

BUSINESS PLAN

CEN/TC 282

Installation and equipment for LNG

EXECUTIVE SUMMARY

Business Environment:

In today's energy world, the LNG market is the most dynamic energy supplier with a high growing potential related to a yearly increasing demand and new identified resources. At European level, the LNG market is submitted to the wide variations created by a fast growing Asian market and the arrival of new producers (Australia, Russia, USA...). In spite of its recognized environmental advantage, the European LNG market becomes more volatile: 2019 shows a stiff renewal of LNG imports, after several years of relative sluggish demand. The pressure for environment protection is more effective on the fast development of the dynamic "small scale" LNG market, which addresses new LNG uses: trucks fueling, boats bunkering, liquid fuel for small and mid-scale industries.

Benefits:

To define the necessary standards to be used to perform the desired level of safety for LNG infrastructure and commercial interoperability in Europe considering its significant position in the international market:

- Confidence and social acceptability of LNG infrastructures and uses
- Diversification of imports of natural gas in the European Union
- Value added experience and contribution for the international development of LNG infrastructures and further diversification of suppliers

Priorities:

- Safety first
- Development of the markets
- Sharing expertise and experience for the growing international activities
- Addressing innovative markets, uses and technical solutions for LNG.

1 BUSINESS ENVIRONMENT OF THE CEN/TC

1.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this CEN/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

Political and economical factors

Declining North Sea gas reserves, deregulation of European gas and electricity markets, global environmental concern have all combined to create new opportunities for LNG in Europe.

For example, the creations of SECA zones (Sulphur Emission Controlled Area) in North and Baltic Seas and North America opens wide opportunities for LNG to become the preferred shipper's fuel. The same endeavor is visible in the road transport sector where more and more trucks rely on LNG to fuel their engines. Hence, beside the traditional but fluctuating "large scale" LNG business, a recent "small scale" LNG business is developing at fast pace, bringing LNG to new users and territories.

Further, many European countries rely on a limited number of energy supply sources. LNG is more flexible than pipeline gas and is therefore seen as an essential aspect of diversification of energy supply sources. For example, Lithuania, Poland have now their own LNG receiving facilities and Germany is considering having the same.

International trade

New exporters (Australia, Russia, USA), bound to become major players of the new LNG world, are entering the LNG market at a growing scale. Asia, which attracted in 2018 76% of the global LNG demand, is the main LNG importing region that dictates the world LNG prices, making of Europe, where comparison between piped gas or LNG is often possible, a fluctuant market. This leads to a demand for a wide flexibility of the main functions (unloading, storage, sendout) in european LNG receiving terminals and for new functionalities, such as zero-sendout, cargo re-loading and transfer.

Legal factors

The number of LNG installations in each country being rather limited, the national regulations specific to LNG are sometimes poor. European standards are appreciated as good references to avoid case by case discussions with local authorities and the subsequent waste of time and risk to increase project costs.

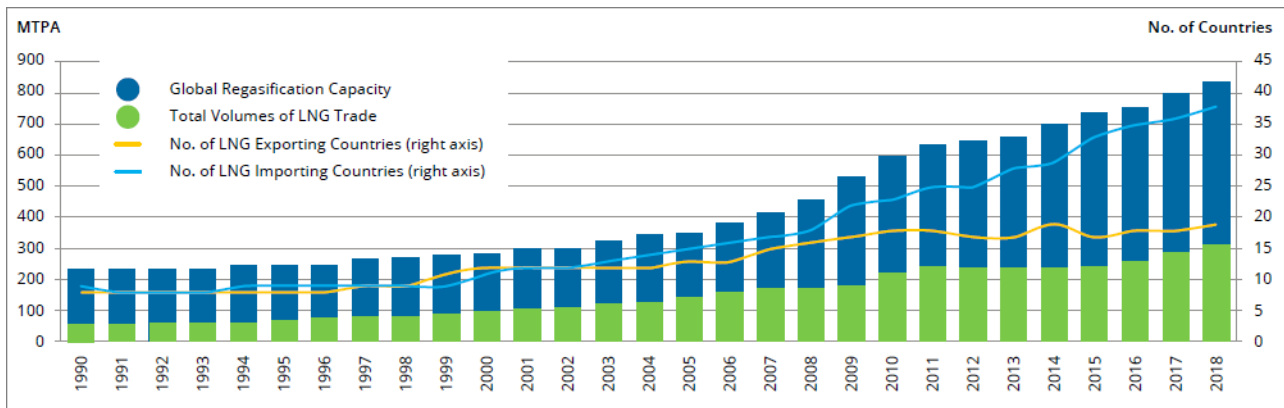
Standardisation aspects

US standards are predominant outside Europe to design LNG installations; it would be an advantage for European engineering companies to be able to refer to a standard corresponding to the design philosophy prevailing in Europe (based in particular on a safety assessment as required by the "SEVESO" Directive); the European industry, which played from the beginning an important role in that field, has an interest in basing their practice on recognized standards.

