

28 FEBRUARY 2024

# GLOBAL STATUS OF CCS 2023

JOEY MINERVINI, PUBLIC AFFAIRS MANAGER – AMERICAS



GLOBAL CCS  
INSTITUTE



# ABOUT THE INSTITUTE

Accelerating the deployment of ccs for a net-zero emissions future

## WHO WE ARE

- International, non-profit climate change think tank
- HQ in Melbourne (offices in Washington D.C., Houston, London, Brussels, Abu Dhabi, Beijing, and Tokyo)
- More than 200 members comprising governments, global corporations, technology companies, research institutions, and non-governmental organizations

## WHAT WE DO

- Fact-based CCS advocacy
- Catalytic thought leadership
- Authoritative knowledge-sharing



# ABOUT THE INSTITUTE

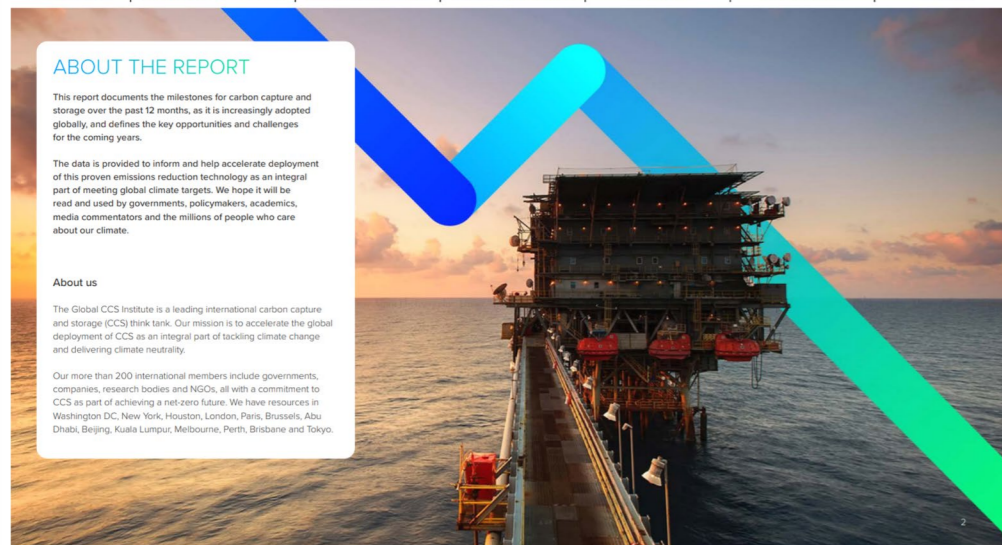
CCS Advocacy





# ABOUT THE INSTITUTE

## Thought Leadership



**IAN HAVERCROFT**  
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# ABOUT THE INSTITUTE

Knowledge Sharing

<https://co2re.co/>

GLOBAL CCS INSTITUTE **CO<sub>2</sub>RE** ABOUT US CONTACT US LOGIN

Home / Facilities

Policies Storage Legal & Regulatory **Facilities** Networks Emissions CCS Requirement CCS Readiness

Facilities Database [Public]

CCS Facilities will be classified as:

- 1. Commercial**
  - CO<sub>2</sub> captured and transported for permanent storage as part of an ongoing commercial operation.
  - Generally have economic lives similar to the host facility whose CO<sub>2</sub> they capture.
  - Must support a commercial return while operating and meet a regulatory requirement.
- 2. Pilot and Demonstration**

Facility Category: ● Commercial CCS ● Pilot/Demonstration

Region: All Country: All Facility Category: All Facility Status: All

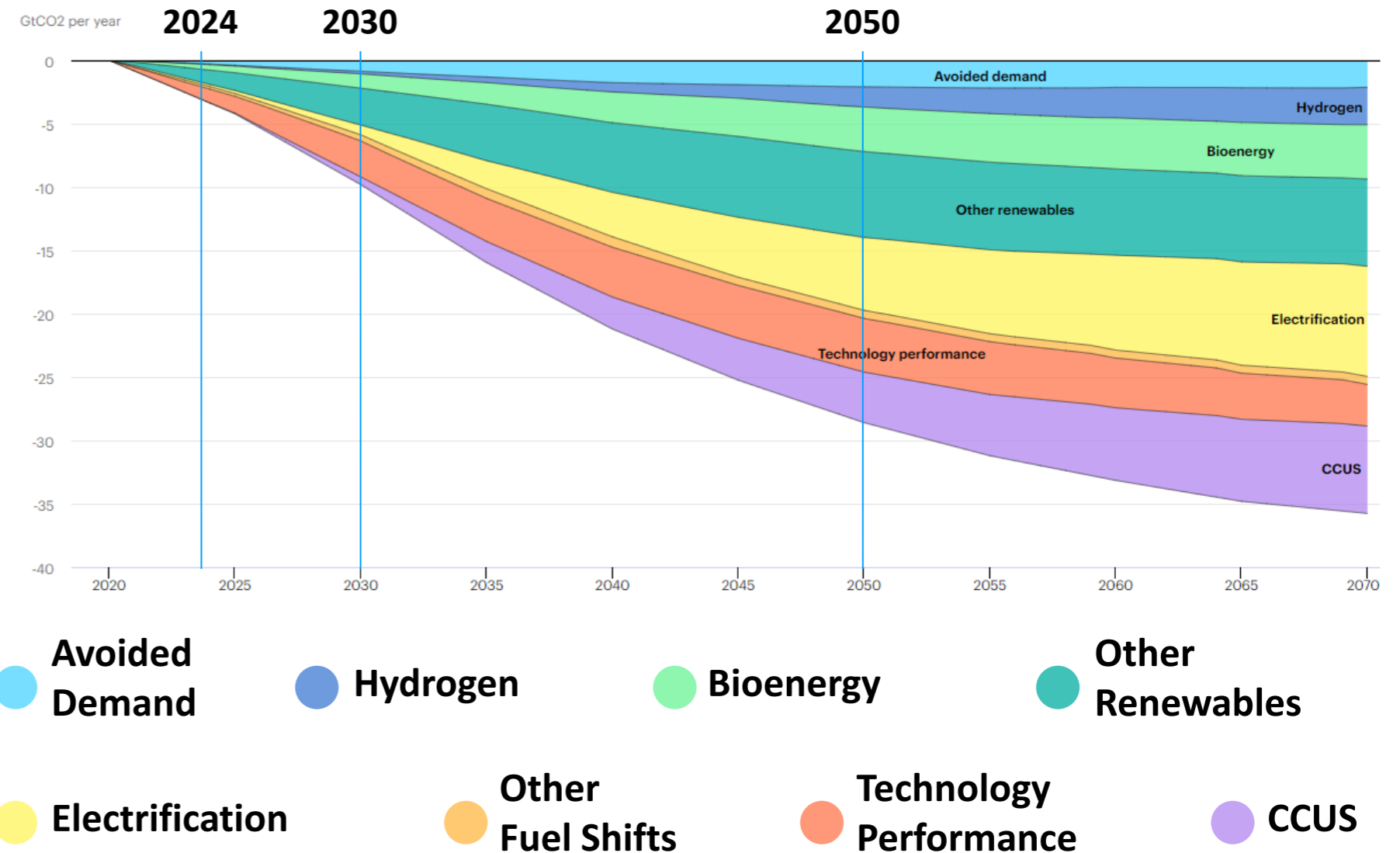
Name	Facility Category	Facility Status	Country	Operational	Industry	Description
One Earth Energy Ethanol	Commercial CCS Facility	Advanced Development	USA	2025	Ethanol	A CO <sub>2</sub> capture assessment will be performed for the One Earth Energy facility, an ethanol production plant in Illinois, the United States. The storage site is the adjacent Illinois Storage Corridor, a CCS network.
MOL Szank Field	Commercial CCS Facility	Operational	Hungary	1992	Natural Gas Processing	A CO <sub>2</sub> -EOR facility has been operating in the Ivanic Oilfield, near Szank, Central Hungary, since 1992. It has cumulatively injected nearly 2 million tonnes of CO <sub>2</sub> for storage as of 31 December 2020. Oil production started in the oil fields between 1966-1970, reaching a high water cut (70%) in 1990. In 1992, a sweetening unit (with amine technology) was built to increase CO <sub>2</sub> concentration for gas injection. In addition, nine production wells were re-completed into CO <sub>2</sub> injectors. In 2002, the CO <sub>2</sub> content reached up to 80% of the total gas injection. The current injection rate is 0.06-0.16 The site has cumulatively injected nearly 2 million tonnes of CO <sub>2</sub> for storage as of 31 December 2020. The Hungarian oil company MOL group has been operating CO <sub>2</sub> injection for enhanced oil recovery (EOR) and enhanced gas recovery (EGR) since the 1970s.
Whitecap Resources Rolling Hills Hub	Commercial CCS Facility	Early Development	Canada	2026	CO <sub>2</sub> Transport / Storage	AltaGas Ltd. and Whitecap Resources Inc. working on Alberta carbon hubs for a potential sequestration hub northwest of Calgary slated to be on stream in potentially 2026. This CO <sub>2</sub> storage hub is part of the Alberta Government's "Carbon storage hubs" proposal and permitting programme.

