



**THE MINISTRY OF ENERGY AND MINERAL RESOURCES
REPUBLIC OF INDONESIA**

Truthful, Professional, Serving, Innovative, Meaningful

JAPAN - ASIA CCUS FORUM 2020

OCTOBER 6th, 2020

CCUS Activities in Indonesia

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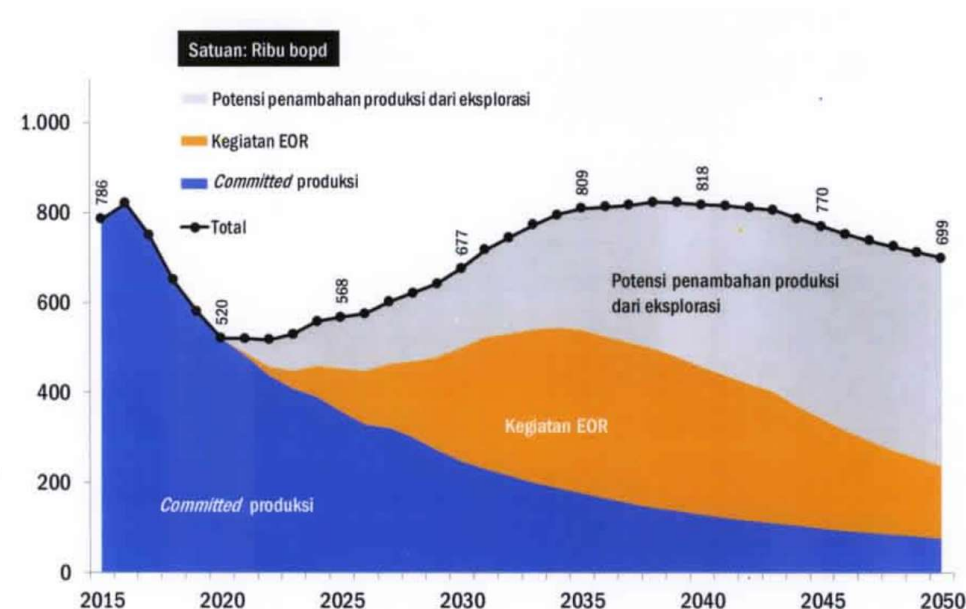
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Background

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.

2. Commitment of Gol to Reduce Green House Gas (GHG) Emission in COP 21 - Paris.



Reduction Scenario
GHG Emission by 2030

29 % business as usual

41 % with international support



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CO₂ Source Distribution



✓ Subang	: PT Pertamina EP ± 16% CO ₂	✓ Matindok	: PT Pertamina EP ± 3% CO ₂
✓ Cilamaya	: PT Pertamina EP ± 30% CO ₂	✓ Senoro	: JOB Pertamina Medco E&P Tomori Sulawesi ± 3% CO ₂
✓ Jatibarang	: PT Pertamina EP ± 23% CO ₂	✓ South Jambi	: ConocoPhillips South Jambi Ltd. ± 60% CO ₂
✓ Merbau	: PT Pertamina EP ± 12% CO ₂	✓ Singa	: Medco E&P ± 38% CO ₂
✓ Gundih	: PT Pertamina EP ± 20% CO ₂	✓ Kuala Langsa	: Medco E&P ± 81% CO ₂
✓ Jambaran Tiung Biru	: PT Pertamina EP ± 35% CO ₂	✓ Alur Siwah	: Medco E&P 27.5% CO ₂
✓ East Natuna	: PT Pertamina EP ± 80% CO ₂	✓ Arung – Nowera	: Medco E&P 60% CO ₂
✓ Tangguh	: BP (Berau) Ltd. ± 12% CO ₂		



