

# Carbon Capture & Storage (CCS)

Industry Report

Prepared by

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## A word from the chairman:

Carbon Capture & Storage (CCS) is largely considered as one of the most efficient and effective to fight global warming. At GPTECH, we are currently allocating significant investment and resources to develop CCS technologies.

Our carbon capture R&D project is inspired by what plants do, take in carbon dioxide and release oxygen, providing us with a renewable source of oxygen on the earth. We aim to develop carbon capture technologies to take CO<sub>2</sub> at the source and reuse and utilize it for better alternatives.

Our initial laboratory results are promising and move us one step closer to successful carbon utilization. We look forward to establishing strategic partnerships to accelerate and expand our project scope.

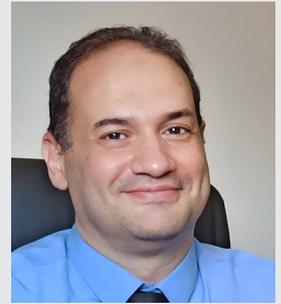


**Sherif Desouky, PhD**  
Executive Chairman, GP HOLDING



## Key Takeaways:

- Fast deployment of Carbon Capture & Storage (CCS) technologies are essential to ensure a swift transition to net-zero emissions in the future. Captured CO<sub>2</sub> can be utilized and reused to provide manufactured goods, materials and alternatives for fuel.
- Potential growth CCS means an increasing demand for more economical carbon capture plants. The global addressable CCS market is expected to have a market value totalling 5.6 billion U.S. dollars by 2026. with 35% projected growth per year.
- A preliminary study carried out by the GPTECH R&D team shows promising results of carbon capture and recovery and a unique opportunity to utilize and reuse it to produce alternative resources such as food and bioenergy.



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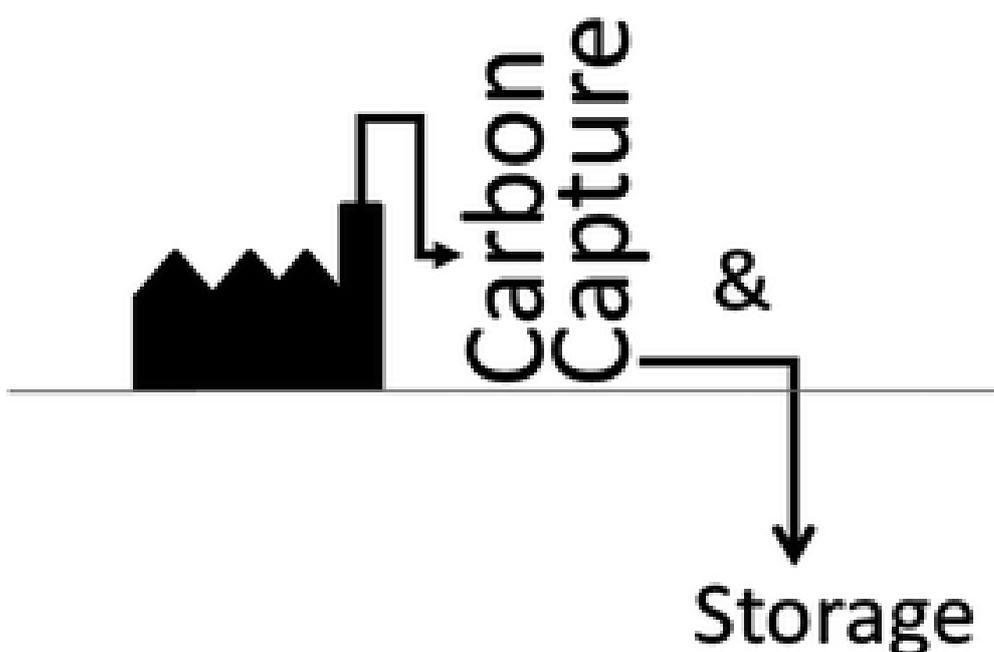
## Background:

- Scientists have calculated that industrialization has caused approximately 1.0°C of global warming above pre-industrial levels. A number will most likely reach 1.5°C between 2030 and 2052 if policymakers did not take the necessary policy steps and cut carbon emissions, which is one of the main reasons that cause global warming, by more than half in the specified period. If countries managed to reach net-zero emissions by mid-century, then we can limit global warming to 1.5°C. Otherwise, it can go up to 2°C and, as a result, increase Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth. Consequently, this will generate a disastrous impact on biodiversity and ecosystems.
- Since the 2015 Paris Climate Agreement, many countries have carried out several tight policies such as decarbonizing electricity generation, electrifying vehicles and maximizing energy efficiency in urban regions. While many of these countries managed to lower their carbon emissions and have developed new standards and regulations to ensure policy goals are met, we still have a long way ahead.

Source: [www.globalccsinstitute.com](http://www.globalccsinstitute.com)

## Carbon Capture & Storage (CCS) as a Solution:

- CCS is the process of capturing carbon dioxide (CO<sub>2</sub>) formed during power generation and industrial processes and storing it to avoid emitting it into the atmosphere. CCS technologies can be integrated with industrial facilities and capture almost all of the CO<sub>2</sub> they produce and consequently reduce CO<sub>2</sub> emissions. In some cases, instead of storing it underground, captured CO<sub>2</sub> can be utilized and reused to provide manufactured goods, materials and alternatives for fuel.
- According to the Global CCS Institute recent reports, a transition to net-zero emissions in the future will not happen without a fast deployment of CCS technologies. The amount of CO<sub>2</sub> that needs to be captured and stored by 2050 is 100 gigaton, and by the end of the century, between 350 and 1200 gigaton. Currently, only around 40 megatons of CO<sub>2</sub> are captured and stored annually.
- To meet the Paris Climate Agreement's goals through CCS technologies, countries are required to invest around USD9.7 trillion. Such investment amount requires a significant capital investment driven by a strong commitment from both the private and public sectors to build enough facilities capable of delivering these volumes. Moreover, an early strategic investment in CCS technologies will provide several economic benefits such as:
  - Generating and maintaining high-value-added jobs.
  - Boosting economic growth through new net-zero industries and innovation.
  - Enabling infrastructure reuse and avoiding shut-down costs.



# Market Share:

- The International Energy Agency (IEA) estimates that CCS must reduce emissions by 29 billion tonnes between 2017 and 2060 in the cement, iron, steel, and chemical sectors to achieve a climate outcome consistent with the Paris agreement. These sectors are responsible for about 70 per cent of CO2 emissions. Such potential growth and spread of CCS mean that there will be an increasing demand for more economical carbon capture plants that can operate at ever smaller scales without incurring a significant penalty for their smaller size.

- As illustrated in fig (1), the global CCS market is expected to have a market value totalling 5.6 billion U.S. dollars by 2026 under the momentum of initiatives undertaken by governments to reduce global greenhouse gas emissions.

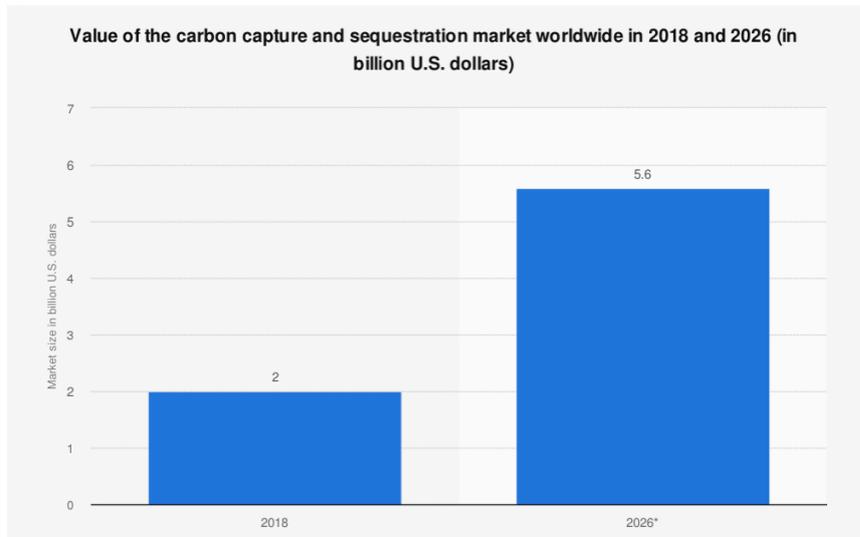


Fig (1): Global Market CCS Value in 2018 and 2026

- By 2040, as shown in fig(2), the addressable market of fuels is expected to be a USD 6 trillion market, biofuels is 400 billion, hydrogen is 1 trillion, chemicals are 4 trillion and carbon capture 2 trillion. Therefore, the projected growth per year regarding the carbon capture market is estimated to be 35%.

