

Eliminate 45Q Thresholds to Unlock Carbon Capture, Utilization and Direct Air Capture Project Development

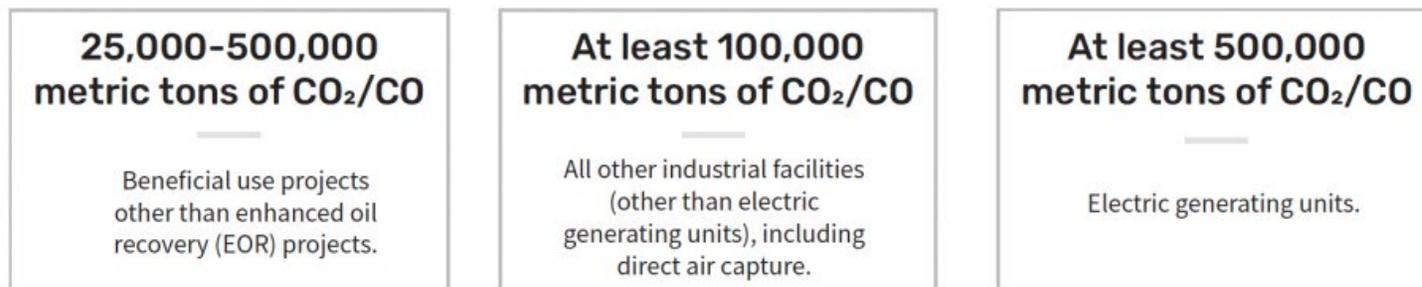
Background

In their [2021 Federal Policy Blueprint](#), the Carbon Capture Coalition's over 80 companies, unions and NGOs recommended that Congress eliminate annual carbon dioxide (CO₂) capture thresholds in the federal 45Q tax credit program. These thresholds limit the potential universe of carbon capture, direct air capture and carbon utilization projects and the overall technology innovation and emissions reduction potential of the incentive. Thresholds arbitrarily preclude the development of many otherwise viable projects at facilities that simply do not emit the volumes of CO₂ required for 45Q eligibility. Finally, 45Q thresholds increase commercial risk and financing costs for projects even at facilities that narrowly exceed thresholds, given investor fears that temporary plant closures or market disruptions (such as in the current COVID-19 pandemic) could result in the loss of credits in one or more tax years.

Currently, approximately 54 percent of power plants and 75 percent of industrial facilities fall below eligibility thresholds, and many direct air capture and carbon utilization projects deploying emerging technologies simply lack the scale to meet them. Eliminating thresholds under 45Q would foster greater carbon capture, direct air capture and carbon utilization project development, technology innovation and cost reductions across sectors, as we work to meet midcentury climate goals and net-zero emissions targets.

Existing 45Q Thresholds

To claim the revamped 45Q tax credits, facilities must meet annual carbon capture thresholds based on facility type (See Figure 1). These three different thresholds were created as part of the expansion and reform of 45Q to enable participation by industrial, direct air capture and carbon utilization projects.



Timing: Eligible projects that begin construction before January 1, 2026 can claim the credit for up to 12 years after being placed in service.

Type of carbon: The type of carbon that can be captured includes all carbon oxides, including CO₂ or CO.

Figure 1: Annual carbon capture thresholds by facility type. Source: Great Plains Institute.

The current thresholds in statute are a legacy of the original 45Q program that was focused on large-scale carbon capture demonstration projects but today serve no obvious public policy purpose. Since the passage of the revamped 45Q tax credit in 2018, it has become clear that existing thresholds do little to address the actual opportunity for carbon capture deployment, instead only limiting the number of facilities able to deploy commercial carbon capture and especially precluding early-stage commercial demonstration of carbon capture, direct air capture and carbon utilization technologies.

Facilities Below Current Thresholds			
Sector	Current Threshold (metric tons of CO ₂ per year)	Number of Facilities Under Threshold	Total CO ₂ Emissions of Facilities Under Threshold (metric tons per year)
Industry	At least 100,000	3,883	109,001,082
Gas Power Plant	At least 500,000	598	75,122,351
Coal Power Plant	At least 500,000	55	10,670,040
Total		4,536	194,793,472

Figure 2: The number of power sector and industrial sector facilities in the United States that do not currently meet the thresholds as defined under the current authorization of 45Q. Data source: EPA Facility Level information on Greenhouse gases Tool, 2019.

