GERG Activity Report 2016 -7

Introduction

GERG, the European Gas Research Group, continues to evolve, as focus within gas innovation increasingly addresses the place of gas in a low-carbon, more integrated energy system.

This year GERG elected a new President. Isabelle Moretti, Technology Director at Engie has replaced David Salisbury of National Grid, who spent over four years driving GERG in its new direction. We thank David for all his hard work and constant support, and welcome Isabelle, who has declared an intent to build on the progress made in the last four years. GERG has also elected two new Vice Presidents, Quentin Mabbutt of National Grid and Werner Wessing of E.ON. We welcome them both to the roles and thank the outgoing Vice Presidents Svein Berger Thaule and Angel Guttierez for their excellent support to GERG and the President since 2012.

The organisation continues to attract new members, now numbering around 24 with 10 Associate Members or Friends. In the last 12 months we have gained Italgas, Cadent Gas, TIGF, and associate members Bureau Veritas and DBI. Sadly, in the same period we have lost both Statoil and Edison due to internal reorganisation. A number of new membership enquiries are in progress at this time. The gas industry both upstream and downstream remains a challenging and continuously changing environment in Europe and we continue to work hard with our members to create an Association which adds value for their diverse interests and priorities.

As part of this process, we continue to look for new partnerships and are working more closely than ever with other Associations and stakeholders in Brussels and beyond. A number of activities with Marcogaz, Eurogas, GasNaturally, CEN, and the European Commission will be covered in this report. Recently GERG was asked by the newly formed Decarbonised Gas Alliance to become a full signatory to the Alliance. The Alliance forms a similar role to GasNaturally at the UK level, but with a greater focus on the benefits of innovation in ensuring a future for gas. GERG is therefore both pleased and honoured that we were chosen as the port of call into the European Associations by DGA.

In the last year, we looked closely at our established way of doing things which was largely driven by bottom-up ideas brought into our five Programme Committees, and decided to trial a new way forward. This consists of working with our members to poll their R&D and innovation priorities, and then reconstructing these ideas into an open, themed call for proposals – the first of which was in 2016. At the same time, we continue to work to construct strategic technology roadmaps in priority areas which will form the basis of future activities, calls and targeted European level initiatives. To better manage the increasing synergies within the industry, the five Programme Committees have been reduced to two. The Transmission, Distribution and Utilisation Committees have been brought together in one, PC TDU, and LNG projects are still handled in a separate Programme Committee, PC LNG. The important cross-cutting activities of PC General Studies are now incorporated directly in these PCS.

Questions are increasingly being asked by policy makers about the future role of gas. GERG now has activities dealing with the main challenges facing the gas industry as we move through the energy transition, and look to demonstrate the key role gas will play in the future.

Broadly speaking these activities include:

Methane emissions

How can the industry demonstrate that it understands the extent of methane emissions and the challenges of reducing these? The MEEM project, led by DBI in Germany is working to establish an

accepted Europe-wide methodology for the estimation of methane emissions, initially focussing on Europe's gas distribution networks. After a successful Phase 1, in which methods were compared, Phase 2 is now underway to home in on a robust and universally applicable methodology.

Renewable gas

Significant flagship projects are now underway in biomethane introduction in the gas grid, and in understanding how to push forward the limitations of hydrogen introduction to ensure that the energy system is meeting the flexibility and low carbon challenge. We have recently completed phase 1 of the GERG biomethane project, in which we have aligned closely with CEN (the European Standardisation Agency). Work has focused on the need to understand what threshold values are needed for trace components to allow us develop robust European standards and therefore remove barriers to biomethane injection in the gas network. Many European network operators have been involved, several of them providing unique and valuable data on biomethane in their countries. We are now expecting to launch Phase 2 of this project later this year, supported by the European Commission through CEN, with a planned experimental programme to begin to answer the unknowns.

In the case of hydrogen, the HIPSNET and Hyready projects are developing a deeper understanding of current knowledge of hydrogen injection into the grid, and recommended practices for network operators. GERG is also closely involved in the CEN and European Commission led Sector Forum Energy Management (SFEM) Working Group Hydrogen. This is developing roadmaps for the standardisation needs for hydrogen in gas networks, and mapping research requirements to fill the gaps in our knowledge.

