

Evaluation of CO₂ Geologic Storage Resource in the Ordos Basin, China

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Development of a significant coal-to-liquids industry in addition to existing and planned power generation has resulted in a growing and significant volume of CO₂ emissions across the Ordos Basin of north central China. Emissions were approximately 270 million metric tons (Mt) in 2004 and planned CTL plants could add 40 Mt. Geological storage (GS) of CO₂ provides a method to limit emissions of CO₂ into the atmosphere. Preliminary results indicate that Ordos Basin has good potential for geologic storage in several targets, including oil and gas fields, deep coal beds and large regional saline formations. The Ordos Basin is the second largest sedimentary basin of China (37*10⁴km²) with a sedimentary succession of 5000m to 10000m. Tectonic activity in basin is dominated by relatively minor vertical movements with rare regional faults. Subsurface and surface geologic, geographic and engineering information was gathered and analyzed on a regional basis to create a 3D model of the basin. The Ordos contains large natural gas and oil production and reserves. Target GS reservoirs, possibly coupled with enhanced hydrocarbon recovery, include the Ordovician carbonate reservoir (Ma5), sandstone reservoir (e.g., Shanxi group, Taiyuan Group, Xiashihezi Group, Yanchang Group, Yanan Group), and Carboniferous and Permian coal seams. Several significant regional seals subdivide the Ordos Basin into three petroleum systems and provide effective CO₂ containment. In addition, most reservoirs in Ordos Basin are under pressured, which may be an advantage for CO₂ geologic storage. Large regional saline formations provide a very significant regional GS target, but require additional data to fully evaluate. Plans have been develop to gather and generate additional subsurface geologic and geophysical data to improve the regional resource evaluation and to assess local areas as GS targets. Preliminary theoretical resource estimates for CO₂ storage indicate that the Ordos Basin has sufficient GS resource to accommodate many decades of planned emissions.