Solutions for gas networks digitalisation

Pietro Fiorentini

:TERRANOVA

Smart grids:
the future of gas networks

Smart grids integrate different types of energy sources while optimizing their distribution at the same time. Thanks to this evolution, natural gas will flow through networks that can instantly manage multiple, erratic and bidirectional inputs.

We are committed in developing solutions **ready to be part of smart and sustainable networks**: an environment where it is crucial to guarantee flexibility in the management of heterogeneous flows, each one with different properties and coming from different source points.
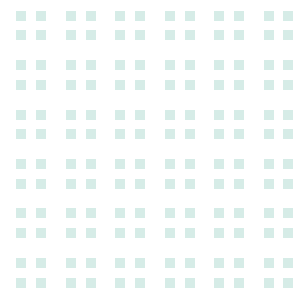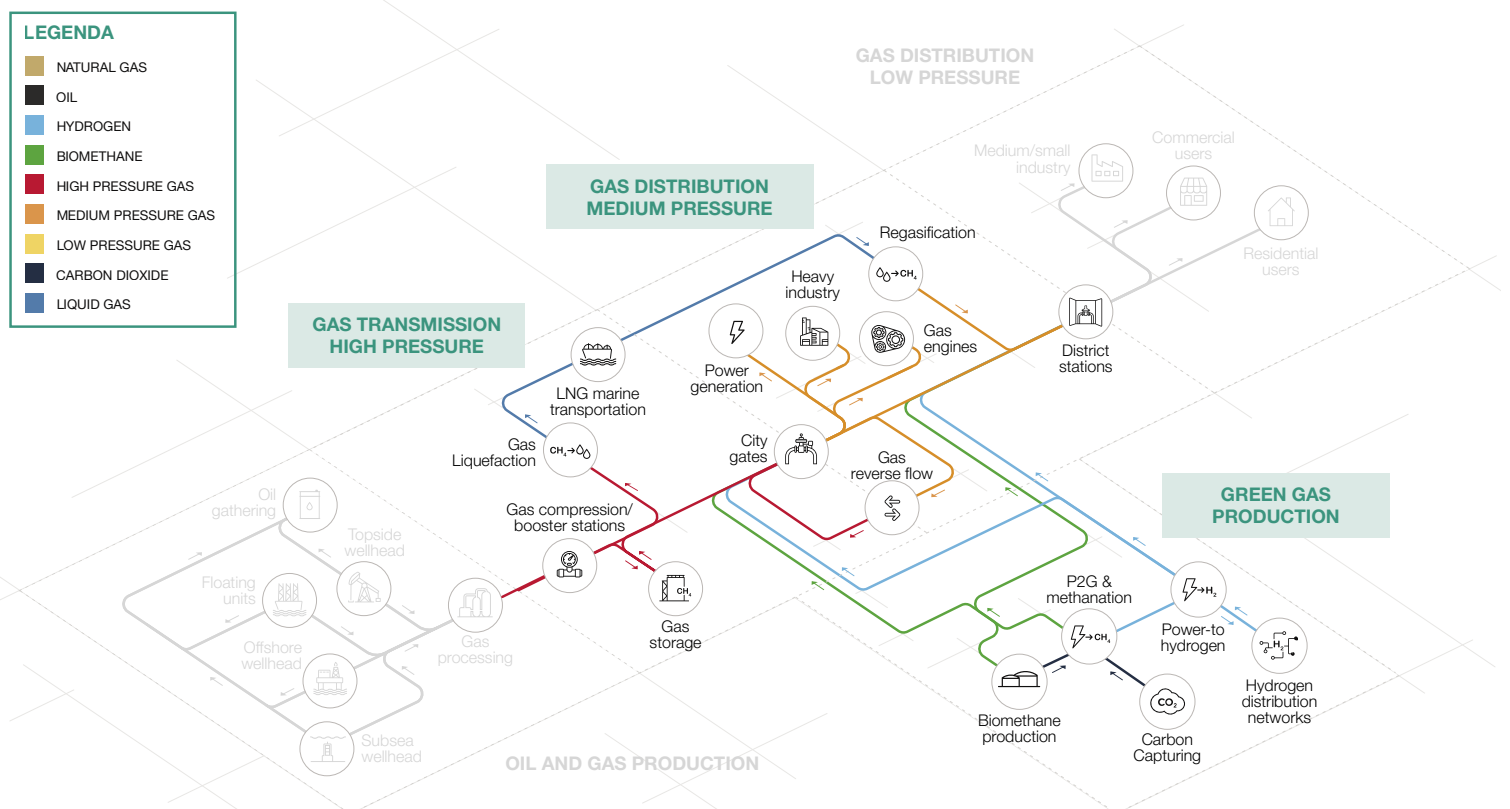
Pietro Fiorentini