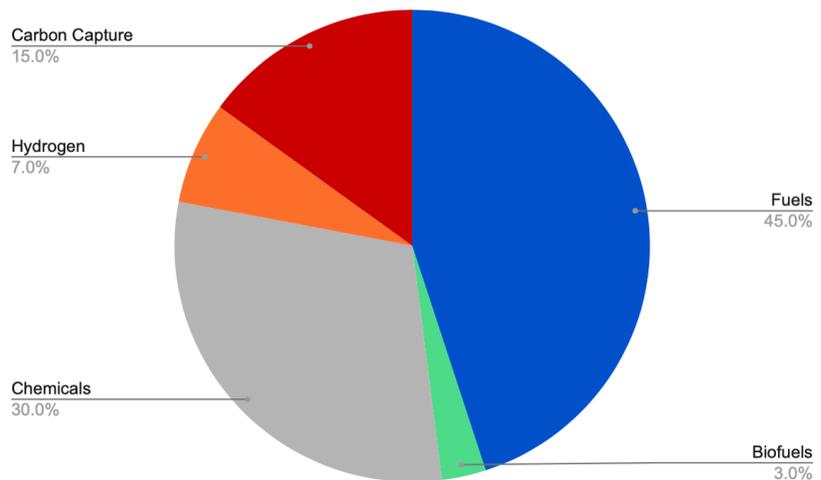


Fig (2): Global Addressable Market Fuels by 2040

Source: [www.statista.com](http://www.statista.com)

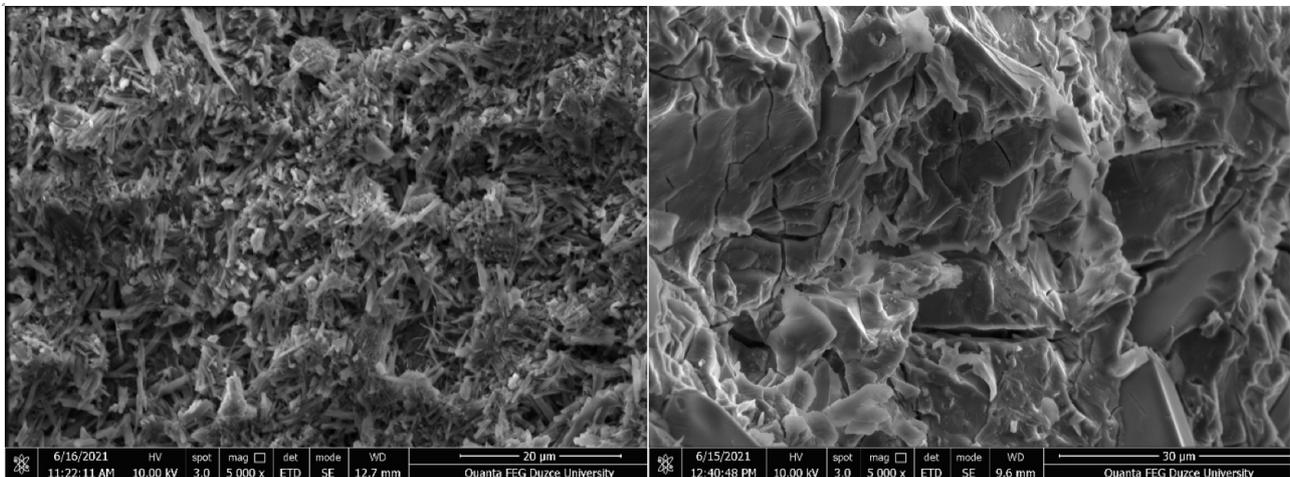
## GPTECH's Role :

At GPTECH, we are aware of the massive potential that CCS carries. Our R&D team worked on improving CCS effectiveness and efficiency through advanced analytical science tools. Our preliminary experimental study investigated the CO<sub>2</sub> storage properties through cation exchange using a new type of materials.

