



# Carbon Removal and Return – Can CCS Decarbonise Industry in South America and Help the Oceans?

**Tim Dixon, IEAGHG**

**4<sup>th</sup> December 2019**

UNFCCC Side Event

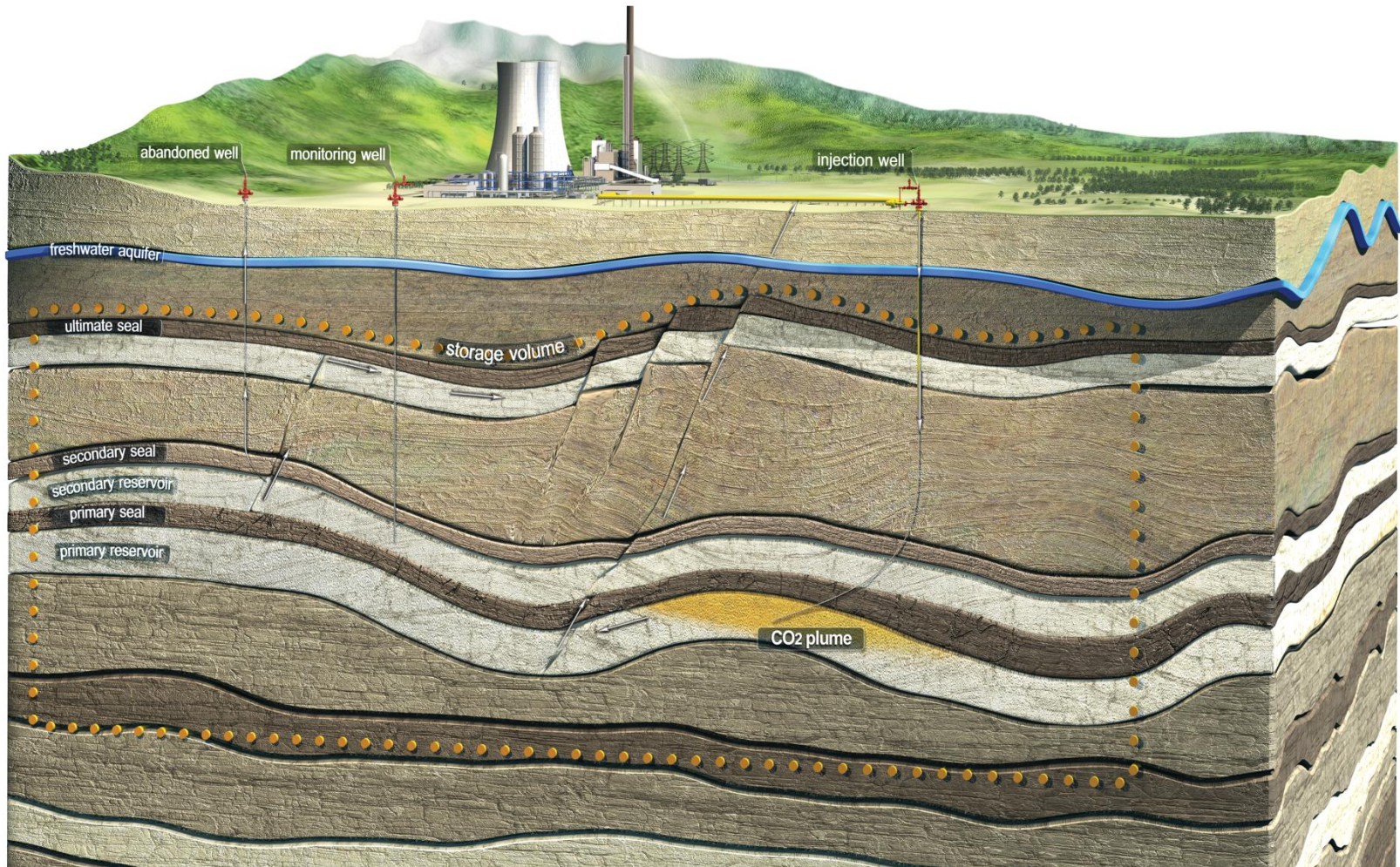
COP-25, Madrid

**BELLONA**

**CCS<sup>a</sup>**

Carbon Capture &  
Storage Association

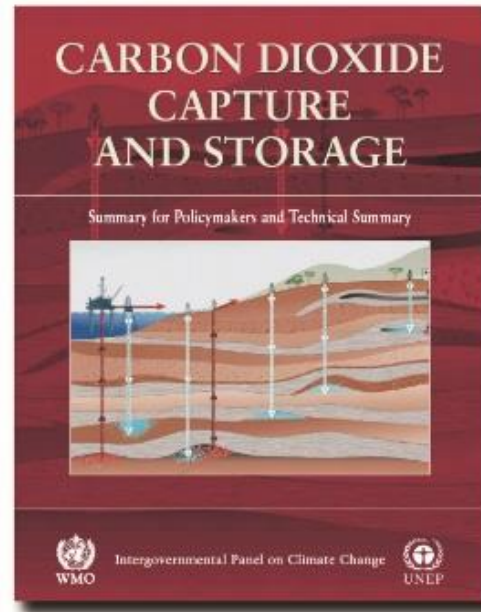
# What is CCS?



Source: DNV



# IPCC Special Report on CCS (2005)

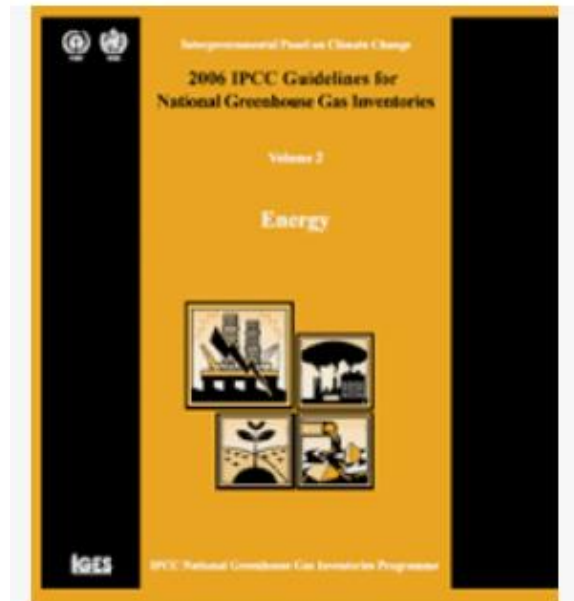