Founded in Bologna in 1940, Pietro Fiorentini is one of the largest industrial companies in North East Italy. With over 80 years of experience along the entire natural gas chain, the Group has now extended its horizons towards developing technologies and solutions for a digital, sustainable world, with special attention for projects linked to water and renewable energies.

:TERRANOVA

Terranova is leader in the development of software for the water, gas & electricity sectors. With considerable know-how for smart metering, operations and smart grid management, the company offers a wide range of software studied ad hoc to respond to the complex, utility sector needs.

Digitalisation of transmission and distribution networks

LEGENDA

- NATURAL GAS
- OIL
- HYDROGEN
- BIOMETHANE
- HIGH PRESSURE GAS
- MEDIUM PRESSURE GAS
- LOW PRESSURE GAS
- CARBON DIOXIDE
- LIQUID GAS

GAS DISTRIBUTION LOW PRESSURE

GAS DISTRIBUTION MEDIUM PRESSURE

GAS TRANSMISSION HIGH PRESSURE

GREEN GAS PRODUCTION

Medium/small industry

Commercial users

Residential users

Regasification

Heavy industry

Gas engines

District stations

LNG marine transportation

Power generation

Gas Liquefaction

City gates

Gas reverse flow

Gas compression/ booster stations

Gas processing

Gas storage

P2G & methanation

Power-to hydrogen

Hydrogen distribution networks

Biomethane production

Carbon Capturing

Oil gathering

Topside wellhead

Floating units

Offshore wellhead

Subsea wellhead

OIL AND GAS PRODUCTION

Digitalisation and remote management of natural gas transmission and distribution networks walk together with metering data management and distribution stations pressure monitoring, as well as the software infrastructure overseeing the gathered data.

In order to keep the status of the pipeline under control, the cathodic protection of the whole gas framework is monitored through a set of control points tied together by a software infrastructure.

Checking the metering data: **Volume converters**

A range of electronical devices able to **communicate immediately and safely** pressure and temperature data coming from industrial meters. **Modus** and **Modus Slim2** volume converters belong to this family of products.

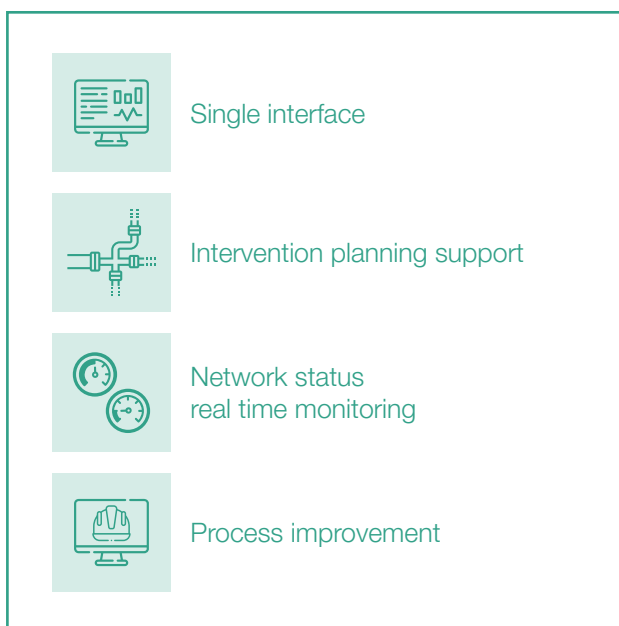# Monitoring the pressure: **Data loggers**