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

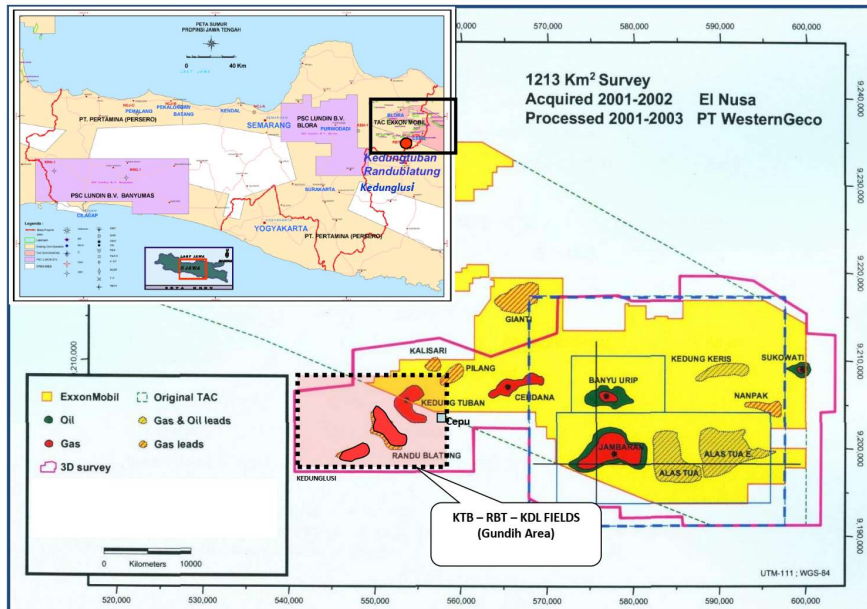
1. FS JCM CCUS/CO₂-EGR Gundih by CoE CCS/CCUS ITB & Japan (June 2020 – Feb 2021)
2. CO₂-EOR Sukowati Field by Pertamina EP (CCUS Study Supported by Japex & CoE CCS/CCUS LEMIGAS)
3. CO₂-EOR Limau Niru Field by Japex & CoE CCS/CCUS LEMIGAS
4. Source-Sink Match by CoE CCS/CCUS ITB & JANUS
5. FS Tangguh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



Gundih CC(U)S Project

GUNDIH AREA

KTB (Kedung Tuban) – RBT (Randu Blatung) – KDL (Kedung Lusi) fields



Feasibility Study (2019)

Injection Target: Kedungtuban Structure (2600-3500 m)

Injection Scenario: CO₂ Injection + impurities

- 800 ton/day for 10 years
- Impurity: H₂S ±1% atau 10,000 ppm
- Total CO₂ Reduction: ± 3 million ton
- Cost: USD 35 million (Capex & Opex)
- Incremental gas production potential: 30 BSCF equivalent

Project JCM Feasibility Study – CCUS Gundih In Cooperation with Japan (METI, J-Power, JOE, JANUS)

- FS JCM: June 2020 – February 2021
- Project Demonstration schedule: 2021-2025
- Potential support from NEDO for Project Demonstration with JCM scheme.



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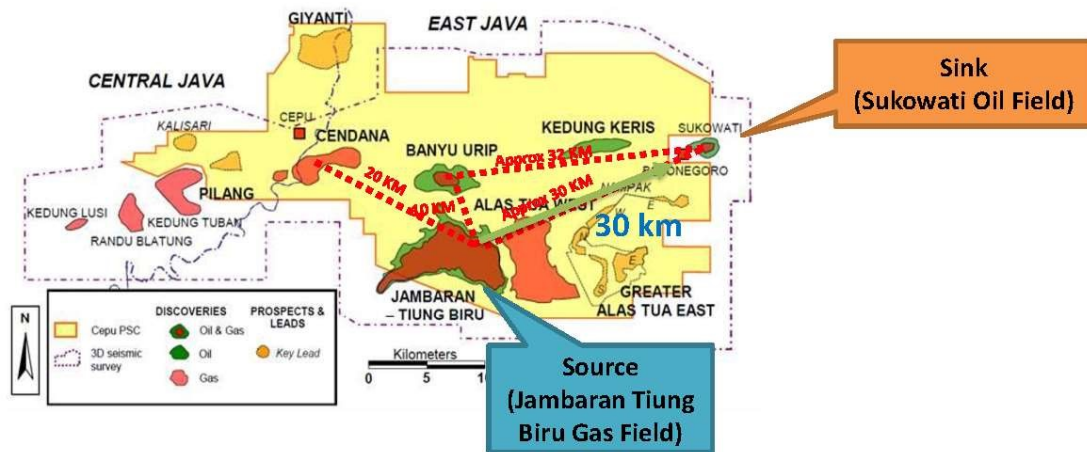


