Carbon capture is the fossil fuel giants' plan to keep extracting

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Attempting to remove CO2 from the atmosphere would block a real climate transition

by Dru Jay

As the climate crisis deepens, governments and corporations are putting more and more stock in carbon capture technologies, which aim to remove carbon dioxide from smokestacks and even directly from the air. New rhetoric about "restoring the climate" is being used to promote these technologies.

Less well known is that global fossil fuel conglomerates have been promoting this technology and are planning to use it to profit from the crisis they created.

The environmental, economic and social implications of scaling up carbon capture technology to the point where it would impact global CO2 levels carry significant costs and will result in significant impacts.

Is CCS being embraced because it's a workable solution, or because it justifies continued fossil fuel extraction?

Here are seven reasons to think twice about carbon capture as a response to the climate crisis.

1. Carbon capture buys time for fossil fuel companies to continue extracting

The "carbon bubble" refers to the fossil fuel assets that can't be extracted for the planet to stay under 1.5˚ of warming, but which remain on the fossil fuel industry's balance sheets. The total liability of the carbon bubble is estimated to be as high as $100 trillion.

As a result, there is a tremendous incentive to promote various forms of geoengineering, including various forms of Carbon Capture. The fossil fuel "super majors" don't necessarily need carbon capture technology to work. They just need it to *appear* to work, both in order to buy more time to continue extracting and to provide governments and regulatory bodies with an excuse to avoid a pitched battle with big oil – something most people would prefer to avoid.

Carbon capture technologies have played this role, buying time (using BECCS as a distraction, notably) contributing to governments avoiding more drastic measures to phase out the fossil fuel industry.

That is likely the reason why fossil fuel companies are among the most enthusiastic early investors in CCS technology (see #6).

2. Carbon often ends up back into the atmosphere, or creates new pollution

As one recent analysis put it, “Scaling [Direct Air Capture] would require a massive investment in its own supporting infrastructure: a new system of pipelines at a magnitude that could rival that of the United States Interstate System.” The pipeline system alone could require up to 120,000 miles of new CO2 pipelines by 2050.

However, most carbon capture schemes plan to achieve economic viability by selling the carbon for industrial use. The main market for carbon is Enhanced Oil Recovery, a technique whereby carbon is pumped into depleted oil wells, helping oil companies access hard-to-reach deposits. Once thus used, there is evidence suggesting that CO2 does not stay underground, and instead escapes into the atmosphere. That, in addition to the additional CO2 created by extracting, refining and eventually burning the heavy oil that is extracted.

Even without leakage, EOR doesn’t store a net volume of carbon without subsidies. The landmark 2019 report Fuel to the Fire explains the process:

In the simulation, a CCS project begins injecting CO2 into a depleted well in 2026, leading to a massive increase in the oil production from the well. Over the ensuing three years, from 2026-2029, the relatively modest amount of CO2 stored by injection is dwarfed by an additional 200,000 tons of CO2 emitted by the produced oil until the well is fully depleted. To reverse these resulting emissions, a further 200,000 tons of CO2 must be injected into the now fully depleted well long after the economic incentives for doing so have ceased to exist.

And what of Carbon Capture Use and Storage (CCUS), the benign-sounding ideas to convert CO2 into synthetic fuel, putting fizz in carbonated beverages, or supplementing the CO2 in greenhouses? The upshot of each of these proposals is that much of the captured CO2 ends up back in the atmosphere. And that’s after energy is expended in transportation or production.

The most likely use of captured carbon to scale is synthetic fuel, which requires additional energy for production (one process requires heating CO2 up to 850˚ C) and shipping, and, in the end, creates new carbon pollution that must be re-captured.

3. It’s an expensive use of money better spent reducing emissions at the source

Most carbon capture schemes will rely on direct state subsidies or government-mandated carbon markets to be viable. In that context, they are properly compared to the other things money could be spent on.

The price of capturing carbon from the atmosphere has fallen from $1000 (all figures USD) per tonne of carbon captured, down to somewhere in the $100-300 per-tonne range. That means that it would cost about $5000 to offset the lifecycle emissions of a typical mid-sized car (or $2500 if we apply the most ambitious cost estimates). [Sources: 1, 2, 3, 4, 5]

In a country like Canada, where around 1.5 million vehicles are sold every year, that would mean a total cost of between $3.7 and $7.5 billion annually. The same sum could put thousands of new city buses on the streets *each year* – among other effective ways to stop burning carbon altogether.

Whether those revenues were state subsidies or raised by directly taxing automobile purchases, the most effective use of that money in both the short and long term would be investing directly in zero-carbon transit and logistics infrastructure, not in carbon capture schemes that directly enable additional fossil fuel extraction.

Worth keeping in mind: fossil fuel companies are likely investing in carbon capture because it falsely creates the illusion that they can keep extracting and selling fossil fuels.

