

Industrial Decarbonization

Industrial decarbonization is the phasing out of atmospheric greenhouse gas (GHG) emissions from all aspects of industry, recognizing the importance of industry for national economic competitiveness and vibrant communities. Decarbonization within the industrial sector ensures momentum towards net-zero carbon emissions goals.

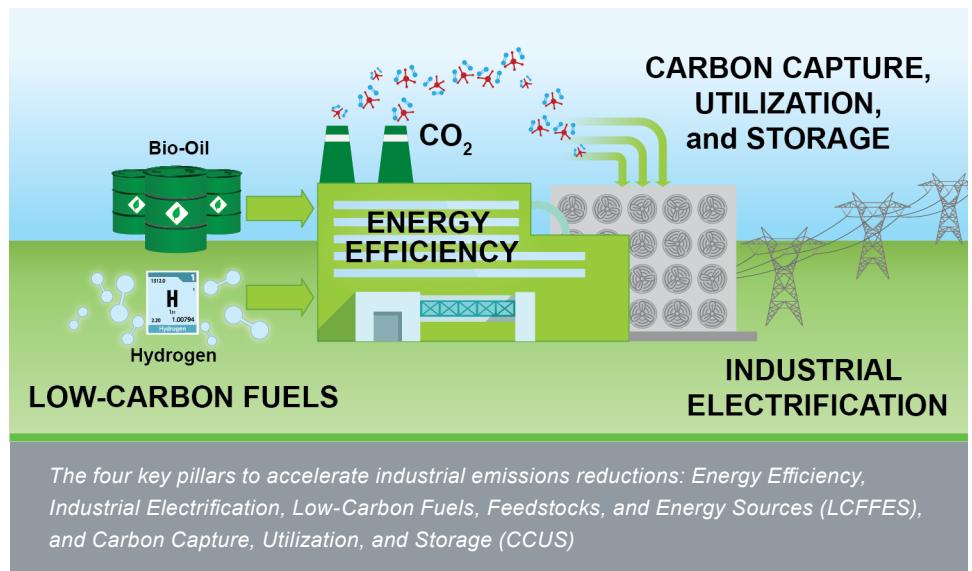
AMO is investing in the research, demonstration, and deployment of new technologies; sponsoring technical assistance programs to upskill workers; and facilitating the deployment of proven concepts in the industrial sector.

AMO has identified four key pillars to accelerate industrial emissions reductions:

- Energy Efficiency
- Industrial Electrification
- Low-Carbon Fuels, Feedstocks, and Energy Sources (LCFFES)
- Carbon Capture, Utilization, and Storage (CCUS)

About the Advanced Manufacturing Office

The Department of Energy's (DOE) Advanced Manufacturing Office (AMO) is dedicated to improving energy and material efficiency, productivity, and competitiveness of manufacturing and the industrial sector. AMO programs work to increase the energy efficiency of manufacturing, promote manufacturing competitiveness, and increase resilience and sustainability to achieve economy-wide net-zero carbon emissions by 2050. AMO strives to execute its mission while emphasizing the Justice40 initiative, which promises to deliver 40% of relevant federal investment benefits to disadvantaged communities.



Energy Efficiency

Energy efficiency is a foundational, crosscutting decarbonization strategy and is the most cost-effective option for GHG emission reductions in the near term.

Decarbonization efforts include:

- Strategic energy management approaches to optimize performance of industrial processes at the system-level
- Systems management and optimization of thermal heat from manufacturing process heating, boiler, and combined heat and power (CHP) sources
- Smart manufacturing and advanced data analytics to increase energy productivity in manufacturing processes

Industrial Electrification

Leveraging advancements in low-carbon electricity from both grid and onsite renewable generation sources will be critical to decarbonization efforts.

Decarbonization efforts include:

- Electrification of process heat using induction, radiative heating, or advanced heat pumps
- Electrification of high-temperature range processes such as those found in iron, steel, and cement making
- Replacing thermally-driven processes with electrochemical ones

Low-Carbon Fuels, Feedstocks, and Energy Sources (LCFFES)

Substituting low-and no-carbon fuel and feedstocks reduces combustion-associated emissions for industrial processes. Decarbonization efforts include:

- Development of fuel-flexible processes
- Integration of hydrogen fuels and feedstocks into industrial applications
- The use of biofuels and bio feedstocks

Carbon Capture, Utilization, and Storage (CCUS)

CCUS refers to the multi-component strategy of capturing generated carbon dioxide (CO₂) from a point source and utilizing the captured CO₂ to make value-added products or storing it long-term to avoid release. Decarbonization efforts include:

- Post-combustion chemical absorption of CO₂
- Development and manufacturing optimization of advanced CO₂ capture materials that improve efficiency and lower cost of capture
- Development of processes to utilize captured CO₂ to manufacture new materials ■