FOOD & WATER WATCH

Carbon Capture and Storage Has Four Fatal Flaws

We must take bold and uncompromising action to stave off the worst effects of climate change. If the planet warms more than 1.5 degrees Celsius, increased temperatures could cause irreversible damage, potentially making parts of the world uninhabitable this century.[1] A central false solution to climate change is carbon capture and storage (CCS), which captures and stores carbon dioxide (CO_2) at smokestacks or from the atmosphere. CCS would waste public money to lock in and double down on fossil fuels' dirty footprint through the creation of an entirely new dangerous industry. CCS, with its many side effects and questionable efficacy, distracts us from real climate solutions.

Worse fossil fuel pollution

Fossil fuel power plants and their supply chains are responsible for ongoing, large-scale pollution. Not only will CCS keep these plants open, but if all fossil fuel power plants used CCS, they would burn 39 percent more natural gas and 43 percent more coal.[2] Without new scrubbers, additional fuel consumption will increase emissions.[3] Power plant emissions of sulfur dioxide, nitrogen oxides and particulate matter contribute to respiratory health problems, like chronic bronchitis, emphysema and existing heart disease, cause labored breathing and reduce life expectancy.[4] In the United States, particulate matter pollution from power plants alone is responsible for 15,000 premature deaths annually.[5]

The extraction of vast quantities of fossil fuels for electricity production also has serious health and environmental consequences where production takes place. Communities plagued by hydraulic fracturing ("fracking") experience well-documented, severe environmental impacts.[6] Coal extraction can cause black lung disease[7] and is associated with other environmental and health impacts.[8]

Black hole for climate dollars

Despite billions in government handouts, power plant CCS technology remains prohibitively expensive and has not lived up to optimistic projections over the past two decades. Between 2005 and 2012, the U.S. Department of Energy (DOE) spent $6.9 billion attempting to demonstrate the feasibility of CCS for coal.[9] However, from 2014 to 2016, less than 4 percent of the planned CCS capacity was deployed.[10] Other projects languished. For example, Southern Company's Kemper plant in Mississippi was supposed to cost $2.9 billion, but projections ballooned to $7.5 billion, $270 million of which came from the DOE,[11] leading to cancellation of the CCS component after years of delays.[12]

Despite decades of support, cost estimates for power plants with CCS remain substantially higher than in 2005.[13] The only U.S. CCS power plant, the Petra Nova project in Texas, built CCS at a cost of $1 billion ($4,200 per kilowatt of capacity), $167 million of which came from the DOE.[14] (For context, estimates for the cost of new natural gas capacity range between $700 and $1,300 per kilowatt.[15])

Storing CO_2 is risky

Long-term underground CO_2 storage is unproven and laden with risks. Well failure during injection or a blowout could release large amounts of CO_2.[16] Additionally, many storage locations are in and around fossil fuel reservoirs, where oil and gas wellbores provide a pathway for CO_2 to leak to the surface.[17] In addition to the climate ramifications, storage leaks could contaminate groundwater and soil.[18] Moreover, CO_2 pipeline or storage accidents could release large quantities of dense gas, which may temporarily accumulate in low-lying areas as suffocating ground-level CO_2 clouds.[19]

Carbon sequestration plans would inject CO_2 at volumes higher than activities already linked to earthquakes.[20] Seismic events with magnitude as high as 4.4 have been recorded at CO_2 injection sites, near levels that can damage buildings and infrastructure and contaminate drinking water.[21] Earthquakes from injection could also rupture storage seals, allowing CO_2 to leak.[22]

Not a climate solution

To avoid the 1.5-degree Celsius tipping point, we must rapidly decarbonize our grid and hit net zero global emissions by 2050.[23] This requires a transition to 100 percent renewable energy.[24] Technology exists to support a transition to 100 percent clean, renewable energy backed up by storage and transmission at prices lower than current energy costs.[25] A variety of energy storage technologies can provide cost-effective, reliable, long-term back-up, obviating the need for dispatchable power plants.[26]

The most ambitious forms of CCS capture 90 percent of emitted carbon; however, when emissions associated with the operation of capture facilities are considered, reductions fall to near 80 percent.[27] Both coal mining and natural gas production emit large quantities of methane, a greenhouse gas 86 times as potent as CO_2 over 20 years.[28] When methane emissions from increased production are factored in, CCS can only reduce electricity sector emissions by 39 percent.[29] The only real solution is a systemic shift to a renewable energy future.

Endnotes

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