Data loggers are specifically designed to **support IoT applications** such as monitoring and controlling gas pressure reduction stations. They allow utilities to keep the situation under control in real time. Within this product family, we have developed the **Mplus-log** data logger.
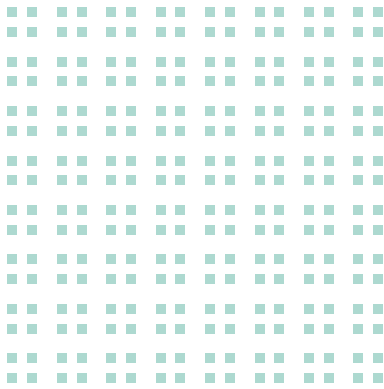
Smart station

Our smart stations for gas distribution can **transfer automatically information** on inlet and outlet pressure, flow rate, gas composition and temperature. Through internal sensors they can **adjust the pressure remotely**, avoiding the intervention of trained workforce onsite. The electrical components can be powered through microturbine or photovoltaic panels, **making them self-sufficient and zero-emission**.

- Single interface

- Intervention planning support

- Network status real time monitoring

- Process improvement

TSG (Terranova Smart Grid) is the digital enablement platform for the smart grid specifically designed for the gas, water and electricity sectors. It enables interactive management of the distribution network, synoptic and process-oriented, supporting various smart devices with no constraints on models usable (datalogger, odorising systems, sensors, cathodic protection devices, public lighting and lots more). It also enables managers to digitise network management, for operational excellence, to limit losses, preserve investments and protect the environment.

Keeping the structure safe:
cathodic protection monitoring

For us promoting the constant monitoring of cathodic protection of the network is critical, because it allows to a**void the waste of a precious resource**, and especially because it **reduces gas emissions into the atmosphere**. For this reason we have developed a monitoring system that integrates devices and software infrastructure in a specific effective and efficient combination.
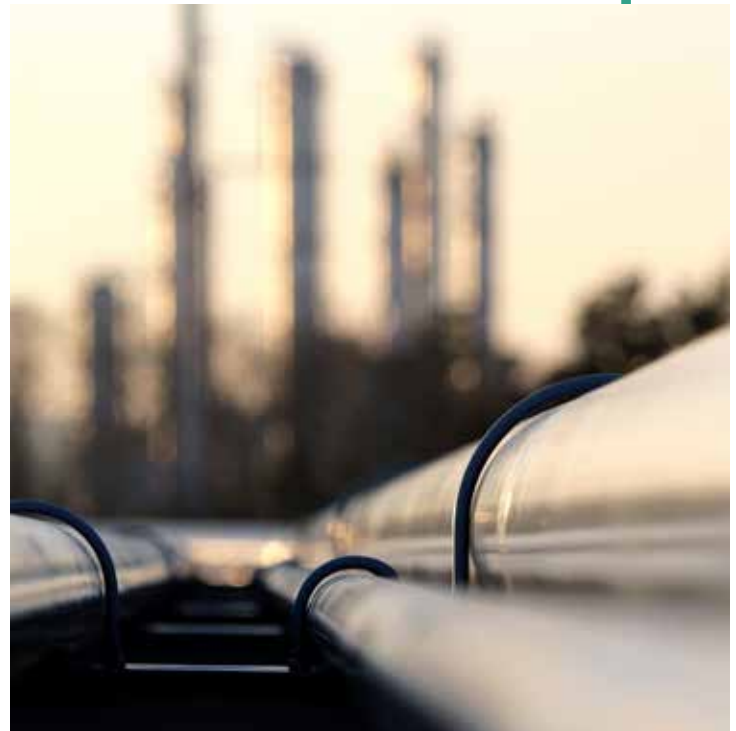
S2B, a new monitoring platform

S2B (Service to Business) is our new cloud platform for management and monitoring of the data coming from field data loggers.