- “For well-selected, designed and managed sites, the vast majority of the CO<sub>2</sub> will gradually be immobilized by various trapping mechanisms and, in that case, could be retained for up to millions of years. Storage could become more secure over longer timescales. ”

# IPPC shows how to report the GHG performance of CCS (2006)



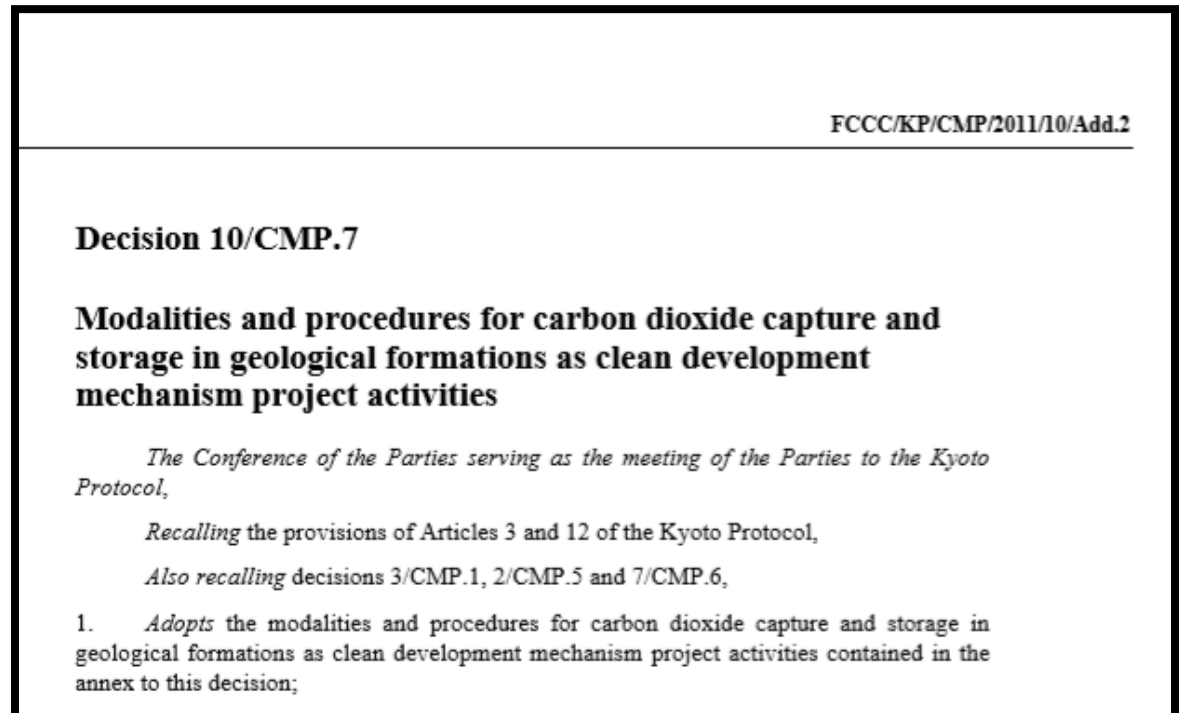
- IPCC Guidelines for GHG Inventories 2006