Microsoft Power BI



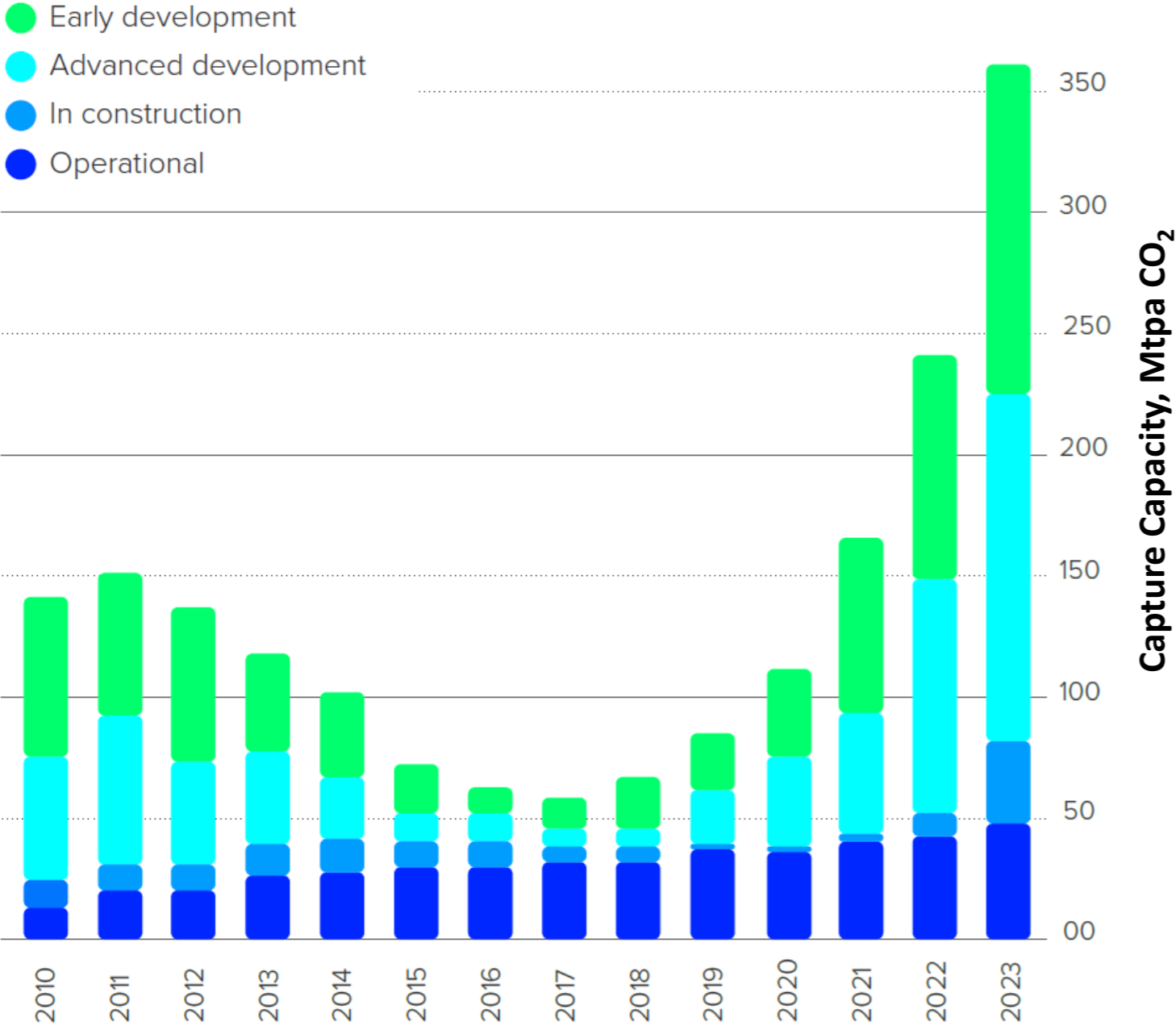
# WHY CCS?

