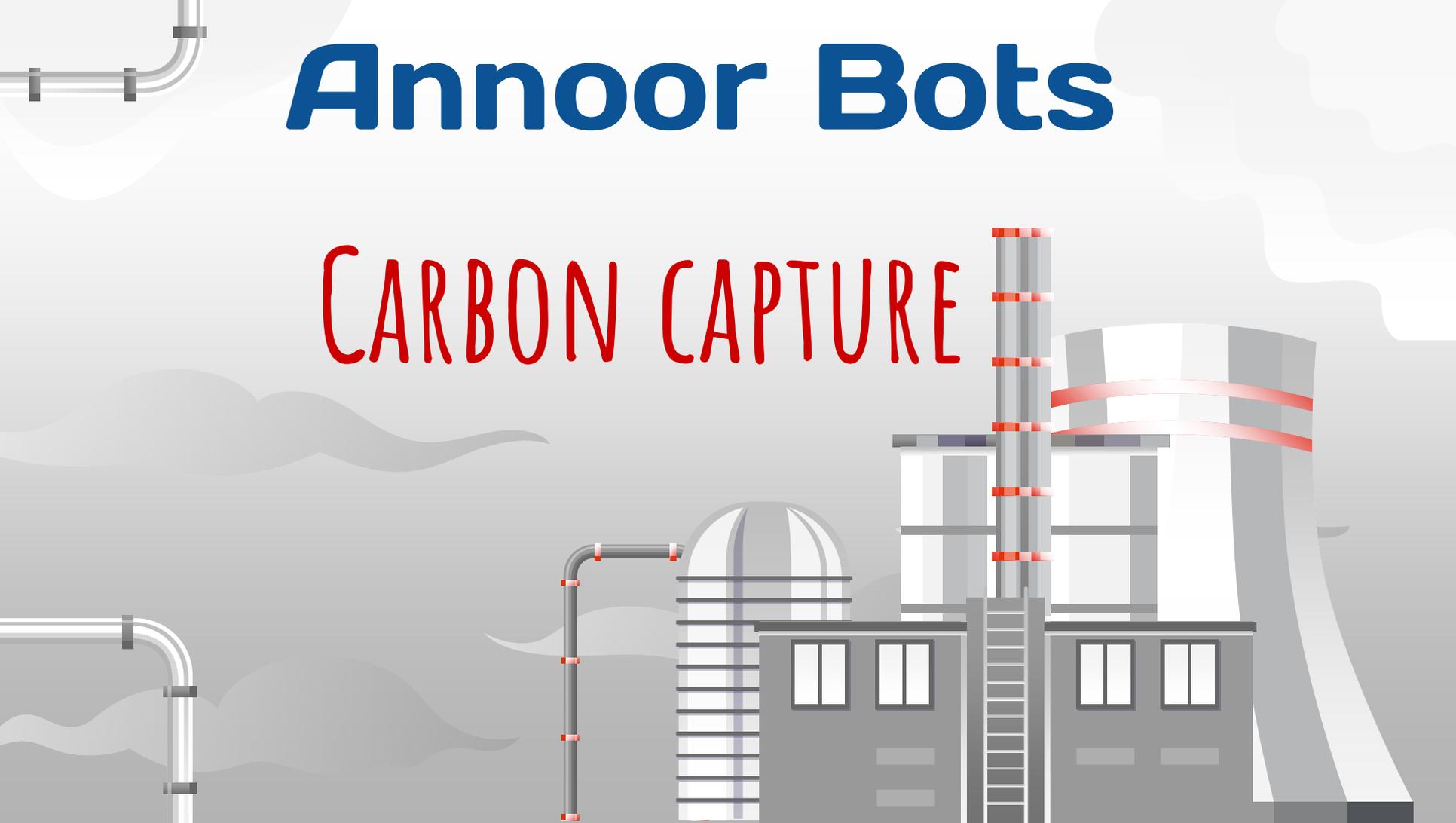


Annoor Bots

CARBON CAPTURE



Background

How did we decide on this topic ?

