



OGMP 2.0 LEAK DETECTION AND REPAIR

Slides ownership:
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OGMP 2.0 leak detection and repair

01 ITALGAS & OGMP

02 CRDS technology adoption

Lessons learned and results achieved

03 Reporting OGMP

Methane emission reduction

ITALGAS & OGMP

ITALGAS is the largest natural gas DSO in Italy and **the 3rd largest player in Europe**. Italgas is committed every day to fight against gas leaks for two major reasons:

- 1) Ensure **gas network safety**;
- 2) Reduce **fugitive emissions** and contribute to European environmental goals.

Highlights

- Italgas has been joining the OGMP 2.0 initiative since November 2020
- Italgas promotes a common approach to methane emissions abatement among members of **GD4S** and among **GD4S, CEDEC, Eurogas, and GEODE**.
- Italgas is also contributing to the effort to define an Italian methane strategy, led by the **NGO** "Friends of the Earth".



About Italgas

74,000 km

gas network

8-9 bn m³/year

gas despatched

7.7 mln

End customers

4,200

employees



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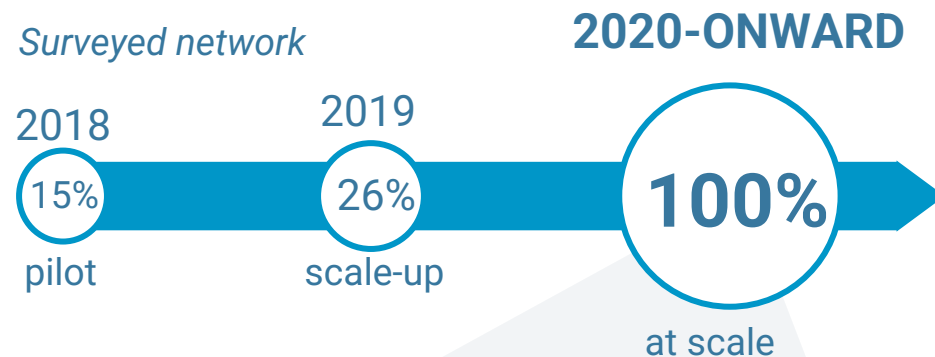
Methane emission reduction

Italgas adoption of Picarro technology

Key figures



In 2018 Italgas launched the adoption of the **innovative gas leakage detection system** based on cutting-edge laser technology (Picarro surveyor)



Dedicated Team

24 Surveyor - 84 Backpack

15x Investigated and Repaired Leakage Density vs 2017

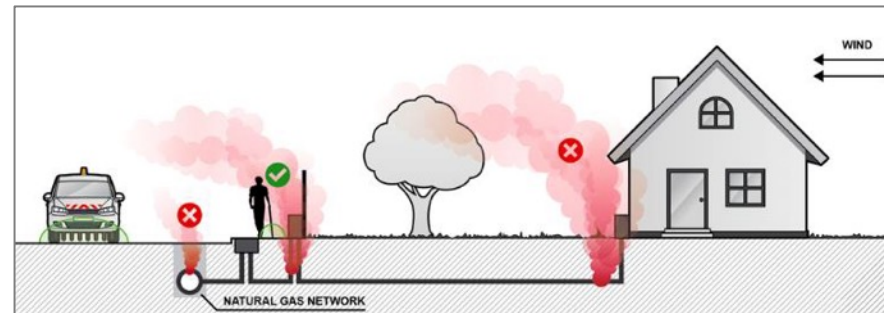
CRDS technology benefits

Higher sensitivity resulting in larger detection areas and faster survey

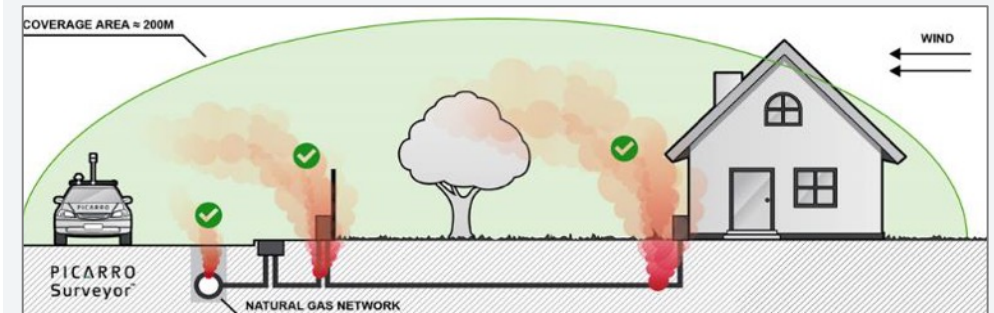
The innovative gas leak detection system Picarro Surveyor allows DSOs to achieve **measurable improvements with respect to traditional technologies.**

