Helping Industry Adopt Carbon Capture and Storage Technologies

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Without carbon capture and storage, known commonly as CCS, "our energy and climate goals will become virtually impossible to reach," proclaims Fatih Birol, executive director of the International Energy Agency. Indeed, in IEA's recent report outlining the major transformations needed for the global energy sector to reach net-zero emissions by 2050, CCS plays a starring role.

IEA's scenario calls for an exponential increase in the total mass of carbon dioxide captured from around 40 megatons per year today to an astounding 7.6 gigatons in 2050 — an increase of nearly 20,000 percent. (For context, U.S. CO_2 emissions from fuel combustion totaled 4.92 gigatons in 2018.)

Environmental lawyers will be critical in helping clients navigate regulatory challenges

So what is CCS, and why is it so important? CCS typically involves capturing CO_2 formed during hydrocarbon-based power generation and industrial processes and permanently storing it so that it is not emitted into the atmosphere. Once the CO_2 is captured, it is compressed and transported to appropriate storage sites, usually by pipelines or ships, where it is injected into deep underground geological formations, such as former oil-and-gas reservoirs, deep saline formations, and coal beds. CCS is the only group of technologies that contribute both to reducing carbon emissions in key sectors directly, and, through more advanced direct air capture engineering, to removing CO_2 from the atmosphere to balance emissions that cannot be avoided.

The IEA is not alone in trumpeting the role of carbon capture. The Intergovernmental Panel on Climate Change's "Special Report on Global Warming" presents four scenarios for limiting global temperature rise to 1.5 degrees Celsius — all require heavy reliance on CO_2 removal technology and three involve major use of CCS.

That's fine in theory, but the world has a long way to go in practice. According to the Global CCS Institute, there are only 26 CCS facilities currently in operation worldwide, and they can capture and permanently store only 40 megatons of CO_2 every year. Recently, there has been an uptick, with 17 new commercial facilities entering the project pipeline in 2020, 12 of them in the United States. Domestic progress is helped by the enhanced 45Q tax credit for CCS projects signed into law in 2018, with the Internal Revenue Service issuing more detailed guidance in 2020. U.S. investment is likely also benefitting from the California low-carbon fuel standard, which provides substantial credit-generation opportunities for fuel producers that utilize CCS and meet certain criteria.

Barriers to wider deployment of CCS include the high costs of capture and challenges associated with transporting CO_2, including the energy required to compress and maintain CO_2 and the need for an expanded pipeline network. Availability of geologic storage is not thought to be an impediment, however, either in the United States or worldwide.

Also problematic domestically is the lack of a uniform federal framework for CCS. Other than permitting for underground injection wells, which is regulated under the Safe Drinking Water Act, the legal and regulatory landscape is a state-by-state patchwork of regulations and case law dealing with issues ranging from ownership of pore space to long-term liability regimes. A number of states, including Illinois, Louisiana, North Dakota, Texas, and Wyoming, have enacted special legislation to improve the regulatory environment for CCS, and environmental practitioners are helping their clients navigate this space.

The Biden administration recognizes that more needs to be done. To stimulate CCS, Biden's infrastructure plan calls for $35 billion in new R&D funding for both renewable energy and CCS; further expansion of the 45Q tax credit; $15 billion for demonstration projects for technologies including CCS; and funding for 10 carbon capture retrofits for large GHG emitters like steel mills, cement plants, and chemical production facilities, emphasizing jobs for disadvantaged communities. Among the applications that will be explored is the potential for CCS to facilitate low-carbon hydrogen production.

CCS recently came under scrutiny, as the White House Environmental Justice Advisory Council called for omitting CCS, as well as direct air capture, from Biden's pledge to deliver 40 percent of clean energy benefits to environmental justice communities. Critics worry about extending the lifetime of facilities that release conventional pollutants into overburdened communities. But Biden's chief climate adviser, Gina McCarthy, and Secretary of Energy Jennifer Granholm have signaled that the administration will continue to back CCS projects, while looking for ways to address environmental justice.

Under an all-of-the-above approach to addressing the climate crisis, environmental lawyers will be critical in addressing these policy and regulatory challenges.