

# Building Decarbonization Society in Indonesia through Carbon Capture, Utilization and Storage (CCUS)

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## Abstract

New discoveries of oil and gas fields in Indonesia have now shifted into CO<sub>2</sub> rich fields, where the CO<sub>2</sub> will become a major obstacle in developing the fields economically. One of the issues in developing CO<sub>2</sub> rich fields is how to dispose the CO<sub>2</sub> safely or even adding some added value into the disposed CO<sub>2</sub>. This presentation offers an alternative of disposing CO<sub>2</sub> from CO<sub>2</sub> rich gas fields by injecting it into oil and gas reservoirs by means of CO<sub>2</sub>-EOR and CO<sub>2</sub>-EGR. Despite its urgency, CO<sub>2</sub>-EOR and CO<sub>2</sub>-EGR has not been implemented on a full field scale in Indonesia due to higher price of captured CO<sub>2</sub>.

One of the biggest challenges in reducing CO<sub>2</sub> emission in Indonesia's oil and gas industries is the constantly growing need of fossil fuel as well as the lack of carbon tax on Indonesia's law. Carbon tax, in which a tax is imposed carbon generating activities, has been successfully applied in several countries, but not in Indonesia. Fortunately, recently the government of Indonesia declared that CCUS will be supported, since it could give additional economic benefit an on the same time the reduction of greenhouse gas from energy sector could be conducted. Besides that, the government of Indonesia has developed the draft of Presidential Decree related to economic value of carbon to speed up the NDC target and to control the GHG emission for national development.

This presentation will explain the current status of Gundih CCUS Project, which will be part of JCM implementation. Gundih CCUS project becomes more interesting, because after injection 10 million tons of CO<sub>2</sub> within 10 years, there will be incremental gas production of about 36 BSCF. The economic benefit from this incremental production is about 3 time higher than the total CAPEX. If JCM scheme could be implemented, the economic benefit from this project is even higher. Currently, the National CoE of CCS, CCUS and Flared Gas Utilization at Institut Teknologi Bandung, Pertamina and consortium from Japan (Janus Co. Ltd., J-Power, JOE and Fukada Geological Institute) are working together for conducting the FS JCM. CoE at ITB is also working together with JANUS Co. Ltd. for developing CO<sub>2</sub>

Later, we propose to develop cluster-based approach to reduce CO<sub>2</sub> transportation and compression cost, besides obtaining additional recovery from the oil fields that are implemented the CO<sub>2</sub>-EOR. This approach was studied in several areas in Indonesia. This study presents an effort to classify source and sink of CO<sub>2</sub>-EOR/EGR. Some fields are major gas producers' field with high CO<sub>2</sub> content, therefore efforts should be taken to utilize the CO<sub>2</sub>, not only as a flare gas that has the potential to pollute its surrounding areas. It is then decided that the CO<sub>2</sub> will be utilized and sold as EOR media to nearby fields, however, care should be taken in order to ensure the economic and technical aspect of CO<sub>2</sub> injection itself. Prior to field selection and calculation, a screening is performed based on available criteria in order to find the most suitable target fields based on reservoir properties and the remaining oil in place.

As conclusion, it is hoped that this study could be used as a reference on how to develop cost efficient CO<sub>2</sub>-EOR and CO<sub>2</sub>-EGR, especially in Indonesia.

*Keywords:* CCUS; CO<sub>2</sub>-EOR; CO<sub>2</sub>-EGR, Mapping of CO<sub>2</sub>-source-sink-match

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