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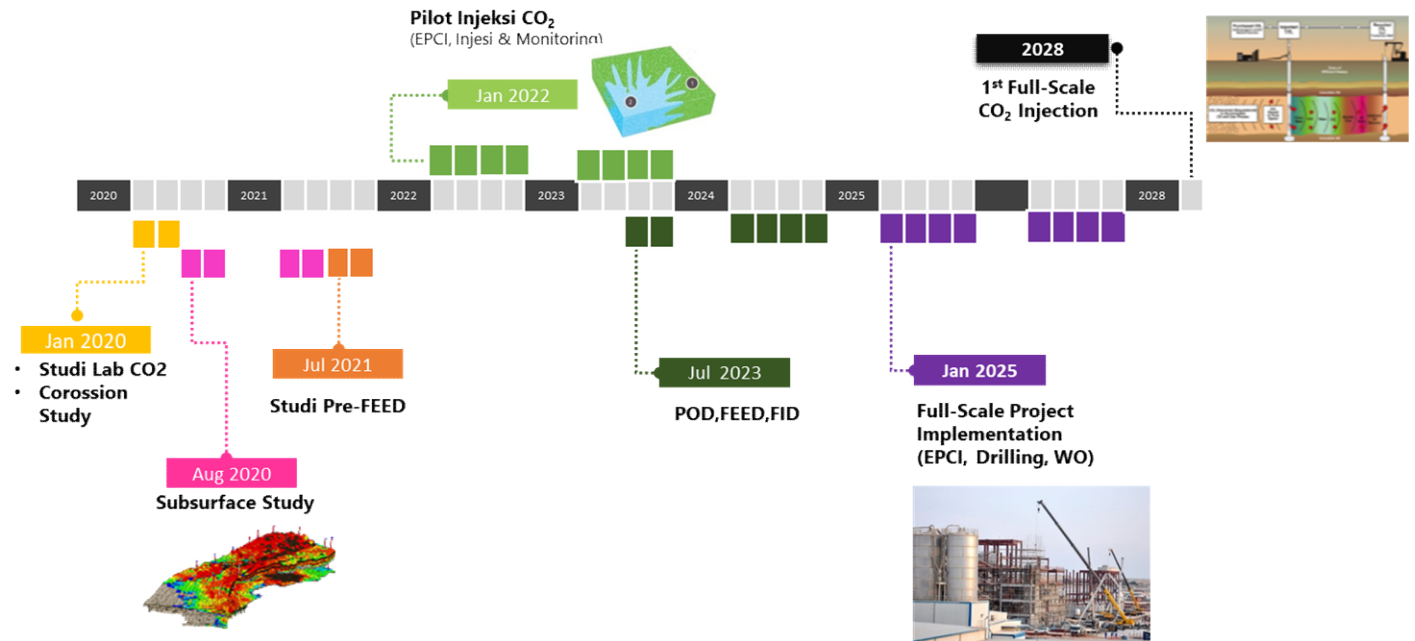
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Sukowati CO2-EOR Project



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,



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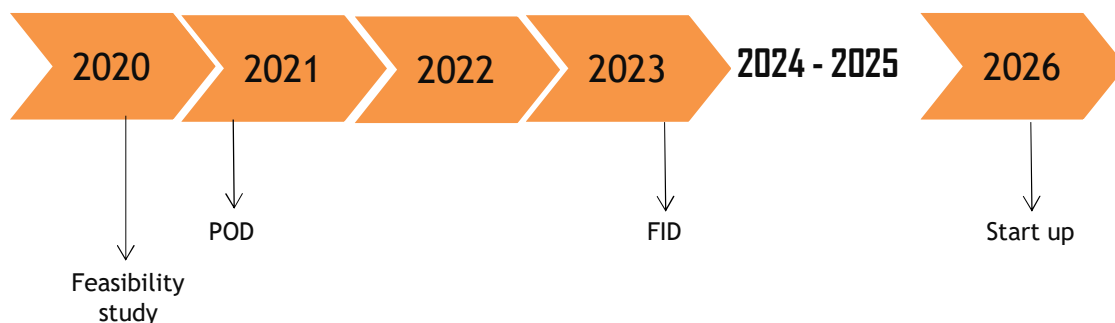
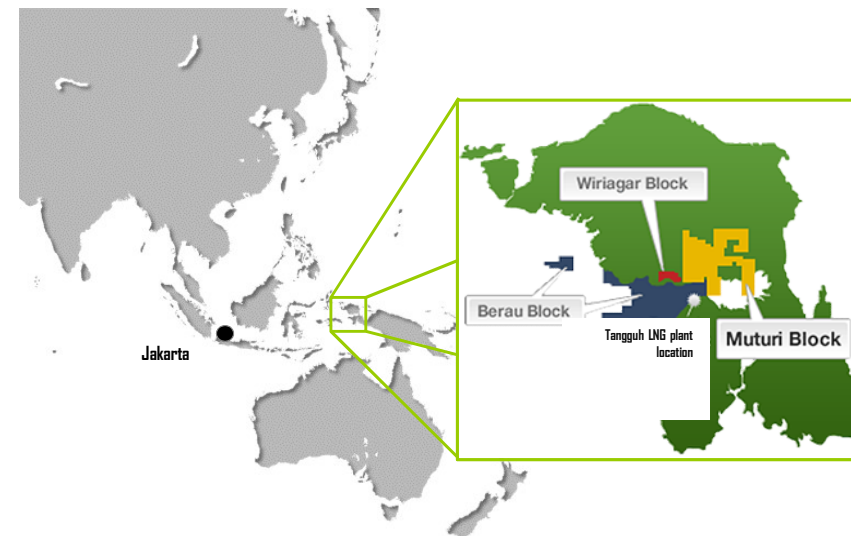
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Tanggung CCUS/CO2 - project is being evaluated

