Japex’s Recent Activities toward the Implementation of the CCUS Project in Indonesia

June 23, 2021

Hiroto Harata
General Manager of Environmental Business Promotion Dept.
Our Capabilities and Possibilities in CCS/CCUS

Aiming the early realization of CCS/CCUS as a pioneer in Japan

- Subsurface investigation (Geophysical Exploration)
- Well drilling from land to subseafloor
- Well management/monitoring

Select candidate locations for CCS/CCUS, and execute CO₂ injection, storage, and monitoring
- Technical capabilities to complete all elements in the JAPEX group for realization including exploration, drilling, and monitoring
- Utilize the data concerning deep saline aquifers*, acquired by our investigations and explorations in Japan

Capture CO₂  Transport CO₂  Utilize CO₂  Inject and Store CO₂

Transport separated and captured CO₂
- Establish CO₂ transportation infrastructures leveraging our expertise in natural gas and LNG supply

Collaborate and Enter Carbon-Neutral Business
- Apply CCS/CCUS to power generation by gas and biomass
- Consider to enter blue hydrogen and methanation business

Focus on gas-fired and biomass plant, including facility owned by other companies
- [Blue Hydrogen] Decompose natural gas, and capture CO₂ after production
- [Methanation] Produce Methane (CH₄) from H₂ and CO₂

Source) JAPEX, Formulation of “JAPEX2050” for the Realization of a Carbon-Neutral Society in 2050
CCS / CCUS History by JAPEX and its affiliate

1993-2000 CO₂-EOR Pilot Test in Japan

2003-2005 Technical Support for Iwanohara CCS Project in Japan

2008-Present: JCCS

2012-Present: Tomakomai CCS Demonstration Project by JCCS

2012-2017 Technical Support for Gundih CCS Project in Indonesia

2016-Present: Active Member of Geological Carbon Dioxide Storage Technology Research Association

2019 Successful Operation of 300,000 ton of CO₂ Injection

2019-2020 CO₂ Microbubble Pilot Test in Japan

Joint collaboration between Indonesia and Japan

JAPEX

PERTAMINA

LEMIGAS

JCM CCUS F/S in Indonesia

2017-Present: S. Sumatra CCUS

2019-Present: E. Java CCUS

2019-2020 CO₂ Microbubble Pilot Test in Japan

Joint collaboration between Indonesia and Japan
Japex’s CCUS Activities in Indonesia

**South Sumatra JCM CCUS F/S**
- Many CO₂ sinks
- Many CO₂ sources
- Pipeline Infrastructures
- CO₂ Pipeline Network (Source: JAPEX)

**East Java JCM CCUS F/S**
- CO₂ Sources
- Oil fields
- Cluster 1
- Cluster 2
- Multi-phase WAG

**JCM CCUS Methodology / Economic Evaluation**
- CO₂ Storage Capacity & Injectivity Assessment
- Risk Assessment of Geological Integrity and Wellbore Integrity
- Comprehensive Monitoring System for CO₂ Storage Complex
- Design for Supercritical CO₂ Pipeline
- JCM CCUS Methodology / Economic Evaluation

**Concept Creation**
- Feasibility Study
- Pilot Activity (incl. prep)
- Development Prep
- Development Commercial

**Source**
- PT Pertamina EP
Unlock CCUS Potential in Indonesia

- There will be huge potential for CCUS in Indonesia.
- By promoting JCM CCUS, this huge potential will be unlocked and available.

**CO₂ Storage Capacity in Indonesia**

<table>
<thead>
<tr>
<th>Region</th>
<th>Capacity (MMtons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Sumatra</td>
<td>229</td>
</tr>
<tr>
<td>S. Sumatra</td>
<td>144</td>
</tr>
<tr>
<td>E. Java</td>
<td>99</td>
</tr>
<tr>
<td>E. Kalimantan</td>
<td>130</td>
</tr>
<tr>
<td>Irian Jaya</td>
<td>18</td>
</tr>
</tbody>
</table>

Source) LEMIGAS (2018), Current Status and Future Path of Developments for CCUS in Indonesia
Our feasibility study indicates that East Java and South Sumatra are prospective area for CCUS storage sites.

Both Indonesia and Japan are located on active island arc, which is different from the CCS / CCUS sites located on the stable continents which tectonically quiet such as US and Europe.

Appropriate subsurface technology and experience of field operation will be required to reduce the risk of CO$_2$ storage and operate it safely.

Japex will work with its longtime partners in Indonesia, Pertamina and Lemigas, to provide solutions to these challenges.
Thank you for your attention

JAPEX would like to contribute to reduce CO$_2$ emissions to sustain oil production with our partners

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- PT Pertamina EP
- PT Pertamina Power Indonesia
- Pusat Penelitian Dan Pengembangan Teknologi Minyak Dan Gas Bumi (PPPTMGB) “LEMIGAS”