Eindrapport

1. Gegevens project

Projectnummer: TKIG01037
Titel: Standards, specifications and input for new regulations for Small-scale LNG applications: *LNG refuelling stations and LNG bunkering*
Penvoerder: Stichting Nederlands Normalisatie-instituut
Projectperiode: 22 Oktober 2012 – 31 December 2014

2. Inhoudelijk eindrapport

2.1 Samenvatting

Om de marktintroductie van kleinschalige lng te garanderen, moet een aantal (juridische) obstakels worden overwonnen. Doel van dit project was de ontwikkeling van de eerste generatie nationale en internationale ISO / CEN-normen en specificaties voor LNG-tankstations voor zeeschepen en voor LNG-bunkering in de binnenvaart op basis van Nederlandse ervaringen. Het achterliggende doel is om onze concurrentiepositie te verstevigen en de uitrol van nieuwe innovaties op het gebied van LNG te versnellen. Het project draagt bij aan de marktintroductie van lng als een milieuvriendelijke brandstof voor auto's, schepen en industriële toepassingen.

Een aantal zaken moest worden verbeterd om de marktintroductie van kleinschalige toepassingen van LNG te kunnen versnellen. Er ontbreken bijvoorbeeld gevalideerde best practices en transparante geharmoniseerde best practices. Dat zorgt ervoor dat er op dit moment geen consistent kader van normen en voorschriften bestaat. Deze geharmoniseerde procedures moeten met alle stakeholders die te maken hebben met de keten van kleinschalige lng worden ontwikkeld.

Doelstelling van dit project was het (versneld) ontwikkelen van nationale en internationale ISO / CEN-normen en specificaties voor LNG-tankstations voor vrachtverkeer en LNG-bunkering in de binnenvaart. Taak van de stakeholders was om normen en richtlijnen te ontwikkelen die op dit moment niet bestaan, maar die wel dringend nodig zijn voor een veilige introductie en verdere ontwikkeling van de kleinschalige lng supply chain-infrastructuur. Het project bouwde voort op de aanbevelingen van de LESAS WP III gap-analyse voor de regelgeving, codes en normen kader voor LNG kleinschalige toepassingen.

Het project bestond uit vijf taken/werkpakket:
Werkpakket 1: Het opzetten van een nationaal LNG-platform voor normen en regelgeving;
Werkpakket 2: Voorbereiding op normen: Gap analyses & scopes workshop (s);
Werkpakket 3: Tankstations voor kleinschalige maritieme toepassingen: van wal tot schip;
Werkpakket 4: De binnenvaart bunkering van lng: van schip tot schip;
Werkpakket 5: Internationale input van het nationaal platform in de internationale platforms - nieuwe initiatieven.

Als projectresultaat zijn de stakeholders in meer dan één normplatform actief. Daarnaast zijn onder initiatief van Nederland de Europese normalisatieontwikkelingen opgestart voor LNG. Dit project heeft een bijdrage geleverd aan het versneld opleveren van de PGS 33-1 voor tankstations, PGS 33-2 voor LNG bunkerstations. Daarnaast zijn binnen de scope van dit project de gewenste stappen gezet voor het vormgeven van een LNG veiligheidonderzoeksprogramma.

Tevens kan worden gesteld dat de mogelijke drempels met de publicatie van de eerste generatie PGS 33-1 en PGS 33-2 grotendeels zijn weggenomen. Het LNG onderzoeksprogramma moet leiden tot validatie van nieuwe inzichten die weer aanleiding (kunnen) zijn voor een herziening van de PGS 33-1 en PGS 33-2.

2.2 - Problem definition (inleiding)

To ensure and accelerate the market introduction of small scale LNG a number of (legal) obstacles will have to be overcome. One of the crucial actions needed is to develop and agree among all stakeholders on the harmonised procedures for LNG bunkering based on the latest state-of-art and to ensure that these standards and guidelines are validated. Due to the absence of validated current practices and the absence of dedicated and transparent harmonised practices, no consistent framework of standards and regulations exists currently.

This project partly ensured that the Dutch LNG sector is one of the frontrunners in the next 20 years and will accelerate the roll out of new innovations in the Netherlands. The lack of standards prohibited the market introduction of this clean and environmentally friendly fuel. The Dutch international competitiveness will be strengthened and new opportunities will be created and bring along advantages in the commercial battle for enhancing the introduction and further development for new small scale LNG applications on large scale in short time.

The first PGS standards for LNG fuelling stations and bunker stations have been published and state-of-art procedures available. The Netherlands is frontrunner in Europe and initiated standards work in Europe.

