# Carbon Storage: Climate Change Hero or Danger to Society?

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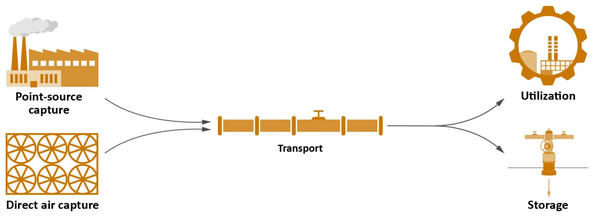
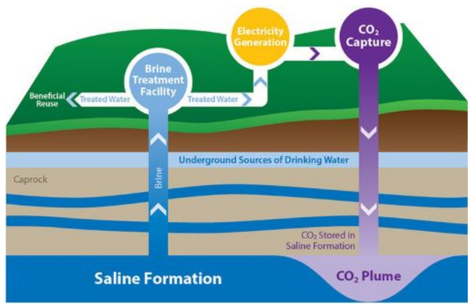
**Research Question:**
*Who makes up the communities surrounding carbon capture facilities reporting to the EPA's GHGRP?*

## Introduction

Carbon Capture, Usage, and Storage (CCUS) refers to technologies that mitigate CO2 emissions from sources like power plants and refineries or remove existing CO2 from the atmosphere. In the U.S., organizations involved in carbon storage report to the EPA's Greenhouse Gas Reporting Program (GHGRP), which tracks emissions under various subparts, including subpart UU (underground injection) and subpart RR (geologic sequestration). While underground injection is often used for enhanced oil recovery (EOR), geologic sequestration involves storing CO2 in underground formations, with some overlap between the two methods.




Source: GAO. | GAO-22-105274



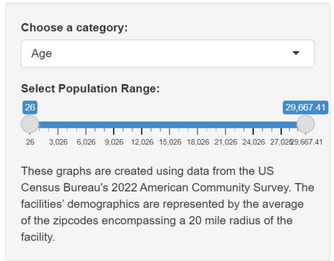

## Background

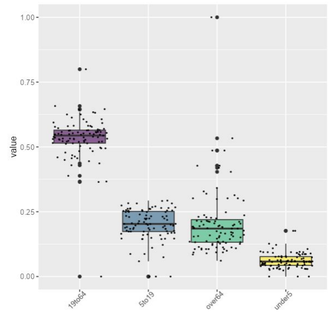
### *The Inflation Reduction Act of 2022 (IRA)*

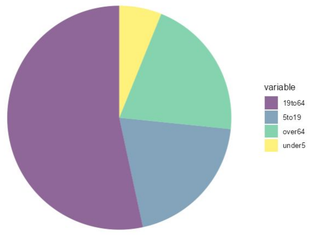
The Inflation Reduction Act of 2022 (IRA) was signed into effect by President Biden on August 16, 2022. The act was aimed at increasing tax breaks for the purpose of "boost[ing] clean energy, reduc[ing] healthcare costs, and increas[ing] tax revenues" (McKinsey & Company). Specifically, the IRA expands on the existing 45Q tax credit which is a "performance-based tax credit for carbon management projects" and it raises the credit for sequestered carbon dioxide from $60/tonnes to $85/tonnes (Carbon Capture Coalition).

## Results (User Interface)

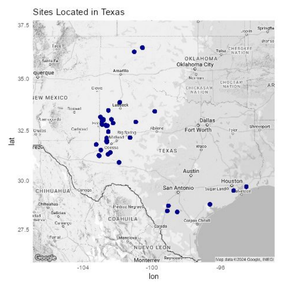
### *Census Data*

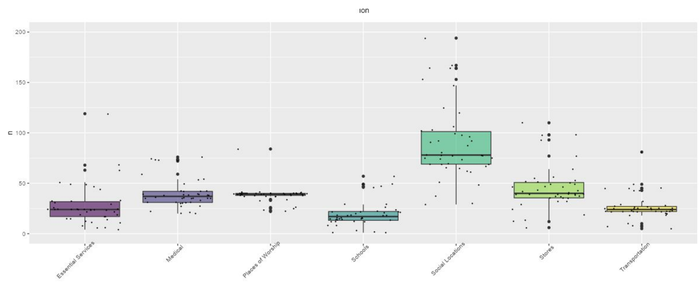


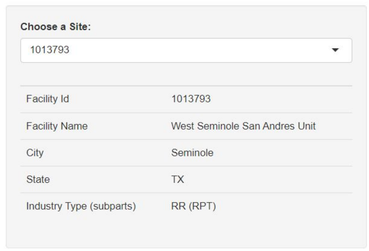



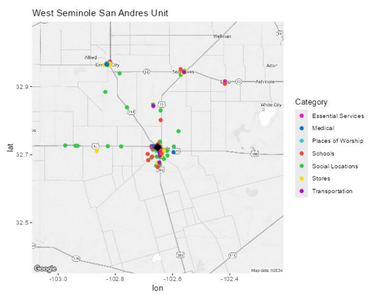




### *Google Maps API Generated Data*




| type | n |
|---|---|
| Essential Services | 31 |
| Medical | 31 |
| Places of Worship | 38 |
| Schools | 21 |
| Social Locations | 99 |
| Stores | 52 |
| Transportation | 27 |

## Background (con't)

### *Health and Safety Concerns*

Where can you build a carbon sequestration facility? In middle to high-income neighborhoods, the idea is often impossible due to zoning laws and community resistance. However, lower-income areas, like St. Rose, Louisiana, are more likely to host such facilities, earning nicknames like "Cancer Alley." St. Charles Clean Fuels (SCCF) plans to build a facility near St. Rose that will capture and release CO2 for later sequestration. Critics doubt the industry's claims of 90% CO2 capture and point out that these facilities also release other pollutants. To transport the CO2, pipelines will be built across the U.S. A 2020 incident in Satartia, MS, highlighted risks when a CO2 pipeline ruptured, injuring over 200 people. Federal regulators found Denbury Inc. violated safety protocols, and though the company was fined $2.8 million, critics argue similar incidents could happen as pipeline networks expand.

## Methodology

There are two main data frames that were created for the purpose of answering my research question: one gathered from the 2022 ACS from the Census Bureau and the other generated using the Google Maps API. The data from the Census Bureau was taken directly from their website. Specifically, I downloaded a dataset that had the data separated by zip codes. Originally, I had considered doing my analysis using county data, but not every facility is located well within a county, and often they're on the border of one. It can't be assumed that neighboring counties have the community, so instead I opted to use a zip code API to average the zip codes that make up a 20 mile radius around each facility, and that is what I used to determine the "community" of a facility, as it relates to the Census data. From the Census data, I was most curious about three things: their ages, income, and ethnic makeup. The second dataset was one that I generated using Google Maps' API, which is compatible with RStudio. Google Places, a subset of the Google Maps API, has preset location types for most of their locations, so I determined my location categories based off of that. After that, I used the Google Maps API to generate the coordinates of each of those types within a 20 mile radius of all 98 facilities that report to subpart UU and subpart RR.

## Conclusion

Based on the Census and Google Maps data collected, carbon injection facilities do not seem to be disproportionately located in marginalized areas. However, considering past accidents, it is crucial for regulators to enforce strict adherence to safety regulations to protect communities. CCUS projects pose different threats to low and high population areas. In lowly populated areas, emergency services may not be robust enough to protect residents in the case of a leak or accident. In highly populated areas, a larger number of residents means a larger number of people who can be adversely affected by any accidents. Moving forward, ensuring both proper regulation and emergency preparedness must be a top priority to safeguard public health and safety.