Health of our networks and gas transport and use

if we are rightly arguing that our networks are the ideal existing source of energy transport into the future, we also need to ensure that they are fit for that future – lifetime extension, integrity and SMART operation are key here. Asset health R&D has been a traditional strength of GERG, with system operators forming a large part of our membership. This work is as important as ever, and is being supplemented by work to understand how our networks can become smarter and more flexible. Several projects developed by our member companies continue in these areas. Additionally, we are developing closer ties with Marcogaz to ensure that our work aligns technical needs with R&D outcomes. GERG has worked closely with Marcogaz and Eurogas on defining the Gas Smart Grid, and on developing position papers on the impact of the Primary Energy Factor (PEF) on gas supply and use.

LNG and the new markets it opens

We have seen significant growth in our LNG project portfolio. Industry standard projects on inline measurement (using Raman Spectroscopy), metrology of small-scale systems and small-scale LNG safety are underway or have been completed. Our members are hoping to develop the Raman technique to the point where it can become a standard method for direct determination of liquid composition. We are also developing models for release behaviour from small-scale facilities which are being validated against experiment at our state-of-the-art member facilities in the UK and France.

In summary, GERG continues to develop, to attract new members, and to stay relevant to the evolving needs of the gas and energy community and the increasingly interconnected energy system. Innovation is increasingly important to the future of the gas industry. The GERG model for open collaboration in innovation is still giving us positive results and benefitting our members, partners and stakeholders in the wider community.

Removing Barriers to Biomethane injection – the GERG Biomethane Project

Biomethane and its introduction into the gas network

Renewably derived gases, whether biomethane or hydrogen, have the potential to make an enormous contribution to the long-term development of a low carbon energy system in Europe and beyond. Although volumes injected into our gas networks are currently small, they are showing rapid growth in some European countries. In the case of biomethane a pan European understanding of the steps needed to remove any technical barriers will greatly support the development of a viable and sustainable growth industry. To approach the removal of these barriers in a consistent and effective manner requires close cooperation with those developing the standards for use of biomethane.

Discussions on biomethane quality standard definition for network injection have been ongoing for several years now. However, a lack of scientific and tangible network data has held back a full understanding of the real impact of biomethane trace compounds on gas infrastructure as well as end-users.
Two European standards on biomethane have been published in 2016 / 2017:

- EN16723-1: Specifications for biomethane for injection in the natural gas network;
- EN16723-2: Automotive fuel specifications

Yet, they are only of voluntary application, and some thresholds values are either missing, or were set through stakeholder agreement but are not always based on real technical data, which has been lacking at a European level.

Therefore to ensure and secure the future of the whole biomethane industry, we need to define threshold values which ensure gas infrastructure integrity, and end-users' equipment integrity, without being unnecessarily stringent and therefore imposing unnecessary extra costs on producers.

The GERG Biomethane Project

In 2016, a GERG project was set up and launched at the initiative of several European gas grid and gas storage operators. This project was led by Engie Lab CRIGEN (representing the French gas infrastructure operators GRTgaz, GRDF, STORENGY). Partners included the Danish Gas Technology Centre, DGC (representing Danish gas operators) , DNVGL UK (representing the four UK gas distribution companies, National Grid/Cadent, SGN, NGN and Wales and the West), Gasum, Gaz System, Innogy, Snam Rete Gaz, and TIGF. Kiwa and DNVGL Netherlands provided additional technical input and delivery based on existing Dutch industry knowledge and their known expertise in this area.

Since there is no precise knowledge about the choice of trace components to follow and the definition of threshold values, the aim of the GERG biomethane project is to gather robust technical information regarding the impacts of biomethane trace components on the gas infrastructures and on the end-users' equipment to propose revision of the standards using strong technical arguments.
The first step, completed this year, is a literature and operational data review to identify the gaps of knowledge. It focuses on two aspects:

- Corrosion: impact of the biomethane trace components in terms of corrosion: CO, HCN, H_2S, NH_3, HCl, HF, organo-halides, micro-organisms;
- Siloxanes: impact of silica compounds found in biogas sources both on the gas infrastructure (pipes, compressors, valves) and on end-users (boilers, engines).

