

OPTIMALIZATION OF PETROCHEMICAL FEEDSTOCKS IN INDONESIA

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**6th ASIA/CHINA PETROCHEMICAL
FEEDSTOCK MARKETS CONFERENCE**

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PERTAMINA

OUTLINE :

I. INTRODUCTION

1. Oil and Gas Law No. 22/2001 and Government Regulation No. 36/2004 and it's impact on Upstream and Down stream Oil & Gas Business
2. Indonesia Oil and Gas Reserves, 2005



II. INDONESIA PETROCHEMICALS INDUSTRY OUTLOOK

1. Petrochemical Industry Chain.
2. Strength and Weakness of Indonesia Petrochemicals Industry
3. Main Olefins & Aromatics Producers In Indonesia (Chandra Asri, PERTAMINA and TPPI)
4. Domestic Petrochemicals Feedstocks Balance (Gas, Naphtha and Condensate)
5. Oil Price Prediction
6. Limitation of Gas, Naphtha and Condensate Supplied for Domestic Petchem Feedstocks Demand

III. NATIONAL OPTIMALIZATION FOR PETCHEM FEEDSTOCKS

1. Optimize Petchem Feedstock for Domestic Industries (Natural Gas, Condensate and Naphtha),
2. Feedstock Price Policy (Gas Price)



IV. PERTAMINA'S PETCHEM FEEDSTOCK STRATEGY FOR OPTIMALIZATION

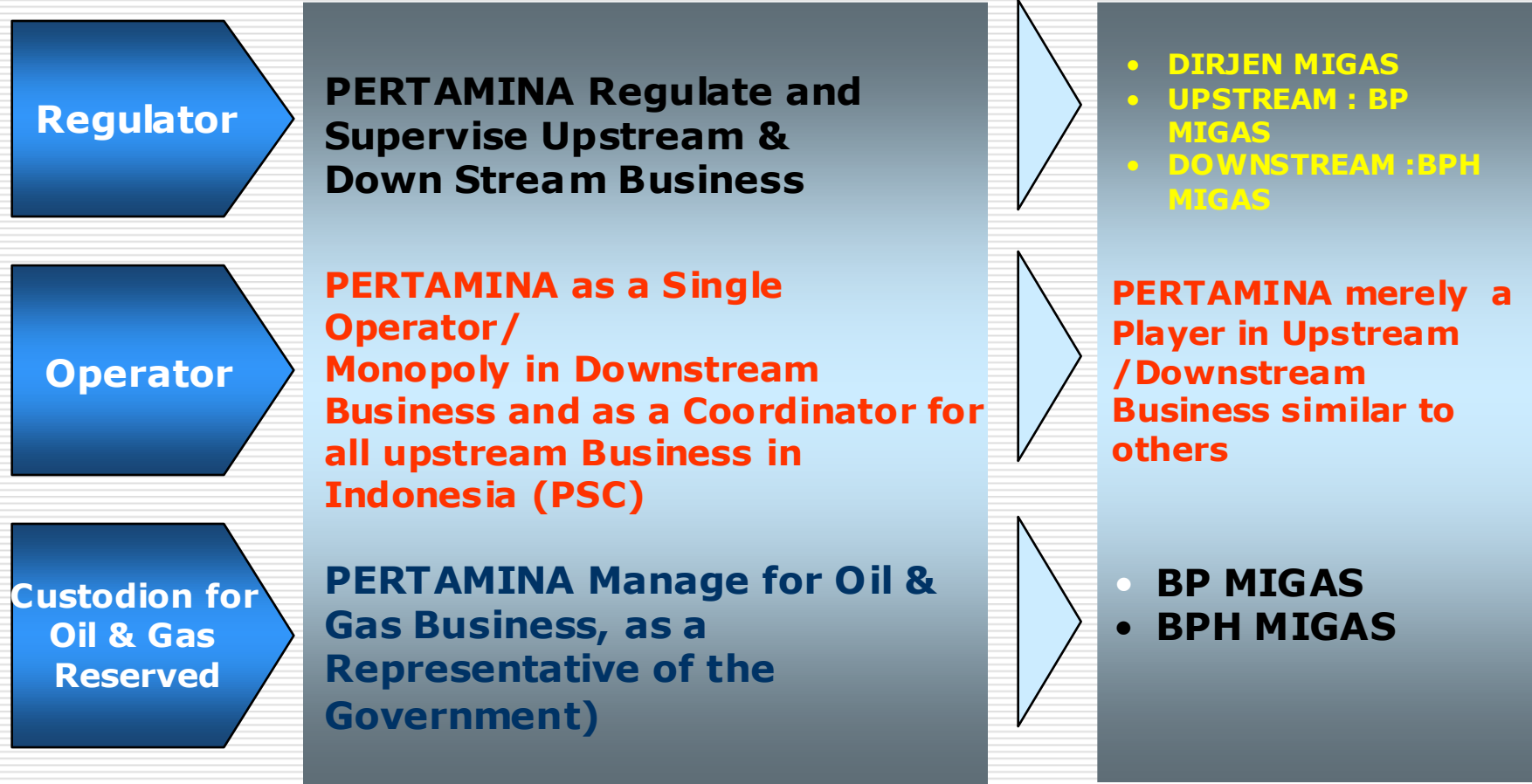
1. Utilizing Offgas ex RCC for Propylene production
2. Utilizing Natural Gas for producing Petrochemicals/Oil products or LNG
3. Utilizing Sr. Kerosene for N-Paraffin production
4. Optimizing Gas Production from new field for Fertilizer Plants Feed or Public Gas Services