- No single climate solution
- Scientific consensus that CCS is necessary to achieve our climate goals.
- UNFCCC, IEA conclude CCS needed in the portfolio of climate mitigation options



IEA 2020: Energy Technology Perspectives 2020

# GLOBAL CCS PROJECT PIPELINE: UNPRECEDENTED LEVELS



49

MTPA OF CO<sub>2</sub> CAPTURE CAPACITY IN OPERATION

32 Mtpa CO<sub>2</sub> in construction, 280 Mtpa CO<sub>2</sub> in development  
 – total project pipeline capacity is 361 Mtpa CO<sub>2</sub>

41

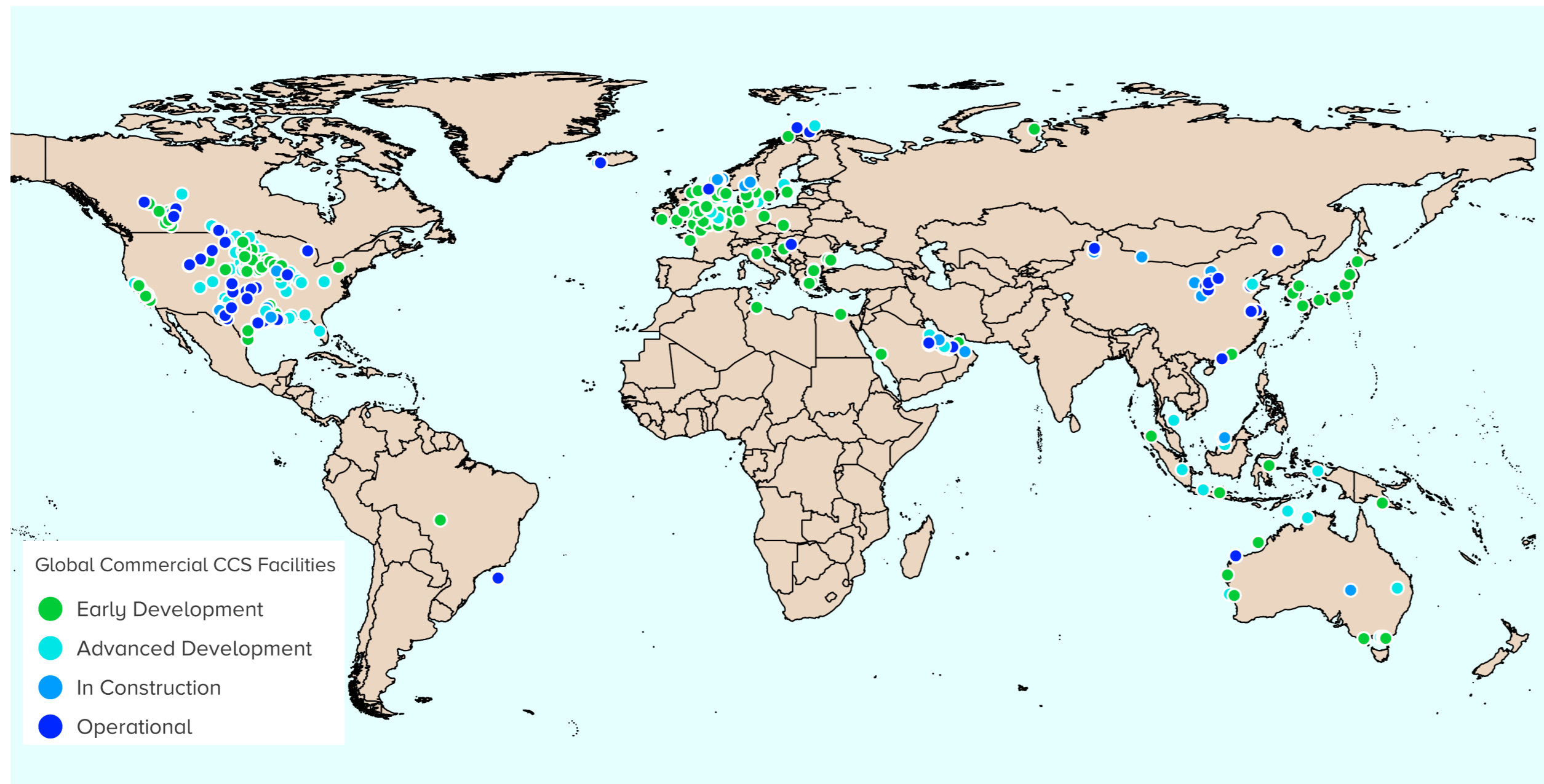
CCS FACILITIES IN OPERATION

26 in construction, 325 in development

198

