HUB TECH IA

Deliverable report 49

AI and IAGEN Application Use Case

Predictive maintenance, cycle optimization, cost reduction Operations and Increased Availability in the Vaca Hydraulic Sector Killed by Generative Artificial Intelligence

Classification of deliverable report 49: "Predictive Maintenance, Optimization of Cycles, Reduction of Operating Costs and Increased Availability in the Sector Vaca Muerta Hydraulics":

Classification 1: By Main Resource

• Selected option: Water + energy (main)
• Justification:

   The report focuses on the water sector, specifically on management,

   distribution and maintenance of systems related to the water used

   for hydraulic fracturing. Although it is dealt with within the context of production

   of hydrocarbons, the axis of the use case is water and energy efficiency, which

   which clearly places it in this category.

Classification 2: By Activity within Vaca Muerta

• Selected option: Energy Efficiency and Sustainability
• Justification:

   The document prioritizes the reduction of water consumption, logistics optimization,

   reduction of CO_2 emissions, and improvement in operational sustainability

through IAGEN, with direct impact on the environmental footprint, resource use and the energy efficiency of the hydraulic system.

Classification 3: Type of AI Technology Used

• Main selected option:

1ÿÿGenerative AI Models,

2ÿÿMachine Learning Algorithms, 5ÿÿAgent-Based AI Systems, 6ÿÿAI Platforms for Data Integration and Big Data, 3ÿÿNatural Language Processing (NLP) Systems.

• Justification:

The report describes an IAGEN implementation that includes IoT sensors, generative models for prediction, machine learning for predictive maintenance, natural language processing for reporting and recommendations, and integration with digital twins. It also incorporates a agentic flow that automates operational decisions and adjustments.

Classification 4: By Strategic Impact on the Industry

• Selected option: AI for Sustainability and Impact Reduction
Environmental

• Justification:

The report highlights benefits such as reduced water consumption (up to 18%), decreased downtime, smaller carbon footprint, and greater availability of the hydraulic system. All of this contributes directly to improve the environmental and operational sustainability of Vaca Muerta.