AI and IAGEN Application Use Case

Continuous Improvement in the Vaca Muerta Oil Industry

Executive Summary – IAGEN Application for Continuous Improvement in Industry
Vaca Muerta Oil Company

This executive summary presents a strategic application of artificial intelligence Generative Innovation (IAGEN) in the energy sector, focused on the Continuous Improvement of Oil operations in Vaca Muerta. This represents a key opportunity to transform production processes in one of the largest unconventional reserves in the world. important in the world, bringing innovation, efficiency and sustainability to the operating ecosystem.

Use case classification

1. By main resource: oil, gas, water and energy (comprehensive approach).
2. By activity: information management and decision-making.
3. By technology used: generative AI, machine learning, natural language processing and data integration platforms.
4. By strategic impact: strengthening decision-making strategic by analyzing large volumes of data.

1. Opportunities for using AI and IAGEN in the sector

IAGEN presents multiple opportunities in the petroleum industry, including: Predictive maintenance analysis, reservoir simulation, automatic generation of customized reports, performance comparison between wells, Document automation, logistics optimization and detection of new deposits. It also applies to regulatory compliance, processing

efficient use of subsurface data and risk reduction through anticipation of faults and operational recommendations based on real data.

2. Expected benefits

- Increased operational efficiency: by reducing analysis times and accelerate data-driven strategic decision-making.
- Cost reduction: by optimizing maintenance, use efficient use of resources and improved logistics.
- Improved safety: thanks to early fault detection, identification of operational risks and generation of preventive alerts.
- Drive for continuous improvement: through the constant identification of opportunities and automation of solution proposals adapted to the operational context.
- Environmental sustainability: through the optimization of energy and water consumption and the reduction of emissions associated with inefficient processes.

3. Application of AI

The solution integrates generative AI and machine learning technologies, applied to critical drilling, production and maintenance processes. Through modules that collect, structure, analyze and visualize data from sensors, human reports and operational records, allows generating models predictive, visualize performance in real time, detect deviations and automate action proposals for each operational level.

4. Proposed AI Agent

The report proposes the development of a Continuous Improvement Agent based on IAGEN, Designed to operate in critical environments of the oil industry, such as plants Hydraulic fracturing, production, transportation, and water treatment. This agent collects structured and unstructured data (maintenance records, sensors, logs, energy and water consumption) and transforms it into inputs.
analyzable, and detects patterns of inefficiency, recurring failures and configurations inadequate operations. Uses machine learning models, series analysis

temporal and recovery augmented generation (RAG) techniques, allowing you to link root causes to operational events and generate accurate diagnoses.

In addition, the agent generates preventive recommendations and specific operational redesigns, such as component changes, adjustments to maintenance plans or suggestion of alternative suppliers. These recommendations are tailored to each user profile through dashboards or chatbots, and are validated through a module feedback that evaluates the real impact of the actions implemented. Its The main benefit is the automated and adaptive continuous improvement, with progressive learning capacity, contributing to efficiency, safety and sustainability of operations.

5. Conclusion

The incorporation of IAGEN for Continuous Improvement represents an evolution A strategic opportunity for the Vaca Muerta oil industry. It not only addresses the sector's technical and economic challenges, but also drives a transformation operational supported by data, machine learning and energy efficiency. This Technology enables smarter and more sustainable exploitation of resources country's energy, strengthening the sector's competitiveness at a global level.