OIL AND GAS CLIMATE INITIATIVE

The CO_2 Storage Resource Catalogue

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Storage Resources and Classification

What is Geological storage, or Sequestration?

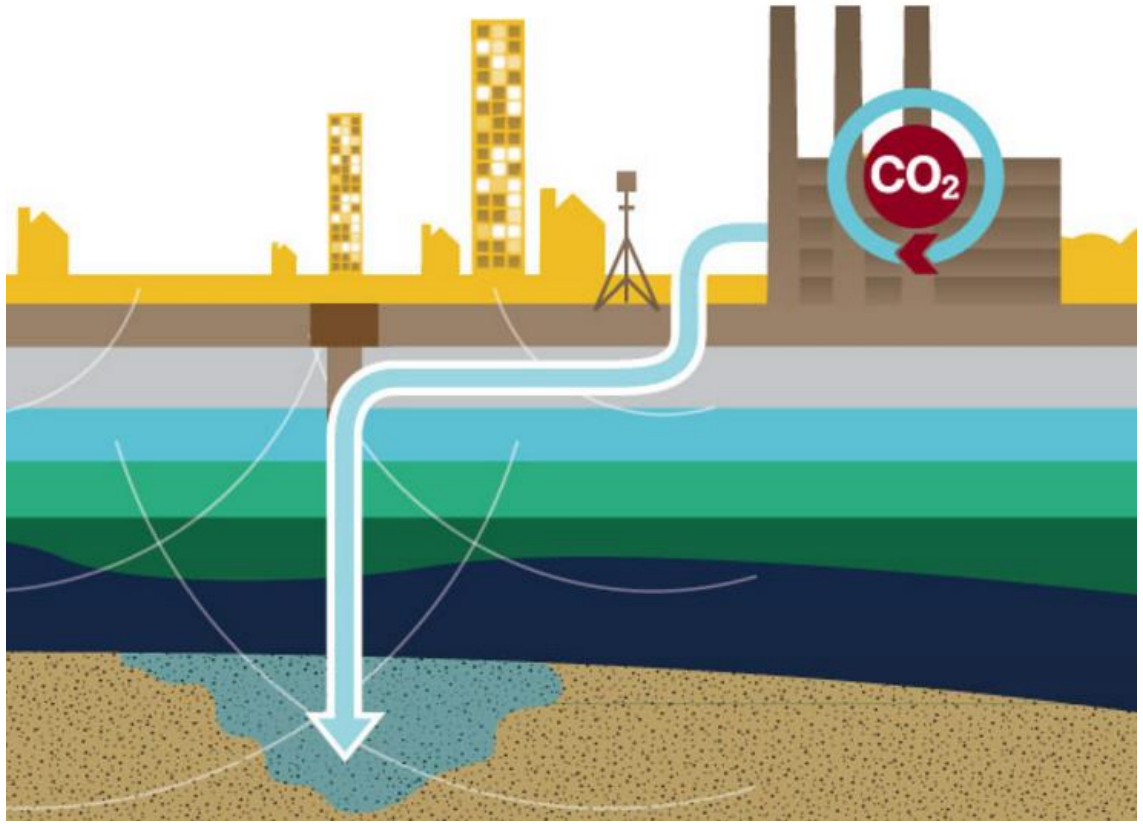
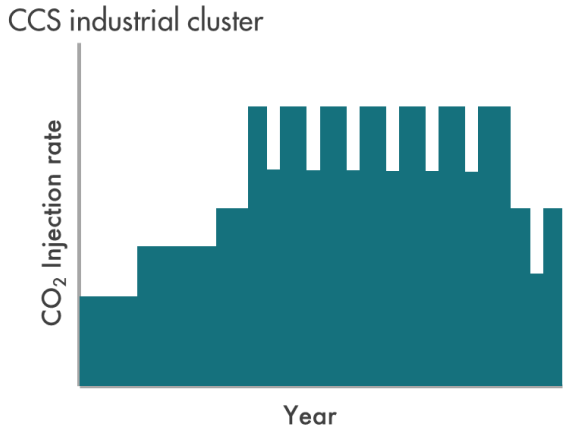


Image courtesy of ZEP

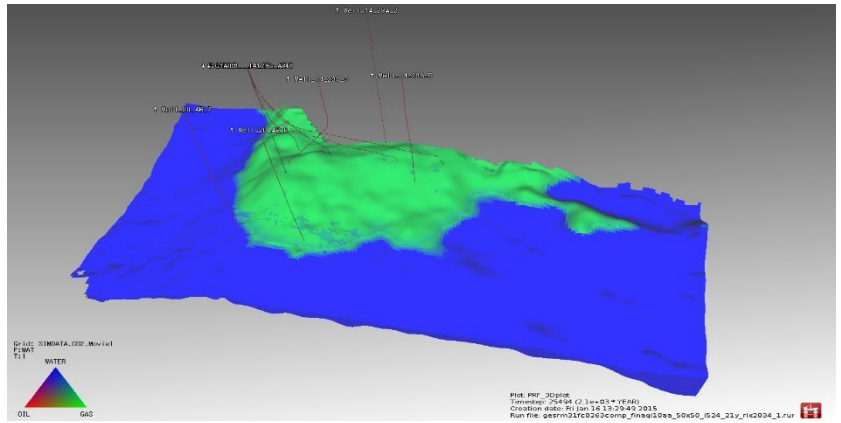
- The injection of CO_2 into geological strata with the aim of **permanently isolating the CO_2 from the atmosphere**.
- Income normally linked to the production of clean products or the absence of emissions penalties.



