HUB TECH IA

Deliverable report 39

AI and IAGEN Application Use Case

Environmental Management in the Minimization of Resource Use for Water and Energy Optimization in Hydraulic Fracturing in Vaca Muerta, Neuquén, Argentina, by IAGEN

Classification of Deliverable Report 39: "Environmental Management in Minimizing Use of Resources for Water and Energy Optimization in Hydraulic Fracturing in Dead Cow":

Classification 1: By Main Resource

• Selected option: Water + energy (main),   Oil and Gas (secondary).

• Justification:

    The report focuses specifically on optimizing water use and energy in hydraulic fracturing operations, addressing in depth the environmental impact, water recycling, energy efficiency, and associated regulations. Although oil and gas are the operational background, The main focus is on the environmental management of water and energy resources.

Classification 2: By Activity within Vaca Muerta

• Selected option: Energy Efficiency and Sustainability

• Justification:

    The central objective of the report is to promote a more sustainable exploitation of hydrocarbon resources by minimizing environmental impact.

Technologies such as digital twins, generative AI, IoT sensors and predictive maintenance systems aimed at improving the efficient use of water and energy, reducing emissions, consumption and waste.

Classification 3: Type of AI Technology Used

• Main selected option:

1ÿÿGenerative AI Models,

2ÿÿMachine Learning Algorithms, 4ÿÿComputer Vision and Image Analysis Systems, 5ÿÿAI Systems Based on Intelligent Agents, 6ÿÿAI Platforms for Data Integration and Big Data.

• Justification:

The report presents a complete agentic flow with sensors, agents predictive, autonomous agents, executives and evaluators. In addition, it describes the use of machine learning, neural networks, simulation, predictive modeling, real-time data processing, computer vision, and models generative for environmental, logistical and operational optimization in fracturing hydraulics.

Classification 4: By Strategic Impact on the Industry

• Selected option: AI for Sustainability and Impact Reduction Environmental

• Justification:

The strategic impact of the report focuses on reducing the use of freshwater, improve recycling, minimize energy consumption and emissions, and comply with environmental regulations through smart technologies. It also recognizes the environmental impact of AI itself (water, energy, carbon) and raises a balanced approach, maximizing net benefits for the sustainability of Dead Cow.