CONCLUSION

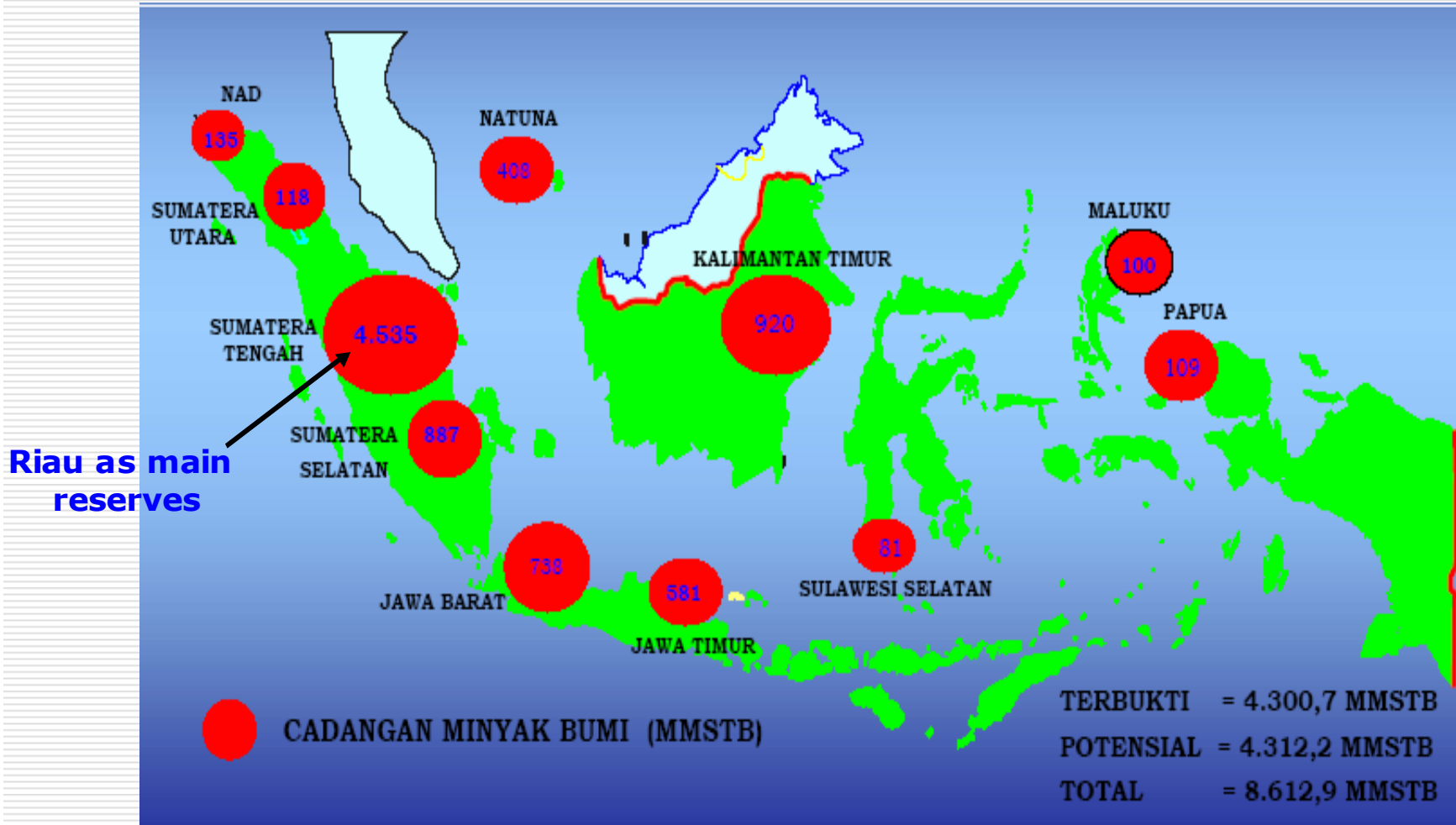
I.1. INTRODUCTION

NEW REGULATION FOR OIL & GAS SECTOR IN INDONESIA (Implementation of Oil & Gas Law No. 22/2001 and Government Regulations No. 35 & 36/2004) **BEFORE** **AFTER**



