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As the Push for Carbon Capture Continues, Analysts Offer Differing Views of Its Future

A new tax credit and political momentum have raised carbon capture's profile. But is it enough?

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Carbon capture and sequestration tied to natural-gas processing presents "low-hanging fruit" for the technology.

Congressional approval of the 45Q tax credit (<https://www.greentechmedia.com/articles/read/can-updated-tax-credits-make-carbon-capture-mainstream#gs.eV2WzhU>) for carbon capture and sequestration (CCS) in February signaled a revival of support for the technology.

Later that month, a group supporting the use of CCS expanded and broadened its focus, renaming itself the Carbon Capture Coalition. It pledged to push for further legislation.

In April, energy heavyweights came together to form a coalition called the Energy Advance Center “to promote the energy industry’s interests in issues related to carbon capture and storage.”

Then, last week, bipartisan legislation referred to as the USE It Act, (<https://www.epw.senate.gov/public/index.cfm/press-releases-republican?ID=863BB162-A8C2-4E9D-B31B-3CCEE69B9F34>) which supports research for the technology, passed through the Senate Environment and Public Works committee.

The bill appealed both to senators who see it as “part of a necessary solution to the climate change crisis,” such as Democrat Sheldon Whitehouse, and to those who support an “all-of-the-above energy strategy,” such as West Virginia Republican Shelley Moore Capito.

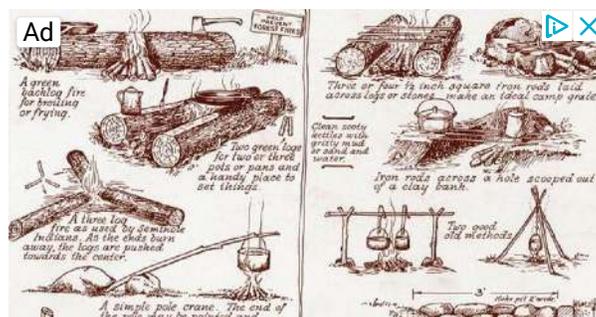
Viewed by many as an essential element of meeting the Paris climate targets, the political fortunes of CCS seemed to be rising with both Republicans and Democrats, even as the Trump administration celebrates (<https://www.washingtonexaminer.com/policy/energy/white-house-trump-wont-back-down-on-paris-climate-deal>) the one-year anniversary of announcing its intent to exit the climate pact.

But recent reports, including one forthcoming from Wood Mackenzie and another from the Energy Futures Initiative (<https://energyfuturesinitiative.org/news/2018/5/22/efi-policy-paper-how-the-45q-credit-may-spur-carbon-capture-innovation>) (EFI), show that analysts remain divided on the technology's prospects.

While supporters of 45Q said the new credit will “without a doubt” propel innovation and investment in CCS, other industry watchers say the economics still don’t pencil out for the global CCS revolution that dramatic climate progress requires.

The Wood Mackenzie report, not yet released, largely examines the potential for CCS in natural-gas processing, which analysts call “low-hanging fruit” because processing natural gas already requires the separation of carbon dioxide. The report’s authors identified 60 global developments where CCS could be applied.

But even with the comparatively low cost of CCS associated with those projects, and the doubling in CCS capacity the application would bring, “the scale of such developments will have limited impact on achieving future targets” required to meet climate goals, write the authors.



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Wood Mackenzie's Head of Gas, LNG and Carbon Consulting, Gavin Law, said that gives him pause about the technology's applications.

"The point is, I think these companies — which are some of the largest companies in the world — are talking about projects that are really in the grand scheme of things quite exciting," said Law. "But they're not really making a big dent under what's required by the Paris Agreement."

Although the costs of separating carbon dioxide are already built into natural-gas processing, the costs of compression and reinjection are not, meaning CCS operations could add "significantly" to overall costs. Researchers at Wood Mackenzie estimated that a carbon price of \$60 to \$100 per ton for natural-gas processing and over \$100 per ton for post-combustion projects would be needed to make projects economically viable.

"I get the impression that CCS is perceived as something that's more about PR and R&D than it is about a viable element to the energy sector," Law said.

Because past CCS projects have benefited from one-time government grants or legislative requirements, analysts at Wood Mackenzie argue that increased incentives will be required to grow the CCS project pipeline beyond the 22 projects currently online or under construction.

"Incentives aside, it would appear that the CCS industry has a huge challenge ahead," the Wood Mackenzie report states.

Those arguments stand in contrast to a recently released policy paper from EFI, a group led by former Energy Secretary Ernest Moniz.

