

# The Global Market for Carbon Capture, Utilization and Storage (CCUS) 2025-2045

<https://marketpublishers.com/r/GF1FF52EFFDFEN.html>

Date: October 2024

Pages: 680

Price: US\$ 1,450.00 (Single User License)

ID: GF1FF52EFFDFEN

## Abstracts

As the world intensifies its efforts to achieve net-zero emissions, Carbon capture, utilization, and storage (CCUS) technologies are emerging as critical solutions for reducing emissions across essential hard-to-abate sectors. CCUS refers to technologies that capture CO<sub>2</sub> emissions and use or store them, leading to permanent sequestration. CCUS technologies capture carbon dioxide emissions from large power sources, including power generation or industrial facilities that use either fossil fuels or biomass for fuel. CO<sub>2</sub> can also be captured directly from the atmosphere. If not utilized onsite, captured CO<sub>2</sub> is compressed and transported by pipeline, ship, rail or truck to be used in a range of applications, or injected into deep geological formations (including depleted oil and gas reservoirs or saline formations) which trap the CO<sub>2</sub> for permanent storage.

The increasing interest in CO<sub>2</sub> conversion technologies is reflected in the growing amount of private and public funding that has been channelled to companies in this field. Over the last decade, global private funding for CO<sub>2</sub> use start-ups is over \$9 billion, primarily in the form of venture capital and growth equity. Large corporations are also increasing their R&D investments and governments are allocating increasing funding.

In 2024, carbon capture investments have been a key focus for energy-related corporate and VC investment. The largest deal in Q1 was a \$90m series A funding round for CarbonCapture, a US-based CO<sub>2</sub> removal technology developer, backed by Aramco Ventures, Amazon's Climate Pledge Fund and Siemens Financial Services. Other carbon capture-related deals included the \$36m series A round by direct air capture tech developer Avnos, backed by Shell Ventures. Mission Zero Technologies received \$28m in a series A round, backed by Siemens. US-based ocean's carbon removal tech developer Captura also closed a \$22m series A round that featured Aramco Ventures, Equinor Ventures as well as other corporates like Eni, Hitachi and

## EDP.

The Global Carbon Capture, Utilization and Storage (CCUS) Market 2025-2045 offers an in-depth analysis offers valuable insights for stakeholders in the energy, industrial, and environmental sectors, as well as policymakers, investors, and researchers seeking to understand the transformative potential of CCUS in the global transition to a low-carbon economy. Report contents include:

Analysis of market trends for integrated CCUS solutions, the rise of direct air capture technologies, and the growing interest in CO<sub>2</sub> utilization for value-added products.

In-depth examination of key CCUS technologies, their current state of development, and future innovations:

Carbon Capture:

Post-combustion capture

Pre-combustion capture

Oxy-fuel combustion

Direct air capture (DAC)

Emerging capture technologies (e.g., membrane-based, cryogenic)

Carbon Utilization:

CO<sub>2</sub>-derived fuels and chemicals

Building materials and concrete curing

Enhanced oil recovery (EOR)

Biological utilization (e.g., algae cultivation)

Mineralization processes

Carbon Storage:

Geological sequestration in saline aquifers

Depleted oil and gas reservoirs

Enhanced oil recovery (EOR) with storage

Mineral carbonation

Ocean storage (potential future applications)

Technology readiness levels (TRLs) of various CCUS approaches, highlighting areas of rapid advancement and identifying potential game-changers in the industry.

Global CCUS capacity additions by technology and region

CO<sub>2</sub> capture volumes by source (power generation, industry, direct air capture)

Utilization volumes by application (fuels, chemicals, materials, EOR)

Storage volumes by type (geological, mineralization, other)

Market size and revenue projections for key CCUS segments

Investment trends and capital expenditure forecasts

Comprehensive overview of the CCUS industry value chain, from technology providers and equipment manufacturers to project developers and end-users.

