

# Natural Gas Field Development and Environmental Issues Indonesia

Research and Development Centre  
for Oil and Gas Technology

**“LEMIGAS”**

Ministry of Energy and Mineral  
Resources

Republic of Indonesia

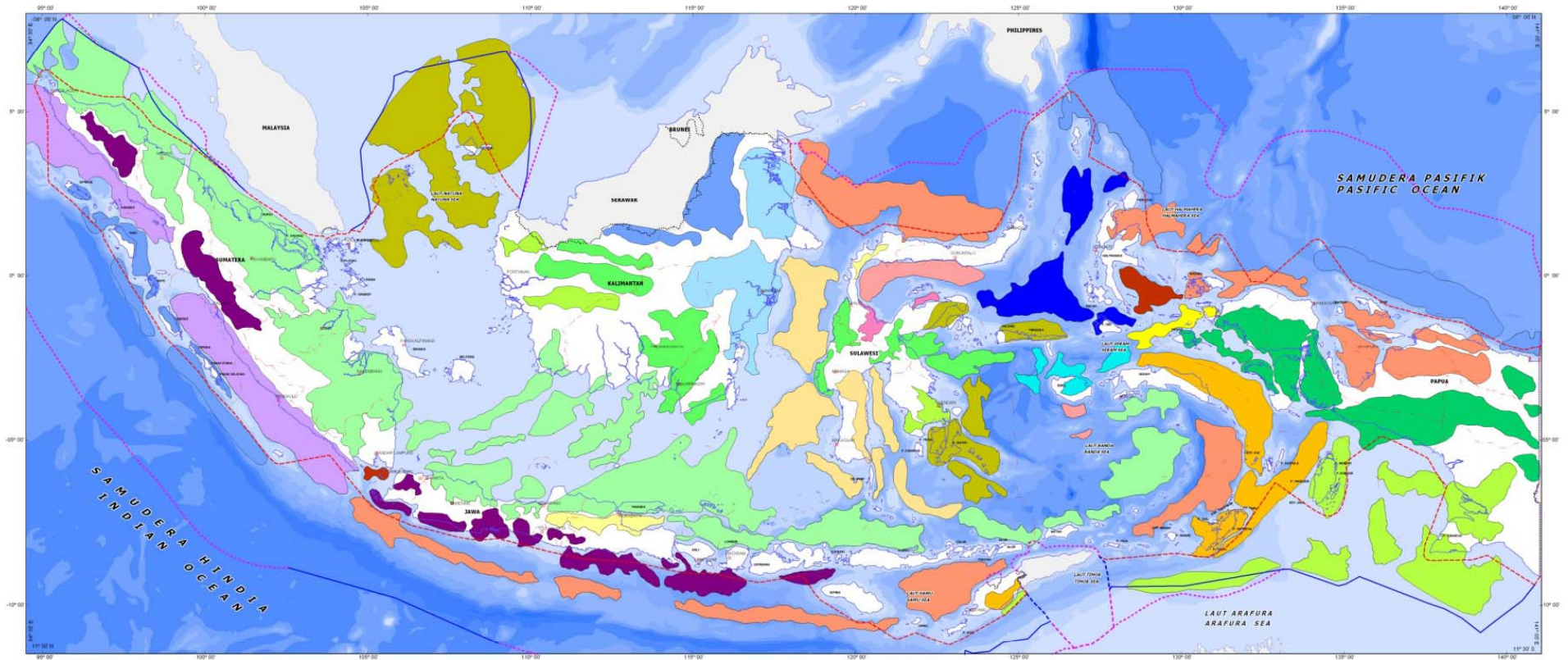


# INDONESIA GAS DEVELOPMENT

- Overview of geology & map showing gas fields and markets
- Gas resources & potential
- Current supply demand scenario (outlook for the next 10 years)
- Natural gas development policy & roadmap
- Identify projects and/or research activities (current & planned) related to natural gas development – institutions involved & contact details
- Issues & Challenges (including environmental issues)

# INDONESIA SEDIMENTARY BASIN

(2009)

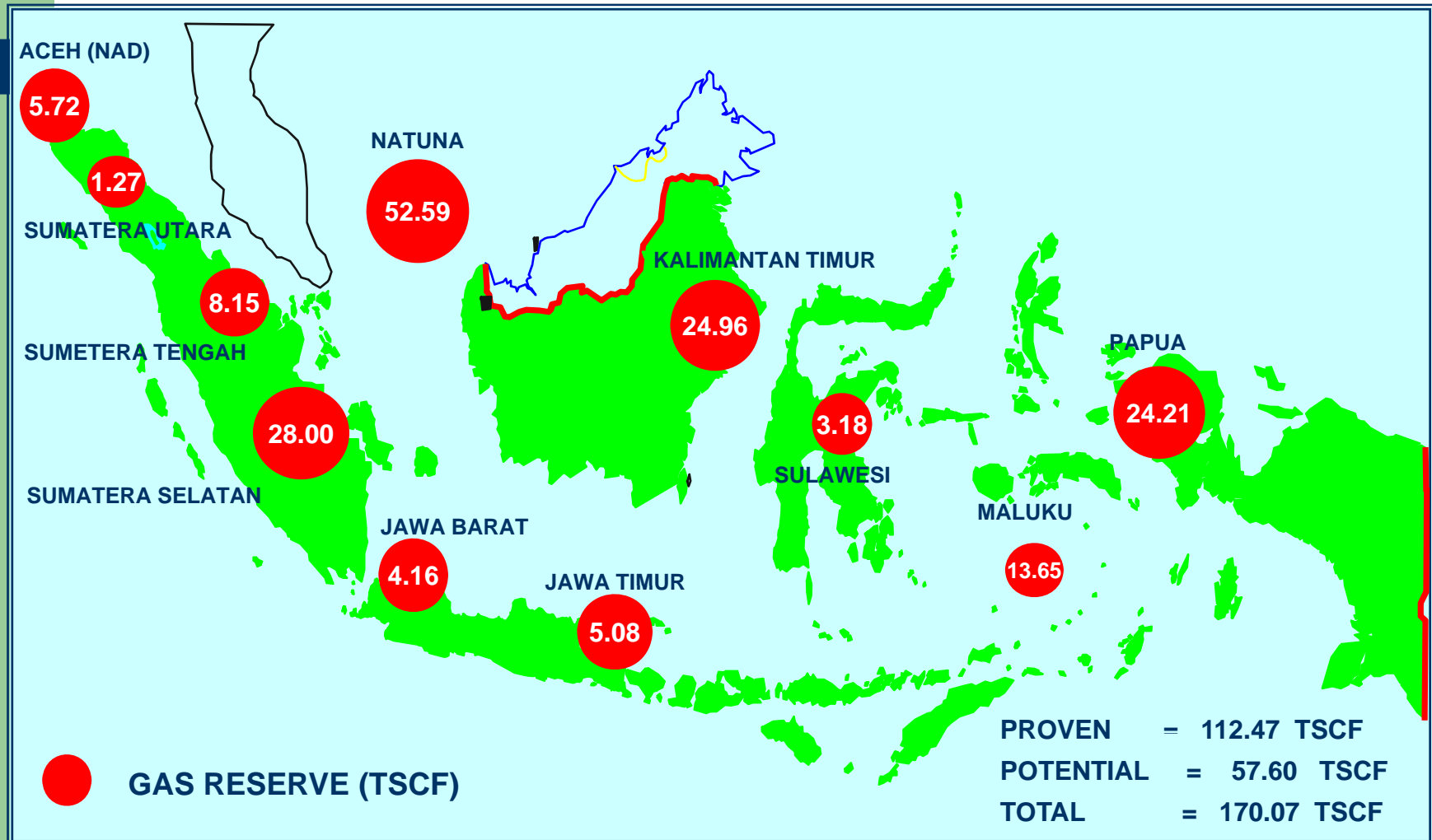


- Overall 128 sedimentary basins, based on surface geology boundaries and gravity data of Indonesia
- Consisting of Tertiary Basins, Pre-Tertiary Basins and Composites Basins



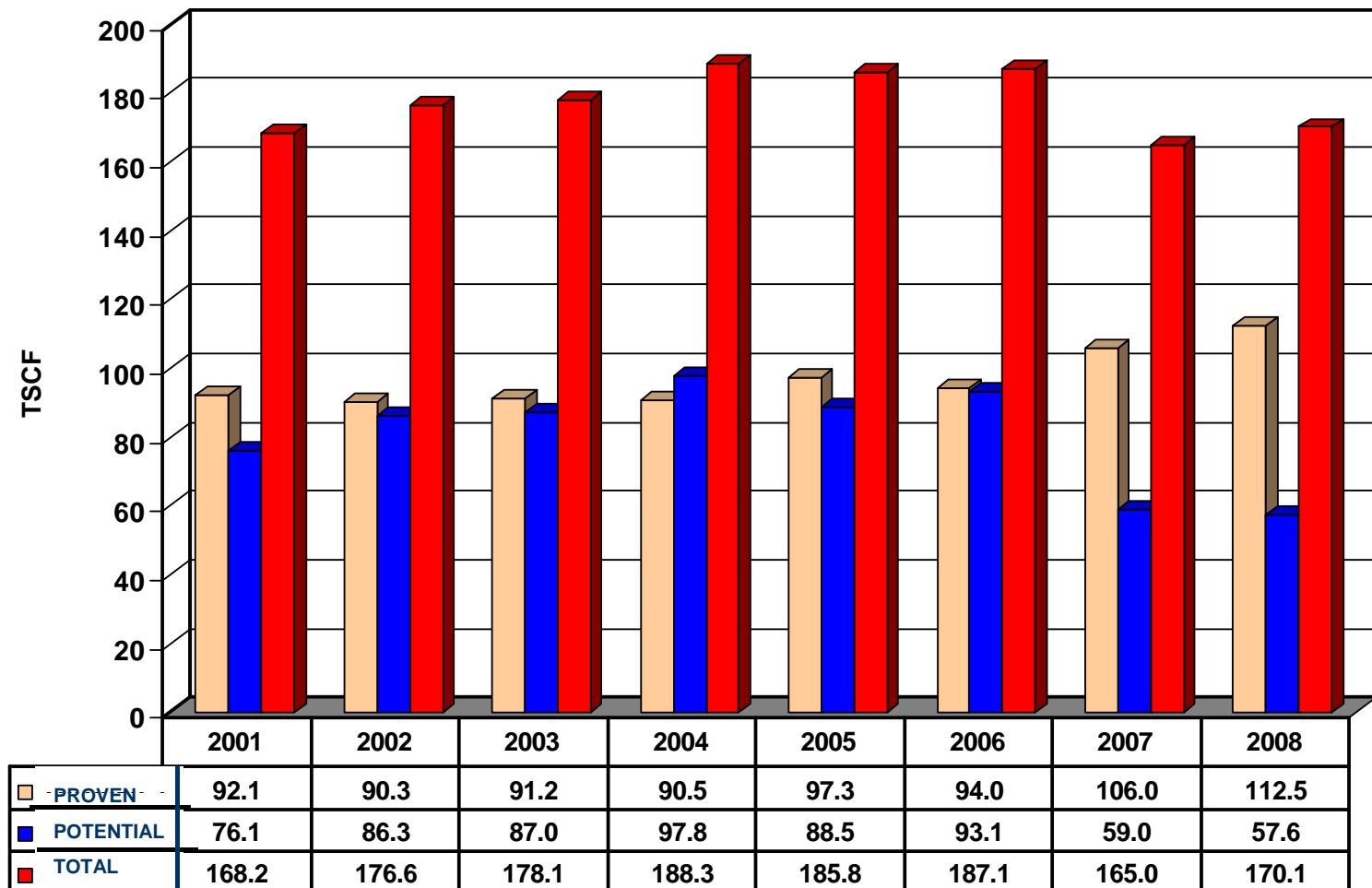
# INDONESIA GAS RESERVE

(STATUS : 1 JANUARY 2008, DJ MIGAS 2008)



