

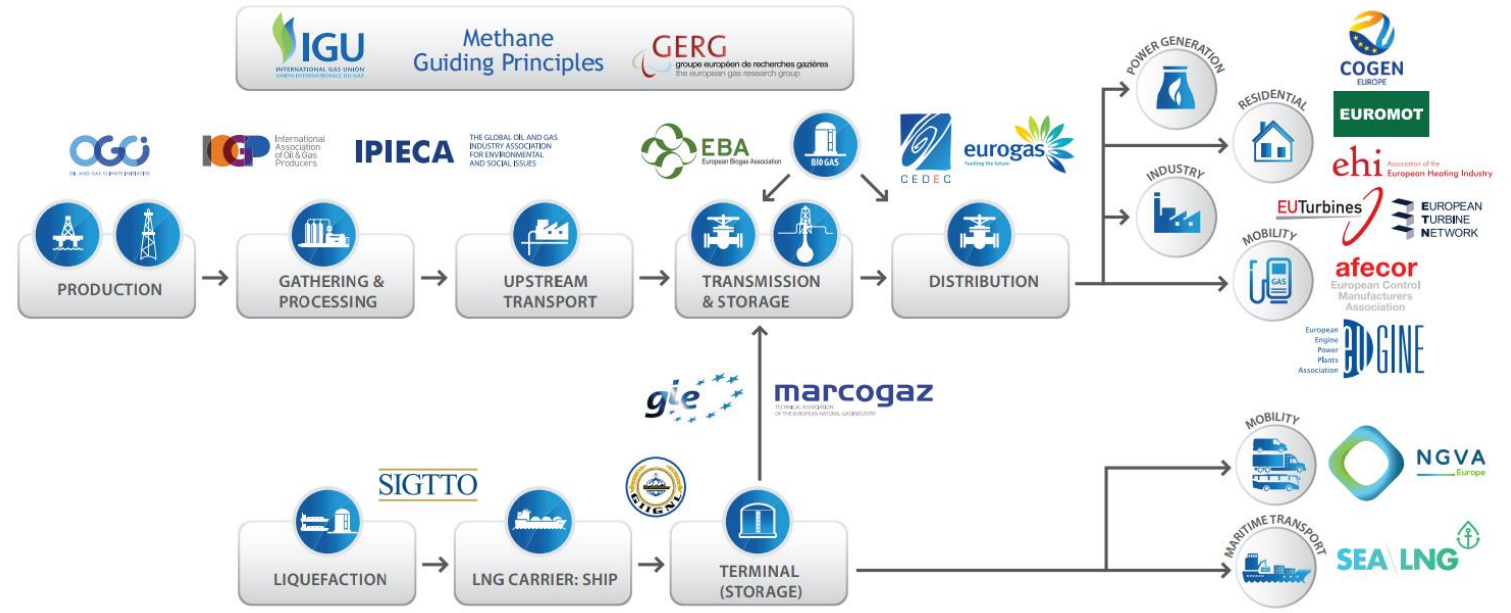


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Monthly Methane Mondays: MARCOGAZ technical recommendation on LDAR

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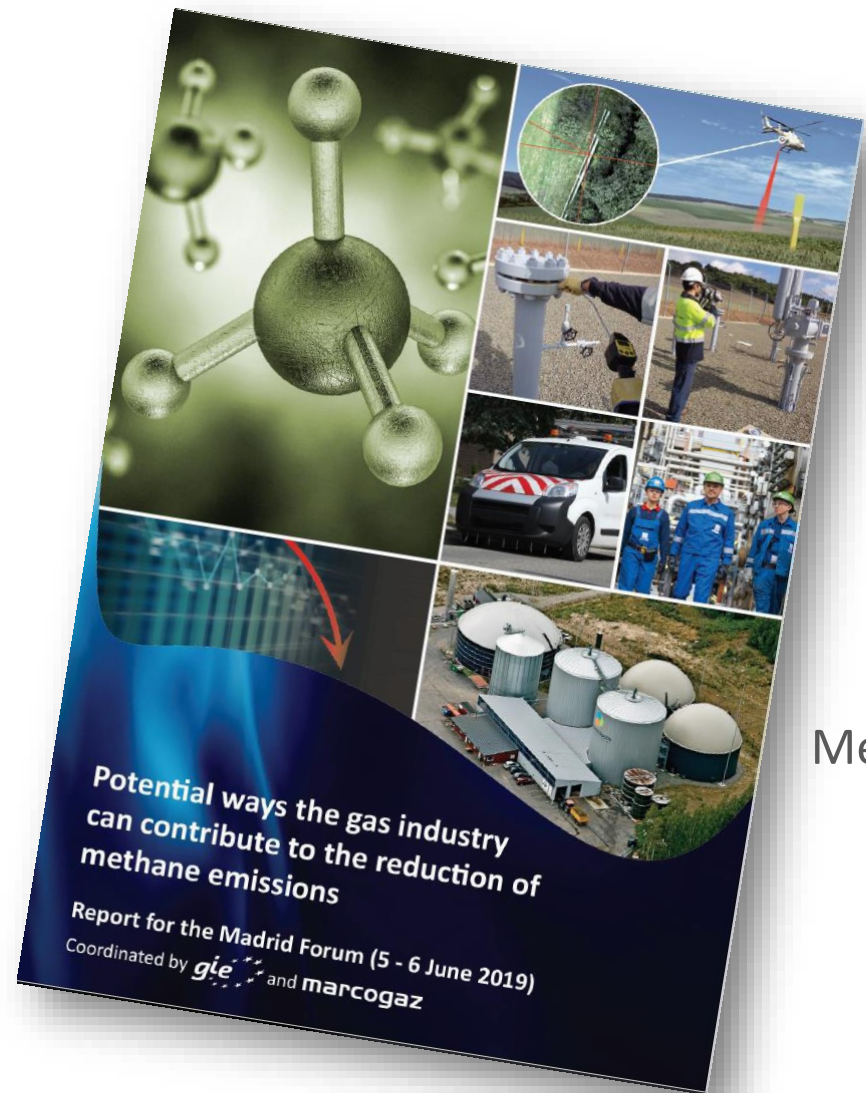
26th of April of 2021