Detailed profiles of over 310 companies across the CCUS value chain. Companies

profiled include 3R-BioPhosphate, 44.01, 8Rivers, Adaptavate, Aeroborn B.V., Aether Diamonds, Again, Air Company, Air Liquide S.A., Air Products and Chemicals Inc., Air Protein, Air Quality Solutions Worldwide DAC, Aircela Inc, Airco Process Technology, Airex Energy, AirHive, Airovation Technologies, Algal Bio Co. Ltd., Algenol, Algiecel ApS, Andes Ag Inc., Aqualung Carbon Capture, Arborea, Arca, Arkeon Biotechnologies, Asahi Kasei, AspiraDAC Pty Ltd., Aspiring Materials, Atoco, Avantium N.V., Avnos Inc., Aymium, Axens SA, Azolla, BASF Group, Barton Blakeley Technologies Ltd., BC Biocarbon, Blue Planet Systems Corporation, BluSky Inc., BP PLC, Breathe Applied Sciences, Bright Renewables, Brilliant Planet, bse Methanol GmbH, C-Capture, C2CNT LLC, C4X Technologies Inc., Cambridge Carbon Capture Ltd., Capchar Ltd., Captura Corporation, Capture6, Carba, CarbiCrete, Carbfix, Carboclave, Carbo Culture, Carbofex Oy, Carbominer, Carbonade, Carbonaide Oy, Carbonaught Pty Ltd., CarbonBuilt, Carbon CANTONNE, Carbon Capture Inc. (CarbonCapture), Carbon Capture Machine (UK), Carbon Centric AS, Carbon Clean Solutions Limited, Carbon Collect Limited, Carbon Engineering Ltd., Carbon Geocapture Corp, Carbon Infinity Limited, Carbon Limit, Carbon Neutral Fuels, Carbon Recycling International, Carbon Re, Carbon Reform Inc., Carbon Ridge Inc., Carbon Sink LLC, CarbonStar Systems, Carbon Upcycling Technologies, CarbonCure Technologies Inc., Carbonfree Chemicals, CarbonFree, CarbonMeta Research Ltd, Carbonova, CarbonOrO Products B.V., CarbonQuest, Carbon-Zero US LLC, CarbonScape Ltd., Carbon8 Systems, Carbon Blade, Carbon Blue, Carbyon BV, Cella Mineral Storage, Cemvita Factory Inc., CERT Systems Inc., CFOAM Limited, Charm Industrial, Chevron Corporation, Chiyoda Corporation, China Energy Investment Corporation (CHN Energy), Climeworks, CNF Biofuel AS, CO2 Capsol, CO2Rail Company, CO2CirculAir B.V., Compact Carbon Capture AS (Baker Hughes), Concrete4Change, Coval Energy B.V., Covestro AG, C-Quester Inc., Cquestr8 Limited, CyanoCapture, D-CRBN, Decarbontek LLC, Deep Branch Biotechnology, Deep Sky, Denbury Inc., Dimensional Energy, Dioxide Materials, Dioxide, Earth RepAIR, Ebb Carbon and many more.

Analysis of key players' strategies, market positioning, and competitive advantages

Assessment of partnerships, mergers, and acquisitions shaping the industry

Evaluation of emerging start-ups and innovative technology providers

Regional Analysis including current and planned CCUS projects, regulatory frameworks, investment climates, and growth opportunities.

Policy and Regulatory Landscape

Analysis of global, regional, and national climate policies impacting CCUS

Overview of carbon pricing mechanisms and their effect on CCUS economics

Examination of incentives, tax credits, and support schemes for CCUS projects

Assessment of regulatory frameworks for CO2 transport and storage

Projections of future policy developments and their market implications

Detailed cost breakdowns for capture, transport, utilization, and storage  
Analysis of cost reduction trends and projections  
Comparison of CCUS costs across different applications and technologies  
Assessment of revenue streams and business models for CCUS projects  
Evaluation of the role of carbon markets in CCUS economics  
Challenges and Opportunities including:  
High capital and operational costs  
Technological barriers and scale-up issues  
Public perception and social acceptance  
Regulatory uncertainty and policy risks  
Infrastructure development needs  
Emerging opportunities, such as:  
Integration with hydrogen production for blue hydrogen  
Negative emissions technologies (NETs) like BECCS and DACCS  
Development of CCUS hubs and clusters  
Novel CO<sub>2</sub> utilization pathways in high-value products  
Potential for CCUS in hard-to-abate sectors  
Future Outlook and Scenarios including  
Pace of technological innovation  
Strength of climate policies and carbon pricing  
Public acceptance and support for CCUS  
Integration with other clean energy technologies  
Global economic trends and energy market dynamics  
This comprehensive market report is an essential resource for:  
Energy and industrial companies exploring CCUS opportunities  
Technology providers and equipment manufacturers in the CCUS space  
Project developers and investors in clean energy and climate solutions  
Policymakers and regulators shaping climate and energy policies  
Research institutions and academics studying carbon management strategies  
Environmental organizations and think tanks focused on climate change mitigation  
Financial institutions and analysts assessing the CCUS market potential

