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IOG 4.0

IAFMI
IKATAN AHLI FASILITAS PRODUKSI MINYAK DAN GAS BUMI INDONESIA

FFPMI 2023 FORUM FASILITAS PRODUKSI MIGAS

29-31 AGUSTUS 2023
YOGYAKARTA

Investasi Migas di Era Energi Transisi

Triharyo Indrawan Soesilo

SPEAKER PROFILE

Name	: Triharyo Indrawan Soesilo
Company/Institution	: Kementerian ESDM
Education	: - S1 : ITB Teknik Kimia 1977 – 1981 - S2 : University of Arizona, 1982 – 1984
Professional Career	: - Dirut PT Rekayasa Industri 2004 – 2010 - Komisaris PT Pertamina (Persero) 2010 - 2012 - CEO Supreme Energy 2012 - 2015 - Direktur Sektor Energi, KPPIP Kemenko Ekon 2015 – 2019 - Staf Khusus Menteri ESDM 2019 sd hari ini
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DIRECTORATE GENERAL
OF OIL AND GAS
MINISTRY OF ENERGY
AND MINERAL RESOURCES

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ASEAN
INDONESIA
2023

THE GOVERNMENT OF
REPUBLIC OF INDONESIA

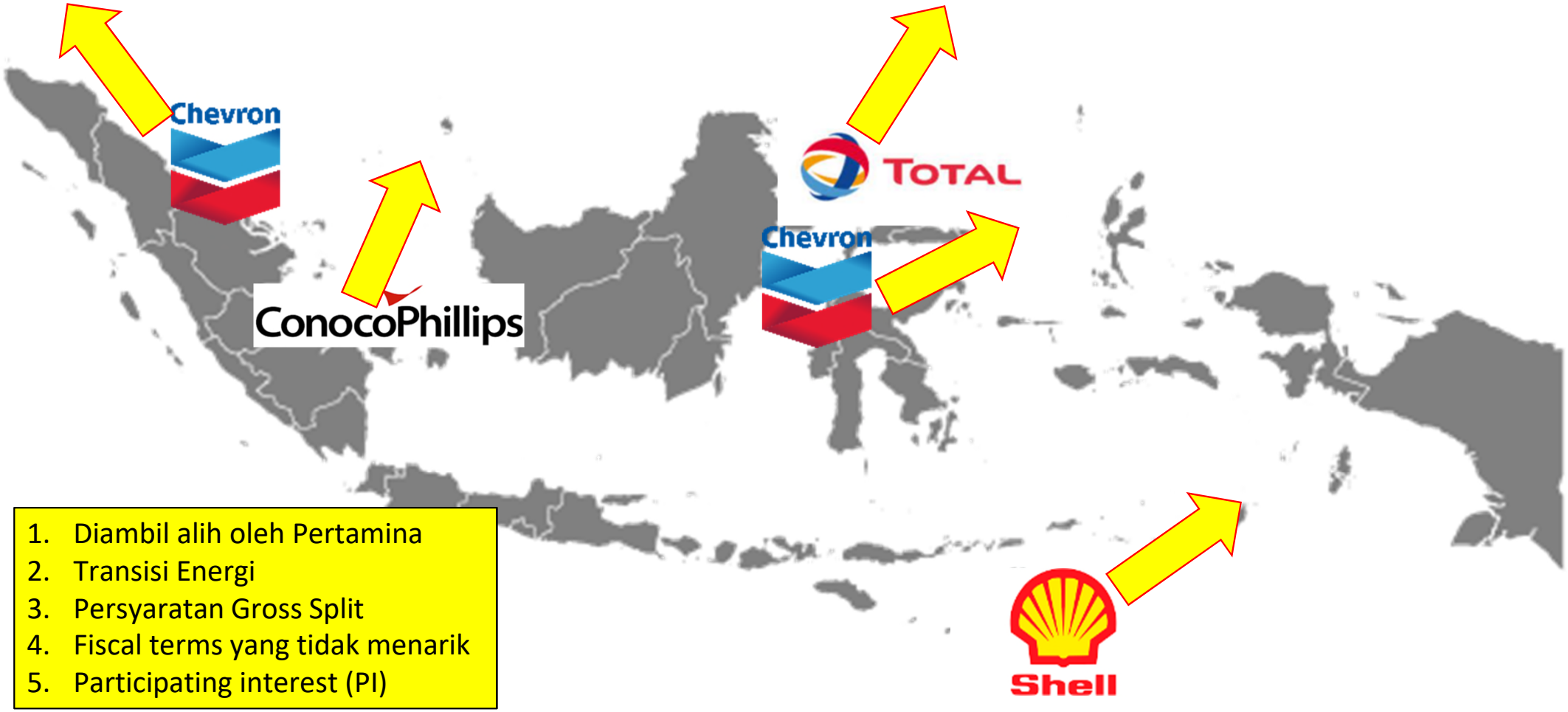
Investasi Migas di Indonesia pada Era Energi Transisi

Jogjakarta, 29 Agustus 2023
Forum Fasilitas Produksi Migas (FFPM)

www.migas.esdm.go.id @halomigas Halo Migas Ditjen Migas @halomigas Halo Migas Ditjen Migas

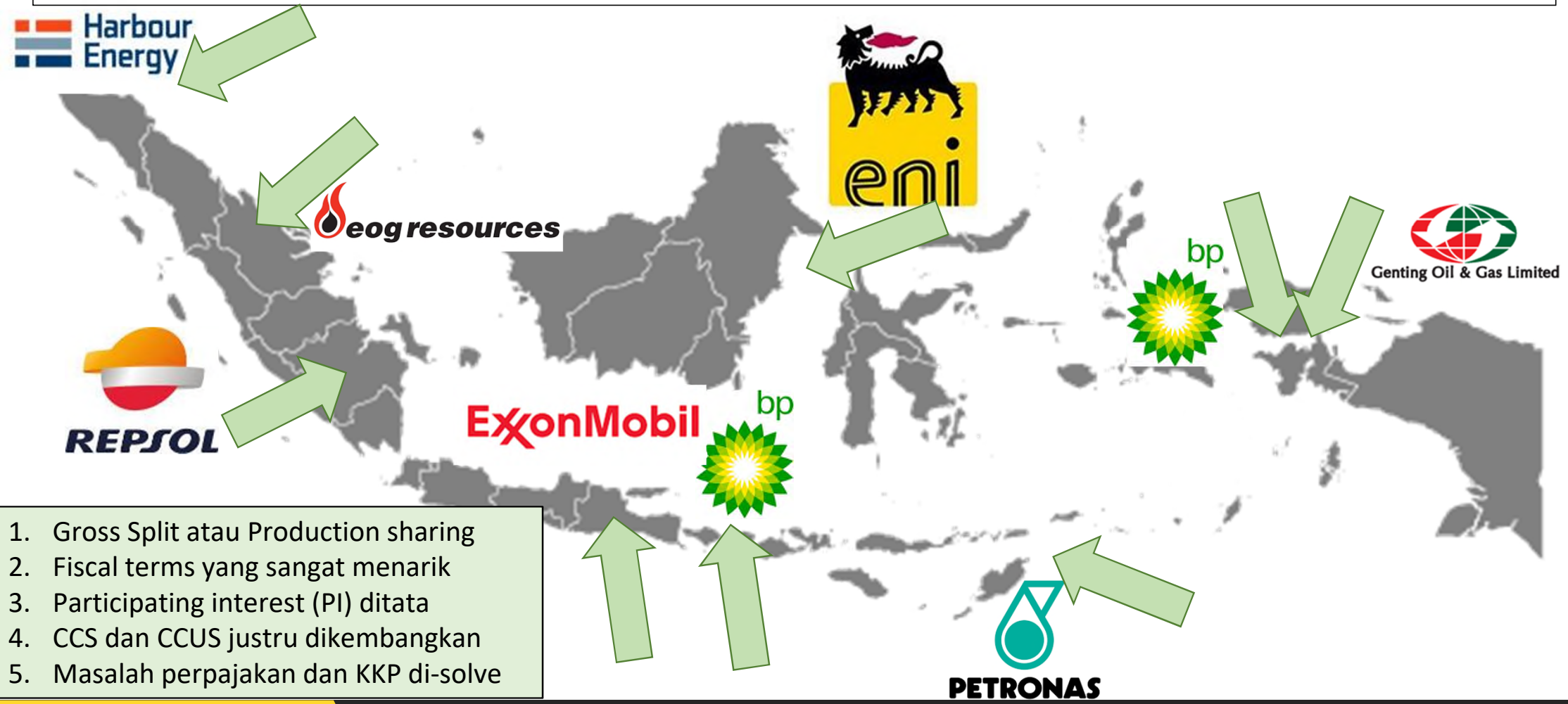
Agenda Presentasi

Kondisi investasi Migas pada tahun 2019
Sebagian besar Oil Majors meninggalkan Indonesia



1. Diambil alih oleh Pertamina
2. Transisi Energi
3. Persyaratan Gross Split
4. Fiscal terms yang tidak menarik
5. Participating interest (PI)

