



TECHNICAL TRAINING AND R&D CENTER



"In DESFA, we believe that the energy industry requires both safeguarding and transfer of know-how from generation to generation, as well as continuous innovation to promote the transition toward a cleaner energy system. This has translated in the need to continuously train our people. Capitalizing on our 30 years' experience, the Technical Training and R&D Center in Nea Messimvria aims to safeguard and hand down the skill set of gas Industry experts and contribute to the research and development of new technologies. We invite you to be part of our journey towards a more sustainable energy future".

Maria Rita Galli, CEO of DESFA

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I. TECHNICAL TRAINING CENTER

Based on its own robust training practice and drawing on its 30 years of experience and operational excellence, DESFA pioneers in technical Operation, & Maintenance training in gas sector and beyond, namely in renewables and low carbon gases.

DESFA is one of the certified Transmission System Operators in Southeastern Europe.



The Training Center provides continuing vocational services complementing, updating and upgrading knowledge, skills and competencies of DESFA's workforce but also third parties' personnel.

- Located in Nea Messimvria, Thessaloniki.
- Strategically placed at the epicenter of southeastern European gas markets.
- First in-house Training Center in the Balkan area.
- Designed to accommodate Transmission and Distribution System Operators in Greece and abroad.

The training center is unique:

- simulation environment, combining theoretical education with practice in specialized laboratories
- hands-on training
- training on equipment at a 1:1 scale facilities
- on-the-job training
- R&D partnerships (HORIZON, Research & Innovate Program)

I. 1 TRAINING FACILITIES

Main building for theoretical and hands-on training sessions:

Cathodic Protection Laboratory / Mechanical Engineering Laboratory
/ Instrument/Electrical Laboratory / Metrology Laboratory / Health and Safety labs
/ Computer training rooms / Conference room / Library / Offices

External metallic-shed facility for hands-on and simulation training sessions:

- **Metering / Regulating (M/R) Stations**
70/19 bar / 19/4 bar / 4/1 bar
- **Insulated steel pipe with insulating joints inside the ground measuring points of cathodic protection;**
- **Re-injection of low-pressure gas to the central heating facility.**

The external metallic-shed facility simulates the midstream and downstream gas industry, giving a global idea of the Operation and Maintenance to the trainees.





I.2 WHO SHOULD ATTEND

The Technical and R&D Training Center is addressed to gas technicians and industry professionals for custom-made courses.

Our courses are addressed to

DESFA's
technical personnel

Students specializing in
Oil & Gas engineering

Gas industry professionals of
Transmission & Distribution
System Operators
in Greece and abroad

I.3 HOW PARTICIPANTS BENEFIT



Our training system

- Creates and maintains technical competencies
- Enhances training culture
- Facilitates the transfer of technical knowledge in the gas sector
- Prepares Oil & Gas Industry professionals
- Facilitates osmosis with the Academic Community
- Builds industry trusting relationships



I.4 TRAINING MODULES

DESFA provides tailored-made training services, according to the needs of the interested parties.

Currently, there are six (6) pillars of educational programs:

1

Quality, Health,
Safety & Environment
(QHSE) Issues for
the gas industry

2

The Pipeline
Transmission
System

3

The Liquefied
Natural
Gas System

4

Dispatching
Operation

5

Gas Technology
/ General

6

Regulatory
Framework

I.5.1 GAS INDUSTRY QHSE



QHSE Management Systems

Processes and procedures of QHSE Management to prevent accidents, monitor all environmental aspects, safeguard the health of employees.



Occupational Health and Safety

Identification of risks, application of mitigation measures, monitoring of measures suitability.



Environment and External Issues

Reduce – Reuse - Recycle as basic principles for environmental impact.



Personal Protective Equipment

PPE as the last line of defense for each employee, proper selection, use and maintenance.



I.5.2 TRANSMISSION SYSTEM



Cathodic Protection & Corrosion Control

Methods, equipment, maintenance and troubleshooting, CP surveys, Pipeline earthing systems, AC corrosion control. Pipeline Inspections, atmospheric corrosion identification and measurement of internal corrosion.



