# Case Study: Compressor Fleet Optimization & Monitoring (Europe)

### GIBES INOV – Energy Optimization & Predictive Maintenance Solutions

## Industry Overview

The European manufacturing sector relies heavily on energy-intensive compressor fleets. Inefficient sequencing and lack of predictive monitoring often lead to:

- High energy consumption and cost spikes.
- Sudden compressor failures causing unplanned downtime.
- Limited visibility into fleet performance and air distribution losses.

## Client Background

A major European automotive parts manufacturer operated 5 large compressors with manually sequenced operation, resulting in:

- Energy inefficiency and unnecessary load/unload cycles.
- Frequent unplanned maintenance events.
- Risk of downtime impacting production schedules.

## Key Metrics

| Metric | Before GIBES INOV | After GIBES INOV | |
|---|---|---|---|
| Compressor Energy Usage | Unoptimized sequencing | Optimized load balancing | 22 |
| Annual Savings (Energy + Downtime) | N/A | $450,000 | Mea |
| Air Leakage Detection | Annual manual audit | Continuous IoT monitoring | Pro |

## Challenges & Constraints

- Manual sequencing of compressors caused energy spikes and inefficiency.
- Sudden failures led to costly unplanned downtime.
- Lack of real-time monitoring prevented proactive maintenance.

## GIBES INOV Solution Architecture

## Hardware Implementation

- IoT pressure sensors and current transducers installed on all compressors and major air distribution lines.
- Vibration sensors integrated on compressor motors for predictive health monitoring.

## Control Logic

- Master PLC (Siemens) running load-balancing algorithms for optimal compressor sequencing.
- Predictive model forecasts when demand exceeds capacity and automatically starts additional compressors.
- Real-time feedback loop prevents energy spikes and reduces mechanical stress.

## Data Analytics & Predictive Maintenance

- Continuous IoT monitoring for energy use, air leakage, and motor health.
- Early warnings allow proactive maintenance, avoiding unexpected downtime.
- Dashboard visualizes fleet performance metrics and historical trends.

## Deliverables

- IoT sensor and gateway setup.
- PLC sequencing program.
- Energy audit certification.

## Implementation Timeline

- **Week 1–4:** System design, sensor installation, and PLC programming.
- **Week 5–16:** Validation, predictive monitoring calibration, and performance reporting.

## Results & Impact

- 22% reduction in energy consumption through optimized load balancing.
- Annual savings of $450,000 in energy and downtime costs.
- Continuous air leakage detection enabled proactive loss prevention and maintenance planning.

## About GIBES INOV

GIBES INOV delivers industrial automation and predictive maintenance solutions that optimize energy usage, increase operational efficiency, and ensure measurable ROI for manufacturing clients.