What Is the Resource?

Hydrocarbon Resource

- "An accumulation of petroleum naturally occurring on or within the Earth's crust"
  - A subsurface rock formation containing an individual and separate natural accumulation of moveable hydrocarbons



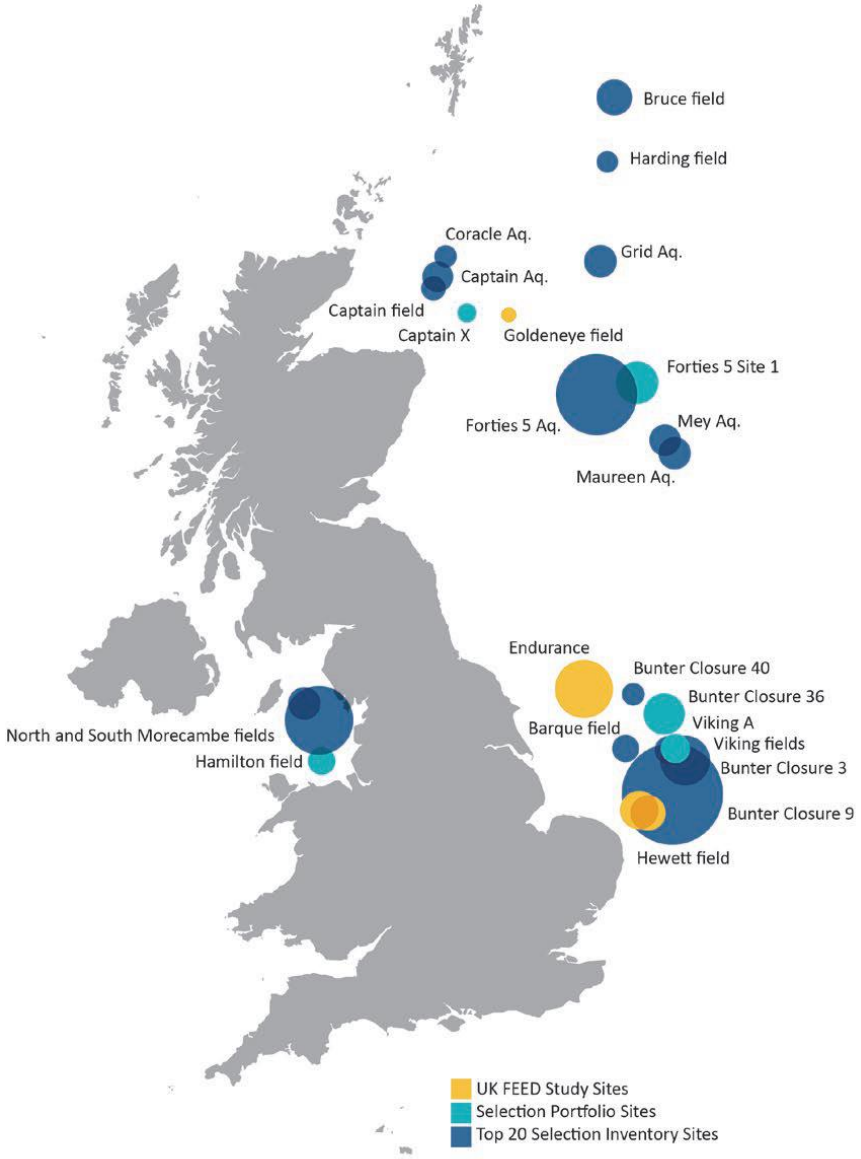
CO_2 Storage Resource

- "The ability to accommodate and retain CO_2 in the subsurface"
  - We are exploring for pressure space
  - Space in the subsurface that can accommodate CO_2

Source: Shell

An Example
What is the UK storage resource?

- "The storage capacity is 78 Gt"
- Job done, let's build a capture plant …
  - When are we ready to sign a take or pay contract?
  - What do I need to obtain shareholder, government or project finance?
  - How many wells do I need to drill?
  - What is my confidence of sustained injection?