## Contents

### 1 ABBREVIATIONS

### 2 RESEARCH METHODOLOGY

2.1 Definition of Carbon Capture, Utilisation and Storage (CCUS)

2.2 Technology Readiness Level (TRL)

### 3 EXECUTIVE SUMMARY

3.1 Main sources of carbon dioxide emissions

3.2 CO<sub>2</sub> as a commodity

3.3 Meeting climate targets

3.4 Market drivers and trends

3.5 The current market and future outlook

3.6 CCUS Industry developments 2020-2024

3.7 CCUS investments

3.7.1 Venture Capital Funding

3.7.1.1 2010-2022

3.7.1.2 CCUS VC deals 2022-2024

3.8 Government CCUS initiatives

3.8.1 North America

3.8.2 Europe

3.8.3 Asia

3.8.3.1 Japan

3.8.3.2 Singapore

3.8.3.3 China

3.9 Market map

3.10 Commercial CCUS facilities and projects

3.10.1 Facilities

3.10.1.1 Operational

3.10.1.2 Under development/construction

3.11 CCUS Value Chain

3.12 Key market barriers for CCUS

3.13 Carbon pricing

3.13.1 Compliance Carbon Pricing Mechanisms

3.13.2 Alternative to Carbon Pricing: 45Q Tax Credits

3.13.3 Business models

- 3.13.4 The European Union Emission Trading Scheme (EU ETS)
- 3.13.5 Carbon Pricing in the US
- 3.13.6 Carbon Pricing in China
- 3.13.7 Voluntary Carbon Markets
- 3.13.8 Challenges with Carbon Pricing
- 3.14 Global market forecasts
  - 3.14.1 CCUS capture capacity forecast by end point
  - 3.14.2 Capture capacity by region to 2045, Mtpa
  - 3.14.3 Revenues
  - 3.14.4 CCUS capacity forecast by capture type

## **4 INTRODUCTION**

- 4.1 What is CCUS?
  - 4.1.1 Carbon Capture
    - 4.1.1.1 Source Characterization
    - 4.1.1.2 Purification
    - 4.1.1.3 CO<sub>2</sub> capture technologies
  - 4.1.2 Carbon Utilization
    - 4.1.2.1 CO<sub>2</sub> utilization pathways
  - 4.1.3 Carbon storage
    - 4.1.3.1 Passive storage
    - 4.1.3.2 Enhanced oil recovery
- 4.2 Transporting CO<sub>2</sub>
  - 4.2.1 Methods of CO<sub>2</sub> transport
    - 4.2.1.1 Pipeline
    - 4.2.1.2 Ship
    - 4.2.1.3 Road
    - 4.2.1.4 Rail
  - 4.2.2 Safety
- 4.3 Costs
  - 4.3.1 Cost of CO<sub>2</sub> transport
- 4.4 Carbon credits

## **5 CARBON DIOXIDE CAPTURE**

- 5.1 CO<sub>2</sub> capture technologies
- 5.2 >90% capture rate
- 5.3 99% capture rate