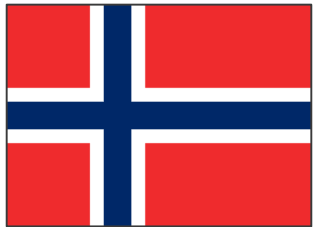


Methane emissions management and reduction for the EU gas industry:

- Not a new topic
- Among the top priorities
- An opportunity to contribute to reaching the Paris Agreement targets

<https://www.gie.eu/index.php/gie-publications/methane-emissions/methane-emission-report-2019>





Technical Guidance Document Number 2: Fugitive Component and Equipment Leaks

Authors:
Climate and Clean Air Coalition (CCAC)

Resource type:
Guidelines & Tools

Publishing year:
2017

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

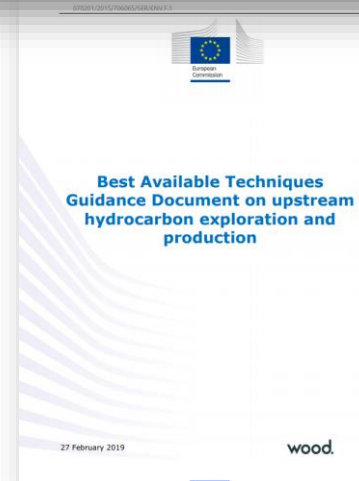
EN 15446

January 2008

ICS 13.040.40

English Version

Fugitive and diffuse emissions of common concern to industry sectors - Measurement of fugitive emission of vapours generating from equipment and piping leaks



Also legislation in some EU Member States, mainly for DSOs

B) Policies, regulations and standards

B.1) Are there any binding rules in your country related to LDAR programmes?

Please indicate "Yes" or "No". If possible, please include the reference to the documents, the links and the competent authorities (E.g. Environmental Authorities, NRA, Energy Ministry, national gas association, national standardisation body, ...). Please feel free to add additional information.

B.2) If No. Is your company performing LDAR programmes on a voluntary basis?

Please indicate "Yes" or "No".

B.3) Are you aware of any non-binding documents (standards, guides) on LDAR programmes that are used in your country?

Please indicate "Yes" or "No". If possible, please include the reference to the documents and the links. Please feel free to add additional information.

B.4) Please feel free to provide additional information

C) Technical aspects on LDAR programmes

C.1) Could you please indicate the frequency of your on-site inspection (detection) and the technology(-ies) used? (Please specify the gas system type or asset or % of assets)

(E.g. yearly in the UGS using soap spray, every 3-years in the compressor station with FID)

C.2) Do you measure/quantify the emissions of the detected leaks? If yes, could you please indicate the frequency and the technology(-ies) used? (Please specify the gas system type or asset or % of assets)

(E.g. Yes. Every 3-years in the LNG terminal using IR camera and hi flow sampler)

C.3) Could you please indicate the maximum period to repair those leaks that cannot be repaired in parallel?

(E.g. 2 years after it was detected)

D) Costs and cost recovery

D.1) Could you please indicate an estimation of the yearly costs linked to LDAR programmes? (Please feel free to add additional information and if possible a disaggregation of the costs (e.g. detection versus repair))

D.2) What part of these costs are included in your regulated revenues? (in the case of regulated companies)

D.3) Has your National Regulatory Authority set any kind of incentive linked to LDAR programmes?

E) Challenges

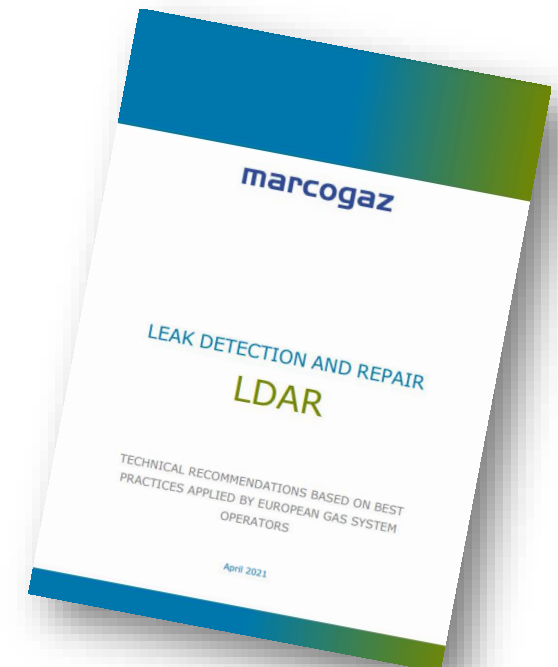
E1) In your opinion, what are the main challenges/barriers to implement ambitious LDAR programmes?



