Petroleum Refining

CLEAN AIR TASK FORCE

Sector Overview

Petroleum refineries process crude oil into transportation fuels like gasoline, diesel, and jet fuel, as well as feedstocks for chemical manufacturing. The refining process involves heating crude oil to separate it into different components, then chemically transforming these components through processes such as cracking and reforming. Refineries are highly energyintensive and rely heavily on fossil fuel combustion, particularly in units like fluid catalytic crackers. Most emissions come from combustion and other high-heat, continuous operations across the facility.

Data Overview

Number of employees	Annual payroll ($ billion)	High-Emitting Facilities[1]	GHG Emissions (MMT CO2e)	GHG Emissions (% of total U.S. Emissions)
51,386	8.04	136	164	2.6%

Note 1: High emitting is defined as greater than 0.025 MMT CO2e/year

1. EPA FLIGHT 2. U.S. Census Bureau CBP 3. EPA GHG Overview

Leading Decarbonization Technologies

Energy efficiency and process upgrades

Improvements in heat integration, steam systems, and process controls can reduce energy use and emissions. While these upgrades are incremental, they are commercially mature and offer near-term benefits without major infrastructure changes.

Alternative fuels

Refineries can substitute portions of their fuel mix with lower-carbon alternatives such as renewable diesel, biogas, or waste derived fuels. While not a full solution, fuel-switching can reduce on-site combustion emissions with relatively low capital cost.

Carbon capture, utilization, and storage (CCUS)

CCUS is a key pathway for refineries, particularly at major emission points like fluidized catalytic crackers. Capture technologies are well suited for large, centralized plants and could be scaled quickly if supported by shared infrastructure and investment incentives.

Policy Recommendations

Tax Incentives for CCUS and Low-Carbon Hydrogen

To accelerate decarbonization in refining, states can offer supplemental tax incentives for both carbon capture and clean hydrogen production. Layering state credits on top of the federal 45Q credit improves project viability for post-combustion CCUS at units like fluid catalytic crackers and hydrogen reformers. Similarly, tax credits, grants, and low-interest loans for clean hydrogen infrastructure—alongside tools like property tax abatements and workforce training—can reduce long-term costs and enable broader adoption.

Accelerated Depreciation for Low-Carbon Petroleum Refining

States can increase the financial appeal of low-carbon retrofits by conforming to or expanding federal accelerated depreciation rules for clean technologies. This allows refiners to recover capital costs more quickly, improving cash flow for projects like carbon capture, electric process heating, or co-processing infrastructure. Aligning tax policy with climate goals can hasten the transition from high-emitting assets to cleaner systems.

Capacity Building for Clean Fuel Deployment

Beyond tax incentives, states can accelerate adoption of low-carbon fuels—like clean hydrogen and renewable diesel—through a portfolio of supportive mechanisms such as permitting assistance, planning grants, technical support, and workforce training. These tools reduce soft costs, improve project timelines, and help build the institutional capacity needed to scale clean fuel use in refining and other industrial sectors.