

The LIFE 13 project

PF Case Study



A digitized, self-regulating and sustainable natural gas distribution network.



LIFE 13 project architecture



THE CONTEXT

Natural gas distribution networks are inevitably subject to expected leaks, particularly at the junction points between pipes and valves or during any accidental damage (e.g. excavation work or vehicles that block a connection). **These leaks are directly proportional to the pressure at which the gas is maintained in the distribution network** to ensure proper service quality standards at the redelivery points.

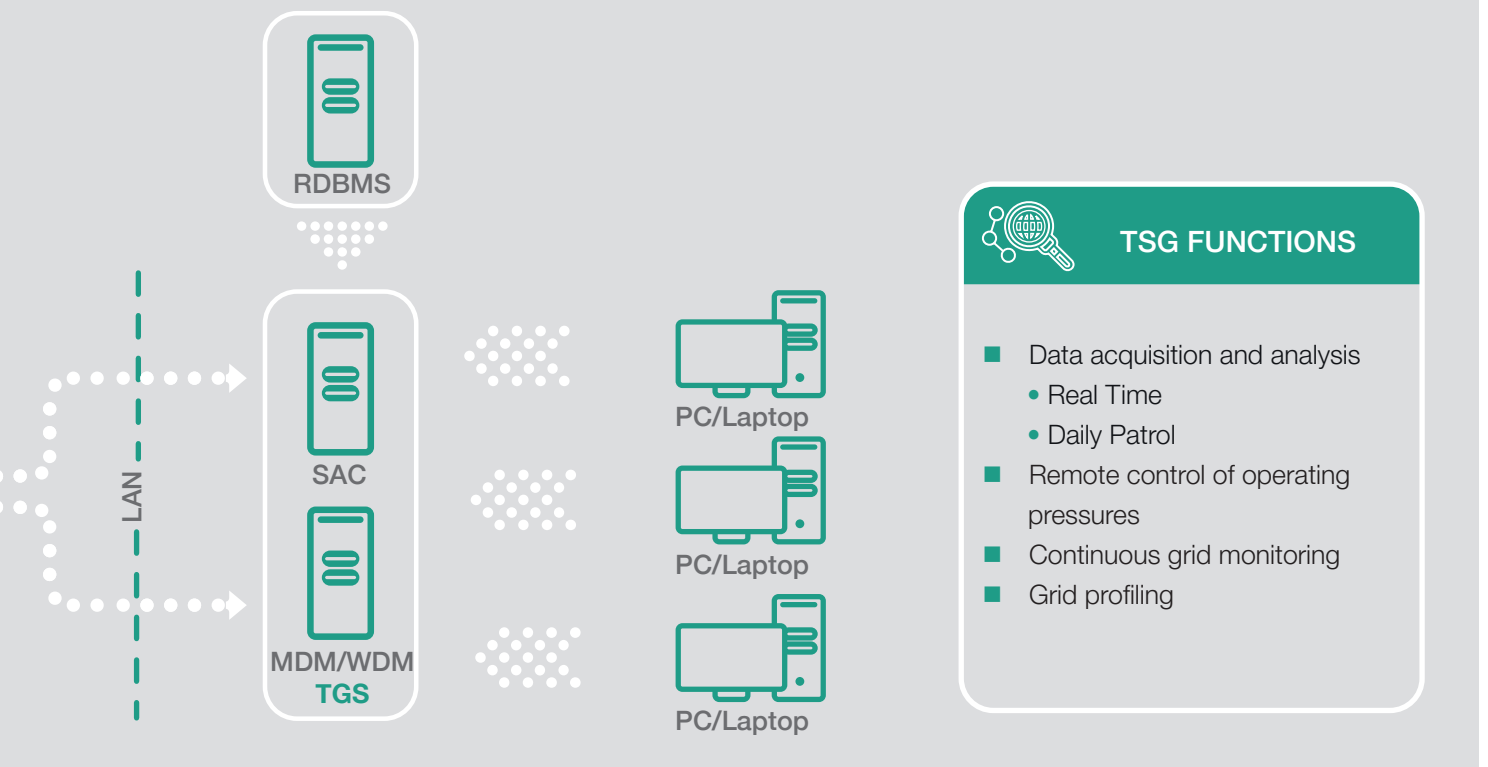
When burnt, natural gas is the fossil fuel with the lowest environmental impact among those that are currently available. However, when it is released into the atmosphere without prior combustion, natural gas is considerably more harmful than CO₂ (the main cause of the greenhouse effect). Therefore, the above-mentioned leaks **can prove to be particularly harmful to the environment**.

