



International Workshop on Offshore Geologic CO₂ Storage



6th International Workshop

13-14 September 2023

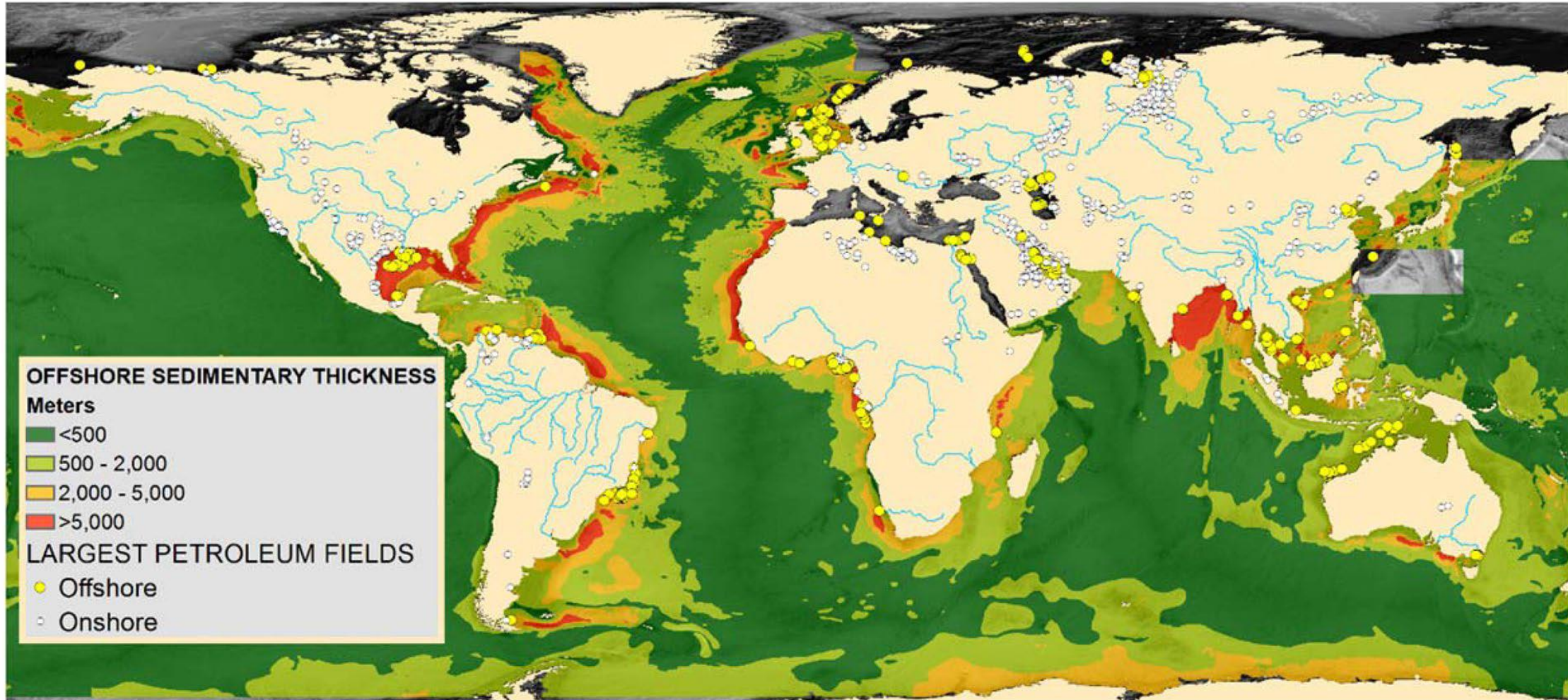
Aberdeen



STOREGDA



The global offshore continental shelves represent the largest near-term storage for Gigaton-scale CCS



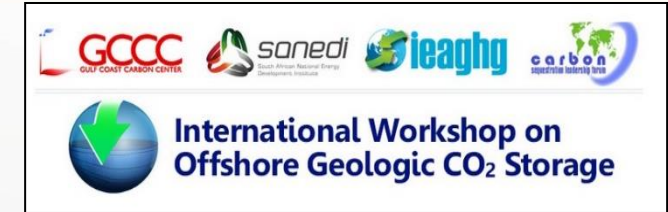
CSLF Report on Offshore Geologic CO₂ Storage



“There is a growing wealth of research, development and practical experiences that are relevant to CO₂ storage offshore, but this expertise is familiar only to a few specific countries around the world. However, there is also significant global potential for offshore CO₂ storage, and countries who are not yet active but may become interested in offshore storage, would benefit from knowledge sharing from these existing experiences and expertise. Such international knowledge sharing would be facilitated by international workshops and by international collaborative projects.”