- *Everyone on the team did a research on yellow and orange energy, then during the team discussion everyone shared their ideas of how can we capture carbon dioxide from the air.*
- *We figured out that there is tech that capture carbon dioxide and make good use of it.*

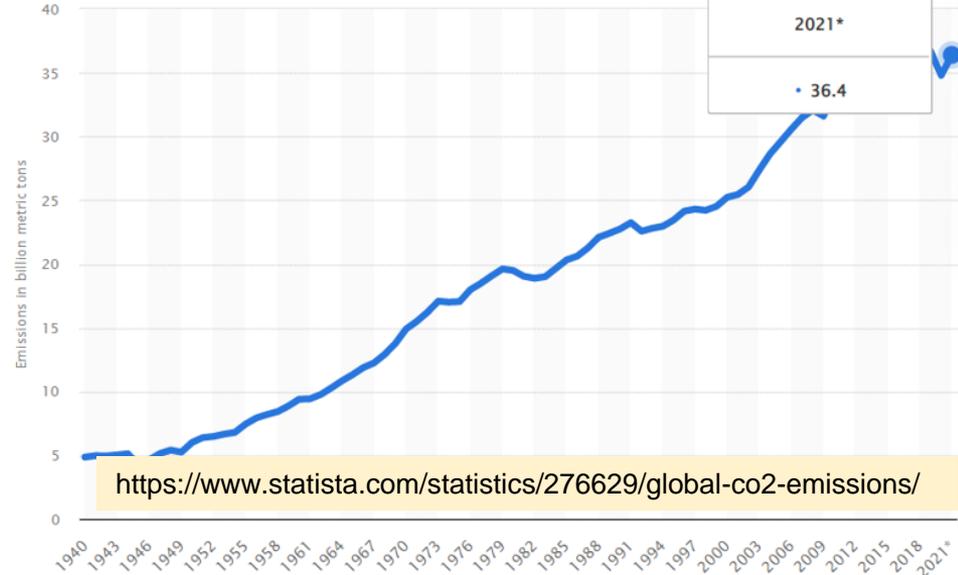


CO2 Produced

- Cars release 348 grams per mile
- In 2021, 36.4 Billion tons of CO2 was produce worldwide.

Annual CO2 emissions worldwide from 1940 to 2020
(in billion metric tons)

Zoomable Statistic: Select the range in the chart you want to zoom in on.

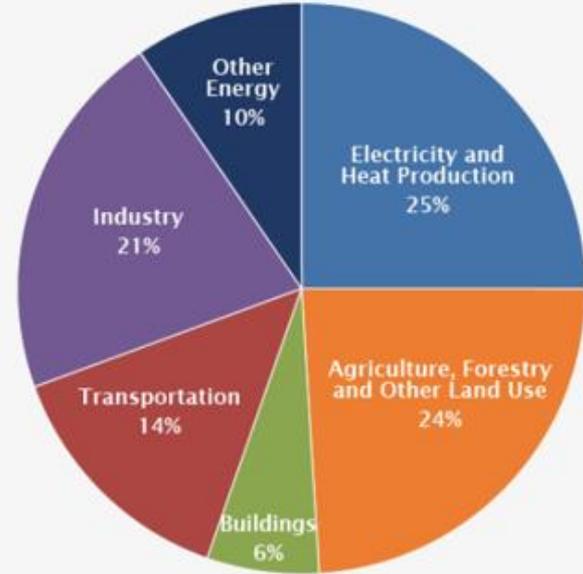


Background (cont.)

Since 1970, CO₂ emissions have increased by about 90%, with emissions from **fossil fuel combustion and industrial processes** contributing about 78% of the total greenhouse gas emissions increase from 1970 to 2011.

Agriculture, deforestation, and other land-use changes have been the second-largest contributors [EPA]

Global Greenhouse Gas Emissions by Economic Sector



Global Greenhouse Gas Emissions Data | US EPA

[Visit](#)

Pollutions from Industrial Processes



Problem Analysis

Studies have estimated an average American's carbon footprint at around 16 tons of CO₂ annually.