Pipeline Integrity

In Line Inspection, Threats evaluation, Risk Assessment, Risk Matrix, remote sensing and geo-hazards monitoring and management in critical infrastructure.



Pipeline Repairs - Coatings

Recognition of mechanical failures, insulation failures, etc. Identification of abnormal pipeline operating conditions. Application and repair of insulations.



Valves

Preventive Maintenance, visual inspection and operation tests, failure detection, replacements, repairs etc.



Pressure Regulation – Overpressure protection

Identification, adjustment, maintenance and repair of regulators. Test and adjustment, maintenance and repair of pressure protection instruments.



Metrology

Metrology Principles, determination of Natural Gas quality, chromatograph & analyzer operation. Operation, maintenance and calibration of NG flow metering systems.



Row Management

Right of way management, patrolling, pipeline aerial surveillance, Damage prevention during excavation.



Distribution Network

Inspection & maintenance of underground gas stations, vent system inspection, etc.

I.5.3 DISPATCHING CENTER



Hydraulic analysis of gas pipeline network

Configuration, execution and analysis of gas pipeline scenarios, reporting of main system variables (pressure, flow, and temperature).



Short-term operational planning and balancing

Flow planning process and transportation plan, line-pack management, imbalance estimation, flow control rules, Operational Balancing Account (OBA) management.



Programmable Logic Controller (PLC) fundamentals

Introduction to PLC: wiring, hardware and operation, programming, troubleshooting, best practices, communications.



SCADA/Distributed Control System (DCS) fundamentals

SCADA/DCS: architecture, hardware and software, communications, differences between SCADA and DCS.



SCADA alarms management

Monitoring and assessment of signals, notification of possible equipment malfunction.



Emergency plan management

Crisis level management for the reliable operation of a natural gas system, ensuring security of supply.



I.5.4 Liquefied Natural Gas (LNG)

- **Ship unloading**

Evaluation of ship type/size, ship approaching & berthing management, unloading processes, jetty safety procedures.

- **Cryogenic tanks**

Technical specs and monitoring of critical systems and equipment, monitoring maintenance and process safety.

- **Cryogenic pumps**

Submerged/canned pumps and pumping system technical specs, monitoring maintenance and process safety.

- **Vaporizers**

Type, process characteristics, operation, monitoring, maintenance, thermal energy requirements and process safety.

- **Boil Off Gas (BOG) compressor**

BOG compressors as part of LNG vapor recovering system, type and compression stages, process characteristics, operation, monitoring, maintenance and process safety.

- **Utilities**

Role in the LNG re-gasification process, systems and equipment description.

- **Fire prevention, detection, fighting for LNG plants**

Logic and architecture of Fire Gas & Spill / Emergency Shut Down / Distributed Control System: Deluge System, foam system, dry powder skids, inert gas discharge system, LNG spillage collection channels and impounding basins.



I.5.5 GAS TECHNOLOGY / GENERAL

- **Permit to Work (PtW)**

Precautionary measures and risk assessment

- **Fire Prevention, Detection, Fighting for gas networks**

Training in real conditions with the cooperation of other industrial facilities and fire brigade

- **Chemical Laboratory and Applied Metrology for Gas industry**

Chromatography, reporting for the gas composition, calibration of chromatographs and pressure equipment

- **Polyethylene (PE) welder certification**

Certification to welders following hand on training and Non Destructive Testing techniques

I.5.6 REGULATORY FRAMEWORK



Tariff, Balancing, Capacity Allocation Mechanisms (CAM), Interoperability Regulations
Compliance with EU Regulations.



Security of Supply Regulation
Compliance with EU Security of Supply Regulation.



Infrastructure Development Regulation
Ten Years Network Development Plans, financing from European and national funds.



I.6 OUR TEAM

Our certified trainers come from our highly skilled and experienced personnel who have been working as planning & design engineers, commissioning engineers, site engineers O&M engineers, inspection & integrity engineers, as well as QHSE engineers and experts, financial advisors and lawyers.