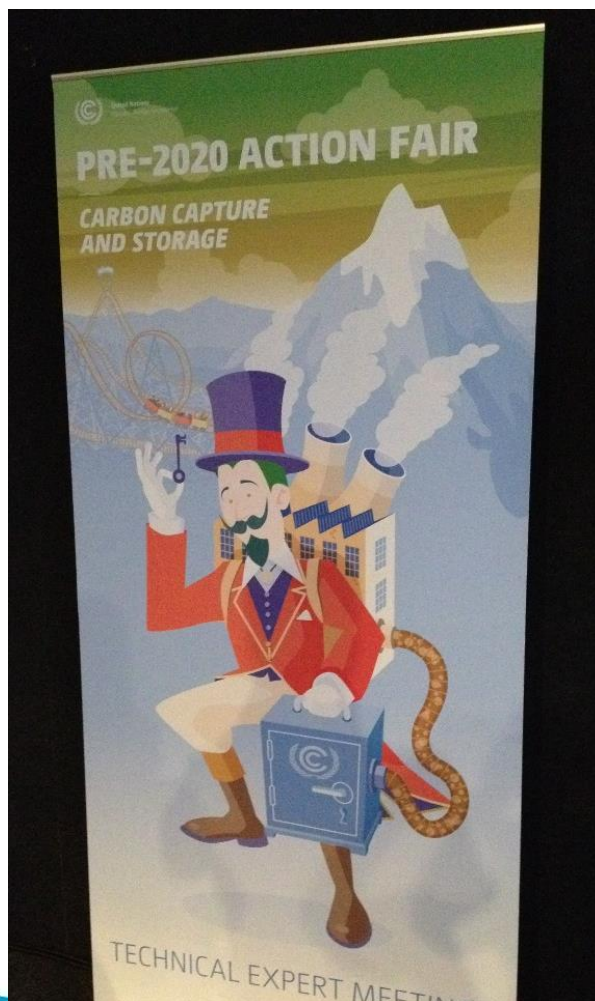
# UNFCCC Approves rules for CCS in Developing Countries (2011)



- COP-17
- CCS in CDM



# UNFCCC examines scale-up potential of CCS in Technical Expert Meeting (2014)



*WORKPLAN ON ENHANCING MITIGATION AMBITION*

## TECHNICAL EXPERT MEETING ON CARBON CAPTURE, USE AND STORAGE

Tuesday, 21 October 2014, 10.00 a.m.–6.00 p.m.

**Summary by the facilitator Mrs Ulrika Raab (Swedish Energy Agency)**





At the technical expert meeting (TEM) to unlock mitigation opportunities in carbon capture, use and storage in the pre-2020 period, held in Bonn, Germany, on 21 October 2014, Parties, observers, international organizations and the private sector engaged in productive discussions to share their experiences in carbon capture, use and storage; lessons learned through implementation; the challenges involved; and the potential to further scale up implementation efforts in the pre-2020 period. Presentations and interventions were made by representatives of national governments, international organizations, the private sector and UNFCCC support institutions.