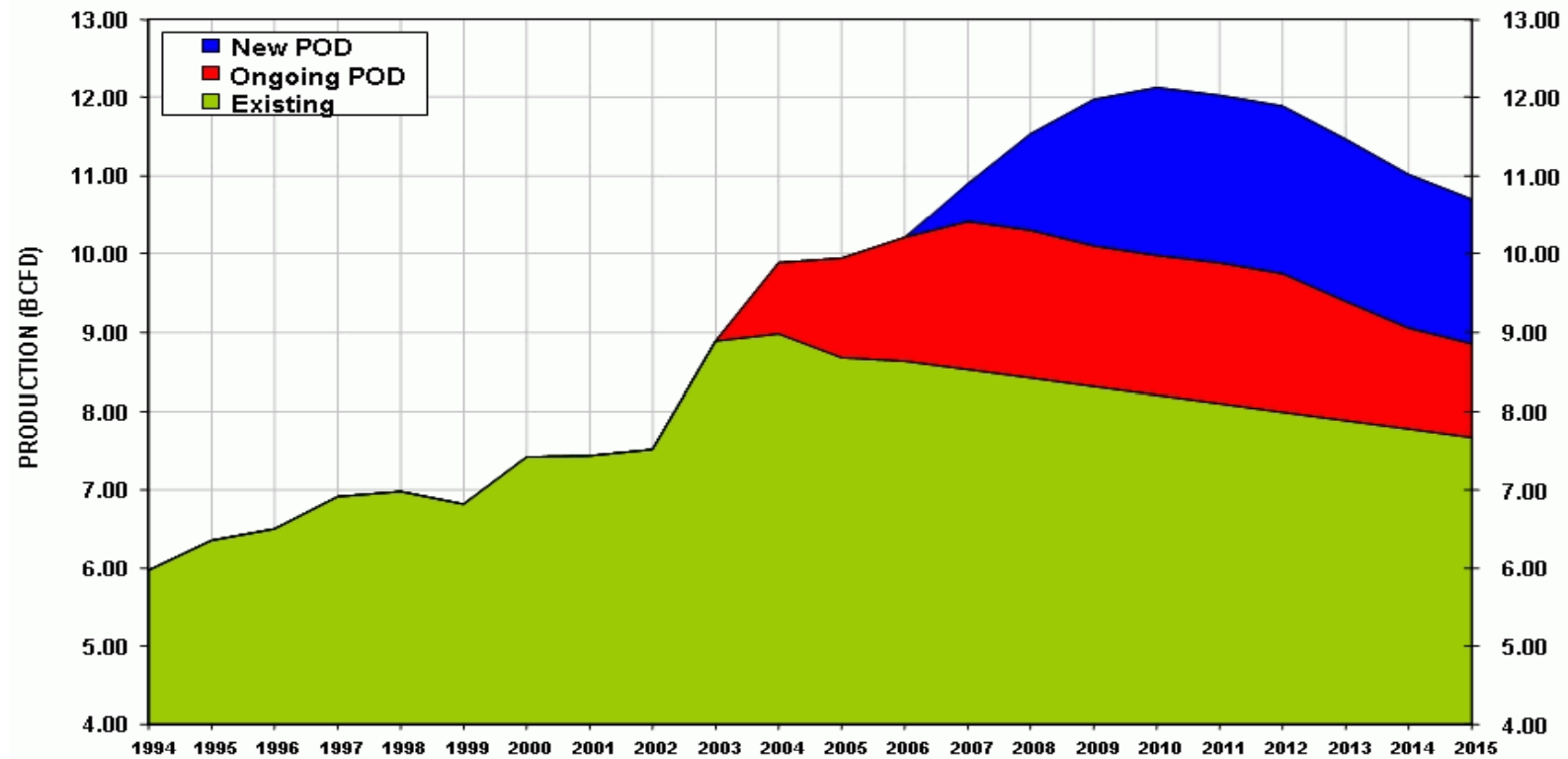
# INDONESIA GAS RESERVE

(2001 – 2008, DJ MIGAS 2008)



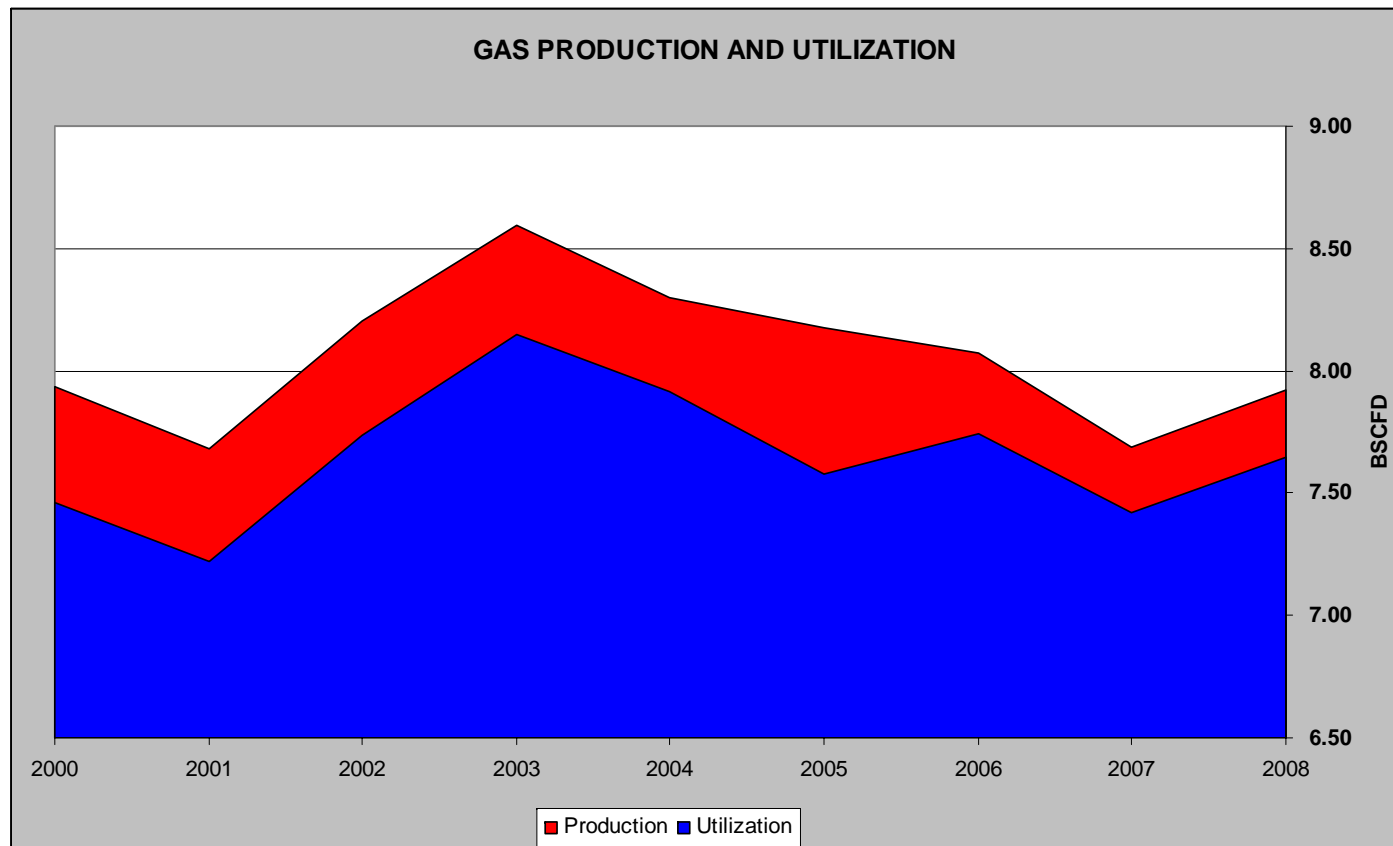
# GAS RESOURCES & POTENTIAL

(bp migas web, 2004)



# INDONESIA GAS PRODUCTION AND CONSUMPTION

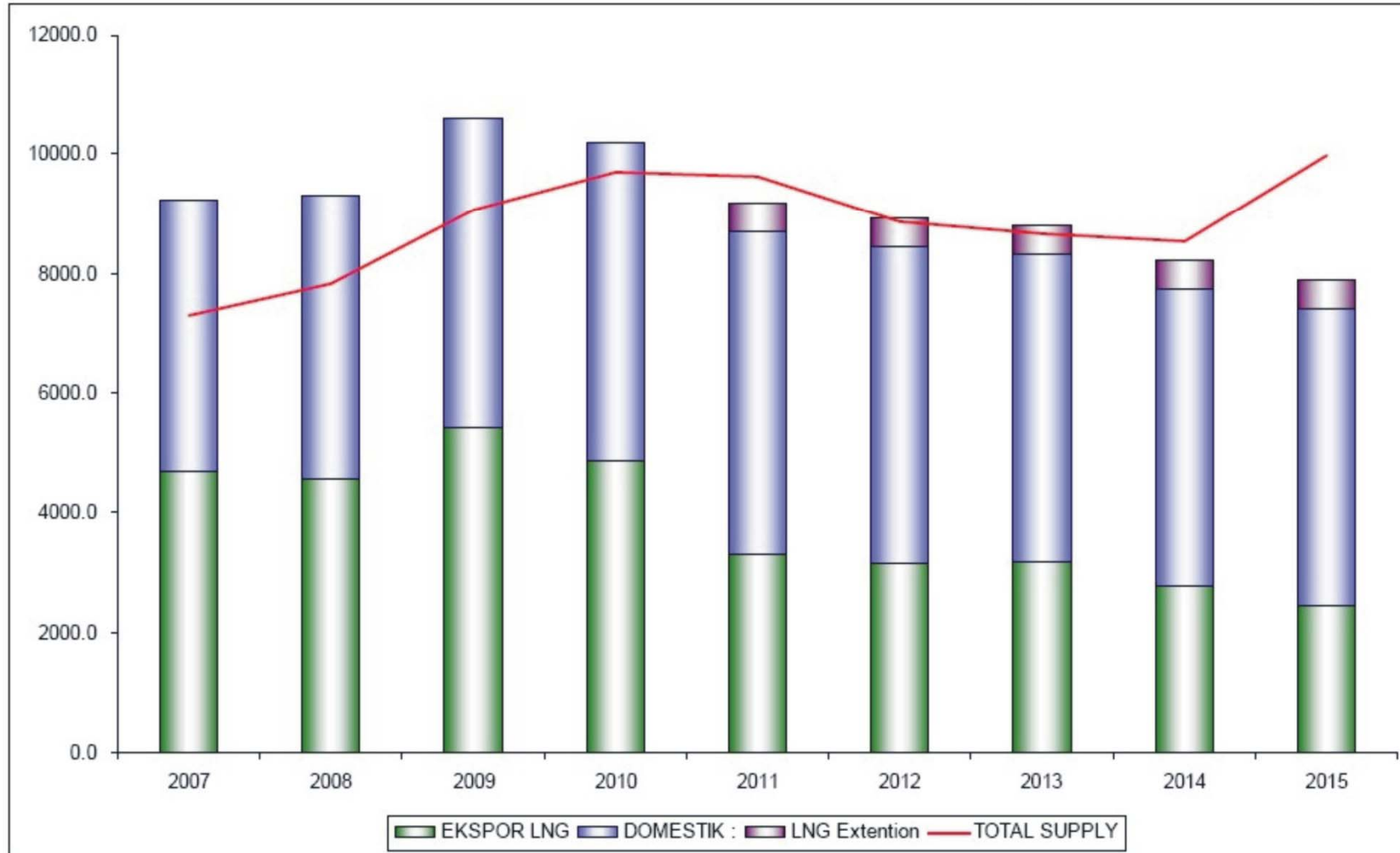
(DESDM, 2009)





DEPARTEMEN ENERGI DAN SUMBER DAYA MINERAL  
DIREKTORAT JENDERAL MINYAK DAN GAS BUMI

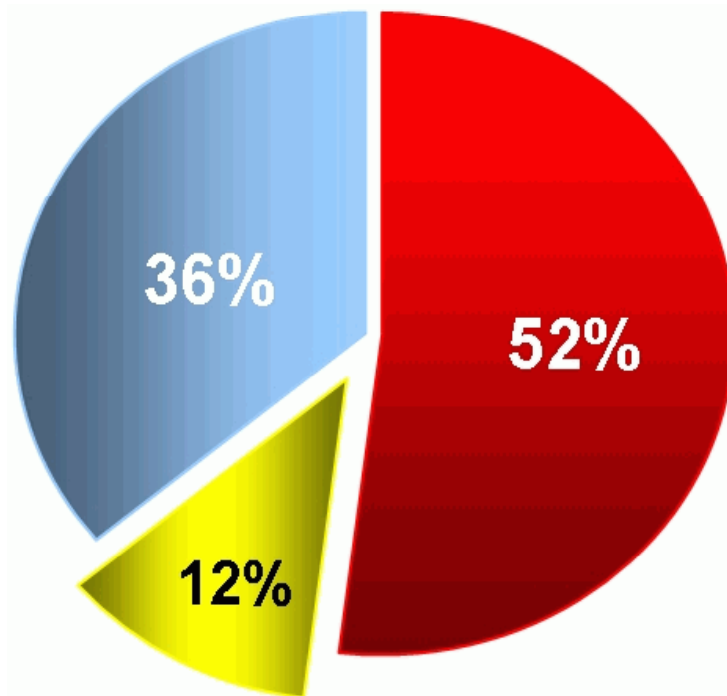
## NATIONAL GAS SUPPLY AND DEMAND FORECAST



CATATAN : EXTENTION 3 MTPA



## GAS UTILIZATION



- Electricity
- Fertilizer
- Industry, etc.