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TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

QUESTIONNAIRE ON LDAR PROGRAMMES

- 31 answers from 17 Member States covering transmission, storage facilities, LNG terminals, distribution and 1 other organization were collected



Leaks are **unintentional emissions from pressurised equipment** used in the oil and gas industry. Leaks are usually caused by imperfections in, or ordinary, wear and tear of sealed joints, such as flange gaskets, screwed connections, valve-stem packing, or by poorly seated valves. Leaks can also come from the walls of pressurized equipment (e.g. vessel or pipeline), as a result of corrosion or damage.

LDAR programmes are used to **identify** and **support the repair** of equipment or infrastructure that can be a source of emissions due to leaks from pressurized equipment. It is often accomplished by a **periodic inspection survey** to identify leaks, **followed by repair** of any found leaks.

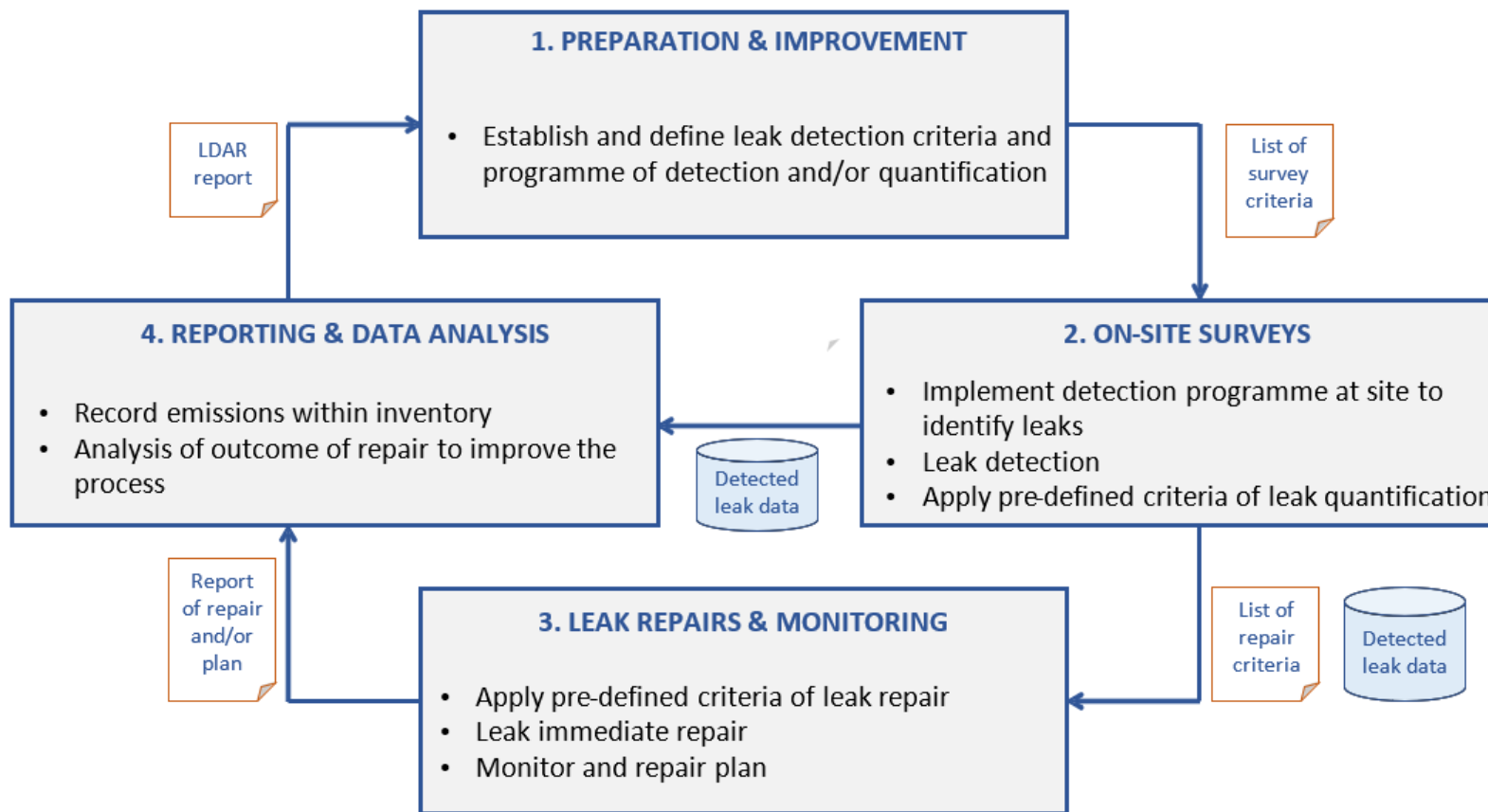


SAFETY



ENVIRONMENTAL

- Companies are defining their LDAR strategies based on
 - Previous experiences, field reality
 - Type, specificities and criticality of installations
 - Learning curves
 - Frequencies
 - Technologies/instruments
 - Thresholds

