
CCS OVERVIEW

**BALTIC CARBON FORUM
OCTOBER 2025**

**CARLO MACCHERINI
SENIOR REGIONAL MANAGER
- GCCSI**

GLOBAL CCS INSTITUTE

WHO WE ARE

Independent climate change think tank

Not-for-profit; Member-based

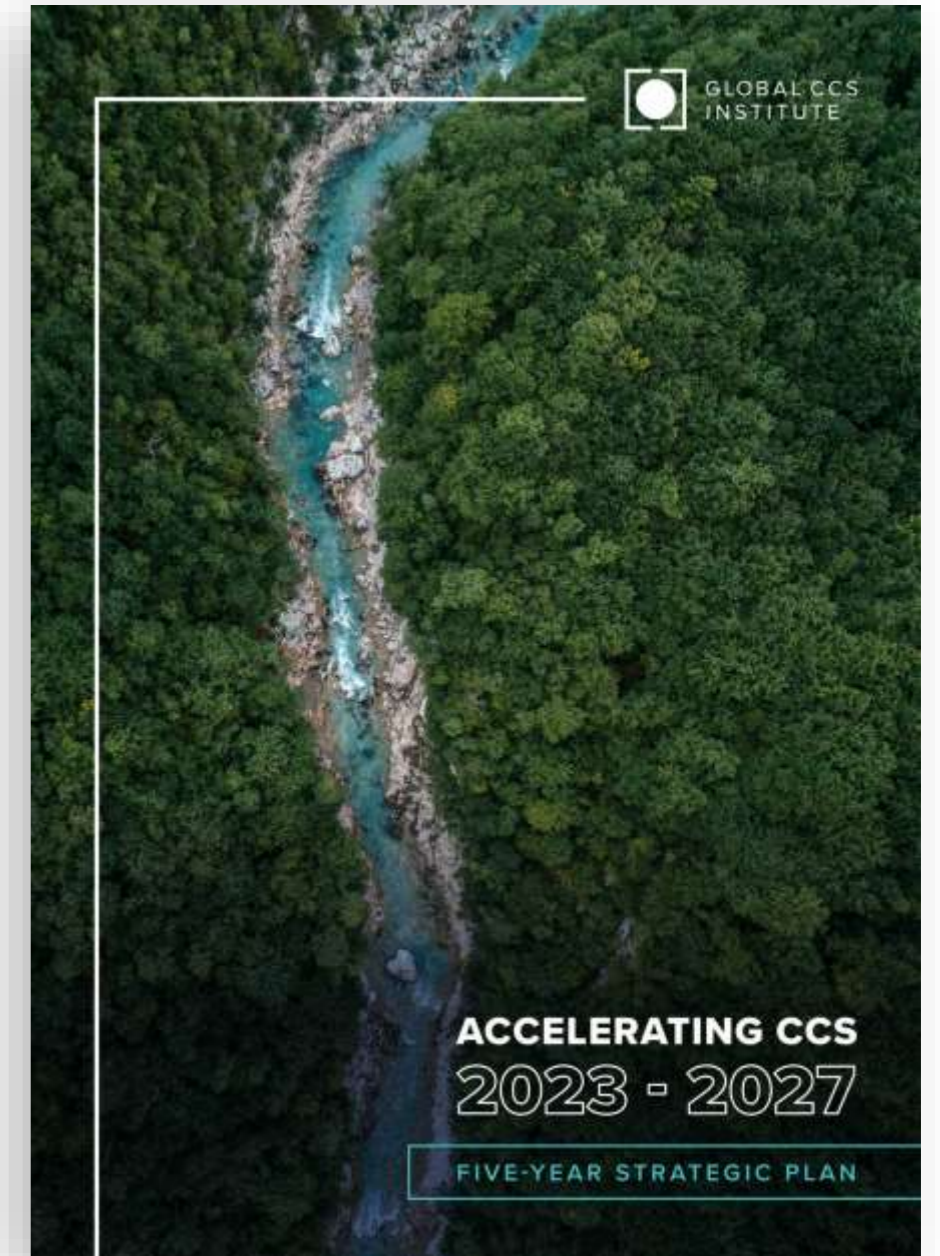
Over 200 members across governments, global corporations, private companies, research bodies and NGOs

MISSION:

Accelerating the deployment of CCS for a net-zero emissions

WHAT WE DO

Fact-based advocacy, thought leadership, knowledge creation and sharing, networking.



