HUB TECH IA

Deliverable report 29

AI and IAGEN Application Use Case

Optimization of Logistics Management in the Energy Sector of Vaca Muerta, Neuquén, Argentina

I. Introduction

Vaca Muerta, one of the largest shale formations in the world, has significantly boosted oil and gas production in Argentina, positioning the country as a key player in the energy market.

Logistics management presents challenges. In addition, the increase in logistics costs in Argentina, driven by factors such as the increase in security prices, communications and fuels, adds another layer of complexity.

In this context, IAGEN emerges as a key tool to optimize the logistics, offering innovative solutions to improve efficiency, safety and sustainability of operations, and contributing to cost reduction.

Generative Artificial Intelligence (GENI) is a branch of artificial intelligence that focuses on the creation of 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.

II. Applications of IAGEN in Logistics Management of the Energy Sector

IAGEN can transform logistics management in the energy sector in various ways. ways, optimizing processes and improving decision-making.

1. Data Analysis and Prediction

- Data monitoring and analysis: IAGEN, with its ability to process large volumes of data generated by sensors and tracking systems, allows Identify patterns and trends that optimize routes, predict demand for transport and improve energy consumption efficiency.
- Prediction and forecasting: IAGEN algorithms predict energy demand with greater precision, facilitating production planning, storage and transportation of energy, which in turn optimizes management resources and reduces costs.

2. Operations Optimization

- Predictive maintenance: IAGEN analyzes data from equipment and machinery to predict possible failures and schedule preventive maintenance, minimizing downtime and optimizing asset lifespan.
- Route optimization: By analyzing variables such as traffic, weather conditions and vehicle availability, IAGEN generates routes optimal for the transportation of materials and supplies, reducing delivery times delivery and transportation costs.
- Inventory Management: IAGEN predicts demand for materials, optimizes inventory levels, minimizes storage costs and avoids shortages, ensuring a continuous flow in the supply chain.

3. Risk Management and Automation

- Risk management: IAGEN identifies and assesses logistical risks, such as accidents, delays or interruptions in the supply chain, and generates strategies to mitigate them. By analyzing data and predicting potential problems, the IAGEN enables companies to make proactive decisions to strengthen their

supply chain resilience and ensuring business continuity.

- Process automation: IAGEN automates repetitive logistics tasks, such as generating transport orders, scheduling shipments and Document management, freeing up staff to focus on tasks more strategic.

III. IAGEN Applications in Logistics Management

Application	Description
Data monitoring and analysis	High-volume processing of data to identify patterns and trends that allow optimization routes, predict demand for transport and improve efficiency energy consumption.
Prediction and forecast	Energy demand forecasting to facilitate planning of the production, storage and energy transport.
Predictive maintenance	Analysis of equipment data and machinery to predict possible faults and schedule maintenance preventive.
Route optimization	Generation of optimal routes for the transportation, considering variables such as traffic, conditions

	climatic conditions and availability vehicles.
Inventory management	Demand prediction for materials and optimization of the inventory levels.
Risk management	Risk identification and assessment logistics and strategy generation to mitigate them.
Process automation	Automation of logistics tasks repetitive, such as the generation of transport orders and management documentation.

IV. Application of agents driven by IAGEN in the activity

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. Agentic Flow Design Proposal for Implementation

- Data Capture: Sensors installed in vehicles constantly record operating, weather and route conditions.
- Processing and Analysis (Analytic Agent): A generative model receives and analyzes this data in real time to detect patterns of anomalies or operational deviations.
- Route Generation (Generative Agent): A specialized GPT agent generates dynamically optimal routes considering multiple operational variables.
- Recommendations and Alerts (Proactive Agent): This agent generates alerts immediate and corrective action recommendations directly to the operators and logistics managers.
- Feedback (Adaptive Agent): Adjusts the model with each new data, constantly improving its accuracy and effectiveness.

V. Benefits of IAGEN Implementation in Logistics Management

The implementation of IAGEN in the logistics management of the energy sector offers a wide range of benefits:

- Cost reduction and efficiency improvement: IAGEN reduces costs by optimizing the efficiency of logistics operations. Route optimization, management of inventory and predictive maintenance, among other applications, contribute to the reduction of operating costs, minimization of waste and improved profitability.
- Increased safety: IAGEN can help prevent accidents, improve safety,

occupational safety and reducing risks in operations.

- Improved decision making: IAGEN provides accurate and timely information real time for strategic decision making.
- Competitive advantage: Adopting IAGEN positions companies as leaders in innovation and efficiency.

VI. Challenges of IAGEN Implementation in Logistics Management

Despite the benefits, the implementation of IAGEN also presents challenges that should be considered:

- Initial investment: The implementation of IAGEN requires an investment in technology, infrastructure and training.
- 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.
- Systems integration: IAGEN must be integrated with existing systems in the company, which may require adaptations and updates.
- Data availability: IAGEN requires accurate and reliable data for its operation, which can be a challenge in some cases.
- Resistance to change: Implementing IAGEN can generate resistance by staff, who may perceive it as a threat to their jobs. To mitigate this challenge, it is crucial to implement training programs that develop the skills necessary to adapt to new technologies, such as analytical skills, effective communication and working in

team. It is important to note that IAGEN, while automating tasks, also creates new job opportunities that require specific skills in the technology management.

- Regulatory framework: The lack of a clear regulatory framework for IAGEN in the sector energy can generate uncertainty and make its adoption difficult.

VII. Regulations and Standards relevant to IAGEN in Argentina

In Argentina, the regulatory framework for IAGEN in the energy sector is in development. The Argentine government, through the Ministry of Energy, is working on defining policies that promote innovation and efficiency energy sector. An example of this initiative is Resolution 79/2025 of the National Electricity Regulator (ENRE), which establishes the call for tenders public hearings to discuss energy-related issues, including incorporation of new technologies. This resolution demonstrates the openness of the government to citizen participation and the search for a regulatory framework that promote the modernization of the energy sector.

In addition, there are regulations that promote energy efficiency and the incorporation of renewable energies, such as Law 27.191, which establishes ambitious objectives for the generation of energy from renewable sources. The Ministry of Energy of Argentina is seeking an energy matrix that, in addition to being inclusive, stable, sovereign, dynamic and federal, is also sustainable, driving the transition towards a model cleaner and more efficient energy.

It is crucial that companies in the energy sector stay up to date on the latest regulations and standards relevant to the implementation of IAGEN, and participate actively involved in the debate on its development.

VIII. Conclusions

IAGEN has the potential to revolutionize logistics management in the energy sector

of Vaca Muerta, offering innovative solutions to improve efficiency, security and sustainability. While the implementation of IAGEN presents challenges, The benefits far outweigh the costs. Companies that adopt this technology will be better positioned to compete in an increasingly demanding and contribute to a cleaner and more efficient energy future.

In the context of Vaca Muerta, IAGEN can be a key factor for the development of the region and the achievement of Argentina's energy goals. By optimizing production, the transportation and distribution of oil and gas, IAGEN can contribute to the country's energy independence and boost exports. Furthermore, the IAGEN can help reduce the environmental impact of operations in Vaca Muerta, promoting sustainable and responsible development.

It is essential that energy sector companies in Vaca Muerta remain at the forefront of IAGEN adoption, invest in training your staff and collaborate with experts in the field to make the most of opportunities that this technology offers. IAGEN is not only a tool to optimize the logistics, but also a strategic investment for the future of the energy sector in Argentina.

Note: In the development of this report, the structure of the reports has been considered. use case, which typically include a "base case" that describes the situation current and an "extended case" that presents the proposed improvements or changes.

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