GLOBAL CCS INSTITUTE

EDITOR'S INSIGHTS

2026 "STATE OF THE ART: CCS TECHNOLOGIES"

JULY 2026

CONTENTS

1.0 INTRODUCTION

The State-of-the-Art: CCS Technologies 2026 (the "Technology Compendium") is the latest edition of the annual publication produced by the Global CCS Institute ("The Institute"). The Technology Compendium is released publicly to provide a platform for technology owners and providers to share their offerings, and to allow developers, proponents, and the wider CCS community an opportunity to dive deeper into the field's latest offerings.

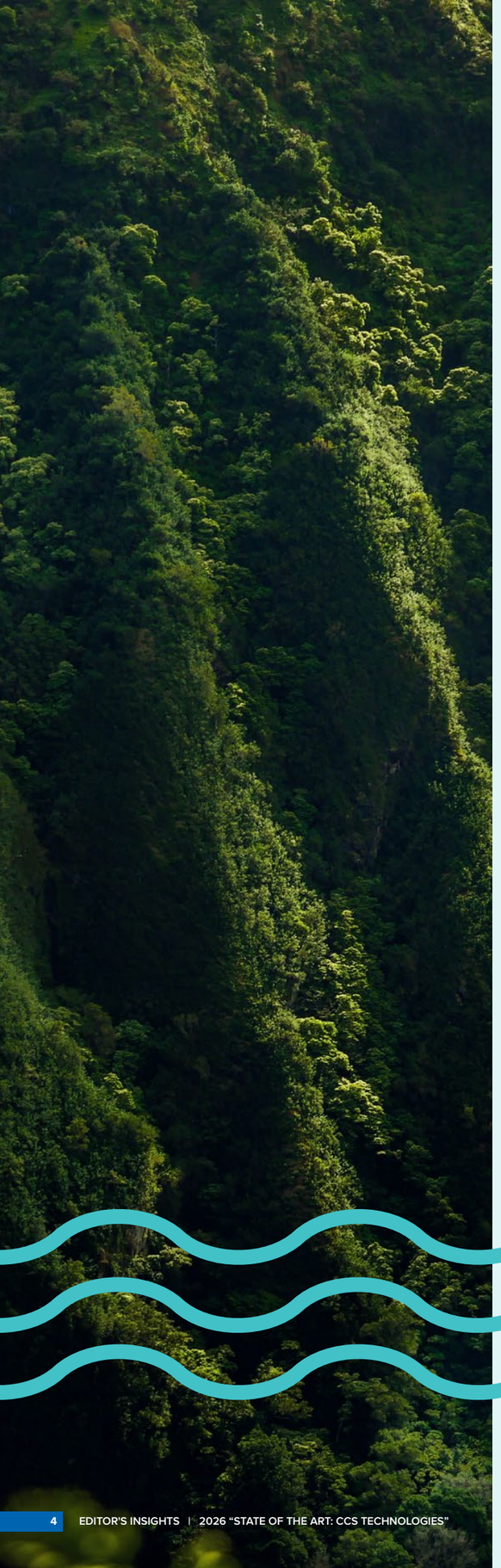
The Technology Compendium is a free-to-enter publication and a collaborative exercise with technology providers who provide their content for inclusion. The technologies presented in the Technology Compendium represent a non-exhaustive overview of the overall CCS technology landscape. However, underlying trends within the wider CCS technology industry are clearly visible.

Our four key insights from the 2026 Technology Compendium are:

- Commercial technology solutions exist across a diverse range of industries
- Storage technology enhances certainty across the development process
- Growth in traditional and emerging capture technologies
- Continued growth in submissions to the Technology Compendium

As we approach 2030, CCS projects are entering critical stages of design and development. It is now that the uptake of CCS technologies must continue to accelerate to address emissions from industrial and power generation sources, alongside the deployment of carbon dioxide removal applications to remove CO_2 already present in the atmosphere.

We are grateful to our Members of The Institute and other submitters who continue to support the work required to bring such a publication together. We hope you find the 2026 Technology Compendium and this Editor's Insights publication useful in your endeavours, as designers, developers, or advocates in accelerating the deployment of CCS globally.



2.0 NOTES AND INFORMATION

The Global CCS Institute has relied on the contributions of over 90 CCS technology providers to compile the Technology Compendium. Any claims regarding technology performance are the responsibility of the company concerned and are not endorsed by the Global CCS Institute. The data reported in this Editor's Insight publication are solely a set of observations regarding the information that has been put forward by the group of technology providers in the Technology Compendium. Readers should confirm any technology-specific details contained in the Technology Compendium with the technology provider concerned.