# IPCC AR5 – CCS is important low-carbon energy technology to keep mitigation costs down (2014)



Mitigation cost increases in scenarios with limited availability of technologies <sup>d</sup>

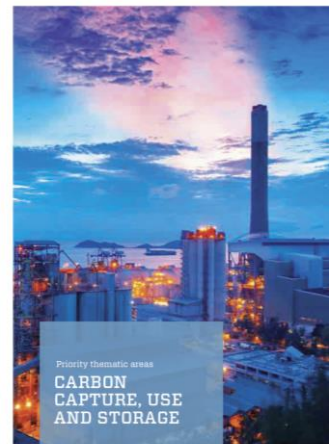
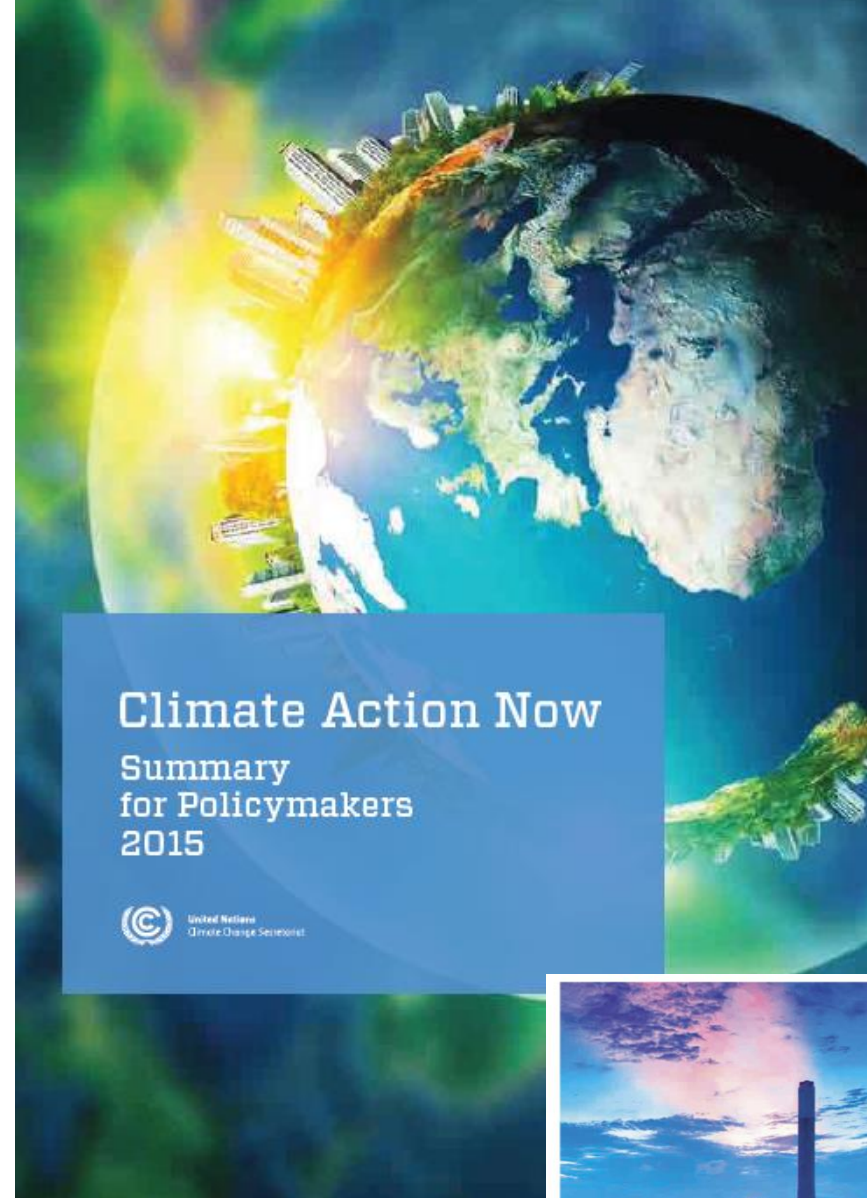
*[% increase in total discounted <sup>a</sup> mitigation costs (2015–2100) relative to default technology assumptions]*

2100 concentrations (ppm CO <sub>2</sub> -eq)	no CCS	nuclear phase out	limited solar/wind	limited bioenergy
450 (430 to 480)	138% (29 to 297%) 	7% (4 to 18%) 	6% (2 to 29%) 	64% (44 to 78%) 



# UNFCCC encourages CCS as early action (2015)

- ‘Climate Action Now’  
UNFCCC – COP21 2015
- *Priority Thematic Area* of “good practice that could be scaled up and replicated by Parties to realize significant mitigation potential” at 2020
- Built on Technical Expert Meetings
- Includes CCUS as one of the six priority areas, along with RE, EE, land-use, transport
- Significance of Boundary Dam CCUS project
- Solutions through international cooperation - IEAGHG