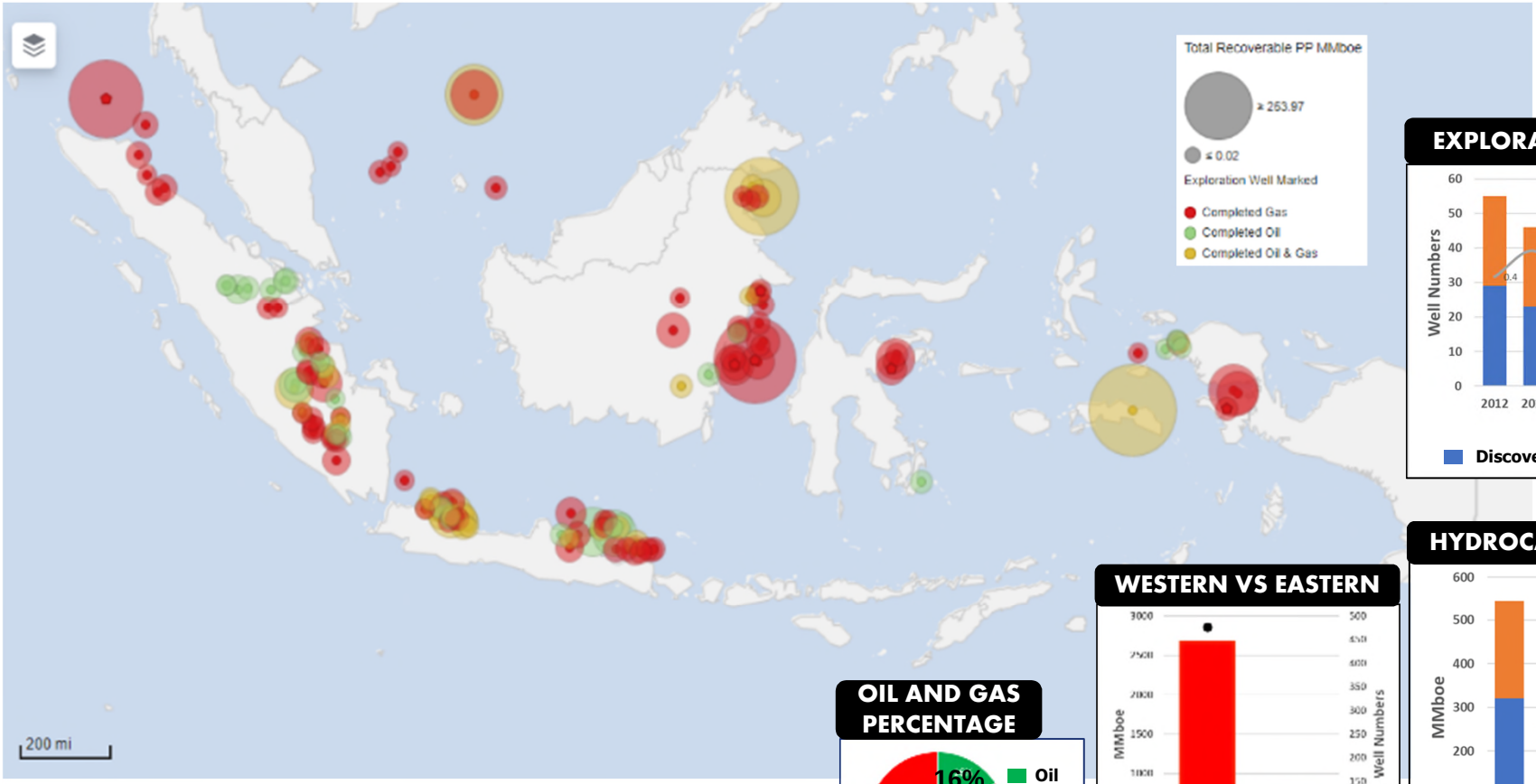
Kondisi investasi Migas pada tahun 2023
Oil Majors justru berbalik mulai melakukan investasi yang signifikan



1. Gross Split atau Production sharing
2. Fiscal terms yang sangat menarik
3. Participating interest (PI) ditata
4. CCS dan CCUS justru dikembangkan
5. Masalah perpajakan dan KKP di-solve

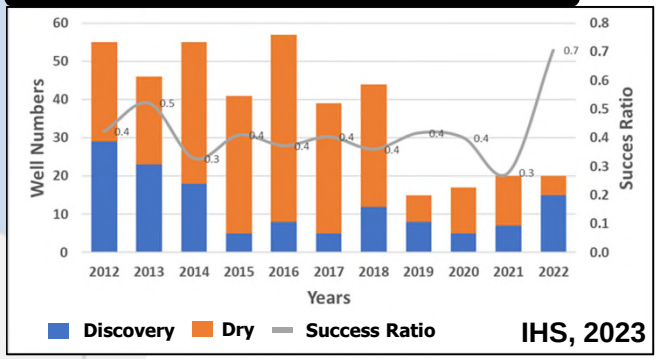
Agenda Presentasi

Investasi Migas mulai diarahkan ke Indonesia Bagian Timur

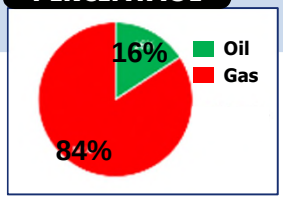


Last 10 Years (2012-2022) Hydrocarbon Discoveries Map (IHS, 2023)