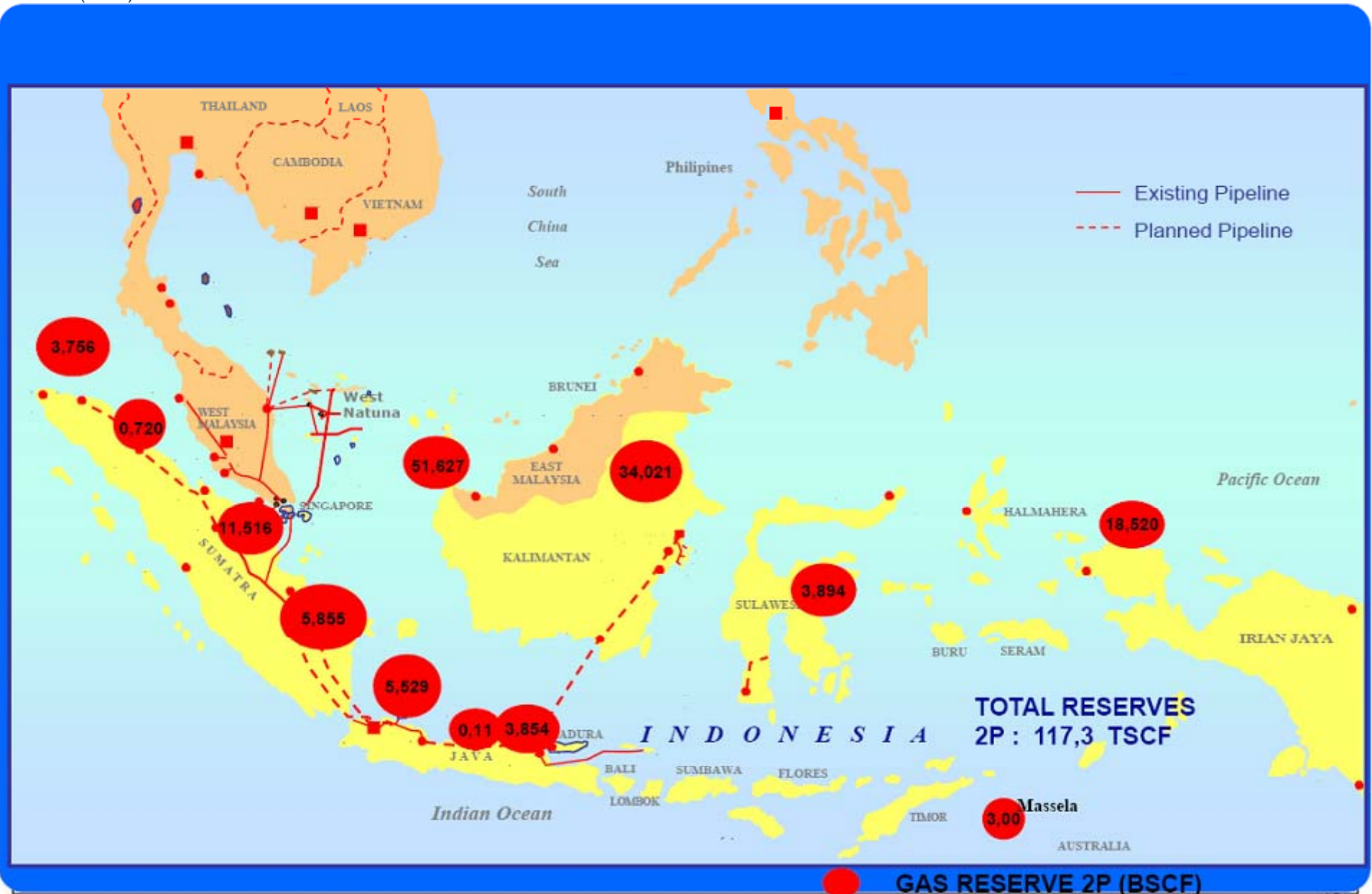
**Contracts = 29**

**Volume = 10.7 TCF**

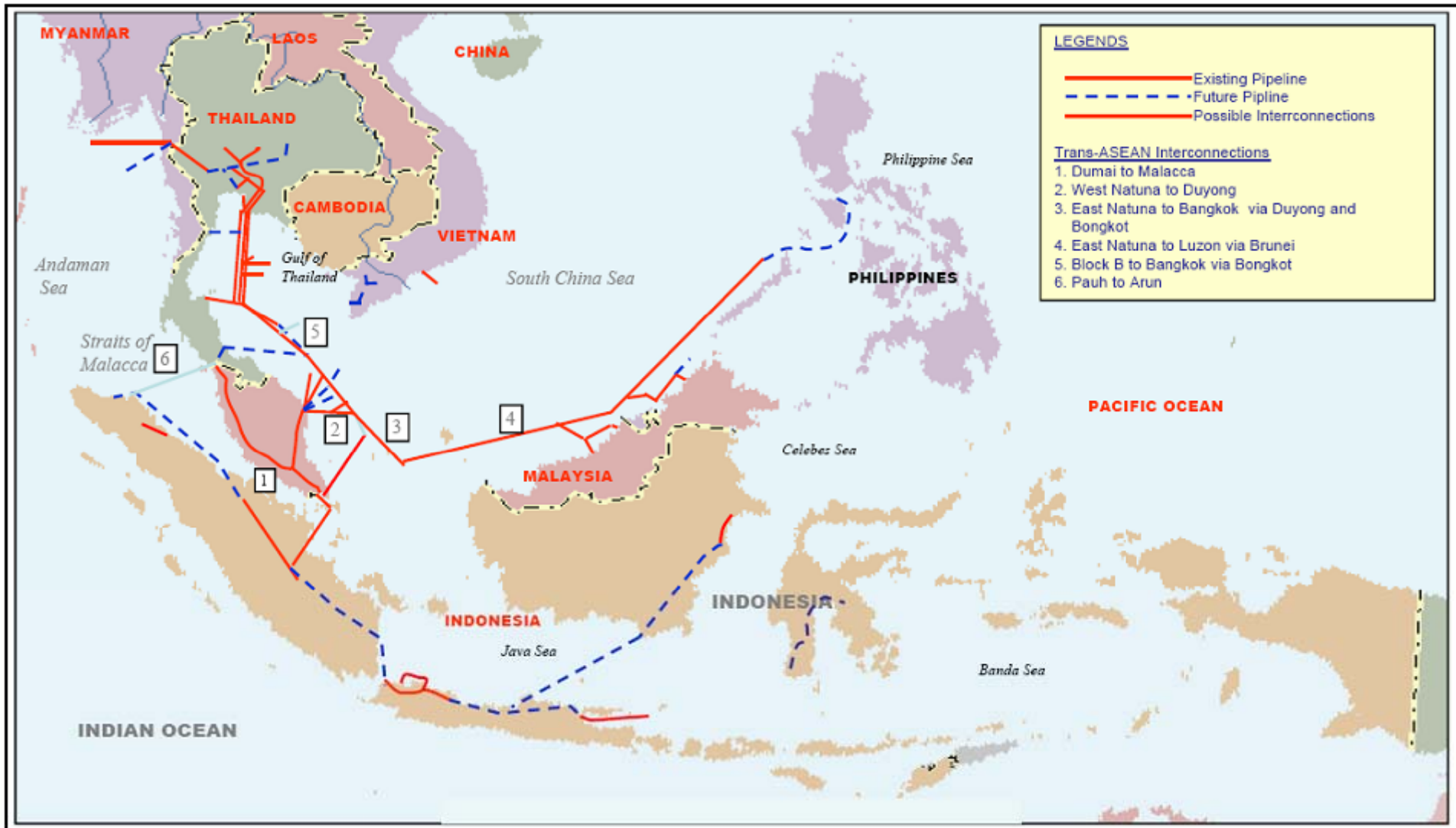
**Value = US\$ 24.3 Millions**

# GAS RESERVE AND PIPELINE SYSTEM

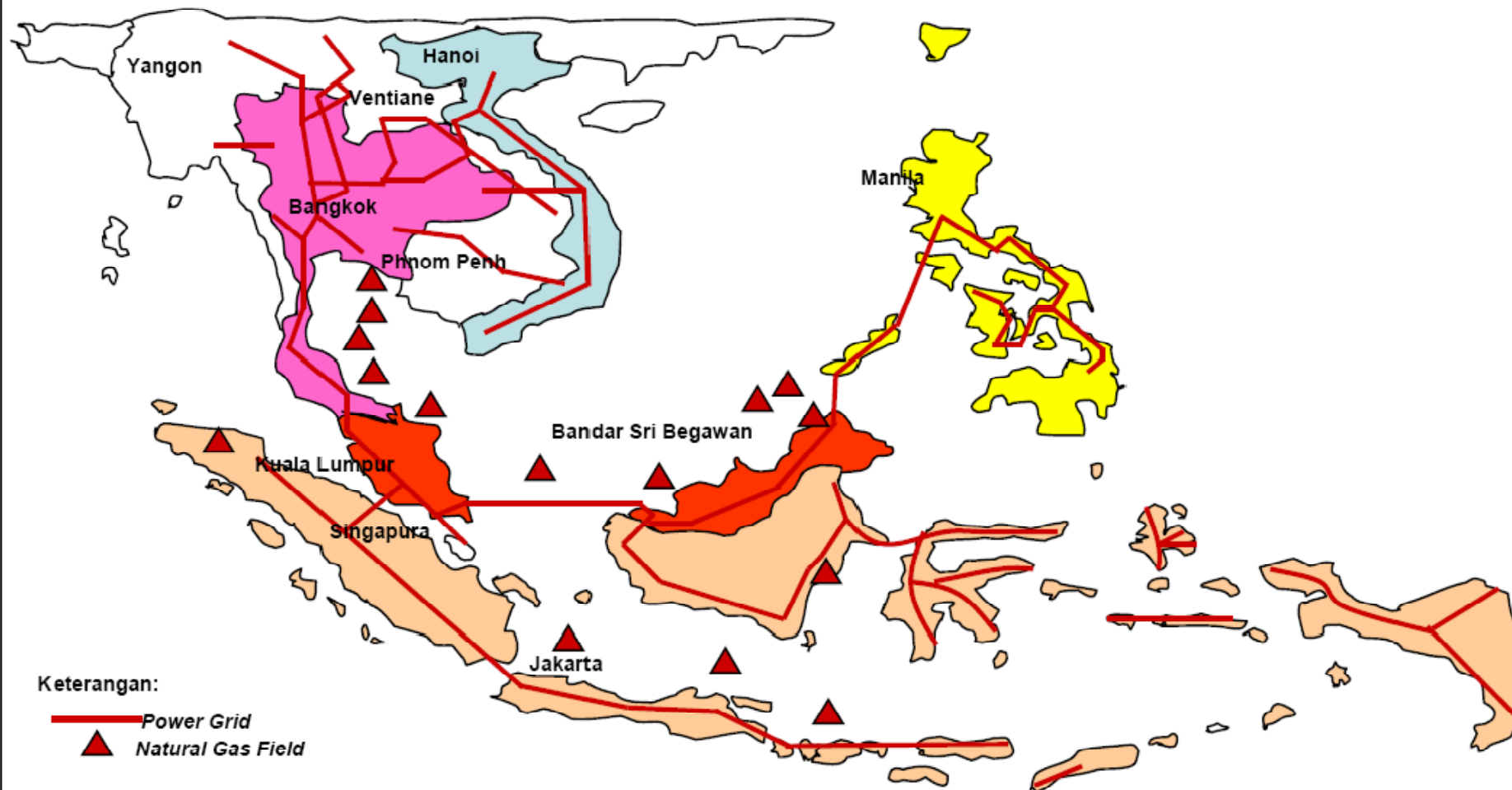
(2005)