● Coverage area
 ✓ Leak detected
 ✗ Leak undetected

TRADITIONAL gas detection



PICARRO gas detection



Detection area

only leaks on main ground

leaks on the entire networks (main, services, aerial, smart meters), including underground leaks

Leak density detection

~0.03 leaks/km

~0.8 leaks/km

Gas detection

Detects only CH₄

Discriminates natural gas from other false positive

Weather conditions

Sensitive

Not sensitive

CRDS Technology: Italgas' fleet

Italgas owns the largest fleet of Picarro's equipment worldwide:

- **24 CRDS technology equipped surveyors + 1 boat;**
- **84 backpacks;**
- **Around 300 people trained** and involved into the fight against gas leaks.



CRDS technology

Lesson learned and results achieved

Application of the CRDS gas leak detection system to Italgas' distribution grids

New challenging approach:

- New business organization with the establishment of a new dedicated team (EMIGAS)
- Spread the innovation culture to the Italgas' territorial units

Lesson Learned:

- Innovative LDAR program:
 - Fleet and workforce management
 - Driving surveys quality control
 - Investigations prioritisation based on emissions or risk ranking
- Fugitive emissions quantification (data measured with LDAR)
- New approach to manage pipelines maintenance (Reactive → Proactive)
- Data quality experience:
 - Reconciliation of data measured on field
- Participation in international committees (OGMP, IMEO, GD4S) and sustainability indexes (Dow Jones, CDP)



Lesson Learned

Italgas has been using this innovative CRDS system along the last **two years**, inspecting +74.000 km in more than **1.800 municipalities**.

FROM REACTIVE TO PROACTIVE APPROACH

10%

2020 capex focused on the proactive maintenance

50%

2021 capex focused on the proactive maintenance

Abatement of Fugitive emissions

- 45%

Emissions avoided thanks to the repair time reduction

Gold Standard



International committees (OGMP, IMEO, GD4S) and sustainability indexes (Dow Jones, CDP)

FLEET & WORKFORCE MANAGEMENT

24

Surveyor

84

Backpack

Continuous Training

40+

Training Sessions

1205+

Hours for technician's training

2208+

Hours for drivers' training

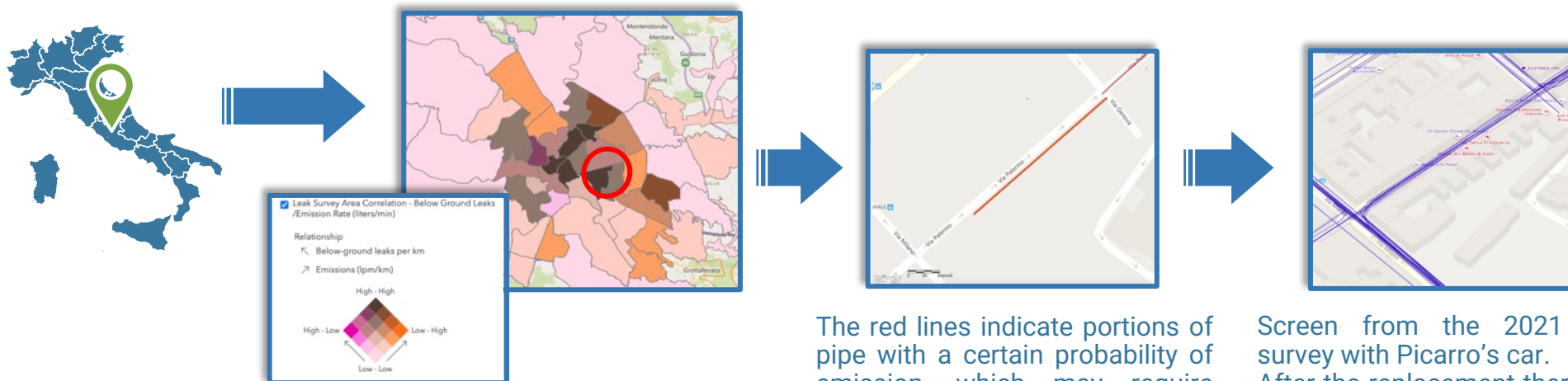


Towards a digital gas network

Smart Maintenance & Fugitive emissions reduction

Picarro's approach full adoption allows Italgas to gain a huge benefit in the detection and repair of gas leaks, such as:

- Drastic reduction of investigation and repairing SLA⁽¹⁾;
- Super Emitters early detection;
- LISAs (leak indication search area) prioritisation;
- Use of collected data for better Asset Management choices and Smart Maintenance model.