Our team works for analyzing training needs and designing custom based training tasks for our clients. For the needs of specific modules, external associates take part in the training programs.



I.7 QUALITY & CERTIFICATIONS

- Certified Quality Management System (ISO 9001:2015 and ISO 27001:2013)
- Certified Managerial Competence System (Hellenic Standard ELOT 1429:2008), for planning and managing co-financed projects.

I.8 E-LEARNING PLATFORM

Learners have access to the DESFA e-learning platform, where they can find all the materials discussed in workshops and explore the full range of training courses offered by the Technical Training Centre. The platform supports both synchronous and asynchronous learning, allowing flexibility to meet diverse training needs.

Our asynchronous e-learning courses provide a comprehensive overview of the natural gas sector, utilizing a combination of presentations, interactive exercises, and additional reading materials. This approach ensures that learners gain a thorough understanding of the industry's dynamics.

Engaging with our e-learning platform equips learners with a solid foundation in the natural gas industry and beyond, enhancing their knowledge and skills.



II. RESEARCH AND DEVELOPMENT (R&D) CENTER

II.1 THE ROLE OF GAS Transmission System Operators IN A DECARBONIZATION WORLD



De-carbonization of gas supplies with increasingly renewable, decarbonized and low carbon gases. Development of these gases is dependent on political choices and decisions beyond the remit of the gas Transmission System Operators, such as DESFA.



TSOs to manage diversity of technological choices while ensuring that achievements of the European energy market for gas are maintained and further developed, in the realities of both a methane and hydrogen-based economy.



Review the regulatory framework and, where necessary, amend it to ensure the developments of gas-based de-carbonization technologies.



*European Network of Transmission System Operators for Gas (ENTSOG)

II.2 HYDROGEN CONTRIBUTION IN THE DECARBONIZATION ROAD MAP

Hydrogen is one of the main pillars in the decarbonization road map. The main benefits are:

The role of hydrogen in the decarbonization roadmap

Carbon Free

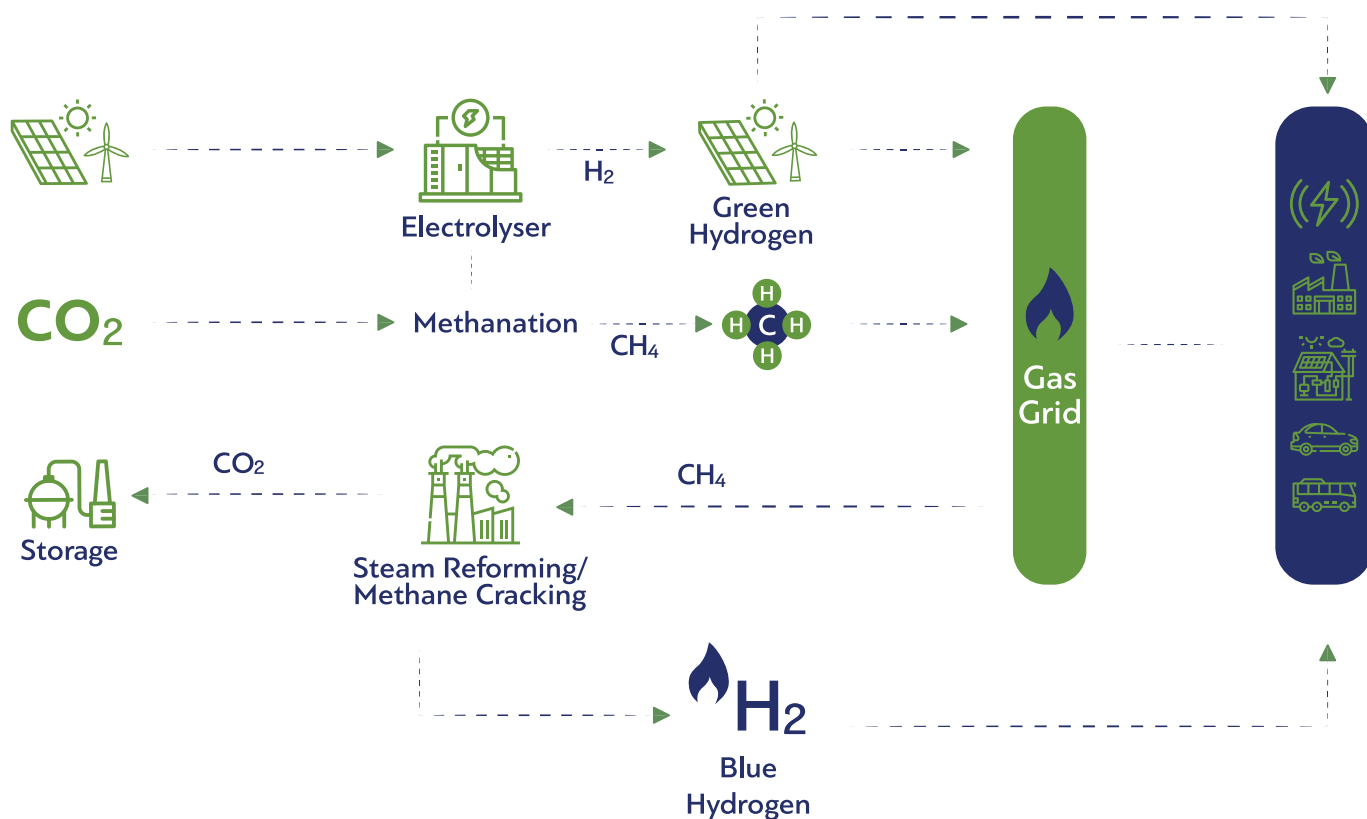
- Can be produced with zero carbon footprint

