2024 SPE Datathon

Analyzing Incentives for CCUS Projects Toward a Net Zero World

Presented by Titan Group

September-October 2024

Problem Statement

CO2 Emission

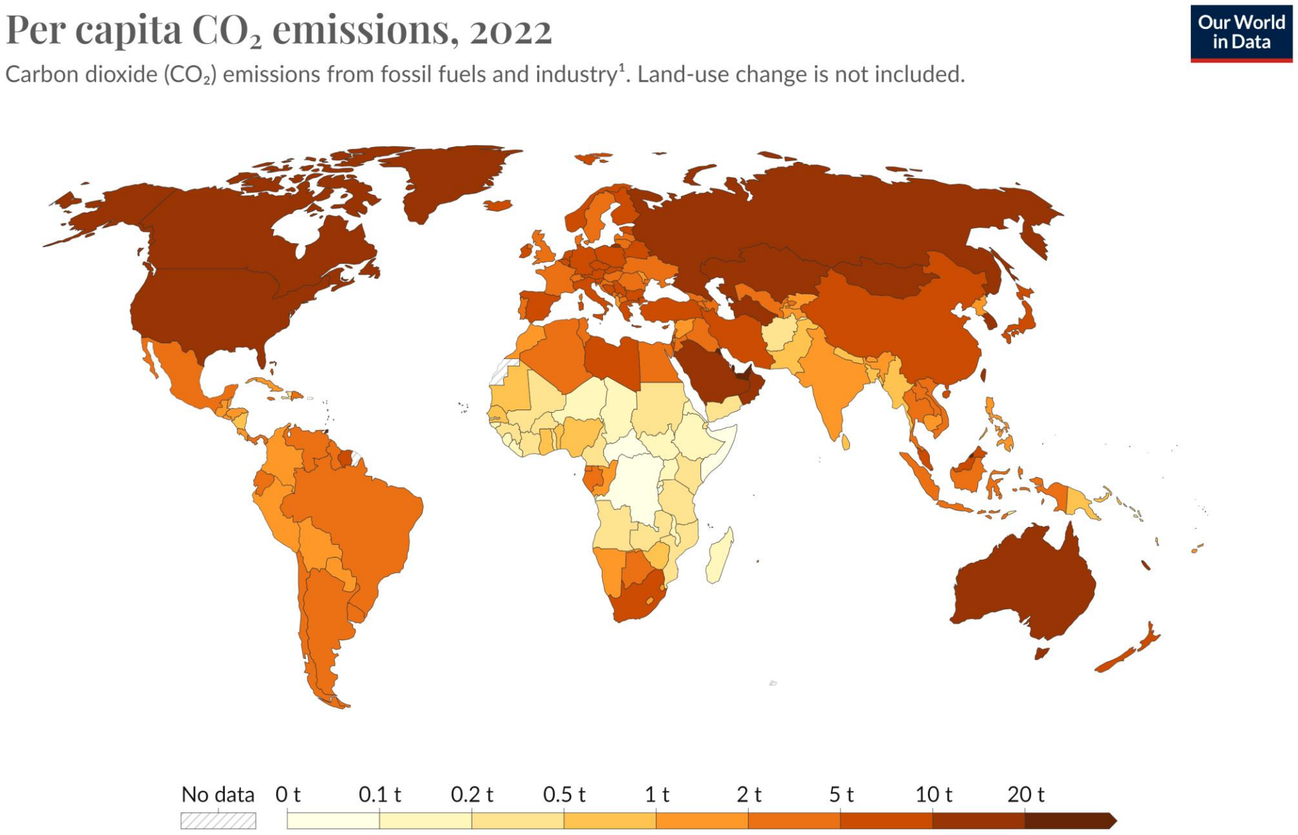
Global Warming

wildfires

ice melting

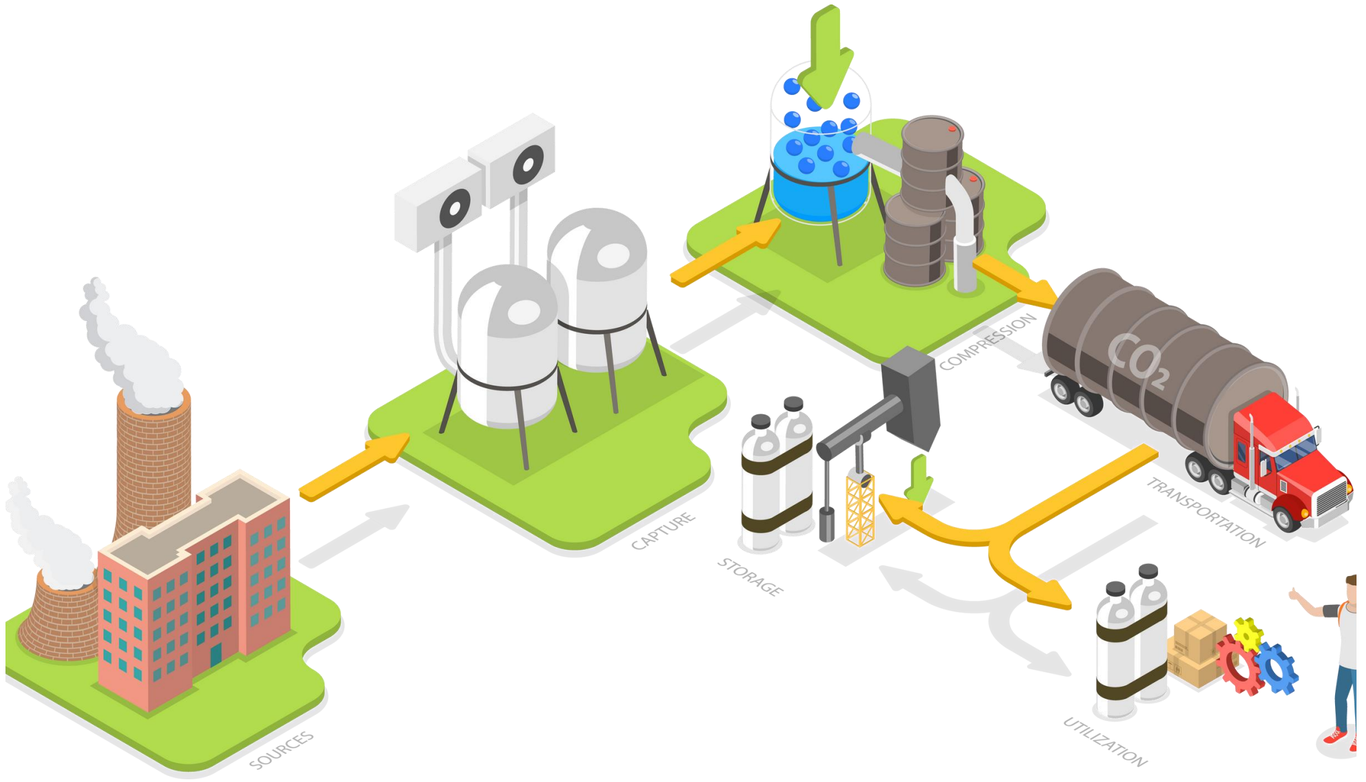
ocean acidification

Global CO2 Emission Heat Map



Project Aim

- Analyze the factors influencing the growth and success of CCUS projects