(CSLF Ministerial Nov 2015: CSLF-T-2015-06)

Workshop Series



- **1st Workshop, 19-21 April 2016, at the BEG, University of Texas, Austin.** 50+ attendees from 13 countries.
 - Organized by the Bureau of Economic Geology (BEG) at the University of Texas at Austin in collaboration with the South African Center for CCS at SANEDI, IEAGHG, and with support from CSLF and UNFCCC's CTCN.
 - To facilitate sharing of knowledge and experiences among those who are doing offshore storage and those who may be interested.
 - **IEAGHG Report 2016-TR2**
- **2nd Workshop 19-20 June 2017, at Lamar University Beaumont, Texas.** 50+ attendees from 9 countries
 - To address and build on the recommendations and topics raised at the first workshop to take offshore storage forward. Continuing the theme of 'how to do'
 - **IEAGHG Report 2017-TR12**

3rd Workshop



Hosted by Research Council of Norway, Oslo, 3-4 May 2018

Aim: To address and build-on the recommendations and topics raised at the first two workshops to take offshore storage forward. Continuing theme of 'how to do'.

Scope:

- How to learn from learnings?
- Value chains for offshore
- Infrastructure (re-use)
- Monitoring offshore CO₂ storage/EOR
- Offshore CO₂ storage resource assessment
- Project updates
- Standards and regulatory frameworks
- Brainstorming towards an international collaborative project

[IEAGHG Report 2018-TR02](#)



4th Workshop



Hosted by University of Bergen, Norway, Feb 2020

Aim: To address and build-on the recommendations and topics raised at the first three workshops to take offshore storage forward. Continuing theme of 'how to do'. 150 attendees. [IEAGHG Report 2020-TR02](#)

Scope:

- Infrastructure
- Deep subsurface monitoring and modelling offshore CO₂ storage
- Regulatory frameworks
- Project updates
- Emerging CCS country needs and progress
- Brainstorming towards an international collaborative project
- *With alternate sessions from*



5th Workshop, New Orleans

19-20 May 2022, Hosted by BEG UT and SSEB



Agenda

- Welcome & Scene Setting
- International Project Roundup (16 projects)
- Technical Aspects of Depleted Fields
- Containment & Pressure Management
- Regulations and Offshore CCS
- Technical Aspects of Saline Formations
- Monitoring Offshore CCS
- Shipping & Shore Infrastructure
- Summary & Recommendations
- [Report IEAGHG 2022-TR05](#)





Conclusions

- The growing number of projects since last workshop! Momentum!
- The range of projects, good for others to learn from
- Some projects planning to use shipping for transport and/or injection
- Good participation by regulators. New industry players coming in
- Re-use of infrastructure is complex, technically and legally. Good examples of the details needed from some projects
- Can we co-locate activities? Maybe, maybe not
- Pleased to see use of env monitoring research outputs for real projects (STEMM-CCS and ECO2 to N.Lights, Greensand, Northern Endurance Partnership)
- N.Lights Env Mon plan 'fit for purpose'

Recommendations

- Continue this outreach – to new industry players and sectors, and to new countries
- Capacity estimations need consistency – use SRMS
- Need work on environmental impacts in GoM?
- Make needs and perspectives known to regulators
- Each site is different-need to let regulators know one size does not fit all.

Attributes of Projects in Development

Courtesy of Ben Pullen, IEAGHG

Project Name	Country	Storage Type	Project phase	In Operation	Estimated Storage Capacity (Mt)	Storage Rate Target (Mt/yr)	CO2 Sources	CO2 Transport	CO2 Handling	Infrastructure Reuse?
Cascadia CarbonSAFE and Solid Carbon projects	USA	Basalt	Planning	Undisclosed	>50	1–3	Industrial	Ship + Pipeline	Floating vessel	No
Talos Low Carbon Solutions, Gulf of Mexico	USA	Saline	Planning	2024–2026	800 (Across 4 sites)	Regional hub: 5–10	Industrial	Pipeline	Fixed platform	Yes
GoM Depleted Field CCS Development by Cox Oil	USA	Saline	Planning	Undisclosed	–	–	Industrial	Pipeline	Fixed platform	Yes