A unique set of data regarding real biomethane quality

The phase 1 of the GERG biomethane project has allowed us to collect a unique set of data regarding real biomethane quality. These data were collected by partners who need to perform biomethane analysis prior to its injection into their gas networks. As there is very little public documentation on trace compounds concentrations in biomethane, this set of data is highly valuable.

These data are very helpful to aid understanding of the real biomethane composition in the gas networks and in the end-users' appliances. The data sets also give some clues on the ease with which biomethane producers can meet the current requirements of EN 16723-1 or the thresholds that may be suggested at the end of coming phases of the project.

The extensive review performed highlighted the gaps of knowledge regarding the impact of biomethane trace compounds on gas infrastructure and on gas users: in particular, the study shows that the impact of siloxanes on heavy duty engines and on some boilers needs further understanding, as well as the impact of biomethane on some materials, especially in the presence of water (which is the case in underground gas storage).

Next steps

The GERG biomethane project has already helped to clearly identify the gaps of knowledge regarding:

- the impact of biomethane corrosive trace compounds;
- the impact of siloxanes on gas appliances, particularly on boilers and vehicles.

This project has set a unique baseline for real European operational data and will be followed by a second phase project funded under the H2020 framework through CEN. This new project will address the priorities given by CEN Technical Committees working on the standardisation programme:

- tests regarding the impact of siloxanes on heavy duty engines;
- tests regarding the impact of siloxanes on boilers and other stationary appliances;
- review on the impact of oxygen on underground gas storages;
- review on the impact of Sulphur on vehicles;
- Impact on health (which is to be studied through the expert group EG4 of CEN TC408).

The next steps will consist in performing tests to complete the existing knowledge.

This project will help to obtain threshold values in agreement with the interests of all the stakeholders needed to develop a successful biomethane industry in Europe:

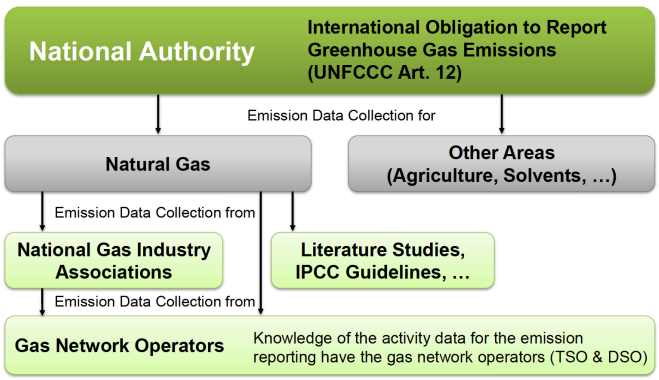
- Biomethane producers: need to have limited treatment / upgrading costs to guarantee the economic viability of the projects, and thus the development of the biomethane sector;
- Grid operators: need to protect the grid infrastructure while including renewable gases in the grid;
- End-users: need to protect their equipment (boilers, engines, etc).

This next project, which is to be launched in Autumn 2017, will gather as many stakeholders (biomethane producers, boilers manufacturers, engines manufacturers, gas grid or storage operators, etc.) as possible in its supervisory board in order to obtain a consensus on values that should be used as thresholds in the future European standards. This project is just one of the many ways that the European gas industry looks to support an increasingly low carbon and renewable energy based future.

Methane Emissions - the MEEM project

The project "Analysing the Methods for Determination of Methane Emissions of the Gas Distribution Grid" was initiated by members of GERG PCD. Representatives from gas companies of seven European nations (Belgium, France, Germany, Italy, Netherlands, Spain and Switzerland) provided information from which a benchmark for existing methods of determining methane emissions could be achieved. The project is being led on behalf of GERG members by DBI. The goal of the project was to identify best practices and optimisation potential as a first step to develop a uniform European method for methane emission estimation from the gas distribution grid that has the potential to be applied by all interested Member States of the European Union. Currently, many different methods are in place and may lead to inconsistent results for emission estimation in Europe. A consistent and transparent reporting scheme within the EU would facilitate the comparison of the total emissions of different countries and would enhance the reputation of the emission estimation.

