of personnel involved in LNG bunkering operations should be adequately trained to guarantee safe operations, in addition to the existing training programs and competence requirements under the applicable regulations and legislation. In addition to the theoretical training, it is recommended that practical training for a specific bunkering activity and location is part of the training program. Suggestions for training topics which should be covered in this practical part of the training are formulated in
the Safety Study 2.4A. It is also recommended that re-training - preferably coordinated internationally - should be undertaken at regular intervals.

d. External safety
- Each country has adopted different methodological approaches in their legislation to determine and assess external safety (distances) in land use planning due to their own implementation of the Seveso Directive. Harmonisation of the methodological approach for LNG installations covered by the Seveso Directive seems therefore not feasible.

- For non-Seveso LNG establishments and activities, however, harmonization could be achieved easier because no specific approaches or guidance has been adopted in national legislation or port regulations. In addition, for non-Seveso LNG bunkering activities inside port limits, approval would be required from the port authority. For the LNG activities (e.g. Ship-to-ship bunkering) that are not governed by other regulators than the port authorities, harmonization can be achieved in port regulations.

- A comparison of the external safety distance for an example scenario (Truck-to-ship bunkering operation) revealed that similar external safety distances would be applicable for the Netherlands, Belgium (Flanders) and Germany. The fact that the safety distances are roughly the same is probably more of a coincidence than due to the similarities in the approach and criteria as there are some fundamental differences identified.

Chapter 4. Other ICGR-activities

a. ICGR-meetings
Under the LNG Masterplan the Coordination Group on Regulatory adjustments (ICGR) was set up to guarantee a smooth uptake of the deliverables of the regulatory activities. In 2014 there have been 2 meetings of the ICGR:

- Meeting April 2014 (Strasbourg)
Kick-off meeting. The aim of this meeting was to introduce the LNG Masterplan and the goal of the ICGR and to get to know the participants of the ICGR.

- Meeting October 2014 (Amsterdam Schiphol)
During this meeting the main topic was the examination of the LNG “truck to ship” bunkering checklist. Given that LNG bunkering is essentially carried out by trucks within the scope of the RPR, this checklist was to be taken into consideration initially. The main objectives were to ensure alignment and compatibility of the checklist and the guidelines with the inland navigation context, and more specifically with the draft police regulation and technical requirements prepared for Rhine navigation. The expert group submitted diverse

16 Chapter 6 of the Safety Study LNG Masterplan, SuAc 2.4A, Operational, Safety and Nautical Conditions, Rhine Port Group and also see the result of Masterplans SuAc 4.2
17 European Commission Environment, Chemical Accidents (Seveso I,II and III) – Prevention Preparedness and Response, accessed on 2014-09-14
proposals and based on the conclusions of the IGCR meeting, the CCNR secretariat could present a new proposal for the LNG truck to ship bunkering list.

- **Planned meeting October 2015 (Strasbourg)**
This will be the last meeting of the ICGR, during the Masterplan Round table meeting. On the agenda is the handover of the results and recommendations from the safety studies to the regulatory authorities.

**b. Handover of the results**
Once it has completed a variety of work in this field, the ICGR will transfer the results and recommendations of the LNG-project to the different involved authorities, such as: local authorities, national authorities, CCNR and UN-ECE. In the recently published Safety Study LNG Masterplan, SuAc 4.1\(^\text{18}\), all the observations, suggestions and findings of the activities carried out in the context of the LNG Masterplan are integrated into a harmonized set of guidelines for Port regulations and best practice LNG bunkering. The work is structured in findings and recommendations, according to 3 levels of detail:

- **Legal framework**
The first level can be characterized as being law specific/related. These are findings that are centred around the questions whether or not foreseen LNG as Fuel activities are legally defined and/or need to be legally defined. The gaps in the regulatory framework are identified and it is defined what regulations need to be developed to enable bunkering and (un)loading of LNG for inland navigation. It is divided into European regulations, national regulations and port regulations.

- **Regulatory requirements**
The second level consist of all findings related to regulatory requirements. This level contains more aspect or industry specific requirements, for instance spatial planning requirements, policy requirements, etc. In many cases these are still legally binding requirements.

To promote development of LNG as fuel on IWT, ideally, a clear and harmonized regulatory framework should exist. However, stakeholders are faced with a diverse set of regulations. Different regulatory regimes exist for the water side (e.g. the vessels) and the shore side (e.g. bunker stations). Regulations for land based LNG installations are governed by local permit procedures and the local interpretation of environmental rules, such as the EU Seveso directive, differ per country. Each country, for example, has adopted different methodological approaches in their legislation to determine and assess external safety (distances) for land use planning (LUP).
In addition to European and national regulation, port regulations are in place to assure efficiency, safety, security and to protect the environment within the port areas. The ports of Antwerp and Rotterdam have drafted specific regulatory requirements to make LNG bunkering possible in their harbours.

\(^\text{18}\) Guidelines for Port regulations and best practice LNG bunkering by DNV-GL (2015-07-14), summery on page 38-41
The findings and recommendations are subdivided in the following aspects:
- permitting and accreditation
- risk assessment in relation to land use planning
- requirements for vessels passing bunker stations and vessels under bunkering
  - Operational requirements

The third level consists of findings that are more related to the LNG as Fuel operations directly, such as operating procedures and checklists, competence requirements and technical requirements. The recommendations are divided into the following aspects:
- operational procedures and checklists
- zoning
- competence.