- Energy Demand by 2050 and feasibility of CCUS projects in the future



Project Progress

Data Collection

- Used 10 datasets from SPE dataset list
- Added Renewable Energy and CO2 Emission datasets

Data Analysis

- CO2 Emission
- Carbon Markets and Credits
- Renewable Energy and CCUS project globally

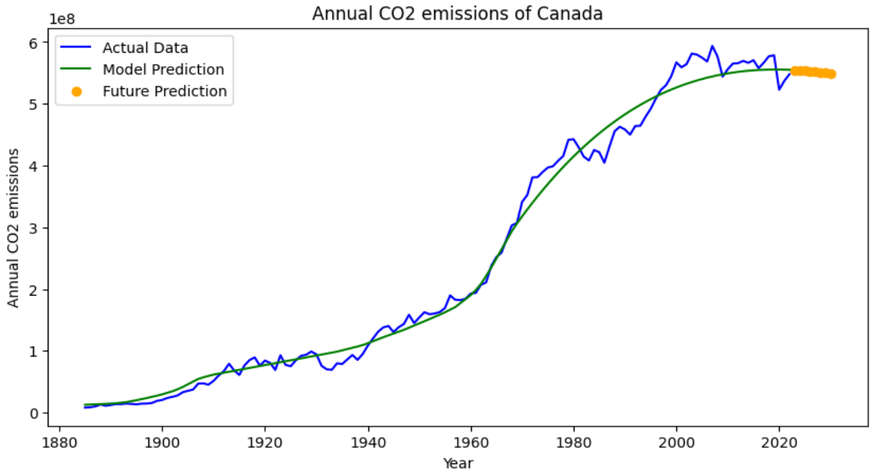
Applying ML Models

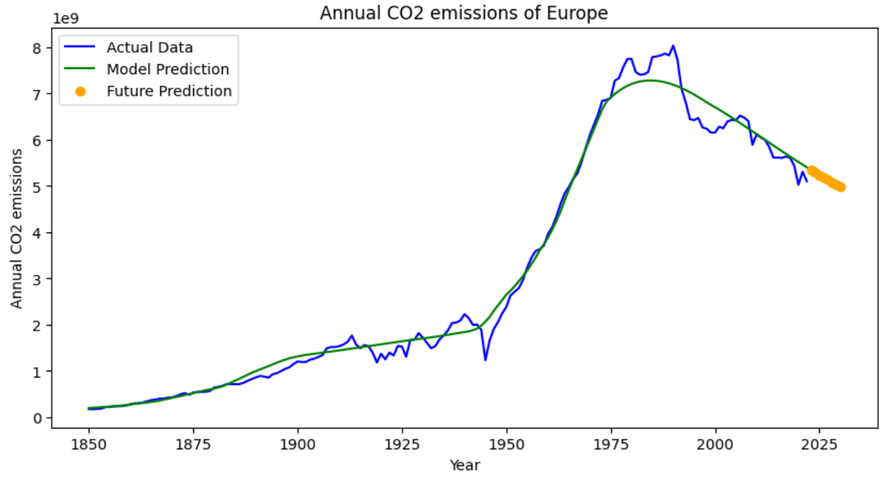
- LSTM models
- ARIMA
- Linear Regression