Methane (CH_4), which is 25-times more potent (100-year time horizon) as a greenhouse gas than CO_2, has become an increasingly important topic. According to Article 12 of the United Nations Framework Convention on Climate Change (UNFCCC), members are required to create "a national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases" [1]. The same requirement exists in Article 5 of the Kyoto Protocol [2].



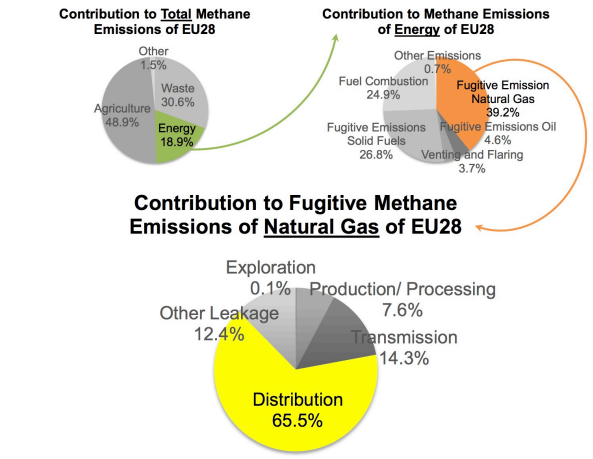
Source: own illustration DBI

Following the framework set out at the convention, the determination and publication of emissions is carried out via a National Inventory Report (NIR).

Several institutions are involved in the creation of the NIR. shows an example how data is collected for emission re- porting. It is notable that the institutions responsible for reporting to the UNFCCC often have no direct access to data and are, therefore, dependent on co-operation with other bodies (e.g. Associations of the Gas Industry), in order to fulfil their obligations. Although the framework for reporting is fixed by the UNFCCC, the method of emission estimation can differ from country to country, and even between several data providers within one country, as long as this method can be scientifically justified. As a result, inconsistencies in reported emissions between different countries can occur.

Looking to the total methane emissions caused by the members of the European Union (EU28) in 2012, the highest share of emissions is caused by the sectors 'agriculture' (48.9 %) and 'waste' (30.6 %).

According to data submitted to the UNFCCC, the sector 'energy' caused 18.9 % of the methane emissions. Only 39.2 % of these emissions from the sector 'energy' were fugitive methane emissions from natural gas. Thus, fugitive methane emissions from natural gas contributed only 7.4 % to the total methane emissions.3 [5] This rather small part of methane emissions should nevertheless be estimated correctly to support the reputation of natural gas.



Note: Illustration shows only national emissions. For instance, emissions of production in Russia are not included.
Source: own illustration DBI after UNFCCC [5]

The GERG-Project focuses on gas distribution because, within the EU28, this element of the national natural gas supply causes the highest share of national methane emissions Nevertheless, it should be kept in mind, that the emissions of distribution grids are comparatively small. According to the latest Marcogaz report, distribution grids show methane emissions of 0.4 % compared to the total mass [tons] of natural gas sales in Europe. Further reasons for focusing in particular on the gas distribution grid are the length of the pipelines (the gas distribution grid forms a considerable part of the total length of the gas infrastructure), and the complexity, which makes emission estimation particularly challenging.

Conclusions and Outlook

Several methods for emission estimation of the gas distribution grid have been evaluated and the most promising methods that should contribute to a future pan-European approach for methane emission estimation, have been identified. The following conclusions can be drawn:

- Currently the emission estimation methods across Europe include different sources of emissions not necessarily consistently. This project therefore proposes a definition of system boundaries of the gas distribution grid.
- There are different emission categories, which have been elaborated. Current emission estimation approaches do not always consider all of the emission categories.
- Every analysed approach for emission estimation shows strengths (e.g. consideration of many parameters that influence emission estimation) but also comprises weaknesses.
- Combination of promising elements extracted from the existing methods is recommended and selected elements need to be further improved.
- A good balance of effort and benefits is important for feasibility and acceptance.

