



## **Carbon Capture Coalition & Industrial Innovation Initiative Carbon Management's Role in Addressing Industrial Emissions Talking Points**

### **Highlight of Recent Research on Industrial Sector Emissions**

#### **Topline:**

The industrial sector, which includes the manufacturing of materials we rely on every day, including steel, cement, and basic chemicals, is on track to be the highest-emitting sector in the US by the beginning of the next decade. Carbon capture technologies will play a critical and complementary role in addressing emissions at industrial facilities, particularly the direct emissions from the conversion of raw materials to finished products, or so-called process emissions. It is important that we ensure technologies like carbon capture are part of the solution in the years ahead to ensure we can meet our ambitious climate, energy production, and economic goals.

#### **Proof Points:**

- In May, Rhodium Group released "[Expanding the Industrial Decarbonization Toolkit](#)," which uses Rhodium's updated industrial decarbonization model, the Industrial Carbon Abatement Platform (RHG-ICAP), to estimate the deployment and emissions impact of decarbonization solutions at existing industrial facilities under current policy and begin to unpack what a longer-term decarbonization strategy can look like for the industrial sector.
- Useful statistics from the report:
  - Since 2005, direct emissions from the industrial sector in the US (including emissions associated with oil and gas production) have decreased by just under 7 percent. Today, the industrial sector accounts for more than 1.5 gigatons (billion tons) of greenhouse gas (GHG) emissions annually.
    - In 2023, Rhodium Group estimated that direct emissions from industry edged out the power sector as the second highest-emitting sector in the US, accounting for 29 percent of total US GHG emissions.
    - In the US, Rhodium projects GHG emissions produced by industry could increase by as much as 12 percent from 2022 levels by 2035 under current policy, due to a combination of factors.
  - Deployment of carbon capture retrofits and new electrolyzer (for the generation of low- and zero-carbon hydrogen) installations driven by current policy could

reduce emissions by 81-132 million metric tons in 2040, resulting in 5-10 percent lower total industrial sector emissions, with notable uptake of both solutions in key subsectors.

- In a high emissions case by 2030, Rhodium Group estimates economic deployment of 73-79 million metric tons (MMT) of carbon capture capacity, concentrated at high-purity capture sources: ethanol production, ammonia production, and natural gas processing.
  - In the high emissions case, the cost of retrofitting other facilities is not met by the available tax credits, and capture retrofits remain at the same level through 2040.
- In a low emissions case (with lower costs for carbon capture equipment), capture retrofits reach 142 MMT in 2040 as the point source categories diversify to include lower purity sources of CO<sub>2</sub> like refineries, steam methane reformers, and integrated steelmaking facilities.
- The Global CCS Institute estimates that there will be about 155 million metric tons of carbon capture capacity in industrial and power facilities in the US, by 2030 if all announced projects come to fruition.

## Addressing Emissions from Heavy Industry Requires Carbon Management

Topline: Certain industrial processes, such as converting lime into cement, have limited or no emissions reduction strategies beyond carbon capture. These emissions cannot be addressed by electrification alone but require a mix of pragmatic solutions, **including carbon management technologies**.

### Proof Points:

- The industrial sector contributes roughly 30 percent of all US greenhouse gas emissions on an end-use basis. There are industries, such as steel and cement, that have significant carbon emissions resulting from the chemistry of the production process itself, regardless of energy inputs. This means that even if we switch to 100 percent renewable energy for fuel sources, the production of materials like steel and cement would still produce large quantities of CO<sub>2</sub>. These so-called process emissions are responsible for approximately one-quarter of the emissions from the industrial sector.
- Steel, cement, basic chemicals and other materials with emissions-intensive manufacturing processes are essential to our everyday lives. These are some of the basic materials used in construction projects, including the build-out of renewable energy projects and the new infrastructure needed for the energy transition. Rather than continue to release emissions created when manufacturing these crucial products, carbon capture equipment can prevent them from entering the atmosphere.
- Deployment of carbon management is particularly crucial to decarbonizing heavy industry and manufacturing sectors – which provide the essential building blocks to modern life, including cement, steel, fuels, and basic chemicals.
  - As just one example, it is **estimated that globally, we will build the equivalent of New York City's worth of infrastructure every month for**

**the next 40 years** due to rapid urbanization and a growing global middle class.

- The International Panel on Climate Change (IPCC) is clear that the deployment of carbon removal technologies, including direct air capture, will be necessary to address hard-to-abate sectors and legacy emissions. From the report: “However, some hard-to-abate residual GHG emissions (e.g., some emissions from agriculture, aviation, shipping, and industrial processes) remain and would need to be counterbalanced by deployment of carbon dioxide removal (CDR) methods to achieve net zero CO<sub>2</sub> or GHG emissions (high confidence).” (page 22, Summary for Policymakers)

## **Policies Necessary to Develop Carbon Management Projects at Heavy Industrial Sites**

### Topline:

While recent laws represent major progress on carbon management, deployment levels of these technologies at heavy industrial facilities necessary to meet midcentury climate targets **will require additional policy, regulatory, and legal frameworks** at the federal and state levels and **improved coordination** between project proponents, local communities, government, and stakeholders.

