HUB TECH IA

AI and IAGEN+ Application Use Case

Energy Optimization in the Oil Industry: Predictive Analysis of Well Performance in Vaca Muerta

Executive Summary – IAGEN Application for Predictive Performance Analytics of Wells in Vaca Muerta

This executive summary presents a strategic application of generative artificial intelligence (GENAI) in the energy sector, specifically in the optimization of oil well performance in the Vaca Muerta formation. It is a
significant opportunity to increase the efficiency, safety and profitability of
operations in one of the world's largest unconventional reserves.

Use case classification

The report classifies this IAGEN application based on four axes:

1. By main resource: oil.
2. By activity: optimization of production processes.
3. By technology: generative AI models (GANs) and machine learning (LSTM, Random Forest).
4. By strategic impact: optimization of production and infrastructure.

1. Opportunities for using AI and IAGEN in the sector

Specific opportunities include well performance prediction, simulation of operating scenarios, generation of synthetic data for modeling

geological, early detection of anomalies and decision-making assistance in contexts of high uncertainty. AI makes it possible to overcome the limitations of traditional methods (such as DCA or EBM) by using large volumes of data and the ability to adapt to dynamic conditions.

2. Expected benefits

The implementation of these technologies contributes to:

- Optimize the hydrocarbon recovery factor.
- Reduce operating costs through predictive maintenance and allocation resource efficient.
- Improve safety through early warnings of failures. • Accelerate decision-making with more accurate, real-time information.

3. Application of AI

The approach combines classical and generative AI into a workflow that includes: Data collection and cleaning, model training, scenario simulation, predictive analytics, and real-time monitoring. Integration with IoT sensors enables continuously update models and adapt operational recommendations accordingly changing conditions.

4. Proposed AI Agent

The report proposes the development of an intelligent agent powered by IAGEN, of the *no-code/ low-code type,* capable of executing autonomous tasks such as analysis, recommendation and simulation. This agent integrates into existing systems, learns continuously and can interact with historical and real-time data. Its main function is automate well performance evaluation and assist in critical decisions. The Key benefit lies in its scalability, low implementation cost and ease of use by non-technical personnel.

5. Conclusion

The incorporation of IAGEN and intelligent agents represents a technological evolution disruptive for the oil sector in Vaca Muerta. Its implementation allows for the transition from a reactive logic to a proactive, data-driven and adaptable strategy geological complexity of the deposit. This digital transformation not only improves profitability, but also drives more efficient and sustainable exploitation of the country's energy resources.