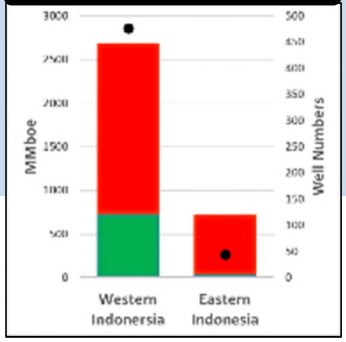
EXPLORATION WILDCAT WELL RESULTS



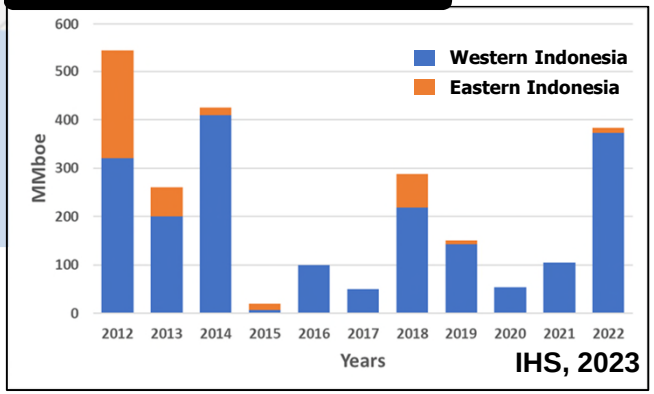
OIL AND GAS PERCENTAGE



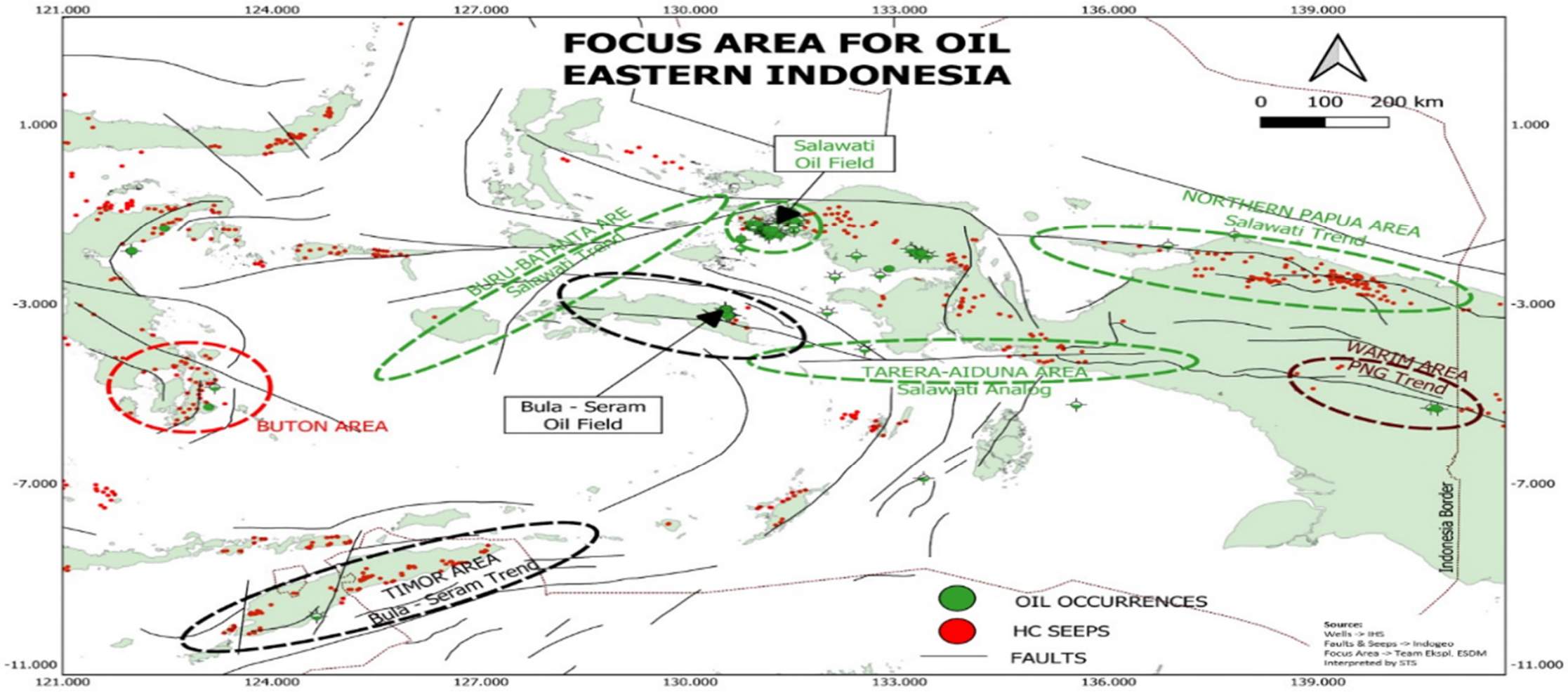
WESTERN VS EASTERN



HYDROCARBON DISCOVERIES



Hasil Seismik 2D secara masif menghasilkan fokus pada 5(lima) area



Status 5(lima) fokus area pada Juli 2023

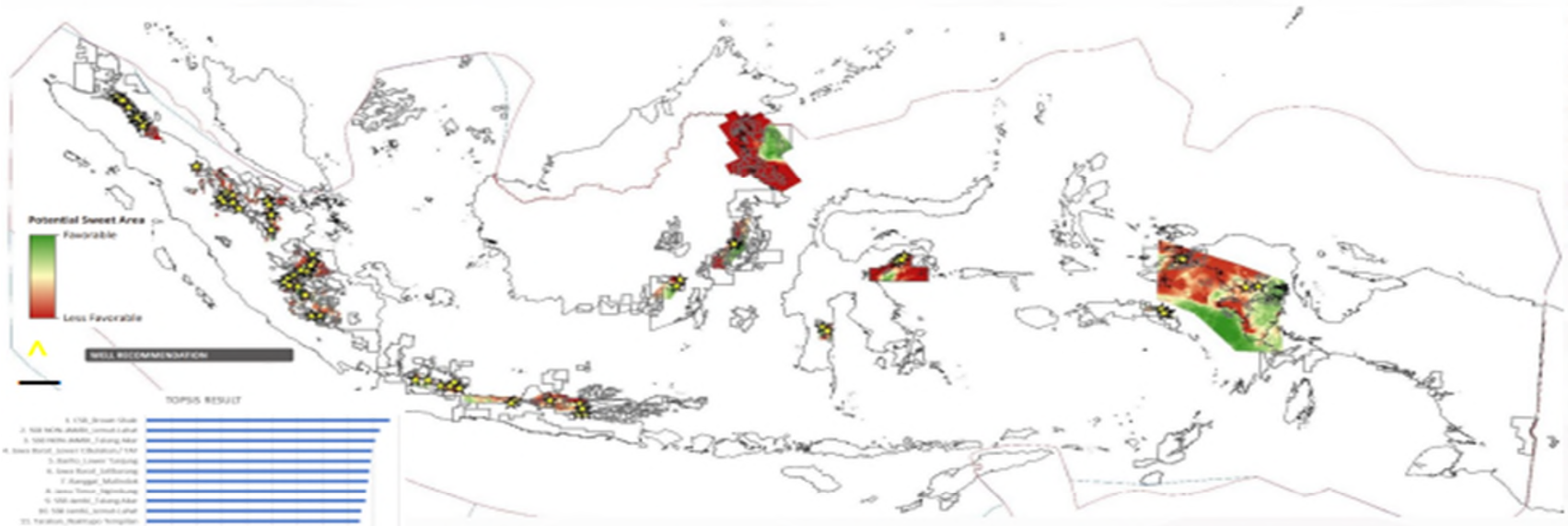
No	Focus Area	Interested parties	Latest status	Next step
1	Area Aru	• Petronas	• Petronas melanjutkan sendiri	• Petronas akan melaporkan progress
2	Area Warim (Papua Onshore)	• Chinese companies (2) • Russian company • British company • European company • American company	• Sudah dilakukan banyak pertemuan • Juga akses ke data room	• Mengupayakan agar terjadi kesepakatan • Perlu sesuai dengan pertimbangan Geo-strategis & Geo-politik
3	Area Timor	• Belum ada peminat serius		
4	a. Area Buton	• PHE dan Petrochina	• Rencana pembahasan Joint agreement • Seismik 2D untuk 650 km tambahan, sedang diproses	• Petrochina akan membuat keputusan setelah Analisa Seismik
	b. Area Buton utara	• PHE	• Pembicaraaan dengan pihak yang berminat	• Mempercepat keputusan
5	Area Seram	• PHE dan Petronas	• Joint study sedang berlangsung	• Menunggu hasil Joint study

Agenda Presentasi

Hasil akhir inventarisasi Migas Non-Konvensional pada tahun 2022

Inventarisasi Potensi MNK Tahap II (2022)

Study Area & Output & Result



MNK Fase I : *Pelaporan Inventarisasi Potens MNK sebanyak **21 Wilayah Kerja***

MNK Fase II : *Inventarisasi Potensi MNK sebanyak **23 Wilayah Kerja** berdasarkan Studi MNK Fase II.*
***14** Cekungan Migas*
***29** Formasi yang paling potensial*
*Terdapat **89 Rekomendasi Sumur eksplorasi** dengan spesifik Target MNK*

MNK Fase I (Tahap I)

No	Wilayah Kerja	FASE	JENIS
1	Blora	EKSPLORASI	KONVENSIONAL
2	Bohorok	EKSPLORASI	KONVENSIONAL
3	South Betung	EKSPLOITASI	KONVENSIONAL
4	Southeast Jambi	EKSPLORASI	KONVENSIONAL
5	Sakakemang	EKSPLOITASI	KONVENSIONAL
6	Belida	EKSPLOITASI	KONVENSIONAL
7	CPP	EKSPLOITASI	KONVENSIONAL
8	Gebang	EKSPLOITASI	KONVENSIONAL
9	Jabung	EKSPLOITASI	KONVENSIONAL
10	Malacca Strait	EKSPLOITASI	KONVENSIONAL
11	Merangin II	EKSPLOITASI	KONVENSIONAL
12	Ogan Komering	EKSPLOITASI	KONVENSIONAL
13	Palmerah	EKSPLOITASI	KONVENSIONAL
14	Pandan	EKSPLOITASI	KONVENSIONAL
15	Pertamina EP	EKSPLOITASI	KONVENSIONAL
16	Rokan	EKSPLOITASI	KONVENSIONAL
17	Selat Panjang	EKSPLOITASI	KONVENSIONAL
18	Siak	EKSPLOITASI	KONVENSIONAL
19	South Sumatera	EKSPLOITASI	KONVENSIONAL
20	Tonga	EKSPLOITASI	KONVENSIONAL
21	South West Bukit Barisan	EKSPLOITASI	KONVENSIONAL

MNK Fase II (Tahap II)

Daftar WK Potensi MNK Area BPMA

No	Wilayah Kerja	FASE	JENIS
1	South Block "A"	EKSPLORASI	KONVENSIONAL
2	Blok "A" Aceh	EKSPLOITASI	KONVENSIONAL
3	Pase	EKSPLOITASI	KONVENSIONAL
4	North Sumatra "B" Block	EKSPLOITASI	KONVENSIONAL
5	Lhokseumawe	EKSPLOITASI	KONVENSIONAL

Daftar WK Potensi MNK

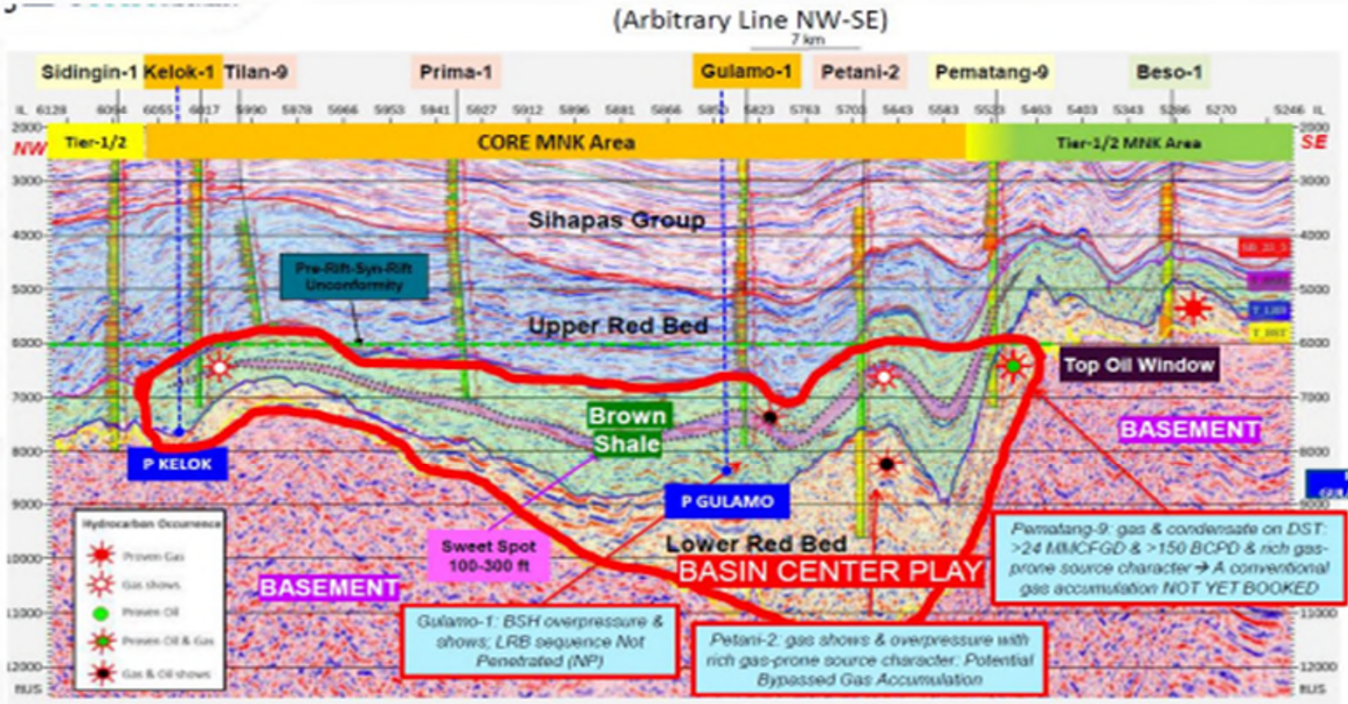
No	Wilayah Kerja	FASE	JENIS
1	Kampar	EKSPLOITASI	KONVENSIONAL
2	South CPP	EKSPLORASI	KONVENSIONAL
3	Rimau	EKSPLOITASI	KONVENSIONAL
4	Lematang	EKSPLOITASI	KONVENSIONAL
5	South Jambi "B" Block	EKSPLOITASI	KONVENSIONAL
6	Corridor	EKSPLOITASI	KONVENSIONAL
7	Jambi Merang	EKSPLOITASI	KONVENSIONAL
8	Brantas	EKSPLOITASI	KONVENSIONAL
9	Cepu	EKSPLOITASI	KONVENSIONAL
10	Liman	EKSPLORASI	KONVENSIONAL
11	Tuban	EKSPLOITASI	KONVENSIONAL
12	Randugunting	EKSPLOITASI	KONVENSIONAL
13	Mahakam	EKSPLOITASI	KONVENSIONAL
14	Sanga-Sanga	EKSPLOITASI	KONVENSIONAL
15	Maratua	EKSPLORASI	KONVENSIONAL
16	Simenggaris	EKSPLOITASI	KONVENSIONAL
17	Tarakan	EKSPLOITASI	KONVENSIONAL
18	Pertamina EP (Donggi - Matindok)	EKSPLOITASI	KONVENSIONAL
19	Sengkang	EKSPLOITASI	KONVENSIONAL
20	Kepala Burung	EKSPLOITASI	KONVENSIONAL
21	Salawati	EKSPLOITASI	KONVENSIONAL
22	West Salawati	EKSPLOITASI	KONVENSIONAL
23	Kasuri	EKSPLOITASI	KONVENSIONAL

Berdasarkan hasil akhir tersebut dilakukan Appraisal Drilling

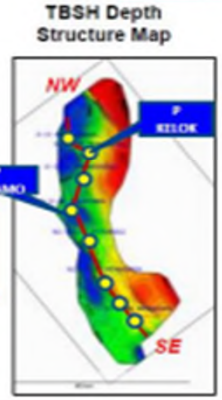
Sumur Eksplorasi Gulamo dan Kelok (DET)