Screen from the 2020 data Asset Management platform.

The red lines indicate portions of pipe with a certain probability of emission, which may require preventive replacement actions.

Screen from the 2021 driving survey with Picarro's car. After the replacement there are no leaks on the same portion of pipe.

1. «Service Level Agreement» → Investigation SLA = time between last driving survey and leak grading;
Repairing SLA = time between leak grading and repair.

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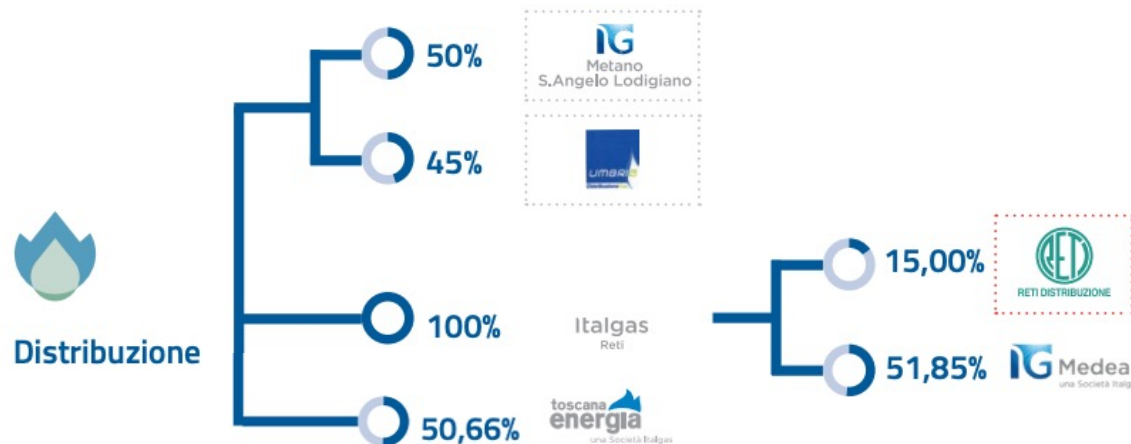
Lessons learned and results achieved

03 Reporting OGMP

Methane emission reduction

Reporting OGMP

Thanks to the use of Picarro's **Cavity Ring-Down Spectroscopy (CRDS)** technology, Italgas positioned itself at L4/L5.



Operated asset

	2020	2021	2022
Italgas Reti	L4/L5	L4/L5	L4/L5
Toscana Energia	L4/L5	L4/L5	L4/L5
Medea	L3	L4/L5	L4/L5

Non operated asset

	2020	2021	2022	2023	2024
Metano S. Angelo Lodigiano (MSA)	L3	L3	L4/L5	L4/L5	L4/L5
Umbria Distribuzione Gas (UDG)	L3	L3	L4/L5	L4/L5	L4/L5
Reti Distribuzione	L3	L3	L3	L4/L5	L4/L5



Survey Picarro

2021 MSA

2022 MSA, UDG, Reti Distribuzione



Methane emission reduction

For Italgas the main drivers for methane emission reduction are:

- **Prioritise leaks** based on their emission rate (localisation and repair of Super Emitters first);
- Try to **reduce the time** for localisation and repair, also in comparison with the standards prescribed by ARERA;
- Use **asset management and predictive maintenance** algorithms, to define CAPEX plans. In 2022, a significant number of investments are expected to be undertaken in the most emissive areas of the network.

