

Theme 1: Introduction to the Storage Catalogue

Q. What is the CO₂ Resource Storage Catalogue?

The CO₂ Storage Resource Catalogue ('the Catalogue') is a collation of published storage resource estimates. This is a public resource provided by the OGCI with the goal of becoming the global repository for all future storage resource assessments (i.e., how much storage potential exists). Development of the Catalogue commenced in 2018 with the first of a series of six annual cycles. Each cycle assesses a different group of countries or regions.

The two main objectives of the project are:

- to complete CO₂ storage resource assessments by classifying published CO₂ storage resource evaluations from around the world against the Storage Resource Management System (SRMS). The aim is to assess sites from the perspectives of commercial viability and readiness, not just technical opportunity.
- to build and populate the CO₂ Storage Resource Catalogue based on the outputs from the assessments.

Each year an annual report summarising the status of the assessment effort, including any issues or refinements to the methodology used, accompanies the database of storage resources. The updates are published annually at the end of each cycle. The report contains key information about the CO₂ Storage Resource Management System (SRMS) and how the assessments are carried out with an appendix of country-specific reports.

Q. What is the SRMS and how is it used in the Storage Catalogue?

The SRMS stands for the [CO₂ Storage Resource Management System](#), developed by the Society of Petroleum Engineers (SPE) (2017). This system is based on the SPE Petroleum Resource Management System (PRMS) and provides a consistent approach to how storable quantities are estimated and how development

projects are evaluated. This allows results to be presented in a comprehensive classification framework to assess sites from the perspective of commercial viability and readiness, not just technical opportunity.

Q. What kind of storage sites are included in the Storage Catalogue?

Currently, the Catalogue is restricted to conventional geological storage sites: depleted oil and gas fields and deep saline aquifers. It should be noted that CO₂ enhanced oil recovery (EOR) is not included in the Catalogue. More unconventional storage types, such as basalts, shales and unmineable coal, are also not yet covered by the SRMS and are consequently not included in the Catalogue.

Q. How is data compiled for the Storage Catalogue?

Each cycle starts with collating publications on CO₂ storage resource assessments in the selected countries. All data must be in the public domain. These sources of information are described as 'evaluations' which are reviewed by the Assessment Team. In addition to technical sources of information, a review of the current legal and regulatory framework for each country is made to identify if a CCS-specific framework is in place. Individual sites are identified, reviewed and assessed against the SRMS to assign a commercial class and resource category. Assessments undergo quality control and peer review before being uploaded to the Catalogue.

Q. The SRMS is a 'project-based' system. What does this mean and what constitutes a 'project'?

The concept of a project in the SRMS forms the link between the amount of CO₂ which can be stored in a geological formation and the decision-making process, which includes commercial aspects. A project may relate to a single or multiple geological formations and may access all or just a portion of the available

storage resource. To gain project status, a notional development plan is needed, either conceptual or derived from modelling, with a stated volume of CO₂ and an indication of the number of wells required to inject that volume of CO₂. This means that both undiscovered and discovered resources may be defined as projects and it is expected that the development plan will mature as a project progresses through the SRMS.

Q. How does the Storage Catalogue differ from other databases of storage capacity?

The Catalogue does not aim to replace any existing databases which contain information and estimates of storage resources. The Catalogue aims to provide a single, consistent approach to resource assessment and classification such that resource estimates can be directly compared. The main drivers of the classification system are commercial, project-related steps. As such, neither resource type, nor the methodology used to evaluate the resource, impacts the classification process.

Theme 2: Country selection within each cycle

Q: How does OGCI select the countries to be assessed in an upcoming cycle?

The objective is to review all countries within the six year period, so no country will be disregarded. OGCI members decide collectively on the countries to be reviewed based on a series of criteria, including country greenhouse gas emissions, OGCI member presence, Clean Energy Ministerial (CEM) membership, CCUS in Nationally Determined Contributions (NDCs), national research and development (R&D) funding allocated to CCUS, and whether or not the country is a signatory of the London Protocol 2009 Amendment.

Q: How can I find out which countries are being assessed in the current cycle?

The countries being assessed are communicated during various webinars and conferences.

Theme 3: Catalogue updates

Q: When is the Catalogue updated?

This effort is a six year process, composed of six cycles. The update takes place at the end of each cycle, meaning once a year.

Theme 4: How is SRMS being used by companies and governments?

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OGCI is promoting the use of the SRMS by anyone who wants to use it, including its member companies; however, it remains up to individual companies, governments, geological surveys, etc., to take the decision to use and eventually adapt the SRMS to meet their needs. We are encouraged by a growing number of publications on the SRMS by various bodies, illustrating the interest in this system.

