HUB TECH IA

Deliverable report 30

AI and IAGEN Application Use Case

Automatic queries - Immediate access to operational information in the Energy Sector in Vaca Muerta

I. Introduction

This report addresses an innovative proposal for the application of intelligence Artificial Generative Engineering (IAGEN) in the Vaca Muerte energy sector, with a focus on the query automation and immediate access to key operational information. In a environment characterized by high technical complexity, the need for responses agile and constantly updating regulations, having intelligent systems capable interpreting, integrating and responding in real time has become a priority strategic.

In this context, the incorporation of intelligent agents powered by IAGEN represents a concrete opportunity to transform the consultation processes, taking decision-making and knowledge management in the energy industry. The report details the design and implementation phases of a composite agent, its capabilities techniques, expected benefits and key recommendations to ensure adoption effective, sustainable and aligned with the current challenges of the sector.

II. IAGEN in Vaca Muerta: Answering Frequently Asked Questions

Generative Artificial Intelligence (GENAI) is a branch of artificial intelligence that focuses on creating new content, such as models, images, code, or text,

from existing data. This technology uses advanced algorithms to analyze large amounts of information, identify patterns and generate new content and original that is often indistinguishable from that created by humans.

The IAGEN can be a valuable tool for companies in the energy sector in Vaca Muerta, allowing them to answer frequently asked questions efficiently and precise. Some specific examples include:

- Production queries: IAGEN can analyze production data, historical and in real time, to answer questions about extraction volumes, well performance and production projections. IAGEN's capacity to analyze large volumes of data and detect patterns can help companies to optimize their production strategies, identify areas for improvement and make more informed decisions.
- Infrastructure queries: IAGEN can access information on infrastructure projects, such as oil and gas pipelines, to respond questions about transport capacity, construction costs and lead times execution. In addition, IAGEN can be used to create simulations and models that help visualize and plan the development of new infrastructures.
- Regulatory inquiries: IAGEN can analyze the regulatory framework of the energy sector, including laws, decrees and resolutions, to respond questions about permits, licenses, and environmental requirements. This can help companies to ensure regulatory compliance and avoid potential sanctions.
- Market inquiries: IAGEN may access price information international oil and gas, global demand and market trends, to answer questions about Vaca Muerta's competitiveness and opportunities export. IAGEN can generate market reports and analyses that help companies understand market conditions and make decisions strategic decisions.
- Sustainability inquiries: IAGEN can analyze environmental data, such as greenhouse gas emissions and water consumption, to respond

questions about the environmental impact of operations in Vaca Muerta and the mitigation strategies. In addition, IAGEN may access information on best practices in water management, such as the implementation of the standard ISO 14001, which has allowed Vaca Muerta companies to reduce their consumption water.

IAGEN can also be used to create marketing and communication content, such as articles, social media posts and promotional materials, which help to companies to communicate their sustainability strategies and generate trust in local communities. In addition, IAGEN can automate customer service, answering frequently asked questions through chatbots and virtual assistants, which improves efficiency and customer satisfaction.

III. IAGen Implementation Composite Agent

Nowadays, it is possible to combine automation through AI agents with the Generative AI-based models to further optimize activities.

1. **Concept of IAGEN agents**

In recent years, generative artificial intelligence (GAI) has revolutionized the way we interact with technology, enabling the development of systems capable of generating content, answering complex questions and assisting with tasks high-demand cognitive skills. From this capacity, a new architecture emerges Technological: IAGen-powered agents. These agents are not simple conversational interfaces, but autonomous systems that can interpret instructions, make decisions, execute tasks and learn from their interactions with the around.

An IAGen agent combines large language models with components additional features such as external tools, memory, planning and autonomous execution. This allows them to operate in complex environments, with the ability to break down Step-by-step objectives, coordinate multiple actions, interact with digital systems

(such as databases, APIs or documents) and adapt to changes in context in real time. These qualities distinguish them from traditional chatbots, and open up a spectrum of more sophisticated and customizable applications.

At the organizational level, these agents are being used to automate processes, generate data analysis, assist in decision making and improve the user experience, both internally and externally. For example, they can assume human resources, legal, financial or logistical tasks, and even those linked to the technical areas of production processes, acting as intelligent assistants that collaborate with human teams. This ability to integrate knowledge and execute tasks autonomously transforms the way organizations can scale your operations without losing quality or control.

In addition, agentic workflows—structures where multiple agents collaborate with each other to solve complex problems—allow responsibilities to be distributed between different agent profiles, each with specific functions. This generates Hybrid work environments where humans and agents coexist, optimizing times, costs, and results. The ability to connect agents with tools such as Google Drive, CRMs or document management platforms further expands its capabilities.

The development of IAGen-powered agents represents a crucial step towards a new era of intelligent automation.

Among the benefits of authentic workflows driven by business models generative artificial intelligence, the possibility of automating processes is found complete, end-to-end production systems, and even add value from the leveraging the skills of language models based on these technologies.