NEW CCS FACILITIES ADDED TO THE PROJECT PIPELINE  
 SINCE 2022 GLOBAL STATUS OF CCS REPORT

# GLOBAL CCS FACILITIES - 2023



41 Facilities  
in operation ●

26 Facilities  
in construction ●

325 Facilities  
in development ● ●

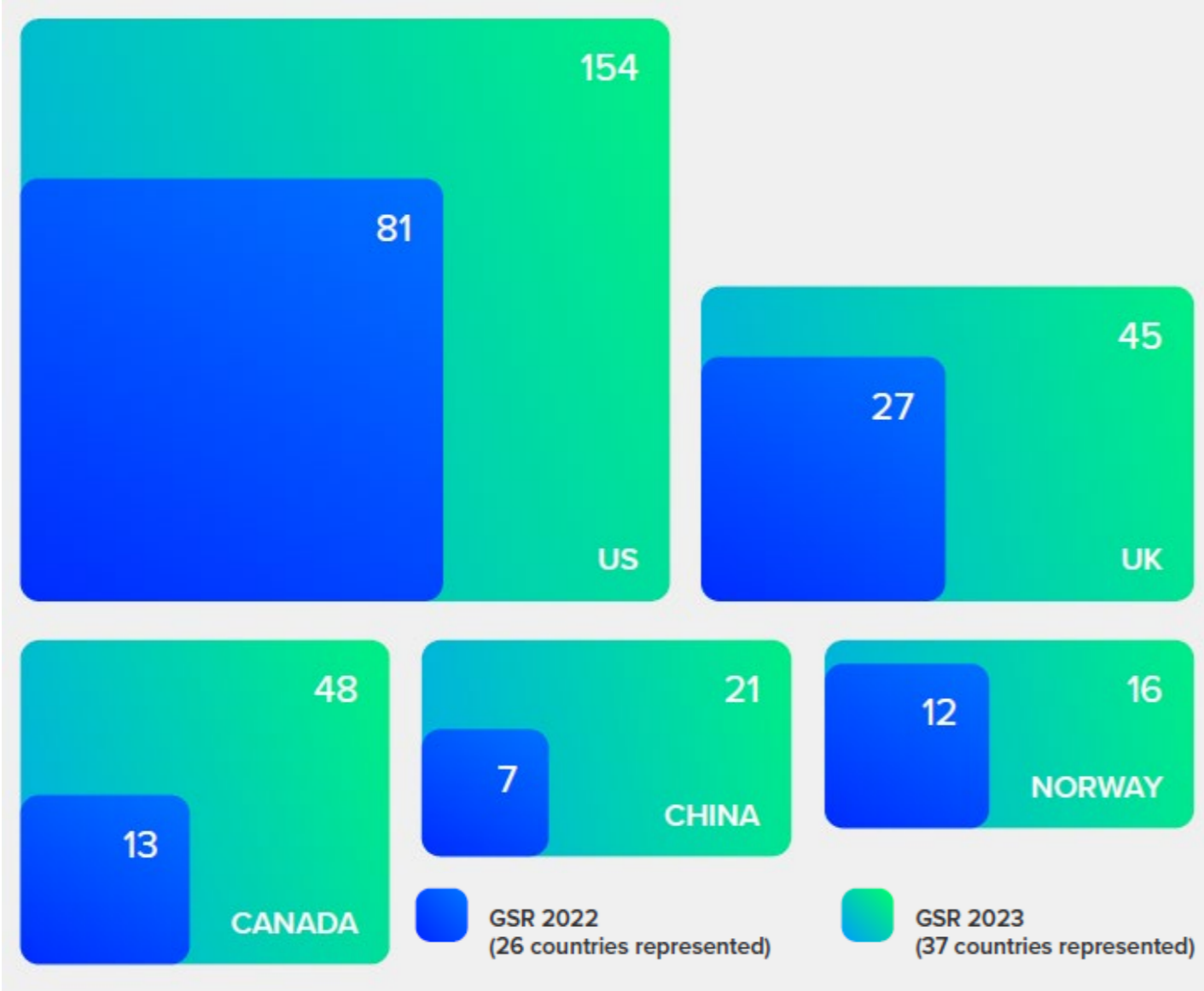
**102%**  
year-on-year increase in  
number of CCS facilities  
in development pipeline.

\*Statistics include Navigator Heartland Greenway network, which was cancelled after Global Status Report publication

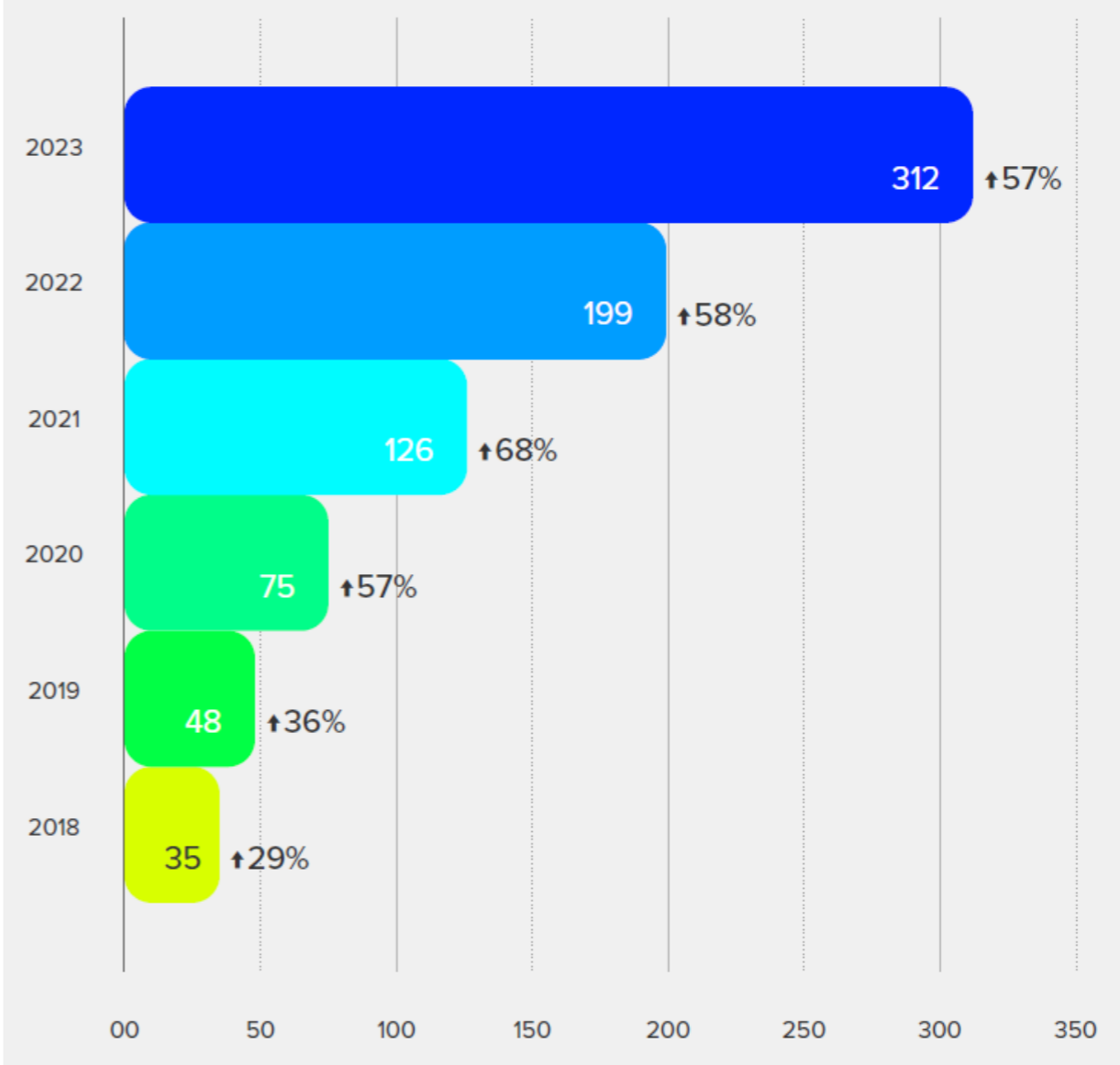


# MORE CCS FACILITIES IN MORE COUNTRIES

2022 to 2023 growth in CCS projects (in development to operating):  
top 5 countries

