



MONITORING, INTEGRATION, AND SUSTAINABILITY

Local solutions for managing the various systems and infrastructures of companies in the oil and gas sector.

Venezuela's automation and sustainability company.



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1. Operational Resilience and Profitability



In the current environment of logistical challenges and energy volatility, the management of oil infrastructure in Venezuela must evolve from a reactive reactivation model to a **Digital Operational Resilience** strategy based on **real-time asset information**. Extraction and transport infrastructure is a strategic asset that is decisive for production continuity and environmental safety; a failure in the power distribution or backup system, in a pumping system, or in an HVAC system exponentially increases the risk of unscheduled shutdowns and environmental sanctions.

Innotica's value proposition is based on the implementation of an interoperable and scalable automation ecosystem designed for critical environments. Through our platforms, which have been developed under open protocols (MQTT, Modbus, BACnet, Ethernet/IP, among others), they apply to the monitoring and control of pumps, level and flow measurement, monitoring of pressures, temperatures, gases, and the integration of existing infrastructure within field systems, tank farms, and refineries.

At Innotica, we transform *legacy* industrial facilities or new developments into smart and sustainable infrastructures capable of self-managing their critical variables, decreasing operating costs, and extending equipment lifespan. Implementations are carried out gradually with the objective of reinforcing the governance of the physical plant, mitigating the dependence on manual monitoring in remote areas, and guaranteeing operability in the face of constant failures of the national electricity supply.

From a financial perspective, digitalization is a tool for **direct OPEX optimization**. Cost reduction through efficiency and **predictive maintenance** is the only viable route to shield profitability against cost inflation and spare parts scarcity. The adoption of these solutions, aligned with international standards such as ISO 50001, ASHRAE, and certifications such as LEED or EDGE, revalues assets, validates ESG compliance before international partners, and positions the company at the forefront of sustainable energy reactivation in the region.

2. Pain Points in Hydrocarbon Infrastructure

Energy Vulnerability

Voltage fluctuations, phase drops, and unmanaged *harmonics* are the main causes of **accelerated degradation** of equipment such as pumps, compressors, variable frequency drives (VFDs), and control cards in general. Operating without visibility into the quality of the power feeding pumps or compressors prevents the detection of destructive events before they cause an **unscheduled shutdown**.

Furthermore, the chronic dependence on self-generation with power plants (often designed for backup and not for continuous use) exponentially increases operating costs (OPEX) and the carbon footprint, accelerating the mechanical wear of generators and compromising the reliability of the backup during critical production moments.

Manual Operation

Lacking historical indicators and live monitoring prevents the implementation of predictive strategies; you cannot correct what you cannot see. This "**operational blindness**" makes it impossible to detect incipient leaks, pressure drops in pipelines, or thermal efficiency losses in real-time, transforming minor incidents into failures that compromise production and violate commitments acquired with international partners.



3

AUTOMATION SOLUTIONS



3.1. Common Infrastructure

The **Unified Operational Management** Solution implemented by Innotica is a **hybrid hardware and software architecture** designed for the critical supervision of oil wells, refineries, and tank farms. It is based on the deployment of agnostic platforms with open industrial protocols, highlighting the use of Modbus TCP, Ethernet/IP, OPC UA, and HART for the plant, and MQTT with wired or wireless communication for efficient telemetry in remote areas. This flexibility guarantees **total interoperability** and the capacity for bidirectional integration with third-party cloud analysis platforms or corporate systems (ERP/SAP), as well as visualization in business intelligence tools such as Power BI.

Key components include smart RTUs, IoT Gateways, and controllers that act as on-site data concentrators. A strategic differentiator of Innotica is the capacity for **Custom Software Development**; not only is it equipment integrated, but also the middleware, APIs, and interfaces necessary for the data to reside where the company's cybersecurity strategy dictates are developed: whether in a scalable Cloud infrastructure or deployed locally on the company's own servers to guarantee the **sovereignty of critical data**.

The ultimate goal of this digital infrastructure is to optimize the hydrocarbon value chain, improving efficiency in extraction and transport, and ensuring process safety. This is achieved by centralizing data from geographically dispersed assets and connecting isolated data from different platforms, transforming reactive operation into predictive management, providing the analytical tools necessary for compliance with environmental regulations and the safeguarding of costly industrial assets.



