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HUB TECH IA

## AI and IAGEN Application Use Case

# Predictive Performance Analysis for Performance Prediction of Wells

### Executive Summary – Application of AI and IAGEN for Performance Prediction of Wells in Vaca Muerta

This executive summary presents a strategic application of artificial intelligence (AI) and generative artificial intelligence (IAGEN) in the energy sector, specifically in optimizing the performance of oil wells in the Vaca Muerta training. This is a concrete opportunity to maximize the exploitation of unconventional hydrocarbon resources through advanced technologies that enhance the efficiency, safety and sustainability of the operations.

Use case classification

The report classifies this application according to the following axes:

1. By primary resource: oil (with gas as a secondary resource).
2. By activity: optimization of production processes.
3. By technology: generative AI models, machine learning (Random Forest, LSTM, GRU, SVM), natural language processing and platforms data integration.
4. By strategic impact: improvement of the productive infrastructure through the predictive analysis and anticipatory maintenance.

1. Opportunities for using AI and IAGEN in the sector

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Specific opportunities include predicting the future behavior of
wells using geological, operational and historical data; the generation
Automated well-to-well comparative reporting; self-explanatory curves
production in natural language; and the simulation of operational scenarios. These
tools allow you to anticipate performance drops, detect anomalies and
optimize decision-making in exploration and exploitation.

2. Expected benefits

The application of these technologies allows:

- Improve operational efficiency and asset availability.
- Anticipate failures and reduce unplanned downtime.
- Reduce maintenance and operating costs.
- Increase security through early warnings and proactive interventions.
- Streamline decision-making through accurate, comparative and automated.

3. Application of AI

The approach combines classical and generative AI into a complete workflow:
Data collection and structuring (from IoT sensors, well logs, SCADA systems), predictive model training, results simulation, time series analysis (LSTM, Prophet), and operational recommendation development. The proposed architecture relies on analytical platforms (SAS, Alteryx, Teradata) and tunable models that are continuously updated based on well performance.

4. Proposed artificial intelligence agent

The report proposes a multi-agent architecture, which highlights the
Knowledge Generating Agent, based on IAGEN. This agent transforms the
technical results of the models in automatic reports that explain the
expected performance of a well, comparing it with similar cases and proposing
operational improvements. Generates hypotheses, suggests optimal configurations, and communicates
recommendations in natural language. Its main function is to assist in decision making

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strategic decisions by automating complex analytical tasks. Your benefit
The key lies in its scalability, autonomy, integration with management systems (Power BI, ERPs) and usability for personnel without advanced technical training.

## 5. Conclusion

The incorporation of AI and IAGEN represents a disruptive transformation for the energy industry in Vaca Muerte. By allowing a shift from reactive management to a predictive strategy, based on data and continuous analysis, these technologies improve profitability, reduce risks, and promote smarter, more efficient, and sustainable exploitation of Argentina's unconventional resources.