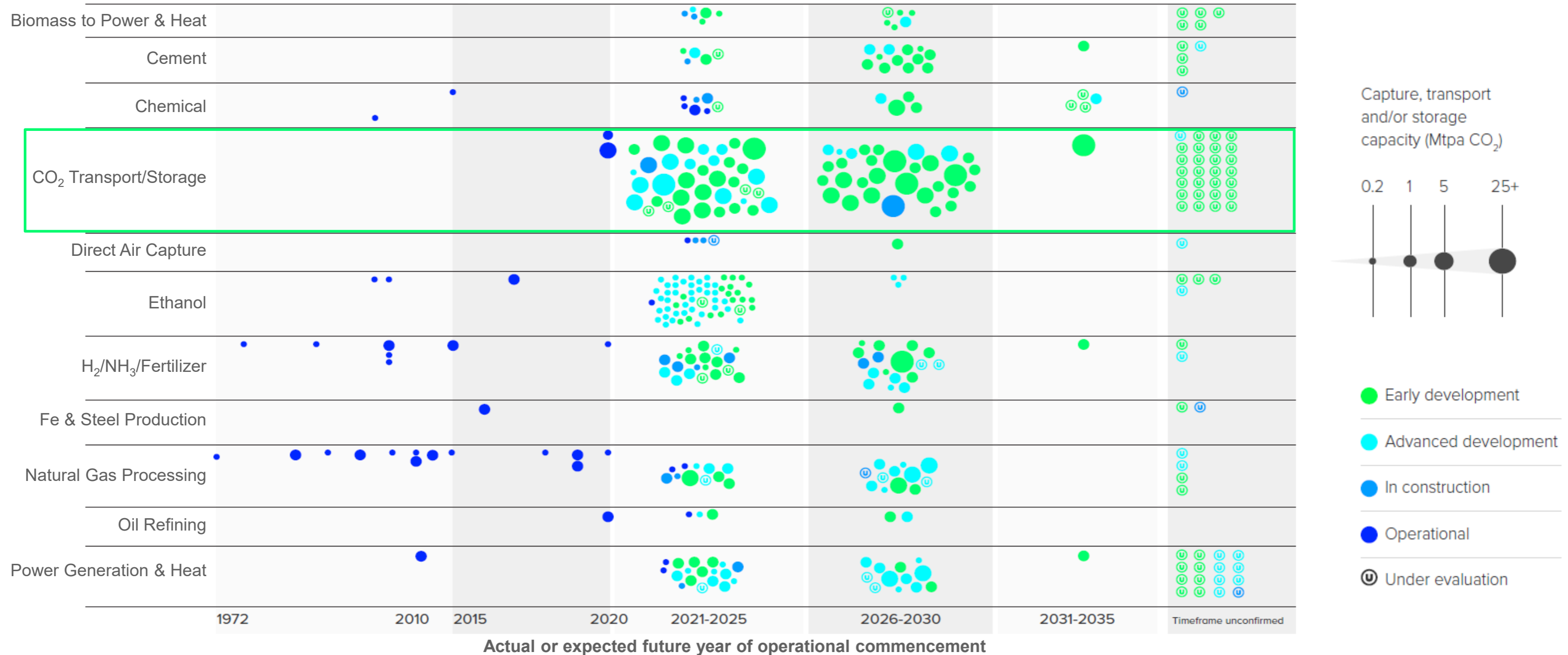


Capture capacity of CCS projects in construction and development  
(Mtpa CO<sub>2</sub>)