- 5.4 CO<sub>2</sub> capture from point sources
  - 5.4.1 Energy Availability and Costs
  - 5.4.2 Power plants with CCUS
  - 5.4.3 Transportation
  - 5.4.4 Global point source CO<sub>2</sub> capture capacities
  - 5.4.5 By source
  - 5.4.6 Blue hydrogen
    - 5.4.6.1 Steam-methane reforming (SMR)
    - 5.4.6.2 Autothermal reforming (ATR)
    - 5.4.6.3 Partial oxidation (POX)
    - 5.4.6.4 Sorption Enhanced Steam Methane Reforming (SE-SMR)
    - 5.4.6.5 Pre-Combustion vs. Post-Combustion carbon capture
    - 5.4.6.6 Blue hydrogen projects
    - 5.4.6.7 Costs
    - 5.4.6.8 Market players
  - 5.4.7 Carbon capture in cement
    - 5.4.7.1 CCUS Projects
    - 5.4.7.2 Carbon capture technologies
    - 5.4.7.3 Costs
    - 5.4.7.4 Challenges
  - 5.4.8 Maritime carbon capture
- 5.5 Main carbon capture processes
  - 5.5.1 Materials
  - 5.5.2 Post-combustion
    - 5.5.2.1 Chemicals/Solvents
    - 5.5.2.2 Amine-based post-combustion CO<sub>2</sub> absorption
    - 5.5.2.3 Physical absorption solvents
  - 5.5.3 Oxy-fuel combustion
    - 5.5.3.1 Oxyfuel CCUS cement projects
    - 5.5.3.2 Chemical Looping-Based Capture
  - 5.5.4 Liquid or supercritical CO<sub>2</sub>: Allam-Fetvedt Cycle
  - 5.5.5 Pre-combustion
- 5.6 Carbon separation technologies
  - 5.6.1 Absorption capture
  - 5.6.2 Adsorption capture
    - 5.6.2.1 Solid sorbent-based CO<sub>2</sub> separation
    - 5.6.2.2 Metal organic framework (MOF) adsorbents
    - 5.6.2.3 Zeolite-based adsorbents
    - 5.6.2.4 Solid amine-based adsorbents

- 5.6.2.5 Carbon-based adsorbents
- 5.6.2.6 Polymer-based adsorbents
- 5.6.2.7 Solid sorbents in pre-combustion
- 5.6.2.8 Sorption Enhanced Water Gas Shift (SEWGS)
- 5.6.2.9 Solid sorbents in post-combustion
- 5.6.3 Membranes
  - 5.6.3.1 Membrane-based CO<sub>2</sub> separation
  - 5.6.3.2 Post-combustion CO<sub>2</sub> capture
    - 5.6.3.2.1 Facilitated transport membranes
  - 5.6.3.3 Pre-combustion capture
- 5.6.4 Liquid or supercritical CO<sub>2</sub> (Cryogenic) capture
  - 5.6.4.1 Cryogenic CO<sub>2</sub> capture
- 5.6.5 Calcium Looping
  - 5.6.5.1 Calix Advanced Calciner
- 5.6.6 Other technologies
  - 5.6.6.1 LEILAC process
  - 5.6.6.2 CO<sub>2</sub> capture with Solid Oxide Fuel Cells (SOFCs)
  - 5.6.6.3 CO<sub>2</sub> capture with Molten Carbonate Fuel Cells (MCFCs)
  - 5.6.6.4 Microalgae Carbon Capture
- 5.6.7 Comparison of key separation technologies
- 5.6.8 Technology readiness level (TRL) of gas separation technologies
- 5.7 Opportunities and barriers
- 5.8 Costs of CO<sub>2</sub> capture
- 5.9 CO<sub>2</sub> capture capacity
- 5.10 Direct air capture (DAC)
  - 5.10.1 Technology description
    - 5.10.1.1 Sorbent-based CO<sub>2</sub> Capture
    - 5.10.1.2 Solvent-based CO<sub>2</sub> Capture
    - 5.10.1.3 DAC Solid Sorbent Swing Adsorption Processes
    - 5.10.1.4 Electro-Swing Adsorption (ESA) of CO<sub>2</sub> for DAC
    - 5.10.1.5 Solid and liquid DAC
  - 5.10.2 Advantages of DAC
  - 5.10.3 Deployment
  - 5.10.4 Point source carbon capture versus Direct Air Capture
  - 5.10.5 Technologies
    - 5.10.5.1 Solid sorbents
    - 5.10.5.2 Liquid sorbents
    - 5.10.5.3 Liquid solvents
    - 5.10.5.4 Airflow equipment integration