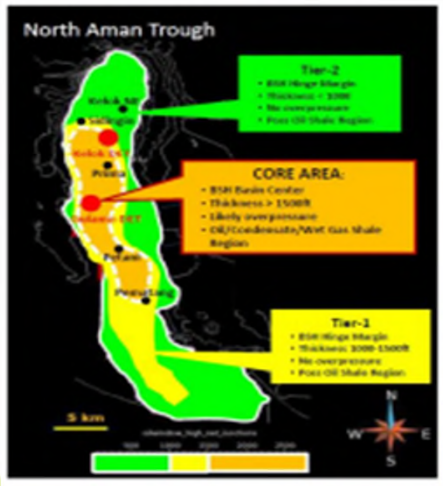
North Aman MNK Regional Seismic Section

MNK Conceptual Exploration/Appraisal

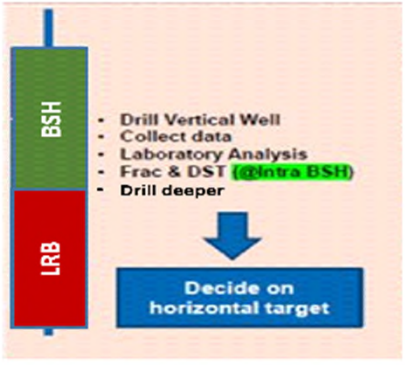
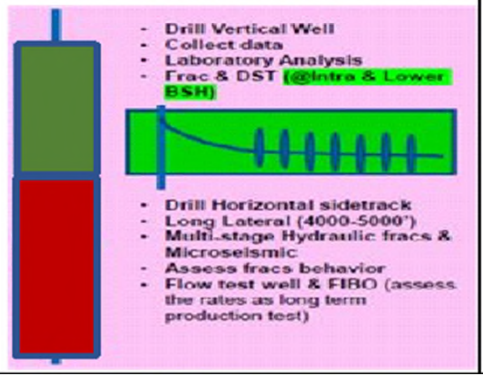
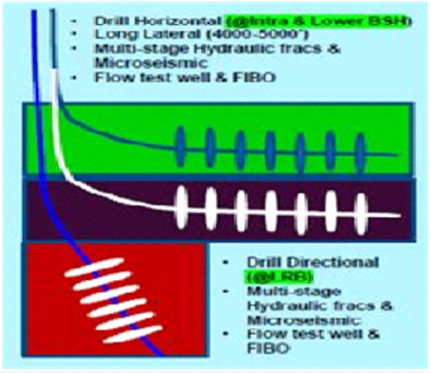


Trough	BSH HC Yield	Exploration Objectives
North Aman	Dominated Liquid Rich (First attempted locations for VOI/value of information Deepening)	• **Sumur-1 Gulamo DET (deepening exploration tail)** untuk: - Akuisisi fresh data di most-prolific CORE MNK area dengan ekspektasi yield oil/liquid rich di Brown Shale (BSH), dan - Uji fracability di interval Intra_BSH sebagai kandidat sweet spot paling menarik untuk landing interval horizontal + multi stage Hyd-Frac in the *Exploration Test of Concept* stage. • **Sumur-2 Kelok DET** untuk: - Akuisisi fresh data di batas fairway CORE MNK area, dengan ekspektasi menemukan batas oil/liquid rich or more gassy (different kerogen type if any) pada Brown Shale di wilayah northern part of North Aman Trough. - Juga membuktikan extend adanya top seal overpressure sebagai batas CORE MNK area sehingga design well spacing dan type curve di area ini masih dapat mengikuti design di Gulamo area.
	Mixed Liquid Rich and Gas	Sebagai target di tahapan Exploration Test of Concept dengan potential 2 lokasi kandidat (**Petani, Prima, dan Pematang di BSH/LRB CORE area**)
South Aman	Mixed Gas and Liquid Rich	Sebagai target di tahapan Exploration Test of Concept dengan potential 2 lokasi kandidat (**Kolokh, Lliefe di BSH/LRB CORE area**)
Rangau	Gas Rich and poss. Wet gas/ condensate	Sebagai target di tahapan Exploration Test of Concept dengan potential 3 lokasi kandidat (**Rangau Deep & Basin Center di URB/BSH/LRB**)



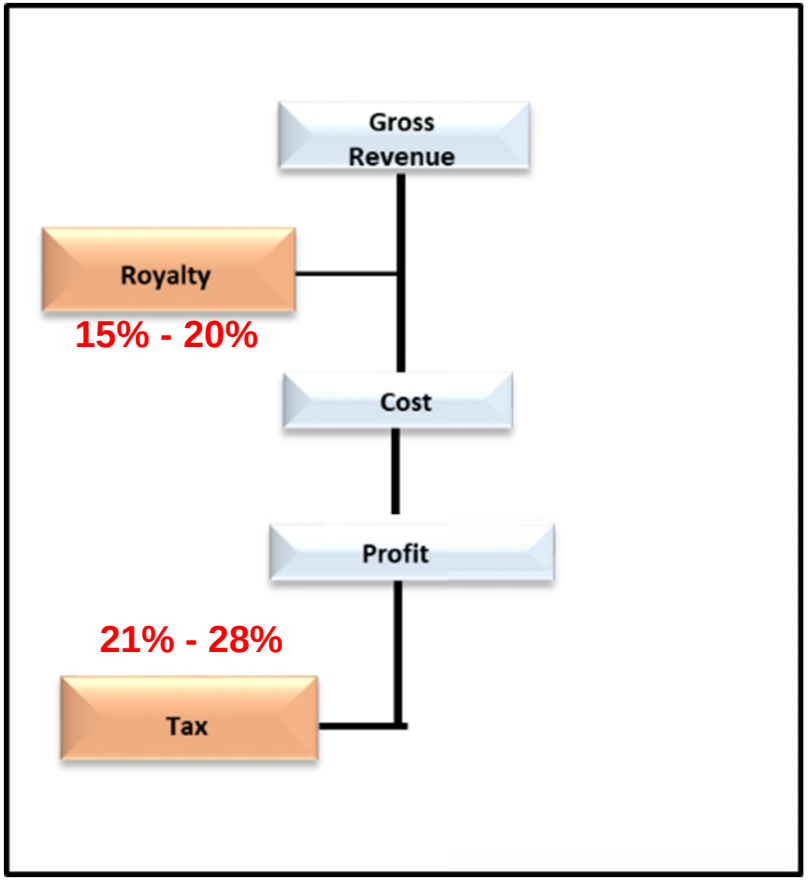


Pihak SKK Migas sudah mulai menyiapkan tahapan pengembangan

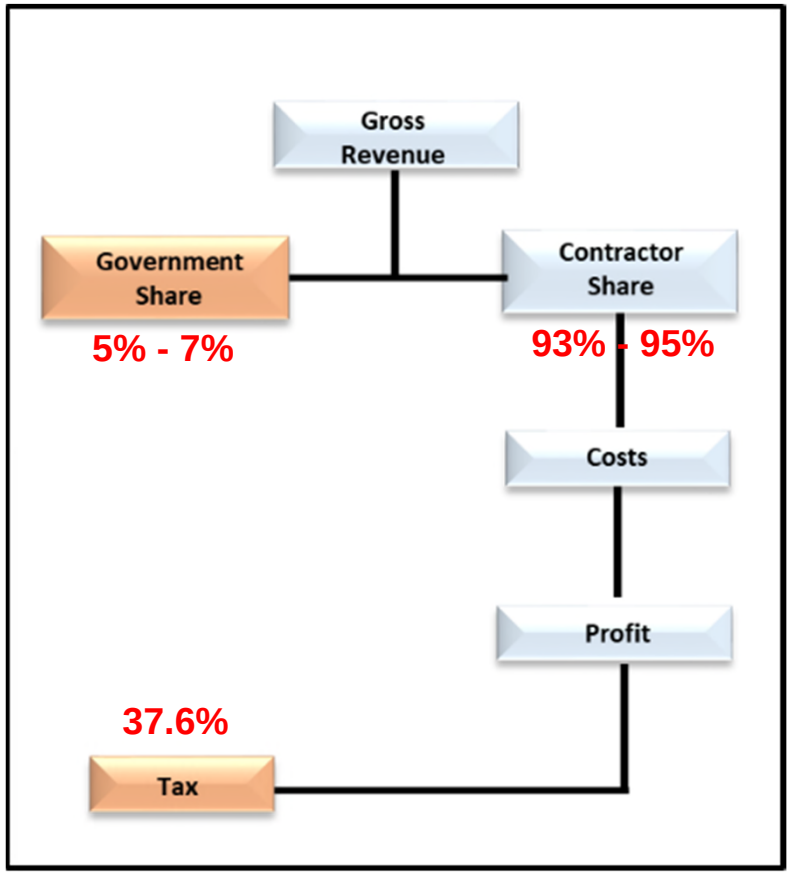
Keterangan	Studi Propektifitas	Test of Concept	WK MNK Exploration	Development
General Information	Studi pada 23 WK + Pertamina EP - Reg4 (14 Basin)	**Data acquisition for VOI**	**Test of Concept Package: 3 troughs** 1 vertical pilot well and 1 horizontal well with hydraulic fracs	**Producer well drilling: 3 troughs** BSH- horizontal well with hydraulics fracs LRB-vertical well with hydraulics fracs
Well (estimated)	N/A	2 Well (deepening) Rig 1000/1500 HP	5-7 wells Rig 1500HP	~600-700 wells BSH (ref 2012) ~150-300 wells LRB (ref 2012)
Period (esimated)	6- 12 Months	2022-2024 (1-2 Years)	2026-2045	2026-2052
Cost (estimated)	Inhouse or 3rd Party Study	**Wells** - Drilling - VOI (Value of Information) - Lab Analysis - Frac Test	- Drilling - VOI: Lab analysis and Frac Test - Hydraulic Fracs(URB/LRB) - Plug Back & Drill sidetrack BSH - Hydraulic Fracs BSH	- Drill BSH - Hydraulic Fracs BSH
Infrastructure & Permits	***N/A***	R/L and Well Pad enlargement	R/L and new Well Pad Pipeline, powerline, tie-in to existing facilities AMDAL	Dedicated new facilities, AMDAL
Well Type				

Pihak SKK Migas juga sedang menyiapkan Fiscal Terms untuk MNK

USA
(Royalty Tax)



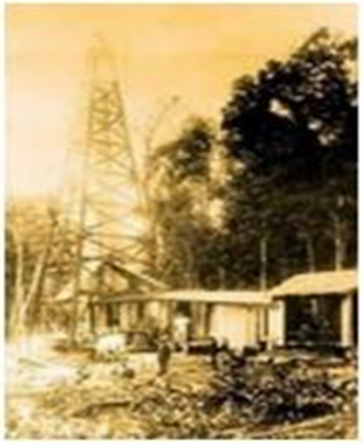
INDONESIA
(GS PSC)