The Global CCS Institute has endeavoured to ensure the information in the Technology Compendium is as accurate as possible. However, it does not guarantee that the information in the Technology Compendium is totally reliable, accurate, or complete. Therefore, the information in the Technology Compendium should not be relied upon when making an investment or commercial decision or provided to any third party without the written permission of the Global CCS Institute.

To the maximum extent permitted, the Global CCS Institute, its employees, and advisers accept no liability (including for negligence) for any use or reliance on the information in the Technology Compendium, including any commercial or investment decisions made on the basis of information provided in the Technology Compendium.

3.0 GROWTH IN TRADITIONAL AND EMERGING CARBON CAPTURE TYPES

While commercially deployed technology today strongly favours amine capture systems, both traditional and emerging capture technology show promise to further reduce costs and improve performance.

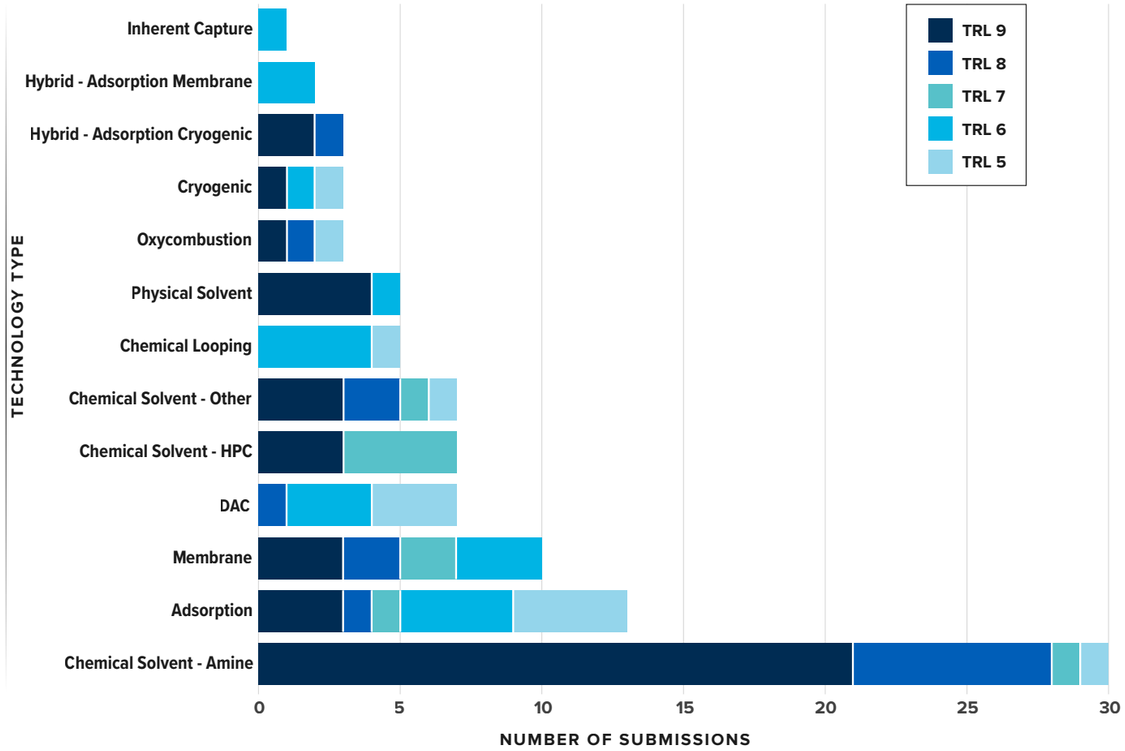
Amine capture technology was first patented for the removal of CO_2 from a gas stream in the 1920s, with deployments to purify natural gas as the first application. This has expanded to hydrogen purification (alongside adsorption), LNG production (alongside cryogenics), and various other deployments, including in low partial pressure applications such as post-combustion capture.

The breakdown of technology types within the Compendium is shown in Figure 1. Amine chemical solvents are strongly represented within the Compendium, and the technical maturity of this solvent system is highlighted by the number of systems reporting their technology readiness as "Normal Commercial Service" (TRL 9).

Novel deployments of existing technology are also pushing the boundaries of technology readiness in certain areas. This is especially true of deployments such as membranes on coal-fired power plants and cement facilities, novel deployments of adsorbents such as metal organic frameworks on low partial pressure applications, and the integration of hybrid systems to preconcentrate and then capture CO_2 from sources such as cement production.

This data reflects the wide range of technology options available to industries to meet their specific needs and continue to drive innovation that improves performance, reliability, and most importantly, cost.

Figure 1: Breakdown of Technology Type and Technology Readiness



The assessment criteria for technology readiness levels can be found on page 6 of the Technology Compendium.