- 5.10.5.5 Passive Direct Air Capture (PDAC)
- 5.10.5.6 Direct conversion
- 5.10.5.7 Co-product generation
- 5.10.5.8 Low Temperature DAC
- 5.10.5.9 Regeneration methods
- 5.10.6 Electricity and Heat Sources
- 5.10.7 Commercialization and plants
- 5.10.8 Metal-organic frameworks (MOFs) in DAC
- 5.10.9 DAC plants and projects-current and planned
- 5.10.10 Capacity forecasts
- 5.10.11 Costs
- 5.10.12 Market challenges for DAC
- 5.10.13 Market prospects for direct air capture
- 5.10.14 Players and production
- 5.10.15 Co<sub>2</sub> utilization pathways
- 5.10.16 Markets for Direct Air Capture and Storage (DACCS)
  - 5.10.16.1 Fuels
    - 5.10.16.1.1 Overview
    - 5.10.16.1.2 Production routes
    - 5.10.16.1.3 Methanol
    - 5.10.16.1.4 Algae based biofuels
    - 5.10.16.1.5 CO<sub>2</sub>-fuels from solar
    - 5.10.16.1.6 Companies
    - 5.10.16.1.7 Challenges
  - 5.10.16.2 Chemicals, plastics and polymers
    - 5.10.16.2.1 Overview
    - 5.10.16.2.2 Scalability
    - 5.10.16.2.3 Plastics and polymers
      - 5.10.16.2.3.1 CO<sub>2</sub> utilization products
    - 5.10.16.2.4 Urea production
    - 5.10.16.2.5 Inert gas in semiconductor manufacturing
    - 5.10.16.2.6 Carbon nanotubes
    - 5.10.16.2.7 Companies
  - 5.10.16.3 Construction materials
    - 5.10.16.3.1 Overview
    - 5.10.16.3.2 CCUS technologies
    - 5.10.16.3.3 Carbonated aggregates
    - 5.10.16.3.4 Additives during mixing
    - 5.10.16.3.5 Concrete curing

- 5.10.16.3.6 Costs
- 5.10.16.3.7 Companies
- 5.10.16.3.8 Challenges
- 5.10.16.4 CO<sub>2</sub> Utilization in Biological Yield-Boosting
  - 5.10.16.4.1 Overview
  - 5.10.16.4.2 Applications
    - 5.10.16.4.2.1 Greenhouses
    - 5.10.16.4.2.2 Algae cultivation
    - 5.10.16.4.2.3 Microbial conversion
  - 5.10.16.4.3 Companies
- 5.10.16.5 Food and feed production
- 5.10.16.6 CO<sub>2</sub> Utilization in Enhanced Oil Recovery
  - 5.10.16.6.1 Overview
    - 5.10.16.6.1.1 Process
    - 5.10.16.6.1.2 CO<sub>2</sub> sources
  - 5.10.16.6.2 CO<sub>2</sub>-EOR facilities and projects

## **6 CARBON DIOXIDE REMOVAL**

- 6.1 Conventional CDR on land
  - 6.1.1 Wetland and peatland restoration
  - 6.1.2 Cropland, grassland, and agroforestry
- 6.2 Technological CDR Solutions
- 6.3 Main CDR methods
- 6.4 Novel CDR methods
- 6.5 Market drivers
- 6.6 Technology Readiness Level (TRL): Carbon Dioxide Removal Methods
- 6.7 Carbon Credits
- 6.8 Types of Carbon Credits
  - 6.8.1 Voluntary Carbon Credits
  - 6.8.2 Compliance Carbon Credits
  - 6.8.3 Corporate commitments
  - 6.8.4 Increasing government support and regulations
  - 6.8.5 Advancements in carbon offset project verification and monitoring
  - 6.8.6 Potential for blockchain technology in carbon credit trading
  - 6.8.7 Prices
  - 6.8.8 Buying and Selling Carbon Credits
    - 6.8.8.1 Carbon credit exchanges and trading platforms
    - 6.8.8.2 Over-the-counter (OTC) transactions