Agenda Presentasi

Potensi Oil in Place di Indonesia masih cukup signifikan

Initial Oil In Place (IOIP): 70.54 Billion bbl

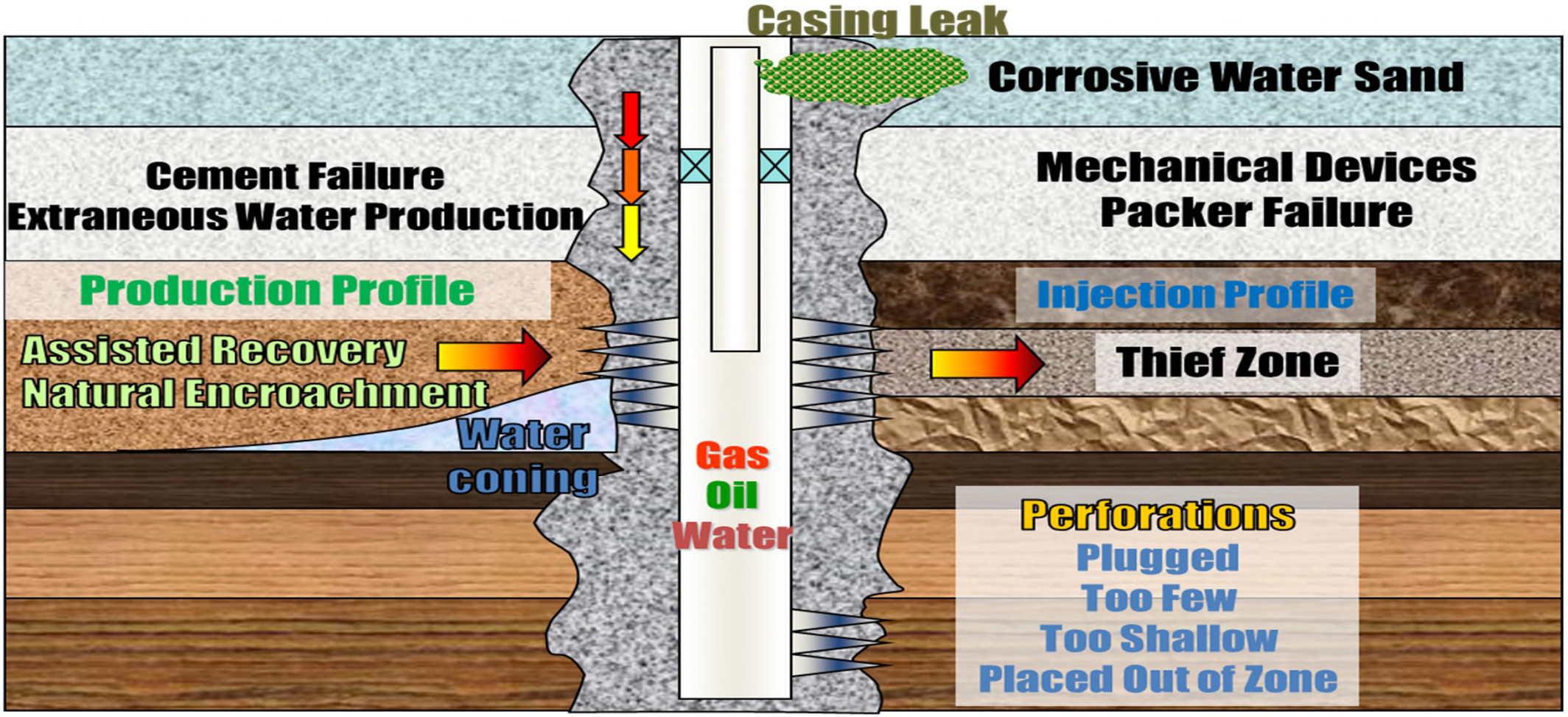


IOR&EOR Potential 40.19 Billion bbl

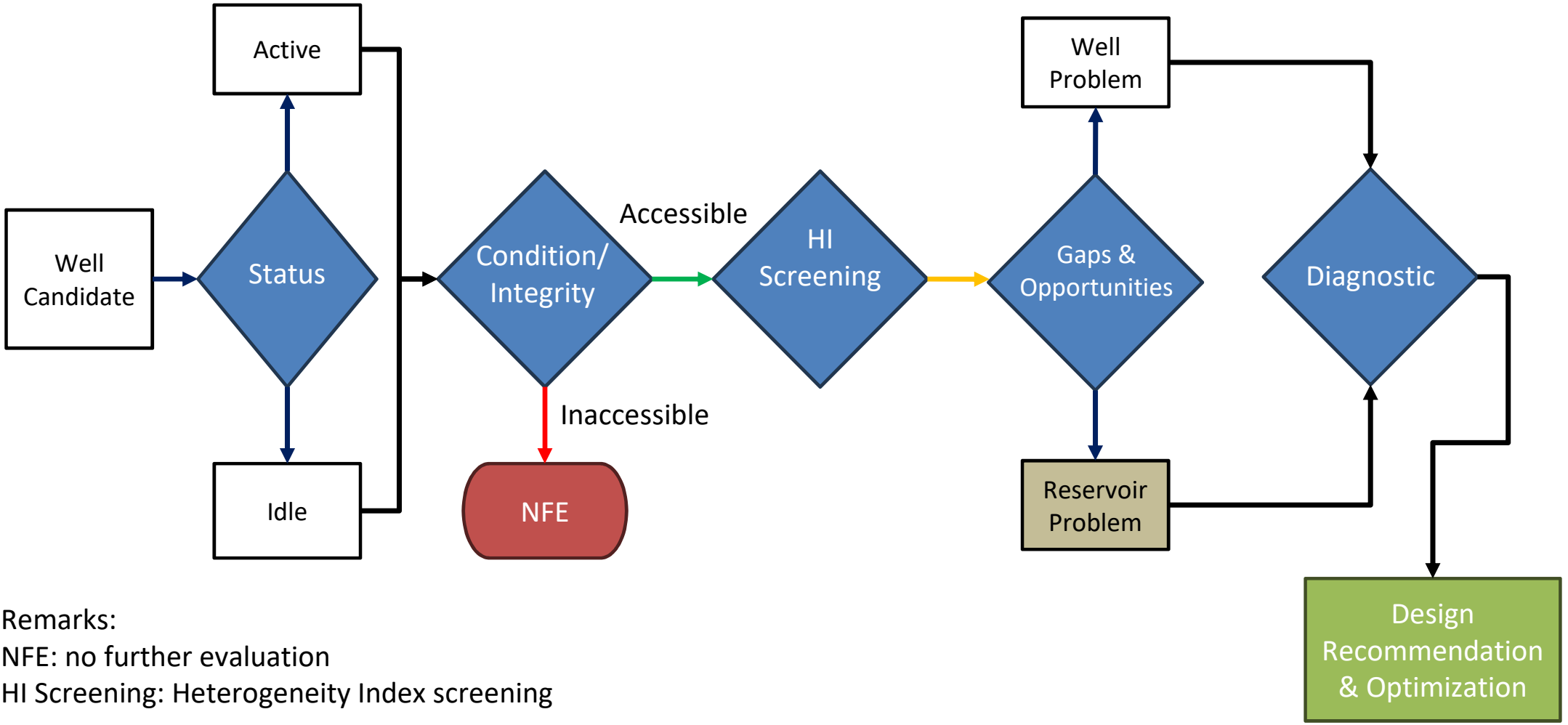
Reserves (proven) 3.95 Billion bbl

Produced 25.4 Billion bbl

Peningkatan produksi terhambat beragam penyebab



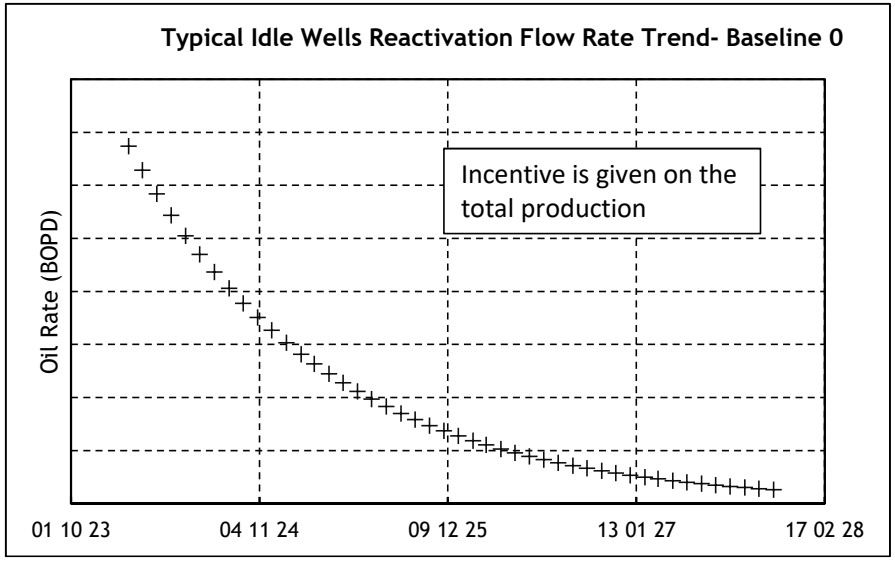
Perlu upaya Diagnostic pada setiap sumur

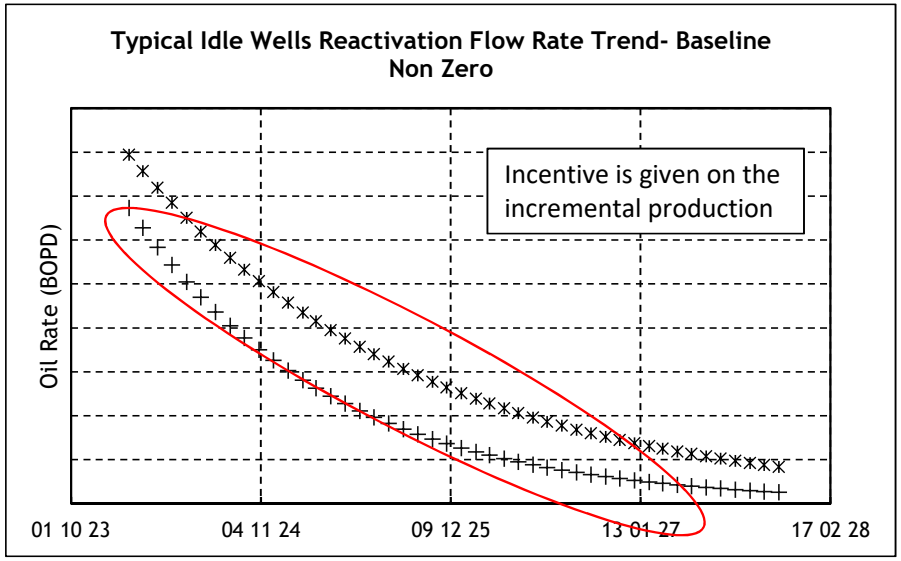


Remarks:
NFE: no further evaluation
HI Screening: Heterogeneity Index screening

Pelaksanaan Diagnostic Team oleh ITB di Jabung dan Fiscal terms

Well	Shut In Reason	Normalized*				Sum of Aditive Factor	Well Intervention Type	Ease of Intervention (Multiplication Factor)	Well Performance Index
		BCO	Cum production	Prediction gain	Other parameter				
Well X	High WC	0.37	0.36	0.89	0.23	1.85	PLT,WSO & Leak impairment	0.51	0.9435
Well Y	Mechanical	0.35	0.6	0.9	0.32	2.17	Fishing	0.95	2.0615
Well Z	High WC	0.55	0.19	0.92	0.14	1.8	WSO & Leak repairment.	0.9	1.62
Well A	Low Influx	0.27	0.97	0.77	0.28	2.29	fracturing	0.79	1.8091

