HUB TECH IA

Deliverable report 18

AI and IAGEN Application Use Case

Construction and installation - Design of the production process - Optimization of Production Processes in Vaca Muerta, Neuquén

Executive Summary – Application of IAGEN in Construction and Installation for the Optimization of Production Processes in Vaca Muerta

This executive summary presents a strategic application of generative artificial intelligence (GENAI) in the construction and installation sector, focusing on production process design and operational optimization. This is an opportunity

relevant to Vaca Muerta, by offering innovative technological solutions to face the challenges of efficiency, safety and sustainability in the production of

unconventional hydrocarbons.

Use case classification

The report classifies this IAGEN application based on four axes:

1. By primary resource: oil and gas (primary); water and energy (secondary).

2. By activity: optimization of production processes.

3. By technology: generative AI models (GPT-4 Turbo, Auto-GPT), algorithms

    machine learning, data integration platforms, and simulations

    virtual.

4. By strategic impact: optimization of production and infrastructure.

1. Opportunities for using AI and IAGEN in the sector

The identified applications include automated generation of operating protocols, real-time predictive analysis for failure anticipation, simulations virtual production process, supply chain optimization, prediction market trends and environmental remediation. The uses are also highlighted in geological exploration through seismic analysis and identification of sites optimal drilling.

2. Expected benefits

The adoption of these technologies allows for improved operational efficiency, reduction costs, increase security through early detection of risks, and provide the processes that are most adaptable to changes in the environment. This in turn facilitates the data-driven strategic decision-making and promotes better management sustainable use of energy resources.

3. Application of AI

IAGEN is integrated through a technical workflow that automates key stages of the process: from planning with automated document analysis, through to generation of optimized operating protocols, up to their validation through virtual simulations and their supervised execution in the real environment. In addition, the system allows real-time monitoring and continuous adjustment based on indicators performance key.

4. Proposed AI Agent

The report proposes the development of an intelligent agent IAGEN designed specifically to optimize construction and installation processes in Vaca Dead. This agent operates in six stages: (1) identifies operational requirements from

from the analysis of technical documents using GPT-4 Turbo, (2) generates detailed operating protocols using Auto-GPT, integrating good practices and machinery configurations, (3) virtually simulates the process using platforms such as Siemens Tecnomatix or AnyLogic, (4) assists in the physical implementation with step-by-step instructions, (5) monitors in real time using IoT sensors and SCADA systems, and (6) adjusts the protocol based on the data obtained, retraining the models and generating iterative improvements.

The primary function of this agent is to transform traditionally manual and rigid processes into automated, adaptive, and digitally supervised flows.
Its implementation allows to detect bottlenecks, prevent operational failures, and optimize time and resources before the physical execution of the project. In addition, it facilitates integration with existing industrial systems (MES, SCADA) and enables improvement continuous based on real data from the operating environment, increasing the safety, efficiency and sustainability of the production process in Vaca Muerta.

5. Conclusion

The application of IAGEN in construction and installation represents an innovation transformative for the energy industry in Vaca Muerta. Its integration allows move towards smarter, more efficient and sustainable operating models. In addition, lays the foundation for a more robust energy transition, where intelligence Artificial not only optimizes current production, but also drives development technological and environmental impact of the sector in the medium and long term.