AROUND 200 DIVERSE MEMBERS

AMERICAS - 77

- Air Products
- America Bureau of Shipping
- Archer Daniels Midland
- ATOCO
- Baker Hughes
- Baltimore Aircoil Co. (BAC)
- Bechtel
- BKV Corp
- Black & Veatch
- Bloom Energy
- Int'l B'hood of Boilermakers
- Burns & McDonnell
- California Resources Corp
- Carbon Direct
- Carbon Engineering
- Carbon GeoCapture
- Carbonvert
- Cenovus Energy
- Cemex
- CF Industries
- Chabina Energy Partners
- Chevron
- ClearPath
- CPV Holdings
- Cozairo
- CRC-IB
- DeGolyer & MacNaughton
- DigiKerma
- Distribution NOW
- Eastman
- Elessent Clean Tech.
- Elysian
- Enbridge
- Entropy, Inc.
- EPR
- EQT
- Equinox Engineering
- ExxonMobil
- Fluor Corporation
- GE Vemova
- Government of USA (DoE)
- Government of Alberta
- Graymont
- Grey Rock Investment Partners
- Halliburton
- Heirloom
- Hess
- HIF Global
- ION Engineering
- Kiewit Engineering Group
- Macquarie Group
- Mangrove Systems
- Mantel Capture
- Milestone Carbon
- NET Power
- NEXT Carbon Solutions
- NOV
- Occidental
- Oregon (DOGAMI)
- Petrobras
- Quorum Software
- Rockwell Automation
- SLB
- SoCalGas
- Southern Company
- Suncor Energy
- Stelco
- Stratum Reservoir
- Svante
- TechnipFMC
- Tenaska
- TC Energy
- Vopak New Energies
- Whitecap Resources
- Williams
- Worley

EUROPE - 55

- Air Liquide
- Alfa Laval
- Axens
- ArcelorMittal
- BP International Ltd.
- Brevik
- Capsol Technologies
- CarbFix
- Carbon Clean
- Carmeuse
- Cool Planet Technologies
- CRH
- DNVGL
- DORIS Group
- Drax Group, PLC
- Dril Quip
- EBN
- Ecolog
- Energiean
- Equinor
- Everlence
- Expro
- Government of UK (DESNZ)
- Heidelberg Cement AG
- HellenIQ Upstream
- Holcim
- HSBC Holdings plc
- Hunting Intl
- Karbon CCS Global
- K2-CO2
- Linde
- Lhoist
- Ljungström
- Maire S.p.A.
- Motor Oil Hellas SA
- Nuada
- OMV Petrom S.A.
- Petrofac
- Port of Antwerp-Bruges
- Prime Marine
- Ramboll
- RWE
- Saipem
- SBM Offshore
- Shell Int'l Petroleum
- Shearwater Geo Services
- SICK
- SLB Capturi
- STOREGGA
- Subsea7
- Technip Energies
- Tecnicas Reunidas
- Titan Cement
- TNO
- TotalEnergies
- Vaisala

JAPAN - 33

- Asahi Kasei
- Chiyoda Corporation
- Chubu Electric Power Co.
- ClassNK
- ENEOS Explora
- Govt. of Japan (METI)
- Hitachi Industrial Products
- IHI Corporation
- INPEX
- Japan CCS Company Ltd.
- JCOAL
- Japan Oil Eng. CO (JOE)
- JAPEX
- JBIC
- J-Power
- JOGMEC
- Kawasaki Heavy Industries
- KHK
- K-Line
- Kobe Steel
- Marubeni
- Mitsubishi Heavy Ind.
- Mitsui OSK
- Mizuho FG
- MUFG Bank
- Nippon Sanso Holdings
- Nippon Yusen (NYK)
- Osaka Gas Co., Ltd.
- RITE
- Sumitomo Corporation
- Sumitomo Heavy Ind.
- Taisei Corporation
- Toshiba Energy Systems

MIDDLE EAST & AFRICA - 8

- ADNOC
- Al Tamimi & Company
- Bapco Energies
- Global Carbon Council
- Kingdom of Saudi Arabia
- Maxtube
- PDO
- TAQA - KSA

CHINA - 7

- CNOOC Energy and Economy
- CNPCRISE
- Government of China (MEE)
- Tongxing Env. Protection Tech
- SINPOEC NR Institute
- Huaneng CERl
- UK-China CCS Centre

APAC - 20

- Chart Industries
- CO2CRC Limited
- Computer Modelling Group
- CSIRO
- Government of Australia
- Government of Northern Territory
- Government of Victoria
- ITRI
- KC8
- LET Australia
- Minerals Council of Australia
- Mitsui E&P Australia
- Petronas
- Pilot Energy
- PTT
- Repsol Exploracion, SA
- Santos Ltd.
- SK E&S Australia
- WesCEF
- Woodside Energy Ltd.