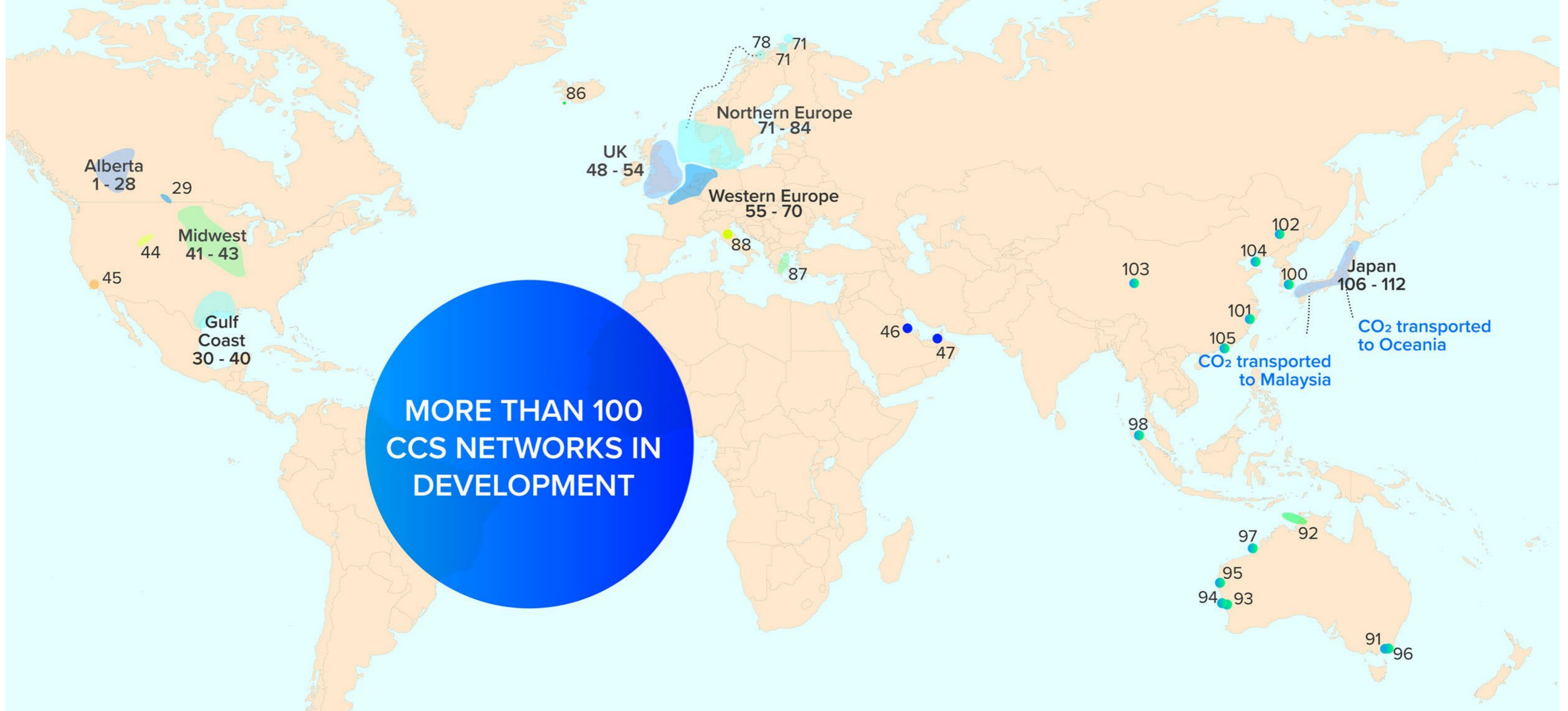




# APPLICATION OF CCS ACROSS INDUSTRIES







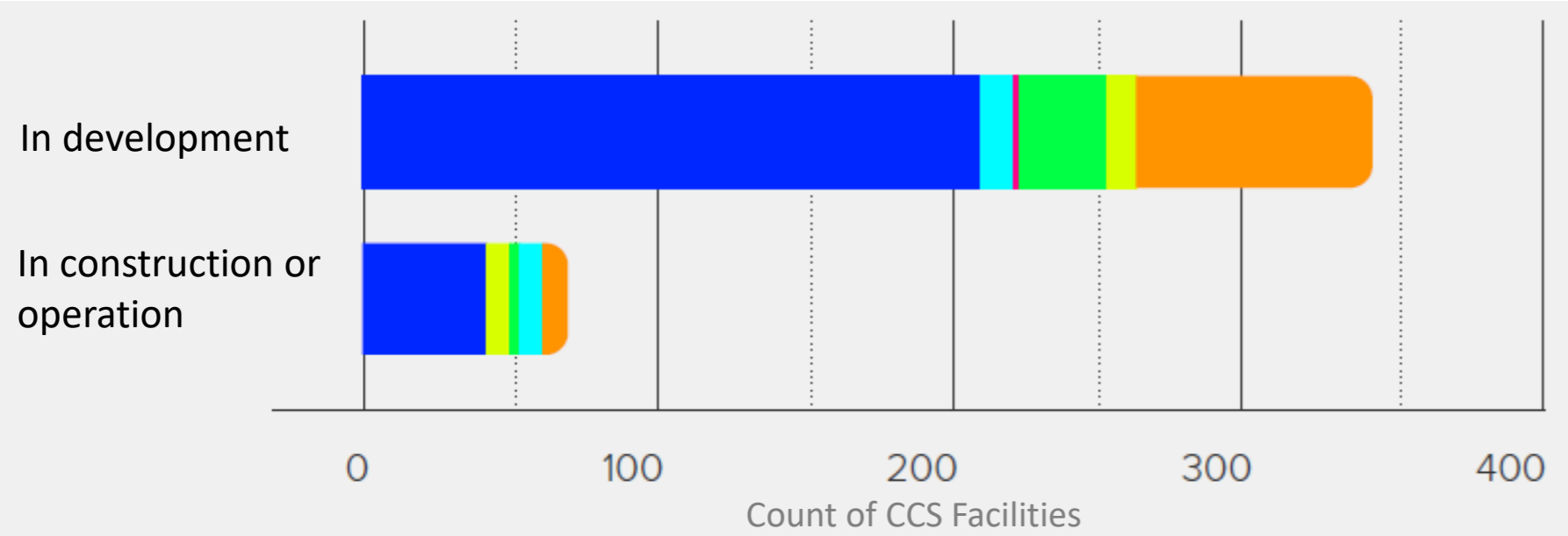
Numbers are unique network identifiers. E.G in Japan, there are 7 separate CCS Networks in development



# EVOLVING CO<sub>2</sub> TRANSPORT & STORAGE

More complex CO<sub>2</sub> transport logistics emerging

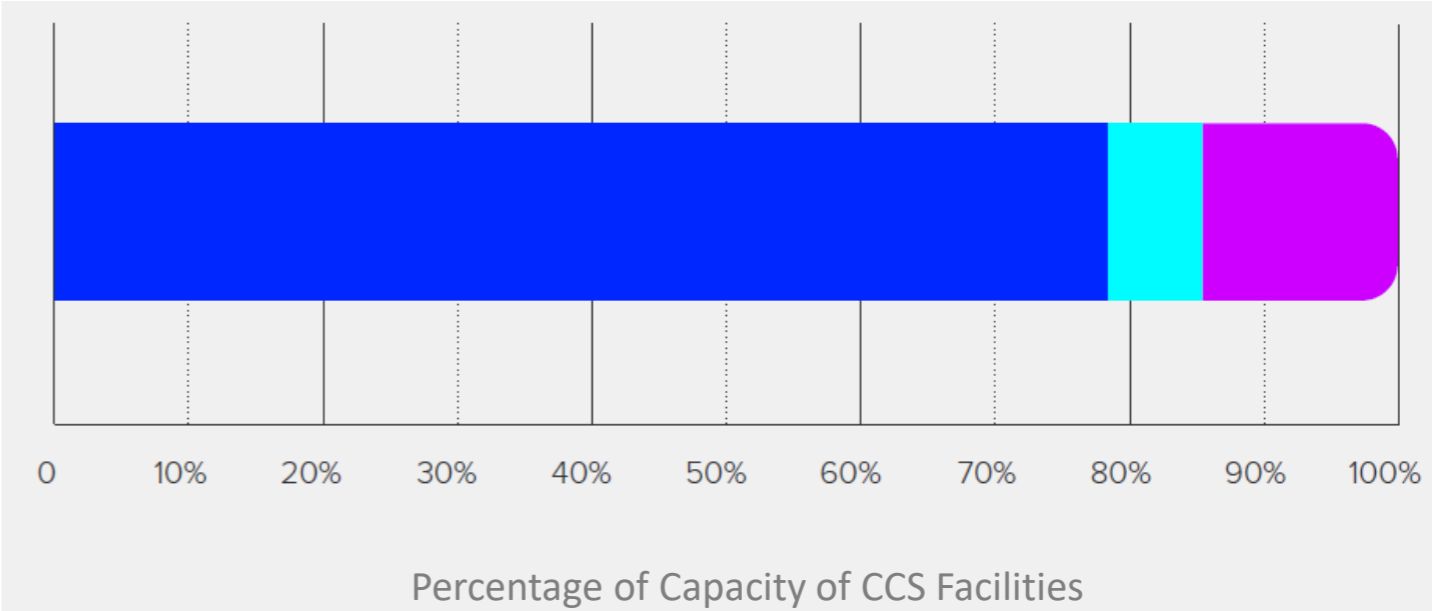
CCS Facility by CO<sub>2</sub> Transport Mode



- Pipeline
- Ship
- Rail
- Combination
- Onsite injection
- Under evaluation

78% of CCS facilities in construction or development by capacity expected to use dedicated geological storage