Experiments showed that the synthesized absorber material had different carbon capture properties from the air and atmosphere with high CO<sub>2</sub> content.

In addition, using special solvent systems produced in our laboratory during preliminary desorption experiments, we were able to recover Carbon in both organic and inorganic forms. The recovery percentage has reached up to 30% and 50%, respectively.

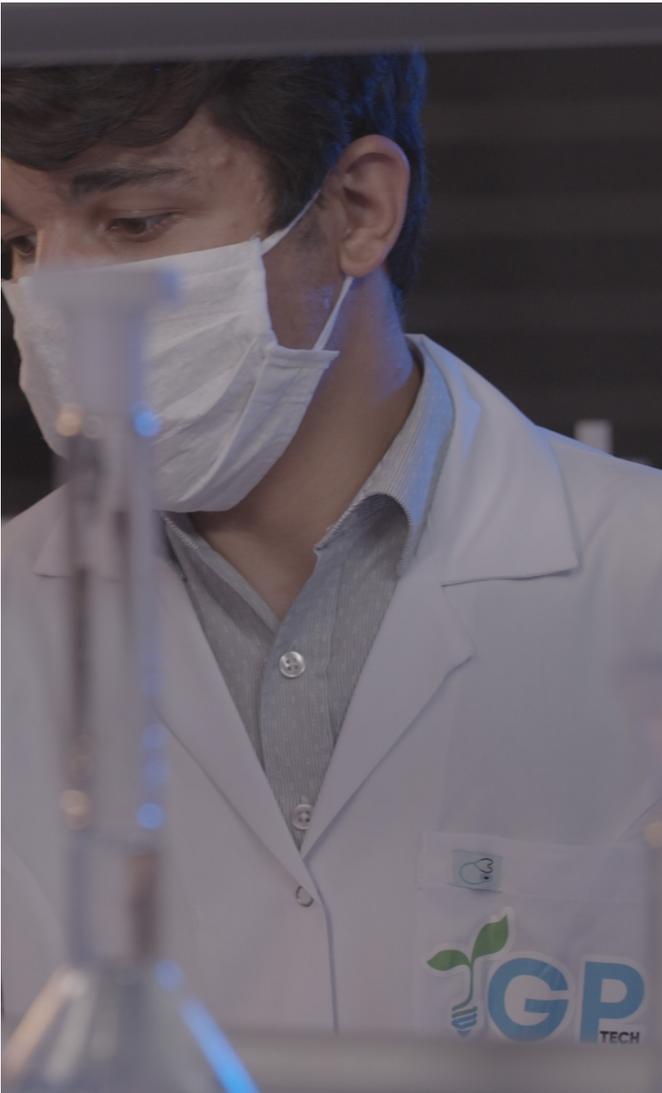
Currently, our study scope is to develop new CO<sub>2</sub> selective material synthesis and solvent systems and prepare the resulting materials for pilot applications. According to the promising laboratory results, producing such an absorptive material enables the production of usable materials such as animal feed and biofuels.



*Our CO<sub>2</sub> capture materials*

## About Us:

In a fast-changing post-pandemic economy, GP Holding is building capacity to be a pioneering player in sustainable and clean technologies. GPTECH is positioned as a specialized R&D center that manufactures technologies that make people's lives easier, transform our environment, and help resolve the world's critical problems. One of our main aims is to develop an innovation pool where brilliant innovators and entrepreneurs from around the world can shape their innovation ecosystems



In cooperation with DU University in Turkey, we strengthen the modern research infrastructure on campus, facilitating access and cooperation with the concerned authorities and government institutions. We also have many partnerships in the field of well-equipped research laboratories in many places around the world in Saudi Arabia, India and Canada, with extensive research facilities and capabilities.



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