The Real Cost of Carbon Capture

To understand the cost of removing and storing CO2, we need to account for:

- **Energy for the extraction process**
- **Additional fossil fuels extracted through Enhanced Oil Recovery**
- **CO2 that escapes through leaks**
- **CO2 emitted back into the atmosphere (e.g. by burning Synthetic Fuel)**
- **Atmospheric pollution (which causes an estimated 200,000 premature deaths annually in the US alone)**
- **Financial and energy costs of massive new infrastructure**
- **Energy for transportation of carbon to storage**
- **Monitoring storage (of billions of tonnes of carbon)**

4. It's a lot of renewable energy to keep the fossil fuel treadmill going

Climeworks, a company developing direct air capture technology, says it aims to capture 1% of annual global CO2 emissions by 2025 using 750,000 shipping containers rigged with collectors. The annual amount of energy required to run that number of DAC collectors (618.8 billion KWh) would supply nearly a quarter of the citizens of the 27 European Union member states with electricity for a full year (at the 2014 average consumption of 5,908 KWh per capita).

The kicker: according to the latest European Commission numbers, Climeworks' target number of DAC collectors would only capture 0.6 per cent of global emissions.

The impact of having most new renewable energy devoted to continuing the fossil fuel economy rather than ending it is, to say the least, much more difficult to measure. If governments continue to fund attempts to scale DAC and other "negative emissions technologies," we'll never know.

5. Carbon capture increases the power and profits of the fossil fuel industry

Carbon capture technologies present two major opportunities for the oil industry: to continue extracting, refining and selling fossil fuels, and also to produce synthetic fuels and sell those. That may be why they have invested heavily in carbon capture technologies.

As Fuel to the Fire explains, "[f]or oil companies, CCS presents an opportunity for additional oil production because the primary uses of captured carbon thus far identified are the production of more oil or other petrochemical products." A few highlights surfaced by the report:

- **ExxonMobil** claims to have "a working interest in approximately one-fifth of the world's total carbon capture capacity" and brags that they have "captured more CO2 than any other company," with their 6.6 million tonnes accounting for "more than 40 percent of cumulative CO2 captured." But make no mistake: this is not a green turn. Exxon is investing $200 billion in new oil projects, and plans to increase production by 25% from 2018 to 2025.
- **Chevron** has sunk more than $75 million into carbon capture research and development. Though it is a fraction of a fraction of the company's $150 billion in annual revenues, it's big money for carbon capture for now.
- The CO2 Capture Project conducts research on behalf of industry partners like **BP**, **Chevron** and **Petrobras**, from which it has received over $50 million in funding.
- **BP** is also a sponsor of Princeton University's Carbon Mitigation Institute.
- **Shell**'s Quest project (one of many investments in carbon capture) claims to have captured 4 million tonnes of carbon. Their Sky Scenario envisions increasing the number of carbon capture facilities from the current 50 to 10,000. This proposed scenario would allow Shell to continue selling oil and gas until the year 2100.

Given the companies' relatively tiny investments in carbon capture (relative to their overall operations), their preferred scenario could be to use the idea of CCS to continue extracting, and power up carbon capture when public subsidies become available.

6. Carbon capture paves the way for dangerous solar geoengineering

If carbon capture technology "works" the way the fossil fuel industry envisions, it will involve creating a global network mirroring the size and complexity of the oil industry itself. It will come with massive environmental impacts, including air pollution, and land use changes – including a major potential for land grabs.

The carbon capture gigaproject would siphon off vast amounts of both climate funding and renewable energy capacity, directing it into sustaining a heavily polluting industry instead of rapidly phasing it out, as most climate scientists say we must do. Instead of investing in collective transit, healthy cities and zero-carbon homes, money and energy will flow to the oil industry.

But what if governments don't provide the public funding to scale up the number of carbon capture facilities from 50 to 10,000, as Shell's Sky Scenario proposes?

Another solution oil companies have had their eyes on for decades is solar geoengineering: proposals for techniques (e.g. spraying tens of thousands of tonnes of sulphur dioxide into the stratosphere) to block sunlight

before it reaches the earth. This set of theoretical techniques is generally shunned for a number of reasons, including the potential for global changes in weather patterns, acid rain, ozone depletion, military uses, and "termination shock" (referring to rapid heating that could result if the sun-blocking stops for some reason).

Despite attempts to separate solar geoengineering from carbon capture, the two are intimately related. If the super majors' plans to hold the planet hostage through growing fossil fuel extraction and light investment in carbon capture don't work, then it will be too late for anything other than blocking the sun to cool the planet – solar geoengineering.

Not surprisingly, fossil fuel interests have played a key but underreported role in developing solar geoengineering. (See Fuel to the Fire, pp. 11-12 for the full story.)

There is also overlap between those working on solar geoengineering and those active in carbon capture.

Solar geoengineering also depends on deploying carbon capture to soften, over a longer period, the effects of "termination shock". So the relationship between the two go in the other direction as well: deployment of solar geoengineering depends on carbon capture at a massive scale.

7. The global opportunity for a different path

As climate scientists have been warning, emissions must be reduced rapidly to prevent catastrophic climate change.

Through carbon capture and solar geoengineering, the fossil fuel industry has laid out a path that entrenches both their highly-polluting extraction and their profits at everyone else's expense.

It is still possible to focus energy globally on reducing emissions, electrifying transport networks, decarbonizing industry, and supporting the peasant farmers who preserve biodiversity and feed most of the world.

As a planet, we still have the opportunity to turn away from the plans fossil fuel companies have made for us. And that involves understanding clearly the profound impacts, as well as the purpose, of carbon capture technologies.