

The Role of 45Q Carbon Capture Incentives in Reducing Carbon Dioxide Emissions

CATF CONTACT:

Kurt Waltzer

Managing Director, CATF

kwaltzer@catf.us

617-624-0234, ext. 292

The 115th Congress is considering tax incentives that would reduce CO₂ emissions by tens of millions of tonnes annually, in the form of the FUTURE Act (S 1353) and the Carbon Capture Act (HR 3761). The language in these bills would extend and expand Section 45Q of the U.S. tax code. Section 45Q provides a performance-based tax credit to power plants and industrial facilities that capture and store CO₂ that would otherwise be emitted into the atmosphere.

Specifically, the credit is linked to the installation and use of carbon capture equipment on industrial sources, gas or coal power plants, or facilities that would directly remove CO₂ from the atmosphere. The captured carbon can then be utilized in the development of products including construction materials, biofuels (e.g., algae), or enhanced oil recovery; or it can be disposed of as waste in deep saline geologic formations. In all cases, to receive the credit, the CO₂ must be stored geologically or be utilized as a feedstock or component of products.

How the 45Q incentives work

- To incentivize carbon capture, the tax credits go directly to the entity doing the capture (i.e., the owner of the capture facility). This could be anthropogenic CO₂ sources such as ethanol plants, steel mills, coal or gas power plants, bioenergy power plants, direct air capture facilities, etc.
- Once captured, the facility can choose to permanently store the CO₂ in deep saline formations or store the CO₂ by providing it to companies that will utilize it in the production of products ranging from plastics, concrete, other commercial materials, and enhanced oil recovery (EOR). In the case of saline formations and EOR, the CO₂ is injected deep underground (multiple miles) to isolate it from the atmosphere. For other forms of utilization, the products must also provide a net reduction of emissions.
- The value of the tax credit depends upon the type of CO₂ storage. CO₂ used for saline storage would receive \$50 per tonne of CO₂ stored while utilization in products, including EOR, would receive only \$35 per tonne of CO₂.
- Saline storage earns a higher \$/tonne CO₂ storage credit than utilization because saline operations do not generate a marketable product, and therefore require a higher incentive level to be economic.
- The credits last for up to 12 years for projects started within the specified time period. After that period, the credits end.

Climate and Economic Benefits of 45Q Incentives

- Modeling conducted by DOE during the Obama Administration examined various carbon capture incentives, including 45Q. DOE's modeling concluded that at credit levels found in the proposed bills:
 - CO₂ emissions in the power sector would drop by about 50 million tonnes per year by 2030 and decline by nearly 70 million tonnes per year in 2040. To place these values in perspective, 50 million/tonnes per year is about 1/5th of the total CO₂ reduction expected to be achieved by the Obama Clean Power Plan in 2025.
 - The U.S. EOR industry would grow by more than 400,000 barrels per day per year by 2035. DOE modeling confirmed that the additional EOR did not result in a net increase in oil consumption. DOE noted,

“The increase in EOR production predominately displaces crude from other sources, and U.S. crude production is similar across all cases.” This finding is consistent with other studies that considered the impact of using CO₂ for EOR. For example, in 2015, the International Energy Agency (IEA) concluded that each barrel of oil produced by CO₂ EOR would displace more than 80 percent of an existing barrel of oil. IEA estimated, after accounting for such a displacement and global market effects, that anthropogenic CO₂ from an emissions source (like a coal plant) that is used in CO₂ EOR provides a net 63% reduction in the source’s emissions. If a typical barrel of oil is used as the benchmark, then oil produced through anthropogenic CO₂ EOR is responsible for 37% less CO₂ emissions than the conventional barrel on a life cycle basis.

- The 45Q incentives are comparable to the emissions reductions benefits of the production tax credits for renewable energy¹.

Other Studies

CATF notes that a recent white paper by Oil Change International (OCI) claims that 45Q will lead to an increase in CO₂ emissions rather than a decrease. The OCI conclusion is erroneous. While the paper is based on the DOE modeling described above, the authors of the OCI white paper ignored two key DOE findings. First, they ignored the 50-70 million tonnes of CO₂ reductions from DOE’s results and substituted a lower value. Second, they ignored DOE’s modeling results that showed that growth in EOR oil production predominantly displaced other oil. Instead, they assumed that oil produced by EOR would increase oil consumption in the US either by 50% to 100% for each EOR barrel produced.

Also, the report erroneously claims 45Q is an oil subsidy, which is incorrect. The incentive is targeting capture of CO₂ from industrial and power sources, or from atmospheric carbon removal. It can be used for oil recovery or a variety of other purposes – all of which will result in net CO₂ reductions.

¹ Incentives for CO₂ Avoided: Comparison of Renewables Production Tax Credit and Proposed 45Q Legislation: http://www.catf.us/resources/factsheets/files/Cost_of_CO2_Avoided.pdf