

CARBON CAPTURE AND STORAGE (CCS)

CECO Environmental delivers proven, integrated technologies for every stage of Carbon Capture and Storage (CCS). From upstream flue gas conditioning to downstream water treatment, our purpose-built solutions protect equipment, maximize CO_2 capture efficiency, and ensure full regulatory compliance, which enables industries worldwide to meet their decarbonization commitments.

CECO ENVIRONMENTAL

www.cecoenviro.com

01 CO_2 Source & Flue Gas Generation

Power Plants, Cement Kilns, Refineries, Hydrogen Production, SAF & Waste-to-Energy*

PROCESS OVERVIEW

Industrial combustion and process emissions generate large volumes of flue gas containing CO_2 alongside particulates, acid gases and moisture which requires robust upstream conditioning to protect downstream capture assets.

KEY CHALLENGES

- High Gas Volumes & Velocities
- Particulates, SOx, NOx
- Moisture and Corrosive Compounds
- Volatile Organic Compounds (VOCs)

CECO SOLUTIONS

- Vibration Dampeners
- Bag Filter / Dust Collector
- Cartridge Dust Collector (CDC)
- Diverters

**SAF (Sustainable Aviation Fuel)*

02 Flue Gas Pretreatment

Protecting Capture Systems and Maximizing Absorption Efficiency

PROCESS OVERVIEW

Flue gas must be conditioned before entering capture columns. Contaminants degrade solvents, corrode equipment, and reduce CO_2 recovery rates. CECO's scrubbing and separation technologies deliver clean, conditioned gas streams.

KEY CHALLENGES

- Particulates & Acid Gas Removal
- Equipment Corrosion
- Solvent Degradation Risk

CECO SOLUTIONS

- Packed Bed / Gas Scrubbers
- Multi-Purpose Scrubber (MPS)
- Ionizing Wet Scrubber
- Candle Filters / Mist Eliminators
- Column & Separator Internals
- Packed Bed Spray Nozzles

03 CO_2 Capture

Absorption, Adsorption, and Hybrid Capture Systems

PROCESS OVERVIEW

The capture stage is the heart of any CCS facility. Efficient CO_2 absorption demands clean solvents free from contamination. CECO's filtration and coalescing solutions protect solvent integrity and maximize capture rates.

KEY CHALLENGES

- Solvent Losses & VOC Emissions
- Corrosive Process Conditions
- Degradation by Contaminants

CECO SOLUTIONS

- Activated Carbon Filters
- Absorption Filter Elements
- Absolute Filter Coalescer
- Liquid Filter Coalescer
- Liquid Filter (Vessels)
- Media Filter Elements

04 CO_2 Conditioning & Purification

Preparing CO_2 for Compression, Utilization, or Permanent Storage

PROCESS OVERVIEW

Captured CO_2 must meet strict purity specifications before compression or injection. Moisture, oxygen, and trace impurities must be reduced to pipeline or storage-grade quality to prevent corrosion and ensure safe transport.

KEY CHALLENGES

- Oxygen & Trace Contaminant Removal
- Moisture Removal
- Pipeline Corrosion Risk

CECO SOLUTIONS

- CO_2 Dehydration Systems

05 CO_2 Compression & Transport

Pipeline, Ship, and Truck Transport of Supercritical CO_2

PROCESS OVERVIEW

Compression raises CO_2 to supercritical conditions for efficient transport. Dry, contaminant-free gas is essential to protect compressor internals and pipeline integrity. CECO's separation technology ensures reliable operation.

KEY CHALLENGES

- Dry Gas Specification Compliance
- Equipment Reliability
- Safety & Leak Prevention

CECO SOLUTIONS

- Vane Separators
- Separation Vessels & Filters

06 Residual Emissions & Tail Gas Treatment

Capture Regeneration, Utilization Units, and Compliance Stacks

PROCESS OVERVIEW

VOCs, solvent vapors, and regulated compounds from regeneration and capture units require effective thermal destruction. CECO's oxidizer portfolio delivers proven, energy-efficient solutions for the most demanding CCS emission streams.

KEY CHALLENGES

- VOCs and Solvent Vapor Control
- Hazardous or Regulated Emissions
- Safety & Leak Prevention
- Energy Efficiency Targets

CECO SOLUTIONS

- Regenerative Thermal Oxidizer (RTO)
- Electric Oxidizers (ERTO / ETO)
- Recuperative Thermal Oxidizer (ReTO)
- Combustion & Burner System
- Concentrator Systems (RCTO / RCRTO)

07 Water & Wastewater Treatment

Scrubber Blowdown, Solvent Wash Water and Utility Streams

PROCESS OVERVIEW

CCS facilities generate complex wastewater streams from scrubbing and solvent regeneration. CECO's integrated water treatment packages enable water reuse, meet discharge limits and manage high Total Dissolved Solids (TDS) and chemical loading.

KEY CHALLENGES

- High TDS & Chemical Loading
- Regulatory Discharge Compliance
- Water Reuse & Zero-Liquid Discharge

CECO SOLUTIONS

- DAF (Dissolved Air Flotation)
- Ultrafiltration & Ceramic Membrane
- Reverse Osmosis
- Multi Media Filters
- Demineralization & Softening Packages
- Sludge & Sewage Treatment Packages

Why choose us?

Effective CCS implementation requires a holistic, end-to-end engineering approach spanning every process stage - from flue gas conditioning and CO_2 capture to compression, emissions control, and wastewater management. Each stage presents distinct challenges, including solvent degradation, equipment corrosion, and strict purity specifications, all of which must be systematically addressed to ensure efficiency and regulatory compliance. No single technology operates in isolation; the performance of a CCS facility depends on the seamless integration of multiple engineered systems working in concert. As decarbonization pressures intensify globally, proven, purpose-built solutions remain essential in translating CCS commitments into measurable, sustainable outcomes.

Partner with CECO Environmental for Your CCS Project

Contact our Carbon Capture Specialists: https://www.cecoenviro.com

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