4.0 COMMERCIAL TECHNOLOGY SOLUTIONS EXIST ACROSS A DIVERSE RANGE OF INDUSTRIES

Innovation and demonstration continue to push the boundaries of where and how technologies can be deployed.

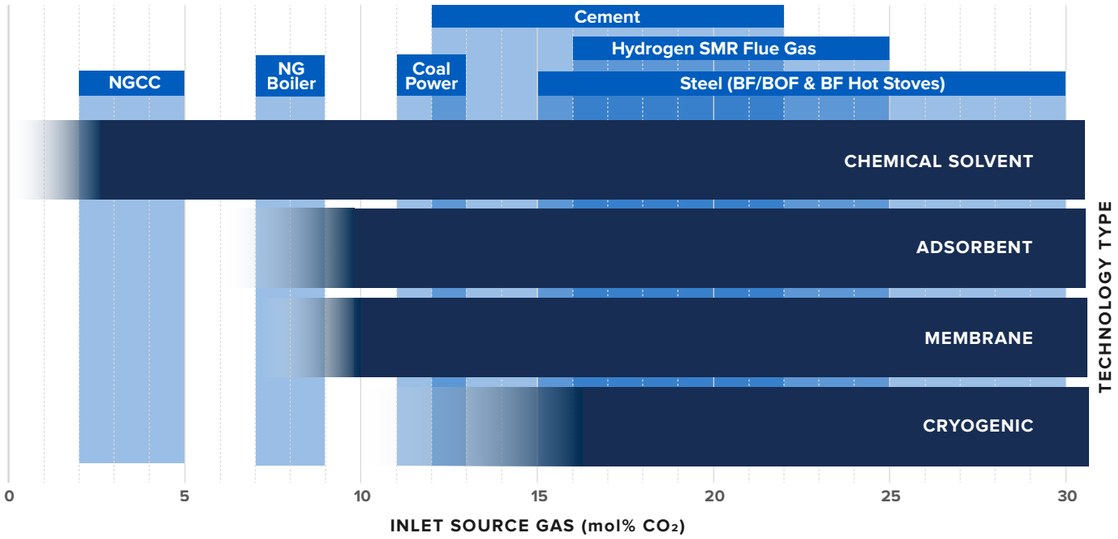
Ongoing developments in the CCS technology space have focused on the ability to handle lower CO_2 inlet concentrations at atmospheric pressure. Our 2025 Editor's Insights highlighted the growing focus on lower partial pressure applications within the CCS sector, as well as the breadth of industries targeted by CCS technology providers.

In the 2026 Technology Compendium, the minimum CO_2 concentration applicable in an atmospheric capture context is reported by submissions across key capture technology classes. This data has been extracted, summarised, and is presented against common deployment targets for CCS in Figure 2.

Chemical solvents, especially amine solvents, are identified as the most likely to handle low partial pressure applications, such as those found in natural gas combined cycle plants (NGCC). This aligns with past commercial capture experience in natural gas-fired power at the Northeast Associates Bellingham facility or the ongoing deployments at Glacier Gas Plant in Canada, Ravenna CCS in Italy, or the Landmark CHP plant in the United Kingdom.

Other technology systems are also seeing further development, such as adsorbent demonstrations on natural gas-fired steam generators, membrane capture on coal-fired power flue gases, and hybrid cryogenic capture systems in cement applications. Each of these demonstrations enhances existing learning and pushes the performance envelope of what these technology classes can do. Further research, development, and innovation can potentially enable commercial capture at even lower source gas concentrations for these capture systems, improving capture rates and increasing technology options across industries where CCS is necessary to meet emissions targets.

Figure 2: Technology Applicability across Source Gas CO_2 Concentrations



5.0 REDUCING UNCERTAINTY FROM SITE SELECTION TO MONITORING

Confidence is built through linked decisions, from early subsurface assessments through to operational assurance.

The storage-related submissions in the 2026 Technology Compendium point to a strong focus on reducing uncertainty across the CO_2 storage lifecycle. The technologies cover site screening, reservoir characterisation, well construction, injection operations, monitoring, and risk management.

A clear theme is the availability of integrated data and modelling workflows before and during injection. Several submissions describe tools for screening storage opportunities, benchmarking project concepts, modelling storage physics, supporting permitting, and informing monitoring plans. These technologies are positioned to help project developers evaluate storage capacity, injectivity, containment, infrastructure constraints, and regulatory requirements during early project development and operational planning. The submissions suggest that digital workflows are being framed as part of the storage assurance process, not only as design tools.

Well integrity is another major area of emphasis. Submissions include wellhead systems, cementing solutions, injection valves, and subsurface safety valves designed for CO_2 service conditions. Common reported features include resistance to low-temperature operating scenarios, metal-to-metal or non-elastomeric sealing, high-pressure operation, and support for long-term containment. The submissions collectively highlight the importance of adapting well equipment and barrier systems to CO_2-specific operating environments.