Theme 6: Site Assessment Methodology

Q. Who carries out site assessments?

The Assessment Team is a group of subsurface specialists from Storegga. Together, with support from the Global CCS Institute and the OGCI Storage Working Group, the Assessment Team identifies, collates and reviews publications for each country assessed to create the Approved Bibliography (the published information which is used in the assessments). All information used must be in the public domain and may include national atlases, peer-reviewed papers, and technical reports and documents. Only existing, published estimates are reviewed, evaluated and assessed; the Assessment Team does not generate new estimates of storage resources.

Q. How is uncertainty in storage resource estimation communicated?

The range of uncertainty is categorized by three specific storable quantities reflecting low, best and high estimates for each defined project. These categories may be based on deterministic or probabilistic methods. Where there is only a single value, the assessors attempt to determine whether this is the best estimate of the storage resource, as this is considered the most realistic assessment of the storable quantities.

Q. How is the level of confidence in a storage resource estimation handled?

The SRMS resource classes contain an inherent assessment of confidence in the published resource estimates. The four resource classes— stored, capacity, contingent and prospective— each imply a different level of commercial maturity, with prospective being the least mature. The first three classes fall under Discovered Storage Resources, where the potential for storage sites within an evaluated geological formation. This requires at least a well, log data and preferably a well test within the site. Prospective resources are undiscovered, meaning that the potential for storage in the target formation is not fully evaluated and therefore carries a greater level of uncertainty. In cases where the assessors feel that insufficient subsurface information is available to support a published storage resource estimate, the site may be downgraded to a lower maturity of classification until further information can be accessed.

Q. How are depleted hydrocarbon fields handled?

As the main levers of the SRMS are commercial project-related, the type of resource is not a key driver for the classification process, so there is no systematic difference in the manner in which depleted oil and gas fields are handled compared with saline aquifers. However, all depleted fields which meet the minimum size threshold (currently 10Mt) are classified as discovered resources due to the availability of subsurface data. Some fields do have commercial readiness problems, either regulatory (no CCS-specific framework allowing CO₂

storage) or with regard to the risk of negative interactions between CO₂ injection for storage purposes and hydrocarbon production. In such cases, the deleted field will be classified as discovered but inaccessible (from a commercial development perspective).

In addition, some fields are classed as being inaccessible due to having a cessation of production (CoP) date far into the future (or no published CoP date at all) which restricts access for CO₂ storage. The assessors use an earliest available date (EAD) which is set 30 years from the time of assessment; if the CoP is later than the EAD, the field is classed as being commercially Inaccessible. If missing CoP dates can be accessed, the site can progress up through the SRMS framework as appropriate.

Q. What is the approach when several resource estimates are published for a single site?

Wherever possible, the most recent resource estimate for a site is used in the assessment. If multiple evaluations are available, they are all reviewed and the most reliable value is used. An audit trail of historical evaluations and estimates is retained in the assessment notes of the database.

Q. Is there a minimum resource size for the Catalogue?

The Catalogue aims to support large, commercial-scale project development. To support this, a minimum threshold for a resource to be included in the Catalogue is set at 10 Mt. This is open to review in future cycles and can be flexible in its application. For example, where a pilot or demonstration project has successfully injected and stored CO₂ and has potential for continued or additional injection, the site is included. A good example of this is the Tomakomai Demonstration project in Japan where 0.3 Mt (300,000t) was injected as part of the project, but the storage aquifer holds additional potential, both discovered and undiscovered.

Key pilot and demonstration projects are recorded in the country summary reports of the annual report, but the injected CO₂ does not contribute to the capacity resource for that country.

Q. Does the Catalogue include other aspects of storage site development, e.g., site monitoring?

There is no specific data input for monitoring (planned or occurring) in the Catalogue; however, each site does have a set of four text boxes: project history, containment, development plan and assessment history, into which any pertinent details derived from the published evaluations are recorded. These may include any details of monitoring plans which might support future commercial development of the site.

Q. What is a 'storage resource' and what is 'storage capacity'?

The storage resource represents all the storable quantities (defined as the quantities of CO₂ that can be stored as part of an estimated pore volume of a geological formation) within a geological formation. The storage resource of a formation comprises discovered and undiscovered storable quantities, both accessible and inaccessible.

In the SRMS, the term 'capacity' refers to storable quantities considered to be commercially accessible by an identified project within a reasonable timeframe. This differs from the more common usage of the term in describing an estimate of pore space available for CO₂ storage by requiring a level of commercial project maturity which includes detailed definitions of containment and injection rates.

Theme 7: Contributing to the Catalogue



Q. How do I submit information for inclusion in the Catalogue?

The goal of the Catalogue is to become the global repository of all future resource assessments. If you have data and a storage resource estimate for a site, you may upload the resource using the linked form on the front page of the website. Please note all information uploaded must be in the public domain.

Q. Can I act as a source of information for the assessment team if I have expert/local knowledge of any of the countries in the current assessment cycle?

Yes! If you have useful information or data contributions to make to the Catalogue project for the countries in the current cycle, the assessment team would be delighted to hear from you. Please note that all information used by the team must be in the public domain.