Energy Carrier

- Energy transport and storage with a lower cost with respect to electricity
- Valorization of the existing infrastructure

Fuel

- Zero Emission fuel
- Decarbonization of the industrial processes.



II.3 DESFA's TRAINING CENTER A PILOT PROJECT FOR THE INJECTION OF HYDROGEN IN THE GAS GRIDS UP TO THE FINAL CONSUMER

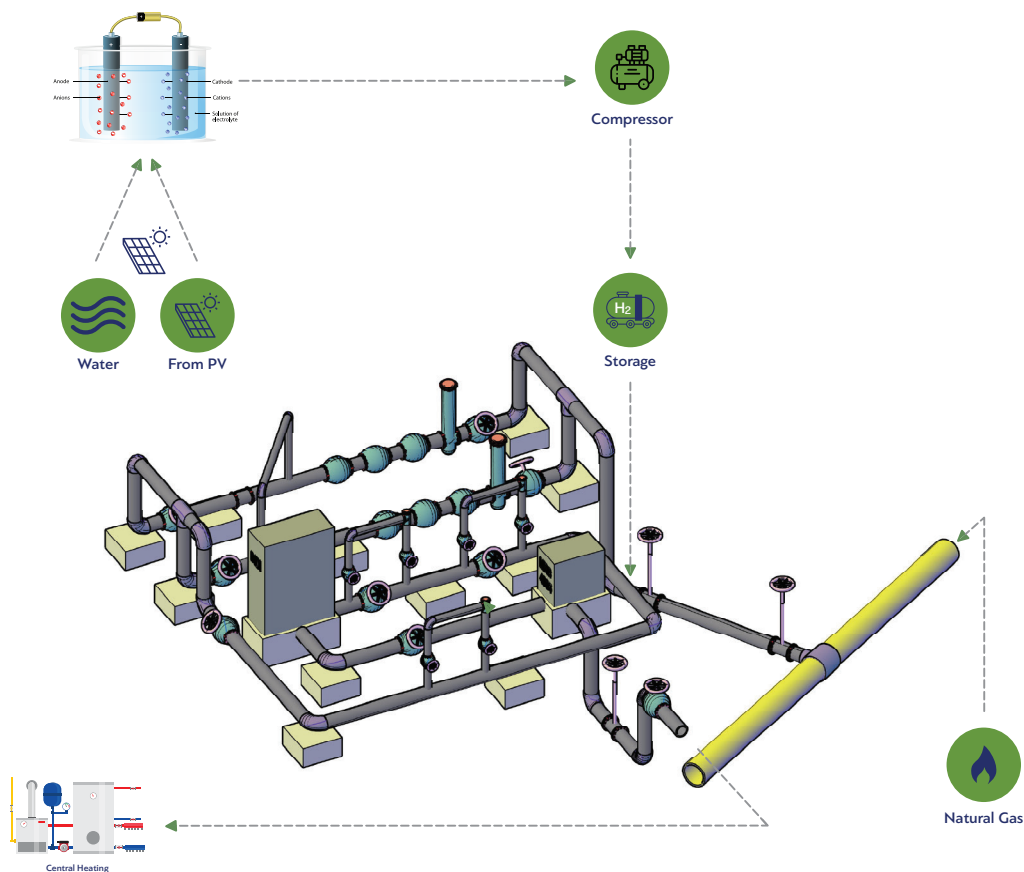
- The Training Center can be used as a R&D facility testing the equipment for the max % of Hydrogen which can safely be injected in the gas network.