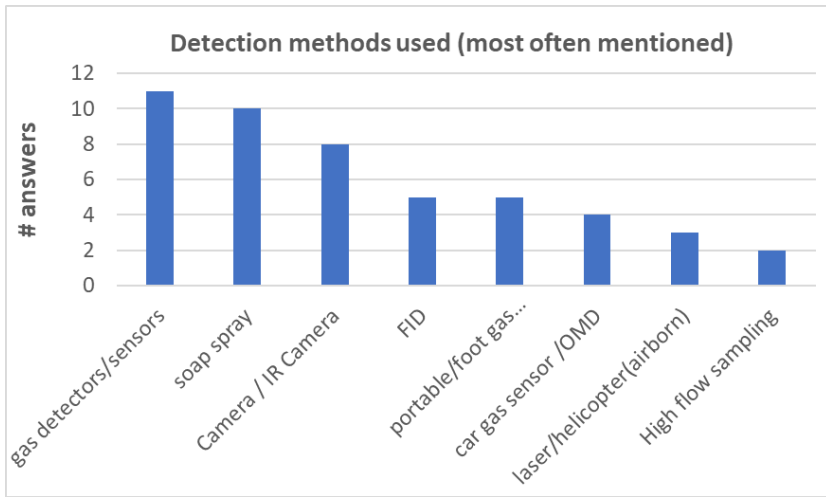


- For **several decades**, gas operators have been conducting LDAR programmes on regular basis for safety reasons and as part of its emissions mitigation strategy
- The LDAR programme is used to **detect** leaks and **repair** them. These activities are in some cases a good opportunity to **quantify** the emissions. Results and information should be **recorded** and can be used for the **reporting**
- Flexibility and recognition that **one solution does not fit all** the assets, operations and equipment along the gas value chain, so different methods should be allowed
- Legislation should ensure **flexibility** for the adoption of future technologies and methodologies for LDAR
- Majority of the mid and downstream operators are **regulated entities**. Costs associated to LDAR should be recognised by NRAs
- **Challenges and gaps**: High costs, cost recovery, time, technologies and service providers, training personnel, mind change
- **MARCOGAZ technical recommendation** on LDAR programmes is available for further standardization and legislative developments

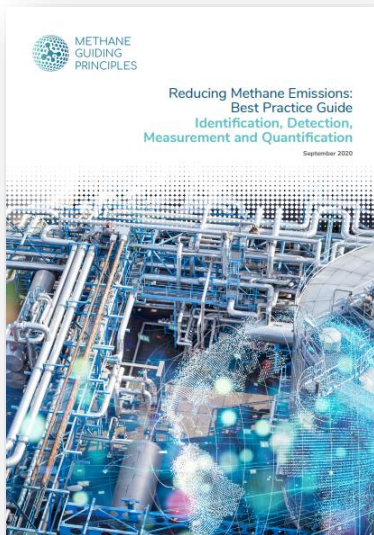


- Leak **detection** is performed on a **large variation in frequency** among the companies taking into account **different parameters** such as:
 - ✓ Safety and/or environmental risk evaluation
 - ✓ Results of previous LDAR campaigns
 - ✓ Type of potential leaking device or component and the material's properties
 - ✓ Age of the device or component
 - ✓ Operating pressure
 - ✓ The cost-effectiveness of LDAR campaigns
- MARCOGAZ recommends that assets are **periodically inspected**. Companies should set the inspection frequency based on the results of previous campaigns. At least for the relevant assets, initial inspections should be performed on an annual basis.