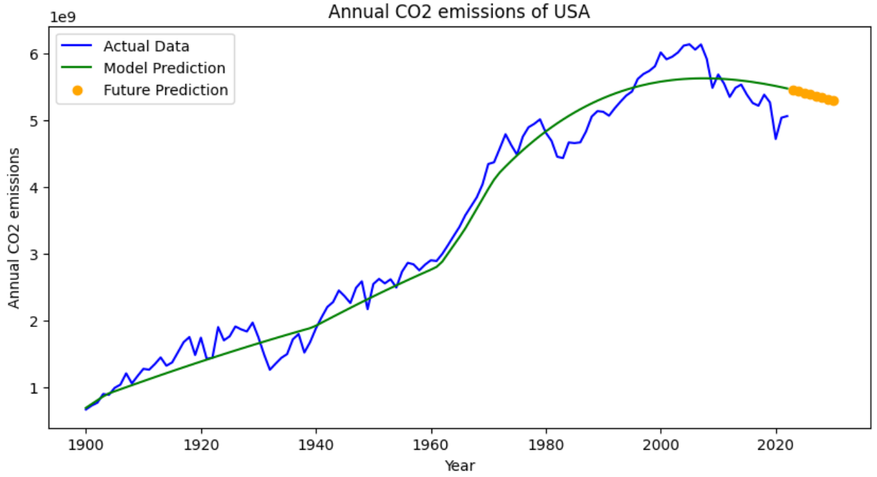
Prediction Analysis

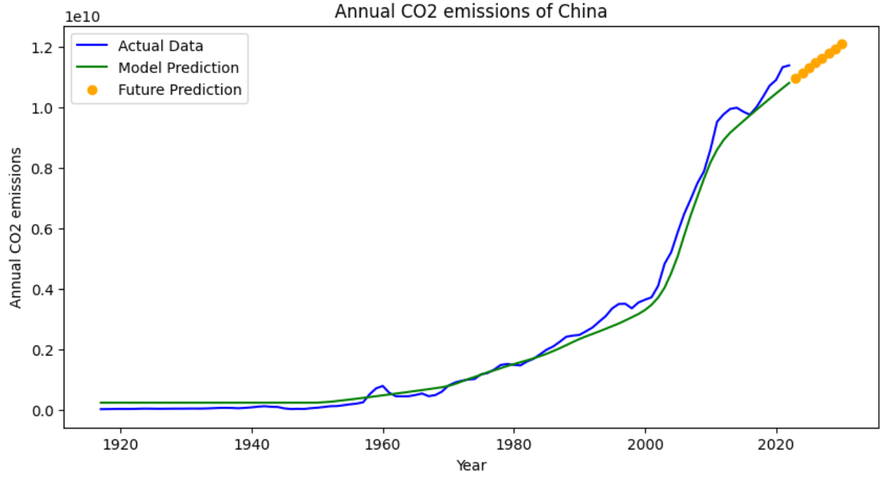
- Pearson Correlation
- Time Series prediction