- Hydrogen will be injected before the entrance to the 70/19 M/R Station in the Metallic Shed training facility and, following the process of gas pressure reduction and measuring, will end to the central heating facility of Nea Messimvria O&M main building.
- The Hydrogen that will be injected in the facility will be produced by electricity generated from a nearby Photovoltaic park with electrolysis (Green Hydrogen production).
- The Photovoltaic park at Nea Messimvria is a planned DESFA project.

-DESFA is developing the project with the support of experts, aiming to contribute to an industrial scale solution.

DESFA actively participates as stakeholder in organizations and partnerships, at a National and European level that are committed to promote a zero carbon future.

Currently DESFA is part of the HORIZON ZEN 24/7 Program. ZEN 24/7 aims at the design and development of a high-performance 33/100 kW-scale rSOC (reversible solid oxide cell) power balancing unit, in order to demonstrate its compatibility both with electricity and gas networks, highlighting its potential in achieving sustainable energy solutions.



III. DESFA AT A GLANCE



III.0 BUILDING ON LONG TERM EXPERIENCE AS A EUROPEAN TSO

Establishing Greece as an energy gateway for Southeast Europe and paving the way to a greener future.

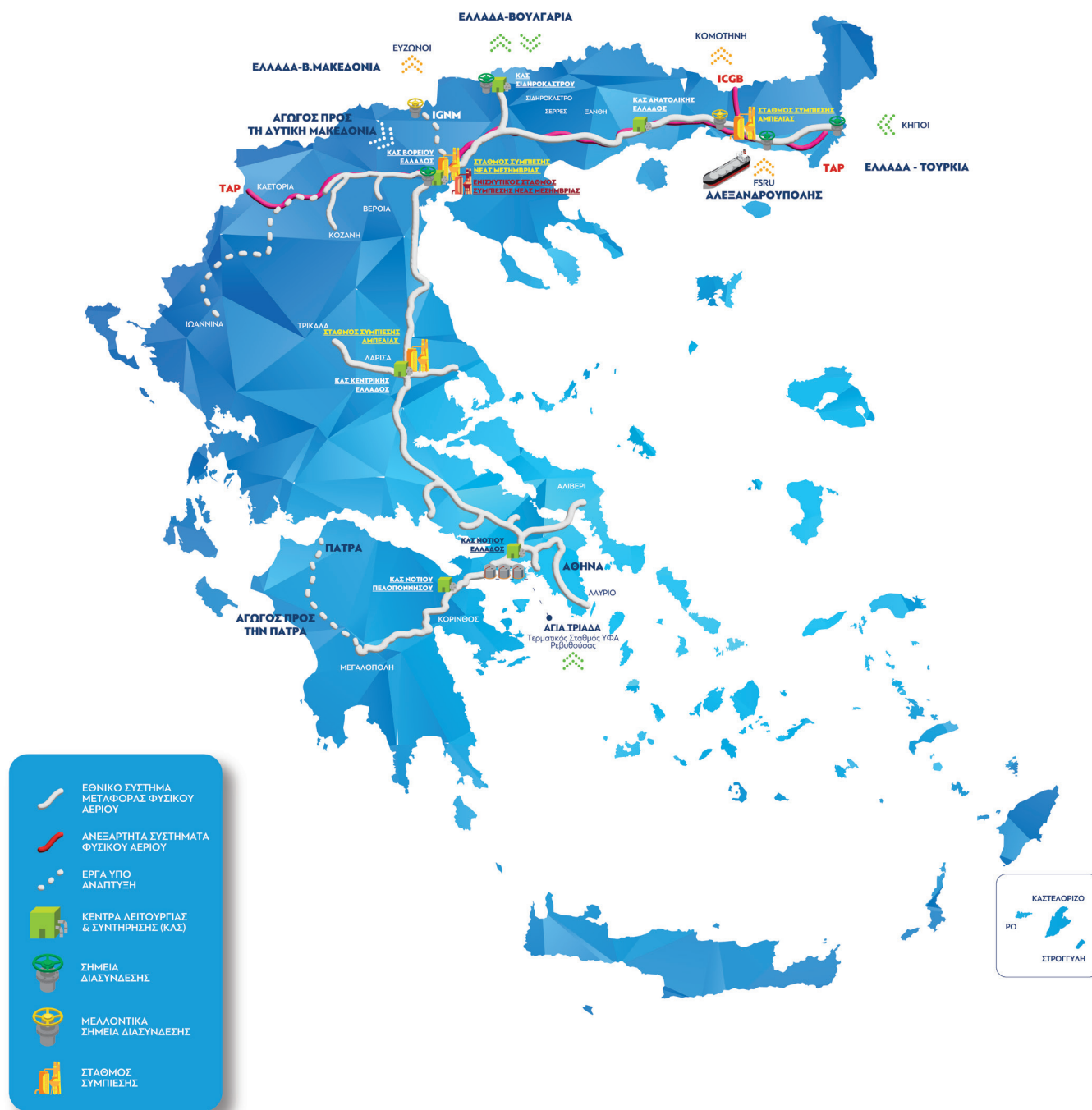
DESFA pursues its business activity as Greece's natural gas TSO, operating and developing the Greek National Natural Gas System and its interconnections, with safety, reliability, transparency, and commercial innovation, **with 30 year of experience.**

