

CO₂ Storage Potential in Austria and its Competitive Subsurface Usage

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Austria is committed to becoming climate net-neutral by 2040, no later than 2050. Reducing the countries hard-to-abate CO₂ emissions will require the substantial application of CCUS to reach this challenging goal. Due to legal regulation and missing public acceptance across Europe, storage sites for CCUS hubs are typically being developed offshore. This is especially challenging for inland countries like Austria where domestic storage is currently not developed and export of CO₂ can only take off once transport infrastructure is completed. Storage of pure hydrogen in porous media is an emerging technology that is hoped to be used for balancing fluctuations in renewable energy and decarbonizing heavy industry. At the same time geothermal energy production is seen as a key technology in providing green base-load energy for decarbonization of the heating sector in cities with district heating networks. We screen hydrocarbon fields and saline aquifers for CCS applicability as well as storage capacity while considering the industry demand for CCS in Austria. We will present our methodology of capacity evaluation which results in an estimated effective capacity of more than 250 Mt CO₂ in depleted hydrocarbon fields while the six biggest fields make up for 155 Mt. Furthermore, we discuss specific challenges for promising storage sites. Storage in saline aquifers is more difficult to assess as those structures were not in the interest of the oil and gas industry in the past. We look at competitive usage of the subsurface in Austria which indicates that CCS in depleted gas fields is more likely in competition with subsurface hydrogen storage, while geothermal energy extraction might be feasible in the same formations as CO₂ storage, but not necessary within the same structural setting. Additionally, utilizing CO₂ as the subsurface energy extraction working fluid in future geothermal projects, called CO₂-Plume Geothermal (CPG) can lead to synergy for geothermal energy production and CCS as well as hopefully increased public acceptance of the latter one. We believe that in the future, while all three technologies can significantly contribute to energy transition as well as the countries climate goals, CCS should not be neglected as only development of domestic CO₂ storage can bridge crucial time periods for hard-to-abate emitters.