Annual CO2 Emission Prediction

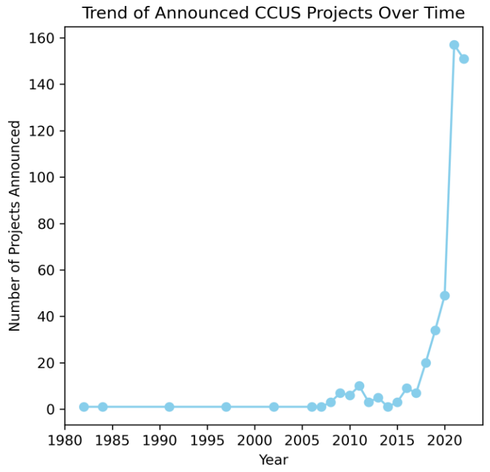


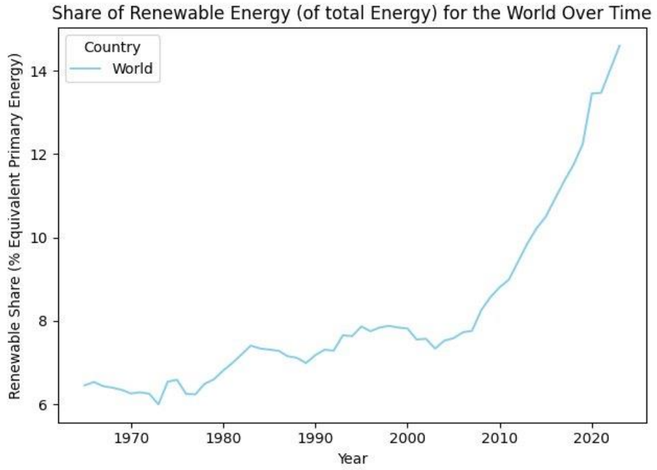


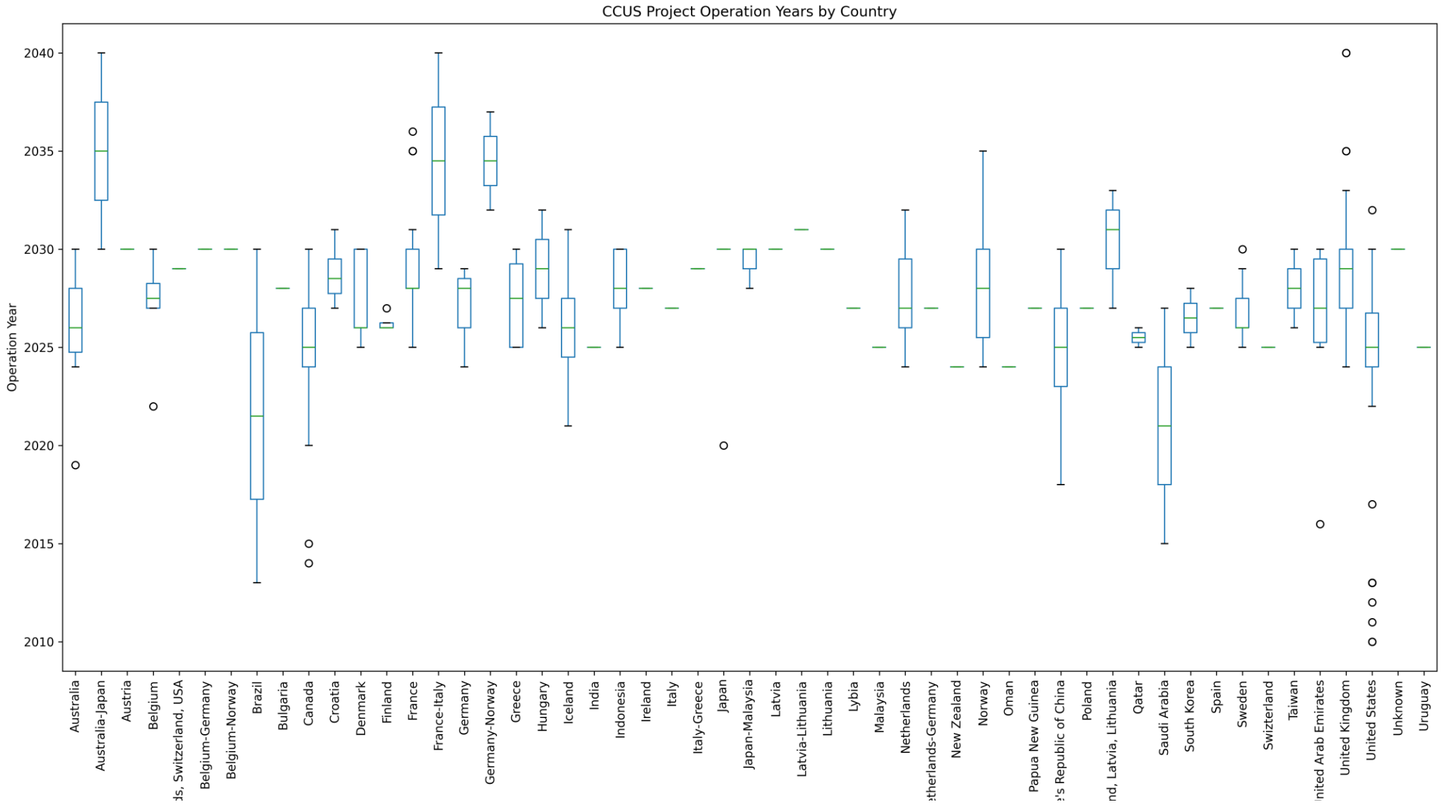




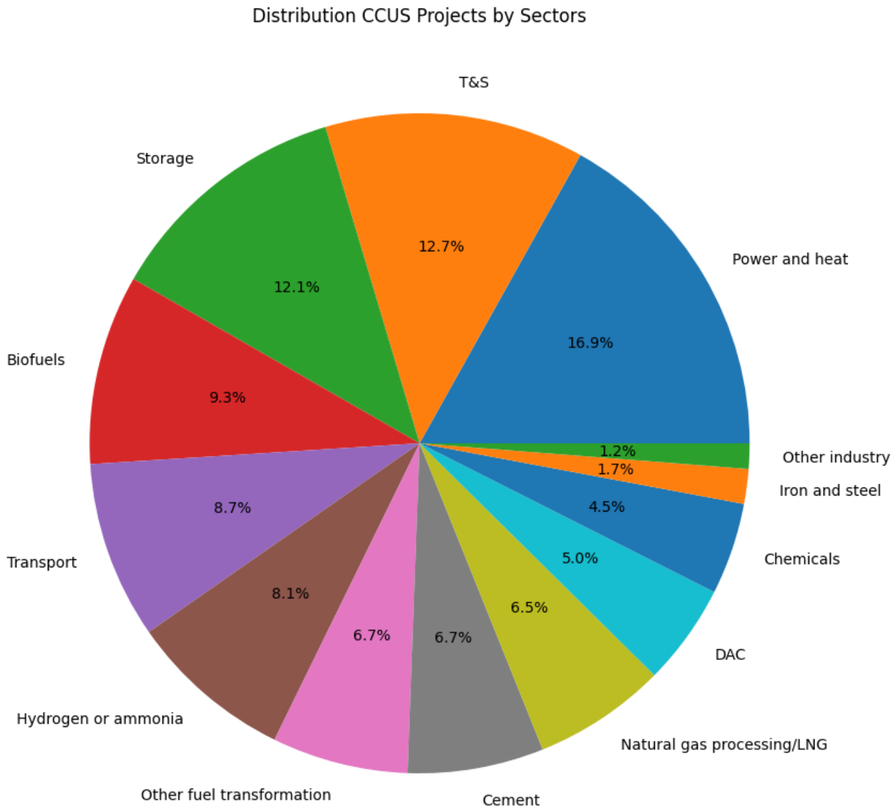
Trend of CCUS and Renewable Projects Globally