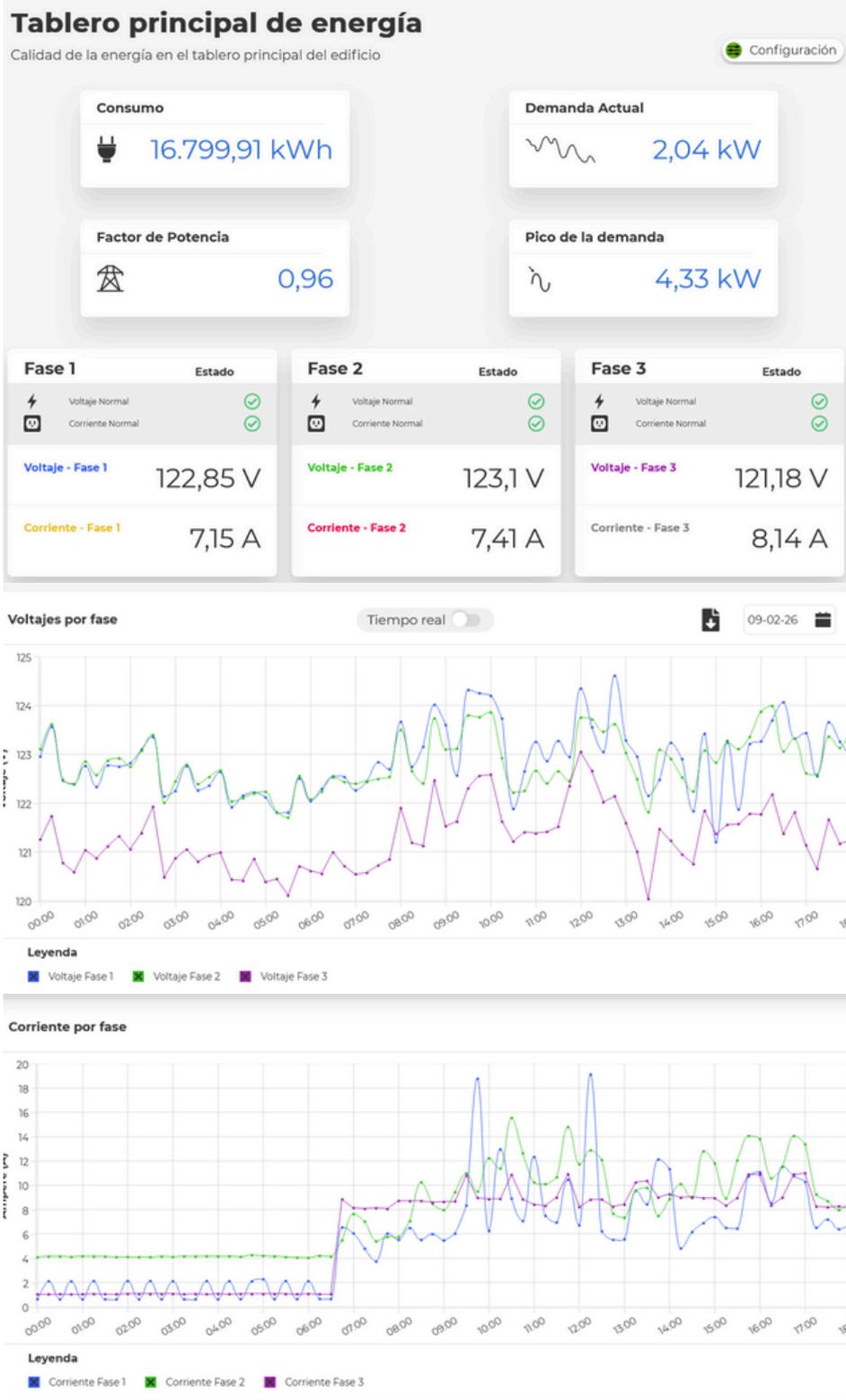
3.2. Power Quality and Energy Consumption Measurement

Innotica's solution centralizes the monitoring of power quality and energy consumption, integrating with new analyzers or leveraging existing equipment in substations and distribution rooms. Technological barriers are broken by communicating data from cabinets, breakers, and meters via standard protocols such as Modbus, Ethernet/IP, IEC 61850, and DNP3; this allows the integration of variables in order to optimize operational processes.