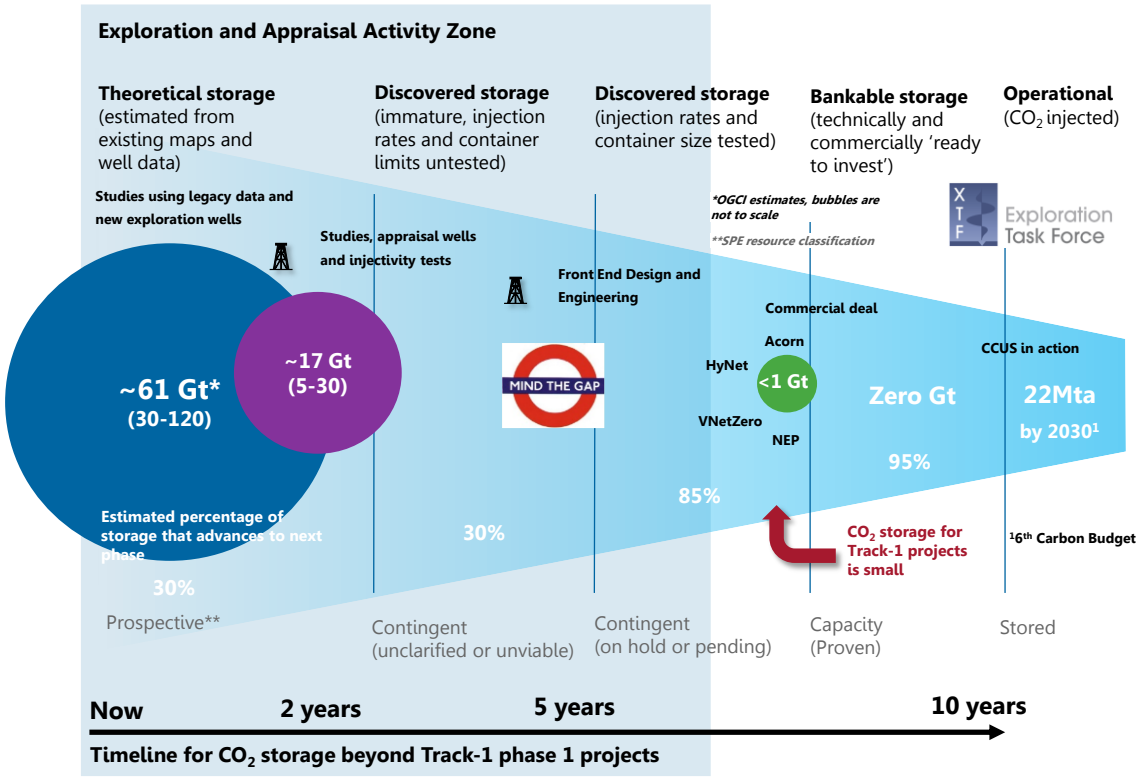


Note: areas of the circles are indicative of CO_2 storage resource potential.

Source: Exploration Taskforce

The reality is not so clear cut …

- How do we compare regional evaluations with "bankable storage"?
- Regional evaluations use volumetric techniques – *rock volume* x *storage efficiency factor*
  - Very high level
  - Not linked to a project
- Project based evaluations
  - Hundreds of hours of work
  - Seismic surveys
  - Exploration and appraisal wells

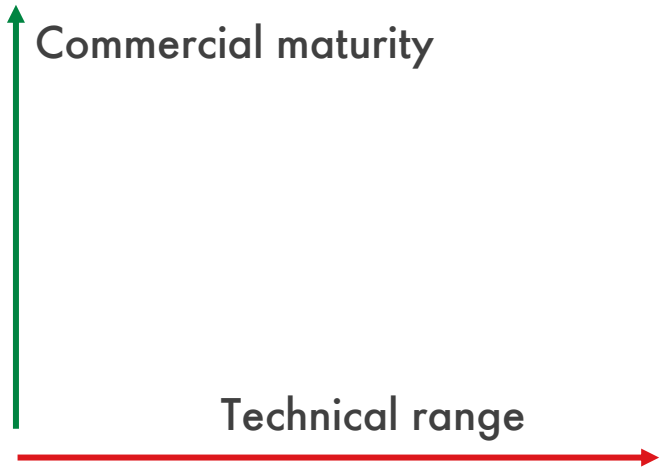


Source: Exploration Taskforce

A classification system is needed

- Consistent manner to classify (not estimate) storage resources
  - Underpin investment decisions
  - Underpin policy decision
  - Track project spend
  - Communicate between customers (capture) and storage