As important next steps the following activities have been identified:

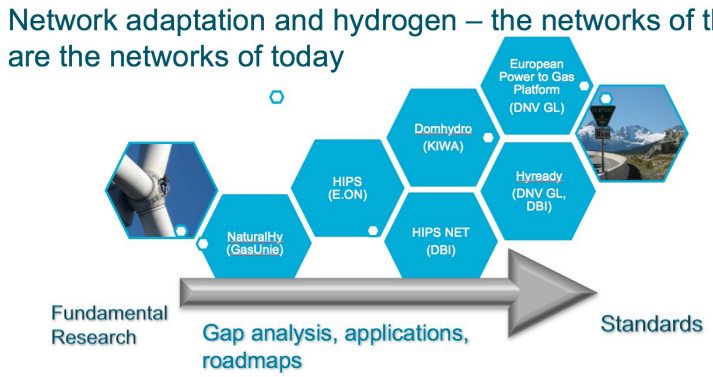
- Performing a detailed effort-benefit analysis to support the selection of features for a future pan-European method
- Development of a pan-European method, including features that are currently missing, e.g. taking into account emission reduction potential of measures that might be applied for example for safety or technical reasons (e.g. use of mobile compressors)
- Agreement on missing clear definitions (e.g. detailed distinction of categories)
- Defining the preferred detail of input data and agreeing on possible adjustment of methods if the necessary input data is not available in a specific country
- Discussing the approach with the authorities (together with respective national DSO and associations as MARCOGAZ and EUROGAS) to support the implementation of findings
- Proposal if and how the developed approach will be further implemented (e.g. as a CEN technical report).

These are the next challenges on the way to a pan-European method for the estimation of methane emissions from the gas distribution grid and will are in the scope of Project Phase II which commenced in late 2016.

The full Phase 1 management report can be found here.

Hydrogen in the Energy System – GERG collaborative activities diversify and expand

GERG set a European research benchmark in 2012 with the production of the HIPS report, with over 30 member companies from the energy community gathering a unique dataset of current knowledge of the impacts of hydrogen in pipeline systems.



Since then hydrogen and the implementation of Power to gas has been at the forefront of much Brussels activity, and GERG has been developing the agenda alongside stakeholders across the community. In the past two years the recognition of the important role Power to Gas could play in integrating our future low carbon energy networks has accelerated. Examples of GERG recent activities and involvement include:

- The HIPSNET project, led by DBI, continues into its fourth year, and is seen as an important centrepiece in the understanding of the current state of the art in understanding hydrogen injection issues.
- The Hyready Project, led by DNVGL is finally underway in 2017. This project aims to develop recommended practices for network and industry operational managers for hydrogen injection.
- The European Power to Gas Platform (DNVGL) continues to develop scenario based outputs concerning business cases for Power to Gas implementation. It strong cross-sector membership is giving it increasing recognition.
- GERG has continued to play a role, (GERG members and Secretary) in developing the Sector Forum Energy Management Working Group Hydrogen, which has continued into its second phase this year. DBI and Engie are Task Conveners for the Task dealing with the Gas network aspects. GERG is convening the Task on Cross Cutting issues. The WG aims to continue to develop a gap analysis for R&I and standardisation issues.
- GERG now has an official Liaison role in the new Hydrogen TC6 which was formed as a direct recommendation from the first Phase of the SFEM WG hydrogen.
- GERG successfully convened a meeting with senior policy makers at DG Energy, in which gas industry members from across Europe made a case for its activities in Power to Gas, and could articulate the regulatory barriers which need to be eroded to make the technology successful.
- GERG has supported the ongoing development of projects such as HYDEPLOY and H21 in the UK. GERG has a role on the Steering Committee of HYDEPLOY.