Robust Frameworks are supplied, programmed, and installed that transform data into operational intelligence, **without depending on a single manufacturer.**

Customized SCADA systems are developed so that they allow drilling down from the general plant view to the specific cabinet detail. The platform enables **remote control** of breakers and loads, a vital aspect for personnel safety and response to contingencies.

The system integrates a user-configurable alarm and notification engine, allowing the **detection of peaks, phase faults**, or harmonics in real-time and the generation of immediate alerts to protect critical assets before production stops.



3.3. Monitoring of Power Plants, Tanks, ATS, and UPS

We supervise your backup infrastructure **without installing invasive sensors**. By connecting directly to the generator and ATS controllers, we extract critical variables such as oil pressure, coolant temperature, battery voltage, and operating hours. For UPS systems, we monitor the **real autonomy** and charge status, allowing for the detection of preventive faults, thus ensuring the protection of SCADA systems and control rooms.



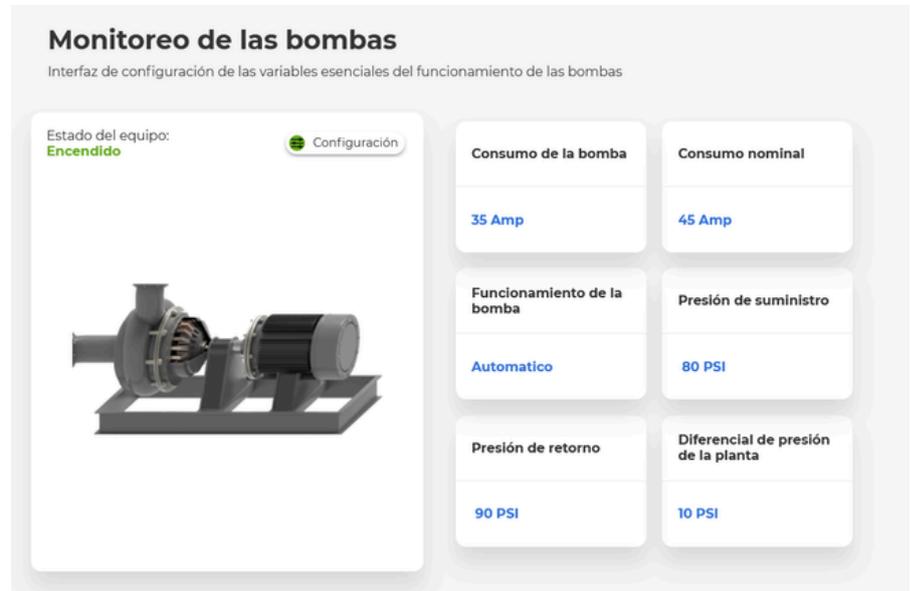
Our solutions allow reading tank levels in real-time and crossing this data with generator operation, allowing for the analysis of consumption over time. This enables the precise calculation of operational autonomy (days/hours available), optimizes **replenishment logistics** in remote fields, and generates alerts in the face of abrupt level drops, mitigating risks of leaks or **fuel theft**.



3.4. Monitoring and Control of Rotating Equipment

It focuses on the continuous supervision of the health of critical assets such as transfer pumps, injection systems, and industrial fans. The system performs monitoring of current consumption per phase, allowing the detection of **electrical imbalances** or overloads before they damage the motor.

Simultaneously, we integrate sensors for **vibration and temperature analysis** on the casing, key variables to identify bearing wear or cavitation. This proactive management ensures the **mechanical integrity** of the equipment over time, transforming corrective maintenance into a predictive strategy that avoids unscheduled shutdowns.



3.5. Level, Flow, and Resource Consumption Measurement

For resource management (water, crude oil, chemicals, or fuel), our priority is to maximize the value of your current infrastructure; for this reason, the Innotica platform connects to existing instrumentation, capturing data from flow meters and level sensors through their native communication protocols or through the interpretation of electrical signals.

In those points of the network where measurement does not exist, Innotica offers the complete supply and installation service of the necessary instrumentation. The record of resource consumption is stored over time to be able to generate indicators related to the measured resources.

