

Reusing depleted oil and gas fields for CO2 sequestration

Publieke samenvatting / Public summary

Aanleiding

Globally, depleted O&G reservoirs represent huge potential storage volumes for CO₂ (in the range of 675-900 Gt). There are, however, some important technical challenges related to injection into them. Upon high-pressure dense-phase CO₂ injection, the low pressure in the depleted reservoirs results in strong cooling and potential freezing of the well and near-well region, due to the Joule-Thomson effect and associated phase changes of the CO₂. This jeopardizes not only injectivity, but also near-well stability and well integrity. Today's available mitigation procedures include heating of the CO₂ and gas phase injection (dictating a high number of injectors). This is both expensive and emission intensive, and is thus a crucial hurdle for making depleted reservoirs attractive storage sites.

Doelstelling

In the RETURN project, the goal is to enable safe and cost-efficient use of depleted O&G reservoirs for long-term CO₂ storage through the development of novel solutions for overcoming injection challenges.

Korte omschrijving

This will be done through execution of four main scientific work packages, focusing on: (I) Coupled well-reservoir flow modelling, (II) Near wellbore processes, (III) Wellbore integrity and (IV) Enabling 'cold' CO₂ injection. The work, comprising both experiments and numerical modelling, will focus on understanding how CO₂ flows down the well and into the depleted reservoir – with special emphasis

Projectinformatie / Project information

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ACT320010

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Algemene informatie / General information

Penvoerder / Secretariat
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on Joule-Thomson cooling effects, phase transformations, pressure and temperature cycling, and the impact thereof on wellbores, reservoir rock and sealing formations.

Resultaat

The output of the project will be advanced numerical models, able to accurately predict the thermo-hydro-mechanical response of the wellbore-reservoir-caprock system to CO₂ injection. These models will be based on the physical processes observed, quantified in experiments performed at realistic in-situ conditions, and validated in field-scale injection tests. As such, these new models will be able to identify safe operational windows for CO₂ storage, which will be assessed through a selection of international case studies and integrated into workflows and procedures for 'cold' CO₂ injection into depleted reservoirs. The project findings will be disseminated through scientific publications in high-impact, peer-reviewed journals, as well as through clear operational recommendations on CO₂ injection planning and execution for storage site operators and regulators in the member countries. The RETURN project will also have a high focus on popular scientific dissemination to make the public aware of the importance of enabling large-scale CCUS for mitigating global emission increases.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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