The Cathodic Protection Monitoring Module is a tool for visualizing, monitoring and managing the electrical parameters of cathodic protection systems from field devices in a simple and comprehensive manner. The collected data contribute to the formation of the Authority's documentation and reports.
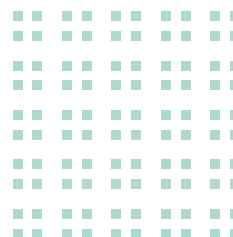
Software and devices: a **symbiotic environment**

We produce a range of data loggers for remote monitoring of cathodic protection. Thanks to their integration in the S2B platform, it is possible to keep the status of the network under control.

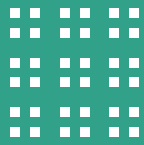4 high-range optoinsulated
channels device
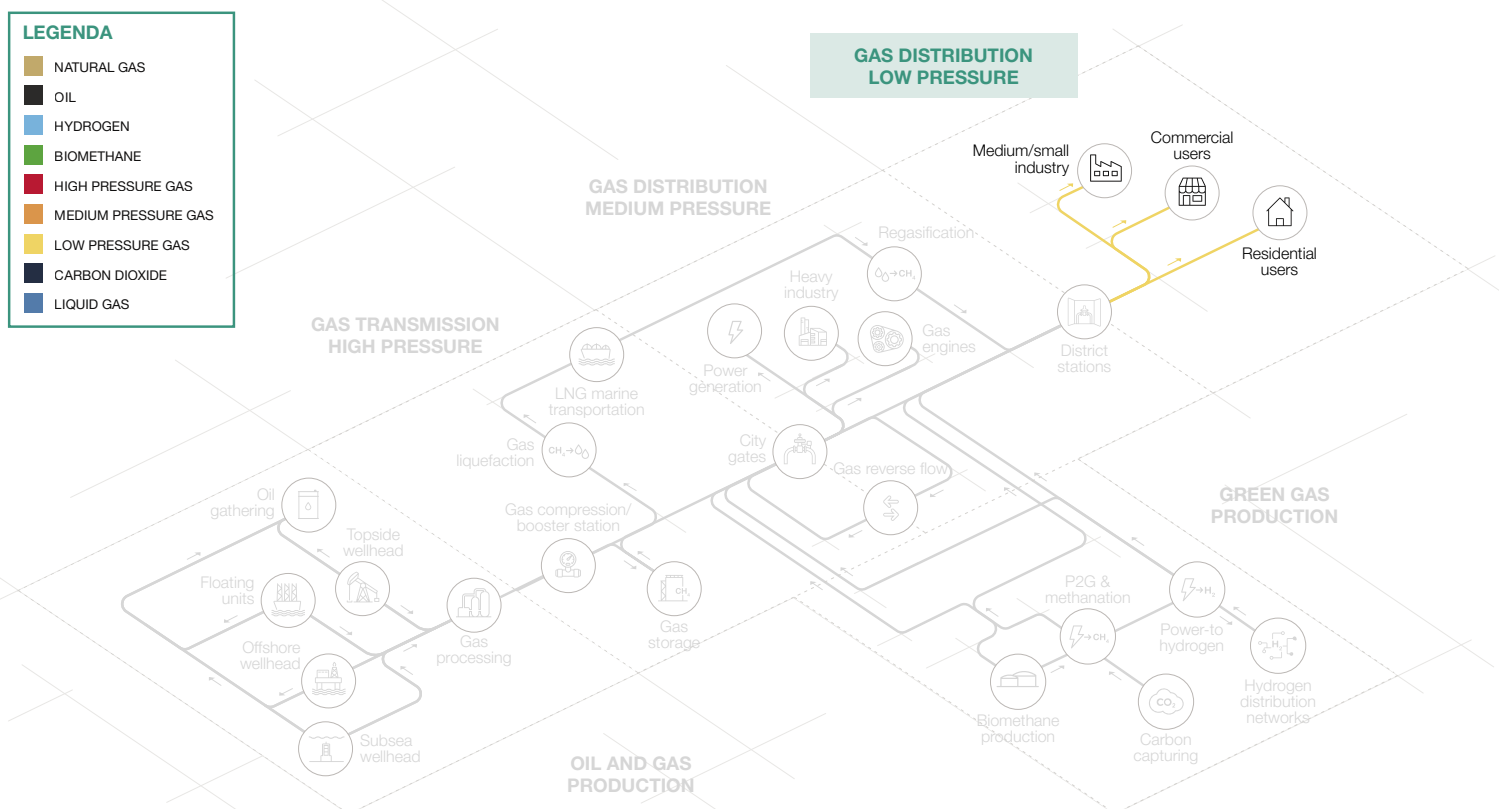
4 DC/AC galvanic
separation channels device

Kairos

We are working on a new remote data logger for the acquisition of electrical quantities of cathodic protection, aimed at responding to future market demands in accordance with the technical rules of the industry.

