HUB TECH IA

Deliverable report 45

AI and IAGEN Application Use Case

Environmental Management: Emissions Monitoring and Leak Detection Methane with Computer Vision in Vaca Muerta

Classification of deliverable report 45: "Environmental Management – Emissions Monitoring" and Methane Leak Detection with Computer Vision in Vaca Muerta":

Classification 1: By Main Resource

• Selected option: Gas (main).
• Justification:

   The document focuses specifically on leak detection.
   methane, which is the main component of natural gas. Although they are mentioned
   also other environmental impacts linked to oil, technical analysis,
   regulatory and technological is oriented towards the reduction of gaseous emissions,
   so gas is the main resource in the use case.

Classification 2: By Activity within Vaca Muerta

• Selected option: Energy Efficiency and Sustainability
• Justification:

   The main objective of the report is to reduce greenhouse gas emissions.
   pollutants, especially methane, to improve operational sustainability,
   comply with environmental regulations and minimize the environmental impact of the
   gas production in Vaca Muerta. This aligns it directly with the category

of energy efficiency and sustainability.

Classification 3: Type of AI Technology Used

• Main selected option: 1ÿÿGenerative

AI Models, 2ÿÿMachine Learning

Algorithms, 4ÿÿComputer Vision and Image

Analysis Systems, 6ÿÿAI Platforms for Data Integration and Big

Data, 5ÿÿAI Systems Based on Intelligent Agents.

• Justification:

The report presents a sophisticated technological architecture: use of drones

autonomous, infrared and hyperspectral cameras, CNNs, GANs, analysis

predictive with generative models, agentic workflows and monitoring in

real time. All this technology is applied to an intelligent and autonomous system

leak detection, prediction and reporting.

Classification 4: By Strategic Impact on the Industry

• Selected option: AI for Sustainability and Impact Reduction

Environmental

• Justification:

The report focuses on how technology can reduce emissions, improve the

regulatory compliance, reduce environmental risks, increase safety,

and position Vaca Muerta as a cleaner and more efficient energy region. This

aligns it directly with the strategic environmental impact category and

sustainability.