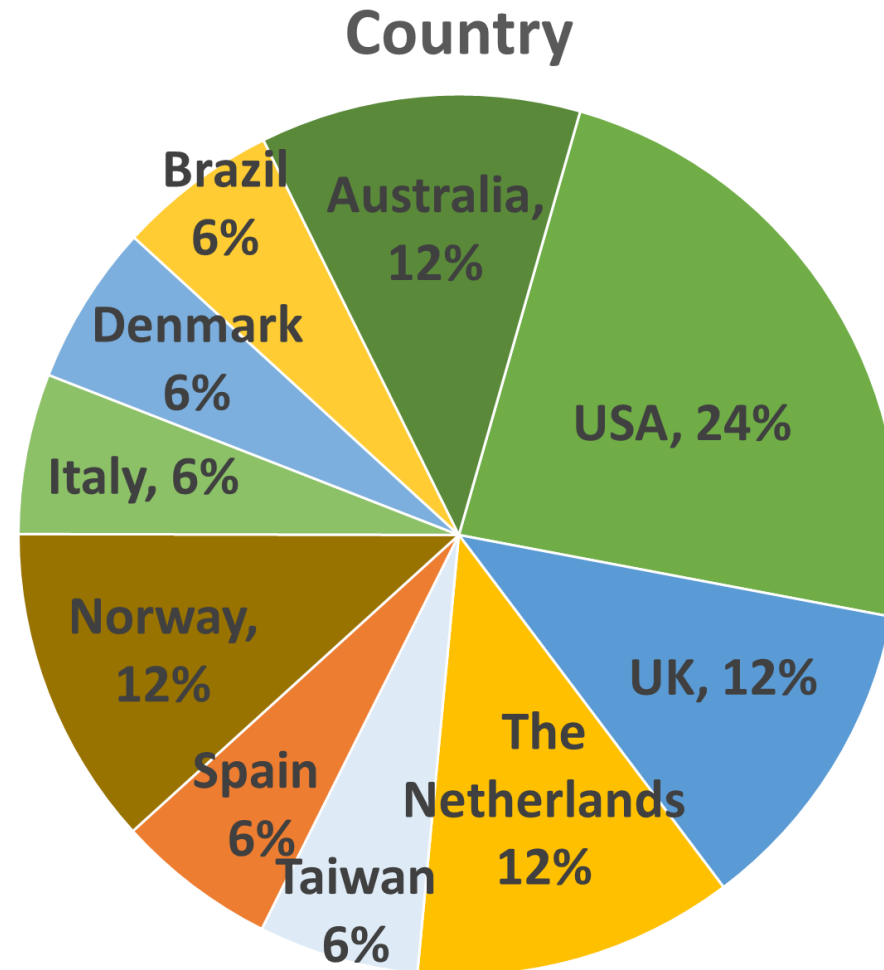
Additional 90 million tonnes per year by 2030!

Aramis	The Netherlands	Depleted Gas	In planning	2026–2027	–	4	Industrial	Ship + Pipeline	Fixed platform	Yes
CCS Status in Taiwan	Taiwan	Saline	Planning	2025	45,900	3.5	Energy + Industrial	Pipeline	Fixed platform	No
Ebro Offshore project	Spain	Saline + Shale caprock	In planning	Undisclosed	40	–	Industrial	Pipeline	Fixed platform	Yes
Northern Lights	Norway	Saline	In build	2024	–	7	Industrial	Ship + Pipeline	Fixed platform	No
Polaris project	Norway	Saline + Shale caprock	Planning	2025	100	2–6	Industrial	Ship	Floating vessel	No
Ravenna CCUS project	Italy	Depleted Oil & Gas	In design	2027	–	4	Industrial	Pipeline	Fixed platform	Yes
Project Greensand	Denmark	Depleted Oil & Gas	In design	2025	–	4–8	Any emitter	Ship	Floating vessel	Yes
Petrobras' Pre-Salt CCS project	Brazil	Oil & Gas reservoirs + Saline	Operational	2012	–	8.7	Industrial	Direct reinjection from ship	Floating vessel	Yes
Deep C Store	Australia	Depleted Oil & Gas	Planning	2029	16,000	5	Any emitter	Ship	Floating vessel	No
Pelican project	Australia	Depleted Oil & Gas + Coal seams	In design	2025-2030	>125	5	Industrial	Pipeline	Fixed platform	Yes

Developing Project Attributes

10 countries from many regions of the world

UK, Europe, Asia-Pacific, North America, South America, Scandinavia



6th Workshop Agenda



- International Project Roundup
 - Injection, Wells, Capacity
 - Legal, Regulatory and Accounting
 - Interaction with other Users
 - Transport and Infrastructure
 - Stakeholder Engagement
 - Monitoring
 - Environmental Aspects
 - Conclusions and Recommendations
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- Optional visit to Maritime and Offshore Energy Museum (Friday morning)

Steering Committee



- Tim Dixon, IEAGHG (Chair)
- Katherine Romanak, BEG (Co-chair)
- Susan Hovorka, BEG
- Tip Meckel, BEG
- Clare Bond, University of Aberdeen (host)
- Rachel Elliot, University of Aberdeen (host)
- Rodrigo Oropeza, Storegga (host)
- Owain Tucker, Shell
- Paulo Negrais Seabra- Independent Consultant (formerly Petrobras)
- Darin Darmiani, US DOE
- Charles Jenkins, CSIRO
- Sveinung Hagen, Equinor
- Filip Neele, TNO
- Nigel Hicks, Council for GeoScience, South Africa
- Nikki Clarke, IEAGHG

The presentations are available on the BEG GCCC's [Global Offshore Initiative webpage](#).



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