Data digitalisation for residential and commercial applications

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OIL AND GAS PRODUCTION

GREEN GAS PRODUCTION

P2G & methanation

Power-to-hydrogen

Biomethane production

Carbon capturing

Hydrogen distribution networks

Accurate gas metering is a primary requirement for the energy industry. We have designed a series of smart meters to help costs reduction for distribution companies while promoting higher awareness about consumption for the end user. Hybrid smart meters combine the well-known membrane gas metering process with an electronic unit that can transmit metering data to distribution companies.

RSE gas meters,
for residential applications

With **over 6 million units produced**, **RSE smart meter** is widely used in low-pressure distribution networks for the residential users. Data transmission from the metering unit to the electronic board is realized through a high-tech interface with an anti-tampering system.

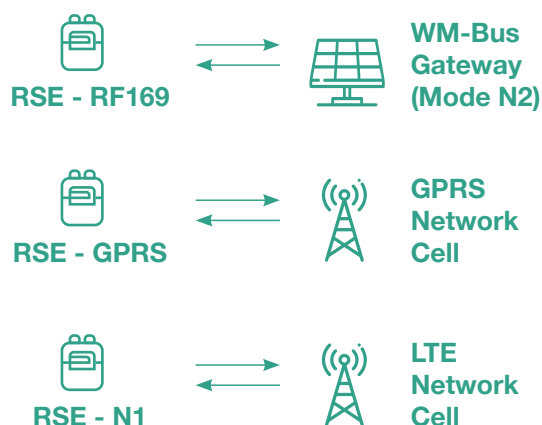# HM gas meters,
for commercial applications

HM smart meters for commercial measurement are equipped with temperature and pressure sensors to compensate for the volume of gas measured. They are primarily used in low-pressure natural gas distribution networks.

Connectivity and communication protocols

Our meters can be equipped with different communication protocols according to the characteristics of the area in which they are located.

RSE - RF169 ⟷ **WM-Bus Gateway (Mode N2)**

RSE - GPRS ⟷ **GPRS Network Cell**

RSE - N1 ⟷ **LTE Network Cell**

Ultrasonic meters

Ultrasonic meters combine static metering technology with multiple communication protocols to provide utilities with a smart grid device capable of transmitting data under all conditions.

SSM-iCON

Our **SSM-iCON** smart meter incorporates the latest ultrasonic technology to measure gases plus a variety of network connectivity options. It is equipped with a valve which can be triggered by remote or locally upon specific events, like earthquake or temperature. **SSM-iCON** is suitable for use with natural gas, biomethane and hydrogen blends (up to 20%).

Beyond
natural gas

We are ready to apply our experience in the smart metering world to **hydrogen utilization** development projects and to **water networks**.

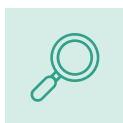# **TAMM**, the smart metering digital platform

TAMM (Terranova Advanced Metering Management) is the digital enablement platform for smart metering dedicated to gas, electricity and water utilities. **TAMM** is oriented at metering processes and is independent of the manufacturer; this enables the same platform to manage more than 100 meter and concentrator models. **TAMM** supports operators with the digitisation process introducing innovation, reducing costs and generating new company value.

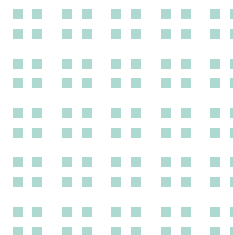Multibrand and multiservice platform

Metering efficency improving

Meters status
real time monitoring

NB-IoT communication

TAMM

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www.fiorentini.com

TERRANOVA
INNOVATIONS FOR UTILITIES

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