BP MIGAS : Regulatory Agency for Upstream Business.
BPH Migas : Regulatory Agency for Downstream Business

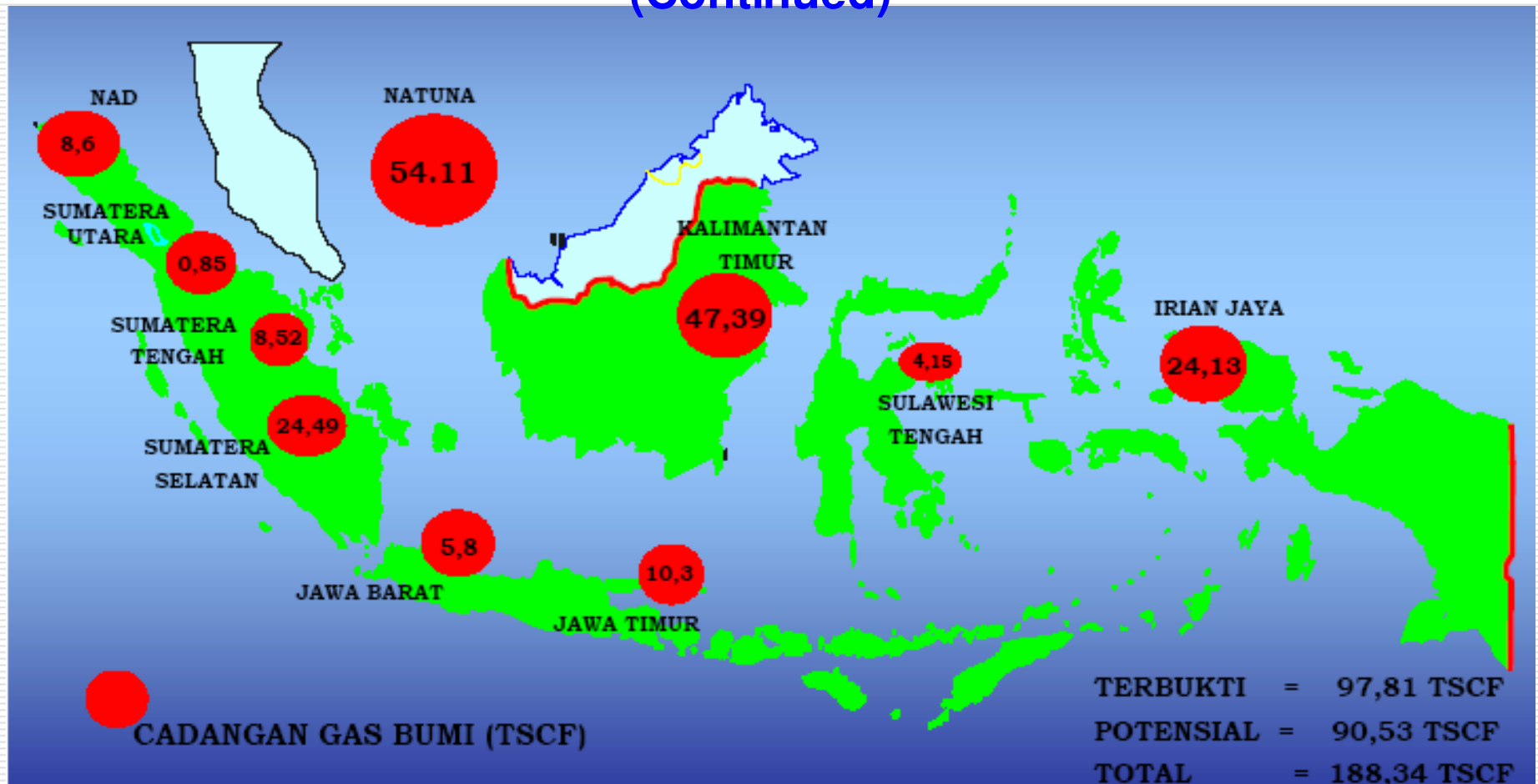
I.2.a. Indonesia Oil Reserves, 2005



- Indonesia total oil reserves (2005) around 8,6 Billion barrels.
- Reserves to production ratio = 18 years.

