IMAGINING SOLUTIONS FOR THE GAS OF TOMORROW
RICE is a key player in research and innovation in the fields of combustible gas, gas infrastructure and their contribution to the energy transition.

Our mission: to serve the ambitions of the Gas Industry in terms of operational excellence, industrial safety, and the energy and ecological transitions. To create value for our customers through innovation, expertise and the provision of new validated solutions in our laboratories and test benches and via our computing and modelling platforms.

RICE combines world-class skills supported by cutting-edge technical resources, some of which are unique in Europe. We cooperate with international research organisations such as the Pipeline Research Council International (PRCI) and the European Gas Research Group (GERG). We participate in several European R&D programs and conduct an open and collaborative innovation policy with both public and private partners.

RICE is at the service of gas infrastructure operators and their component suppliers, energy companies and industrial customers. We provide customised services and manage programs that contribute to the emergence of new sectors in the fields of renewable gases, energy storage, big data and smart grids.

At the service of a gas industry of excellence, RICE is firmly committed to the energy transition.

ÉRIC COURTALON
Director of RICE

100 men and women:
doctors, engineers, project managers, technicians

± 3

sites in Île-de-France:
Saint-Denis, Alfortville, Bois-Colombes

54 & 330

inventions patents

in the fields of transport, storage and gas distribution
GAS ANALYSIS & METERING


PIPES

Optimise the lifespan of metal and non-metallic pipes. Assess network integrity. Qualify equipment and materials, as well as detection, and protection, implementation, location and rehabilitation techniques.

4 CENTERS OF EXCELLENCE

INDUSTRIAL PERFORMANCE & SAFETY

Ensure the safety and availability of gas systems: risk management, reliability and maintenance. Optimise their design, operation, performance and costs: sizing, equipment, steering, smart grids, predictive maintenance, data and connected objects.

INNOVATION & OPTIMISATION

Foster innovation, develop its internal and external ecosystem. Protect inventions, manage and defend intellectual property rights. Optimise technological oversight and knowledge management.
MANAGING INDUSTRIAL SAFETY

Gas infrastructures must operate safely over many decades for the benefit of people, goods and the environment. They are subject to rigorous regulations, which are regularly reinforced. RICE develops tools and techniques to help operational staff meet these requirements.

Qualification of materials and equipment, welding and connection solutions, protection against corrosion and external damage, stress computation, risk studies, safety solutions: we contribute to the design and maintenance of safe and resistant networks and participate in standardisation work at French, European and international levels.

We provide operators with the means to determine the resistance and the lifespan of pipes subject to external stresses or with defects. We develop innovative installation, inspection, maintenance and repair techniques.

We improve mechanisms for quality control, odorisation, gas leak detection and measurement, as well as safety systems. We help gas infrastructure operators to better control their industrial risks, including their human and organisational dimensions.

New technologies to improve safety
- A complex analytical protocol to determine the origin of methane present in the air (network leakage or biological fermentation).
- Remote diagnosis and augmented reality to improve the safety and reliability of complex maintenance or control operations.
- Drones, laser remote sensing (LiDAR), connected terminals to monitor transport networks.
- A SmartBall equipped with sensors to detect gas leaks or even locate pipes.
- SMART coatings to reduce operational maintenance or facilitate inspection on networks.

Simulation software available to customers
- PERSEE+ to model the effects of an accidental leak of natural gas, hydrogen or LNG.
- RAMCES PLEIADE to calculate the stresses caused by different loads and hazards on the transmission and distribution pipes and to help design underground transmission pipes.
- GADLINE to analyse pipe defects and their effects.
- GASPACK to calculate all the physico-chemical and thermodynamic properties of combustible gases based on their composition. These softwares can be adapted to the specific needs of users, to whom we provide training.
RICE performs fatigue, proof and failure tests of up to 1000 bar for metal tubes over a diameter range up to DN 1400. We have state-of-the-art equipment and analytical techniques to characterise polymer and composite materials.

