



MARCOGAZ

Methane Emissions Report - Midstream

2017

marcogaz
TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

- **CH₄ emissions reports**

- Transmission (update with figures 2015)
- Distribution (update with figures 2015)
- Underground Gas Storage (new)
- LNG terminals (new)
- End-uses / appliances (pending)

→ Position Paper*

- **Best practices for reduction of the CH₄ emissions**

- Currently limited to Transmission and UGS activities

- **MEEM project [GERG]**

- Research for harmonization of data collection and calculation of CH₄ emissions in the EU
- MARCOGAZ will promote this into CEN standardization

*Ref. WG-ME-17-31

“Bottom > Up” methodology: based on an aggregation of collected data from the field (>< “Top > Down”)

$$\text{Total CH}_4 \text{ emissions} = \Sigma(\text{Emission factor} * \text{Activity factor})$$

Emission factors describe typical methane emissions of a component or part of the gas system (e.g. valve, pipeline section).

The **Activity factors** are the population of emitting components such as pipelines (length), installed compressors, the number of venting activities, accidental perforation, etc.

The first step is to collect data on CH₄ emissions for EU28.

1) To **collect data** from different european companies

Included emissions

- ✓ Fugitive emissions
- ✓ Pneumatic emissions
- ✓ Vented emissions (maintenance + incidents + operations)
- ✓ Unburned CH₄ in combustion processes

2) To check the **correlation** between CH₄ emissions and Activity Factor

3) Conclusion on **representative dataset**

Methodology - Forms

Example

METHANE EMISSION Calculation for Distribution

| Organisation | | | Natural Gas Composition | | |
|-------------------------|--|--|--|--------|--|
| Company: | | | Average Methane Content of Natural Gas: | | % (Vol.) |
| Emissions for the Year: | | | Density of Methane: | 0,7175 | kg/m ³ |
| Responsible Person: | | | Conversion Factor from m ³ Nat.gas to g CH ₄ : | 0 | g CH ₄ / m ³ Gas |

| Calculation | | | Activity Factors | | Emission Factors | | | | Total Emissions | | Source for own factor | | | Remark (please specify, if possible) |
|-------------|-----------------------------------|----------|------------------|------|------------------|---------|---------|------|-------------------|---------|-----------------------|------------|------------|---|
| No. | System Category | Pressure | Data | Unit | Marcogaz Range* | | Company | | Nat.Gas | Methane | Measurement | Literature | Estimation | |
| | | | | | Minimum | Maximum | Data | Unit | m ³ /a | g/a | | | | |
| 1. | Distribution Lines | | | | | | | | | | | | | |
| 1.1 | Grey cast iron with lead joint | Low | | km | M | | | M | | | | | | |
| | | Medium | | km | M | | | L | | | | | | |
| | | (1) | | km | | | | | | | | | | |
| 1.2 | Ductile cast iron | Low | | km | L | | | L | | | | | | |
| | | Medium | | km | M | | | L | | | | | | |
| | | (1) | | km | | | | | | | | | | |
| 1.3 | Steel | Low | | km | L | | | L | | | | | | |
| | | Medium | | km | L | | | L | | | | | | |
| | | (1) | | km | | | | | | | | | | |
| 1.4 | Steel with cathodic protection | Low | | km | L | | | L | | | | | | |
| | | Medium | | km | L | | | L | | | | | | |
| | | (1) | | km | | | | | | | | | | |
| 1.5 | Steel without cathodic protection | Low | | km | L | | | M | | | | | | |
| | | Medium | | km | M | | | M | | | | | | |
| | | (1) | | km | | | | | | | | | | |
| 1.6 | Plastic Polyethylene PE | Low | | km | L | | | M | | | | | | |
| | | Medium | | km | M | | | L | | | | | | |
| | | (1) | | km | | | | | | | | | | |
| 1.7 | Plastic PVC | Low | | km | | | | | | | | | | |
| | | Medium | | km | | | | | | | | | | |
| | | (1) | | km | | | | | | | | | | |

Origin: Measurements + Literature + Estimation

Transmission / Underground Storage / LNG Terminals

- ✓ Fugitive emissions: e.g. measurement EN15446 (EPA21 in US), bagging
- ✓ Pneumatic emissions: e.g. measurement, estimation
- ✓ Vented emissions (maintenance + incidents + operations): e.g. calculation
- ✓ Unburned CH₄ in combustion processes: e.g. measurement, estimation

Distribution

- ✓ **Leak flow capturing**: capturing the leaking gas as far as possible, by encapsulating the leaking components.
- ✓ **Suction method**: capturing as much of the leakage by (partial) enclosing the leaking components, diluting the leakage using excess suction.
- ✓ **Direct method, optical**: no explicit sampling, but using optical path concentration sensors.
- ✓ **Direct method, pressure decay**

LNG

4.700 ton CH₄
0,002 % compared to the EU28 sales
0,003% of anthropogenic CO_{2eq}

UGS

38.000 ton CH₄
0,01% compared to the EU28 sales
0,02% of anthropogenic CO_{2eq}

TSO

133.000 ton CH₄
0,05% compared to the EU28 sales
0,08% of anthropogenic CO_{2eq}

DSO

339.000* ton CH₄
0,12% compared to the EU28 sales
0,21% of anthropogenic CO_{2eq}

Remarks

- ✓ Results valid at global European level and not for an individual country.
- ✓ (*) 553.000 with 95% confidence level as mentioned in the report.

1. Total amount of **CH₄ emitted in 2015** from the EU28 Natural Gas Grid (Transmission, Distribution, Underground Storage, LNG Terminals) is **0,2%** compared to the total mass [*tons of CH₄*] of Natural Gas **sales** in EU28 [*tons of Natural Gas*].
2. Total amount of **GHG emitted in 2015** from the Natural Gas Grid (Transmission, Distribution, Underground Storage, LNG Terminals) is **0,3%** of the total of **anthropogenic** GHG emissions (CO₂equivalents) in EU28.
3. Special attention should be given to **harmonized reporting standards** (data collection, measuring methods, calculation methods, units, reporting, ...) in EU.



Thank you !

marcogaz

TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

Avenue Palmerston 4
1000 Brussels
BELGIUM
T: +32 2 237 11 39
www.marcogaz.org