3.6. Pressure and Temperature Measurement



Precision in process variables is non-negotiable for operational safety; for this reason, our solution captures data in real-time directly from flow lines, exchangers, and separators, eliminating sporadic manual readings. We adapt to the plant's operational reality, integrating signals from existing instrumentation such as thermocouples, RTDs, and pressure transmitters.

In those points where instrumentation is deficient or nonexistent, Innotica offers the complete supply and installation service of new industrial-grade sensors, considering the process information where the pressure and/or temperature measurement is performed.

3.7. Protocol Mapping for Equipment Integration

We solve the challenge of multiple industrial communication technologies through the implementation of multiprotocol Gateways. Our team of engineers performs an exhaustive survey of your process data to execute a **precise variable mapping**, translating and normalizing records from different manufacturers into a unified data structure.

This capability allows us to consolidate multiple protocols into a single gateway, creating a **transparent bridge** between the plant floor and management. The standardized data remains available for both Innotica's SCADA and third-party applications (ERP, Cloud, or existing Historians), ensuring that information flows without barriers to where the organization needs it.

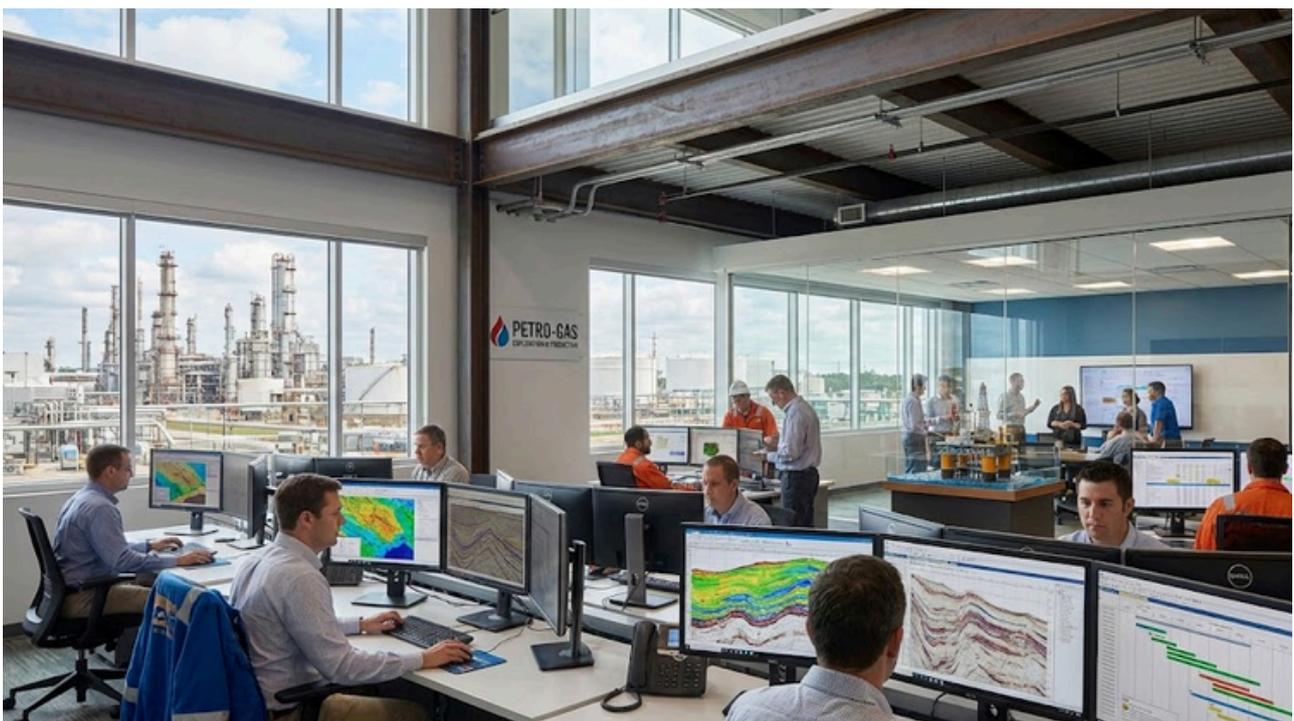


3.8. Infrastructure Monitoring and Control

The efficient management of physical assets in the oil and gas sector transcends the process area; it ensures the **habitability, safety, and operational continuity** of the spaces that support production, from administrative buildings and laboratories to remote camps and dining halls. Innotica's solution unifies the supervision of these dispersed infrastructures, transforming static facilities into **smart environments** capable of self-managing their resources and responding in real-time to the needs of their occupants.