LEGEND

- Government / Quasi-Govt
- Extractives
- Engineering / Tech Services
- Technology Providers
- Power Producers
- Research / Universities
- Industrial
- Other: NGOs / Unions, Associations, Finance, Engineering, Shipping

WHY: CCS IS ESSENTIAL TO REACH NET ZERO



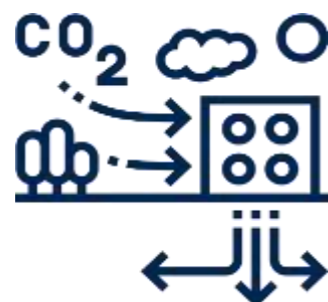
Achieving deep decarbonisation in hard-to-abate industry.



Enabling the production of low-carbon hydrogen at scale.

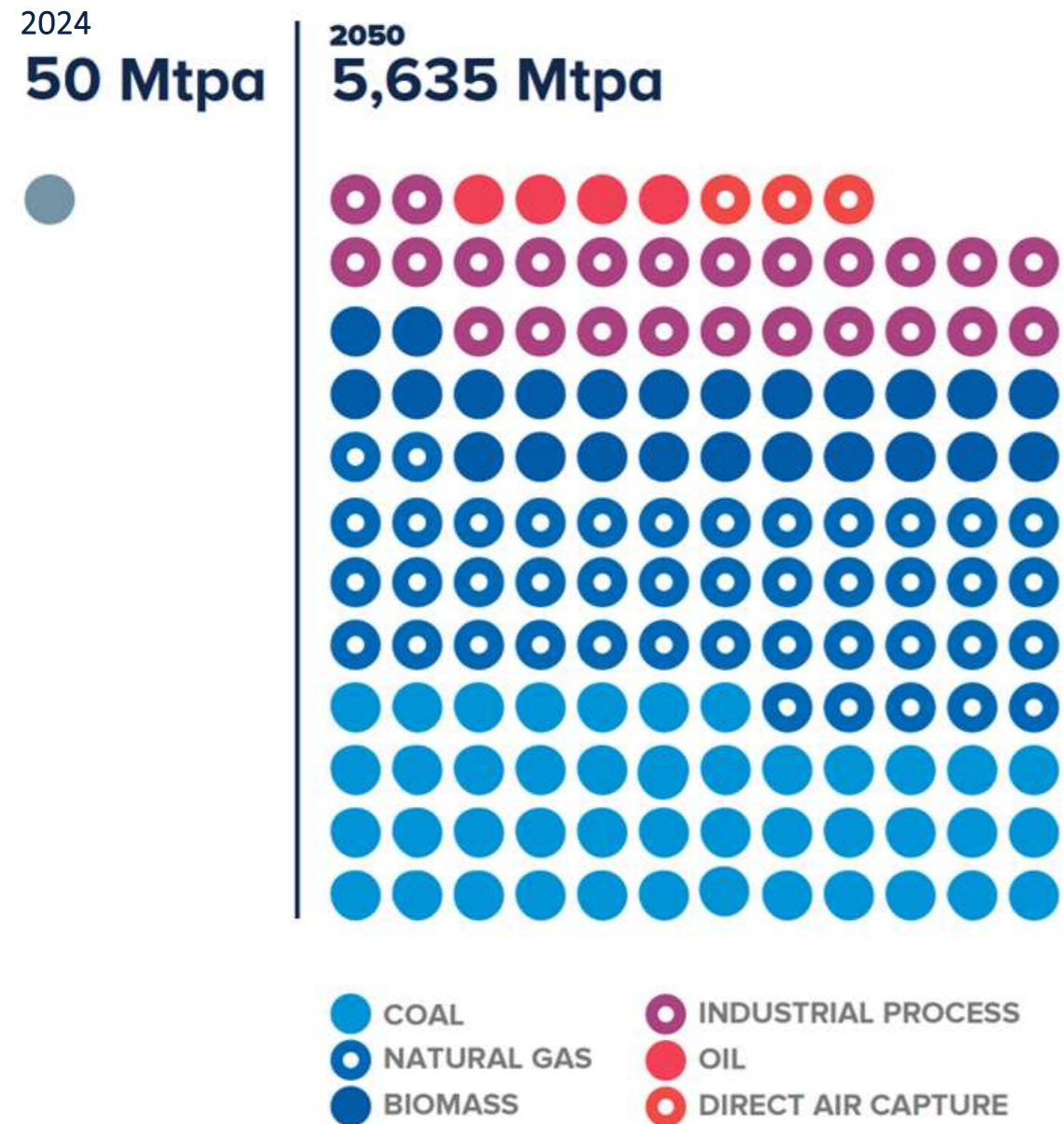


Providing low carbon dispatchable power.