A single mature tree, meanwhile, may take in about 50 pounds of carbon dioxide per year.¹ At this rate, **it would take 640 trees per person** to account for all American emissions, which adds up to **more than 200 billion trees**. A recent study estimated there are about 3 trillion trees on Earth right now.

As part of the planet's natural carbon cycle, carbon sinks such as the forests and oceans absorb an enormous amount of naturally emitted CO₂ as well as much of what humans create.

Humanity's emissions have tipped that natural cycle out of balance.

We need more ways to capture CO₂ from the atmosphere.

Carbon dioxide capture background

Most trees that capture Co2:

- Birch
- Sitka
- Spruce
- Scots

The trees absorb 25 kg of co2 per year

Technology that capture co2

- Breakthrough technology turns coal plant CO2 into baking powder
- <https://inhabitat.com/breakthrough-technology-turns-coal-plant-co2-into-baking-soda/capture> (DAC)
- SHELL CANSOLV® CO₂ CAPTURE SYSTEM

Carbon Capture Technologies

SHELL CANSOLV® CO₂ CAPTURE SYSTEM



Shell Catalysts & Technologies has developed a CO₂ capture technology utilising a regenerable amine that offers cutting-edge performance, including low parasitic energy consumption, fast kinetics and extremely low volatility. The technology allows for the capture of CO₂ from flue gas. The CO₂ is then delivered to the client for eventual sequestration or sale into the EOR and commodity markets.

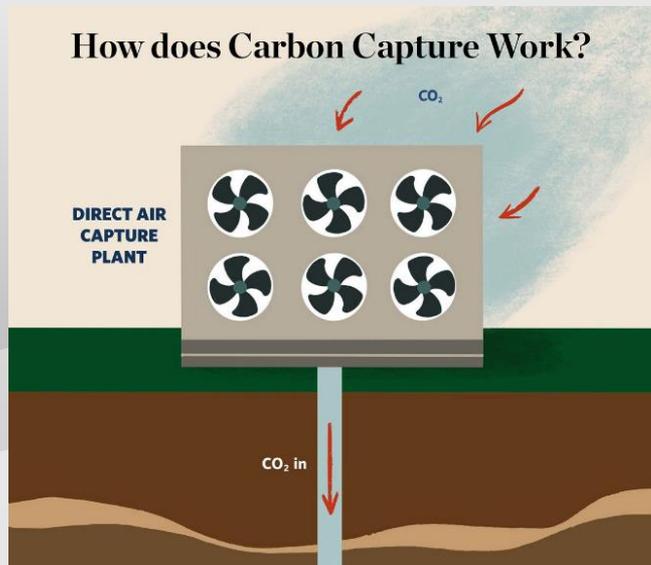
BREAKTHROUGH TECHNOLOGY TURNS COAL PLANT CO₂ INTO BAKING POWDER



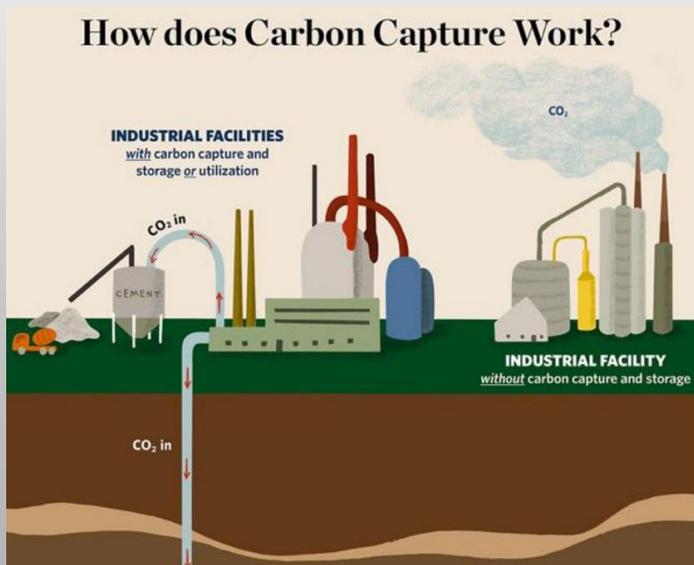
CO₂ is captured from the boiler and used to make soda ash (sodium carbonate) which is the very same stuff housed in any baker's pantry.