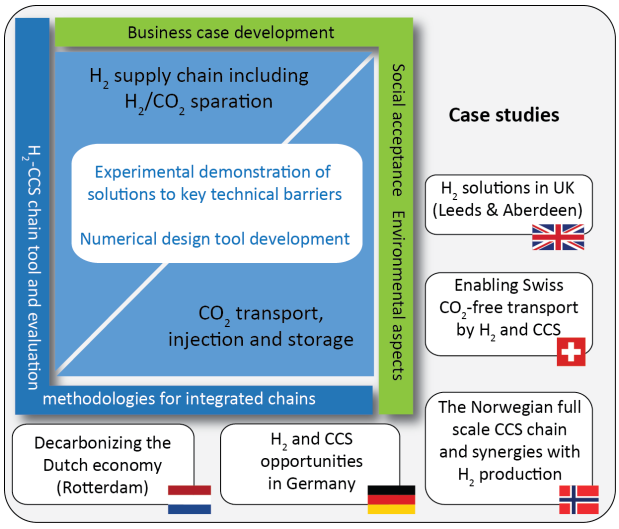
Project ELEGANCY - Accelerating CCS Technologies in the hydrogen domain

Project ELEGANCY was recently funded by the European Accelerating CCS Technologies (ACT) programme. The €15M project is led by Sintef in Norway, and members include Gassco, OGE, Statoil, TNO, Imperial College, PSI and ETH Zurich, British Geological Survey, Scottish Enterprise, Climeworks, ECN, ICL, RU Bochum, SCCR-SoE, Casale, First Climate, Swerea and MEFOS. GERG has a role in convening meetings and dissemination of project information in the Brussels community.

Objectives and challenges

The ELEGANCY project aims to support the realization of Europe's decarbonized energy system by exploiting the synergies between CCS and H_2.
Specifically ELEGANCY aims at:

- Revealing business opportunities for CCS enabled by H_2 as a key energy carrier in the future energy system by performing case studies
- Validating key elements of the CCS chain by pilot- and laboratory-scale experiments
- Optimizing combined systems for H_2 production and H_2/CO_2 separation
- Reducing uncertainties in the storage of CO_2 produced by reforming to H_2
- Developing cutting edge innovative simulation tools for cost-efficient and safe design and for the operation of key elements of the CCS chain
- Providing an open source based techno-economic design tool for the full CCS chain, including H_2 as energy carrier
- Understanding societal readiness to various CCS components



ELEGANCY will reduce the time to market for CCS by overcoming selected key barriers on a component, system and business-case level.

To reach the above-mentioned objectives, ELEGANCY will address challenges along the value chain both from a systems perspective and on a detailed level. While the technical content is at the core of the project, relevant social, business and legal issues will be given significant attention.

The North Sea has a wealth of offshore storage potential. Appraisal has not been made of lowest-cost CO_2 storage provision or to assess possible reservoir responses to the impurities within the CO_2 gas captured during H_2 production at a steam methane reformation plant as proposed by Leeds City Gate. ELEGANCY will assess the specific lowest-cost storage requirements needed for CO_2 captured during H_2 production for the Leeds City Gate project.

GERG PC LNG

The GERG PC LNG Portfolio continues to expand and attracts members from outside the GERG community. A number of major project initiatives are now underway, and specific initiatives in flow measurement and small-scale LNG safety are developing. Some examples are shown below. An additional major project led by VSL looks to develop a flow standard for LNG is also underway with GERG partner involvement.

Raman Spectroscopy for inline analysis of LNG Quality

Objectives

Fluxys and Shell intend to test the performance of Raman technology for composition measurement of LNG. For this a Raman analyser is being installed on of the Fluxys LNG terminals LNG discharge lines, with the already approved Fluxys LNG method using gas chromatography as reference. For a period of six months the results of both systems will be collected and handed over to a third party for evaluation.

To further optimize the quality and transparency of this test, a project is underway in which GERG members and interested parties can participate in providing input to the final evaluation, draw final conclusions and share recommendations to advance this new technology as well as to participate in an industry workshop to present the final results to the wider LNG community and regulators.

