

Carbon Capture & Storage: The Band-Aid of Climate Change

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Climate Change Consequences

Global climate has changed in the past, but there's abundant evidence that humans are the dominant forcing and that we've pushed our atmospheric carbon dioxide levels higher than in past natural cycles. Warming from greenhouse gases has the potential for devastating impacts that will affect everyone. Climate influences local and regional weather patterns, storm systems, sea level rise, ice sheet melting, global food security, economies, forest fires, human communities, biodiversity loss, and more [1].

Action on Climate Change

Due to variations in geographic patterns, some places are expected to warm more than others, see more extreme weather events, and see higher rises in sea level [1]. Climate policies are needed now more than ever to reduce the negative impacts that warming will have on myriad communities, such as droughts, extreme hurricanes & wildfires, crop losses, and economic crises that may come from lack of climate action and continued CO₂ emissions.

Carbon Capture and Storage

Carbon Capture and Storage (CCS) is a potential option for aiding in the reduction of global emissions. CCs takes CO₂ out of the air and either stores it back into the ground or ocean, or it reuses the carbon. By placing CCS with existing or new power plants, this could reduce their emissions without eliminating the use of fossil fuels. It is a great temporary solution while the search for renewable energy sources continues.

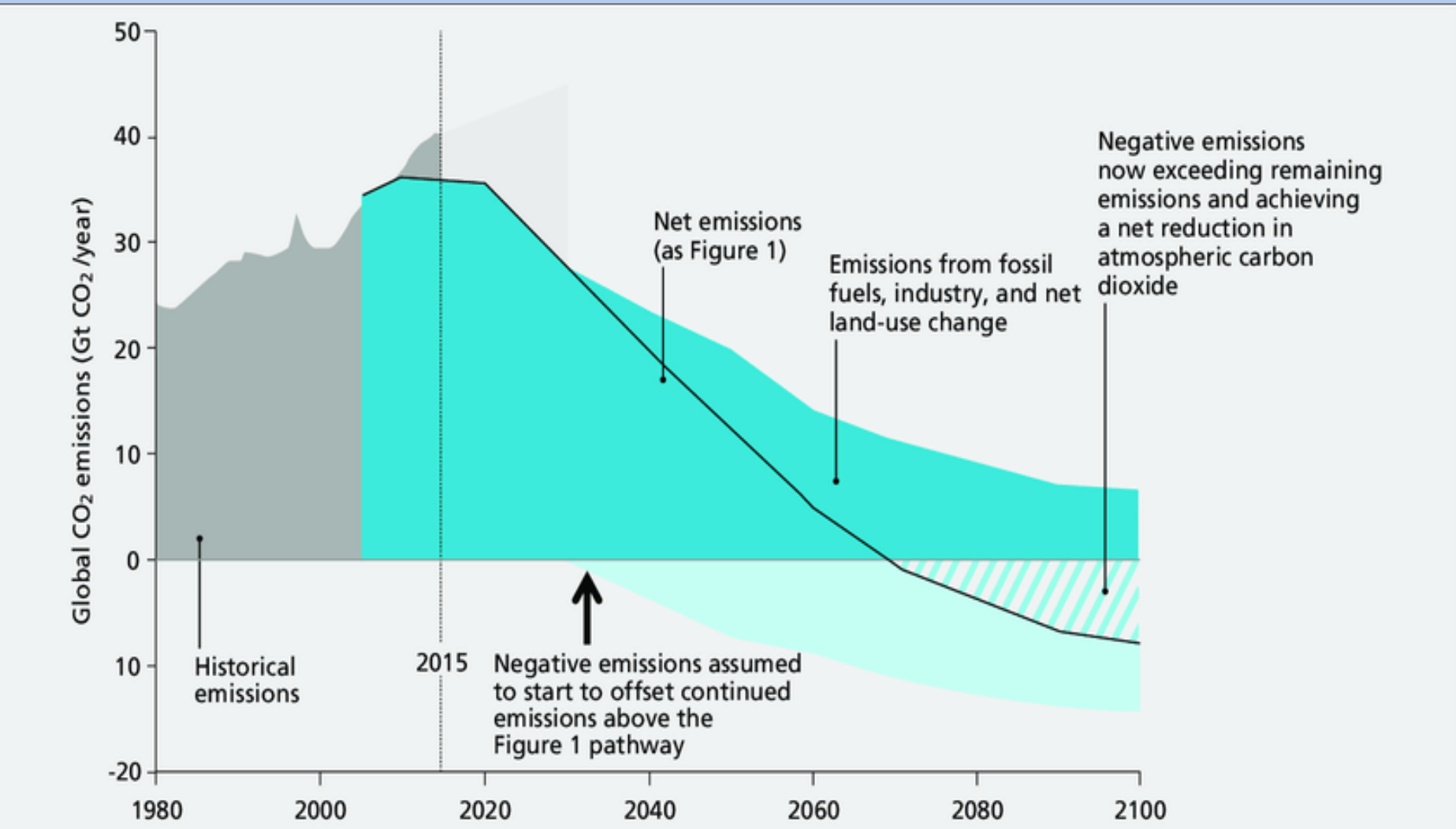


Figure 1. CO₂ emissions trajectories once carbon dioxide removal strategies are included in mitigation efforts, allowing for emissions to continue while keeping on track with IPCC budget & 1.5°C Paris Agreement [5].