- 6.8.8.3 Pricing mechanisms and factors affecting carbon credit prices
- 6.8.9 Certification
- 6.8.10 Challenges and risks
- 6.9 Value chain
- 6.10 Monitoring, reporting, and verification
- 6.11 Government policies
- 6.12 Bioenergy with Carbon Removal and Storage (BiCRS)
  - 6.12.1 Advantages
  - 6.12.2 Challenges
  - 6.12.3 Costs
  - 6.12.4 Feedstocks
- 6.13 BECCS
  - 6.13.1 Technology overview
    - 6.13.1.1 Point Source Capture Technologies for BECCS
    - 6.13.1.2 Energy efficiency
    - 6.13.1.3 Heat generation
    - 6.13.1.4 Waste-to-Energy
    - 6.13.1.5 Blue Hydrogen Production
  - 6.13.2 Biomass conversion
  - 6.13.3 CO<sub>2</sub> capture technologies
  - 6.13.4 BECCS facilities
  - 6.13.5 Cost analysis
  - 6.13.6 BECCS carbon credits
  - 6.13.7 Sustainability
  - 6.13.8 Challenges
- 6.14 Enhanced Weathering
  - 6.14.1 Overview
    - 6.14.1.1 Role of enhanced weathering in carbon dioxide removal
    - 6.14.1.2 CO<sub>2</sub> mineralization
  - 6.14.2 Enhanced Weathering Processes and Materials
  - 6.14.3 Enhanced Weathering Applications
  - 6.14.4 Trends and Opportunities
  - 6.14.5 Challenges and Risks
  - 6.14.6 Cost analysis
  - 6.14.7 SWOT analysis
- 6.15 Afforestation/Reforestation
  - 6.15.1 Overview
  - 6.15.2 Carbon dioxide removal methods
  - 6.15.3 Projects

- 6.15.4 Remote sensing in A/R
- 6.15.5 Robotics
- 6.15.6 Trends and Opportunities
- 6.15.7 Challenges and Risks
- 6.15.8 SWOT analysis
- 6.16 Soil carbon sequestration (SCS)
  - 6.16.1 Overview
  - 6.16.2 Practices
  - 6.16.3 Measuring and Verifying
  - 6.16.4 Trends and Opportunities
  - 6.16.5 Carbon credits
  - 6.16.6 Challenges and Risks
  - 6.16.7 SWOT analysis
- 6.17 Biochar
  - 6.17.1 What is biochar?
  - 6.17.2 Carbon sequestration
  - 6.17.3 Properties of biochar
  - 6.17.4 Feedstocks
  - 6.17.5 Production processes
    - 6.17.5.1 Sustainable production
    - 6.17.5.2 Pyrolysis
      - 6.17.5.2.1 Slow pyrolysis
      - 6.17.5.2.2 Fast pyrolysis
    - 6.17.5.3 Gasification
    - 6.17.5.4 Hydrothermal carbonization (HTC)
    - 6.17.5.5 Torrefaction
    - 6.17.5.6 Equipment manufacturers
  - 6.17.6 Biochar pricing
  - 6.17.7 Biochar carbon credits
    - 6.17.7.1 Overview
    - 6.17.7.2 Removal and reduction credits
    - 6.17.7.3 The advantage of biochar
    - 6.17.7.4 Prices
    - 6.17.7.5 Buyers of biochar credits
    - 6.17.7.6 Competitive materials and technologies
  - 6.17.8 Bio-oil based CDR
  - 6.17.9 Biomass burial for CO<sub>2</sub> removal
  - 6.17.10 Bio-based construction materials for CDR
  - 6.17.11 SWOT analysis

## 6.18 Ocean-based CDR

- 6.18.1 Overview
- 6.18.2 Ocean pumps
- 6.18.3 CO<sub>2</sub> capture from seawater
- 6.18.4 Ocean fertilisation
- 6.18.5 Coastal blue carbon
- 6.18.6 Algal cultivation
- 6.18.7 Artificial upwelling
- 6.18.8 MRV for marine CDR
- 6.18.9 Ocean alkalisation
- 6.18.10 Ocean alkalinity enhancement (OAE)
- 6.18.11 Electrochemical ocean alkalinity enhancement
- 6.18.12 Direct ocean capture technology
- 6.18.13 Artificial downwelling
- 6.18.14 Trends and Opportunities
- 6.18.15 Ocean-based carbon credits
- 6.18.16 Cost analysis
- 6.18.17 Challenges and Risks
- 6.18.18 SWOT analysis

## 7 CARBON DIOXIDE UTILIZATION

### 7.1 Overview

- 7.1.1 Current market status

### 7.2 Carbon utilization business models

- 7.2.1 Benefits of carbon utilization
- 7.2.2 Market challenges

### 7.3 CO<sub>2</sub> utilization pathways

### 7.4 Conversion processes

- 7.4.1 Thermochemical
  - 7.4.1.1 Process overview
  - 7.4.1.2 Plasma-assisted CO<sub>2</sub> conversion
- 7.4.2 Electrochemical conversion of CO<sub>2</sub>
  - 7.4.2.1 Process overview
- 7.4.3 Photocatalytic and photothermal catalytic conversion of CO<sub>2</sub>
- 7.4.4 Catalytic conversion of CO<sub>2</sub>
- 7.4.5 Biological conversion of CO<sub>2</sub>
- 7.4.6 Copolymerization of CO<sub>2</sub>
- 7.4.7 Mineral carbonation