The contribution that Pietro Fiorentini, Teranova and RetiPiù made to solve this problem was to develop the **LIFE 13 Green Gas Network project**, which led to the creation of a system composed of a physical device and a

software infrastructure. The device detects pressure trends and reacts on the basis of the dynamic modulation profile previously developed by a control centre operator. The operator has the possibility of monitoring the current pressure trend and intervening remotely via the software platform.

The project was **nominated as one of the finalists in the Climate Change category of the 2019 edition of the LIFE Awards**, the tool with which the European Union supports entities working to protect the climate and the environment.





Mario Carlo Borgotti, Executive Director of RetiPiù, outlines the key features of the Life 13 Green Gas Network project, addressed together with Terranova and Pietro Fiorentini.

“There are essentially three key issues that have shaped the evolution of this project:

- **Environmental sustainability**, via the stated objective of reducing greenhouse gas emissions due to gas leaks from distribution networks by at least 3%;
- **Innovation**, with the development and testing of a new management and control system for regulating pressure levels;
- **Resilience**, because the new system is able to optimise the pressure of the various sectors at all times, on the basis of operating data that are detected and processed in real time.”

The collaboration and sharing of information between RetiPiù, Pietro Fiorentini and Terranova have allowed us to achieve the scenario for testing the various systems and adapting them to the needs of the distribution network. Respect for safety rules, the application of the tools and actions in the field have allowed us to ascertain that

it is possible to operate a gas distribution network in compliance with the highest safety standards for end users, while reducing CO₂ emissions into the atmosphere at the same time (the main objective of the LIFE 13 project) thanks to adequate pressure regulation.

The Smart Grid digitalisation component applied to a gas distribution network should also be noted. This approach is consistent with ARERA directives, which pursue the objectives of reducing consumption, improving energy efficiency and cutting emissions. In this context, investments are therefore adjusted to these objectives, to the full benefit of the end user.

The key points that should be highlighted when describing the project are, therefore, the reduction in CO₂ emissions and the consequent environmental impact, the general scenario of the Smart Gas Grid and, lastly, the balance between technological solutions, advantages for end users and environmental protection.