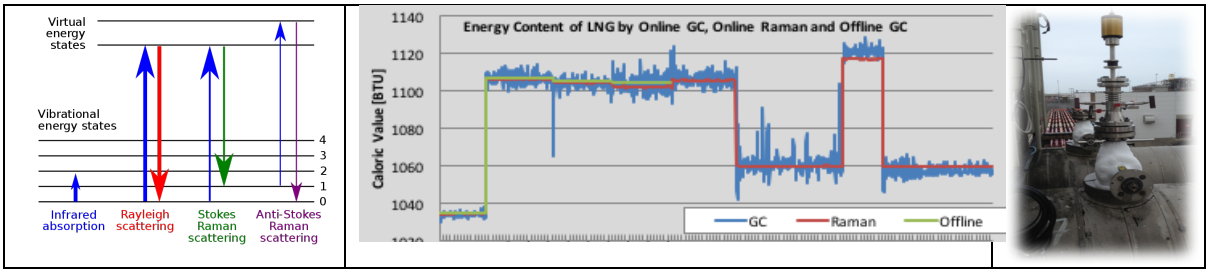
Benefits

Direct liquid analysis provides an excellent opportunity to enhance the continuous LNG composition measurement and calculation of physical properties required to prepare a “Certificate of Quality”.

Raman technology would allow for a simpler, sensor based composition measurement directly in the LNG providing the following benefits:

- Reduce the need to invest in complex vaporiser technology and experienced specialist maintenance staff to operate and maintain them.
- Improve reliability and reduce errors introduced by phase transition of LNG, this way improving reputation and reduce disputes on gas quality for the trading of LNG.
- Reduce operating costs for consumables, maintenance and calibration.

These benefits will contribute to enable deployment of composition measurement in small bunkering stations and can accelerate the use of LNG as a commercial fuel.



Small-scale LNG release tests and model improvements

Objectives

This project, led by DNV GL, focuses on the safety implications of LNG dispersion from small-scale LNG Infrastructure such as inland shipping, bunkering stations or LNG truck filling stations during & after loss of containment situations. It tries to assess risks and to identify hazards at small scale LNG bunkering stations. The regulation authorities are working on issuing standards for safe design, site construction and operation of LNG filling stations. This requires the presence of approved physical models. The verification and the validation of these models should be done against a wide range of experimental data. In this way, the project aims:

- to assess credible risks and hazards scenarios at small-scale LNG Infrastructure such as inland shipping bunkering stations or LNG truck filling stations,
- to make a significant step forward in the model improvement and development enabling modellers to validate and improve their models,
- to provide a crucial input for QRA and thus contribute into setting up safety guidelines for inland shipping bunkering stations or LNG truck filling stations.

Programme

It consists of two phases,

- Phase 1 looking at catastrophic rupture of LNG tanks and
- Phase 2 looking at failure of LNG transfer hoses.

Phase 1 tests were started at the Spadeadam test facility in September 2016. A single skin LNG tank, half-filled with LNG, was heated, leading to a substantial and fast pressure increase and the results observed and measured

.

The next tests are scheduled for mid 2017. Later this year, Phase 2 will commence.

LNG DistJet

Objectives

This experimental and numerical project, led by Engie, aims to better assess the consequences of an accidental LNG release and mitigate hazards close to public small-scale LNG applications. New applications for LNG such as refuelling, bunkering and power generation bring installations closer to areas of higher population density. Project results will lead to improved safety distance calculations for pressurized LNG releases, and the identification of the most relevant barriers to hazard reduction for LNG installations. The project aims to improve the accuracy of risk assessments for both authorities and the public. This improved accuracy on small-scale facilities is required because of the smaller proximity distances compared to a classic LNG import or export terminal.

The project will receive reliable measurements of gas concentration and temperatures for a large range of applications, and link these to the calculations by the model. In this way, a better understanding of release conditions, scale effects and height release should be obtained.

Programme

This project consists of two phases:

- Phase 1: small-scale experiments to validate the source terms
- Phase 2: medium to large-scale for flammable gas dispersion measurements

Phase 1 will be carried out in 2017 and will allow development of a detailed experimental database of the release properties. The range of nozzle orifices that will be investigated during this first program will be limited because of safety considerations (indoor releases) and/or because of physical interaction between the generated cloud and the boundary of the infrastructure, making the measurements less representative of a real situation.