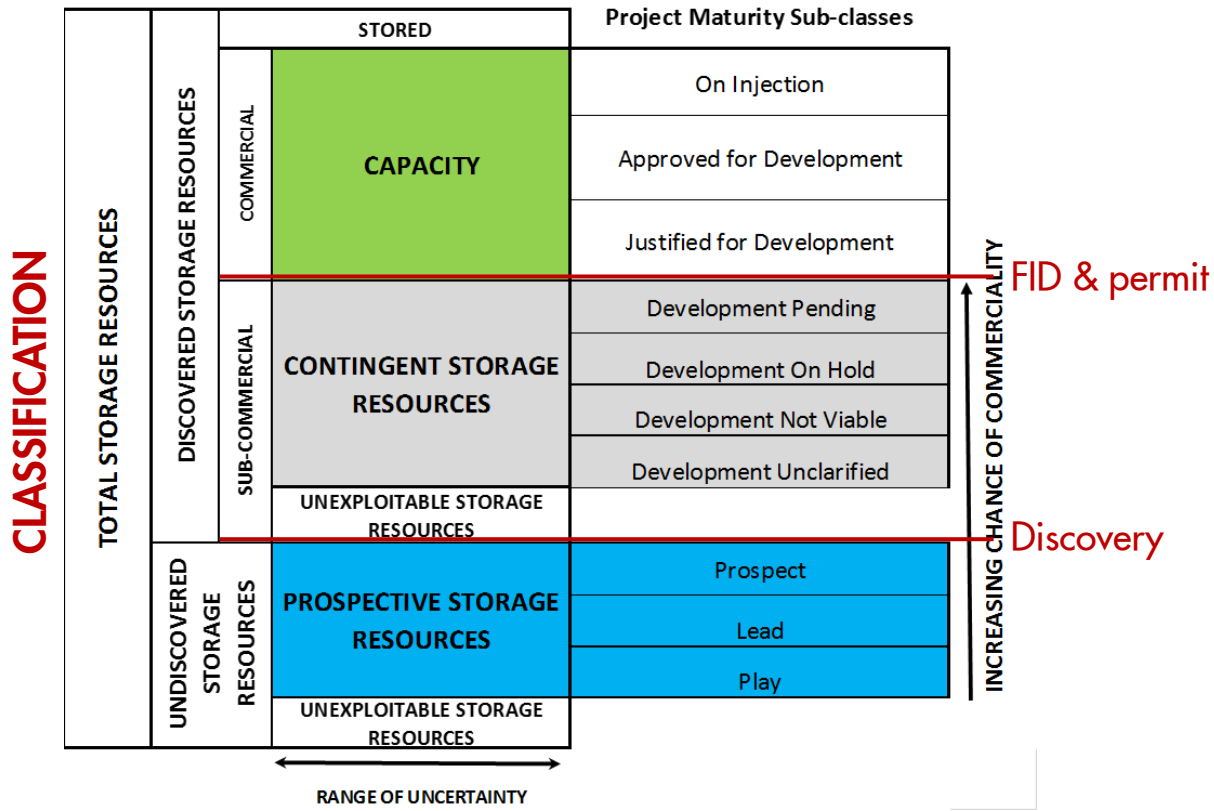
- Project Based – or might say, injection mechanism based



The Storage Resource: SRMS

- Project based, built on PRMS
- Classification involves assigning the stage of project maturity
- Major Classification thresholds
  - Discovery
  - Commercial (& technical) maturity
- Use P10, P50, P90 volumes and constraints
- Expect resource range decrease with maturity

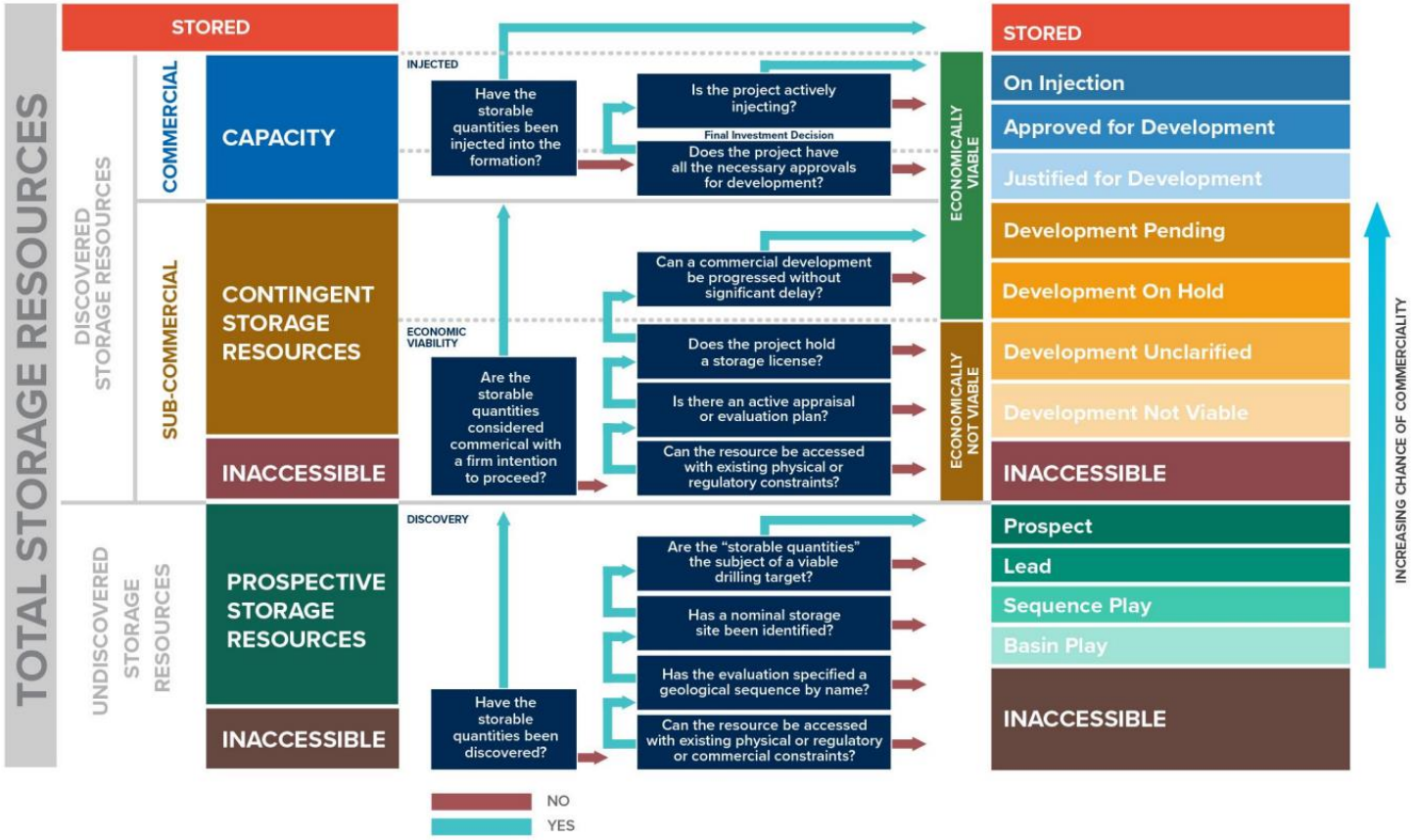
SPE classification of CO_2 storage resources