2.3 Objective

The main objective of this project was to start the development of the first generation development of (inter)national standards and specifications for LNG refuelling stations for maritime vessels and for LNG bunkering in the inland waterways (ship-to-ship). Without these standards the roll-out of the projects and facilities will be very difficult.

The aim of the project was to involve the stakeholders to start the standardization initiatives which are urgently needed for a safe introduction and further development of the LNG small supply chain infrastructure and to overcome the regulatory barriers. The project builded on the results and recommendations of the LESAS WP III gap analysis for the regulations, codes and standards framework for LNG small scale applications.

Many technical discussions on working group level were still needed before the actual drafting could start. These discussions focussed on finding answers to the following main question:
What is needed to ensure safety for the environment and human health aspects for LNG small scale applications, in particular for the following activities?

- Fuelling of LNG ships (shore-to-ship).
- Bunkering of LNG ships (ship-to-ship).

This lead to the new deliverables: PGS 33 – Part 1 and 2 and a pre-standard (NPR or NTA). These new deliverables are important documents for the legislative framework. This again is necessary for a rapid and smooth development for LNG applications for mobility on land as well as for the Dutch inland waterways and short sea shipping.

In 2010 and 2011 the LESAS project was finalised by DNV, TNO and NEN. The objective of this project was to develop a roadmap towards an optimal small scale LNG supply chain for the Rotterdam

area from a safety, commercial, technical and legal point of view based on the long term vision of relevant stakeholders.

Within this project at the same time possible legal barriers for LNG in the international guidelines, governmental legislation and technology were outlined and recommendations were presented to overcome these barriers.

Several recommendations of the LESAS project were initiated in this project.

2 Project description (werkwijze)

The purpose of the project was to accelerate both pre-standardization and international standardization initiatives, including health, safety and environmental aspects, for:
- LNG filling stations for small scale maritime applications (shore – to – ship);
- LNG bunkering (ship – to – ship).

The project was executed in the following work-packages / tasks:
Work-package 1: Setting up of national LNG standards (RCS) platform;
Work-package 2: Pre-standards work: Gap analyses & scopes workshop(s);
Work-package 3: Ensure international input and exchange in relation to filling stations for small scale maritime applications: shore-to-ship (PGS 33 – part 2);
Work-package 4: Inland waterway bunkering of LNG: ship-to-ship (NPR/NTA);
Work-package 5: International exchange – new initiatives.

The preparatory work for work-packages 3 and 4 was carried in work-package 2. In this way the scopes of the deliverables from the project was clear, well defined and harmonized to the existing, and/or being under development, (inter)national RCS framework. The work-packages 3 & 4 was about (inter)national standards development. Work package 5 was to ensure alignment with international initiatives, exchange experiences and to ensure harmonisation of standards and regulations.

2.1 Task 1: Setting up National LNG standards and regulations platform

First phase was to set up am LNG small scale standards platform. This was done in 2012 in strong cooperation with the stakeholder groups (private – public). Although standardization involves all stakeholders by default, a wider market need's analysis was needed for this work package. This platform could also follow the international activities on LNG standardisation and can give input on the international activities.

The objectives of the standards platform, the work plan, organizational aspect was discussed and agreed.

2.2 Task 2: Pre-standards work - Gap analyses & scopes

Preparatory to the main deliverables of this project a clear definition of the scopes was needed. The aim of this work-package was to clearly define the scope for the two new agreements (PGS 33 – part 2 and a NTA or NPR). By means of a gap analyses an inventory was made of the requirements and boundary conditions which needs to be covered by the scopes. The outcome of LESAS serves as a starting point.

This pre-standards work was executed and resulted in a final project plan for the development of PGS 33 part 2 to be presented for agreement to the PGS Executive Programme Board

With the agreement of the PGS Board this task was concluded in 2012.

Tasks & activities
1. Desk research (internet, reports, publications,)
2. Input stakeholders (Interviews (LESAS ‘2’) teleconference, workshop, amount interviews and with whom)

3. Validations provisional findings of 1 and 2 (workshop)
4. Define scopes for deliverables as input for work-packages 3 and 4

2.3 Task 3: Filling stations for small scale maritime applications: shore-to-ship (PGS 33 – part 2)

In 2012 the development of a new Dutch guideline for LNG filling stations for vehicles was completed. With this document, PGS 33 – Part 1 -, safe fuelling of LNG to motor vehicles was ensured and the use of LNG as fuel came a step closer. For inland navigation it was important to prevent that it will lag behind road transport, therefore it was essential to extend the PGS 33 with a part for fuelling vessels on inland waterways: PGS 33 – Part 2. Several aspects have to be resolved and which will be covered by this work package. Like the development of the 'binnenvaartregeling' amendments needed for the bunkerplatforms; The additional external safety discussions; the preparation of amendments and revisions.