# TRANS ASEAN GAS PIPELINE (TAGP)



# ASEAN POWER GRID



Keterangan:

-  Power Grid
-  Natural Gas Field

11 proyek Asean Power Grid:

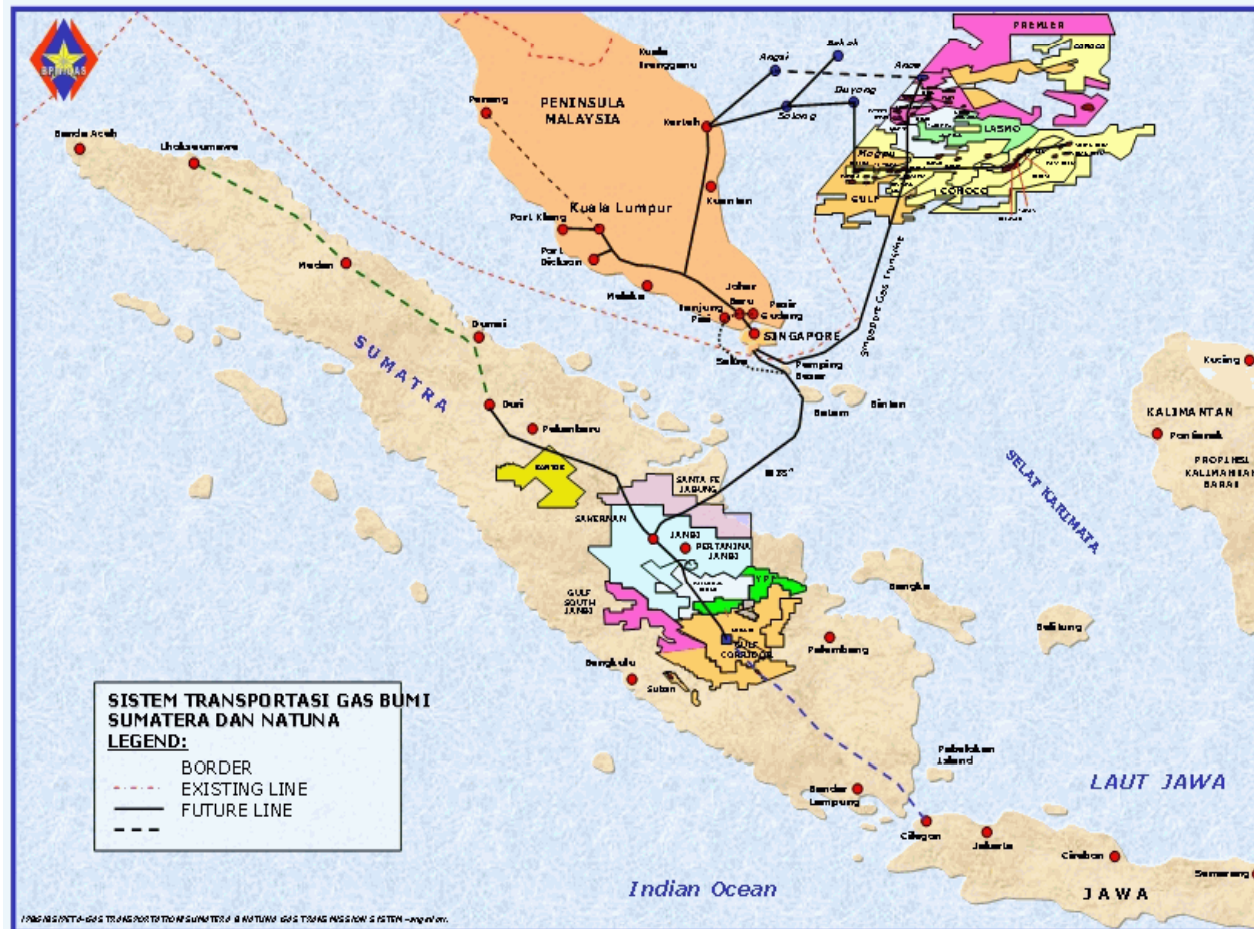
- 1) Republik Rakyat Laos – Thailand;
- 2) Myanmar – Thailand;
- 3) Thailand – Kamboja;
- 4) Kamboja – Vietnam
- 5) Sumatra (Indonesia) – Penisular (Malaysia);
- 6) Penisular (Malaysia) – Singapura;
- 7) Sumatra (Indonesia) – Singapura;
- 8) Batam (Indonesia) – Singapura;
- 9) Sabah/Sarawak (Malaysia) – Brunei;
- 10) Sabah/Sarawak (Malaysia) – Kalimantan Barat (Indonesia)
- 11) Philipina – Sabah/Sarawak (Malaysia)

