

Implementation of CO<sub>2</sub> capture and geological storage (CCGS) technology at the scale needed to achieve a significant and meaningful reduction in CO<sub>2</sub> emissions requires knowledge of the available CO<sub>2</sub> storage capacity. CO<sub>2</sub> storage capacity assessments may be conducted at various scales—in decreasing order of size and increasing order of resolution: country, basin, regional, local and site-specific. Estimation of the CO<sub>2</sub> storage capacity in depleted oil and gas reservoirs is straightforward and is based on recoverable reserves, reservoir properties and in situ CO<sub>2</sub> characteristics. In the case of CO<sub>2</sub>-EOR, the CO<sub>2</sub> storage capacity can be roughly evaluated on the basis of worldwide field experience or more accurately through numerical simulations. Determination of the theoretical CO<sub>2</sub> storage capacity in coal beds is based on coal thickness and CO<sub>2</sub> adsorption isotherms, and recovery and completion factors. Evaluation of the CO<sub>2</sub> storage capacity in deep saline aquifers is very complex because four trapping mechanisms that act at different rates are involved and, at times, all mechanisms may be operating simultaneously. The level of detail and resolution required in the data make reliable and accurate estimation of CO<sub>2</sub> storage capacity in deep saline aquifers practical only at the local and site-specific scales. This paper follows a previous one on issues and development of standards for CO<sub>2</sub> storage capacity estimation, and provides a clear set of definitions and methodologies for the assessment of CO<sub>2</sub> storage capacity in geological media. Notwithstanding the defined methodologies suggested for estimating CO<sub>2</sub> storage capacity, major challenges lie ahead because of lack of data, particularly for coal beds and deep saline aquifers, lack of knowledge about the coefficients that reduce storage capacity from theoretical to effective and to practical, and lack of knowledge about the interplay between various trapping mechanisms at work in deep saline aquifers