

## GERG PROJECT PROPOSALS – JANUARY 2020 UPDATE

### ASSESSMENT OF METHANE EMISSION FROM GAS UTILISATION

The natural gas industry of Europe is under pressure to document the loss of methane throughout the whole value chain from production to utilisation of gas. This project proposes a gas industry effort to document the loss of methane in the utilisation part of the value chain, which is today the part where less is known and that may be one of the largest contributors to the global emissions from natural gas.

Three main sponsors from France, the Netherlands and Denmark will support the action (agreement in discussion, the final decision is expected by the end of January) that should lead to a minimum budget of 300.000 Euro.

The overall aims of the project are as follows:

1. To document the emission of methane from the different segments of gas utilisation (existing market) for the countries involved.
2. To document the emission of methane of new technologies and new gas utilisations (e.g. gas in transport) that are relevant for the countries involved.
3. Combining the emissions factors with existing market data to establish a quantitative and detailed picture of national methane emissions and recommendations for reduction (national mapping of emissions).
4. To elaborate on solutions for methane emissions reduction based on the understanding of the CH<sub>4</sub> emissions mechanisms and new technologies available.

The study will be data driven – so, besides literature work, there will be substantial data (testing) behind the reported emission factors. Several partners (members of GERG) from the three sponsor countries have already been identified and have agreed to collaborate in executing the technical work programme. Contacts have also been made to collaborate with two other on-going projects (USA & Germany).

More sponsors are welcome at two levels:

1. At country level or large company level for 100,000 Euro (main sponsors joining the three existing ones)
  2. At individual company level for 10,000 Euro (simple sponsors)
- Associations may also join (fee in discussion)

Main sponsors are monitoring the project and making decisions on the work programme including appliances to be tested and also deciding on the result dissemination policy. The main sponsors have full access to all results and will be given detailed deliverables covering points 1 to 4 above.

Simple sponsors will propose segments of technologies that are relevant for their activities and will be invited to an Advisory group to interact with the project during its execution. Simple sponsors will also be given the relevant national mapping of emissions.

Duration: 2 to 2.5 years; starting in February-March 2020.

Contact : Jean Schweitzer, DGC ([jsc@dgc.dk](mailto:jsc@dgc.dk))

## SPARCLING PHASE 2

The experimental and numerical project SPARCLING, led by ENGIE, tries to better assess the consequences of an accidental LNG release and mitigate hazards close to public small-scale LNG applications. Phase I: **Detailed experimental determination of pressurized LNG release properties** (200k€) was finished in April 2019, and the report is being prepared. A go/no go decision will be taken afterwards for Phase II:

Phase II: **LFL distances for small scale representative LNG releases** (200k€) -TBD

- Lead by ENGIE in Montoir de Bretagne (France)
- Investigation of conditions representative of LNG small scale application (9 tests):
  - Storage pressure: 1,5 / 4 / 9 bar abs
  - Height of release: 0,1 / 0,5 / 1 m
  - Release diameter: 10 / 25 mm
- Subcooled and saturated condition with use of cryogenic pump
- Quantification of rainout
- Verification of small-scale tendencies observed in phase 1 on a larger, representative scale.
- Provide good quality data on both source term and dispersion of flammable gas in order to validate the link between both prediction models.

New participant: 40 k€ / phase to join:

- expansion of the scope
- decrease of participation cost

Contact: Dirk Goeminne, Fluxys ([dirk.goeminne@fluxys.com](mailto:dirk.goeminne@fluxys.com))

## WEATHERING OF STORED LNG

As introduced by Prof. Vesovic, Imperial College launched a study to construct a realistic model of LNG weathering, to allow the LNG industry to predict and optimize LNG behavior in LNG storage tanks. The different physical processes that govern weathering are taken into account in the mathematical model.

A first set of conclusions, leading from the model's calculations are:

- following the transient period, the temporal evolution of the vapour temperature profiles is primarily governed by the increase in the vapour height
- the heat transfer by the advective upward flow dominates the energy exchange in the vapour phase. The natural convection within the vapour phase is negligible.
- vapour to liquid heat transfer is small, in line with recent experimental findings, and in general, less than 10% of the heat that enters vapour is transferred, indicating that the vapour phase constitutes an effective thermal resistance.
- the BOG rate is mainly governed by the evolution of the liquid volume. The variation in BOG rates will be greatest for small tanks with a poor insulation;

In a next phase, the intention is to validate and adjust the model with practical data, which could be delivered by LNG Terminal operators. These data providers could later on dispose of the model to fine tune their daily operations and tank strategy management.



Contact: Velisa Vesovic, Imperial College, and Dirk Goeminne, Fluxys ([v.vesovic@imperial.ac.uk](mailto:v.vesovic@imperial.ac.uk) and [dirk.goeminne@fluxys.com](mailto:dirk.goeminne@fluxys.com))