We’re applying new materials science and leveraging something that already exists to solve a global problem by extracting carbon from the air through the retrofitting of rooftop air conditioning units with carbon capture capabilities.

Kashif Nawaz, Group Leader, Multifunctional Equipment Integration
Recent Impacts

Additively manufactured carbon capture technology—Creating a first-of-its-kind aluminum device that significantly enhances the capture of carbon dioxide emitted from fossil fuel plants and other industrial processes. By using additive manufacturing, researchers custom designed a multifunctional device that resolves the challenge of heat produced when solvents are used to absorb carbon in smokestack flue gas treatments.

Reducing cement carbon emissions—Working with industry to develop a breakthrough carbon capture process that will close the loop on carbon emissions released from cement plants. By developing, optimizing, and scaling up carbon capture process components that can be integrated into cement plant production, the carbon footprint is reduced through technological upgrades.

Net-zero carbon fuels—Developing synthetic liquid fuels from renewable electricity, carbon dioxide, and bio-feedstocks to decarbonize the transportation sector and advance mobility for clean energy, sustainability, and national security. This is accomplished by directly converting carbon dioxide to ethanol in a high-yield process using a nanotechnology-designed catalyst.

Retrofitting equipment for carbon capture—Integrating a multifunctional cooling tower to complement existing rooftop heating, ventilation, and air conditioning equipment that deploys system controls to optimize the performance of both cooling and carbon capture functions. The cooling tower integration allows for the direct air capture of carbon from the atmosphere.

Unique Facilities

The Manufacturing Demonstration Facility (MDF) houses integrated capabilities to drive the development of new materials, software, and systems for advanced manufacturing technologies that support the secure production of clean energy products.

The Building Technologies Research and Integration Center (BTRIC) improves the energy efficiency and environmental compatibility of residential buildings with research focused on envelopes, multi-functional equipment integration, sensors, and controls.

The Grid Research Integration and Deployment Center (GRID-C) provides solutions to support the decarbonized utility, buildings, and vehicle sectors while advancing and integrated, secure, and resilient power grid.

The National Transportation Research Center (NTRC) develops and helps industry deploy efficient and secure transportation technologies focusing on advanced energy storage, electric drive systems, alternative fuels, and intelligent mobility systems.