# TRANSMISSION PIPELINE AND FLOW



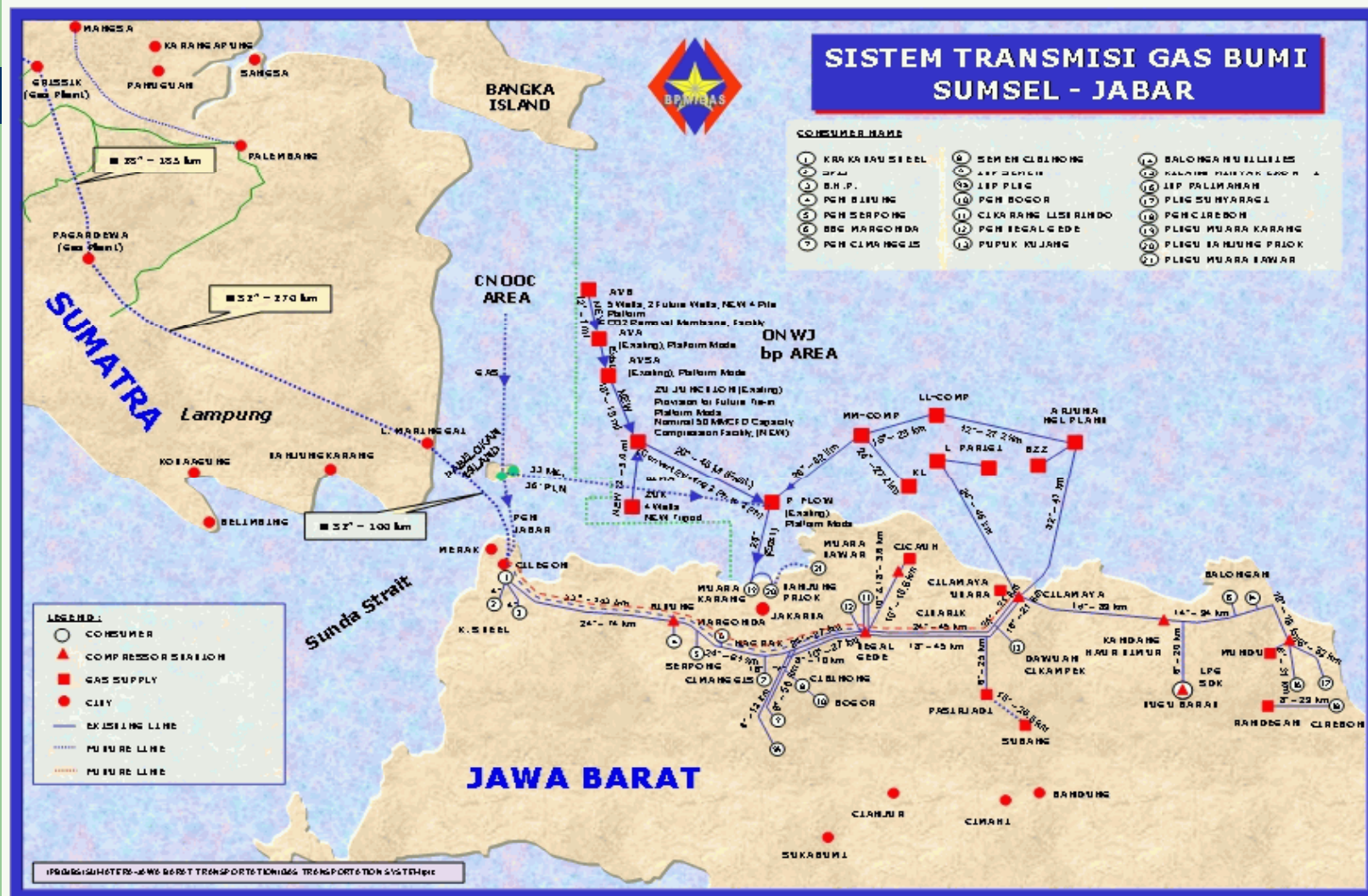
# TRANSMISSION PIPELINE

## Sumatra and Natuna



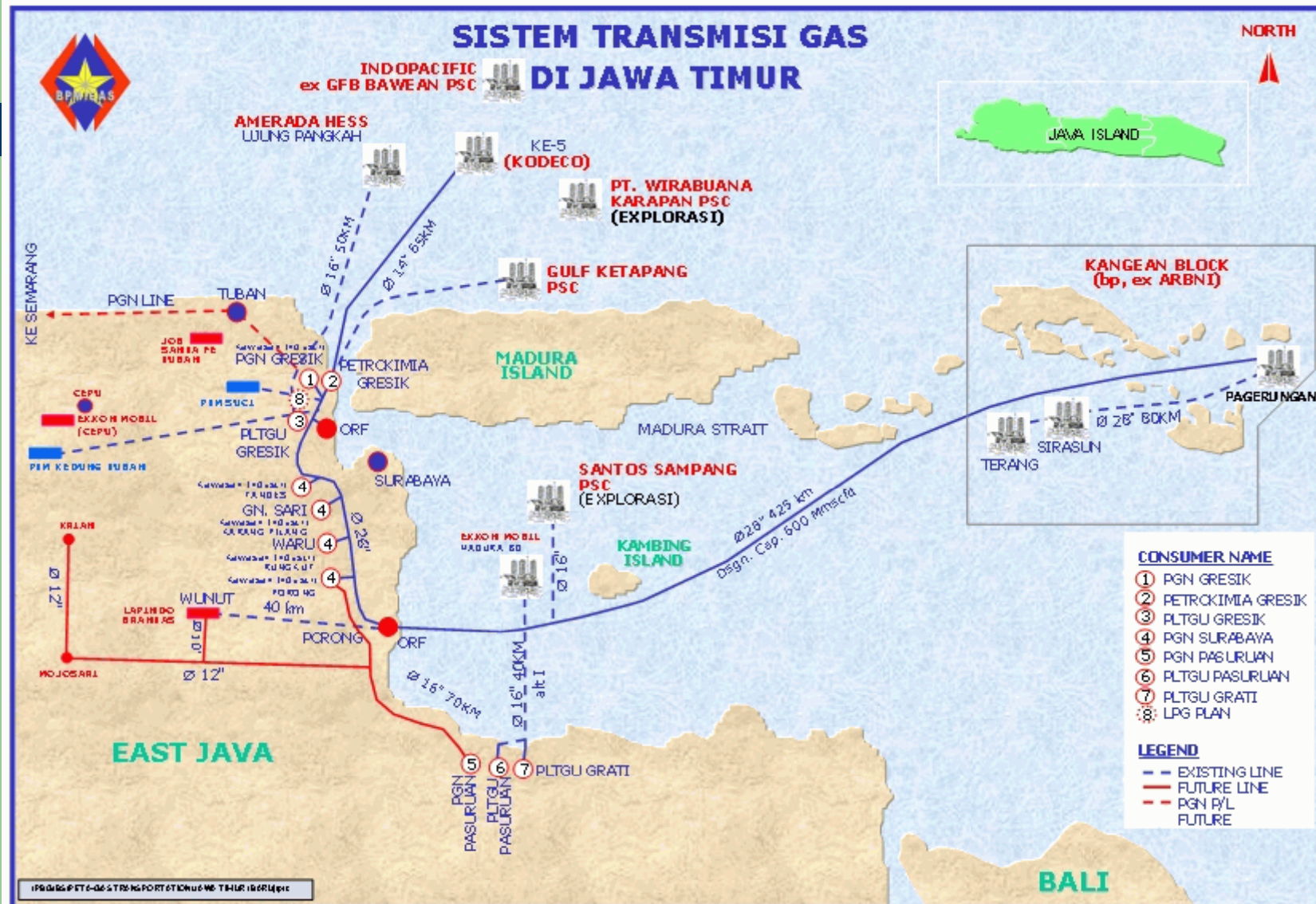
# GAS TRANSMISSION SYSTEM

## South Sumatra – West Java



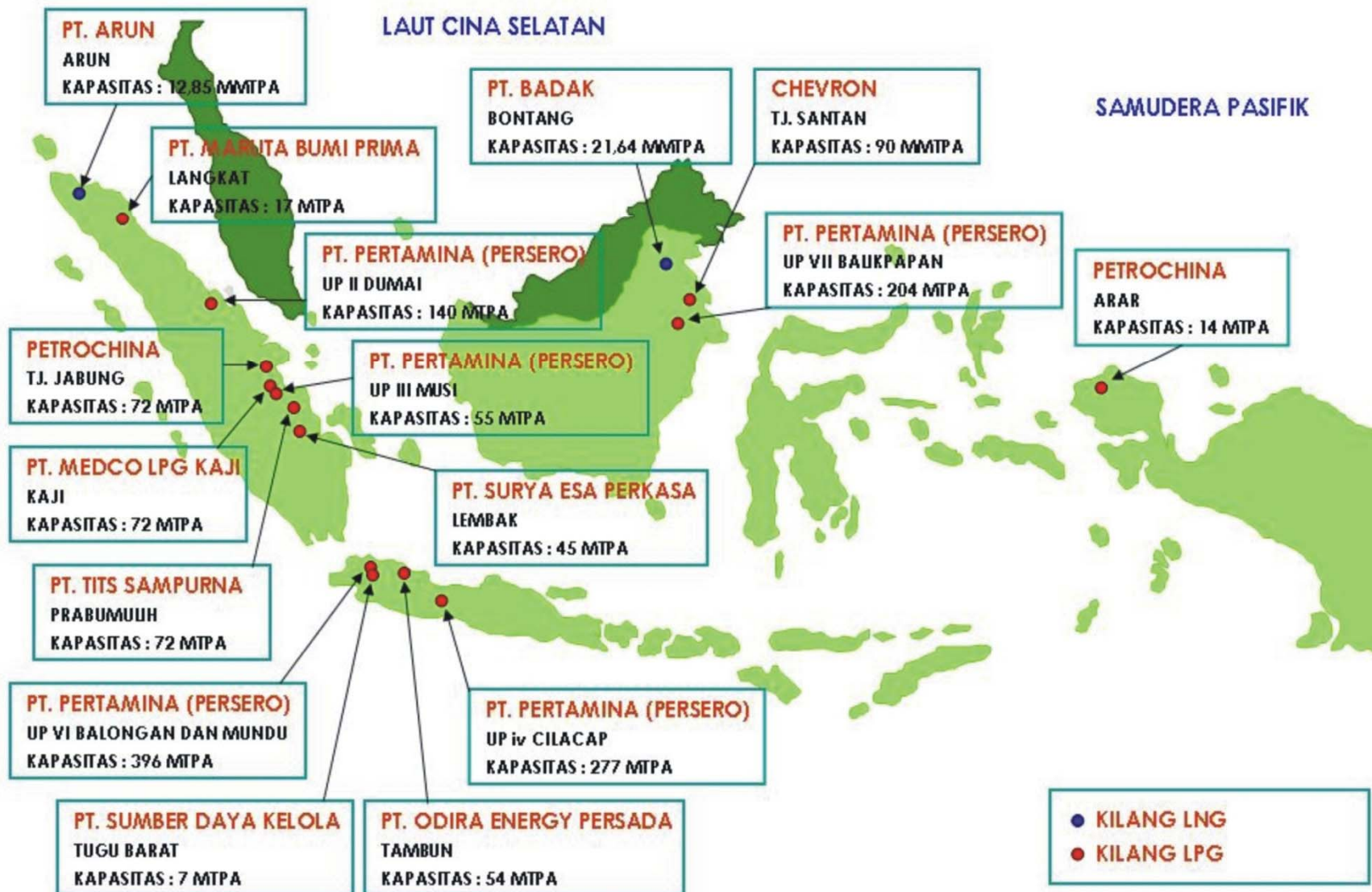
# GAS TRANSMISSION SYSTEM

## East Java





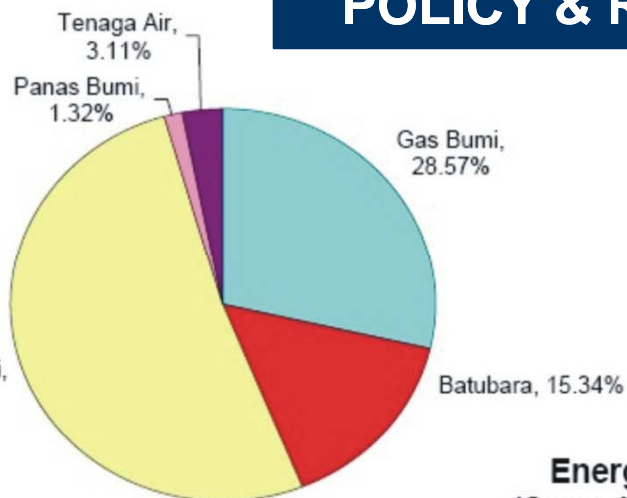
# GAS MILL DISTRIBUTION



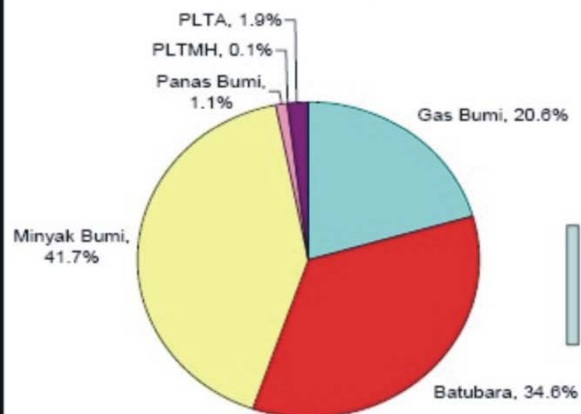


# INDONESIA ENERGY POLICY & ROADMAP 2025\*)

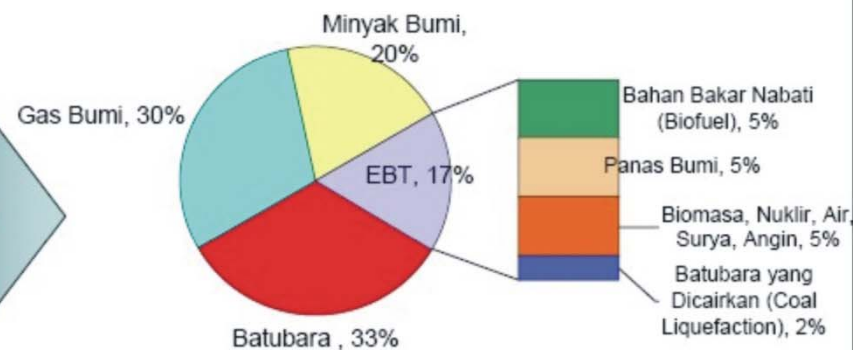
Energi (Primer) Mix Saat Ini



Energi Mix Tahun 2025  
(Skenario BaU)



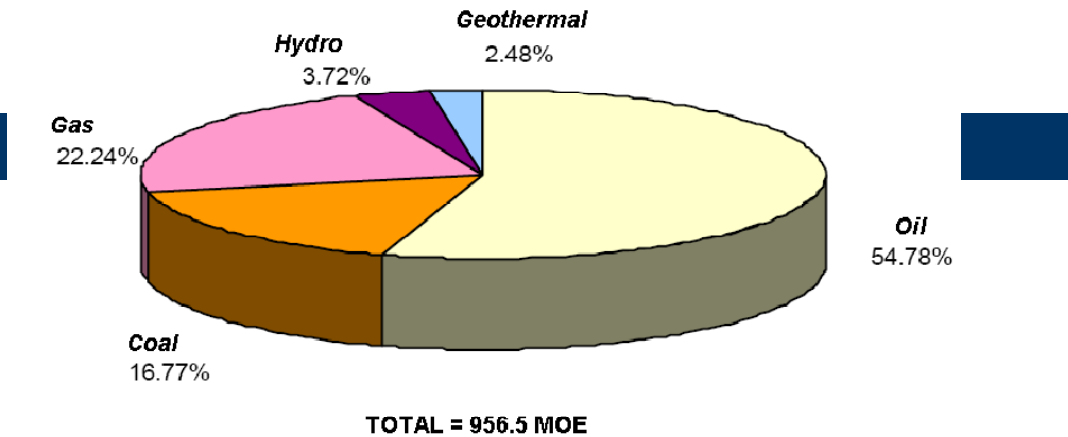
Energi Mix Tahun 2025  
(Sesuai Perpres No. 5/2006)



