

Multidisciplinary decision process for ranking CO₂ injection sites in deep saline aquifers

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Abstract. Carbon capture, utilization and storage (CCUS) technologies are required to play a significant role towards a low-carbon future and to meet the ambitious climate mitigation targets established by the international agreements and policies.

PilotSTRATEGY is a EU funded research project aiming at advancing the understanding of deep saline aquifers (DSA) resources for CO_2 geological storage in Southern and Eastern Europe and, specifically, at characterizing sites for CO_2 injection pilots in Portugal, Spain and France. In the Portuguese study area, the Lusitanian basin, alternative onshore and offshore areas are being considered for implementation of pilot injection site. A decision process is required to select the final site and different previously applied methodologies, based on technical criteria, were reviewed for ranking the alternative sites. However, the decision process must also consider social and economic aspects that are not covered by the existing technical methodologies.

This paper presents the multidisciplinary decision process pursued to rank and select the pilot injection site in the Portuguese target region. The method is based takes into account geological and risks criteria, but is complemented by social, economic, and regulatory aspects. The decision process is implemented in qualitative and semi-quantitative approaches, with the qualitative approach relying on a Boston Square Analysis, while the semiquantitative approach applies the Analytic Hierarchy Process to define weights to each criteria. The application of the methodology is illustrated for the Lusitanian basin.

Keywords: CO₂ injection sites, decision process, Deep Saline Aquifers, PilotSTRATEGY, Analytic Hierarchy Process, CCUS.