### Proof Points:

- As the US continues to lead the charge on supportive policy levers to enable global economywide deployment of carbon management technologies, enhancements to the 45Q tax credit have turbocharged interest in applying carbon management technologies across emitting sectors. Today, thanks to these historic policies in support of carbon management, there are now nearly [220 announced carbon management projects](#) in the US across a range of emitting sectors.
- However, despite impressive advances in the sector over a short period, the **current pace of development is not on track to meet economywide decarbonization**, with [carbon management needing to capture and store](#) at 1 billion metric tons of CO<sub>2</sub> globally per year by 2030 and subsequently increasing to 6 billion metric tons per year by midcentury. While the remarkable progress achieved with the passage of legislation by prior Congress’ is an important start, we must continue building on this momentum to meet deployment goals made necessary by midcentury climate targets.
- The recent enhancements to 45Q provide additional incentive to deploy carbon management technologies at higher cost but crucial sectors to decarbonize. The cost of deploying carbon management technology differs across the industry sectors, depending on the concentration and purity of the CO<sub>2</sub> emissions. While [estimates](#) range depending on industry and facility type, it is becoming clear that the 45Q tax credit alone is not enough to incentivize deployment of carbon management technologies across emitting sectors.

- On average, IRA's enhancement to the 45Q tax credit provides economic viability for deploying carbon management technologies in those sectors that produce a high-purity stream of CO<sub>2</sub>. The majority of heavy industrial sectors require additional mechanisms to close the cost gap between the costs of deployment and the support provided by the 45Q tax credit.
- Additional support is required to close the gap between the 45Q incentive and the cost for first-of-kind demonstration and deployment across industry sectors, to pave the way for cost-effective, economywide deployment.

## Decarbonizing Industry While Protecting and Creating High Wage Jobs

Topline: Carbon management provides a critical pathway for **creating and retaining the high-wage jobs base that families and communities depend upon** while positioning our nation's industrial, energy, and manufacturing sectors for global leadership in achieving net-zero emissions by midcentury. The industrial and manufacturing sectors provide workers with a broad range of skill sets family sustaining jobs that form the backbone of many regional economies.

### Proof Points:

- Deploying technologies across the entire carbon management value chain—including carbon capture, removal, transport, utilization, and storage, as well as low-carbon hydrogen produced with carbon capture—will be essential to reaching midcentury climate goals while preserving and expanding the high-wage jobs base that families and communities depend upon.
- Enhancements to the 45Q tax credit enacted through the Inflation Reduction Act will safeguard **high-wage jobs that sustain families and communities** and ensure the **long-term viability of key domestic industries** which those jobs have historically relied on.
- The Rhodium Group found that **carbon capture retrofit opportunities at industrial and electric power facilities across a 28-state region have the potential to create between 70,000 to 100,000 jobs associated with capital investment per year over the next 15 years.**
- Additionally, carbon capture retrofits and related infrastructure across the same region has the potential to create over 45,000 to 65,000 ongoing jobs over the next 15 years.
- Carbon management has the potential to create over 114,920 – 168,770 total jobs across the midcontinent and mid-Atlantic regions over the next 15 years, based on projections from the [Rhodium Group](#).
- Unionized skilled labor is essential in building and scaling carbon management technologies. These workers, who are often considered among the best trained, can ensure the deployment of carbon management infrastructure is effective and timely, helping meet the workforce demand for the clean energy transition.

- The Department of Labor sets the wage rates for 45Q according to the specific geographic area of the project. Additionally, labor provisions applied to 45Q mandate that a certain percentage of the workforce on these projects must be composed of apprentices from registered apprenticeship programs. To qualify for the full 45Q credit amount, projects are required to utilize registered apprentices for a minimum percentage of total labor hours. For projects starting construction in 2023, at least 12.5 percent of labor hours must be performed by apprentices, increasing to 15 percent in 2024 and subsequent years.