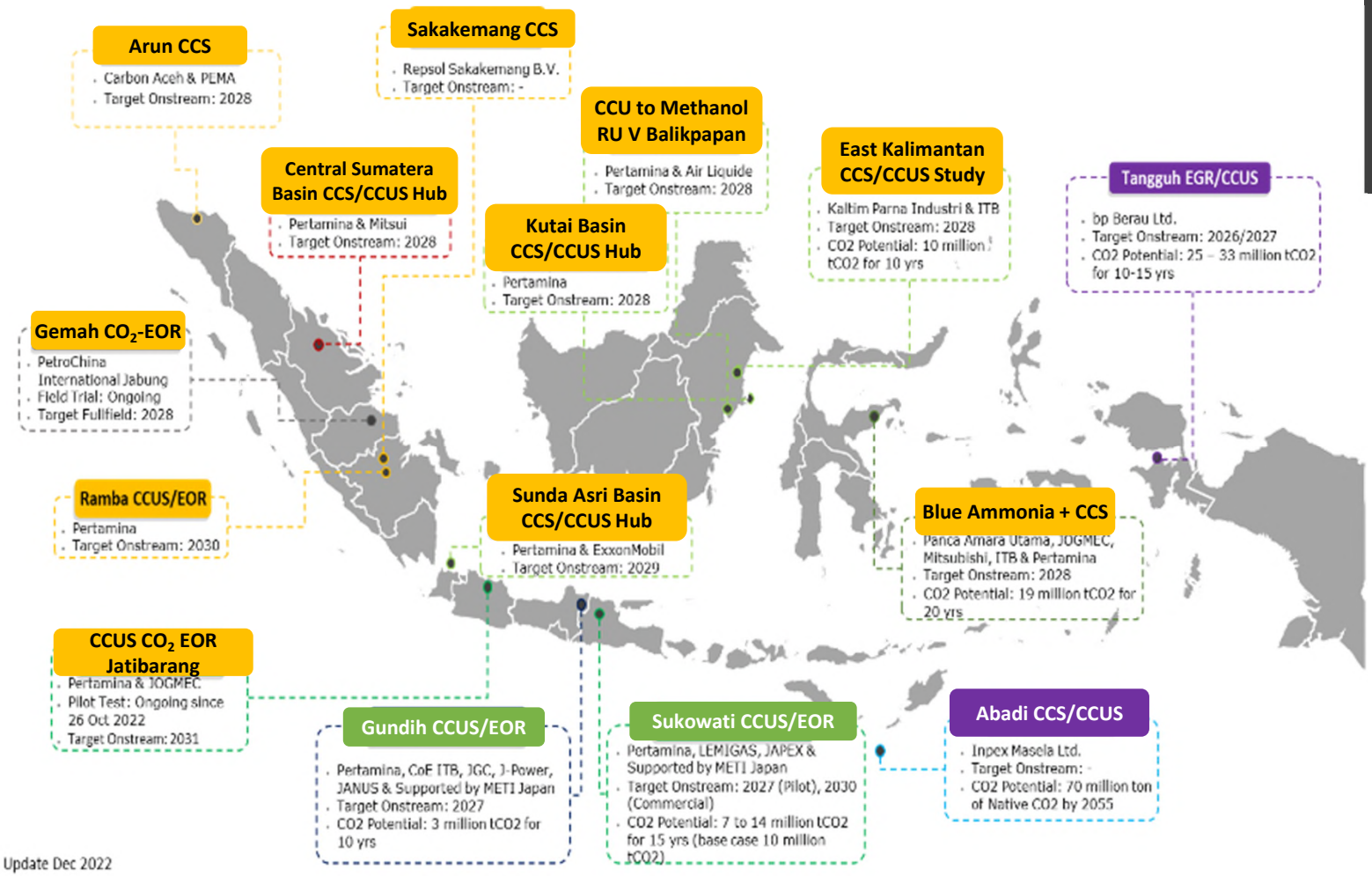




Agenda Presentasi

Para Stakeholders mensyaratkan investasi Migas harus meng-implementasi CCS atau CCUS

Government has issued MEMR Ministerial Regulation No.2/2023 on Implementation of Carbon Capture & Storage and Carbon, Capture, Utilization, and Storage in Oil & Gas Upstream activities.



Update Dec 2022

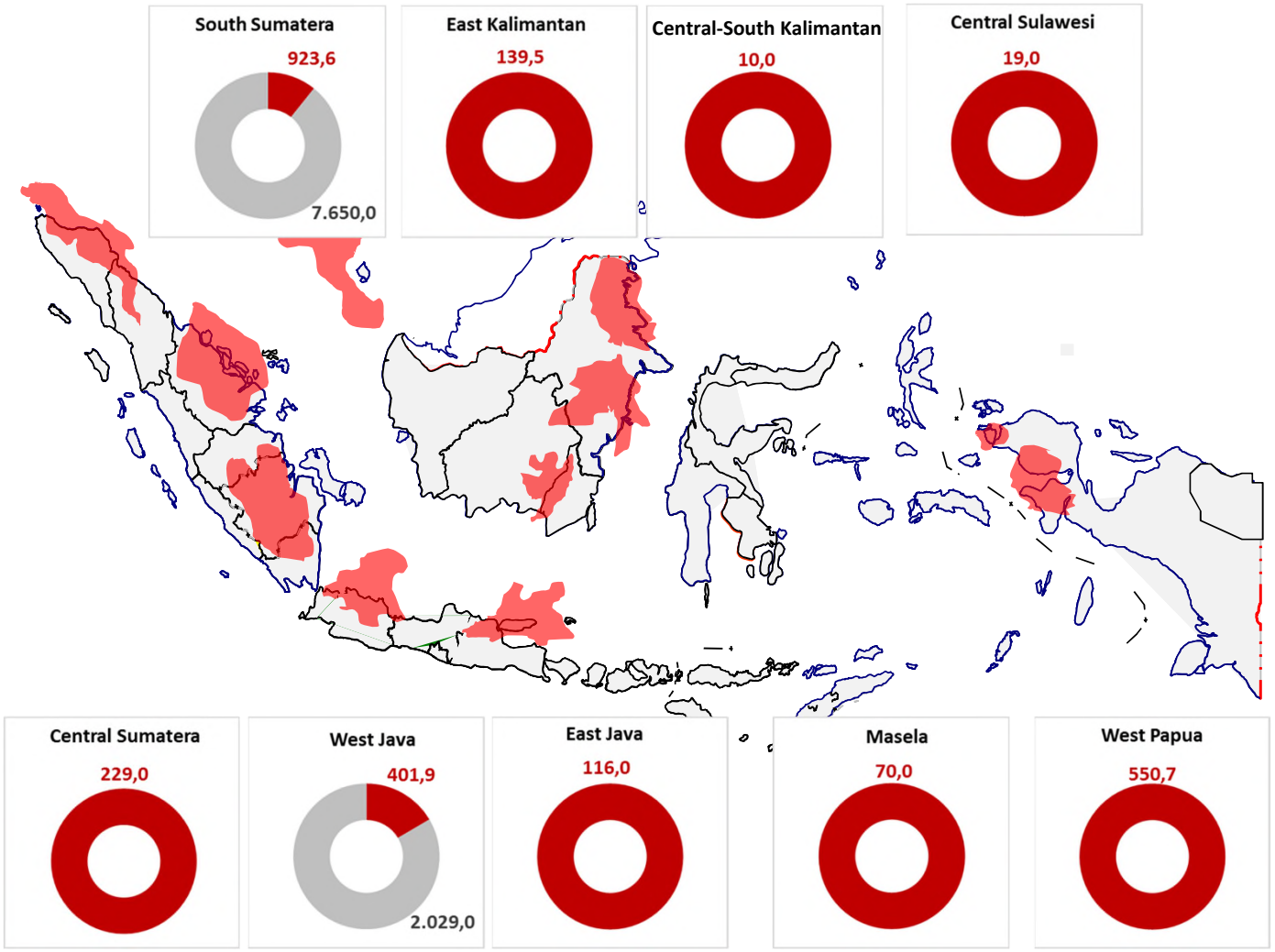
- Total of 15 CCS/CCUS projects (study/preparation phase)
- 8 out of 15 projects to start onstream before 2030
- Total potential of CCS/CCUS by 2030-2035 is around 25,5–68,2 millions tonne of CO_2

Estimated injections cost per ton of CO_2 for various Carbon Capture and Storage (CCS) projects :

1. **Natural gas purification, Gundih, East Java**
   - **Cost : 43 to 53 USD per tonne CO_2.**
   - Capacity : 0,3 million tonne of CO_2/year.
   - Investment : USD 105 million.
2. **LNG Production, Bintuni, West Papua**
   - **Cost : 33 USD per tonne CO_2.**
   - Capacity : 2,5-3,3 million tonne CO_2 /year.
   - Investment : USD 948 million.
3. **LNG Production in Masela, Maluku**
   - **Cost : 26 USD per tonne CO_2.**
   - Capacity : 3,5 million tonne CO_2 / year.
   - Investment : USD 1,4 billion.

