Deliverable report 53

AI and IAGEN Application Use Case

Treatment and recycling of fracking water in Vaca Muerta

Classification of report deliverable 53: "AI for water treatment and recycling" of fracture in Vaca Muerta":

ÿ Classification 1: By Main Resource

Water + energy

- The report is entirely dedicated to the management, treatment and reuse of flowback (return water) in hydraulic fracturing, highlighting its environmental, logistical and regulatory impact. The use of AI is proposes to optimize processes, reduce consumption of fresh water, energy, and minimize waste.

Classification 2: By Activity within Vaca Muerta

Energy Efficiency and Sustainability

- The focus of the report is sustainable water resource management and recycling. of water used in fracturing. AI is applied to improve treatment performance, reduce emissions, waste, and dependence on freshwater. This It is fully framed within the operations sustainability strategy in Vaca Muerta.

Classification 3: Type of AI Technology Used

- 1ÿÿGenerative AI Models (for simulating treatment scenarios, prediction and autonomous control)
- 2ÿÿMachine Learning Algorithms (flowback quality prediction, operating parameter optimization, predictive maintenance)
- 4ÿÿArtificial Vision Systems and Image Analysis (detection of water anomalies and visual hazard conditions)
- 5ÿÿAI Systems Based on Intelligent Agents (autonomous control of valves, pumps, dosing, emergency response)
- 6ÿÿAI Platforms for Data Integration and Big Data (IoT sensors, SCADA (real-time traceability and monitoring)
- 3ÿÿNLP (for automation of regulatory reports and traceability with MERE)

Classification 4: By Strategic Impact on the Industry

AI for Sustainability and Environmental Impact Reduction

- The objective is to maximize water reuse, reduce liquid waste, optimize energy consumption of the treatment, minimize operational incidents, reduce logistics emissions, and improve regulatory compliance. It aligns directly with the pillars of sustainability and environmental efficiency of the hydrocarbon sector.