

Monetizing Sour Gas Fields Through Integrated Field Development and Storage Development Plans: Case Studies from Malaysia Offshore Basins

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Abstract

Several significant gas discoveries in the prolific Sarawak and Peninsular Malaysia basins, Malaysia offshore have been stranded due to higher content of contaminants like CO₂. To develop these fields along with reduction of greenhouse gas emissions for sustainability development, an integrated approach has been followed to develop hydrocarbon and storage of CO₂ through carbon sequestration projects. A few depleted oil and gas fields and the saline aquifers were screened to finalize potential geological storage sites. The workflow includes the following three major studies which aims at filed development, storage site for CO₂:

CCS site selection (both Regional and field scale) for Understanding origin of Contaminants through basin modeling Integrated Field Development Plan (FDP) and Storage Development Plan (SDP)

The studies encompassed subsurface and surface studies which are critical, using significant amount of data in the basin acquired over few decades.

Regional studies on CCS site selection resulting in CCS atlas: Extensive regional as well focused studies have been carried out to understand the potential sites for carbon sequestration sites. The studies focused on both saline as well as depleted fields. The Atlas is gives ample information which is crucial in planning for future CCS sites in relation to the stranded fields.

Integrated FDP and SDP studies have been carried out for some of the sour gas fields in Sarawak and Peninsular basins are enabling development of these stranded fields. These Simultaneous and interactive studies are critical for the success of the project. In peninsular Malaysia, depleted filed with clastic reservoir been studied while in Sarawak both clastic and carbonate reservoirs have been studied. Contaminant studies to understand origin and distribution of CO₂/H₂S : A comprehensive regional studies focusing on analyses of CO₂/ H₂S data and basin modelling to understand the source of the contaminants has been carried out .

For CO₂ prediction the 3D basin model includes contribution of both organic and inorganic-derived CO₂.

This study encompasses all the aspects e.g., sub surface as well surface which are critical for success of these projects. Also, instead of carrying out isolated studies this workflow aims at studying both source (high contaminant fields) and sinks (depleted and saline aquifers) together. The study integrates all the aspects of carbon sequestration and field development to develop the stranded fields in a sustainable way with an objective of achieving Net Zero carbon.