With extensive experience and highly skilled personnel, DESFA has been proven a trusted energy partner in SE Europe and beyond, with its shareholders including the Greek State (34%) and Senfluga SA (66%), a joint company of Snam, Enagás, Fluxys, and Damco, **being part of a greater European family of Transmission System Operators (TSOs).**

Leveraging its robust infrastructure and expertise, DESFA plays a vital role in bolstering energy security and diversifying gas supply sources in the country and the wider region, establishing Greece as an energy gateway.

Furthermore, DESFA paves the way to a greener future, working intensively for the decarbonization of its network, with the integration of renewable gases, such as hydrogen and biomethane, and the promotion of cutting-edge energy solutions and technologies, such as carbon capture and storage.

III.1 NATIONAL NATURAL GAS TRANSMISSION SYSTEM



1465 km high pressure pipelines

1 LNG Regasification Terminal

4 gas entry points



III.2 OPERATION AND MAINTENANCE EXCELLENCE

100%

Intrinsic Availability
of delivery points

100%

Availability of
LNG Terminal

100%

Intrinsic Availability
of Compressor Station

III.3 SAFETY AND ENVIRONMENT FIRST



Quality / Health & Safety / Environmental Management certified
(ISO 9001, ISO 45001) and audited by third party auditors



0

Fatal
Accidents

< than 10y average

Lost Time Injury Rate
Yearly performance



Member of the
“Oil and Gas Methane
Partnership – OGMP
2.0”, aiming to zero
CH₄ emissions

Carbon Footprint
Report, according
to the international
standard 2050:2011
PAS and ISO14064

100%
of dangerous
wastes managed



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