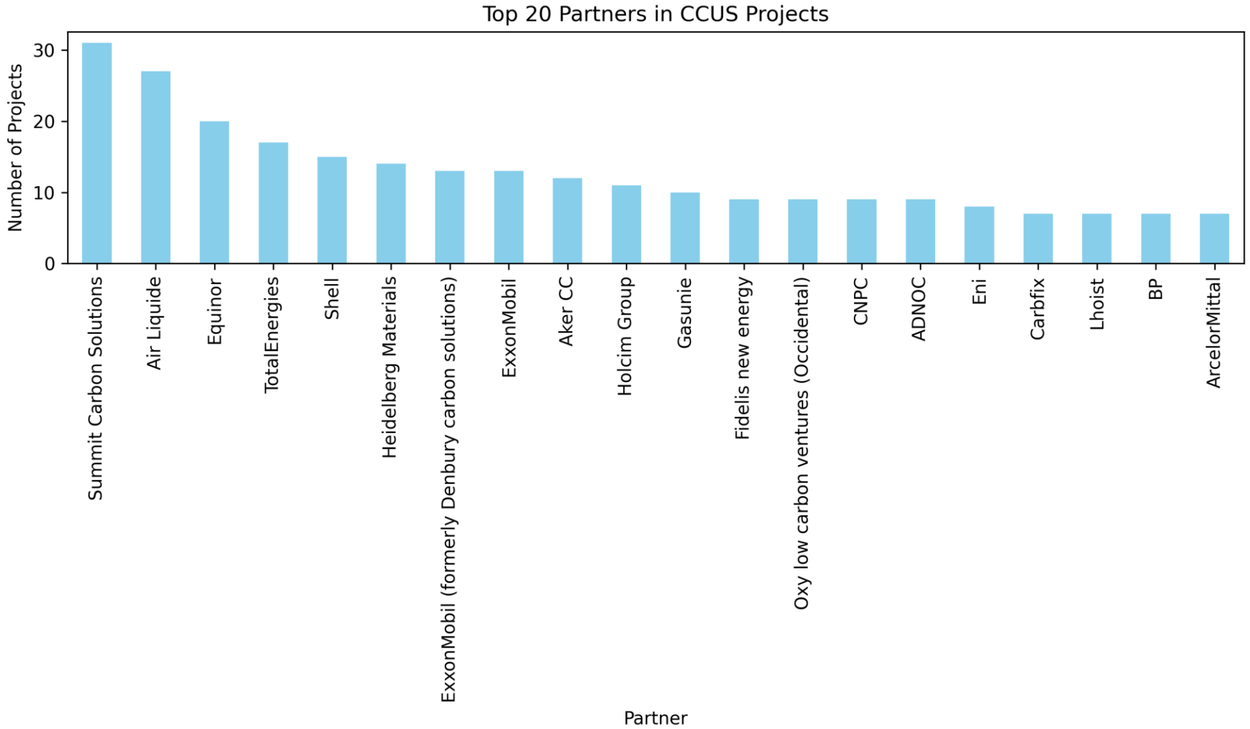




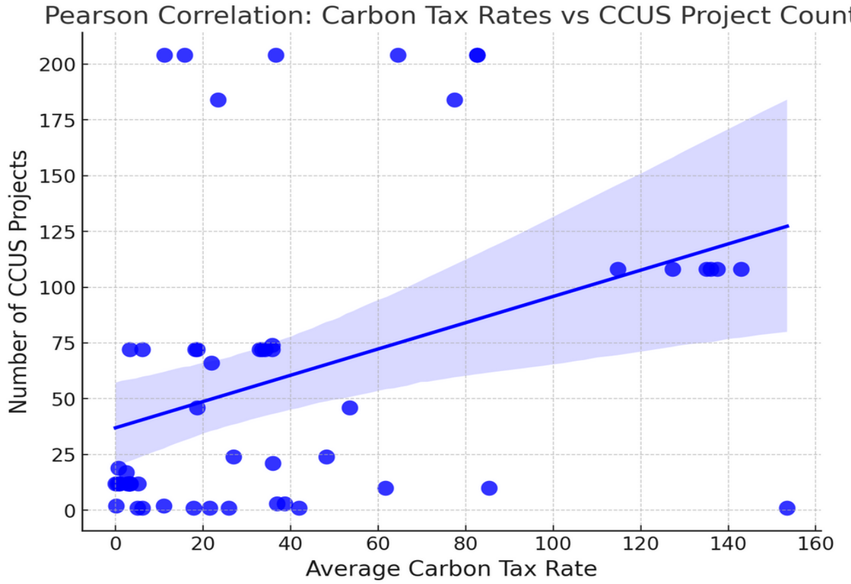


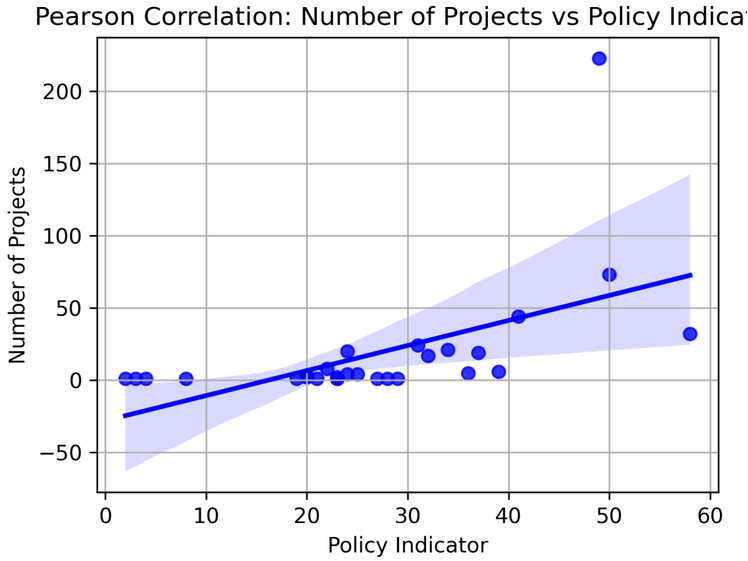
CCUS Partners and Project Types

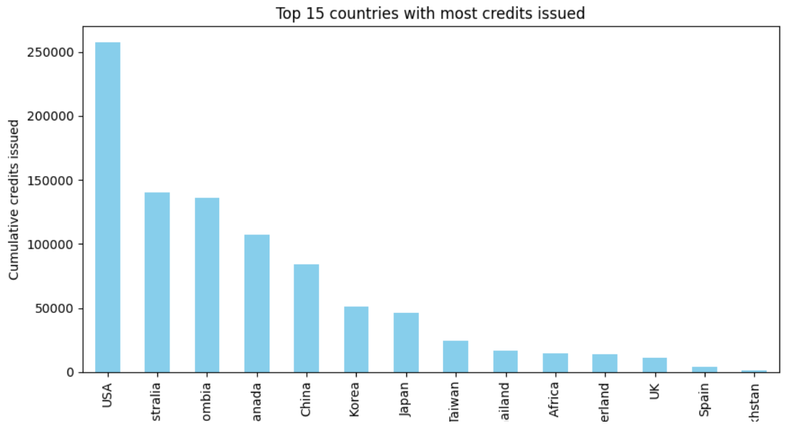


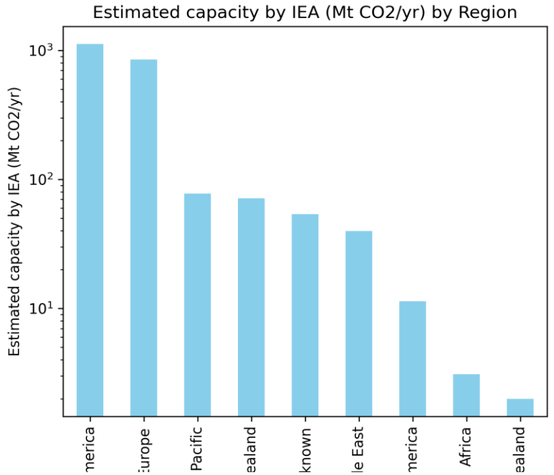


CCUS Projects Incentives









The Rise of CCUS Projects (2019–2021)

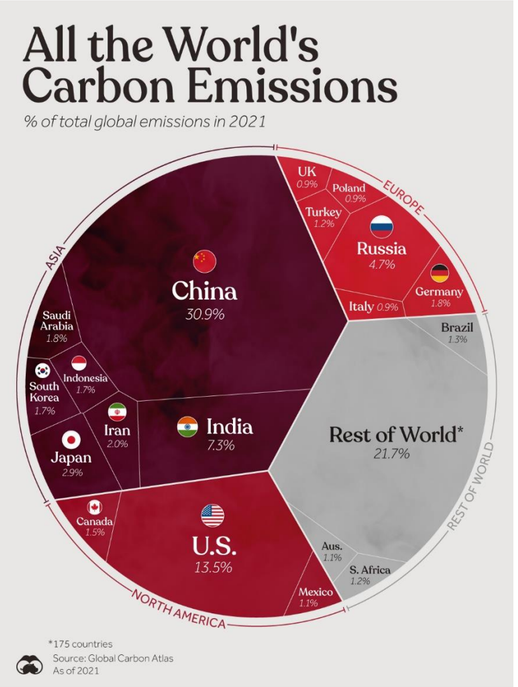
- Global net-zero commitments gained significant momentum around 2020, as many nations aimed to align with the Paris Agreement to limit global warming. The European Union adopted the European Green Deal in 2020, targeting climate neutrality by 2050, with a focus on decarbonizing sectors like energy and industry. Similarly, the UK launched its *Net Zero Strategy* in 2021, which builds on previous policies such as the *Ten Point Plan* for a green industrial revolution. The strategy includes substantial investments in green technology and aims to create thousands of jobs while cutting emissions across various sectors.