Technological Feasibility

- Most CCS technology = enhanced oil recovery (EOR) since the 1970s
- CCS in power plants is not a widely available technique because it's a newer option with many uncertainties and few plants are equipped with it.
- Average coal plant paired with CCS would increase electricity generated by 40-70% & reduce CO₂ emissions by 85% [1].
- Implementation cost can range due to operating & maintenance costs, energy requirements, available funding, power plant type, and storage option [2].

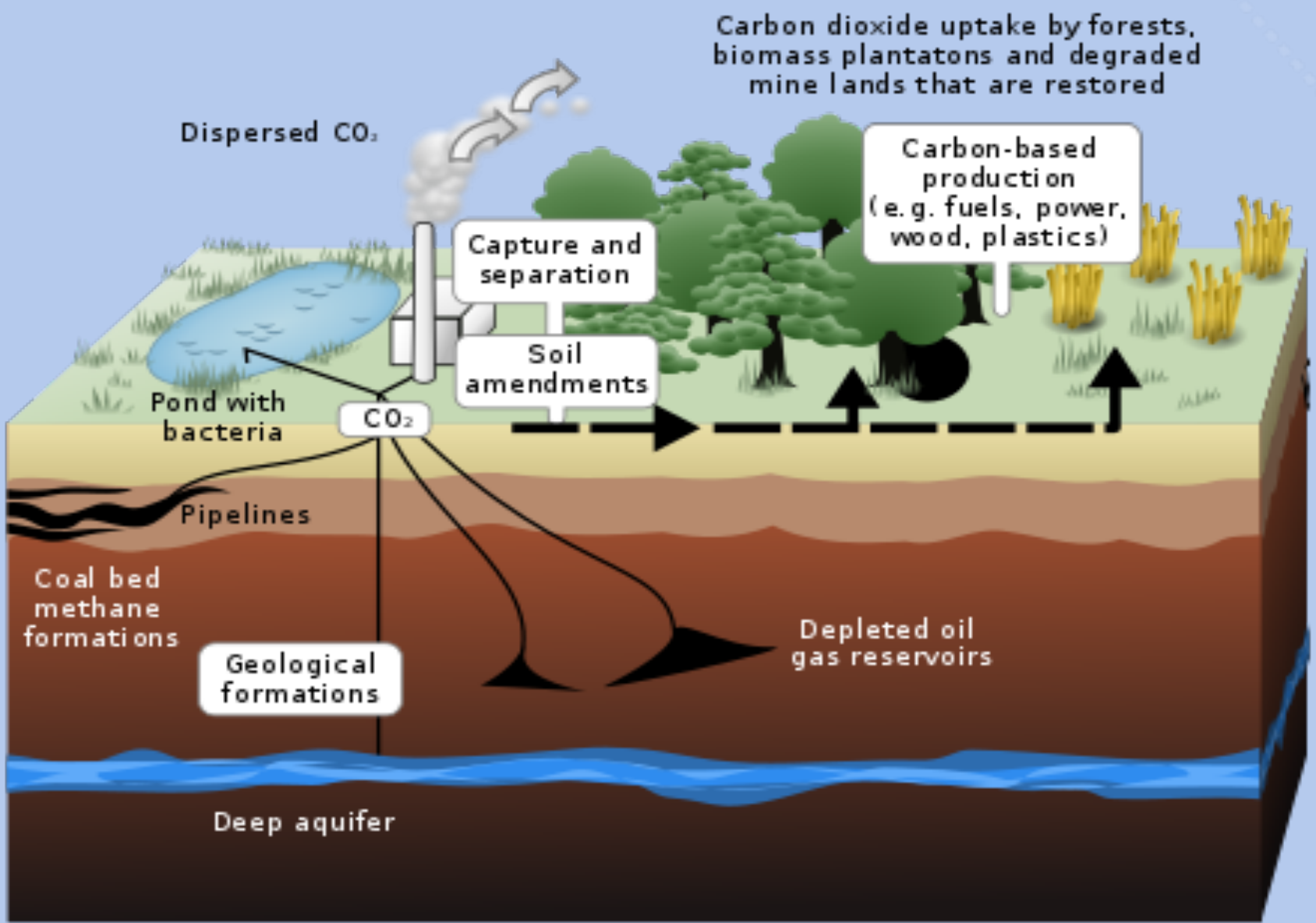


Figure 2. Carbon Capture and Storage takes the CO₂ from factories and takes the CO₂ and places it in natural reservoirs pictured above.

Stakeholders

- Electric, utilities, oil/gas companies, CO₂-intensive industries, and non-governmental organizations [3].
 - CCS provides economic benefits across many sectors including fossil fuel & infrastructure.
 - Provides jobs in manufacturing, production of CCS, CO₂ storage, EOR, bio-refining, and more [4].
- Developed & developing countries (U.S., Europe, China, African countries, etc.)
 - CCS provides a way to reduce CO₂ emissions while developing cleaner & more eco-friendly energy.
- Politicians, economists, environmental scientists, regular citizens, plants, animals because they're also affected by environmental & CO₂ changes

Conclusions and Recommendations

Carbon Capture and Storage should be considered when discussing climate change. CCS is one of the few options that doesn't require society to give up fossil fuels completely, and it also is one of the few that takes existing CO₂ out of the air. Although it offers many benefits, CCS cannot be the only solution to climate change due to its need for further research and that it prevents climate change but doesn't provide a long-term solution.

Examples of Implementation

In 1972, one of the first CCS was implemented in the US in Texas that transported CO₂ from Terrell gas processing plant to oil fields in West Texas [6]. Since then more than 21 plants have been implemented across the world, including Abu Dhabi (2015), Canada (2015), Saudi Arabia (2015), Brazil (2013) and Norway (1996) [6].

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