https://www.spe.org/industry/CO2-storage-resources-management-system.php

OGCI members supported SPE in development of SRMS

SRMS, SRMS guidelines, Global Storage Resource Catalogue



Flowchart for the classification of storage resources based on the SRMS guidelines and terminology

The storage resource catalogue

The OGCI CO_2 Storage Catalogue

Six year programme started in 2019

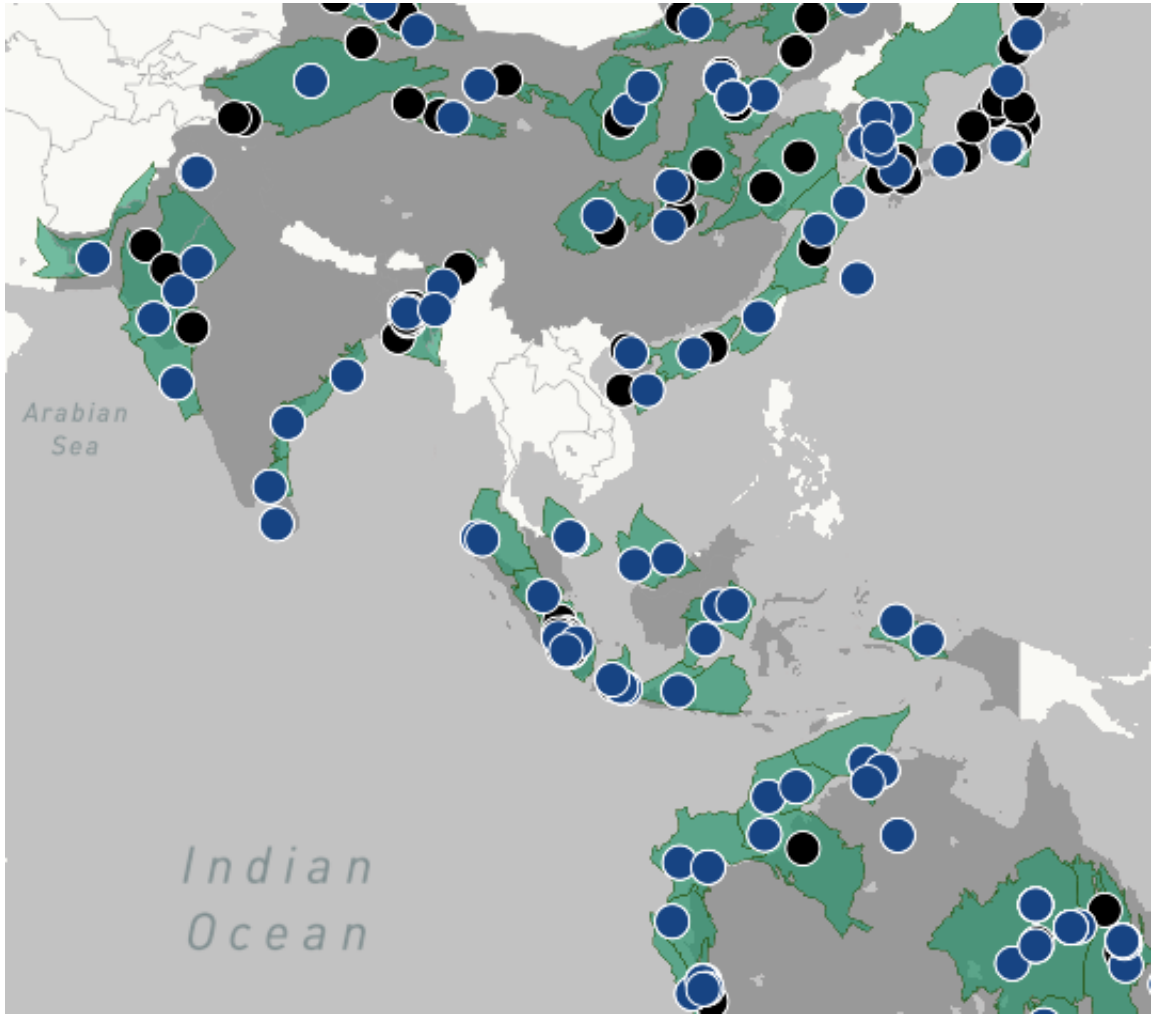
- Encouraging adoption of the SRMS
- Classifying all published CO_2 storage assessments through the SRMS