\*) Sesuai Perpres No. 5 Tahun 2006

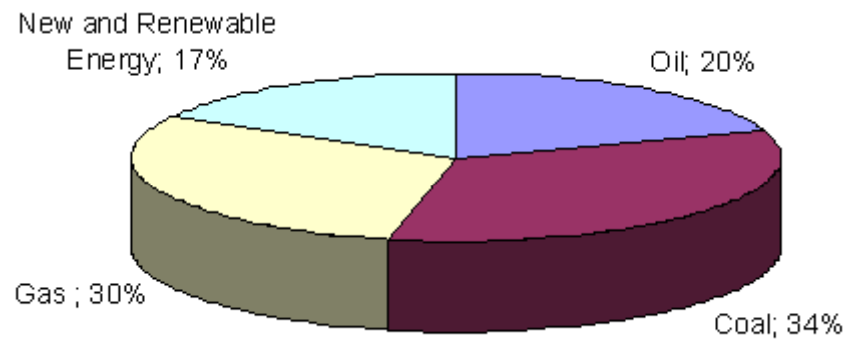
# NATIONAL ENERGY PROJECTION

2005



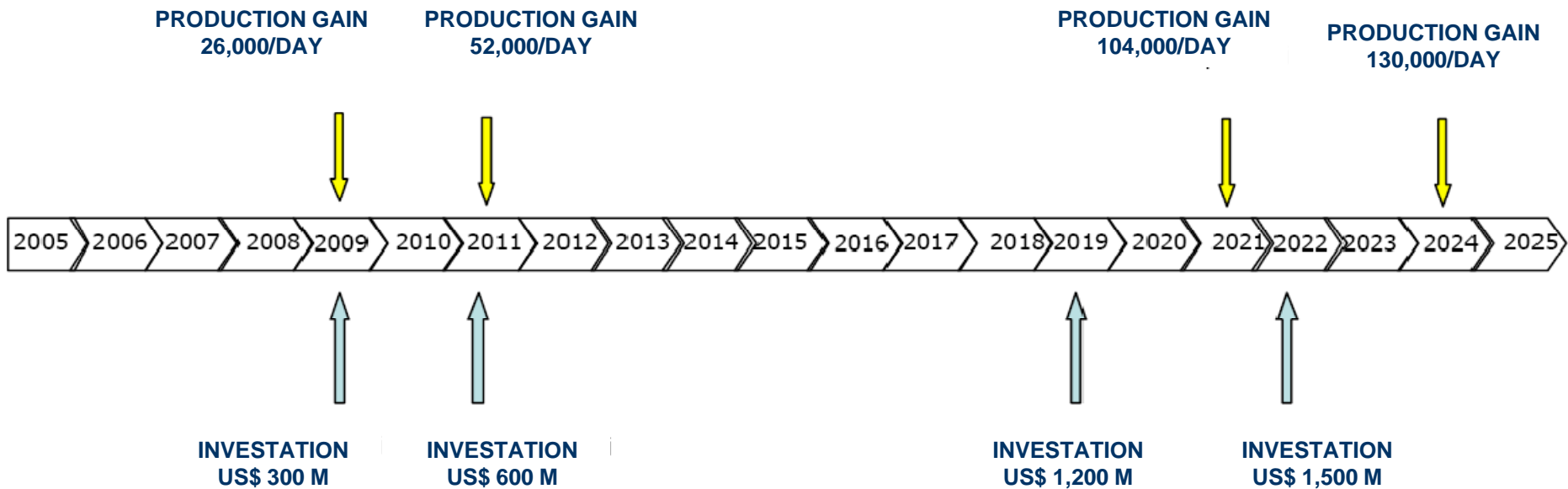
Sumber: Handbook EE 2006

2025



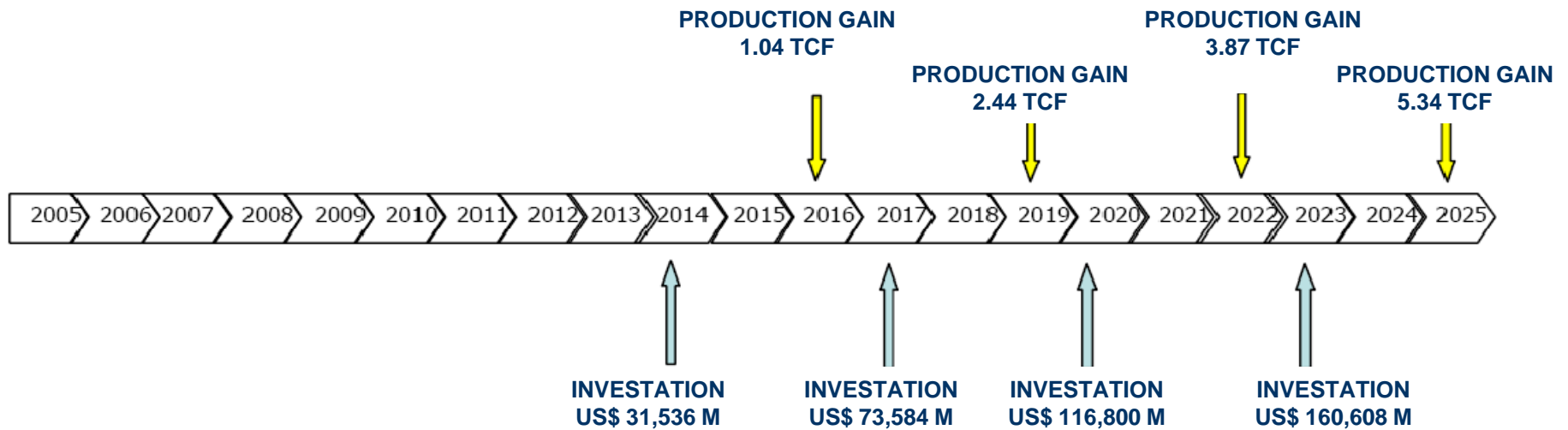
# LNG TERMINAL MILESTONE

**CUMULATIVE PRODUCTION 312,000 TON/DAY**  
**CUMULATIVE INVESTATION US\$3.6 BILLION**



# CBM MILESTONE

**CUMULATIVE PRODUCTION 4.64 TCF**  
**CUMULATIVE INVESTATION US\$382.5 BILLION**



# ISSUES AND CHALLENGE

- Increasing energy demand and decreasing oil reserve. Currently Indonesia is net oil importer, and need other resources for oil substitution, gas is one of them.
- 11 non producing basins with discovery and 22 virgin basins in tertiary sediments.
- Some stranded gas fields (marginal fields) for local energy and oil substitution. Usually located far from civilization. Current issue substituting oil fuel to gas for power plant.
- Non Fossil fuel cost is still high compare to Fossil fuel
- Gas issues post Arun dan East Kalimantan era: TANGGUH, SENORO and SUBAN. Last issue is MASELA gas development (big reserve remote location)
- EAST NATUNA FIELD, large reserve with high impurities (70% CO<sub>2</sub>). Need high capital and high technology. Possibly using CCS. 222 TCF OGIP dan 46 TCF Reserve.

# CONTACT DETAIL



## Directorate General Oil and Gas

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Jl. H.R Rasuna Said Kav. B-5  
Jakarta 12910  
Phone : +62 21 5268910

or

## Geological Agency

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Bandung 40122  
Phone : +62 22 7219573

or

## BP MIGAS

Patra Office Tower  
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Jakarta 12950  
Phone: +62 21 52900245-48

or

## ENERGY AND MINERAL RESOURCES RESEARCH AND DEVELOPMENT AGENCY

Jl. Ciledug Raya Kav. 109  
Cipulir  
Jakarta 12230  
Phone : +62 21 7394422



Thank You  
Terima Kasih





# HYDROCARBON POTENTIAL

EAST NATUNA

- Source Rocks: Arang, Gabus dan Terumbu Formation.
- Primary Reservoir : Gabus, Terumbu Formation
- Trap: Structure and Stratigraphic
- Cap Rock : Intra Arang Shale
- Resources : Gas Reef, 222 TCF OGIP dan 46 TCF Reserve.