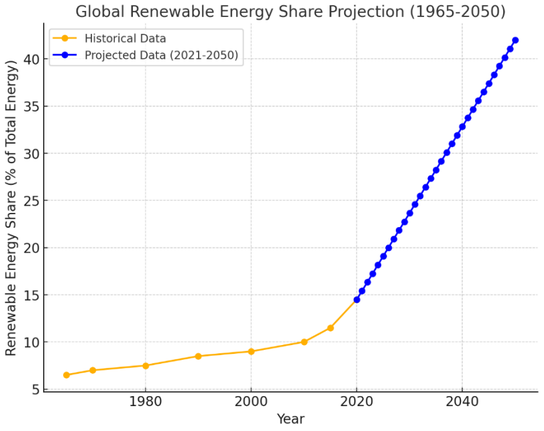
- In the U.S., President Biden's administration spurred investments in carbon capture, utilization, and storage (CCUS) through expansions of the 45Q tax credit. Biden also proposed a $2 trillion clean energy plan, focusing on boosting industries like electric vehicles and sustainable energy. Meanwhile, Canada took a legal approach, passing the *Net-Zero Emissions Accountability Act* in June 2021, which binds the country to specific climate goals. Norway, taking a more aggressive approach, set a target to achieve net-zero emissions by 2030.

- Technologically, advancements in renewable energy, battery storage, and CCUS have been critical, though no single breakthrough around 2020 radically changed the trajectory. Instead, it has been the cumulative effect of policy support, technological improvement, and financial incentives driving the transition.

Recommendation

- Carbon Tax is not enough toward Net Zero World
- Importance of Regulations, especially Global Regulations
- Individual Country Regulations vs Global Regulations
- Renewable Energy in combination with CCUS projects
- Better Carbon Credit Systems





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- Our World in Data: Per capita CO_2 emissions
- Data on CO2 and greenhouse gas emissions by Our World in Data
- Renewable Energy World Wide : 1965~2022: link
- World Carbon Pricing Database
- Public profit and emission database
- Global CCS Institute Facilities Report
- CO_2 emissions dataset (from Our World in Data): link
- UK The 2021 Net Zero Strategy targeted a net-zero by 2050 https://www.gov.uk/government/publications/net-zero-strategy
- Canada The Canadian Net-Zero Emissions Accountability Act, which became law in June 2021 https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html
- European Green Deal is approved in 2020 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