Objectives

- Open web resource
- Transparency to the CCS community, regulators, project financiers, the wider public
- Share information on resource maturity

Full report on ogci website

Large interest from the CCS community



https://www.ogci.com/co2-storage-resource-catalogue/

Six year rolling programme classifying storage resource estimates

Cycle	Cycle 0	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Period	**2017**	**2019-2020**	**2020-2021**	**TBC**	**TBC**	**TBC**	**TBC**
Countries Assessed	Australia	Australia	Australia[2]				
	Baltic Region (Denmark and Germany)	Baltic Region (Denmark and Germany)	Indonesia				
	Bangladesh, India, Pakistan, Sri Lanka	Bangladesh, India, Pakistan, Sri Lanka	Japan				
	Brazil	Brazil	Malaysia				
	China	Canada[1]	Mexico				
	Norway	China	South Korea				
	United Kingdom	Norway					
	U.S.A	United Kingdom					
		U.S.A					

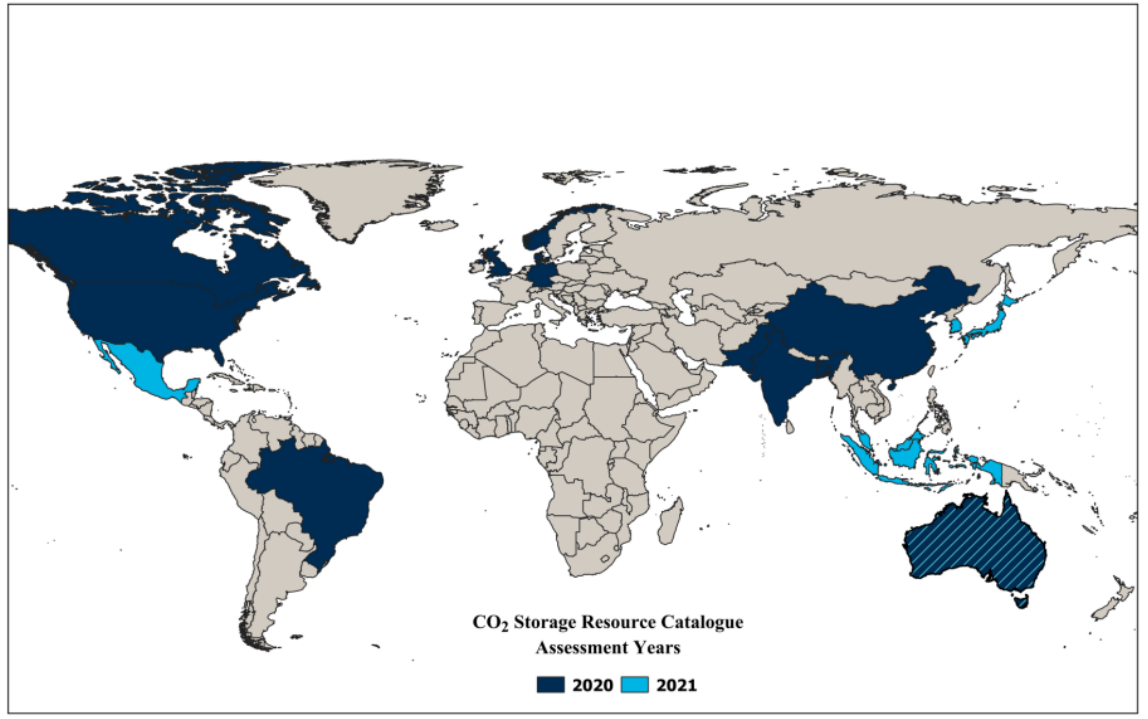


Figure 2-1 Map showing countries included in the CSRC.

Countries assessed – summary of results so far

- 715 resource sites from 18 countries
- 12,958 Gt resource
- 96% is undiscovered Prospective
- 4.3% (551Gt) discovered sub-commercial Contingent
- 0.25% commercial Capacity – Australia, Canada, Norway and USA