Potensi penyimpanan CO2 di Indonesia

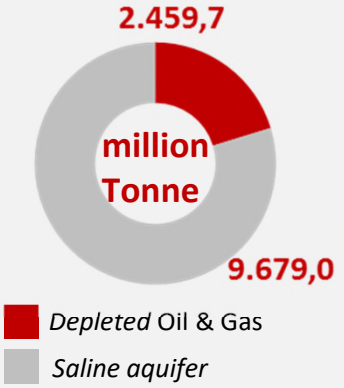
Unit : million tonne CO_2



Total CO_2 Storage Potential

12,2 billion tonne CO_2

- *Depleted* Oil & Gas:
  2,5 billion tonne CO_2
- *Saline Aquifers*:
  9,7 billion tonne CO_2



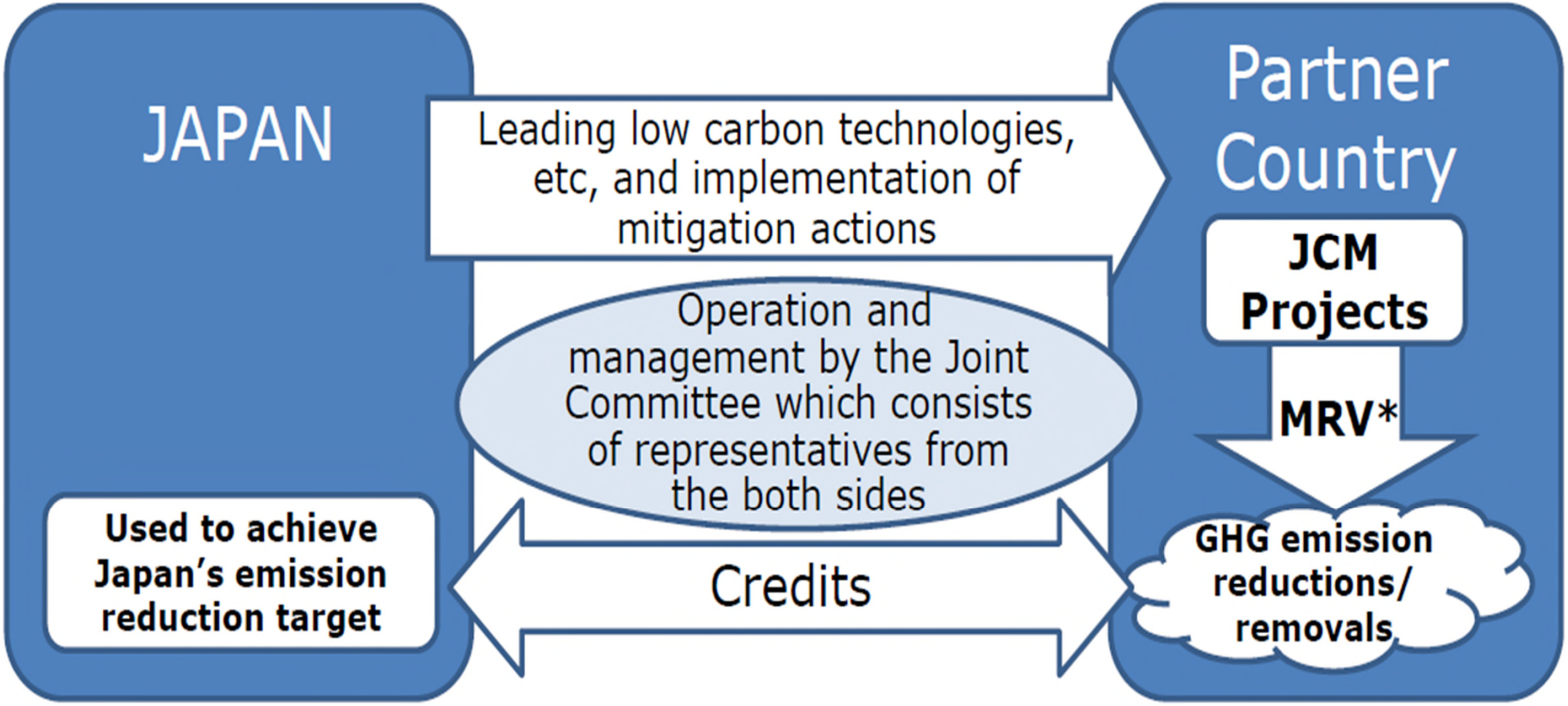
Source:
LEMIGAS 2009 Study; LEMIGAS-ADB 2012 Study; LEMIGAS-World Bank 2015 Study; Ditjen Migas, **15 ongoing-porject**

Study from International Institution :

- **ExxonMobile:**
  ~80 Giga Tonne CO_2 in saline aquifers
- **Rystad Energy:**
  >400 Giga Tonne CO_2 Oil & Gas Reservoir and Saline Aquifers

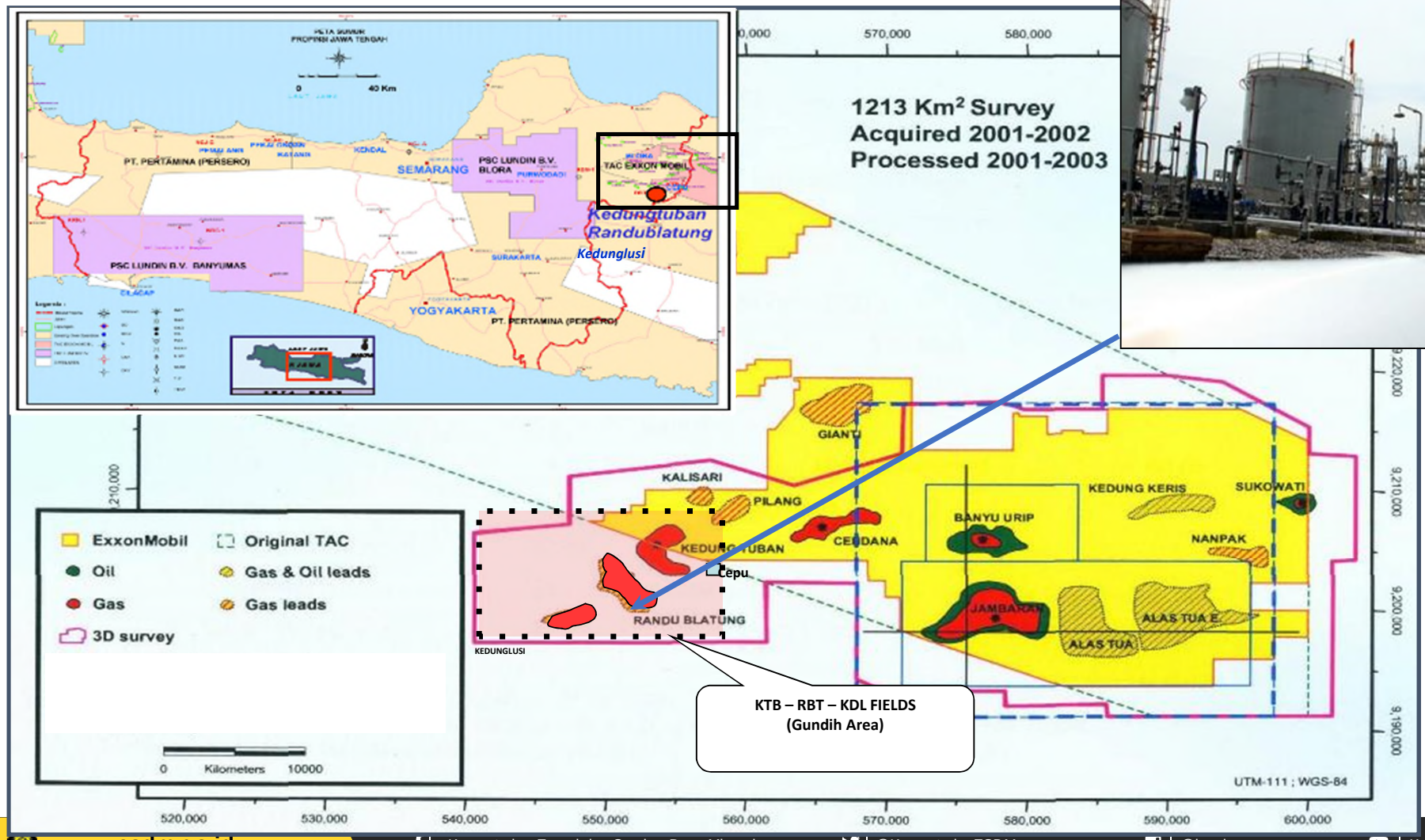
Pada 10 Januari 2022, Indonesia adalah negara pertama yang menanda-tangani kerja sama dengan Jepang untuk penerapan Joint Crediting Mechanism (JCM)

Skema penerapan Joint Crediting Mechanism (JCM)



*measurement, reporting and verification

Proyek CCUS pertama yang didanai oleh JCM adalah Fasilitas Produksi Gas di Gundih, Jatim



- 70 MMSCFD for 12 years
- CO_2 = 21%, equivalent to 800 tpd

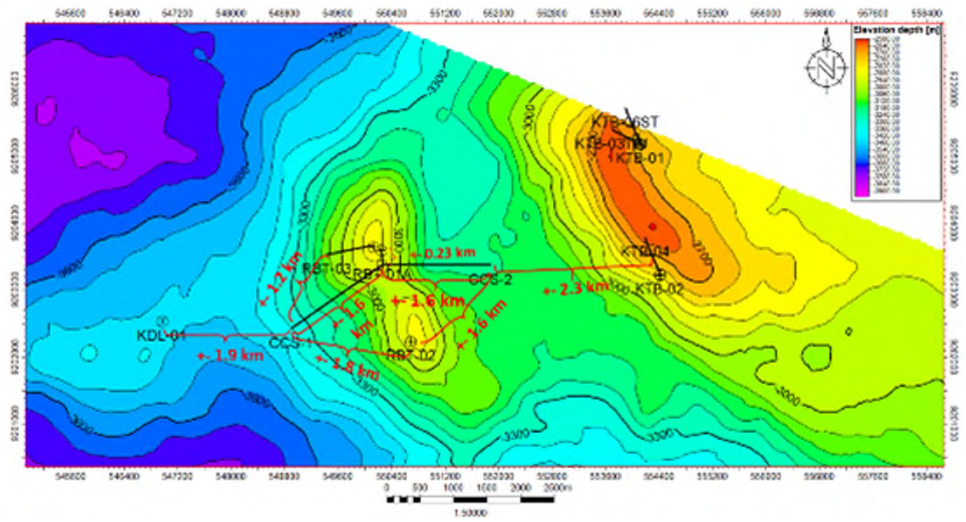
Japanese companies supporting the studies at Gundih, East Java