Monitoring and operational assurance also feature prominently. The submissions include in-well sensing, passive soil gas monitoring, multi-physics MMV systems, seismicity monitoring, and structural integrity monitoring. These entries describe continuous or repeated data collection functionality across the reservoir, wellbore, near-surface environment, and nearby infrastructure. The stated aim is to support conformance monitoring, containment assessment, anomaly detection, regulatory reporting, and risk response during project operation.

For the submissions that reported TRLs, most values are at TRL 9 for "Normal Commercial Service", with a handful reported at TRL 8 and TRL 7. This suggests that the storage-related submissions are largely positioned around technologies, tools and workflows that providers present as commercial or near-commercial application.

6.0 EXPANDED SUBMISSIONS COVERING FULL CCS CATEGORIES

An expanded Technology Compendium enables designers, developers, and advocates to access a more inclusive reference tool on technology providers and their offerings.

The Technology Compendium is a voluntary, collaborative exercise between the Institute and technology providers in industry. The result is a non-exhaustive list of available technologies on the market, both available for implementation today and upcoming novel technologies. We, the Institute, are grateful to our Members and Technology Compendium Submitters for their ongoing support and efforts to help bring this content to the CCS community and the wider public.

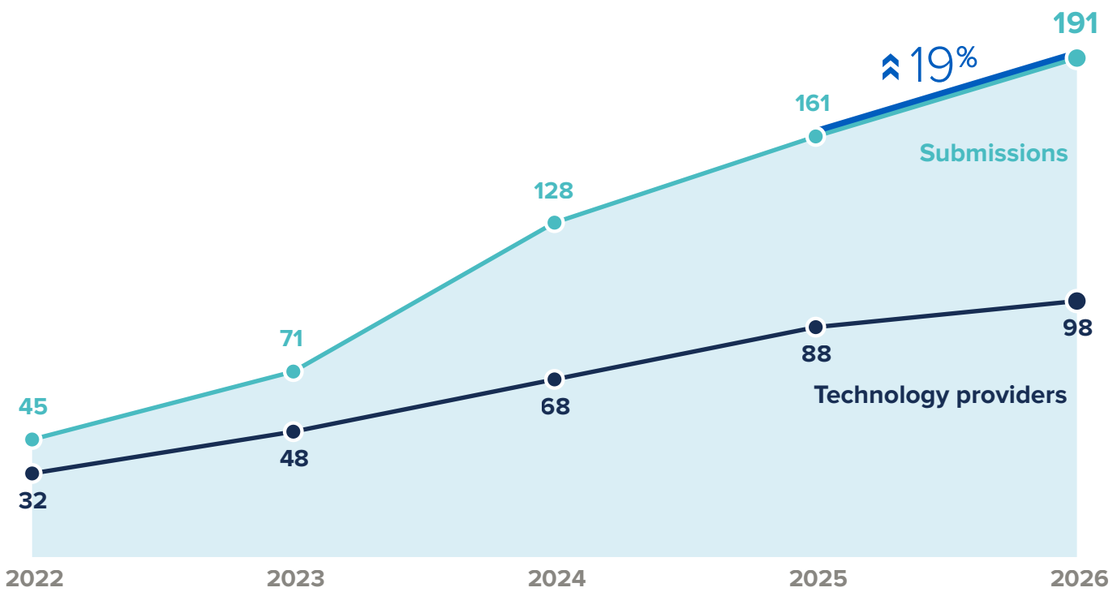
Since its beginning in 2022, the Technology Compendium has seen a growth in submissions from 45 in 2022 to 191 in 2026. The number of technology providers present in the Technology Compendium has also grown from 32 to 98. This growth includes both new entrants to the CCS space, alongside the inclusion of established technology providers able to contribute for the first time. The growth over the past editions is shown in Figure 3.

This growth in both companies and submissions is derived from a combination of existing providers sharing more about their technology and newcomers to the CCS industry starting to offer innovative solutions to the market. With more companies and submissions represented, the Technology Compendium better serves its purpose as a key reference publication for CCS developers, proponents, and advocates to understand and engage with CCS technology providers.

Growth in submissions has slowed compared with our 2025 edition as in Figure 3, reflecting the existing coverage across many key players in the CCS system already present in the Technology Compendium. That being said, the continued research, development, and deployment of the technologies included provide the wider community with a greater insight into the latest updates in CCS technology developments.

The Institute is aware of additional CCS technologies not mentioned in this or past Technology Compendia, established and emerging, and we are working on future editions to include these technologies.

Figure 3: Number of Technology Providers and Submissions included in the GCCSI Technology Compendium



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