

The Quest to Build the “World’s Largest” Carbon Capture Facility

Every year, another company issues a press release announcing plans to build the “world’s largest” carbon capture facility (often of its kind). These announcements are frequently met by stories celebrating how such an accomplishment would be significant for the future viability of carbon capture and storage (CCS) as a whole. Despite surging announcements, the level of in-service CCS remains relatively flat. That is because many of these “world’s largest” projects face delays, budget overruns, and frequent cancellations before ever entering service. New Food & Water Watch (FWW) analysis shows how these projects routinely over-promise and fail to deliver, reflecting fundamental underlying technological problems with CCS.

Carbon Capture Predictions Continue to Disappoint

The fantasy of carbon capture, enabling “clean” fossil fuels, has received billions in federal support dating back to the 1980s.¹ Proponents consistently claim that widespread technological feasibility and consequent adoption of carbon capture is right around the corner. These predictions reliably fall flat. A FWW investigation of carbon capture’s track record during the Obama administration found that out of 11 large-scale demonstration projects highlighted by the U.S. Department of Energy (DOE), only 3 remained operational as of mid-2025.² The industry has yet to recover. According to the U.S. Environmental Protection Agency (EPA), between 2016 and 2023, carbon capture from industrial facilities declined from 17.2 million to 16.1 million metric tons of carbon dioxide (CO₂) per year.³

In 2011, the Global CCS Institute (GCCII) claimed that around 150 million tons per year of carbon capture projects were in operation, construction, or development globally.⁴ However, the vast majority of this CCS capacity was in the “development” categories. By the GCCII’s own count, in 2023 this translated to less than 50 million tons per year of operational global CCS capacity.⁵ The GCCII now touts the number of project announcements, even though it admits that “relatively few have yet advanced to operation.”⁶ In the 2023 GCCII report, the first chart actually excludes operational CCS, showing a massive growth of CCS projects in “development and construction.”⁷

Promises to build the “world’s largest” clean coal plant go nowhere

In New Mexico, a CCS project at the San Juan Generating Station was yet another failed attempt to build a “world’s largest” CCS project.⁸ Founded by an analyst and investor fired in 2012 for mooning his bosses,⁹ the project’s backer Enchant Energy claimed that the project would become a model for other CCS projects across the western U.S.¹⁰ Originally pitched in 2019 with a \$1.3 billion price

tag,¹¹ the carbon capture system was supposed to be operational in 2023.¹² The project never made it past planning stages, and in late 2024 the San Juan plant was demolished.¹³

One reason projects like this fail is that proposed CCS systems practically double the water needs of original coal plants.¹⁴ While the company and the DOE spent \$29 million to study the feasibility of converting the San Juan Generating Station to CCS,¹⁵ miners and plant workers received only \$20 million in severance from the closing of the coal plant.¹⁶

The quest to build the “world’s largest” carbon capture project continues

In September 2022, CarbonCapture Inc. and Frontier Carbon Solutions announced “Project Bison,” a Wyoming direct air capture CCS facility that they claimed would be operational by late 2023 and capture 5 million metric tons of CO₂ from the air each year by 2030.¹⁷ Just like Enchant, Project Bison could have become the “world’s largest” carbon capture facility of its type.¹⁸ By June 2023, CarbonCapture Inc. still had no employees in Wyoming.¹⁹ Despite the mounting delays, the company managed to attract an equity investment from Amazon.²⁰

Correspondence between CarbonCapture Inc. and the DOE obtained from a Freedom of Information Act (FOIA) request revealed that Project Bison relied heavily on additional speculative and expensive technologies such as small modular nuclear reactors, conversion of CO₂ to jet fuel, and blockchain tracking of emissions.²¹ In addition to millions in DOE funding for engineering studies, the company sought funding through the separate carbon capture hub program.²² However, less than two years after announcing the facility, CarbonCapture Inc. pulled the plug, citing an inability to source electricity amid competition from data centers and cryptocurrency miners.²³

Occidental continues trying to build the “world’s largest” CCS plant

Occidental Petroleum has engaged in a public relations onslaught to define itself as a “net zero oil company,” including a branding deal to become the “preferred carbon removal partner” for the NFL football team the Texans.²⁴ Occidental claims that it will build and operate 70 carbon capture facilities by 2035.²⁵ While pitching itself as special among oil companies, Occidental remained clear that its views and positions were “generally consistent” with groups like the American Petroleum Institute and the U.S. Chamber of Commerce.²⁶ The company simply supports CCS because it sees CCS as a way to keep burning oil and gas forever.²⁷

Central to Occidental’s climate-friendly image is a billion-dollar investment in the “world’s largest” direct air capture project, originally slated to be open in late 2024.²⁸ Although this project promises to capture 500,000 metric tons of CO₂ per year when built, eventually scaling up to 1 million tons, this is only 0.02 percent of U.S. CO₂ emissions.²⁹ As of August 2024, the project’s budget had increased 30 percent from original estimates, and its opening was pushed back to “mid 2025.”³⁰

This is not the first time Occidental has bet on CCS. The company’s Century natural gas processing plant was central to claims about the bright future for CCS. In 2010, Occidental’s business partner SandRidge bragged that the Century facility would be North America’s largest industrial CCS facility.³¹ Built to supply Occidental with an additional source of CO₂, Occidental anticipated a large boost in oil production as a result of the new enhanced oil recovery (EOR).³²

Slated to open in late 2010,³³ the facility did not open until September 2012.³⁴ From the beginning, SandRidge failed to make sufficient contractually obligated CO₂ deliveries to Occidental, resulting in penalties.³⁵ By 2015, Occidental had written down most of the plant’s value in filings to the U.S. Securities and Exchange Commission.³⁶ The facility never recovered from this rough start. In 2022, Occidental sold the facility for less than the cost of building it, having never operated it at more than one-third of capacity.³⁷

Conclusion

While carbon capture projects consistently underwhelm, renewables are booming. Net generation from wind and solar power grew nearly eight-fold from 2010 to 2024, accounting for 17.5 percent of all electricity generated in the U.S. in 2024.³⁸ And in contrast to CCS, 81 percent of solar projects were on or ahead of schedule in 2023; among the delayed projects, most only suffered a delay of one to six months.³⁹ Battery storage capacity grew from 1.6 gigawatts in 2020 to 26 gigawatts by the end of 2024. From 2021 to 2024, more than two-thirds of U.S. planned battery storage capacity was built.⁴⁰ Now is the time to abandon the fantasy of carbon capture and to embrace real, practical solutions to climate change.

Endnotes

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