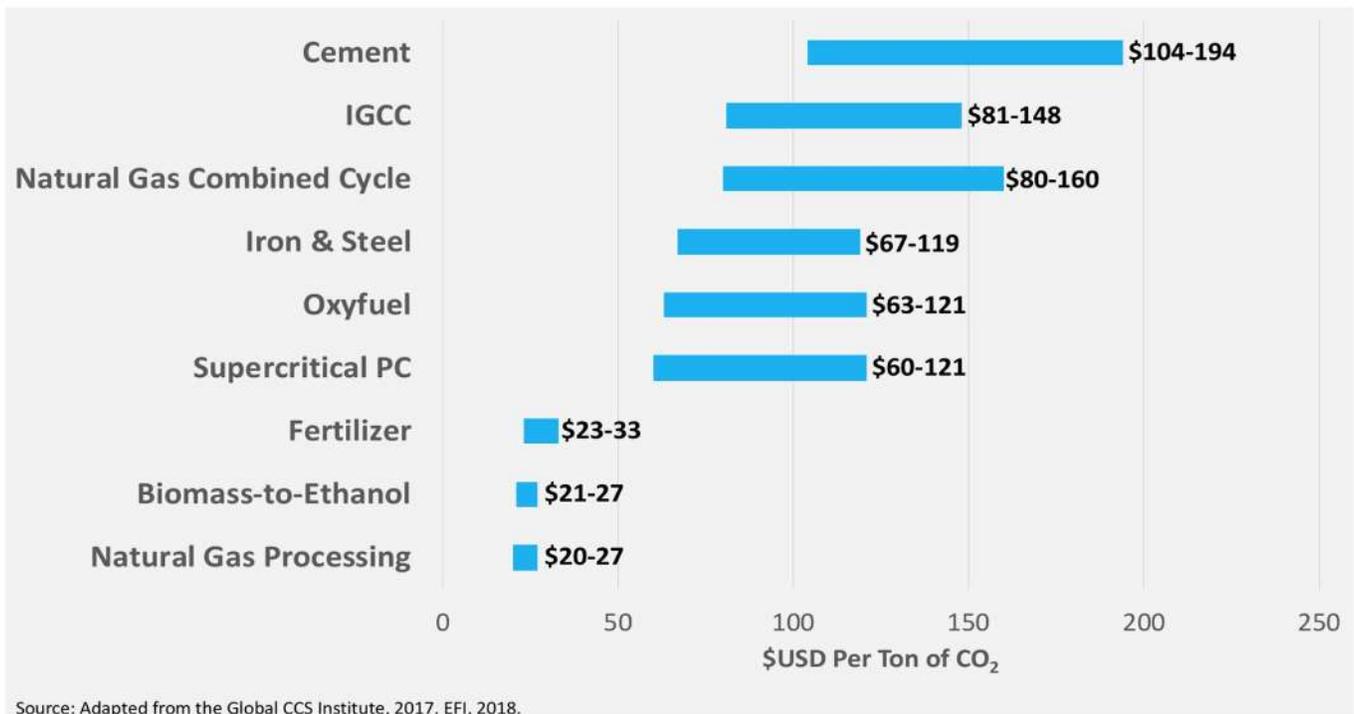
Authors of that report argue that the 45Q credit may "significantly enhance the development and market diffusion of CCUS [carbon capture, utilization and storage] technologies and processes in both industrial and power applications, creating commercial opportunities both in the U.S. and abroad." They estimate the 45Q expansion could lead to between 50 million and 100 million tons of CO₂ being captured and stored per year.

The report also notes that natural-gas processing and other activities that create a pure stream of CO₂, like ammonia production, are the most economic candidates for CCS. With the \$50 per ton credit from 45Q for geological storage and the \$35 per ton for CO₂ sold to oil fields for enhanced oil recovery, EFI said the credits provide "substantially higher revenues" than it costs to retrofit plants.

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Estimated and Measured First-of-a-Kind Costs for CCS Applied to Different Plants



EFI does, however, agree that added policy levers, like handling post-injection uncertainties, may be required to make CCS possible for a wider swath of commercial projects. But Julio Friedmann, an author of the report who is on leave as a senior fellow at the Lawrence Livermore National Laboratory, said the carbon price doesn't need to be as high as the one outlined in the Wood Mackenzie report.

“Substantial deployment of CCUS into the power sector (coal, gas or biomass) requires additional policy measures,” he said. “However, a ‘price on carbon’ needn’t be one.”

In its report, EFI claims the impact of 45Q is comparable to a price on carbon because “in establishing the level of the tax incentive for CO₂ capture, the 115th Congress has tacitly placed a value on avoiding CO₂ in the atmosphere.” EFI said 45Q cannot stand in for U.S. commitments under the Paris Agreement; however, taken together with actions from cities and states, it helps propel the U.S. forward and acts as a step toward more concrete climate policies.

Friedmann added that promising technologies under development from companies such as NET Power and Inventys could reach price points that make power sector deployment possible.



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NET Power announced last week that its first fire test, which basically proves whether its supercritical CCS demonstration plant (<https://www.globalccsinstitute.com/insights/authors/Global-CCS-Institute/2018/05/31/net-power-announces-revolutionary-ccs-milestone>) in Texas will function, went smoothly. The company hopes to deploy 300-megawatt e-class commercial plants around the world starting in 2021.

Law, though, wonders if isolated examples like those can add up.

“Maybe I’m missing something,” he said. “The people who are doing these projects are obviously doing them for a reason, but is it more R&D and demonstration of ability to do them, or is it because it’s a commercially sensible thing to do?”

The Intergovernmental Panel on Climate Change sees CCS as necessary to slow the steady march of climate change. According to EFI, 87 percent of IPCC models require carbon dioxide removal to join a roster of other climate mitigation activities to keep the world’s average temperature increase below 2 degrees.

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