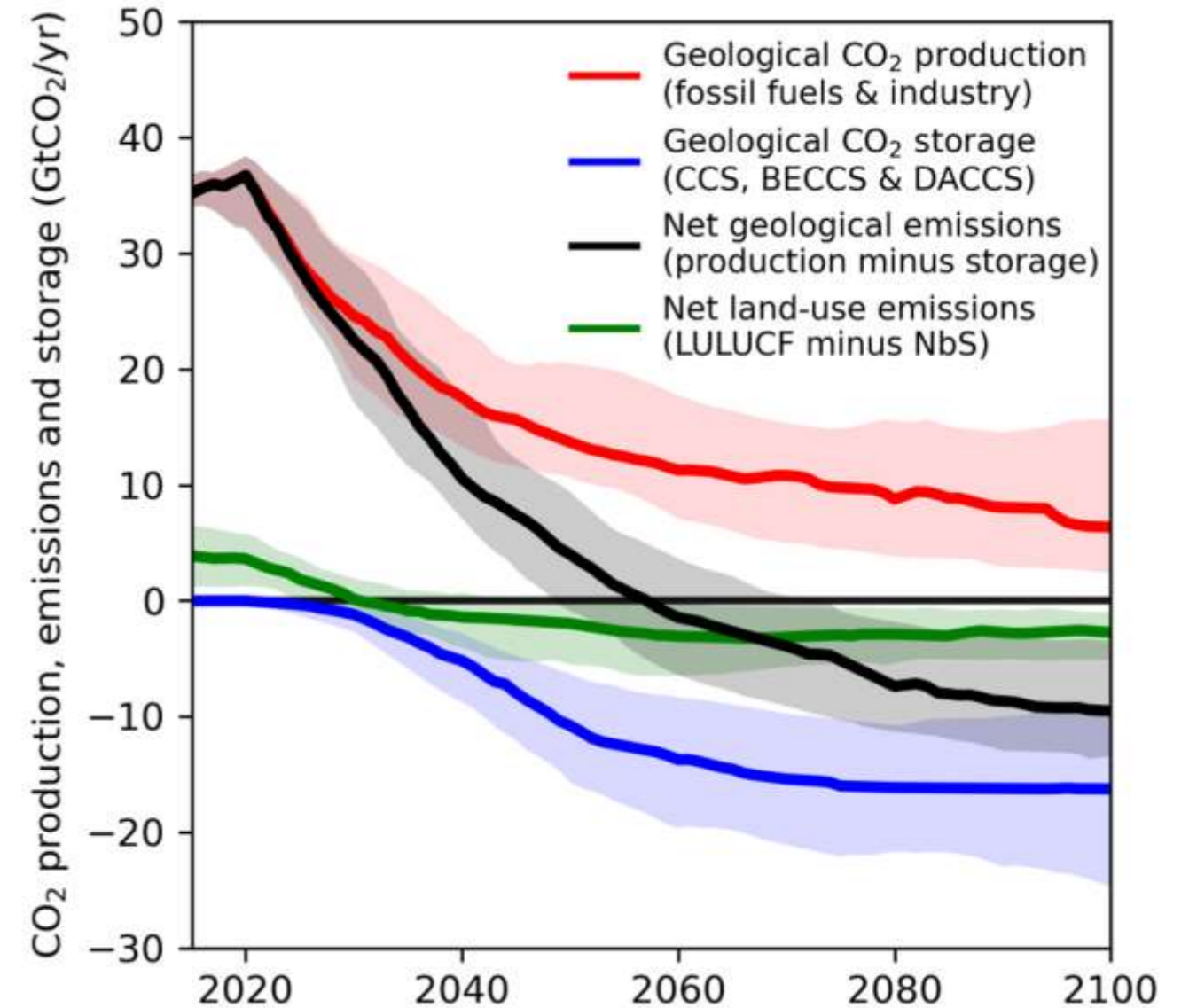


Delivering negative emissions.