CASE STUDY | LIFE 13 PROJECT

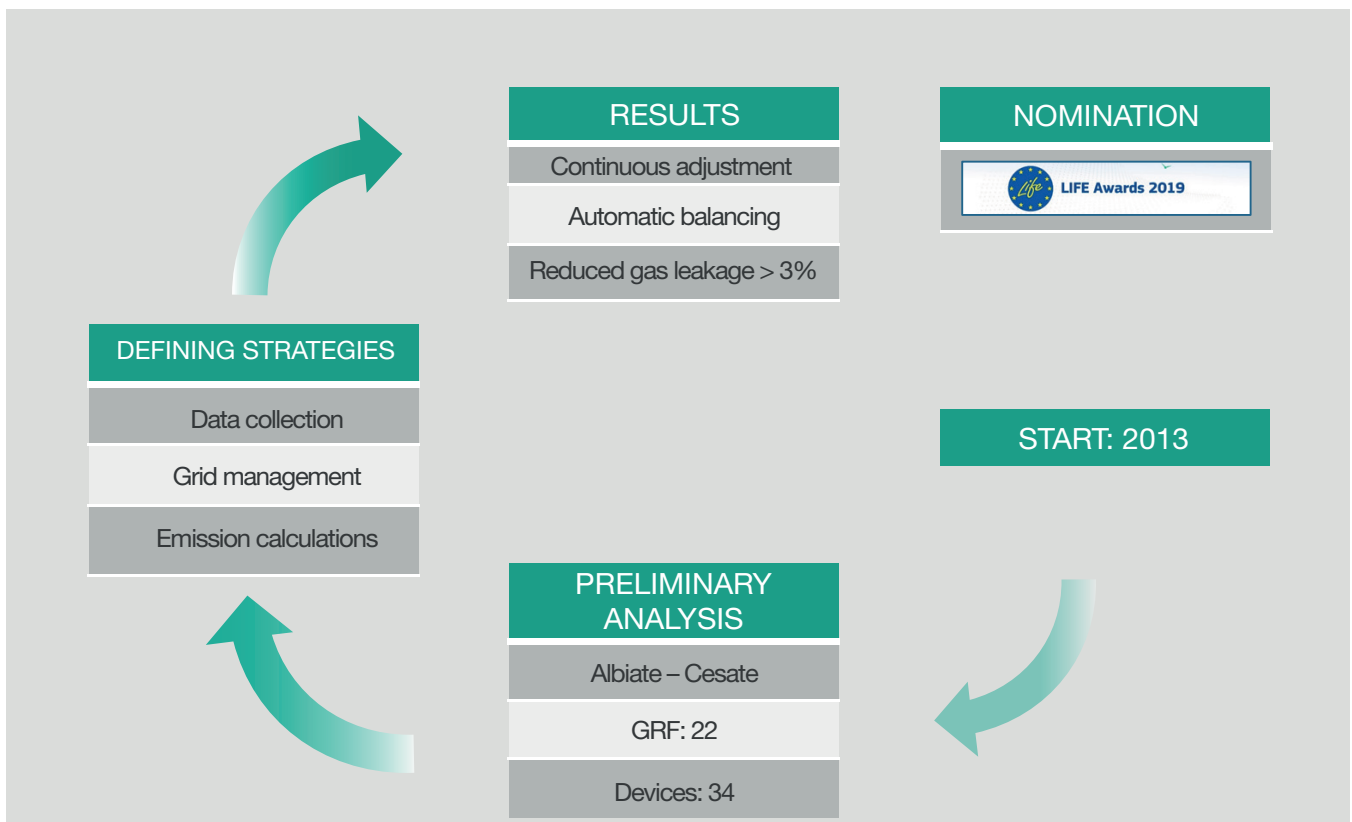


RESULTS AND BENEFITS

In addition to the structural advantages of the system designed by Pietro Fiorentini, Terranova and RetiPiù in terms of the reduction of greenhouse gas emissions, **there are also significant organisational advantages that are worth highlighting**. Indeed, the system allows us to remotely conduct all the operations involved in running a distribution system and improve operating costs. This represents the first step towards a new gas distribution network where all elements can be managed remotely, with the implementation of smart algorithms and dedicat-

ed alarm systems, in order to obtain greater efficiency both in terms of predictive maintenance and routine management, while maintaining high safety standards at all times. In this scenario, it is thus possible to reduce the human input required on site, **thereby preventing the occurrence of any risks/failures with quick intervention and reduced costs**.

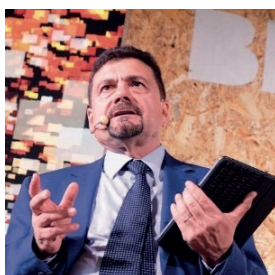
The LIFE 13 project has shown that it is possible to reconcile high standards of service quality and network operation while limiting gas emissions, by exploiting the potential of smart devices and central monitoring software. **The result is**



Future development	Tool	Expected result
Reduction in leaks and emissions	Profiling Centralised management of operating pressures	Emission calculation Energy Efficiency Certificates (GSE recognition process begun)
Environmental Safety	Advanced alarm systems Pollution and Noise Sensors	Increased system efficiency Increased environmental sustainability
System efficiency	Single platform Configurable reporting	Reduced operating costs Response speed
Pressure monitoring	Device parameters setting Gas Distribution Quality Reports	Pressure monitoring Gas Distribution Quality compliance
Strategy	Investment in location assets Creation of an innovative and accredited project	Possibility of access to Industry 4.0. Innovation score in sector tenders. Increase in the value of assets and remuneration in tariffs (MIR and RAB)

a **self-regulating network** that can adapt the operating pressures to real needs, thereby preventing dangerous excess pressure and limiting emissions from the expected leakages of the network into the atmosphere.