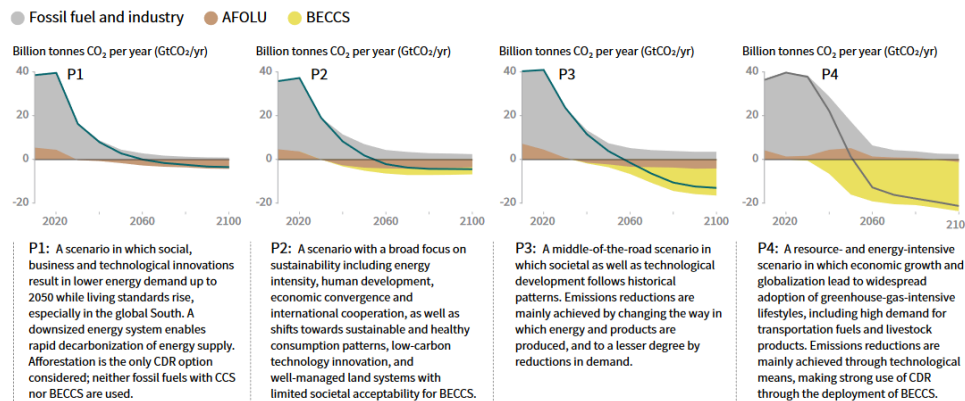
# IPCC 1.5 Special Report and CCS (2018)



Impacts and pathways to achieving 1.5C by 2100, in context of increasing global response, sustainable development and poverty



Breakdown of contributions to global net CO<sub>2</sub> emissions in four illustrative model pathways



- “Removing BECCS and CCS from the portfolio of available options significantly raises mitigation costs.” (Chp 4.3)
- IEAGHG Note: IAMs typically assume Capture rate of 90% - this is a limiting factor for CCS deployment from IAMs later this century. Can be increased to 99% with cost increase only ~ 5%. See IEAGHG Report 2019-02.

• <https://www.ipcc.ch/report/sr15/>



# Export of CO<sub>2</sub> for CCS allowed by London Protocol (2019)



- UN treaty for **marine environmental protection** – Amended to allow offshore geological storage of CO<sub>2</sub> in 2006.
- LC41/LP14 meeting at IMO London, 7<sup>th</sup>-11<sup>th</sup> October 2019
- **London Protocol's 2009 CO<sub>2</sub> Export Amendment** - Needs two thirds of the 51 Parties to the London Protocol to ratify for it to come into force (ie 34). Norway, UK, Netherlands, Iran, Finland and Estonia ratified to date
- **Norway and Netherlands proposal to LP14 for “Provisional Application” of 2009 Export Amendment (joined by UK).**  
Drawing on IEA report 2011
- IEAGHG supported with Information Paper 2019-IP11, and evidence-base in LP plenary with paper LC41/INF3
- **Success! Resolution for Provisional Application adopted 11 October 2019**

