

Carbon Capture & Storage: A Harmful Distraction

2023 Annual Conference of the Society of Environmental Journalists

David Schlissel, Director of Resource Planning Analysis April 21, 2023



Institute for Energy Economics and Financial Analysis

www.ieefa.org

What is carbon capture and why is it now such a big issue?

- Carbon capture reduces the carbon dioxide (CO₂) produced by fossil-fired electricity generators and certain large industries.
- Carbon capture is touted as a way to extend the lives of existing fossil-fired generators while decarbonizing the economy.
- But in order to do so, all, or very nearly all, of the CO₂ produced by these facilities will have to be captured.
- And a key point that is often ignored by the industry and its supporters is that carbon capture would have to do this over the long-term, year-in and year-out for decades in order to decarbonize the economy.



There is only limited experience with carbon capture

- Although carbon capture has been around since the late 1930s, as of the end of 2022 there were only 27 carbon capture projects in the world.
- There was only one coal-fired power plant in the world capturing CO₂ and no natural gas-fired power plants. A second coal plant captured CO₂ from 2017 to the end of April 2020 as part of a demonstration project partially funded by the US Department of Energy. This project, named Petra Nova was mothballed in 2020 but its current owner is intending to restart the project later this year.
- The CO₂ has been captured from only a single steel plant (in Dubai). Unfortunately, there is no public information on how well this worked.
- Most carbon capture facilities have been used to capture CO₂ from ethanol production or from natural gas processing.

Carbon capture has not proven that it can achieve 95% capture of CO_2 over the long-term

Reality Check: Real-World CO₂ Capture

There's no evidence that any other carbon capture project has achieved anywhere close to 95% capture

The claims that such high capture rates will be achieved are based on the results of smallscale and relatively short testing of new technologies plus a lot of unsupported statements from vendors.





Why is it Important to Consider the Entire Life Cycle of a Proposed Carbon Capture Project?

Carbon Capture Targets Focus Only on CO₂ Emissions From Power Plants



The carbon capture and storage discussion almost exclusively revolves around the production and capture of CO₂ from power plants. However, upstream leakage of methane and downstream emissions of CO₂ are potentially significant sources of carbon that are not included in capture targets or assessments of efficacy.

underground



Institute for Energy Economics and Financial Analysis IEEFA.org

75% of the CO₂ captured in the world is used for Enhanced Oil Recovery (EOR)

- In EOR captured CO₂ is used to produce additional oil that might not otherwise be economical or technically possible to produce.
- On average each ton of CO₂ produces 2 to 4 barrels of oil.
- When burned, each of these barrels of oil might produce .44 tons of CO₂.
- This is why using captured oil for EOR is a really bad idea.
- Injecting captured CO₂ also produces earthquakes in some areas.



Methane leakage is a very serious climate issue

- Methane is an extremely potent greenhouse gas. It has a 20-year global warming potential 83-88 times that of CO₂ over the first few decades after it is emitted into the atmosphere. It is 25 times more potent than CO₂ even 100 years after being emitted.
- Current peer-reviewed scientist studies have concluded that approximately 2.5%-3% of the methane leaks into the atmosphere during the production, processing, and transportation of natural gas.
- Substantial amounts of methane also is emitted during the mining of coal.
- Adding carbon capture to a power plant or an industrial facility does not address these significant upstream methane emissions.



Adding Carbon capture takes a long time

- Designing, constructing and connecting a carbon capture facility to a power plant or industry plant will take years.
- Carbon capture may not be possible at all plants and it might require major changes at others.
- There is no one-size or one-design-fits-all for carbon capture facilities. Adding is not like going to a Home Depot and being told that carbon capture equipment is on aisle 10. They will have to be designed to fit the space and the layouts of existing plants.



Adding carbon capture is very expensive

- Estimates of adding carbon capture to existing power plants project that the cost of doing be \$1 to \$1.5 billion or more.
- A recent study by the consulting firm Lazard has estimated that adding carbon capture to an existing gas-fired power plant will increase its levelized cost of power by about 25%. Adding carbon capture to a new-build gas-fired gas power plant would add about 16% to the cost of its power.
- These actually are very low estimates compared to what utilities have projected in the past for the impact of adding carbon capture to their power plants. Actual costs might be significantly higher.
- According to Lazard's analyses, existing gas-fired power plants already are in some parts of the US
 more expensive to run that renewable solar, wind and storage resources. Adding carbon capture will
 make them even more expensive relative to these resources.
- These estimates do not include the cost of piping and sequestering underground the captured CO₂.



For More Information

- Contact David Schlissel at dschlissel@IEEFA.org •
- Check out the following page and research on IEEFA's website: •
 - Blue Hydrogen: A Fuel Without a Future •
 - www.ieefa.org/blue-hydrogen ٠
 - Petra Nova mothballing post-mortem •
 - Carbon captures methane problem •
 - The carbon capture crux: lessons learned ٠
 - Sign up with IEEFA to get new research from IEEFA when its available. ٠