Tasks of Japanese Parties

Study Item	Conducted by	Main Tasks
Geochemistry Study	J-POWER	• Conduct impact assessment of H_2S on formation water
Facility Study	JGC / JGC PT JGC INDONESIA	• Design CO_2 injection facility
Monitoring Study	JGC / JOE	• Develop a CCS monitoring plan • Design a monitoring system
Technical Support to Subsurface Study	JANUS / JOE	• Provide technical supports on subsurface studies

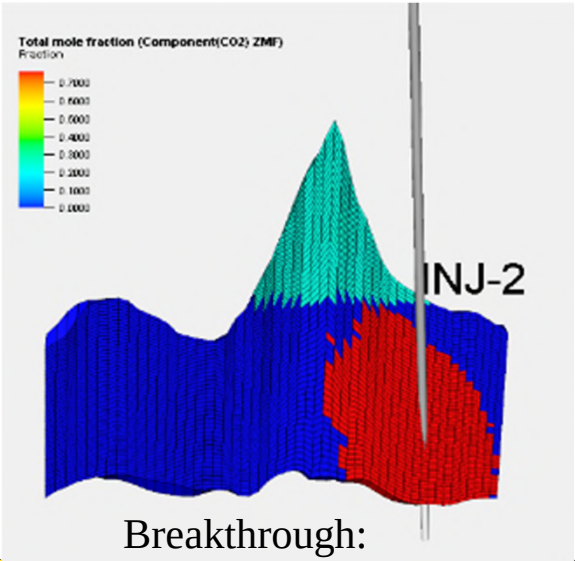
Financially-supported by 経済産業省 Ministry of Economy, Trade and Industry

Gundih East Java CCS Project results using JCM mechanism

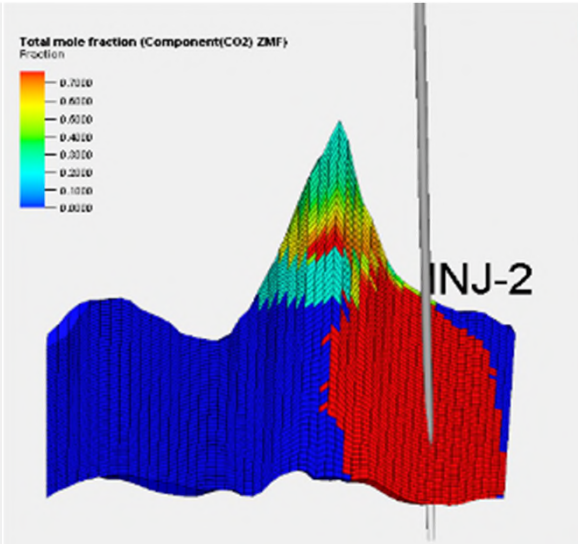


Currently Gundih Central Processing Plants releases 800 ton/day of CO_2. If all of available CO_2 is injected to Kedung Tuban structure:

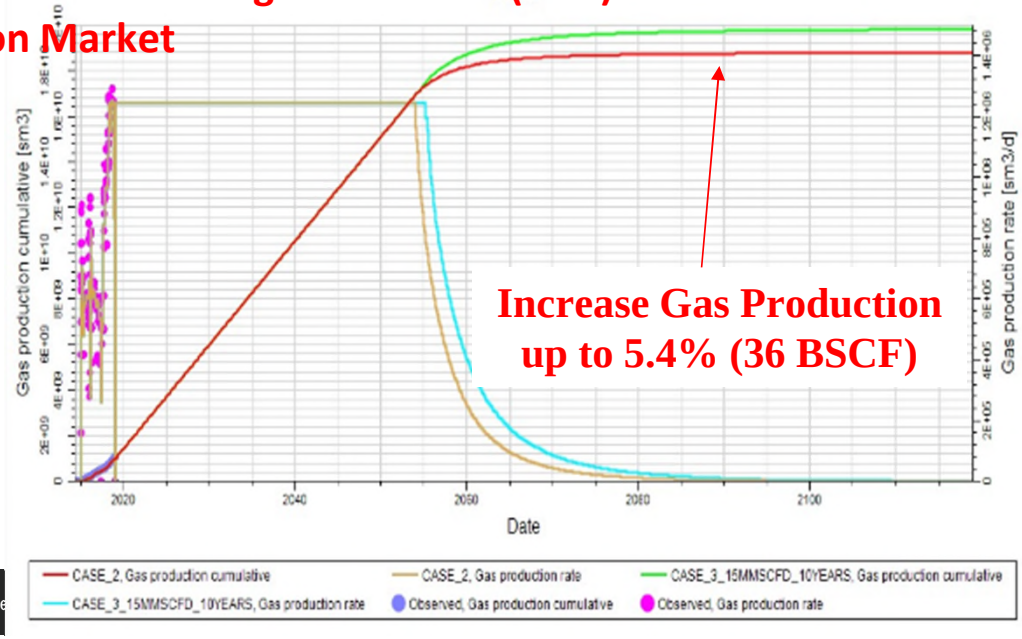
- 3 million ton of CO_2 will be reduced for 10 years of injection time.
- Incremental gas production (80% CH_4) of 36 BSCF for 10 years, equivalent to approx. USD 100 - 120 mio.
- The Capex for 10 years CO_2 injection = USD 49 mio, total OPEX = USD 20 mio
- Offering participation to foreign institutions for injecting CO_2, e.g. **using Joint Crediting Mechanism (JCM) scheme or traded in on Market**



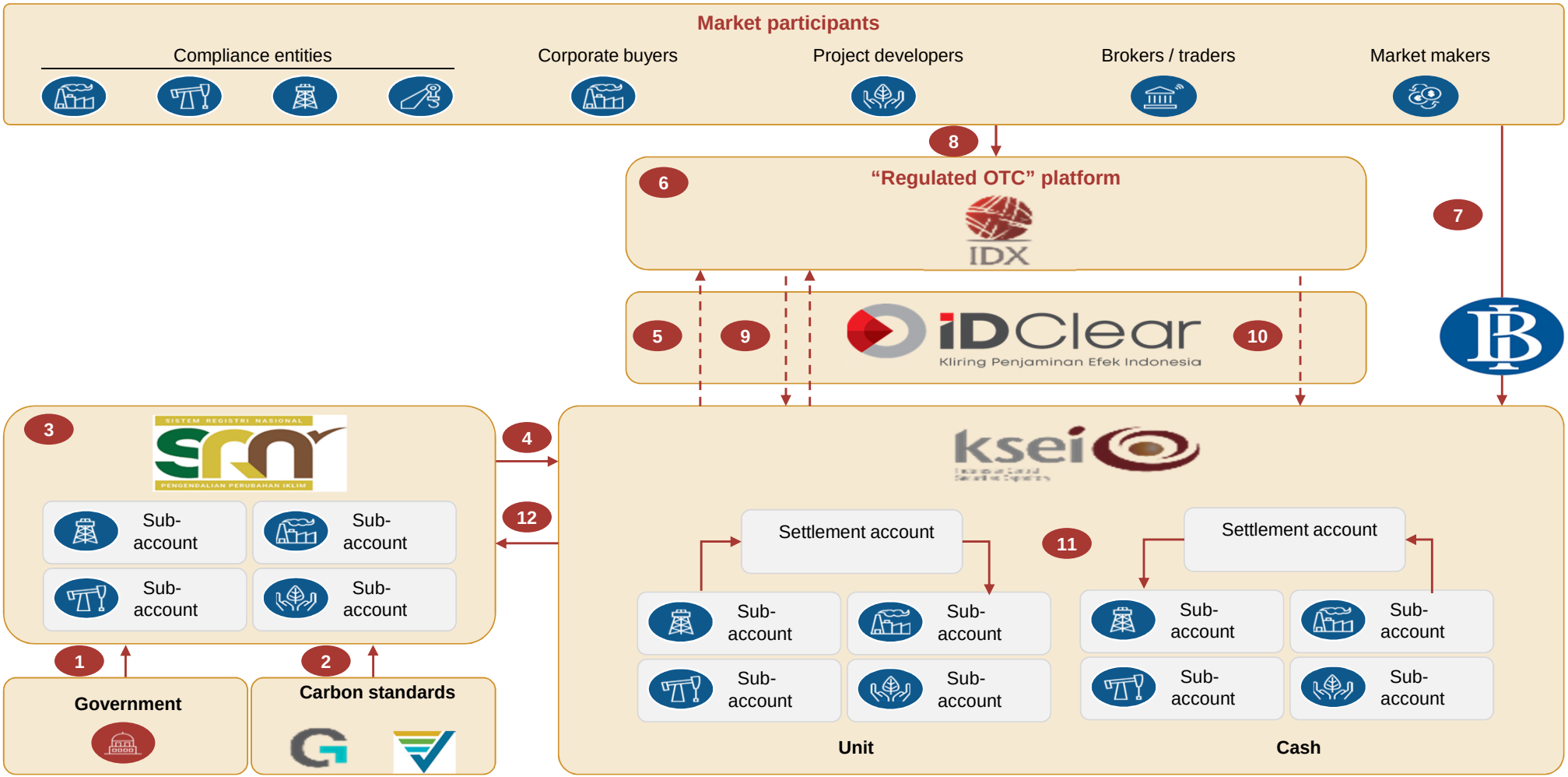
Breakthrough:
15 years after 1st injection



100 years after 1st injection



Pada Agustus 2023, Otoritas Jasa Keuangan telah keluarkan aturan Carbon Trading



Ditjen Migas bersama-sama Badan Standarisasi Nasional akan mengadopsi Verra Standard dalam penyusunan Metodologi perhitungan dan penerbitan Sertifikat Pengurangan Emisi (SPE)

Verified Carbon Standard
A VERRA STANDARD

BSN BADAN STANDARDISASI NASIONAL

SISTEM REGISTRI NASIONAL
SRN
PENGENDALIAN PERUBAHAN IKLIM

Agenda Presentasi

Peluang Bisnis bagi para pelaku di Industri Fasilitas Produksi Migas diperkirakan akan sangat cerah dimasa mendatang

1. Semakin banyaknya kegiatan investasi Migas di Indonesia, pada kegiatan Eksplorasi maupun Produksi
2. Peluang Bisnis di Indonesia Bagian Timur
3. Peluang Bisnis di Migas Non-Konvensional (MNK)
4. Peluang Bisnis di Migas Konvensional
5. Peluang Bisnis di CCS dan CCUS

Thank you

Special Advisor to Minister of Energy and Mineral Resources on Investment and Infrastructure Development

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