

# Carbon Removal

Just stopping emissions is not enough.

## The Opportunity

Humans have already saturated the atmosphere with carbon, which means we need to not only curb future emissions, but also remove existing pollutants—also known as “legacy emissions”—from the atmosphere.

Carbon Dioxide Removal (CDR) is a set of technologies and techniques specifically designed to remove carbon dioxide from the atmosphere and store it safely in materials like soil, forests, kelp, and concrete.



CDR takes carbon from the atmosphere and stores it in various forms such as soil, underground reservoirs, forests, kelp, or synthetic materials like concrete.

## Six of Boulder County’s Carbon Removal Technologies

### Nature-Based

#### AFFORESTATION & REFORESTATION

Planting new trees, either where they grow naturally, or in new areas.

#### Benefits

- Low Cost • High Availability
- Support Local Communities
- Biodiversity / Habitat Values

### Nature-Based

#### IMPROVED FOREST MANAGEMENT

Managing working forests according to practices that increase carbon and CO2 drawdown rates.

#### Benefits

- Low Cost • High Availability
- Major Co-benefits

### Hybrid

#### BIOCHAR

Breaking down plant biomass to create a highly stable form of carbon that can be spread over land or used in other repurposed ways.

#### Benefits

- Increased Nutrient Retention
- Better Water Filtration & Retention
- Rebalanced Soil pH

### Hybrid

#### BIOENERGY WITH CARBON CAPTURE & STORAGE

Utilizing biomass combustion or other methods, followed by CO2 capture and geologic sequestration.

#### Benefits

- High Availability • Reduces Waste
- Stabilizes Soil

### Engineered

#### CARBON MINERALIZATION

Injecting CO2 taken from industrial waste directly into cement, to harden and store the carbon with a mineral matrix.

#### Benefits

- High Durability • Effectiveness
- Stronger Building Materials

### Engineered

#### DIRECT AIR CAPTURE

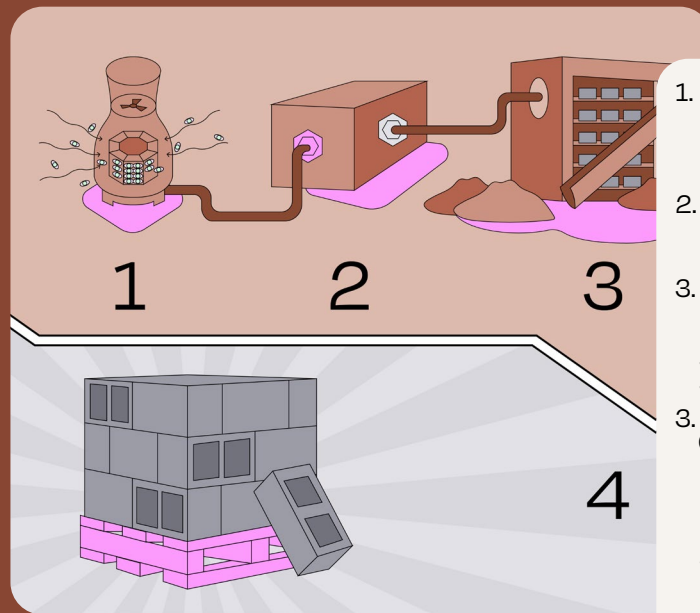
Utilizing technologies that extract CO2 directly from the atmosphere for storage or reuse.

#### Benefits

- Scalability • Small Land Footprint
- High Durability When CO2 is Stored Underground

# Scaling Carbon Removal Across the West

Since 2021, local governments in the “four corners” region have been assessing and investing in projects to test and scale innovative carbon removal efforts.



- 1. Direct Air Capture**  
Removes carbon dioxide (CO<sub>2</sub>) from the air & makes it available for industrial use.
- 2. CO<sub>2</sub> Processing**  
CO<sub>2</sub> is prepared for use in a concrete curing chamber.
- 3. Concrete Plant**  
Products are made from a mix containing calcium-rich waste materials and cured with CO<sub>2</sub>.
- 3. Ultra-Low Carbon Concrete**  
Concrete made through this process both removes and avoids carbon emissions. Compared to other traditionally-made building products, its carbon output is 70-100% less!

CDR only works if projects start at the local level, then scale up. Knowing this, municipal and county governments across Arizona, Colorado, New Mexico, and Utah formalized the 4 Corners Carbon Coalition (4CCC) to assess, support, and scale promising carbon removal projects.

4CCC is technology-neutral, and focuses on projects that will achieve long-term storage, are measurable and verifiable, do not impose burdens on communities anywhere, and can deliver other economic, social, or ecological benefits.

## [The 4 Corners Carbon Coalition](#)

### Become a CDR Expert



In 2023, Boulder County and Carbon Direct released a playbook to help local governments develop CDR strategies, including best practices and case studies of different project structures. [Read the Playbook.](#)

### Stay in the Loop



Grant opportunities come and go, but CDR is (ideally) forever. 4CCC shares project updates, funding opportunities, and more on their website. [Visit the 4CCC Website.](#)

### Join a Collective



You don't need to be a materials scientist or government climate office to make an impact. Networks like OpenAir bring people together to drive research & development, citizen science, policy advocacy, and activist business development. [Join the Network.](#)

