



RESERVOIR SYMPOSIUM

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Reservoir Characterization for Energy Security

Subsurface Uncertainty in CCS: Perspectives from Lenders and Insurers

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ABSTRACT

Carbon Capture and Storage (CCS) is vital for decarbonization, yet subsurface uncertainties create significant challenges for financing and insurance. This presentation examines how lenders and insurers assess and manage these technical risks to support CCS project viability.

Key uncertainties involve geologic storage integrity, CO₂ leakage pathways, and long-term containment. These factors influence project risk profiles, regulatory compliance, monitoring strategies, and financial viability. The discussion covers geological screening, leakage risk modelling that includes risks from legacy wellbores, and integrated risk assessments such as Bowtie analysis. The impact of regulatory frameworks like the U.S. 45Q tax credit and Alberta's TIER system on risk perception and creditworthiness is also addressed.

Additionally, evolving policies and regulations in greenhouse gas accounting and carbon markets influence lender and insurer confidence. Several case studies from North America and Europe highlight how technical due diligence, rigorous risk analysis, and clear communication help de-risk projects and facilitate financing and insurance underwriting.

By integrating geological, engineering, and financial insights, this talk bridges subsurface uncertainty with market demands for risk clarity. The goal is to inform project developers, financiers, and insurers on strategies to mitigate subsurface risks, improve capital access, and advance CCS deployment amid changing regulatory and commercial environments.