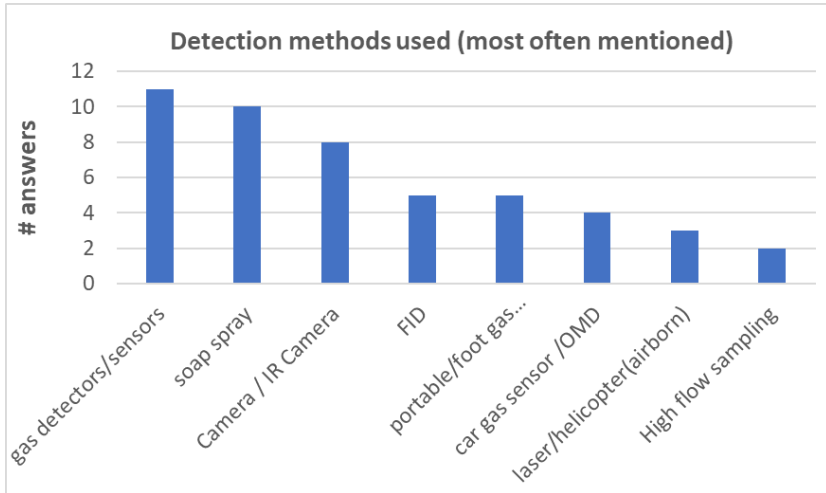
Different practices and technologies



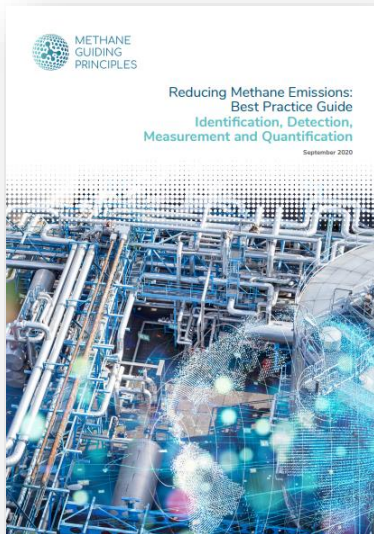
14 other methods were mentioned



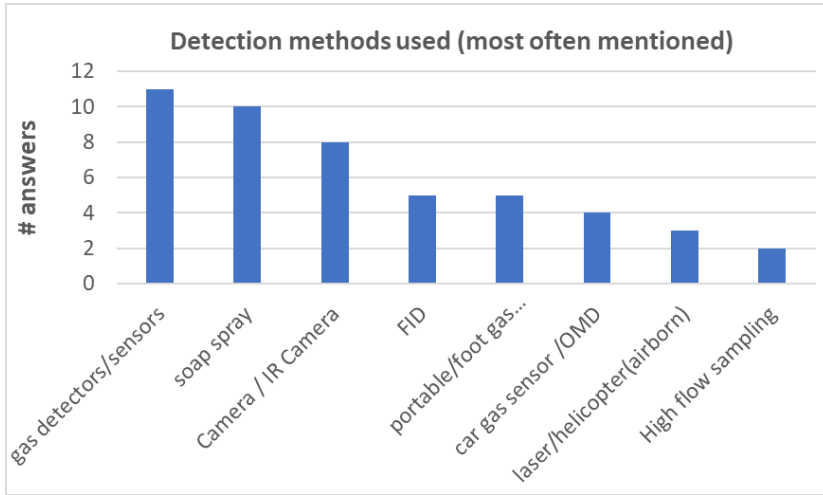
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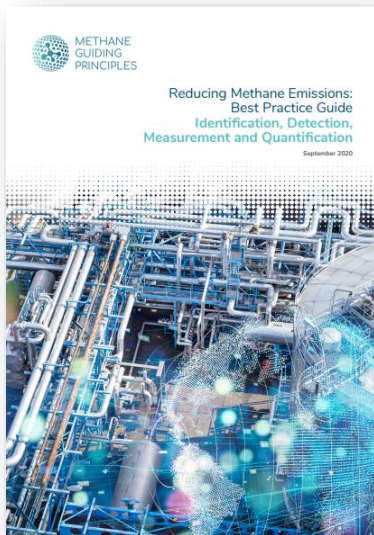
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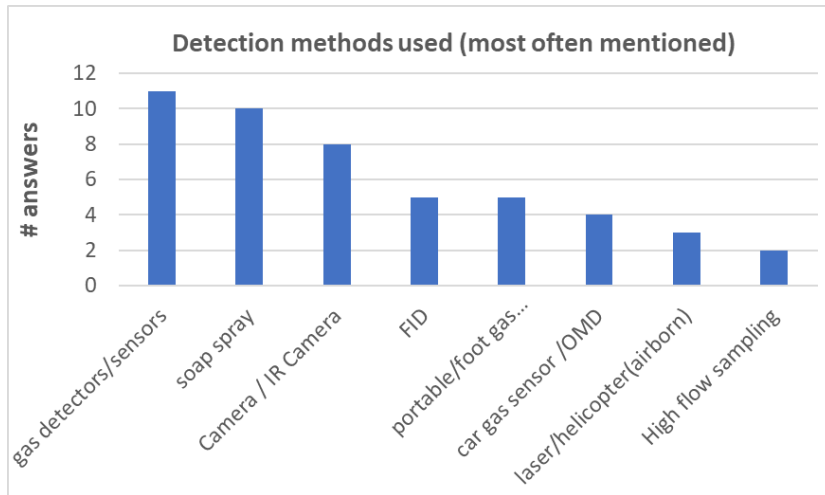
Different practices and technologies