TARGET 2020

General Information about the target			Performance in the Reference or Base Year			Target Year			Reporting Year			
Consolidation Basis (Operational Control, Equity)	Year in which the target was set	Reference / Base Year	Total emissions in scope of the target	Units of measure	Target Year (e.g. 2025)	Targeted reduction from Reference or Base Year, %	Absolute emissions in Target Year	Current Reporting Year	Total CH4 emissions	% Change from Reference or Base Year	Target status in reporting year	
Operated Asset	2020	2015	21.959	tCH4	2025	-83%	3.711	2020	5.154	-77%	Underway	

TARGET 2021 *

* Values have to be defined

General Information about the target			Performance in the Reference or Base Year			Target Year			Reporting Year			
Consolidation Basis (Operational Control, Equity)	Year in which the target was set	Reference / Base Year	Total emissions in scope of the target	Units of measure	Target Year (e.g. 2025)	Targeted reduction from Reference or Base Year, %	Absolute emissions in Target Year	Current Reporting Year	Total CH4 emissions	% Change from Reference or Base Year	Target status in reporting year	
Operated Asset	2020	2015	21.959	tCH4	2025	-83%	3.711	2021	4.618	-79%	Underway	

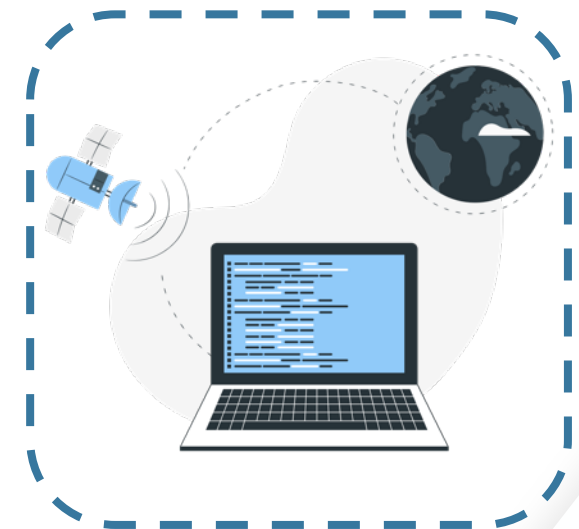
NOTE: With the support provided by Politecnico di Torino, Italgas has also estimated the emissions not measurable by Picarro such as permeation fugitive emissions, vented operational emissions/maintenance and removal installation of gas meters.

What's next?

With the experience gained during these years, Italgas is now supporting other DSOs across Europe to meet the challenge of reducing methane emissions and contributing to the achievement of the European environmental target:

- **Best practice**
- **Operative support**
- **Smart maintenance**

In addition, in terms of LDAR, Italgas is setting up a test field to carry out **cross-examination tests** (e.g. Hi flow sampler) in collaboration with the **Politecnico di Torino** and is promoting test phases of new technologies such as **drones** and **satellites**.





**THANKS FOR YOUR
ATTENDANCE**





BACK UP

CRDS Technology adoption Roadmap

POC on 15% of the network
Repaired leaks: 8 K
Outsourcing of Driving and Backpack activity

Inspected 100% of the network
Repaired leaks: 33 K
Insourcing of Driving and Backpack activity
Fleet: 15 surveyors and 66 backpacks

Smart maintenance capex budget
Insourcing of Driving + Backpack activity
Fleet: 24 surveyors and 84 backpacks
Advisory Service to other DSO

2018

2019

2020

2021

2022

Extension of the POC to 26% of the network
Repaired leaks: 11 K
First insourcing of Driving and Backpack activity

Inspected 100% of the network
Repaired leaks: 28 K
Asset Management POC
Insourcing of Driving and Backpack activity
Fleet: 19 surveyors and 76 backpacks

Leak Detection workflow



Thanks to the workflow management optimisation Italgas has applied a drastic reduction of investigation and repairing SLA⁽¹⁾

PLAN

MONITORING

COMPLIANCE REPORT (Driving survey)

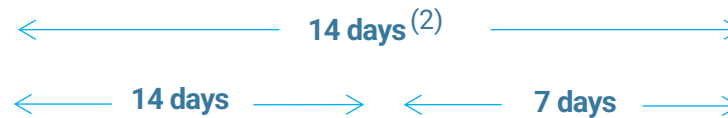
LISA INVESTIGATION (Backpack)

LEAK GRADING

LEAK REPAIR



TIMING



	SE (3)	OE
A1	1 days	1 days
A2	1 days	2 days
B	7 days	12 days
C	7 days	70 days

1. «Service Level Agreement» → Investigation SLA = time between last driving survey and leak grading; Repairing SLA = time between leak grading and repair.
2. If leak grading is done with the first LISA investigation (only possible for above ground leaks), then the total time between these two phases is 14 days, otherwise (for below ground leaks) the two phases have different intervals (14+7 days).
3. A Super Emitter is a leak with an emission rate greater than or equal to 0,27 sm³/h (10 sft³/h).