# SUPPORTED SLIDES



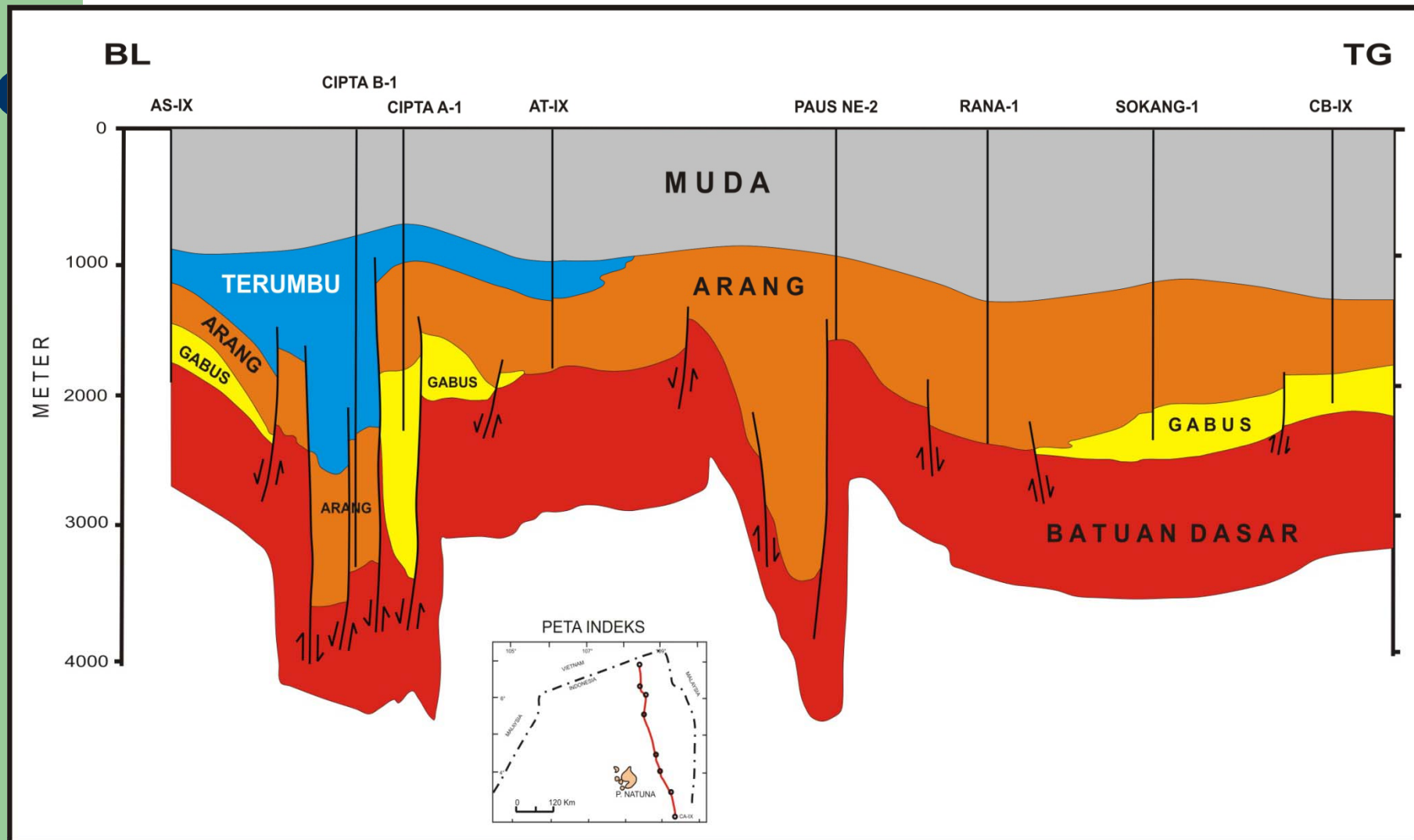
# NATIONAL ENERGY PROJECTION

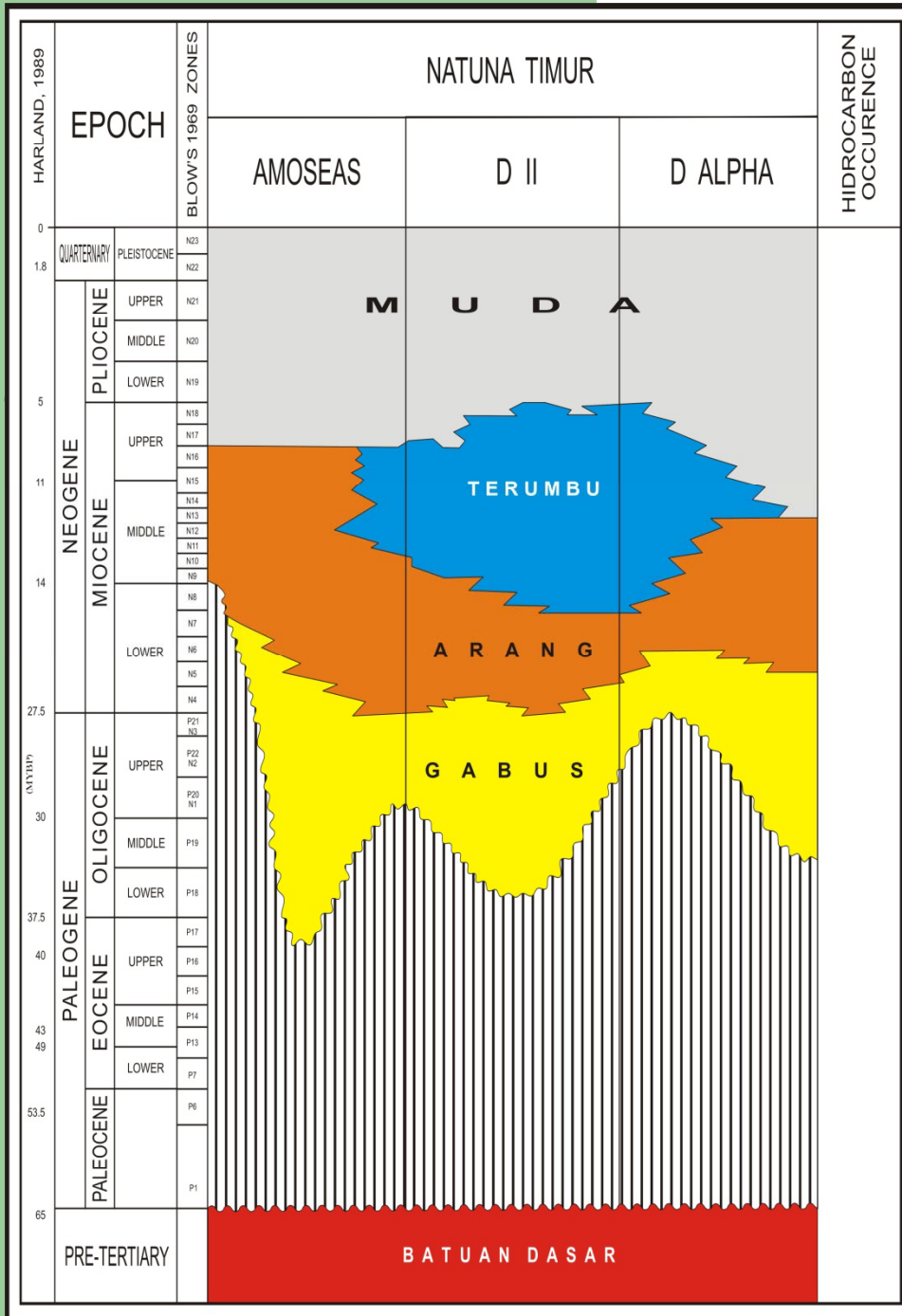
(MBOE)

Energy Type	2005	2010	2015	2020	2025
Oil	524.00	550.70	578.00	605.80	638.90
Coal	160.40	210.30	349.70	743.80	1099.40
Gas	212.80	363.70	382.50	477.10	832.00
CBM	0.00	0.00	23.00	74.60	127.80
Water	34.00	41.70	56.60	60.50	65.12
Geothermal	23.70	23.70	61.80	115.80	167.50
Nuclear	0.00	0.00	0.00	27.90	55.80
Other Renewable	1.60	3.50	7.40	11.70	17.40
Biofuel	0.00	32.50	89.00	102.40	166.90
Coal Liquefaction	0.00	0.00	14.20	47.40	80.50
<b>TOTAL</b>	<b>956.50</b>	<b>1226.10</b>	<b>1562.20</b>	<b>2267.00</b>	<b>3251.32</b>

# GEOLOGICAL CROSS SECTION

EAST NATUNA





# STRATIGRAPHY

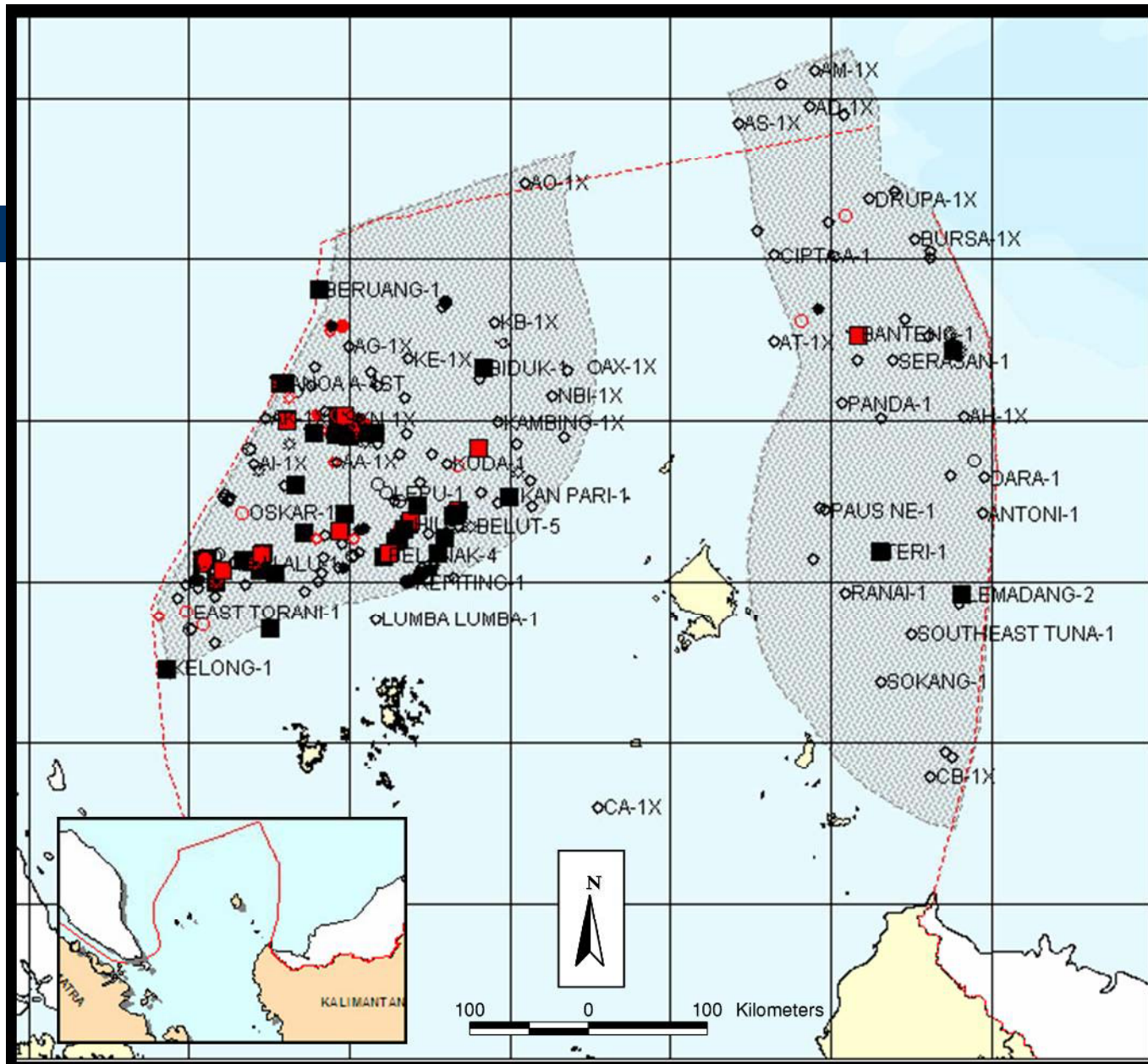
## EAST NATUNA

# EXPLORATION HISTORY

EAST NATUNA

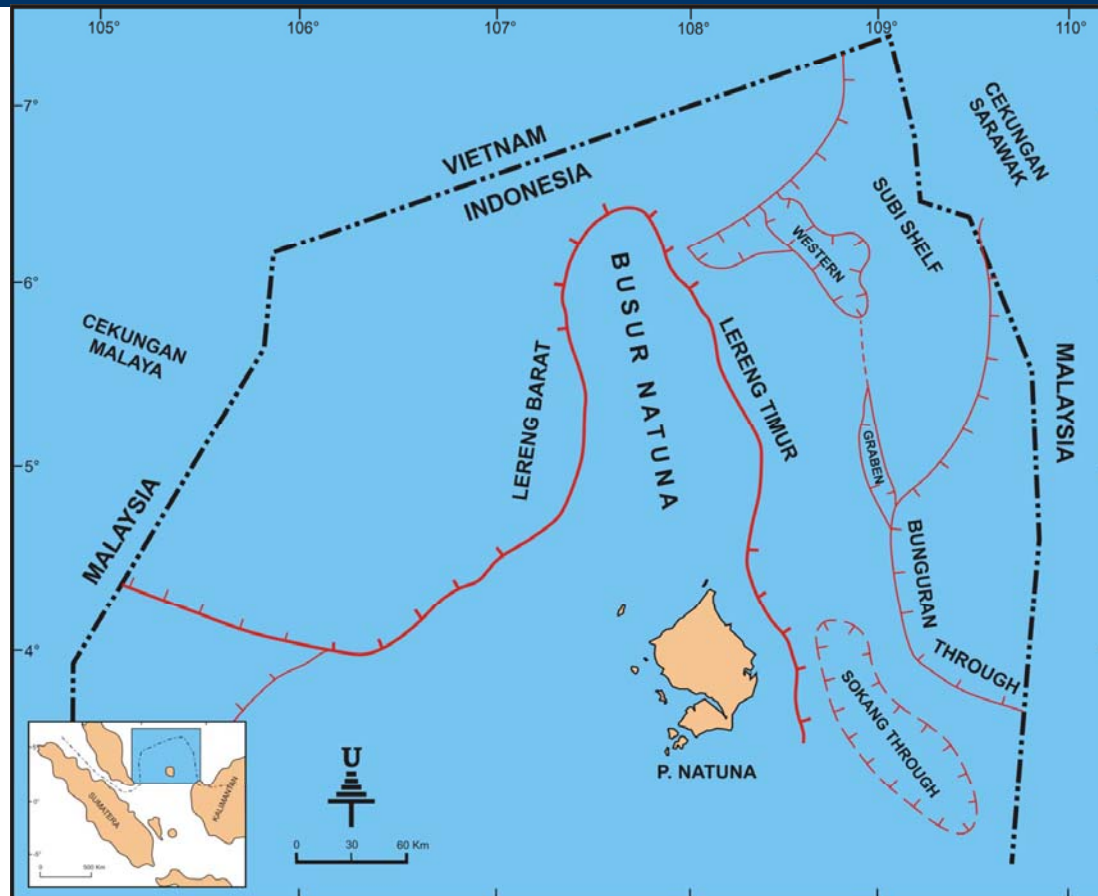
- 70 Period : Intial Exploration Activity for Blok D-Alpha, 1973. Agip found AL Structure.
- 80 Period : 2D additional seismic acquisition as long as 2500 km. Gas discovery in L-2X (1981), continued similar discovery in L-3X, L-4X, dan L-5X (1983) well.
- Estimated OGIP 222 TCF, Formasi Terumbu (Reef Formation).