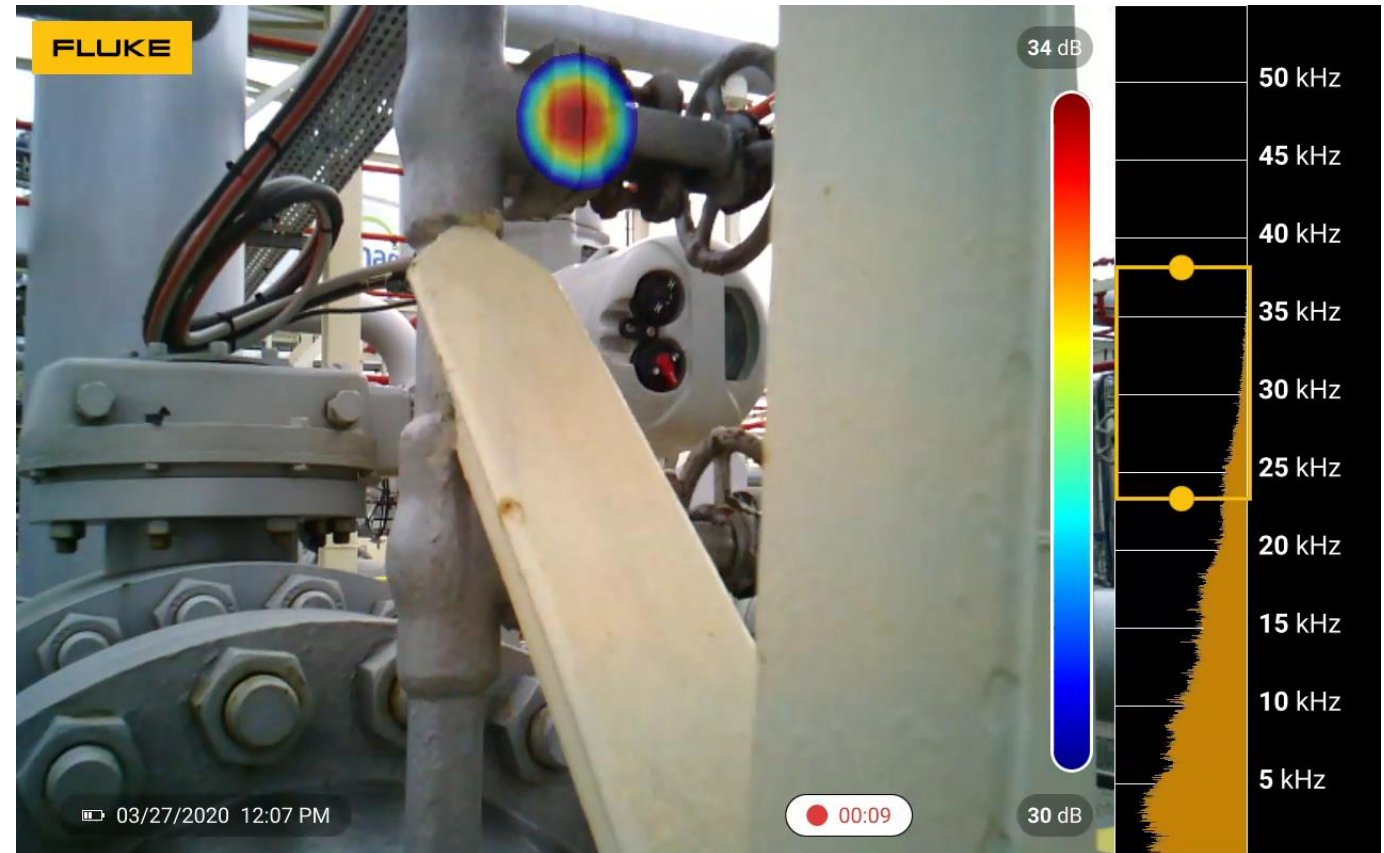
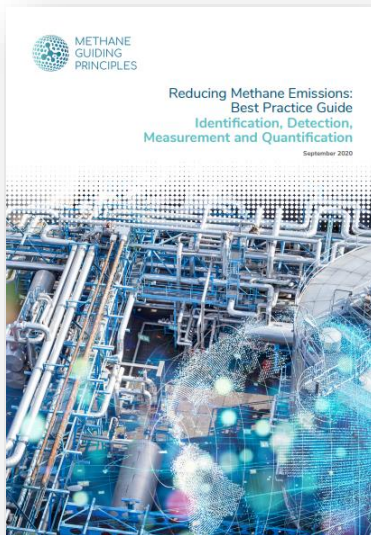
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Different practices and technologies



14 other methods were mentioned



Technology evolves very quickly -> Legislation should allow for the adoption of future technologies and methodologies for LDAR

The detected leaks needs to be repaired as soon as possible taking into account safety, technical and economic aspects (if feasible, parallel repairs).

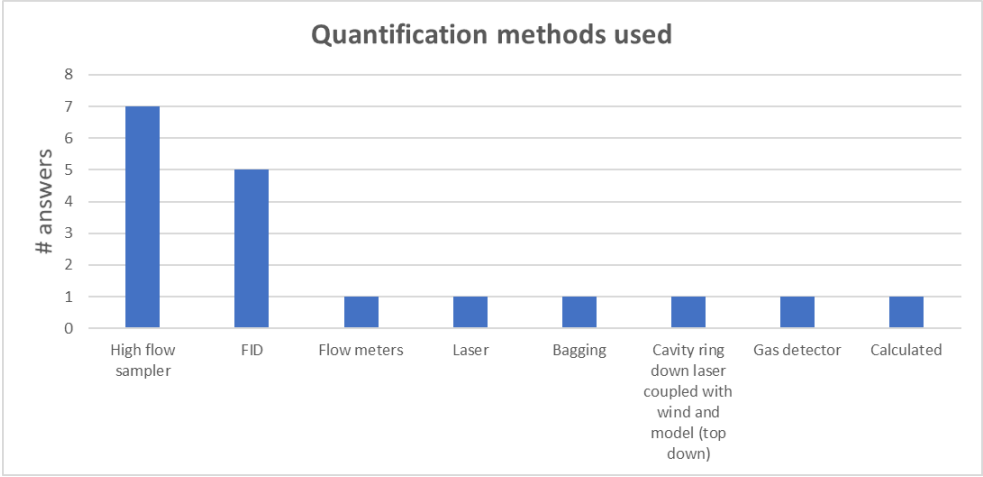
Repairs that cannot be performed immediately are planned and they need to be **classified** taking into consideration different aspects such as safety impact, amount of methane, concentration of the leak, accessibility, cost-effectiveness evaluation.