To study the resistance and behaviour of the pipes, a to-scale test bench can create damage similar to those caused by backhoes.

An unparalleled test area for testing network detection systems. This includes five types of soil, polyethylene, PVC, cast iron and steel pipes of 20-400 mm in diameter and electrical cables buried at depths of 0.60-3.20 m.

The Existing Connections Protection System (Dispositif de Protection des Branchements Existant - DPBE) developed by RICE protects polyethylene gas networks in the event of third-party aggression. It limits accidental methane emissions if the pipe is uprooted.

Our 2D and 3D digital simulation resources allow us to study the effects of a wide range of risk phenomena.
CONTRIBUTING TO OPERATIONAL EXCELLENCE

Design, management, control, maintenance and information: gas infrastructures are undergoing a digital revolution and integrating increasing amounts of intelligence. The benefits for operators, users and consumers are greater reliability, availability, flexibility and efficiency at lower cost, as well as the right information at the right time to optimise their decisions. RICE contributes to all of these.

Controlling investment, operating and maintenance costs is a goal we share with our customers. We help them to select the most appropriate equipment and materials. We rely on advanced modelling and dynamic simulations tools to optimise the design, maintenance and renewal of their infrastructures. Our test benches can evaluate many types of equipment under near-actual conditions.

The opening up of the energy market is accompanied by new needs for flexibility, competitiveness and information. We provide tailor-made solutions to facilitate and improve the reliability of the management of gas systems. We support the development of smart grids, connected objects, communicating technologies and their applications.

Gas analysis and metering are major issues for operators, balance sheet managers, and for large consumers who want to monitor their consumption precisely and control their production. We place our expertise at their disposal.

Our recent services aimed at improving performance include:
- Evaluating new technologies for measuring the higher heating value (HHV) of gas.
- Acceptability study stresses exerted on a transport pipeline by a tunnel boring machine.
- Functional analysis and redesign of small delivery stations at lower cost.
- Optimisation of maintenance plans for compressor stations and delivery stations: reduction in costs and downtime.

Economic and operational optimisation software
- MINOPEX to optimise the management of a transport network in real time according to the configuration of supplies and consumption.
- CARPATHE to optimise the design, scope and management of distribution networks: master plans, sizing, materials and works, safety in the event of an incident.
The quality of a pipe's steel is assessed by micro-test. Developed in association with Total and Mines ParisTech, this method allows users to rapidly estimate the risk of a defect detected in a pipe by taking a single steel chip from the surface. The affected section will only be replaced if there is a proven risk. Less expensive than routine replacement, this solution also has the advantage of reducing network downtime.

GeoBot is a miniature motorised probe designed to precisely georeference small diameter gas pipes in urban areas. Designed to comply with a new cost-controlled regulation, it will be operational in 2019.

A unique possibility in Europe to evaluate air and gas up to 60 bar and 10,000 m³/h. The equipment used to operate the networks includes meters, pressure regulators and reducers, valves, safety and sealing systems, odorisation systems, etc.

MINOPEX, CAPAFLEX, RICE develops customised tools to optimise the operation of gas transportation networks.

A well-devised drill head. RICE has overseen the European Orfeus project, which is now entering an industrialisation phase. The goal: to avoid damaging underground networks during direct trenchless drilling. The solution: a drill head integrating a radar and 3D visualization on the surface of the surrounding subsoil to detect and circumvent any obstacles.
ACCELERATE THE ENERGY TRANSITION

The energy transition heralds a new model marked by the growth in decentralised production, a largely renewable gas mix and the complementarity of electricity and gas systems. RICE anticipates and facilitates these developments.

Controlling and monitoring the quality of biomethane, hydrogen and synthetic methane is a major challenge. The goal is to be able to inject these into the gas infrastructure safely for both industry and end users. We contribute to this through cutting-edge expertise, methods and analysis. We help the competent authorities to define the necessary specifications, the producers to meet the requirements of these specifications, and the infrastructure operators to check them.