Tasks & activities
1. Create a taskgroups under the PGS 33-team for maritime
2. Compose proposals to be included in PGS 33-2, 33-1 and or other initiatives (drafting, editing, distributing work items, getting expertise and experience from stakeholders).
3. Resolve comments (managing and processing comments, WG meeting, adjustments drafts).
4. Prepare final proposals / reports / advices (either for PGS 33 approval or submission to PGS board for approval).
5. Ensure input of international (CEN/ISO) views. Ensure alignment

This work package / task took much more time than envisaged. The development started in 2012 and ended in 2014. But with the publication of PGS 33-2 in 2014 the next milestone was achieved.

2.4 Task 4: Inland waterway bunkering of LNG: ship-to-ship (NPR/NTA)

The objective was to formulate requirements for procedures for handling LNG safely during all bunkering activities from (floating) ship to ship transfer. Safety also implies to working conditions where adequately qualified personnel and up-to-date equipment operated properly are a must. The requirement will be complied in an agreement, the so-called Netherlands Technical Agreement (NTA) or a Dutch Guide (NPR).

Tasks & activities
1 Create a platform (new working group for LNG bunkering ship – to – ship)
2 Compose a draft for public enquiry (drafting, editing, distributing work items, getting expertise and experience from stakeholders)
3 Resolve comments (managing and processing comments, WG meeting, adjustments drafts)
4 Prepare final document for publication (approval by working group, editing and formatting for publication)

A platform was formed to discuss the need for the ship-to-ship transfer procedures needed in the Netherlands. In the meantime the Rotterdam ‘Havenverordening’ has its LNG ship-to-ship transfer rules in place. At the finalisation of this project, 31-12-2014 there was no final agreement yet on rewriting this procedure into an NTA or NPR. A harmonised bunkering procedure is still on the wish list but research is needed on several technical issues (like LNG transfer systems).

This topic is also on the draft list of the PGS Executive Programme Board as a possible PGS 33 part 3. Discussions are still ongoing end 2014. Start of the development is expected for 2016.

2.5 Task 5: International exchange – new initiatives

It was important to ensure Dutch input for the deliverables of ISO/TC 67/WG 10 and ISO/PC 252 through national mirror groups. The objective was to end up with harmonized standards which are aligned with the Dutch situation. Active input into the committees was already been done through the national mirror groups by commenting on drafts which are under development and giving input for new work item proposals.

As NEN is a member of both ISO and CEN, NEN has access and knowledge of all standards of the major standardization bodies. Furthermore, it can provide fast-track standardization processes within ISO and CEN, once a stakeholder or the project requests registration of agreements to continue development of a process, product or market. NEN is responsible for communication with ISO and CEN on progress of standardization, for following the ISO and CEN rules and procedures, for document versions of the standards (including formal enquiry stage and formal vote stage) and for planning and organizing meetings of the technical committees and working groups of which it holds secretariats.

Also, via its NEN unit Energy Resources holds inter alia the secretariats of the ISO technical committee on materials, equipment and offshore structures for the petroleum, petrochemical and natural gas industries, including LNG (ISO/TC 67), ISO technical committee on natural gas (ISO/TC 193), ISO technical committee on LNG and CNG filling stations (ISO/PC 252), CEN technical committee on petroleum products and liquid and gaseous (bio)fuels (CEN/TC 19 CEN technical committee on sustainably produced biomass for energy applications (CEN/TC 383). Because of these international secretariats, NEN is able to bring the experienced within the European and international oil and gas industries including the upstream and downstream LNG developments to the table in this project.

Over the years, NEN has managed and participated in research, trade support and twinning projects and inter-laboratory studies. Many of these concern application of standards and harmonization and implementation of technical legislation.

Since 2006 NEN and its members got strongly involved in standardization work for the LNG business. The first years the focus was mainly on upstream (offshore) activities. Recently the LNG discussions with stakeholders in the Rotterdam area are focusing on downstream activities. One of the issues discussed for the development of downstream (small scale) LNG activities was barriers to trade and barriers to downstream LNG developments.

2.6 Results

The final results of this project are in line with the objectives. Only the planning was extended. More time was needed due to the need to solve technical issues before we were able to have consensus on the LNG state – of – art.

As a result of the tasks LNG platforms for standardization were initiated in 2012 and 2013. Based on the outcome of LESAS stakeholders were invited. For the PGS 33-2 the LNG platform agreed a project plan with defined scope. This LNG platform identified the gaps in the standards field for LNG filling stations for small scale vessels.

PGS 33-2 was developed. 3 meetings were held in 2012. 6 meeting in 2013 and 2 meetings were held in 2014. As part of the preparation many taskgroup meetings were held.

