CCUS Activities in Indonesia

ADHI WIBOWO
Director of Oil and Gas Engineering and Environment
Directorate General of Oil and Gas
1. National Energy Plan (RUEN) of Indonesia
   Enhanced Oil Recovery (EOR) technology is one of the solutions to increase oil and gas production in Indonesia.

CO₂ Source Distribution

✓ Subang : PT Pertamina EP ± 16% CO₂
✓ Cilamaya : PT Pertamina EP ± 30% CO₂
✓ Jatibarang : PT Pertamina EP ± 23% CO₂
✓ Merbau : PT Pertamina EP ± 12% CO₂
✓ Gundih : PT Pertamina EP ± 20% CO₂
✓ Jambaran Tiung Biru : PT Pertamina EP ± 35% CO₂
✓ East Natuna : PT Pertamina EP ± 80% CO₂
✓ Tangguh : BP (Berau) Ltd. ± 12% CO₂
✓ Matindok : PT Pertamina EP ± 3% CO₂
✓ Senoro : JOB Pertamina Medco E&P Tomori Sulawesi ± 3% CO₂
✓ South Jambi : ConocoPhillips South Jambi Ltd. ± 60% CO₂
✓ Singa : Medco E&P ± 38% CO₂
✓ Kuala Langsa : Medco E&P ± 81% CO₂
✓ Alur Siwah : Medco E&P 27.5% CO₂
✓ Arung – Nowera : Medco E&P 60% CO₂
Carbon Capture, Utilization and Storage (CCUS)

“DG Oil and Gas focus on the CCUS (CO₂-EOR/EGR), especially for the projects that will continue to the full-field stage”
- Vice Minister of MEMR, December 2018 -

CCUS Studies in Indonesia
1. FS JCM CCUS/CO2-EGR Gundih by CoE CCS/CCUS ITB & Japan (June 2020 – Feb 2021)
2. CO2-EOR Sukowati Field by Pertamina EP (CCUS Study Supported by Japex & CoE CCS/CCUS LEMIGAS)
3. CO2-EOR Limau Niru Field by Japex & CoE CCS/CCUS LEMIGAS
4. Source-Sink Match by CoE CCS/CCUS ITB & JANUS
5. FS Tangguh CCUS/CO2-EGR by BP Berau Ltd. & ITB (Sept - Dec 2020)
**Feasibility Study (2019)**

**Injection Target:** Kedungtuban Structure (2600-3500 m)

- **Injection Scenario:** CO\(_2\) Injection + impurities
  - 800 ton/day for 10 years
  - Impurity: H\(_2\)S ±1% atau 10,000 ppm
  - Total CO\(_2\) Reduction: ± 3 million ton
  - Cost: USD 35 million (Capex & Opex)
  - Incremental gas production potential: 30 BSCF equivalent

**Project JCM Feasibility Study – CCUS Gundih**

Cooperation with Japan

(METI, J-Power, JOE, JANUS)

- a. **FS JCM:** June 2020 – February 2021
- b. Project Demonstration schedule: 2021-2025
- c. Potential support from NEDO for Project Demonstration with JCM scheme.
**Sukowati CO2-EOR Project**

- **Pilot CO2 Injection**: 250 ton/day (5 MMSCFD) CO2 for 1 year
- **Full-scale Project**: 5500 ton/day (100 MMSCFD) CO2

**Milestone Sukowati CO2 EOR Project**

- The distance Sukowati oil field to Jambaran Tiung Biru gas field is about **30 km**.
- CO2 Potential based on PEPC study:
  - Gas Production plateau is 315 MMSCFD for 15 years
  - CO2 Content 30%, thus CO2 potential is 110 MMSCFD for 15 years

Source: Pertamina EP,
The current Tangguh CO2 emissions are ca. 5 million tCO2e pa and will increase up to 8 million tCO2e pa when Train 3 starts up.

Internal bp preliminary study shows that EGR/CCUS will add reserves ca. 200 bcf and up to 30 million tCO2 will be sequestered until 2035*.

bp, as operator, has low carbon emission initiatives which align with Indonesia’s NDC target.

Ca. 3 million CO2e pa will be sequestered and that is equivalent to ca 1% of Indonesia’s energy sector NDC target of ca. 314 million tCO2e per year.

Prior to including EGR/CCUS into Tangguh development plan, bp and partners appointed ITB and LEMIGAS to conduct Feasibility Study; 4 month study expected to be completed in end 2020.

Tangguh Joint venture participating interest
- bp, 40.22%
- Mitsubishi Inpex, 16.30%
- JX Nippon, 12.23%
- KG Mitsui, 10.00%
- LNG Japan, 7.35%
- CNOOC, 13.90%

*additional reserves and carbon sequestration volume will be confirmed as part of joint feasibility study result thru 2045.
CHALLENGES FOR CCUS IN INDONESIA

- Monitoring Liability under PSC Contract
- Carbon Trading/ Pricing in Oil and Gas Industry
- CCUS Business Model
CCUS TECHNOLOGY for NATUNA D-ALPHA??

- Gas Reserves: 46 TCF
- CO₂ Content: ±72%
- Discovery Year: 1973
Terima Kasih & Follow Kami