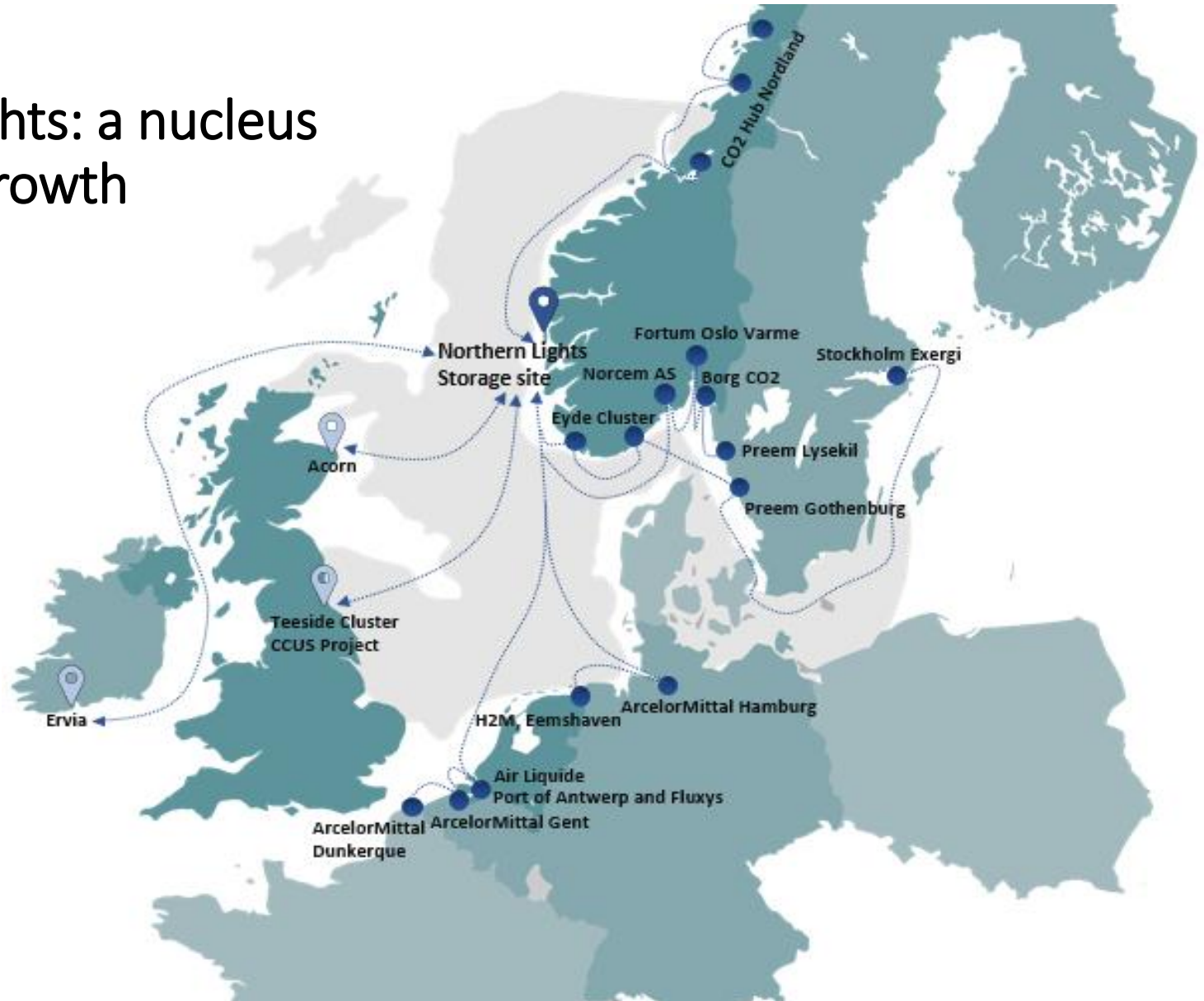


# Export of CO<sub>2</sub> for Offshore Geological Storage is Allowed

- This means that countries can now legally export and import CO<sub>2</sub> for offshore geological storage
- Environmental protection is in place. The guidance documents for permitting offshore storage and for export agreements were revised/finalised for transboundary activities in 2012 (CO<sub>2</sub> Specific Guidelines) and 2013 (Agreements and Arrangements).



# Northern Lights: a nucleus for further growth



Kilde: PCI-søknad fra **Northern Lights** (Equinor, Shell og Total)



# Large-scale CCS Facilities Globally Proving the Technologies work





# **Carbon Removal and Return – Can CCS Decarbonise Industry in South America and Help the Oceans?**

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## **Agenda**

- **Welcome, Introduction and Context Setting** – Tim Dixon IEAGHG (Chair)
- **IPCC Special Report on Oceans and the Cryosphere** - Carol Turley, PML, UK
- **Direct Air Capture with CCS** - Jen Wilcox, Worcester Polytechnic, USA
- **Monitoring, Safety and Technology Transfer** - Katherine Romanak, The University of Texas, USA
- **Developing a National CCS Programme in Trinidad and Tobago** - Andrew Jupiter, University of the West Indies, T&T
- **CCS to Decarbonize Cement** – Beth Hardy, International CCS Knowledge Centre, Canada
- **Sustainable Jobs from BECCS in South America** - Piera Patrizio, IIASA
- **CO2 Transport and Storage: A Flexible Low Carbon Infrastructure** - Keith Whiriskey, Bellona, EU
- **Summing Up and Key messages** - Tim Dixon IEAGHG
- **Questions and Discussion from the audience**



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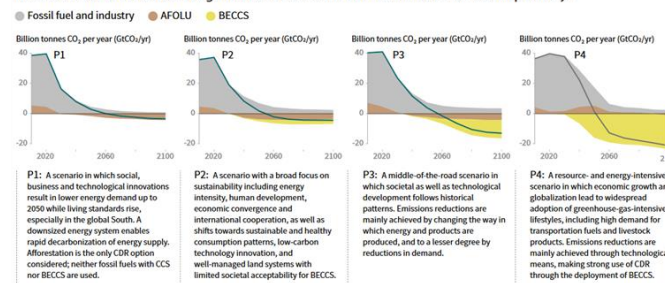


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