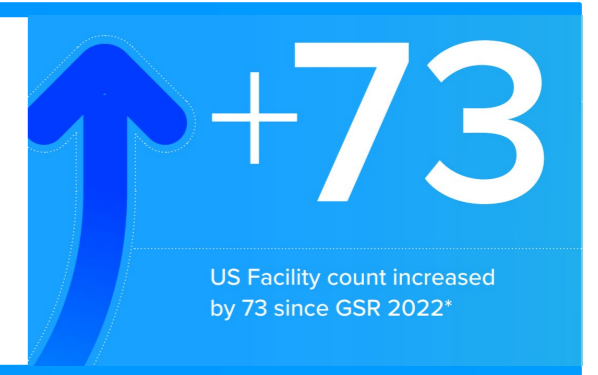
CCS Facility Capacity by Storage Type



- Dedicated geological storage
- Enhanced oil recovery
- Under evaluation



# CCS DEVELOPMENTS IN THE USA



- US facility count (all stages of development) increased by 73 compared to GSR2022 – benefitting from Inflation Reduction Act (2022), CHIPS & Science Act (2022) and Bipartisan Infrastructure Law (2021).
  - BIL includes over USD 12 billion in investments in carbon management.
  - IRA lowers carbon capture thresholds, increases the dollar value of tax credits and adds provisions for direct pay and tax credit transferability.
- Ethanol, ammonia, hydrogen and fertilizer production, as well as power generation and heat are the top applications for carbon capture in the USA.
- The Department of Interior (BOEM) is developing regulations for offshore storage and the Department of Transportation (PHMSA) is updating CO<sub>2</sub> pipeline standards (new rules now submitted to OMB for review).
- The US EPA has received an unprecedented number of Class VI permit applications (As of Feb 16, 2024: 125 wells associated with 42 projects at EPA regional offices, with another 78 wells associated with 38 projects in WY, ND, and LA).
- Regulatory uncertainty and permitting demand, as well as lack of community support in some areas, pose risks to CCS deployment in the US. These challenges arise in other regions, including Europe.



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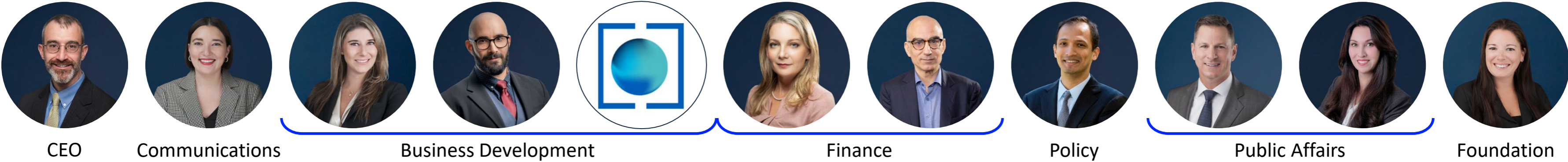
# REALIZING CCS AT SCALE GLOBALLY

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- Reaching the required scale for CCS will require us all to work together.
- Existing climate change policy commitments and pledges, if delivered, can get us to hundreds of million tonnes per annum scale.
- To reach gigatonne per annum scale globally, deployment in emerging markets and developing economies should increase significantly.
- Scaling up CCS to the levels needed to achieve net zero, the highest levels of safety, environmental stewardship, accountability, community engagement, and societal benefits need to be incorporated into projects.
- Project lead times must decrease to achieve the level of global deployment needed by 2030.
- Large role for governments in developing policy to drive investment.



# INSTITUTE ENGAGEMENT IN THE U.S.



## 74 U.S. MEMBERS

- Government
- Industrial Manufacturers
- Technology Providers
- Engineering / Tech Services
- Power Producers
- Extractive Industry
- Financial Institutions
- Labor Unions

## COLLABORATION

NGOs, U.S. states, international partners, law firms, R&D organizations, think tanks



## EVENTS





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# OPPORTUNITIES FOR STATE-LEVEL ENGAGEMENT

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## EDUCATE

Lawmakers and staff, state-level organizations, community groups and other stakeholders on CCS role in Net-Zero, its versatility, technical maturity, safety and effectiveness, opportunities and benefits to communities

## PARTNER

Collaborate with state-level organizations, academic institutions, in-state industry to conduct outreach and build public trust and awareness

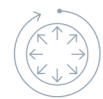
## ADVOCATE

Provide fact-based information to support public discourse, state-level initiatives and decision making aimed at accelerating safe and effective CCS deployment



# OPPORTUNITIES FOR COLLABORATION WITH STATES

## Example from the state of Western Australia (in collaboration with CSIRO)



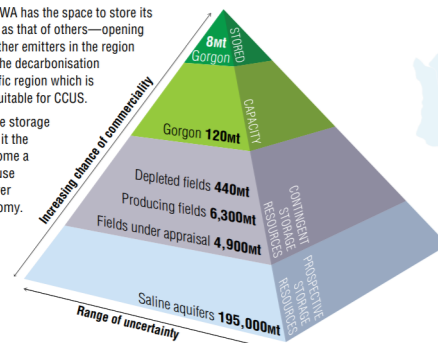
### Carbon storage capacity

The modelled Pilbara example would have a capacity to sequester 40mtpa—a similar amount to that currently being stored annually across the globe.

Overall WA has abundant potential capacity to store CO<sub>2</sub>. The study shows a total prospective storage resources of 195,000mt CO<sub>2</sub>. North Canarvon Basin alone with prospective storage resources of 48,000mt is sufficient to store all WA's current annual emissions for 700 years.

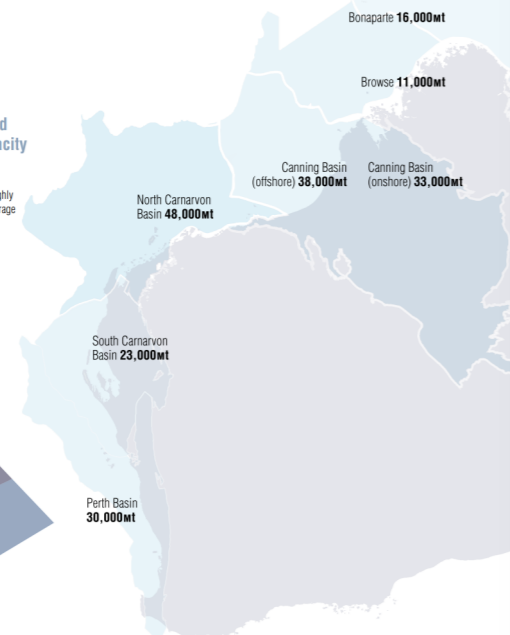
This means that WA has the space to store its own CO<sub>2</sub> as well as that of others—opening up a market to other emitters in the region and supporting the decarbonisation of the Asia-Pacific region which is geologically unsuitable for CCUS.

WA's prospective storage resources gives it the potential to become a global powerhouse in the future lower emissions economy.



