



Do Not Subsidize Expensive “Carbon Capture and Storage” Technologies

Myth

Carbon capture and sequestration (CCS), also known as “carbon capture and storage,” has been promoted as a way of reducing, and potentially eliminating, the carbon dioxide (CO₂) emissions of coal- and natural gas-fired power plants.

Carbon capture has been around for half a century and is used in both the oil industry and various chemical-production sectors, where CO₂ can sometimes be a contaminant in gas and in various other flows encountered in processing a variety of chemical products. This capture occurs at the point of production. The trapped CO₂ is then transported by pipelines, similar to those used to transport oil and natural gas, and is then “sequestered” in holding areas far underground, usually depleted oil or gas wells.

Supporters tout the ability of CCS to have a significant impact on near-term CO₂ emissions reductions. However, this is not the case.

Policy Message

1

Very Expensive: The cost to remove CO₂ from our atmosphere through CCS is incredibly expensive. At the very least it is well more than double the “social cost” of carbon dioxide determined by the Obama Administration.

2

Huge Undertaking: Sequestering just a tenth of global emissions would require burying 50 supertankers worth of gas daily.

3

Counterproductive: Retrofitting coal plants with CCS technologies reduces their thermal efficiency between 25-35 percent, necessitating the additional consumption of 400-600 million tons of coal to replace lost energy production.

4

Ineffective: A 2015 study by MIT researchers published in the *Proceedings of the Royal Society A* find EPA’s estimate that 90 percent of sequestered CO₂ are eliminated in CCS is far too optimistic and that only a small fraction of the CO₂ turns to rock, making it possible that much of the gas can find its ways back into the atmosphere.

5

Better Way to Reduce CO₂: The best, cheapest, way to continue to reduce CO₂ emissions is encourage the use of natural gas in our electricity generation mix. CO₂ emissions in the United States have been relatively flat since 1990 at the same time that natural gas consumption has increased by 56 percent.

6

Just Cut Red Tape: Instead of giving subsidies and tax credits to CCS technology companies, better off removing and rejecting unnecessary and detrimental regulations on the natural gas industry.

Reality

CCS is an very expensive way to reduce CO₂ emissions. A 2018 study published in *Joule*, favorable to the CCS process, finds the levelized cost per metric ton of CO₂ captured and would be between \$94 and \$232. On the high end, this represents a cost five and a half times higher than the \$42 per ton “social cost” of carbon as tabulated by the Obama Administration. The median estimate of \$163 per metric ton of CO₂ from the study is nearly four times higher than the Obama estimate.

Also, Retrofitting coal plants with CCS technologies requires a large amount of energy consumption on its own and reduces their thermal efficiency between 25-35 percent. This represents an enormous deduction in the electricity the power plant can then provide the outside world. To make up for this reduction

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Notes

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Myth continued

in energy production from nationwide retrofitting, an additional 400-600 million tons of coal would have to be consumed each year. Without this additional consumption, 75-100 gigawatts of electricity generation would be cut. This represents more than the peak demand of the entire state of California, which consumes more electricity than any other state.

Sequestering just 10 percent of global emissions would also require large amounts of space. [According to Robert Bryce of the Manhattan Institute](#), it would “require building an industry as large and sophisticated as the global oil sector — in reverse. To put the scale in perspective, global oil production now totals about 100 million barrels per day. A VLCC supertanker holds about 2 million barrels. Therefore, getting rid of 10 percent of global greenhouse gas emis-

sions would require burying the equivalent of 50 VLCC loads of worthless waste gas every day.”

CCS may also be far less effective than advertised. A [2015 study](#) by MIT researchers published in the *Proceedings of the Royal Society A* find the Environmental Protection Agency’s (EPA) estimate that 90 percent of sequestered CO₂ are eliminated in CCS is far too optimistic and that only a small fraction of the CO₂ turns to solidifies and turns to rock, making it possible that much of the gas can find its way back into the atmosphere. There is no point in paying to store CO₂ if it will eventually leak out of its containment center and reappear in the atmosphere.

It is a false dream to suggest CCS can be a major part of the solution to a warming world.