However, its implementation also poses technical, ethical and legal challenges, from responsible design to human oversight. Therefore, understanding your

architecture, its operational logic and its potential impacts is fundamental to its effective and safe adoption in various professional contexts.

2. IAGEN-driven agent design proposal for the activity

Objective: To implement a generative artificial intelligence (IAGen) system adapted to internal documentation, ensuring accuracy, operational utility and scalability.

Phase 1: Identification and Collection

a. Intelligent Collector Agent

Function: Detects, accesses and organizes all relevant internal documentation to be used as a training corpus.

Key capabilities:

- Semantic exploration of documentary bases (files, PDFs, SharePoint, Google Drive).
- Classification by type of document (manuals, resolutions, reports, policies).
- Detection of duplicate or obsolete documents.
- Automatic indexing and metadata.

b. **Collaboration with human resources:**

- Request validation of the collected documentation.
- Tag documents with "pass", "review", "exclude".

Phase 2: Model Training

a. Specialized Training Agent

Function: Trains a model or fine-tuning (RAG) on validated documents, adapting it to the specific context of the organization.

Key capabilities:

- Generation of embeddings and vectorization of documents.
- Training with representative examples (prompts + answers).
- Performance evaluation in comprehension, response and context.

Collaboration with human team:

- Review of outputs in controlled tests.
- Tuning hyperparameters and confidence thresholds.
- Iterative correction of errors or hallucinations.

Phase 3: Technical Implementation

to. Operational Integrator Agent

Function: Connects the trained IAGen model to existing interfaces of the organization.

Key capabilities:

- Integration with platforms such as Microsoft Teams, Intranet, Slack or systems inmates.
- Embedded in virtual assistants or smart forms.
- Support for multiple languages and privacy levels.

Complementary actions:

- Execution of pilot tests with selected users.
- Collection of preliminary metrics (understanding, usefulness, confidence).

Phase 4: Launch and Monitoring

a. Performance and Continuous Improvement Monitor Agent

Function: Constantly evaluates the functioning of the system and coordinates actions improvement.

Key capabilities:

- Real-time metrics: response accuracy, latency time, satisfaction of the user, thematic coverage.
- Record of unresolved cases or uncertain answers.
- Automatic generation of progress and performance reports.

Post-launch actions:

- Application of direct user feedback (surveys or interface).
- Dynamic adjustment of the model, prompts and RAG.
- Activation of retraining cycles according to documentary changes or regulatory.

Additional Agent Considerations

Privacy and confidentiality management: access control to certain documents or answers according to user profile.

Audit and traceability: complete record of each interaction for review and control quality.

Scalability: modular architecture that allows expansion to new domains or departments.

IV. IAGEN Cost-Benefit Analysis

Implementing IAGEN in the Vaca Muerta energy sector requires an initial investment. However, the potential benefits may outweigh the costs .

Costs	Benefits
Acquisition of IAGEN software	Greater efficiency
Investment in technological infrastructure (servers, storage, etc.)	Error reduction
Staff training in the use of IAGEN	Improved decision-making
Maintenance costs and system update	Greater customer satisfaction

V. Recommendations for the Implementation of IAGEN

Technicians:

- Short-term investment in AI agent implementation teams
  Technology and training: Investment in proof of concept and testing is required
  pilot. The focus here has to be on training the talent to implement, since
  There is a trend towards cost reduction in systems that allow
  “no code” and “low code” automation. For the first stage, we also
  recommends using teams with experience in design and implementation
  AI agents. Finally, it is key to form an in-house team for the
  accompaniment and appropriation of an agentic culture that redefines the
  human-computer interaction.
- Select the IAGEN technology appropriate to the specific needs of the
  company.
- Ensure the quality and availability of data for training the
  IAGEN models.

- Integrate IAGEN with existing enterprise systems for a seamless workflow efficient information.
- Implement security measures to protect data and ensure the privacy.

Organizational:

- Define a clear strategy for the adoption of IAGEN, with objectives, deadlines and responsible.
- Train staff in the use of IAGEN and in change management.
- Promote a culture of innovation and collaboration to make the most of the IAGEN potential.
- Establish monitoring and evaluation mechanisms to measure the impact of IAGEN in the organization.
- Consider using IAGEN in training programs for staff. energy sector.

VI. Conclusions

The IAGEN has the potential to transform the energy sector in Vaca Muerta, improving efficiency, decision-making and sustainability. While the Implementation of this technology requires an initial investment, the benefits potential are significant. By following the technical recommendations and organizational, companies in the energy sector can take full advantage of the IAGEN capabilities to answer frequently asked questions and optimize your operations and contribute to the responsible development of Vaca Muerta.

The adoption of IAGEN in Vaca Muerta can not only improve efficiency and profitability of companies, but also contribute to a more sustainable energy industry sustainable and competitive in Argentina. IAGEN can help optimize the

production, reduce environmental impact, manage risks and attract new investments, consolidating Vaca Muerta as an engine of economic growth and an example of responsible development in the energy sector.

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