CCS GROWTH REQUIREMENTS



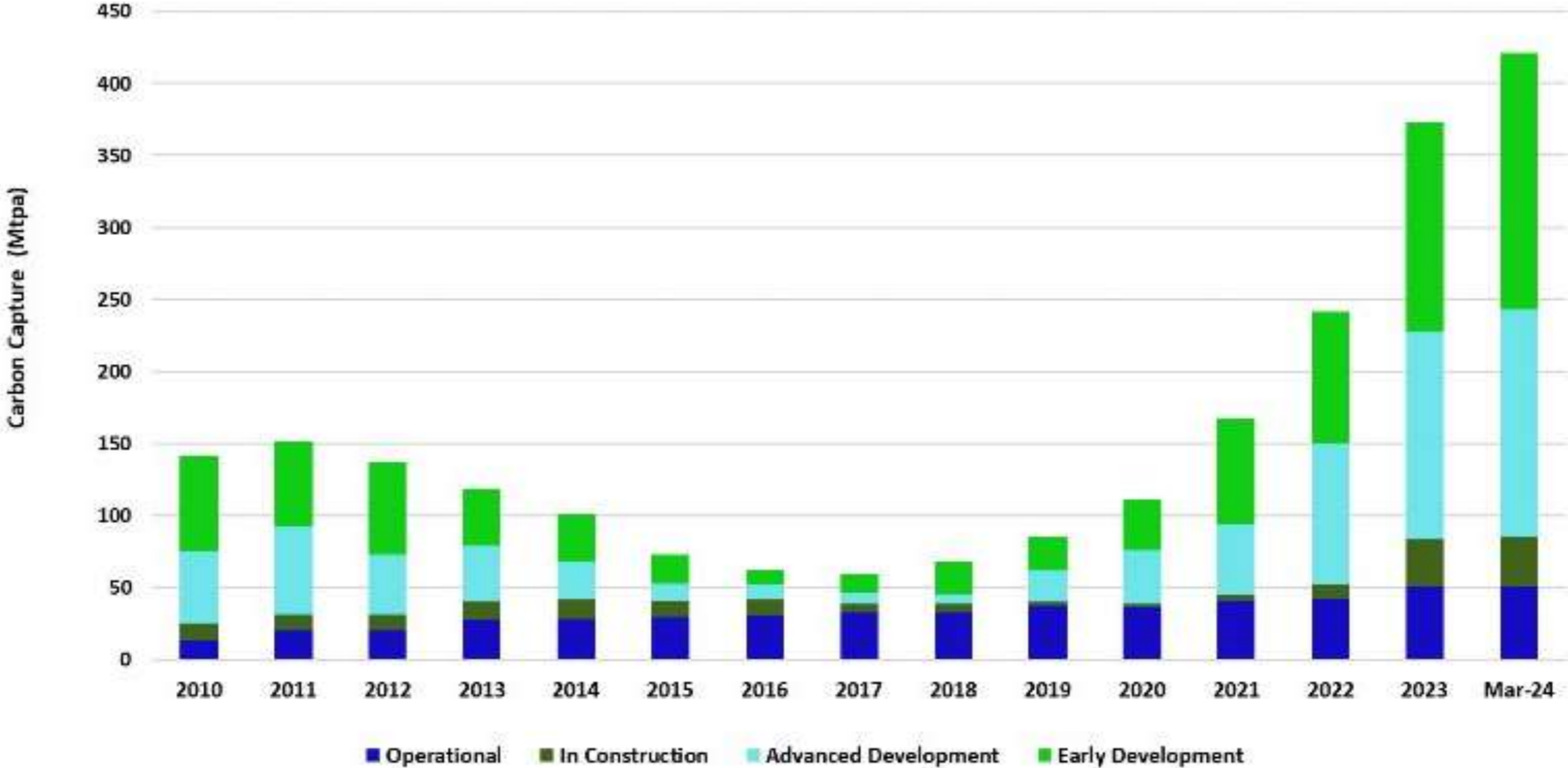
Updated from IEA SDS report 2019



Source: Jenkins (2023): 1.5°C- compatible scenario produced from IPCC's AR6 scenario database.[

PROJECTS PIPELINE: UNPRECEDENTED LEVELS

Capacity of Commercial Facilities Pipeline 2010-March 2024



Source: GCCSI CO2RE Database CCS Facilities through March 2024.