Projects Narrowly Exceeding 45Q Thresholds Remain Impacted

Even for facilities that narrowly meet minimum 45Q thresholds on paper, project developers may be unable to secure financing for projects on favorable terms due to the risk posed by operational or market disruptions. The potential for unforeseen closures, including recent large-scale COVID-19 related shutdowns, increase uncertainty and risk for investors considering projects close to existing 45Q thresholds, as failure to meet the threshold in any given year, means the loss of credits for that tax year. Figure 3 below includes the number of facilities that only exceed current 45Q thresholds by up to 25 percent and thus are at greater risk from closures or market disruptions threatening their ability to monetize the 45Q tax credit in any given year.

Facilities Narrowly Above Current Thresholds			
Sector	Current Threshold (metric tons of CO ₂ per year)	Number of Facilities Narrowly Above Threshold	Total CO ₂ Emissions of Facilities Narrowly Above Threshold (metric tons per year)
Industry	At least 100,000	196	21,769,825
Gas Power Plant	At least 500,000	34	18,851,801
Coal Power Plant	At least 500,000	12	6,784,982
Total		242	47,406,608

Figure 3: Power and Industrial facilities that narrowly exceed 45Q thresholds by up to 25 percent.

45Q Thresholds: Unnecessary and Avoidable Barriers to Technology Demonstration, Innovation and Emissions Reductions

While total emissions from 45Q-eligible facilities are much greater than non-eligible facilities, thresholds in the 45Q program stifle innovation and, ultimately, the emissions reduction potential of carbon capture, direct air capture and carbon utilization technologies that, with benefit of early demonstration at smaller scales, can subsequently be deployed successfully at larger scales, lowering costs over time. Decisions about project scale should be left to project developers and investors, who seek to optimize the scale of their projects based on factors such as facility scale, technology readiness, market conditions and available federal and state policy support. They tend to design initial projects to be as large as feasible, often looking to scale up technologies further in subsequent projects. The thresholds in place for the 45Q tax credit impede this well-established approach to technology demonstration, innovation and commercialization.

Innovation in Carbon Utilization & Direct Air Capture Especially at Risk

Carbon utilization is the process of converting captured waste gases (CO₂ or CO) to produce low-carbon fuels, chemicals, materials, and other useful products that reduce emissions of greenhouse gases, relative to incumbent products or processes. Additionally, beneficial utilization of pre-combustion industrial gases helpfully removes other pollutants as part of the utilization process.

Increasingly, carbon utilization is seen as an important complement to large-scale carbon storage, as it provides value-added markets for carbon capture operations and constitutes an important component of a circular carbon economy.

The National Academies of Science has estimated that utilization pathways could manage up to 1 gigaton of CO₂ per year globally. Domestic market valuation estimates range from [\\$800 billion](#) to over [\\$1 trillion](#) per year and include high-value products, such as chemicals and carbon fiber, and bulk commodities including fuels, building materials, agricultural feedstocks and other widely used products.

The current minimum threshold of 25,000 metric tons of CO₂/CO for carbon utilization projects under 45Q is especially harmful. Many carbon utilization technologies are not immediately scalable to the 25,000 metric ton threshold, nor are some utilization markets such as local production of concrete ready mix even capable of reaching that scale in many circumstances. The threshold unnecessarily precludes emissions reductions, jobs and investment by locking these opportunities out of the 45Q program altogether.

Direct air capture project development is also severely constrained by the current 100,000 metric ton threshold. Technology demonstrations are crucial to a sector that still lacks the economies of scale which benefit larger projects. Early direct air capture pilot projects operate at a rate of [several thousands of tons per year](#), significantly below the current threshold. It serves absolutely no public policy purpose to limit early deployment of a technology that the Intergovernmental Panel on Climate Change, International Energy Agency and U.S. National Academies of Sciences all recognize as critical to achieving midcentury climate goals.

Conclusion

Current thresholds in the 45Q statute have no coherent underlying scientific or technical basis and pose a barrier to innovative carbon capture technology deployment across sectors and at all phases of technology maturity. They create uncertainty and, in some instances, insurmountable obstacles to project developers, with no corresponding technology innovation or emissions reduction benefits. By placing arbitrary caps on the development of otherwise viable and valuable projects, thresholds discourage learning by doing and, ultimately, hamper the viability of nascent

carbon capture, direct air capture and carbon utilization technologies. Finally, the current policy unnecessarily increases risk and financing costs even for projects at facilities that narrowly exceed thresholds, due to investor concerns that temporary plant closures or market disruptions will result in the loss of the credit in one or more tax years.

Rather than encourage all viable pathways to emissions reductions with a 45Q credit value based upon storage or utilization of the captured carbon, instead, these thresholds arbitrarily limit the universe of potential projects. Congress should remove all 45Q thresholds, unlocking greater project development across a wide variety of sectors including industry and power, direct air capture and utilization.