MARCOGAZ recommends to carry out the repairs within 1 year from detection considering its safety impact, the environmental aspects and its cost-effectiveness. Some specific situations need to be solved via dedicated procedures with possibility to deviate from the 1 year recommendation.

It is recommended to **monitor** the **repairs**.



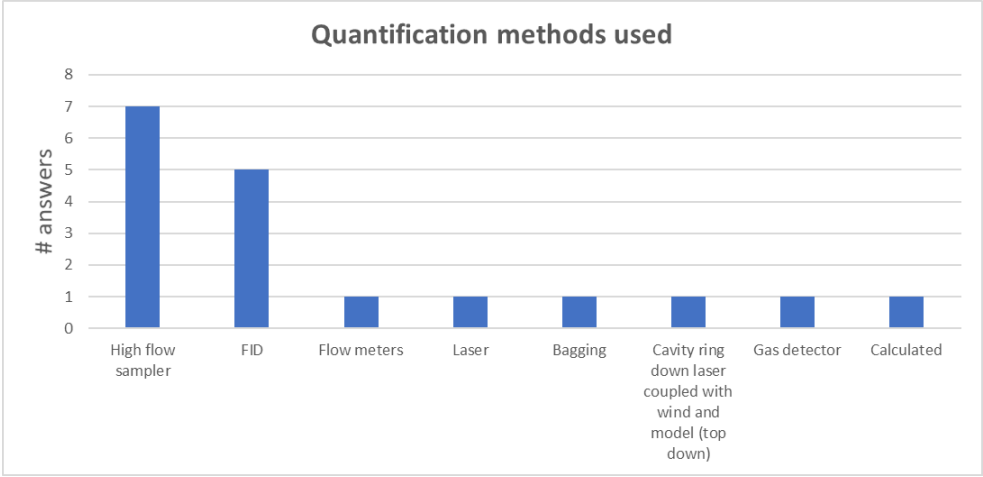
LDAR campaigns can be a good opportunity to quantify some emissions



Quantification is done based on measurements (flow measurements, EN 15446, emission factors...).



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LDAR campaigns are essential part of the DSO safety policy
Most infrastructure is located in publicly accessible areas



(City gate station)
(TSO)



Pipelines
< 16 bar



District stations
1:2000 connections



Pipelines (typ. 100mbar) +
Service lines

2 km per 100 connections,
often on client site



[Update informatie gasmeters - Netbeheer Nederland](#)

Metering cabinets
in or at client residence

Gas odorisation is essential for timely leak detection

- 24 h call centre
- Immediate reaction on call (< 30 minutes)
- Typically: 1 call on 100 customers per year
- Experiment in NL: gas odour typically reported within 1 day

Additionally:

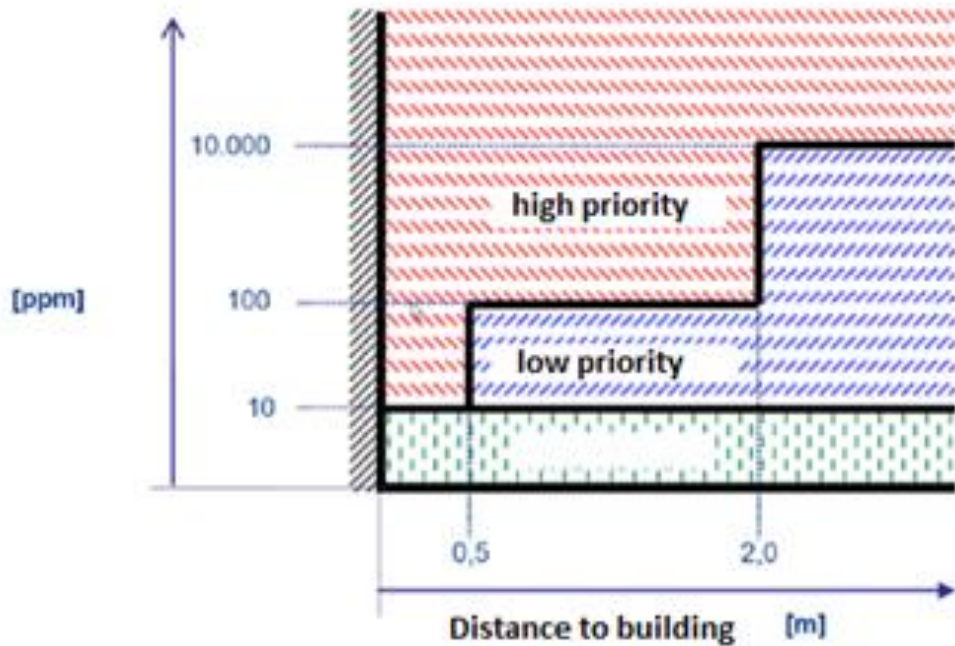
- Periodic leak survey pipelines
- Periodic inspection of station and cabinets



