

CARBON CAPTURE, UTILIZATION, AND STORAGE

*Delivering sustainability driven solutions
to your carbon capture projects.*



Carbon Capture, Utilization, and Storage (CCUS) plays a crucial role in achieving negative emissions, effectively offsetting emissions from systems where achieving zero emissions independently is impractical. However, the rapid growth of the CCUS industry presents its own set of challenges. Specifically, the capture of CO₂ necessitates specialized equipment that must perform optimally over decades while minimizing downtime.

SES Renewables Solutions™ is uniquely positioned to address these challenges by offering comprehensive design, analysis, and testing solutions in the CCUS domain. With our expertise and capabilities, we assist in the development of efficient and long-lasting equipment for CCUS.

Design and Analysis

CO₂ capture systems frequently encounter dynamic thermal-structural loading, leading to fatigue damage that requires thorough quantification and mitigation during the design phase. To address this, advanced tools such as finite element analysis and computational fluid dynamics analysis are employed. Additionally, the stored CO₂ in reservoirs poses the risk of migration and leakage, which can be effectively modeled using various analysis techniques.

At SES Renewables Solutions, our expertise lies in advanced modeling methods and the application of structural design codes specifically tailored to the CCUS domain. By leveraging our understanding of these techniques, we bring significant value to our clients' engineering teams.

Monitoring and Inspection

Implementing proactive monitoring and inspection practices for in-service equipment enables condition-based preventative maintenance of CO₂ capture absorption media and pressurized equipment, moving away from traditional interval-based approaches. This shift towards condition-based maintenance, when coupled with physics-based digital twins, offers operators substantial cost savings compared to conventional methods.

Our NeoSight® platform is specifically designed to address these requirements. Built from the ground up, NeoSight facilitates proactive monitoring and inspection of CO₂ capture systems. By leveraging this platform, operators gain real-time insights into the condition of their equipment, allowing them to detect potential damage or issues early on thus optimizing operational efficiency.

Testing

Transporting and storing CO₂ in a supercritical state at high pressures necessitates thorough design considerations which are often validated by testing. At SES Renewables Solutions™, our invaluable expertise lies in testing pressure-containing equipment specifically designed for CO₂ applications.

We have a proven track record of successfully conducting numerous full-scale tests on CO₂ systems. These tests encompass a range of challenging scenarios, including destructive tests on pressurized systems subjected to both low and high temperatures. Our comprehensive testing capabilities allow us to assess the performance and durability of pressure-containing equipment under extreme conditions, providing our clients with reliable data and insights.

About SES Renewables

SES Renewables Solutions™ is a division of Stress Engineering Services, Inc. that specializes in renewable energy consulting. Our expertise lies in supporting clients throughout the entire lifecycle of renewable energy projects, regardless of their scale. We offer comprehensive guidance in developing, executing, and commercializing these projects. Our focus is on providing clients with sound technical solutions to design, install, commission, operate, and maintain their energy systems safely and economically.

About Stress Engineering Services

Since 1972, Stress Engineering Services, Inc. has been a global leader in engineering services and solutions for a variety of industries. We are committed to providing the most comprehensive design, analysis, and testing services with an unsurpassed level of engineering integrity and skill. Our multi-disciplinary engineering methods, advanced technology, innovative applications, and highly knowledgeable and experienced staff provide proven, quantifiable benefits to its worldwide portfolio of clients. For more information, visit www.stress.com.

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CCUS