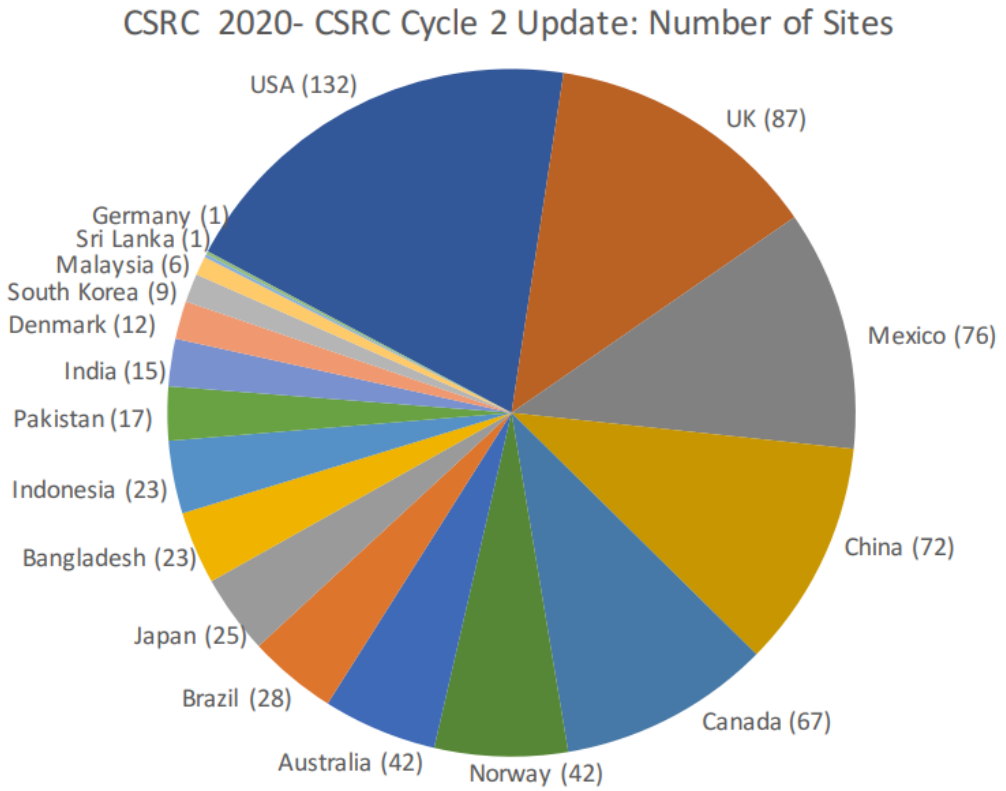
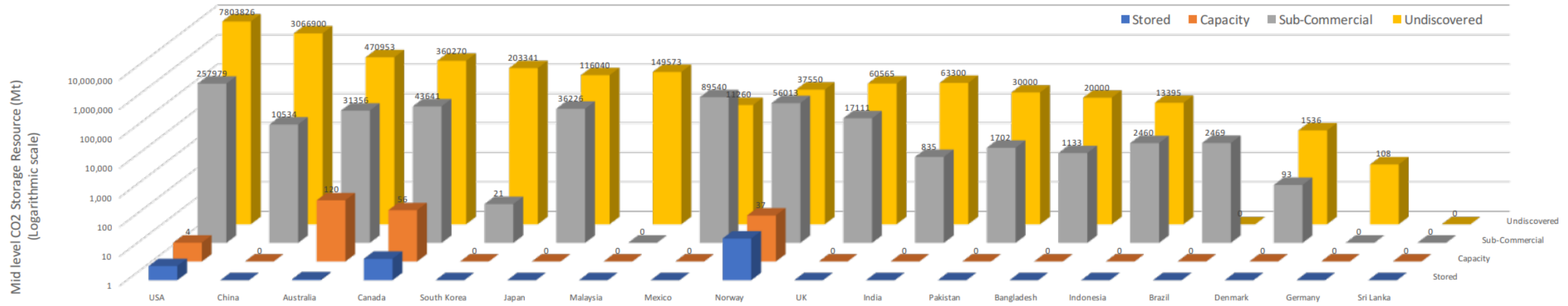
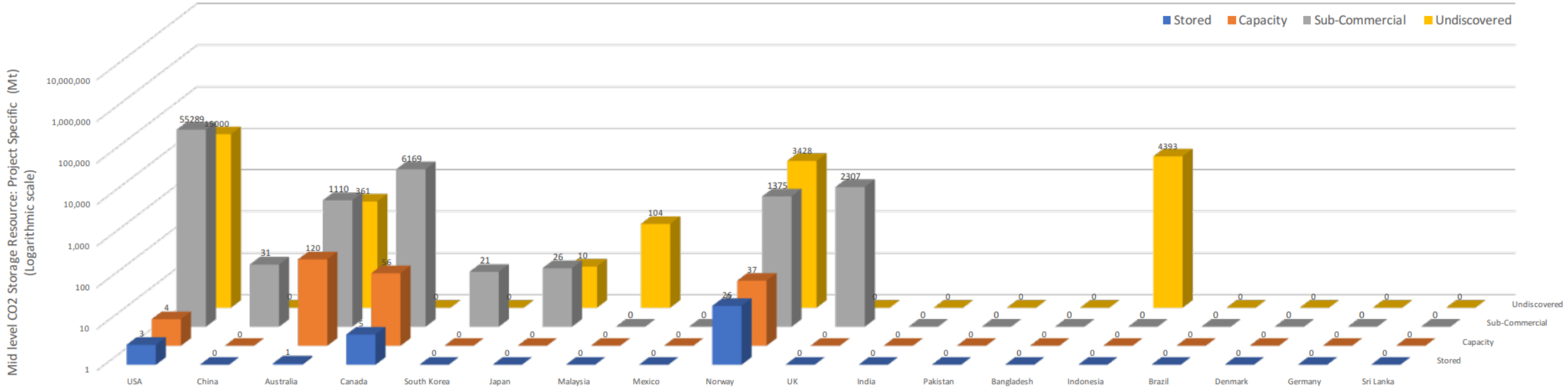


Figure 1-1. Number of potential storage resource sites assessed in the CSRC, by country or region. N =715.