Our BMS (Building Management System) platform acts as a centralized brain that integrates disparate technologies under an open architecture. This allows operators to visualize and control subsystems that traditionally operate as "system islands", optimizing maintenance and ensuring compliance with industrial safety and comfort (SHA) regulations through:

- **Precision Climate Control (HVAC):** Automated control of Chillers, AHUs (Air Handling Units), and air conditioners in Shelters to protect electronic equipment and ensure thermal comfort.
- **Lighting and Power:** Smart management of lighting circuits and power outlets to maximize energy savings and reduce the carbon footprint.
- **Physical Security and Access Control:** Integration of CCTV systems, biometric control, and intrusion detection into a unified interface.
- **Hydropneumatic and Sanitary Systems:** Constant monitoring of drinking water pressure and the operation of treatment plants in camps.
- **Fire and Gas Detection:** Real-time supervision of the status of detection panels and technical alarms for immediate response to emergencies.
- **Consumption Measurement:** Record of water, electrical energy, and fuel consumption during the operation of the organization's different infrastructures.



4.1. Legal and Environmental Compliance Audits

Regulatory compliance in Venezuela should not be seen as an administrative formality, but as a pillar of **Operational Governance**. At Innotica, we transform legal verification into a tool for financial and legal risk mitigation for Oil and Gas operators.

Our service specializes in the comprehensive audit of technical and operational documentation, ensuring that every asset has the necessary legal backing for its uninterrupted operation:

- **Verification of Prior Control Instruments:** Audit and monitoring of the Land Occupation Authorization and Natural Resources Affectation Authorization (AOT and AARN, respectively, for their acronyms in Spanish), ensuring that the operation remains within the limits authorized by the governing body.
- **Control of Effluents and Atmospheric Emissions:** Verification of compliance with technical standards regarding air quality and control of polluting emissions, as well as the characterization of liquid effluents to avoid environmental sanctions.
- **Hazardous Waste Management:** Audit of handling, storage, and final disposal protocols for chemical waste and drilling muds, aligned with current national legislation.
- **Soil and Water Body Quality:** Preventive monitoring of environmental quality in areas of direct influence to guarantee the absence of deviations from technical standards.



4.2. Environmental Site Assessments (ESA) and Liability Management

The acquisition of land or operation under licenses and concessions **requires rigorous environmental Due Diligence**. Innotica implements international industry standards to identify environmental risks before they become critical financial liabilities.

Our methodology is based on **ASTM** standards, providing a clear roadmap for strategic decision-making:

Phase I ESA (ASTM E1527-21): We perform a Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. This non-intrusive assessment identifies **Recognized Environmental Conditions (RECs)**, detecting the presence or probability of release of hazardous substances or petroleum products on the site.

Phase I ESA (ASTM E1903-19): If RECs are identified, we execute the Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process. This phase involves intrusive sampling of soil and groundwater to confirm and quantify the actual extent of contamination.

Design and Supervision of the Remediation Plan: Based on the findings of Phases I and II, we design and supervise the environmental cleanup plan, ensuring that the rehabilitation of the affected areas complies with safety objectives and international regulations.



4.3. Operational Carbon & Water Footprint Management

In the current energy transition scenario, resource use efficiency is synonymous with profitability. Innotica deploys cutting-edge technology to turn sustainability indicators into auditable assets that validate ESG performance before global partners.

We approach footprint management with a focus on OPEX optimization and value creation:

- **GHG Emissions Inventory and Gas Recovery:** We implement systems for the Greenhouse Gas inventory, focusing on reduction strategies and eliminating unnecessary flaring.
- **GHG Emission Reduction Certificates:** We structure operational data to opt for valid carbon certificates, allowing the company to capitalize on its decarbonization efforts and improve its international positioning.
- **Water Resource Management:** We monitor the operational water footprint through strict control of abstraction, use, and reinjection of formation water. Our goal is to minimize discharges, reduce operating expenses for water management, and mitigate negative externalities in the environment.
- **Sustainability Dashboards:** We centralize energy, water, and fuel consumption data in real-time interfaces, transforming physical variables into business intelligence for audits and performance reports.



