



Use Case of AI and IAGEN Application
Optimization of Maintenance Cycles in Vaca Muerta

Deliverable Report Classification 5: Optimization of Maintenance Cycles in Vaca Muerta

♦ **Classification 1: By Main Resource**

- **Selected Option:**  Oil (main),  Gas (secondary)
- **Justification:**

The report primarily addresses operational activities related to oil extraction and production in Vaca Muerta, highlighting the importance of maintaining operational continuity in the production of hydrocarbons (oil and gas).

♦ **Classification 2: By Activity within Vaca Muerta**

- **Selected Option:** Optimization of Production Processes
- **Justification:**

The central objective of the report is to optimize maintenance cycles using Generative AI to significantly reduce equipment downtime, increase asset availability, boost production, and ensure operational continuity. These actions are directly related to the optimization of production processes, especially in the context of predictive and prescriptive maintenance.

♦ **Classification 3: Type of AI Technology Used**

- **Main Selected Option:** ① Generative AI Models and ② Machine Learning Algorithms
- **Justification:**

The report clearly emphasizes the use of Generative Artificial Intelligence (IAGEN) to develop sophisticated predictive models that enable failure

prediction and the creation of dynamic, optimized maintenance plans. It also specifically references classic machine learning algorithms, such as Neural Networks (LSTM), Support Vector Machines (SVM), and deep learning algorithms for predictive analysis.

♦ **Classification 4: By Strategic Industry Impact**

- **Selected Option:** AI for Optimization of Production and Infrastructure
- **Justification:**

The strategic impact most strongly emphasized in the report focuses on increasing the availability of critical infrastructure through predictive maintenance, reducing operational costs, and boosting production. This strategic approach seeks to maximize operational efficiency and minimize unplanned downtime, generating significant economic benefits and strengthening Vaca Muerta's competitive and sustainable position.