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Revolutionizing End-of-Life Oilfields: A Green Transition Hub Emerges

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In a groundbreaking initiative, the Ayoluengo oilfield in northern Spain is set to undergo a radical transformation from an end-of-life oilfield to a living lab for pioneering technologies in coupled CO2 storage and geothermal extraction systems. RamRei Energy, in collaboration with Vatnaskil and Prairie Research Institute, aims to shift the focus from abandonment to re-utilization, turning the Ayoluengo oilfield into a sustainable hub for carbon capture, utilization, and storage (CCUS) and geothermal energy.

Project Overview

The Ayoluengo oilfield, with an estimated abandonment cost of 5 million Euros, has served as a significant oil producer for several decades. The project, known envisions converting the field into a green transition hub with a carbon sink and sustainable geothermal utilization. The focus is on Enhanced Geothermal Systems (EGS), where permanent CO2 storage enhances the long-term thermal capacity of the field.

Objectives and Significance

Aligned with the EU requirements, the project's objectives address the dual challenges of carbon reduction and green energy transition. By integrating CO2 storage with geothermal utilization, the project pioneers a transformative approach. The team aims to advance from Technology Readiness Level 4 (TRL4) to TRL5, showcasing their commitment to driving the transition to a decarbonized economy.

Addressing Key Areas

The project directly addresses on CO2 storage sites, enabling CCUS technologies, CO2 injection, and the reuse of existing energy assets. The Ayoluengo oilfield will serve as a living lab, testing and implementing innovative technologies for a coupled CO2 storage and geothermal extraction system.

Holistic Methodology

The project's methodology is robust, data-driven, and adaptable. It begins with a comprehensive assessment of the geothermal reservoir and existing infrastructure. By prioritizing efficiency and effectiveness, the team streamlines the transformation process while maintaining stringent quality standards. The methodology emphasizes carbon storage while enhancing the benefits of geothermal utilization, positioning the project as a leader in end-of-life oilfield conversion.

Expected Impact

The project's impact is extensive, addressing goals like faster scale-up of CCUS technologies, market and business case development, and strengthening public perception of CCUS. Beyond economic benefits, it provides societal and environmental advantages, with potential net-zero or negative CO2 emission solutions by the mid-2030s.

Dissemination and Exploitation

The project's outcomes will be pivotal in demonstrating cutting-edge technologies. Serving as a pilot testing ground, the Ayoluengo oilfield becomes a platform for transnational collaboration, showcasing advanced geothermal solutions and the integration of CO2 storage. This dissemination fosters a sustainable adoption of technologies with added value in the geothermal sector.

Relevance for the Energy Transition

The project holds profound relevance in unlocking the latent potential within the oil production industry. By repurposing oilfields into carbon sinks and geothermal energy sources, it contributes to a decarbonized future. The proposed model generates income through carbon credits, energy sales, and

collaboration with CCUS-related and ORC manufacturers, showcasing commercial advantages.

Implementation Plan

The project's work plan spans three years, focusing on coordination, database construction, conceptual model development, reservoir and infrastructure assessment, CO2 injection and storage, geothermal utilization, and reporting. A two-stage vision includes a pilot project to test initial designs.

Project Consortium

RamRei Energy, Vatnaskil, and Prairie Research Institute form a diverse consortium, leveraging their expertise in geothermal, oil, and CCUS sectors. This collaboration creates a dynamic synergy for addressing challenges and driving innovation.

The project represents a pivotal step towards sustainable energy solutions. By transforming an end-of-life oilfield into a green transition hub, the project pioneers a holistic approach to address environmental, social, and economic challenges, shaping a more sustainable future for the energy industry.