1.2 Quantitative Indicators of the Business Environment

Agencies such as International Gas Union (IGU), International Group of Liquefied Natural Gas Importers (GIIGNL) and others provide very accurate and up-to-date data about the LNG market. Hereabove are shown some information extracted from their annual report. The reader will find more information on their website.

Global LNG trade



There are currently thirty five onshore or offshore LNG import terminals in Europe (including Norway and Turkey) with a total nominal regasification capacity of 173.3 MTPA. The actual use of this capacity is approx. 50%.

Sources: IGU 2019 World LNG Report

Retail (small scale) LNG trade:

| SMALL-SCALE LNG CARGOES LOADED FROM RECEIVING TERMINALS IN 2018 | |
|---|-------------------|
| Country | 10 ³ T |
| Belgium | 83.5 |
| Indonesia | 71.4 |
| Japan | 413.5 |
| Netherlands | 124.0 |
| Spain | 0.9 |

| TRUCK LOADING OF LNG FROM RECEIVING TERMINALS IN 2018 | |
|---|-------------------|
| Country | 10 ³ T |
| AMERICAS | |
| Chile | 250.8 |
| Dom. Rep. | 104.1 |
| USA | 82.6 |
| ASIA | |
| China | 14 040.0 |
| India | 46.5 |
| Indonesia | 2.9 |
| Japan | 1 430.3 |
| South Korea | 181.3 |
| EUROPE | |
| Belgium | 25.8 |
| France | 112.2 |
| Lithuania | 0.1 |
| Netherlands | 53.4 |
| Poland | 30.8 |
| Portugal | 116.3 |
| Spain | 718.5 |
| Turkey | 459.0 |
| UK | 26.4 |

Source: GIIGNL Annual Report 2019

2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC

Benefits expected from the work of CEN/TC 282 are mainly:

- to respond to the recent evolution of the LNG market (LNG small scale plants, terminals and carriers),
- to support European legislation on access rules to LNG terminals: Directive 2009/73/EC concerning common rules for the internal market in natural gas.

For example EN 1473 "Design of onshore installations" gives updated guidelines for the design, construction and operation of all onshore liquefied natural gas (LNG) installations including those for the liquefaction, storage, vaporisation, transfer and handling of LNG. In its on-going revision it will also address pressurized storages

3 PARTICIPATION IN THE CEN/TC

All the CEN national members are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organizations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standards organization in your country.

4 OBJECTIVES OF THE CEN/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

4.1 Defined objectives of the CEN/TC

CEN/TC 282 has fulfilled its initial objectives and published several European standards according to its scope of Work:

Installation and equipment for LNG

EN 12065

Installations and equipment for liquefied natural gas - Testing of foam concentrates designed for generation of medium and high expansion foam and of extinguishing powders used on liquefied natural gas fires
Published 1997

EN 12066

Installations and equipment for liquefied natural gas - Testing of insulating linings for liquefied natural gas impounding areas
Published 1997

EN 12838

Installations and equipment for liquefied natural gas - Suitability testing of LNG sampling systems
Published 2000

EN 13645

Installations and equipment for liquefied natural gas - Design of onshore installations with a storage capacity between 5 t and 200 t
Published 2001

EN 1474-3

Installation and equipment for liquefied natural gas - Design and testing of marine transfer systems - Part 3: Offshore transfer systems
Published 2008

EN ISO 16903

Petroleum and natural gas industries - Characteristics of LNG, influencing the design, and material selection (ISO 16903:2015)

Published 2015

EN ISO 16904

Petroleum and natural gas industries - Design and testing of LNG marine transfer arms for conventional onshore terminals (ISO 16904:2016)

Published 2016

EN ISO 20088-1

Determination of the resistance to cryogenic spillage of insulation materials - Part 1: Liquid phases (ISO 20088-1:2016)

Published 2016

prEN ISO 20088-2 Determination of the resistance to cryogenic spillage of insulation materials - Part 2: Vapor phase

Published 2020

prEN ISO 20088-3 Determination of the resistance to cryogenic spillage of insulation materials - Part 3 Jet release

Published 2019

prEN ISO 20257-1 Installation and equipment for liquefied natural gas - Design of floating LNG installations - Part 1: General requirements (ISO/DIS 20257-1:2018)

Published 2020

EN ISO 20519

Ships and marine technology - Specification for bunkering of liquefied natural gas fuelled vessels (ISO 20519:2017)