WA's existing and prospective capacity

Geological basin highly suitable for CO<sub>2</sub> storage



#### Enablers/accelerators

1. A regulatory regime to establish rights-of-way to CCUS hubs
2. Support the exploration and appraisal of prospective storage resources

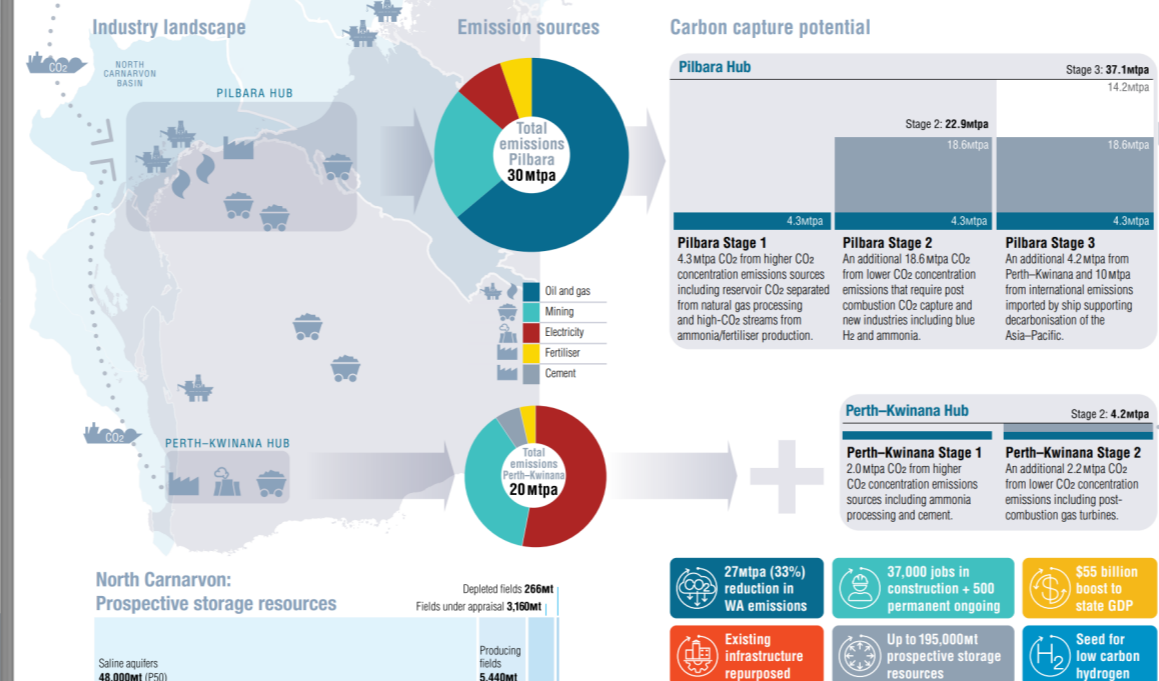


Enough capacity to store 700 years of WA emissions and that of our regional partners.

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KEY FINDINGS FROM THE WA CCUS HUBS STUDY UNDERTAKEN BY CSIRO AND GCCSI FOR THE WA LNG JOBS TASKFORCE

### Hubs example: Pilbara and Perth-Kwinana



SOURCE: CARBON STORAGE TASKFORCE 2009, NATIONAL CARBON MAPPING AND INFRASTRUCTURE PLAN

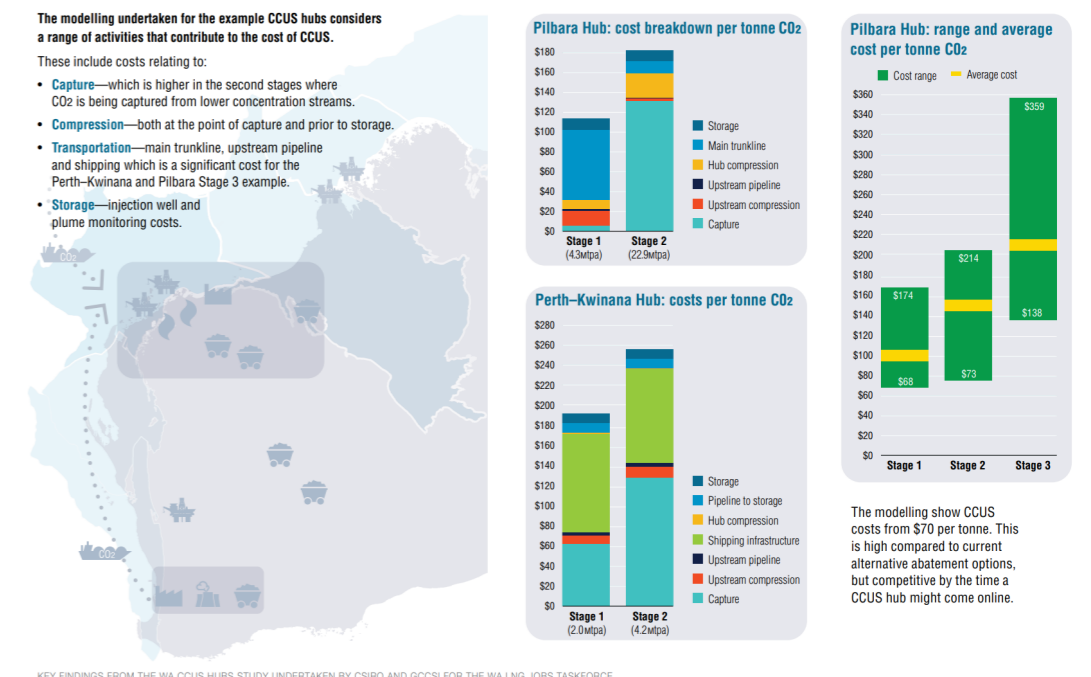
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### Hubs example: contributing costs

The modelling undertaken for the example CCUS hubs considers a range of activities that contribute to the cost of CCUS.

These include costs relating to:

- **Capture**—which is higher in the second stages where CO<sub>2</sub> is being captured from lower concentration streams.
- **Compression**—both at the point of capture and prior to storage.
- **Transportation**—main trunkline, upstream pipeline and shipping which is a significant cost for the Perth-Kwinana and Pilbara Stage 3 example.
- **Storage**—injection well and plume monitoring costs.



KEY FINDINGS FROM THE WA CCUS HUBS STUDY UNDERTAKEN BY CSIRO AND GCCSI FOR THE WA LNG JOBS TASKFORCE

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## Study on the potential for CCS Hub development



# THANK YOU

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Download the report here:

[status23.globalccsinstitute.com](https://status23.globalccsinstitute.com)



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