# WELLS IN NATUNA



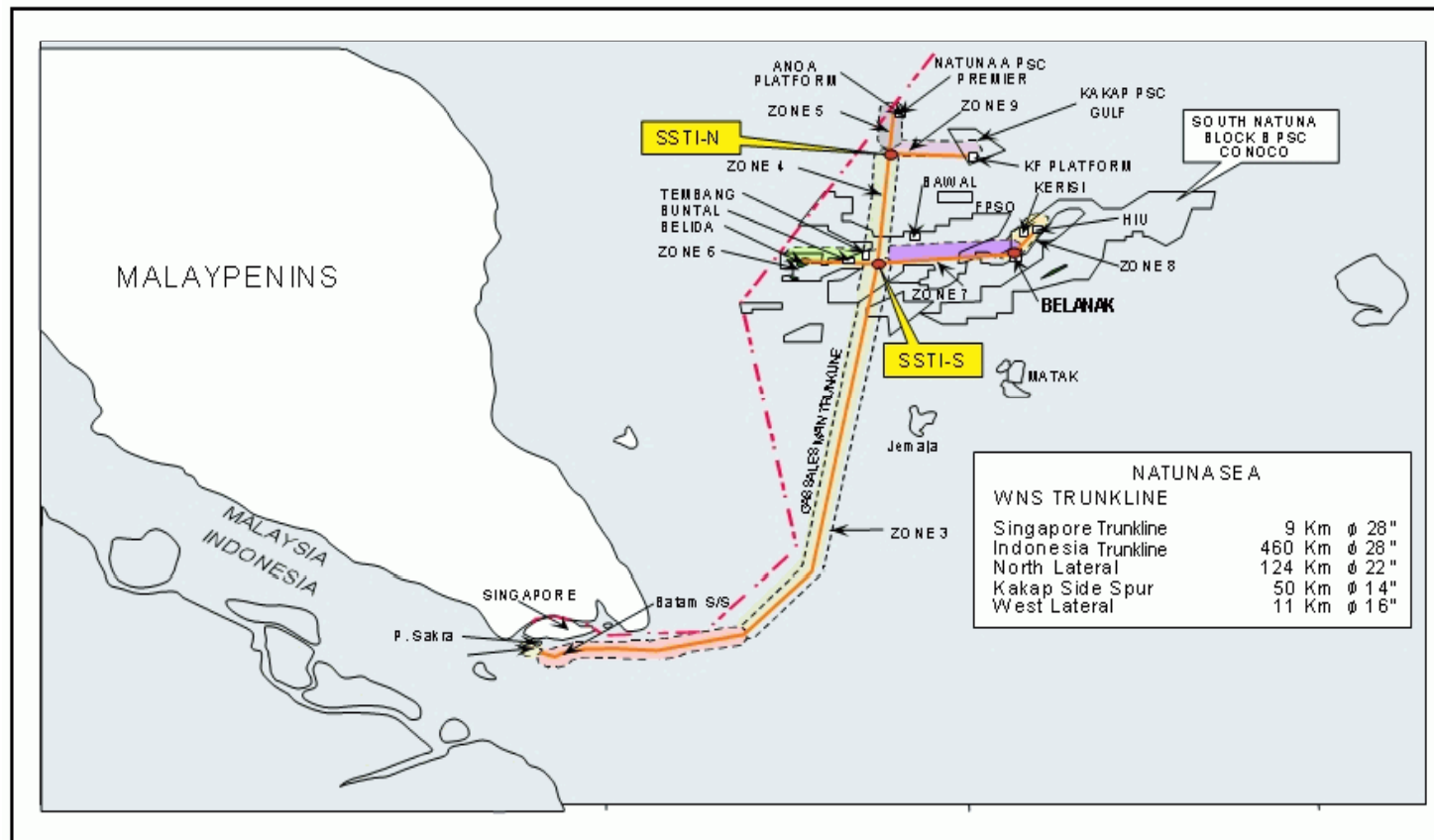
# TECTONIC SETTING

EAST NATUNA

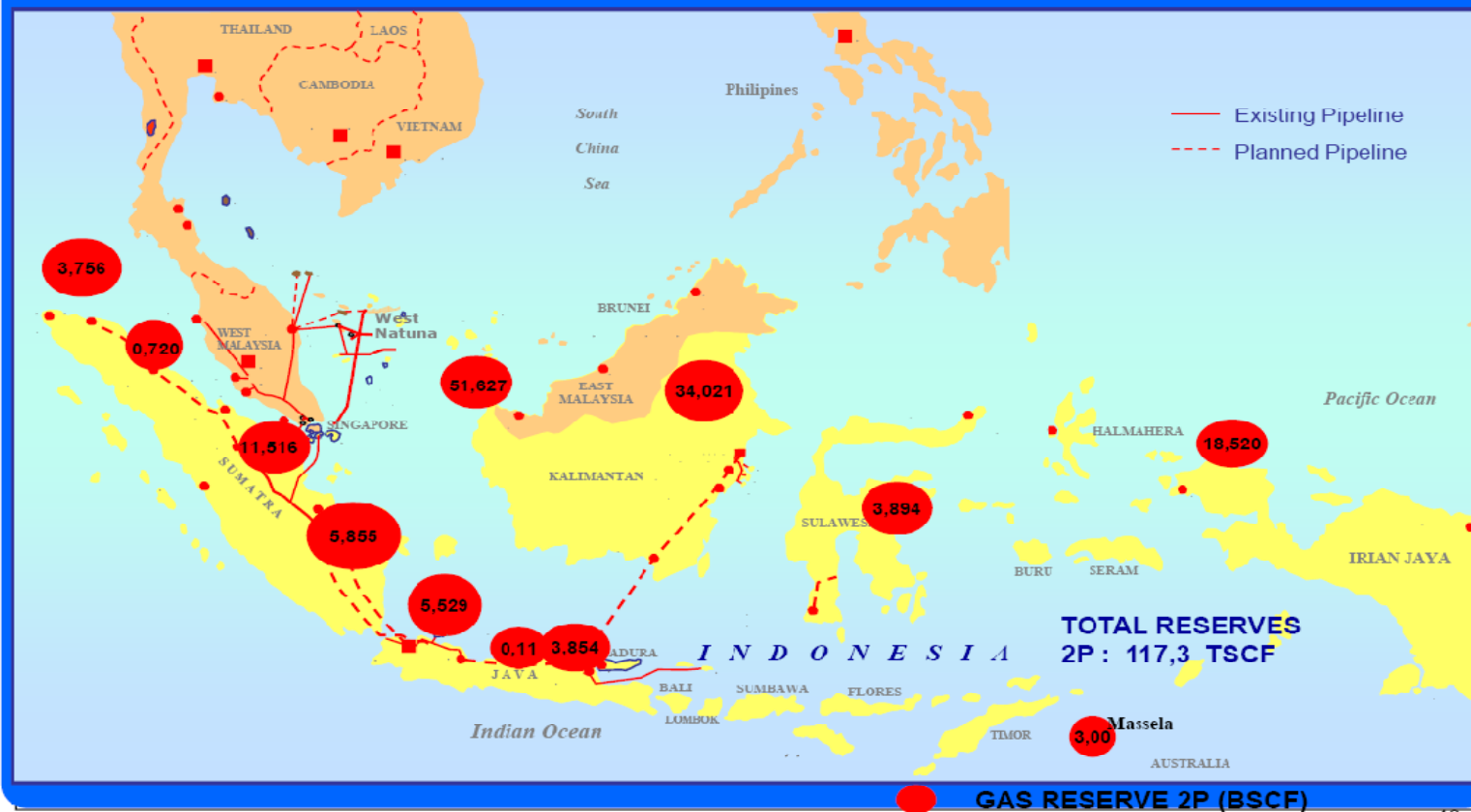




# WEST NATUNA GAS PIPELINE



## LAMPIRAN G2. CADANGAN DAN JARINGAN PIPA GAS\_2005



## LAMPIRAN B1 POTENSI ENERGI NASIONAL 2005

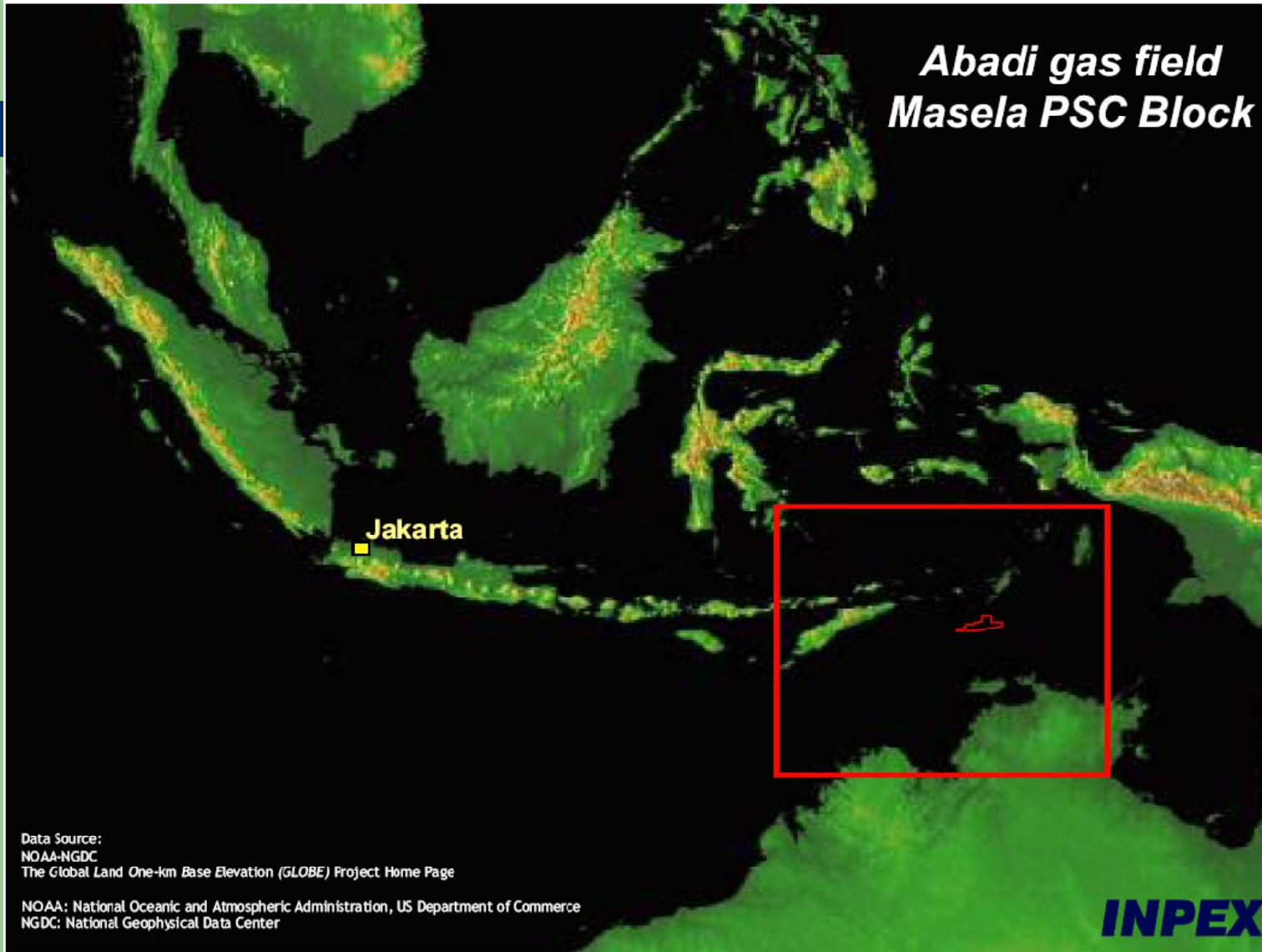
JENIS ENERGI FOSIL	SUMBER DAYA	CADANGAN	PRODUKSI	RASIO CAD/PROD (TAHUN)
Minyak	86.9 miliar barel	9.1 miliar barel*)	387 juta barel	23
Gas	384.7 TSCF	185.8 TSCF	2.95 TSCF	62
Batubara	58 miliar ton	19,3 miliar ton	132 juta ton	146

\*) Termasuk blok Cepu

ENERGI NON FOSIL	SUMBER DAYA	SETARA	KAPASITAS TERPASANG
Tenaga Air	845.00 juta BOE	75.67 GW	4.2 GW
Panas Bumi	219 Juta BOE	27.00 GW	0.8 GW
Mini/Micro Hydro	0.45 GW	0.45 GW	0.206 GW
Biomass	49.81 GW	49.81 GW	0.3 GW
Tenaga Surya	-	4.80 kWh/m <sup>2</sup> /hari	0.01 GW
Tenaga Angin	9.29 GW	9.29 GW	0.0006 GW
Uranium (Nuklir)	24.112 ton* e.q. 3 GW untuk 11 tahun		

\* Hanya di daerah Kalan - Kalbar

**Abadi gas field  
Masela PSC Block**



Jakarta

Data Source:  
NOAA-NGDC  
The Global Land One-km Base Elevation (GLOBE) Project Home Page

NOAA: National Oceanic and Atmospheric Administration, US Department of Commerce  
NGDC: National Geophysical Data Center

**INPEX**