PROJECTS PIPELINE: GSR2024

628 Projects in the pipeline

416 Cumulative capture capacity

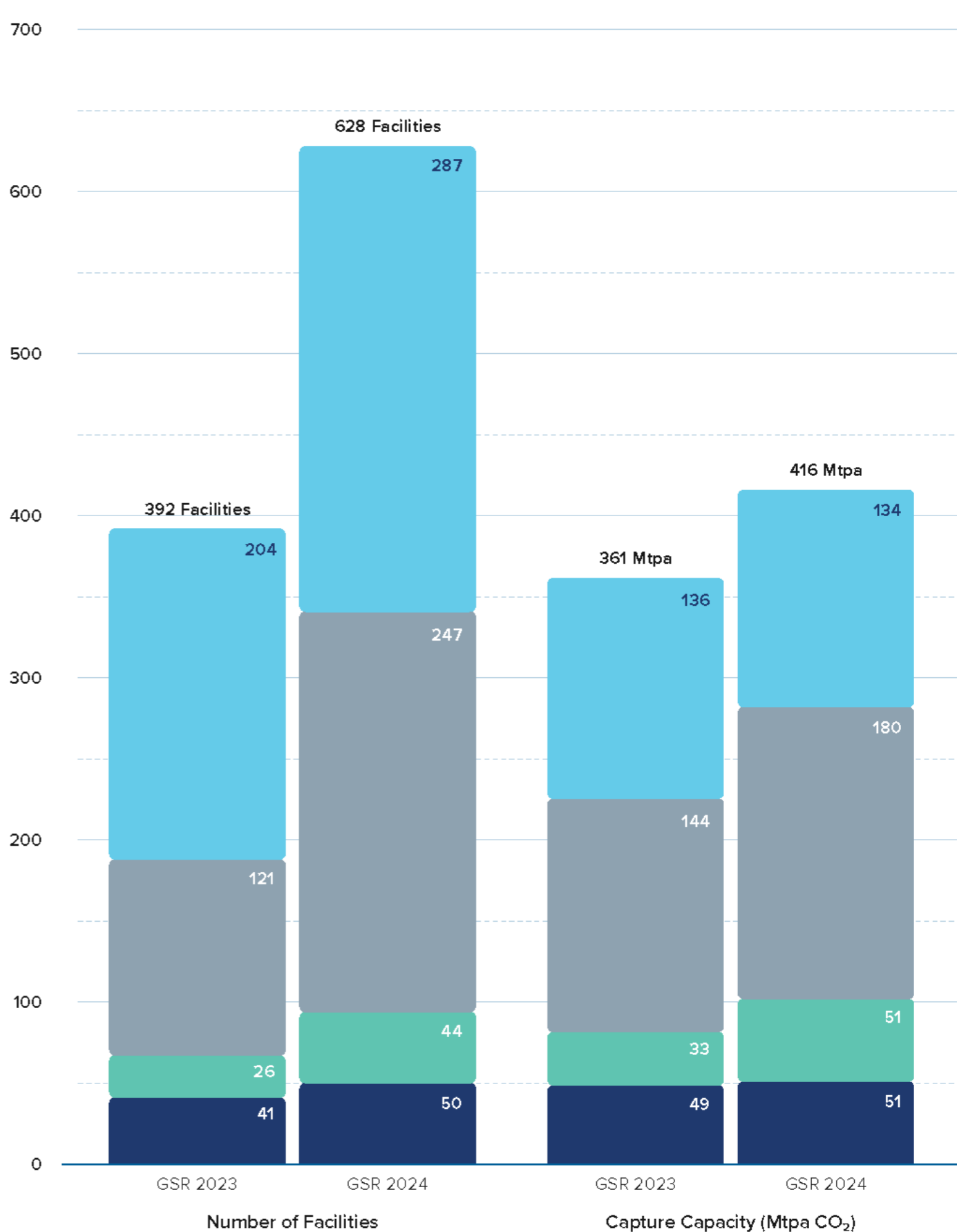
Significant growth in the CCS facilities pipeline