“In terms of sustainability, this project represented a real example of how to use a more flexible and less rigid distribution network, a veritable smart network capable of guaranteeing and self-regulating the pressure depending on the needs of the end users, for functional optimisation in terms of leakage reduction”.



Mario Carlo Borgotti
RetiPiù Executive Director

FUTURE DEVELOPMENTS

The project has led to a real system revolution. If today we are able to control pressures, tomorrow we will be able to control the network end points (odorisation levels, cathodic protection, and much more) to get a complete vision **and prevent risky situations occurring for end users.**

The real benefit of this experiment was that, beyond the theory, **today we are able to implement automations that dynamically manage the entire network.** This objective could not be assumed at the beginning, as the operating pressures of a distribution network are influenced by a series of parameters that are difficult to manage and predict with any certainty (consumption, external temperatures, etc.).

The large-scale diffusion of this system will therefore bring about a widespread and tangible environmental benefit, without negatively affecting the quality and safety of gas distribution networks whatsoever.

COMPANY PROFILES

Pietro Fiorentini was founded in Bologna in 1940 and is today a leading industrial company in North-East Italy, with its headquarters in Arcugnano (Vicenza). The Group has around 30 locations amongst its manufacturing and commercial sites, both in Italy and abroad, and employs around 2,400 people worldwide. In 2020, consolidated turnover surpassed €380 million, up by around 17% compared to 2019. The Group boasts a sound clientele of natural gas distribution and transportation companies, oil & gas companies, EPCs, industrial end-users and utility companies, which recognise its absolute standing in terms of product and process innovation. The company's production is centred around a wide range of technologically-advanced solutions for the entire natural gas supply chain: from components to services for the transmission and distribution networks, as well as a series of engineered solutions that include valves, multiphase flow meters, processing plants, stations and reduction and metering units. In the last decade, the company has made significant investments in R&D, M&A, its factories and production means, thanks to which it now holds a leadership position in smart metering today, as well as in smart grids more generally, and can offer integrated end-to-end solutions due to the software solutions provided by its subsidiary Terranova. More recently, in the field of energy transition, the Group has been accelerating its efforts to seize new opportunities related to green energy sources, such as biomethane, hydrogen and power-to-gas. With a strong focus on the global market, the Group generates over 70% of its revenues outside of Italy.

www.fiorentini.com



Since 2001, **Terranova** has been a leader in the energy and utilities sector thanks to its ongoing focus on research and innovation and has constantly strove to support businesses in their digitalisation, growth and business consolidation processes. Over 300 companies use our products every day and we employ more than 330

employees, across 10 locations, to guarantee them the best experience. Our employees work together to develop and improve leading products in the traditional sectors of gas and electricity distribution and sales, the environment and water service, and in smart network and smart grid projects oriented towards smart cities, both in Italy and abroad. All this has allowed us to reach 41 million in turnover. The companies Arcoda and Ambiente.it are also part of the group, which work in the utilities sector also, producing software solutions to provide mobile map data with vehicle tracking and for the complete management of the waste chain, respectively. Since 2011, Terranova has been an integral part of the Pietro Fiorentini Group, a global leader in the production of technologically-advanced products and services within the energy sector. This is a partner with whom we actively operate internationally, developing action strategies together that can be consolidated with new services for our current and future presence within the gas network.

www.terranoftware.eu



RetiPiù S.r.l. distributes natural gas by managing 286,000 PDRs; distributes electricity by managing 25,000 PODs; provides a public lighting service for a total of 12,000 lighting points managed. Through its own Metrological Inspection Centre, the company is accredited to carry out checks on volume conversion devices fitted to gas meters in accordance with the provisions of Italian Ministerial Decree no. 75/2012. RetiPiù also assists public administrations in developing projects aimed at improving quality of life and environmental sustainability, by designing, creating and managing energy efficiency services and implementing smart solutions, based on digitalisation, sustainability, resilience and open innovation solutions.

www.retipiu.it