## 7.5 CO<sub>2</sub>-Utilization in Fuels

### 7.5.1 Overview

### 7.5.2 Production routes

### 7.5.3 CO<sub>2</sub>-fuels in road vehicles

### 7.5.4 CO<sub>2</sub>-fuels in shipping

### 7.5.5 CO<sub>2</sub>-fuels in aviation

### 7.5.6 Methanol-to-gasoline (MTG) synthesis

### 7.5.7 Power-to-methane

#### 7.5.7.1 Thermocatalytic pathway to e-methane

#### 7.5.7.2 Biological fermentation

#### 7.5.7.3 Costs

### 7.5.8 Algae based biofuels

### 7.5.9 DAC for e-fuels

### 7.5.10 CO<sub>2</sub>-fuels from solar

### 7.5.11 Companies

### 7.5.12 Challenges

### 7.5.13 Global market forecasts 2025-2045

## 7.6 CO<sub>2</sub>-Utilization in Chemicals

### 7.6.1 Overview

### 7.6.2 Carbon nanostructures

### 7.6.3 Scalability

### 7.6.4 Pathways

#### 7.6.4.1 Thermochemical

#### 7.6.4.2 Electrochemical

#### 7.6.4.3 Microbial conversion

#### 7.6.4.4 Other

### 7.6.5 Applications

#### 7.6.5.1 Urea production

#### 7.6.5.2 CO<sub>2</sub>-derived polymers

##### 7.6.5.2.1 Pathways

##### 7.6.5.2.2 Polycarbonate from CO<sub>2</sub>

##### 7.6.5.2.3 Methanol to olefins (polypropylene production)

##### 7.6.5.2.4 Ethanol to polymers

#### 7.6.5.3 Inert gas in semiconductor manufacturing

#### 7.6.5.4 Carbon nanomaterials

### 7.6.6 Companies

### 7.6.7 Global market forecasts 2025-2045

## 7.7 CO<sub>2</sub>-Utilization in Construction and Building Materials

### 7.7.1 Overview

- 7.7.2 Market drivers
- 7.7.3 Key CO<sub>2</sub> utilization technologies in construction
- 7.7.4 Carbonated aggregates
- 7.7.5 Additives during mixing
- 7.7.6 Concrete curing
- 7.7.7 Costs
- 7.7.8 Market trends and business models
- 7.7.9 Carbon credits
- 7.7.10 Companies
- 7.7.11 Challenges
- 7.7.12 Global market forecasts
- 7.8 CO<sub>2</sub>-Utilization in Biological Yield-Boosting
  - 7.8.1 Overview
  - 7.8.2 CO<sub>2</sub> utilization in biological processes
  - 7.8.3 Applications
    - 7.8.3.1 Greenhouses
      - 7.8.3.1.1 CO<sub>2</sub> enrichment
    - 7.8.3.2 Algae cultivation
      - 7.8.3.2.1 CO<sub>2</sub>-enhanced algae cultivation: open systems
      - 7.8.3.2.2 CO<sub>2</sub>-enhanced algae cultivation: closed systems
    - 7.8.3.3 Microbial conversion
    - 7.8.3.4 Food and feed production
  - 7.8.4 Companies
  - 7.8.5 Global market forecasts 2025-2045
- 7.9 CO<sub>2</sub> Utilization in Enhanced Oil Recovery
  - 7.9.1 Overview
    - 7.9.1.1 Process
    - 7.9.1.2 CO<sub>2</sub> sources
  - 7.9.2 CO<sub>2</sub>-EOR facilities and projects
  - 7.9.3 Challenges
  - 7.9.4 Global market forecasts 2025-2045
- 7.10 Enhanced mineralization

## I would like to order

Product name: The Global Market for Carbon Capture, Utilization and Storage (CCUS) 2025-2045

Product link: <https://marketpublishers.com/r/GF1FF52EFFDFEN.html>

Price: US\$ 1,450.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/GF1FF52EFFDFEN.html>