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COUPLED

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CO_2 Utilisation Process via Looping tEchnology Demostration

First Year Project Results

One year into its journey, COUPLED is making important progress towards its ambition of transforming recycled CO_2 into renewable fuels through innovative and integrated technologies. Over the past months, the consortium has reached key milestones in the design and engineering of its pilot plant, taken the first steps towards identifying future market opportunities, and strengthened its efforts to engage stakeholders and explore the social acceptance of CO_2 conversion technologies. In this edition, we take a closer look at the achievements shaping COUPLED's next steps, from engineering developments to market integration and public engagement.



From concept to reality: COUPLED pilot plant takes shape

Major engineering milestones bring COUPLED closer to pilot plant construction.

The design and engineering of the COUPLED pilot plant have made significant progress, marking an important step towards demonstrating the project's innovative CO_2 conversion technologies. Working closely with the University of Manchester, the engineering team has completed the Heat and Mass Balance and Piping and Instrumentation Diagram (P&ID), two essential documents providing the technical foundation for the pilot plant's design and equipment procurement. Developed and refined through several iterations, the Heat and Mass Balance established the basis for the P&ID, enabling the team to move forward with the selection of main equipment, valves and instrumentation.

Another major achievement is the completion of the reactor design, one of the most complex elements of the pilot plant. Particular attention has been given to the interaction between the reactor vessel and its internal refractory lining. The design documentation has now been submitted to a Third Party Certification Authority for appraisal and approval ahead of fabrication. Progress has also been made towards equipment procurement. Technical specifications for the main equipment have been finalized, supplier quotations received and evaluated, and several suppliers selected for purchase. The dimensions of the selected equipment have also been incorporated into the overall skid design.

Finally, the first draft of the Control Philosophy has been completed, outlining the principles that will guide the pilot plant's control system. Potential control system suppliers have been identified and are currently being evaluated to determine the most suitable solution for the project.

Together, these achievements represent an important step in translating COUPLED's technological concept into an integrated pilot plant, laying the groundwork for the next stages of equipment procurement and fabrication.



Beyond technology: exploring COUPLED's market potential

Understanding the innovation landscape is the first step towards bringing COUPLED technologies to market.

Developing innovative technologies is only part of the journey. Understanding where they can create value, who could benefit from them and what challenges might affect their adoption is equally important.

During its first year, COUPLED has been laying the foundations for its future exploitation and market integration strategy.

A key milestone was the completion of Deliverable D9.1 - Ecosystem Analysis, in July 2026. Building on a dedicated methodology, the analysis explored the innovation landscape surrounding COUPLED, examining relevant European and national research and innovation projects, technological trends, stakeholder networks and publicly available patent information.
An important outcome was the mapping of the COUPLED value chain, identifying the different actors that could contribute to the development and future deployment of the project's technologies, from feedstock providers and technology developers to industrial end-users and other supporting stakeholders.

Building on these findings, the consortium is now exploring potential market applications and opportunities for COUPLED's exploitable results. Through further research and the identification of stakeholders for targeted interviews, the project aims to better understand market needs, adoption barriers and opportunities for scale-up and replication across different industrial contexts.

These insights will contribute to the upcoming Technology and Market Opportunity Outlook Report (D9.2), expected at M18, supporting the development of future exploitation strategies and business models.

The objective is clear: ensure that COUPLED's technological advances are accompanied by a realistic understanding of their potential industrial applications and market opportunities.



Building awareness, fostering engagement and understanding social acceptance

Innovation needs more than technological progress: it needs visibility, dialogue and trust.

Over its first 12 months, COUPLED has established a strong foundation for communicating its ambitions, sharing progress and engaging with the wider innovation community. The launch of the project website and social media channels, the publication of its first press release and newsletter, and the release of two project videos have helped introduce COUPLED and its objectives to a broader audience. The consortium has also actively participated in international scientific events, including the 8th International Conference on Chemical Looping (ICCL 2026) in Manchester, creating opportunities to exchange knowledge, present project developments and strengthen connections with the research and industrial communities. Alongside these activities, COUPLED is addressing another essential dimension of innovation: social acceptance.

Understanding Social Acceptance of Carbon Dioxide Conversion into Renewable Fuels

Turning CO_2 into renewable fuels is a promising way to cut industrial emissions. But a technology's success depends on more than whether it works. It also depends on whether people trust it.

COUPLED treats social acceptance as a core principle from day one, it is more than yes or no. COUPLED's social acceptance framework reviews scientific literature and real-world CCUS case studies to understand the factors influencing public perceptions of CO_2 conversion technologies. The findings highlight the importance of public knowledge, institutional trust, safety concerns, fairness in decision-making and local context. People may welcome a fuel made from CO_2 while still having concerns about the facility producing it.

Trust and justice are central to acceptance. Trust grows through transparency, responsiveness and accountability, but it also requires people to perceive decision-making processes as fair.
The framework identifies three key dimensions of justice: how benefits and burdens are distributed, how decisions are made, and whose knowledge and perspectives are recognized.
The evidence points towards a clear approach: engage early, maintain dialogue throughout the project and make public engagement a genuine two-way exchange. Projects relying solely on technological promise or climate benefits tend to be socially fragile.

These findings will guide the integration of social acceptance throughout COUPLED's implementation, ensuring that social readiness develops alongside technological innovation.

Discover more about COUPLED!

Curious to learn more about COUPLED and its journey towards turning recycled CO_2 into renewable fuels? Explore our **first project video** to discover the project's ambitions, innovative approach and expected impact. You can also catch up on our **first newsletter** and explore our **communication materials**, including the project leaflet, poster and other resources, to learn more about the technologies and people behind COUPLED.

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