The result was the publication of the PGS 33-2 Filling stations for LNG maritime small scale vessels in March 2014. The PGS 33-2 is publicly available at the website of the PGS organisation.

There was no final agreement yet o a harmonised bunkering procedure and this is still pending now.

This topic is also on the draft list of the PGS Executive Programme Board as a possible PGS 33 part 3.

Dutch experts were nominated in the International Standardization platforms of ISO and CEN. The Dutch PGS 33-2 was translated and was circulated to the international experts and regulators.

On behalf of the Netherlands Dutch experts presented our recommendation in CEN and ISO.

2.7 Spin off projects (vervolgactiviteiten)

Several spin offs are ongoing of which the Dutch LNG Safety Programme is the most connected.

This started in 2014 and the objective of this program is to enhance the knowledge about internal and external safety of small scale LNG supply and the use of LNG as a fuel in trucks, inland-barges and short sea vessels to allow development of innovative and safe distribution and LNG propulsion systems. This pre-normative research program will be executed in a coordinated fashion, ensuring extensive exchange of (existing) knowledge and interim results between the market parties and relevant authorities.

The program will provide necessary knowledge for:
- regulatory development of internal safety standards such as PGS33;
- enhanced methods to calculate external safety risks for QRA models like Safety.NL and RBM II;
- normative documents via NEN , extended to international CEN/ISO level;
- local permit granting authorities;
- guidance for incident response organisations;
- guidance for engineering companies to provide safe designs in line with codes and regulations.

The results of this project will included in the next generation PGS 33-1 and PGS 33-2.

2.8 Conclusion

This project accelerated the standardization initiatives needed for the market introduction of small scale LNG. After 2 years the standardization network both national and international grew fast.

In line with the economic development of introduction of LNG both for vehicles as for vessels we see more standardization project being initiated. The dissemination towards the industry and regulators is well received and also the international stakeholders are interested in our standardization (and technical procedure) developments.

The technical discussion in the standardization platforms lead to a new state-of-art which is the basis for the innovations of tomorrow.

This project also gave strong input to the new platform initiatives from the industry like the Dutch LNG Platform (initiated by the Industry in Rotterdam and North Netherlands.

2.9 Dissemination of knowledge and results

The IPR for the deliverable in work package three (PGS guideline) lies with the PGS organisation. The PGS publication will be publish by NEN on behalf of the PGS organisation and will be publically available on the web. The IP Rights for the deliverable of work package 4 lies with NEN. But also the deliverable(s) of this work package will be published by NEN and become widely available for worldwide use.

3. Projectdetails

Er zijn geen noemenswaardige technisch en organisatorisch problemen opgetreden tijdens het project. Qua organisatie zijn meer medewerkers betrokken bij het project en is iemand tussentijds vervangen. Qua tijdsdoorloop heeft het project één maal uitstel gevraagd.

Ten opzichte van het Projectplan zijn geen grote wijzigingen opgetreden. De verschillende taken konden we allen opstarten. 1 taak, de ship-ship transfer procedure is nog in ontwikkeling en zal binnen dit project niet kunnen worden afgerond.

Er zijn minder werkelijke kosten gemaakt dan begroot. Dit is in de excel sheets verder toegelicht.

Qua kennisverdeling kunnen we melden dat de PGS 33-1 en PGS 33-2 reeds veelvuldig zijn gedownload. Tevens zal het resultaat dankzij vertaling in de Engelse taal internationaal worden verspreid.

Qua PR zijn de resultaten van het project meerdere malen ingebracht in netwerkbijeenkomsten van het Nationale LNG platform. Tevens zijn op internationale congressen presentaties gegeven.

Tenslotte is de voortgang besproken in de internationale technische standaardisatie plaformen.

Verlening 2013 en verlening 2014 (tot 10 juli 2014): “Het project is uitgevoerd met subsidie van het Ministerie van Economische Zaken, Subsidieregeling energie en innovatie (SEI), Topsector Energie uitgevoerd door Rijksdienst voor Ondernemend Nederland.”

About NEN

NEN provides national and international standardization and regulation knowledge. As a member of both ISO and CEN, it combines the standards processing ability and the technical know-how. NEN has access and knowledge of all standards of the major standardization bodies. Furthermore, it can provide fast-track standardization processes within ISO and CEN, once a stakeholder or the project requests registration of agreements to continue development of a process, product or market. NEN is responsible for communication with ISO and CEN on progress of standardization, for following the ISO and CEN rules and procedures, for document versions of the standards (including formal enquiry stage and formal vote stage) and for planning and organizing meetings of the technical committees and working groups of which it holds secretariats.

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