50 Facilities in operation

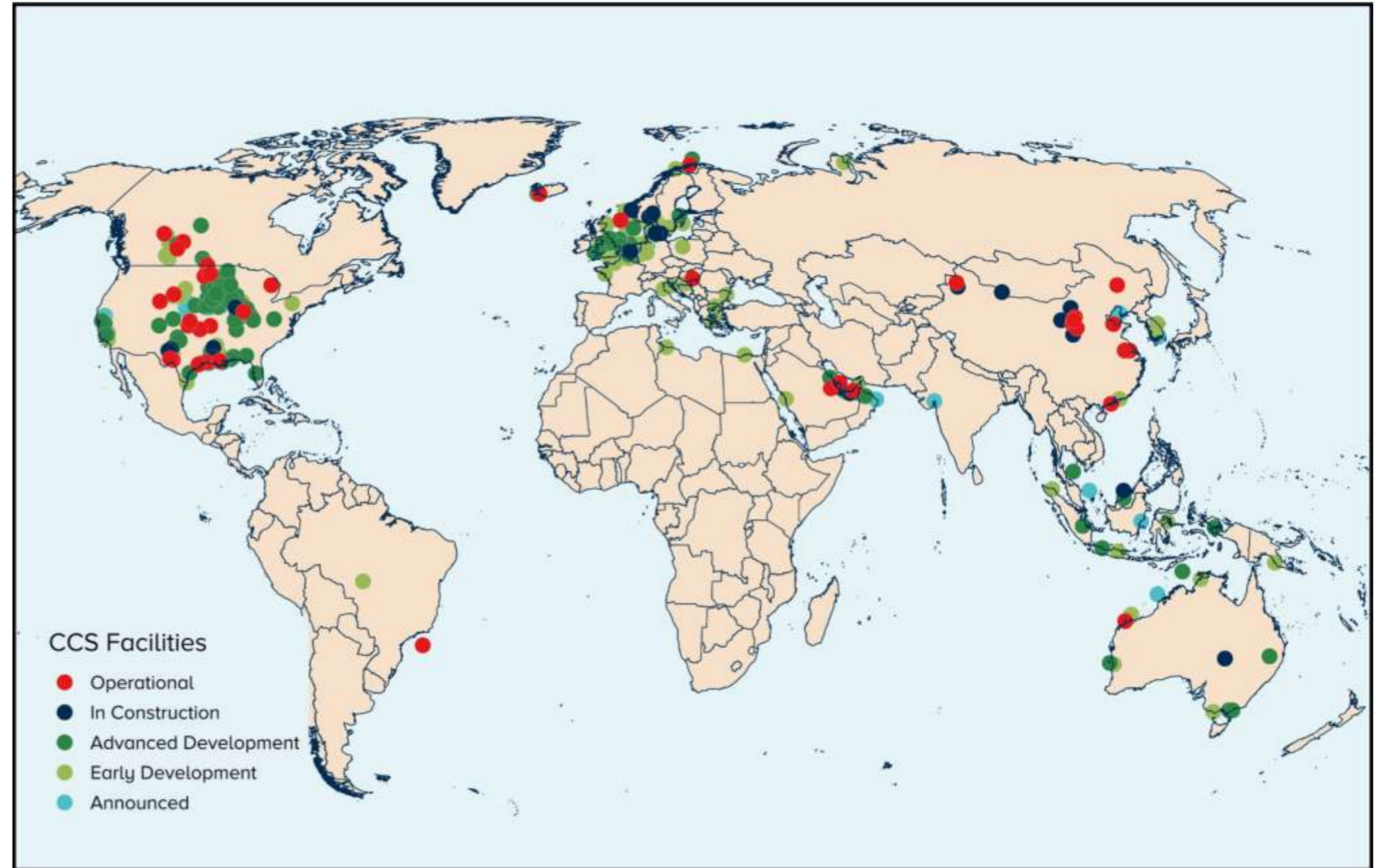
44 Projects in construction

■ Early Development
 ■ Advanced Development
 ■ In Construction
 ■ Operational

Commercial CCS facilities by number and total capture capacity



PROJECTS: WHERE?



This map does not include the following:

- Pilot and Demonstration Facilities
- Announced Facilities
- Facilities where precise location is yet to be confirmed

Source: GCCSI CO2RE Database CCS Facilities through March 2024.

APPLICATION MATURITY

Established Commercial Applications



NATURAL GAS
PLANT



STEAM METHANE
REFORMER



FERTILISER
PLANT



GASIFICATION PLANT



CHEMICAL
PLANT

Emerging Commercial Deployments



BIOMASS



CEMENT
PLANT



REFINERY



FUTURE POWER
GENERATION



COAL



STEEL
PLANT

CCUS DEVELOPMENTS: EUROPE

11 Operational
CCS facilities

15 Facilities in
construction

- 11 projects in operation / ready to operate
- 14 projects in construction (FID taken)
- 222 CCS projects (APR-25) vs 120 (GSR23) vs 73 (GSR22)
- Hydrogen, fertilizer, power gen, cement, biomass to power/heat, DAC
- Bilateral and multilateral agreements – including talks EU-UK!
- NZIA aims for 50 Mtpa storage (2030) → 44 O&G companies named
- UK £21.7B; Germany €3.3B; Denmark €3.8B; EUCOM approved €5.2 billion worth of state aid for CCS related investments in Sweden, Poland, and Portugal
- 14 crossborder CO₂ infrastructure projects on the PCI – PMI list
- EU ETS review (2026): include w-t-e? include CDR? Link with UK ETS?