- 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



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CHALLENGES FOR CCUS IN INDONESIA

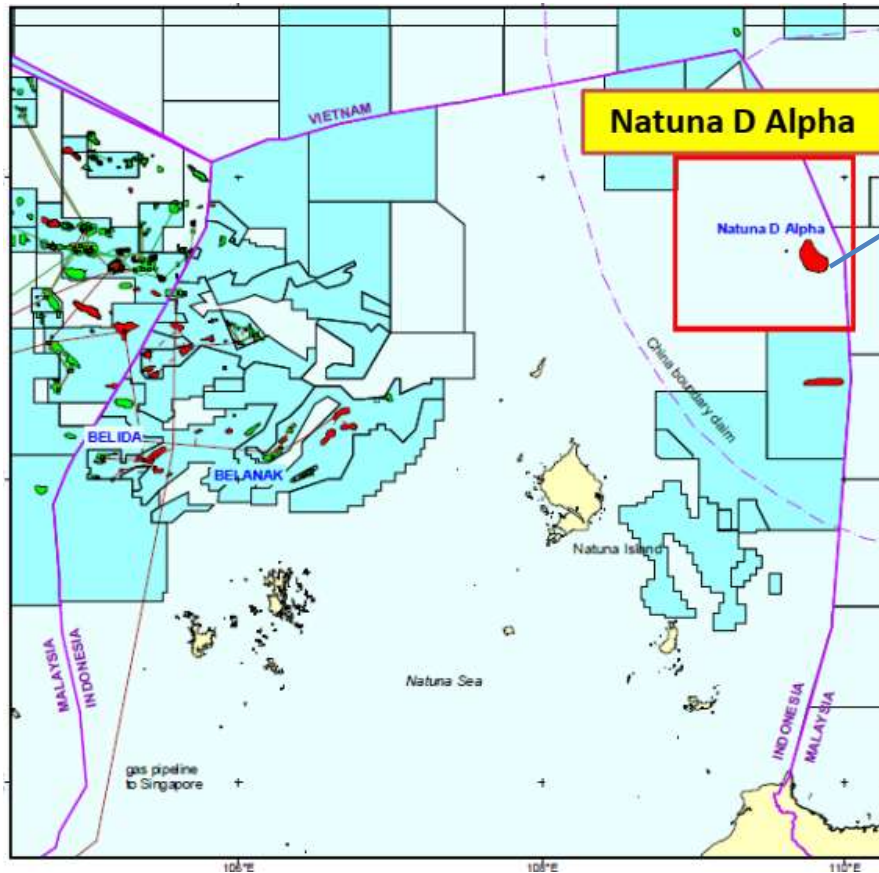
Monitoring Liability
under PSC Contract

Carbon Trading/ Pricing
in Oil and Gas Industry

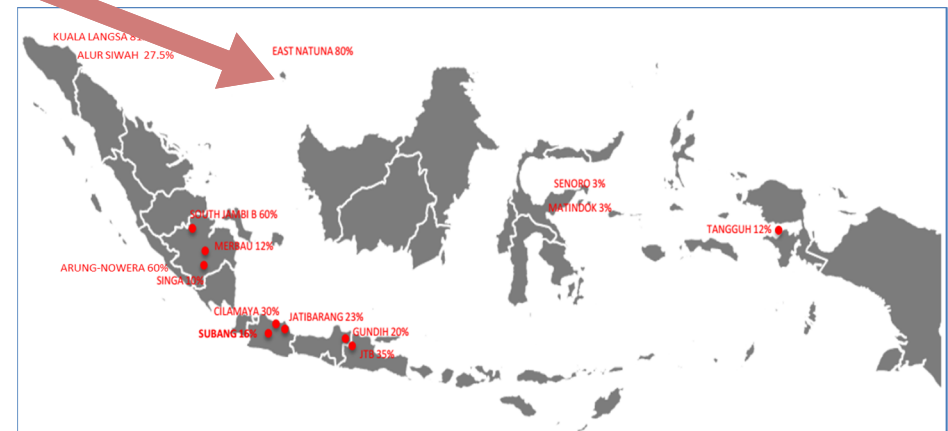
CCUS Business
Model



CCUS TECHNOLOGY for NATUNA D-ALPHA??



Gas Reserves	: 46 TCF
CO ₂ Content	: ±72%
Discovery Year	: 1973



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Terima Kasih & Follow Kami



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