Published 2017

EN ISO 21593 Ship and marine technology - Technical requirements for liquefied natural gas bunkering dry-disconnect/connect

Published 2019

EN ISO 28460

Petroleum and natural gas industries - Installation and equipment for liquefied natural gas - Ship-to-shore interface and port operations (ISO 28460:2010)

Published 2010

FprEN 1474-2

Installation and equipment for liquefied natural gas - Design and testing of marine transfer systems - Part 2: Design and testing of transfer hoses

Under approval

prEN 1473

Installation and equipment for liquefied natural gas - Design of onshore installations

Under Approval

prEN ISO 20088-4

Determination of the resistance to cryogenic spillage of insulation materials - Part 4 : Ignited Cryogenic Jet Release

Under Drafting

prEN ISO 20257-2

Installation and equipment for liquefied natural gas - Design of floating LNG installations - Part 2: Specific requirements for FSRU

Under Approval

prEN ISO 20519 rev

Ships and marine technology - Specification for bunkering of liquefied natural gas fuelled vessels

Under Drafting

CEN/TC 282 is continuously reviewing its collection of standards to contribute to that they reflect the state of the art and possible targets in terms of requirements.

The revision of some of its standards with the publication of upgraded versions is part of the process.

4.2 Identified strategies to achieve the CEN/TCs defined objectives.

CEN/TC 282 tries to avoid any duplication of work or conflicts in the texts with other CEN or ISO TCs or national regulations in Europe. CEN/TC 282 aims to promote the EN standards in Europe and in the rest of the world.

For equipments used in, but not specific to, the LNG industry (cryogenic tanks, valves, pumps,...), CEN/TC 282 relies on other existing CEN/TCs which have the best expertise, and gives its comments so that the specific features of LNG are taken into account.

The CEN/TC 282 presently has Liaison Officers, who provide their Report for each plenary session of the TC, with the following bodies:

- **CEN / TC 12** Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries
- **CEN / TC 265** Metallic tanks for the storage of liquids
- **CEN / TC 268** Cryogenic vessels
- **CEN / TC 301** Road véhicules
- **CEN / TC 326** Natural Gas Vehicles - Fuelling and Operation
- **CEN / TC 408** Natural gas and biomethane for use in transport and biomethane for injection in the natural gas grid
- **ISO / TC 8 / WG 8** Liquid and gas fueled vessels
- **ISO / TC 28 / WG 20** Classifications and specifications
- **ISO / TC 67 / SC9** LNG installations and equipment
- **MARCOGAZ** WG LNG Applications
- **SIGTTO**

4.3 Environmental aspects

The gas supply companies, in the widest sense of their activities (production, transport, distribution) have a long tradition in ensuring that networks and facilities are operated according to well-defined procedures which are the centrepiece of quality management systems. They are based on the general criteria of the series ISO 9000 and currently developed gas-specifically as EQAS (European Quality Assurance System) in CEN/TC 234 in order to adhere more efficiently to the procedures peculiar to the gas activities.

Companies are more and more inclined to take into account environmental aspects, since the series ISO 14000 resulting in EMAS (Environment Management System) have a similar structure, and the measures to be taken are directly linked to the technical operations and therefore cannot be dissociated from them.

Review of the key environmental issues associated with the scope of the work covered by CEN/TC 282:

- Resources used,
- Energy consumption/use
- Emissions to air
- Emissions to water

These aspects have been addressed in details in CEN/TR 16388 "Gas-Specific Environmental Document - Guideline for incorporating within standards to minimize the environmental impact of gas infrastructure across the whole life cycle".

A more recent aspect of environmental concern is the adaptation of the LNG industry to the climate change. The CEN/CENELEC has established a Coordination Group "Adaptation of European Standardization to Climate Change" (ACC-CG) in order to push all the concerned TCs to incorporate in their new and existing standards a specific consideration to the ability of LNG installations to cope

with the effect of climate changes. A guidance for standards review has been established in this regard.

The EN 1473 is caring about ACC in the current revision work of the WG 5.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC WORK PROGRAMME

The main factor impacting negatively the completion of the work is the lack of expert resources with only few European countries having an LNG industry. Nowadays 13 EU countries (Belgium, Finland, France Greece, Italy, Lithuania, Poland, Portugal, Malta, Netherlands, Spain, Sweden, UK) plus Norway and Turkey are CEN members and have LNG terminals and only few countries like Germany have LNG equipment manufacturers.

It means that having five countries participating to a new work item or a revision of a standard is somehow difficult.

Furthermore, the technical expertise needed and the size of the standards (more than 100 pages) make difficult to follow the CEN 3-year-timeframe. Despite the work of the working groups, tolerances had to be requested in the development of the standards currently in the work programme.