

CIRCULAR CARBON INNOVATION: An Unrealized Investment Opportunity



For many businesses, investors, governments, and individuals around the globe, there is an urgent and compelling *social case* for taking action to address climate change. Less understood, however, is the *business case* for a category of innovation we call circular carbon.

Circular carbon innovation includes technologies and pathways that seek to generate economic value from the reduction or use of atmospheric CO₂. A particularly promising set of technologies within circular carbon innovation is focused on converting CO₂ into valuable products.

Over the past year, the Circular Carbon Network led a discovery process to crowdsource insights into the key barriers to new capital investment in these technologies. The conclusions below reflect the results of direct engagement with approximately 200 investors and industry stakeholders through market surveys and two interactive workshops.

Here is what we have learned about this investment opportunity and the challenges we must overcome to turn unrealized potential into profitable solutions.



The Global CO₂ Initiative and CO₂ Sciences have estimated that by 2030, CO₂ products could generate between \$800 billion and \$1.2 trillion annually and reduce CO₂ emissions by 10% to 15%.

CO₂ PRODUCTS PRESENT DIVERSE AND SIGNIFICANT OPPORTUNITIES FOR INVESTORS.

CO₂ is a building block for a wide diversity of products and materials with both B2B and B2C applications, including transportation fuels, chemical intermediates, concrete, and polymers. Many technologies have the capability to make multiple CO₂ products.

The market potential for CO₂ products is coming into focus. The Global CO₂ Initiative and CO₂ Sciences have estimated that by 2030, CO₂ products could generate between \$800 billion and \$1.2 trillion annually and reduce CO₂ emissions by 10% to 15%.

Small and large corporations alike are increasingly focused on minimizing climate change risk, maximizing clean energy opportunities, and identifying sustainability solutions that are tangible and additive.

UNCERTAINTY ABOUT VIABILITY AND PROFITABILITY HAS SLOWED CAPITAL FLOWS INTO CIRCULAR CARBON TECHNOLOGIES.

New energy innovation always carries questions around policy and regulatory risk, capital intensity compared to other sectors, and the potential impact of any single solution.

Most circular carbon technologies are nascent, and data that would help address these core questions is not typically available. The infrastructure and networks—both physical and virtual—that could help fill data gaps do not yet exist at any significant scale. Standard contracts, financing tools, and other models have not yet been developed. These issues create significant barriers for investors to consider and commit to circular carbon technologies.

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This analysis identifies FINANCIAL TOOLS, MARKET SERVICES and TECHNOLOGY DEVELOPMENT SUPPORT that can address key barriers and unlock new investment in circular carbon innovation:

EARLY STAGE

Market Services

- Create a deal sharing clearinghouse for companies seeking capital and investors seeking opportunities.
- Offer innovators training in “how to talk to investors.”

Technology Development Support

- Establish an independent, third- party validation entity to collect and communicate key technical data to investors while protecting IP.
- Establish a regional network of incubators to support companies in a diversity of geographies.

SCALING

Financial Tools

- Develop standardized models for credit enhancements, shared risk pools, and blended capital arrangements.

Market Services

- Encourage innovators to define performance guarantees for new products.

Technology Development Support

- Encourage early engagement with standards bodies that set rules and regulations for new products.

COMMERCIALIZATION

Financial Tools

- Develop contracts whereby regional pricing arbitrage opportunities create a financial incentive for traders to enter markets at scale.

Market Services

- Encourage corporate customers to offer open innovation challenges around specific performance needs.
- Create toolkits for corporate investors and procurement officers seeking to meet sustainability goals.

WE CAN HELP CATALYZE THIS INVESTMENT OPPORTUNITY.

- There is an emerging and strong business case for circular carbon innovation, but more action is required. We need additional engagement to unlock the capital, meet the challenge, and seize the opportunity. Here’s what you can do:
 - Share your feedback at carbon@xprize.org. We would love to hear comments on the barriers that must be addresses, or examples and case studies of creative financial tools, market services, or technology development support.
 - Join our network to receive updates about Circular Carbon Network discussions and events at: xprize.org/circularcarbonnetwork

ABOUT THE CIRCULAR CARBON NETWORK AND THE NRG COSIA CARBON XPRIZE

The Circular Carbon Network (CCN) brings together diverse industry leaders and stakeholders to share knowledge, build relationships, and increase the flow of capital and deals for circular carbon solutions. The Circular Carbon Network is an initiative of the NRG COSIA Carbon XPRIZE, a \$20 million incentive prize competition for breakthrough CO₂ conversion solutions. XPRIZE competitors are using CO₂ to produce food, fertilizer, concrete, carbon fiber, fuels, biodegradable plastic, industrial chemicals, and more.