Breakdown covering all and only project related





Findings

Data gaps

- We would like more information to be shared and available on the Catalogue

SRMS is a project based system

- SRMS Resources should be associated to a project description
- The vast majority of the assessments are not
  - 90 Gt only amongst 13 000 Gt of resources are associated to projects
  - No indication on how the volumes could be stored
  - Within 50 or 1000 yrs? Injection only or brine extraction? How many injectors?
- We have implemented a filter to enable users to deselect resources not associated to projects
- We believe this remains a major weakness on current understanding of CO_2 storage global resources

Ambitions

Becoming an international standard

- With improvements from users feedback, new versions of the SRMS, …

Transitioning towards a self-sustained Catalogue

- uploading SRMS-compliant resources to the Catalogue

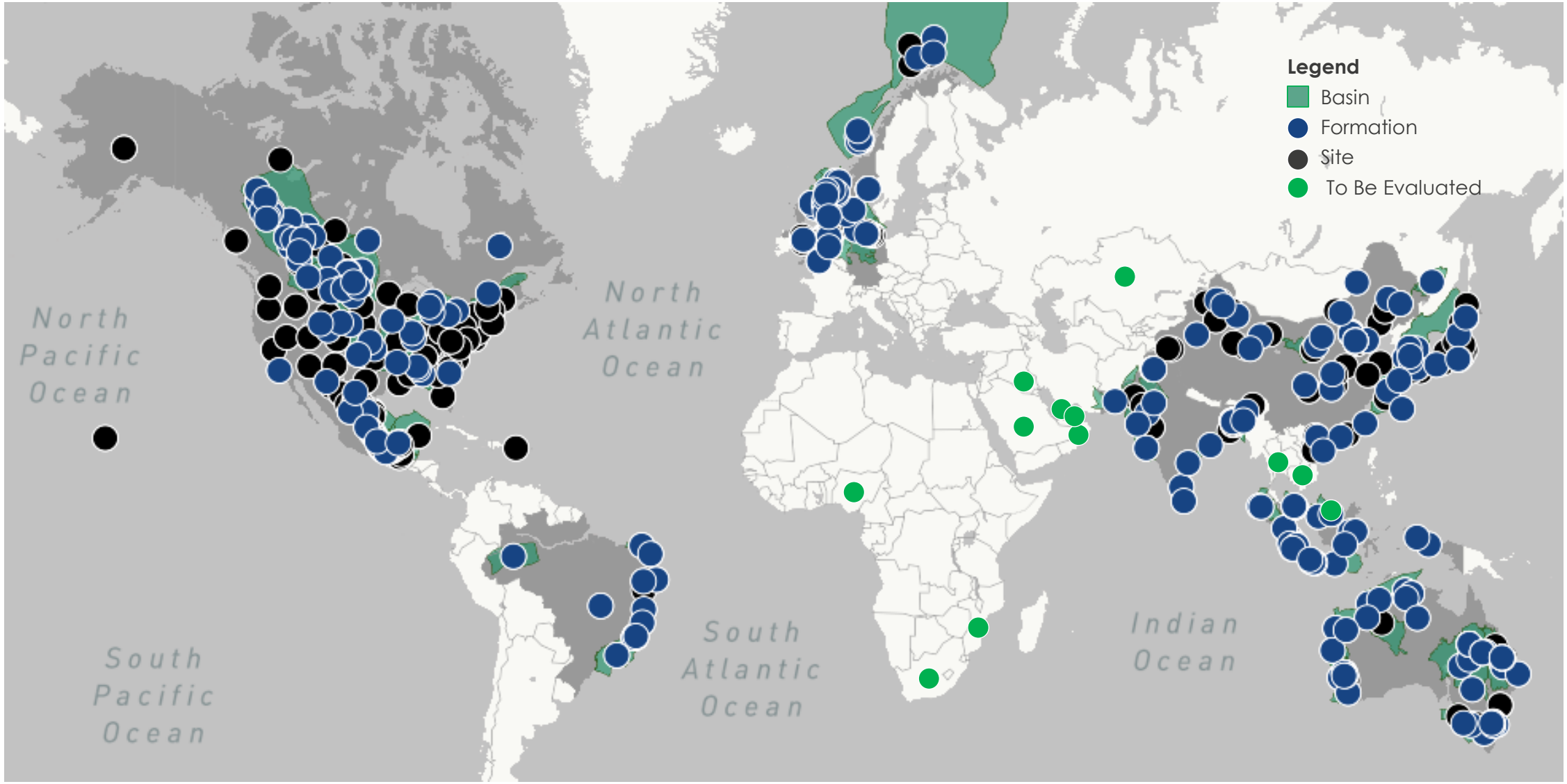
Promoting project-base resource assessments to Atlas generators

- We believe CCS industry needs clarity on how resources will be delivered
  - What timeframe
  - Need of brine extraction? What injector density?
  - What impacts (level of pressure increase, CO_2 migration, …)

➢ And we welcome this workshop to have this discussion

Thank you

CO_2 Storage Resource Catalogue



Source: OGCI
https://www.ogci.com/co2-storage-resource-catalogue/