HUB TECH IA

Deliverable report 40

AI and IAGEN Application Use Case

Report on Exploration, Reservoir Modeling and Analysis of geological data to identify areas with shale gas

Executive Summary – Application of IAGEN for Shale Reserve Prediction Gas in Vaca Muerta

This executive summary presents a strategic application of generative artificial intelligence (IAGEN) in the energy sector, specifically in exploration, reservoir modeling, and data analysis for dynamic reserve prediction.
of shale gas. This is a concrete opportunity to boost the decision-making process strategic decisions in Vaca Muerta, one of the most relevant assets for the Argentina's energy independence.

Use case classification

 The case is classified according to the following axes:

1. By main resource: gas (shale gas).

2. By activity: information management and decision-making.

3. By AI technology used: generative models (GANs, VAEs), learning automatic (MLP, Random Forest, Gradient Boosting), artificial vision (CNNs), stochastic simulations (Monte Carlo), data integration platforms and

intelligent agents.

4. By strategic impact: support for strategic decision-making through
data analysis.

1. Opportunities for using AI and IAGEN in the sector

The IAGEN application allows you to integrate and analyze large volumes of data
geological, seismic and operational data in real time to more accurately predict the
recoverable reserves. It offers key opportunities to design strategies for
drilling, optimize operating parameters, simulate production scenarios and
reduce the uncertainty inherent in unconventional reservoirs.

2. Expected benefits

Among the benefits are:

• Improved accuracy and reliability of reserve estimates.
• Reduction of operating costs by avoiding unnecessary drilling.
• Optimization of productive efficiency through data-driven decisions.
• Increased control over technical and economic risks.
• Generation of dynamic projections that adapt to the behavior of the
deposit.

3. Application of AI

IAGEN is implemented through a technical approach that combines data collection
data, generative model training, stochastic simulation, optimization
Multivariate and real-time adjustment. Neural networks are applied for modeling.
seismic, Monte Carlo simulations to quantify uncertainty and algorithms for
machine learning to predict the productive performance of wells.

4. Proposed AI Agent

The report proposes an intelligent agent based on IAGEN, designed to operate in
five phases: data collection and preparation, generative modeling and simulation,

optimization of extraction strategies, validation and continuous tuning, and assistance to the decision-making. This agent processes seismic, geological, and operational information to generate predictive scenarios adjusted to the dynamic conditions of the reservoir, optimizing parameters such as well pressure and injection rate.

Its main function is to automate the complete reserve evaluation cycle, adapting in real time to new operational data and offering recommendations strategic. This allows for maximizing gas recovery, reducing costs, and providing technical and executive managers precise tools for high-level decisions impact.

5. Conclusion

The incorporation of IAGEN into reserve prediction represents an evolution decisive for the intelligent exploitation of Vaca Muerta. Its application transforms the geological and operational evaluation processes, supports data-driven decisions, and positions Argentina as a regional benchmark in technological innovation applied to energy development. This digital transformation strengthens efficiency, sustainability and autonomy of the sector.