4.4. LEED and EDGE Infrastructure Certification



Sustainability in the hydrocarbon sector is not just an environmental goal; it is a strategic asset that adds value to infrastructure and validates corporate commitment before international markets. Innotica offers a comprehensive Consultancy and Accompaniment service for the certification of administrative buildings, camps, and control rooms. We manage the entire project cycle, from the initial bioclimatic diagnosis to the technical defense before certifying bodies, guaranteeing high-performance infrastructures that reduce operating costs (OPEX) and improve the quality of life of field personnel.

LEED (LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN)

We focus on the Operation and Maintenance (O+M) certification for existing buildings and Design and Construction (BD+C) for new developments. Our engineering optimizes energy efficiency, water management, and indoor environmental quality, aligning your facilities with the most globally recognized sustainability standard by the USGBC.

EDGE (EXCELLENCE IN DESIGN FOR GREATER EFFICIENCIES)

We implement cost-effective strategies to achieve the IFC (World Bank) standard, ideal for camps and massive developments. Our goal is to certify a minimum saving of 20% in energy, water, and energy embodied in materials, providing a fast and verifiable route towards the decarbonization of your civil infrastructure.

5. Innotica Work Team



Electronic Engineer graduated from Simón Bolívar University, with more than 16 years of experience in the development of Instrumentation, Control, and Automation projects, as well as in the management and coordination of the Quality Control area in the industrial sector.



Director of the Sustainability Unit at Innotica and LatAm Coordinator of the WorldGBC. With more than 20 years of experience in the sustainability sector applied to the industrial sector, he is an EDGE Expert, Advisor to the Venezuelan Council of Sustainable Construction (CVCS), and PhD candidate in Sustainable Development. A specialist in decarbonization, he leads the strategic transformation of assets towards global certifications and ESG compliance.



Senior Software Architect specialized in critical systems interoperability. Expert in the design and management of APIs for the integration of industrial monitoring platforms (OT) with third-party corporate applications. He leads the creation of secure digital ecosystems that unify dispersed operational data.



Electronic Engineer, accredited LEED AP ID+C, expert in the integration of automation protocols (KNX, LonWorks, Modbus, Ethernet/IP) and SCADA/EMS/BMS systems. His trajectory covers from fiber optic infrastructure and telecommunications shelters to the sustainable digitalization of industrial plants.



Electronic Engineer with postgraduate degrees in Renewable Energies and Home Automation, certified in ISO KNX and LonWorks protocols with experience in Modbus, Ethernet/IP, Allen Bradley, HART. His international experience in Madrid in R&D and aviation electronics grants him exceptional technical rigor to design automation solutions and critical infrastructure management.

6. About Innotica and its Experience

Innotica is a technology engineering firm specializing in automation, monitoring, and sustainability, founded with the mission of transforming Venezuelan infrastructure into smart and resilient ecosystems. We are not just equipment integrators; we are solution developers who understand the local operational reality and convert it into a competitive advantage through our own technology and global standards.

Our experience is not theoretical. For years, we have been the strategic partner behind operational continuity in large infrastructures of the country, industrial plants, financial centers, and corporate buildings throughout the national territory. We have successfully implemented critical management systems (BMS/EMS) where the margin of error is zero.

This transversal trajectory allows us to apply the best practices from different sectors to the Oil and Gas industry:

- **Industrial and Manufacturing Sector:** Automation of production data collection systems and industrial services for large mass consumption plants.
- **Banking and Technological Sector:** Precision climate control and energy backup for Data Centers of top-tier financial institutions, where data security is the priority.
- **Large Commercial Infrastructures:** Asset management and energy efficiency in large-scale buildings, achieving sustainability certifications and tangible operational savings.

Our strength lies in our agnostic integration capacity. We do not tie our clients to a single brand; we connect their existing assets (Legacy) with new IoT and Cloud technologies, developing the necessary software so that everything speaks the same language. In a country that requires robust solutions and immediate support, Innotica offers the security of local engineering with global reach and vision.



 **INNOTICA**