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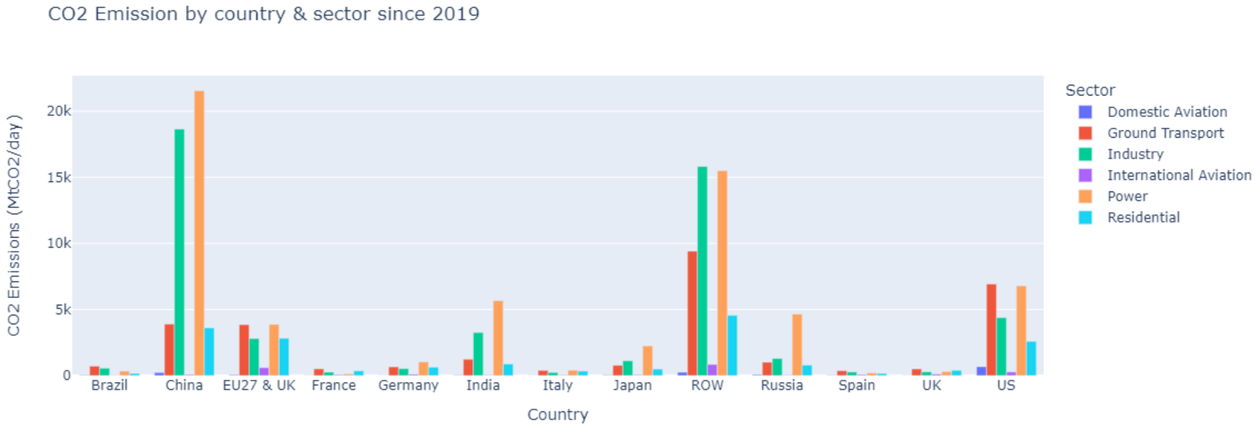
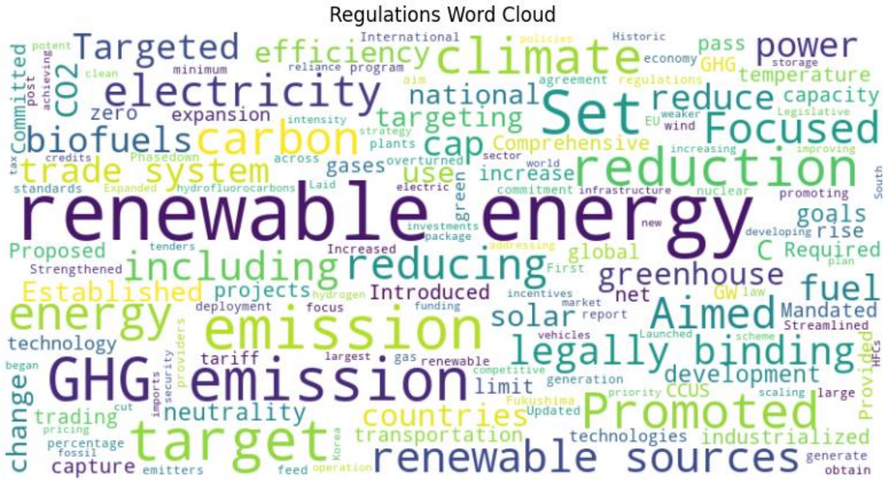
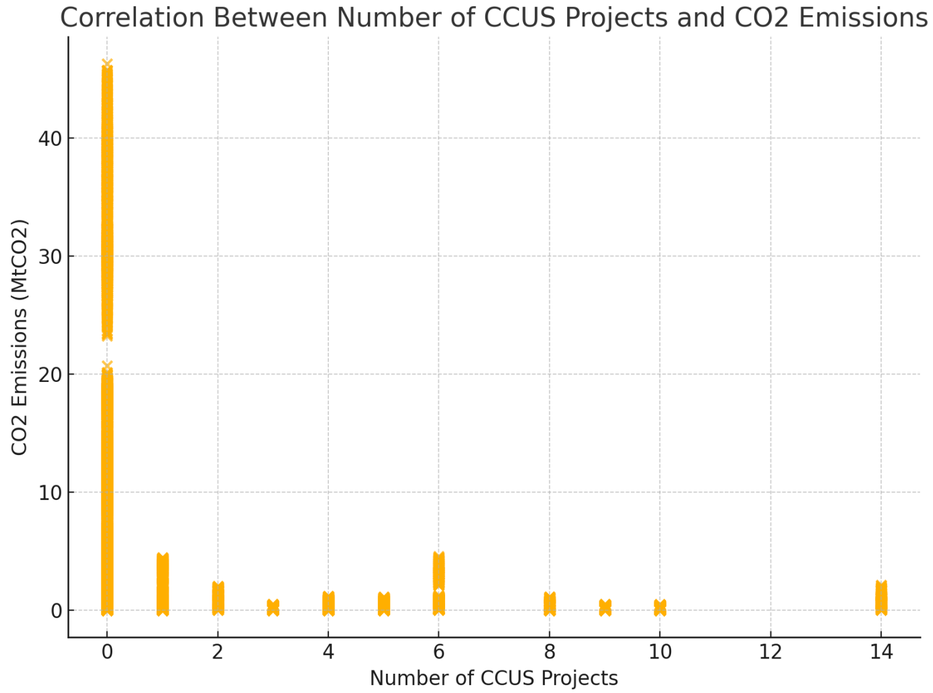
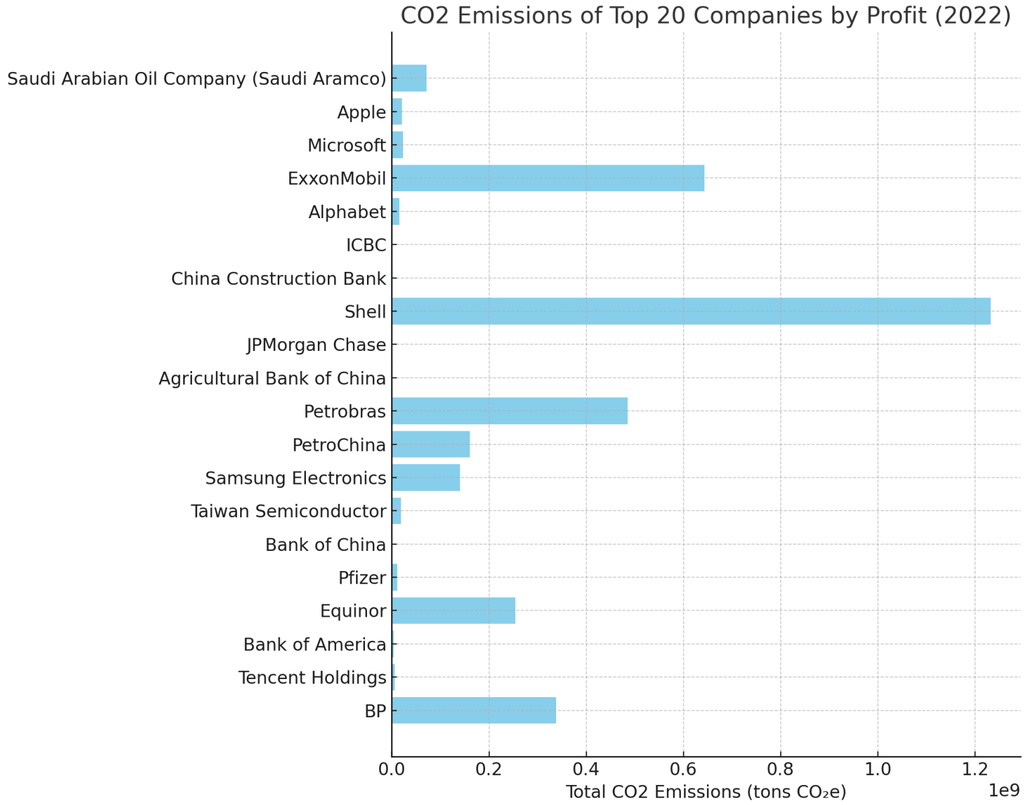
Further Analyses







Further Analyses

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