CCUS DEVELOPMENTS: EUROPE

UNITED KINGDOM:

4 clusters capturing 20-30 mtpa (2030); **£21.7 billion allocated 2024**; £960 million GIGA fund; 27 storage permits issued; EU ETS integration with UK ETS anticipated

THE NETHERLANDS: SDE++; Aramis; Delta-Rhine and Delta-Antwerp corridor; **YARA & Porthos FID & construction**; 13 Mtpa storage target; Pension fund interest in T&S; Gasunie green bond;

DENMARK: Government funding, incl. for BECCS. **Permits onshore** + offshore; 4 Mtpa storage target; **Greensand FID & construction**; 13 Mtpa

NORWAY: **Northern Lights and Brevik now ready**; Growth beyond Northern Lights

SWEDEN: BECCS support

POLAND: 4 Mtpa storage target



GERMANY: Key principles for a Carbon Management Strategy; **Carbon Storage Act** adopted by Federal Cabinet ; **CCfDs**; 5 Mtpa storage target

AUSTRIA: Nat Carbon Mgmt Strategy

ROMANIA: Delayed adoption of National Integrated Energy and Climate Change Plan; 10 Mtpa storage target

GREECE: EU IF success; active storage regulator; Prinos too small? **access to Egypt?**

ICELAND: Carbfix onshore permit

ITALY: Injection at Ravenna; CCS committee; 7 Mtpa storage target

SWITZERLAND: call for CCS projects

FRANCE: Draft CCUS strategy released; **CCfD's**; tender; **London Protocol**

BELGIUM: Bilateral agreements; **pipeline network incl. regional regulation**; **offshore pipeline to Norway**; EU IF success; PCI success

National Carbon Management strategies: **Published** **In preparation**

CCS BILATERAL AGREEMENTS IN EUROPE

Countries	Austria	Belgium	Denmark	France	Germany	Iceland	The Netherlands	Norway	Sweden	Switzerland	United Kingdom
Austria			MoU (July 2024)								
Belgium			MoU (September 2022)		Joint declaration (February 2023)		MoU (June 2023)	MoU (April 2024)			MoU (February 2022)
Denmark	MoU (July 2024)	MoU (September 2022)		LoI (March 2024); MoU (March 2024)	Joint declaration (April 2023)		MoU (August 2022); MoU (October 2023)	MoU (June 2023); MoU (April 2024)	MoU (April 2024)		MoU (April 2023)
France			LoI (March 2024); MoU (March 2024)				Pact (April 2023)	LoI (December 2022); LoI (January 2024)			Statement of cooperation (March 2023)
Germany		Joint declaration (February 2023)	Joint declaration (April 2023)					Joint declaration (January 2023)			Joint declaration (November 2023)
Iceland										Declaration of Intent (July 2021)	
The Netherlands		MoU (June 2023)	MoU (August 2022); MoU (October 2023)	Pact (April 2023)				MoU (April 2024)		MoU (March 2022)	
Norway		MoU (April 2024)	MoU (June 2023); MoU (April 2024)	LoI (December 2022); LoI (January 2024)	Joint declaration (January 2023)		MoU (April 2024)		MoU (April 2024)	Declaration of Intent (May 2024)	CCS-CDR agreement (June 2025)
Sweden			MoU (April 2024)					MoU (April 2024)		MoU (December 2023)	
Switzerland						Declaration of Intent (July 2021)	MoU (March 2022)	Declaration of Intent (May 2024)	MoU (December 2023)		
United Kingdom	MoU (Feb 22)	MoU (February 2022)	MoU (April 2023)	Statement of cooperation (March 2023)	Joint declaration (November 2023)						

Global CCS needs global collaboration



Outlook is positive for CCS

Increasing policy support, new investments, & project deployments worldwide

Challenges still to overcome

Difficult investment settings, community concerns, regulatory barriers

Collaboration is key to global CCS deployment

Governments, industry, and research community must work together to remove barriers, lower costs and drive investment

THANK YOU