Strict standards are already in place
Detection levels are technology dependent

- Figure from NEN7244-6
- Specific for carpet probe

Repair action



- Leak survey by car

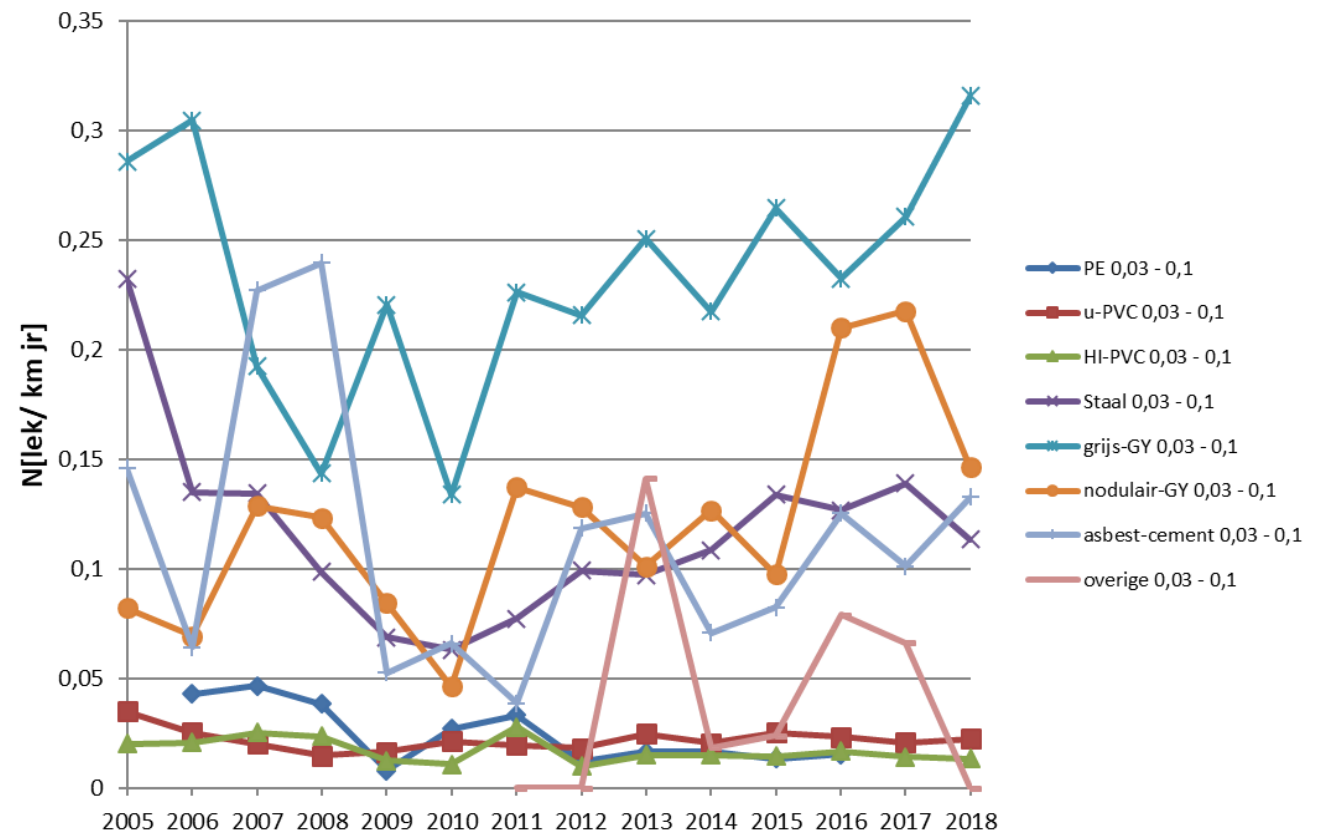
- Carpet probe inspection



Modern distribution grids are very gas tight

- Figure from Kiwa NBNL report
- Leak density of typically 1 leak per 50 km
- Older materials have more leaks, and are being replaced
- Leak density is related to inspection frequency (1 yr – 5 yr)

Lekfrequentie (N) Lagedruk net



For the DSO the implementation of LDAR is part of the daily routine

For DSO:

- Complete set of standards is in place in many countries
- Result of surveys and calls reported to National Regulators
 - External auditing in place
- Safety has highest priority because of continuous presence of people in immediate neighbourhood of the assets
- Safety is the driving consideration for LDAR
- Environmental aspects are less constraining than safety concerns

- Flexibility and recognition that one solution does not fit everywhere, so different methods should be allowed
- Legislation should ensure flexibility for the adoption of future technologies and methodologies for LDAR

Thank you for your attention!



Gas Infrastructure Europe

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