Phase 2 will be carried out in 2018 and will allow a larger scale for the release and in open-air, extrapolation of the Phase 1 results and validation of the results for larger scale. It will obtain a full mapping of the lower flammability limit distance versus the storage conditions for a 10 mm release.

Events List

GERG has taken part in the following external events in the period 2016-7

- JRC Energy Storage Conference, Brussels (President)
- Energy Security for the Future, new Vision, Strategy Innovation, Monaco June 2017, President
- ISO JRC Conference, Dec 2016– "H2Market: Multi-fuel Service Stations and Power to Large Scale Hydrogen". Presentation on Hydrogen Adaptation (Secretary)
- IGU IGRC 2017 Rio de Janeiro – Exhibitor and multiple partner papers
- Meeting organised for DG Energy with Gas Industry representatives (Secretary, President, members)
- Presentation at CEN 234 – SFEM WG hydrogen liaison workshop (Secretary)
- Presentation on Network adaptation and Cross-cutting issues at CEN TC6 inaugural meeting (Secretary)
- Eurogas Annual Conference October 2016, Innovation and the Future of Gas (Secretary)
- Fleishmann Hillard Panel on H21 Project, Brussels, with European Commission (Secretary)

European Initiatives contributed to:

SFEM Working Group Hydrogen – Task Convener, report contributor
CEN TC6 – Liaison Organisation
Sustainable Biofuels Advisory Group (SGAB, Sustainable Transport Forum) – Contributor to report
ART Fuels Forum (successor to SGAB)

Working with Partners

- Eurogas Marcogaz GERG Smart Grids Task Force
- Marcogaz GERG Working Group on the PEF
- Eurogas Paper on Innovation Incentives in the gas distribution industry
- GasNaturally Steering Committee
- K4i Management Board

Papers Published or submitted

- GERG Update, IGU magazine, Autumn 2016
- GERG Biomethane Project – European Energy Innovation, in Press
- GERG Biomethane Project – Submitted to EBA Annual conference 2017
- GERG Biomethane Project, submitted to WGC 2018

List of ongoing GERG projects

	Renewable Gases and Low Carbon Gas	
1	The GERG Biomethane Project – removing technical barriers to the introduction of Biomethane, Industry and Horizon 2020	Engie
2	HIPSNET – A network for information exchange on Hydrogen in Pipelines	DBI
3	Development of an Accurate and Consistent Method for Methane Emission Estimation of the Gas (Distribution) Phase 2 (MEEMS)	DBI
4	Hyready – Recommended Practices for hydrogen in Pipelines	DNVGL
5	Elegancy – Accelerating CCS technologies for hydrogen production and distribution. Horizon 2020	Sintef
6	European Power to Gas Platform	DNVGL
7	Portable gas detectors to ensure safety when handling mixtures NG+H_2 or pure H_2	E.ON
8	Field investigation with Hydrogen Injection	E.ON
	Distribution	
9	Certification of Odour-Handy (THT, TBM, SFree) for the Gas grid operator	E.ON
10	Keyhole Tests (GTI)	E.ON
11	Identification, evaluation and industrialization of civil application of UAV for pipeline operators	Engie
12	A guideline for PE100RC	Kiwa
13	Clamp-on meters for distribution	Kiwa
14	Bagging- off system	Engie
	Transmission	
15	State of the Art of Small Bore Robotic inspection Tools	Gassco
16	Developing a Recommended Practice on Life Extension for Pipeline Networks	DNVGL
	Utilisation	
17	Self-regulated gas boilers able to cope with gas quality variation: State of the art and performances	DGC
18	Evaluation of the MEMS gas sensor technology	DGC
	LNG	
19	Performance review Raman technology for LNG custody transfer update	Fluxys
20	A calibrated Flow Standard for LNG	VSL
21	LNG DistJet / SPARCLING	Engie
22	Small-Scale LNG Release Tests and Model Improvements	DNVGL
	The total GERG Project portfolio value is approximately €27M	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