

CO2 sequestration and gas extraction of deep unmineable coal seams

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CO2 sequestration into coal seams is one of the favored options for reducing atmospheric CO2 emissions from power and industrial plants. CO2 sequestration capacities of coalfields in Japan were estimated from old geological and experimental data. Remaining coal seams in old coal mines and untapped coal seams near old coal mines are estimated to be able to sequester about 1 Gtons of CO2 in Japan.

Recent systematic exploration of oil and natural gas revealed that huge volumes of coal seams lie deep in Paleogene sedimentary basins along the Japanese islands. Deep coal and coaly shale are noticed as source rocks of natural gas and oil. In the central Hokkaido, unmineable coal seams deeper than -1,200m and shallower than -3000m are found to reach as much as 100 Gtons that may store 3.5 Gtons of CO2 and contain nearly 900Gm3 of coalbed methane. Coal-bearing Paleogene sedimentary basins spread widely offshore of the Honshu and Kyusyu islands.

CO2 sequestration potential of deep unmineable coal seams in Japan would reach well past 10 Gtons. Huge volumes of deep unmineable coal seams may not only provide potential sinks for CO2, but also unseen enormous energy resources. Deep unmineable coal seams may contain more than several trillion cubic meter of coalbed methane. Injection of supercritical carbon dioxide in high pressure may extract volatile component of deep unmineable coal seams more effectively combined with underground microbial gasification of coal. Deep unmineable coal may provide huge new energy source in Japan.