We provide solutions to maximize the injection of renewable gas by adapting the way the networks are controlled. When local consumption is insufficient, reverse compression facilities reverse the direction of the gas flow, returning it to the transportation system to expand the consumption area. RICE plays a part in the development of reverse compression facilities.

We contribute to the development of new industrial sectors that will gradually replace imported gas with locally produced renewable gas: methanisation of fermentable waste; gasification of biomass or waste; power-to-gas to store and recover excess renewable electricity.

Guaranteeing the quality of biomethane
- RICE works alongside French infrastructure operators to carry out an exhaustive analysis of biomethanes injected into the networks, to determine their impacts and to optimise the means of control before and during injection.
- RICE participates in the EMPIR European Metrology Program to prepare the first standards dedicated to the analysis of biomethanes.
- RICE issued an international call for projects to source innovative, competitive, cost-effective solutions for compliance and quality control of biomethane. 14 projects from 7 countries were submitted; 4 projects from 3 countries were selected. The key: tests carried out in RICE laboratories.

30% renewable gas by 2030
This is the goal of the French gas industry.

100 % renewable gas by 2050
This is possible according to ADEME, which has identified 460 TWh injectables:
- 30 % by methanisation
- 40 % by gasification
- 30 % by power-to-gas.

135 TWh
This is the storage capacity of French gas infrastructures.
RICE has extensive means of analysis, from devices dedicated to a single compound, such as fluorescence, to analysers capable of recognizing several hundreds of compounds, such as gas chromatographs coupled to mass spectrometers.

400! This is the number of campaigns carried out by RICE teams to analyse the quality of the biomethane injected into the networks.

RICE develops hydrogen expertise to support the development of the infrastructures of tomorrow (safety, integrity, behaviour of mixtures). We are also researching methanation processes that will enable to inject more hydrogen into the gas networks.
ENERGISE AND IMPROVE INNOVATION

Participatory and collaborative innovation, open innovation and co-construction are at the heart of our approach. The challenge is to create value and develop an innovation ecosystem by mobilizing individual creativity and collective intelligence.

The purpose of our OSER collaborative platform is to allow each employee to contribute to innovation by involving themselves in the search for solutions. The platform hosts the projects of all teams competing for the Innovation Challenge. This wide-ranging competition encompasses key themes such as energy transition, industrial performance and managerial innovation: in 2018, 129 applications were submitted by 300 participants.

In addition to projects with major industrial groups, research organisations and universities, we are actively developing our relationships with innovative start-ups, SMEs and ETIs through calls for projects and hackathons.

Maintenance, design, training, market applications... digitalisation extents to all areas and is hastened by the contribution of the Innovation Mission.

Upgrade
A specialist team is in charge of implementing strategies for the protection, upgrade and defence of intellectual property rights that are best suited to each individual case.

Open Innovation
Launched in 2016, the Open Innovation Challenges help source operational solutions to business issues through external calls for projects. The 2018 edition includes six calls for projects for the year. The platform dedicated to these challenges also allows us to collect spontaneous proposals for innovations that may be useful for gas infrastructures.
An example of collaborative innovation is the winner of the 2016 Innovation Challenge – the ITX VR virtual reality tool that allows operators to self-train. Wearing immersion headsets, they manipulate valves and control and grasp the consequences of their actions in conditions very close to reality.

Launched in 2012, the RICE drone projet promotes the aerial surveillance of work sites. The drones’ agility facilitates the inspection of strategic sites that are difficult to access.

Presentations, conferences, exhibitions, demonstrations, visits and awards linked to the Innovation Trophies: More than 800 people took part in #SharingEnergies, the GRTgaz 2018 Innovation Day. This was an opportunity for RICE to be rewarded for its most innovative projects.

The SPRINT (Smart Pipe Repair In-Line Tool) projet – the winner of the Innovation Challenge 2018, designed by RICE – could revolutionize network maintenance. This piston makes it possible to maintain gas transit while the pipes are undergoing repairs. The results are a reduction in costs and time, while safety and environmental impacts are optimised!