HOW CARBON CAPTURE WORKS

CARBON CAPTURED One way of capturing carbon dioxide is by pulling CO₂ from the air, concentrating it into a liquid, transporting it, and pumping it into deep underground formations.



CARBON CAPTURE 101 Some industries can capture CO₂ by storing or using it for their manufacturing process. Facilities that can't capture, store or use that CO₂ are emitting climate-changing gas.



The CO₂ is concentrated into a liquid, transported to a suitable site for storage, and pumped deep underground into a porous geologic formation such as deep saline formation consisting of a porous layer of rock filled with salty water, which keeps the CO₂ trapped underground permanently.

OUR INNOVATIVE SOLUTIONS

Promote the Following

1. The government plants at least 100 trees on behalf of by every American from their taxes.
2. The government encourage and promote the use of more renewable energy like **solar** and **wind** and **Hydro** with subsidies.

Design the Following

1. Sustainable Lamps for every home powered by Algae to help Capture CO₂ from the atmosphere
2. Design a **CO₂ capture system for every home**. The captured CO₂ will be stored and used in products such as baking powder, concrete or liquid fuels.

OUR INNOVATIVE SOLUTIONS

An Algae Street Light Design



Photosynthesis is the process by which organisms use sunlight to convert carbon dioxide and water into oxygen and sugars, which organisms use for energy. Effectively, photosynthesis allows the algae to store light energy in a form of chemical energy that they can use – or that ingenious scientists can convert to electricity.

A small lamp that requires you to breathe into the algae container to provide them with carbon dioxide

<https://sustainable-nano.com/2015/03/03/algae-lamps/>

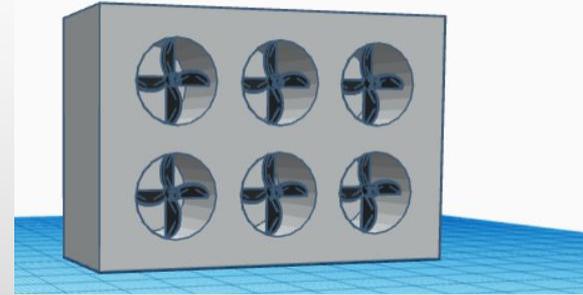
OUR INNOVATIVE SOLUTIONS

Designing CO2 Capture System For Every Home

Direct Air Capture systems use fans to move air through the machine, where chemical solvents selectively trap the CO2 and allow other components of air to pass through.

Most systems use liquid solvents or solid sorbents, which are composed of common chemicals. Once carbon dioxide is captured from the atmosphere, heat is typically applied to release it from the solvent or sorbent. Doing so regenerates the solvent or sorbent for another capture cycle.

Other systems in development use electrochemical processes, which could reduce energy needs and costs.



The captured CO2 can then be injected deep underground for sequestration in certain geologic formations or used in various products and applications.

COSTS & MANUFACTURING

Cost for a home unit ~ \$1,500-\$3,500

We plan on doing more research on the cost and manufacturing.

SHARING

Our school and community through our Robotics website: <https://annoorrobotics.com/>

References

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Our Team

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2. AbuBakr M. A. Yasein - 7th Grade
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4. HafsaH Nayab - 5th Grade
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7. Maryam Khan - 4th Grade
8. Zayd Abbasi - 4th Grade

A stylized illustration of a factory. On the left, a large cooling tower with a red and white striped top is emitting a thick plume of white steam. In the center, a tall, grey smokestack with a red top is connected to a building with a grid-like roof. To the right, another tall, grey smokestack with a red top stands next to another building with a grid-like roof. The buildings have several windows. In the foreground, there are pipes and a red structure. The background is a light grey gradient with soft, grey smoke clouds.

Thanks!

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