Source : ESDM 2005

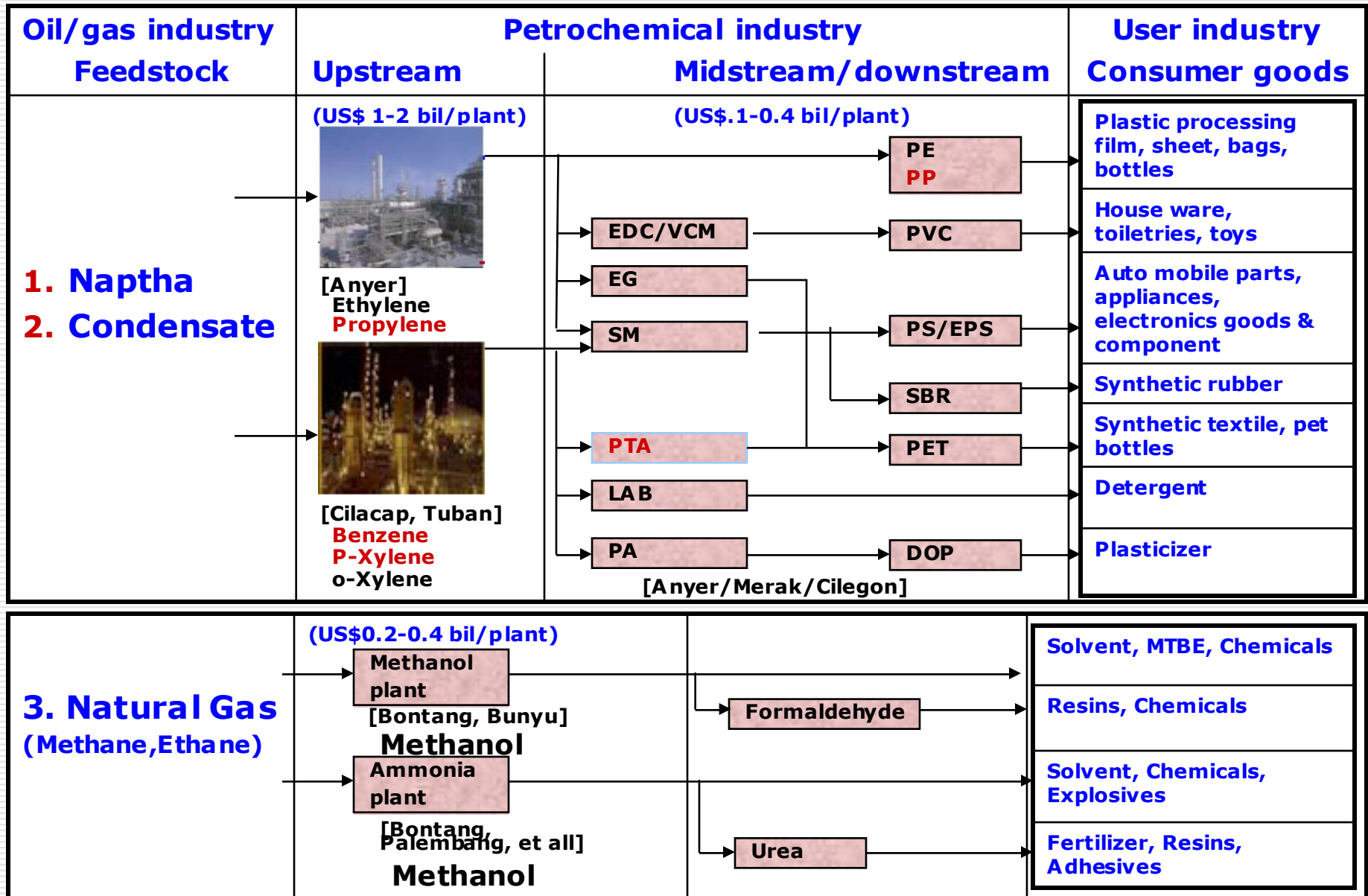
I.2.b. Indonesia Gas Reserves , 2005 (Continued)



- **Indonesia Gas Reserves around 188 TSCF (2005)** which main reserves located in Natuna, East Kalimantan, Irian Jaya and South Sumatera. For Natuna Reserves is not produced yet.
- **Reserves to production ratio = 61 years.**

Source : ESDM, 2005

II.1. Petrochemical industry chain in Indonesia



II.2. STRENGTH & WEAKNESS OF PETCHEM INDUSTRY IN INDONESIA

A. STRENGTH :

- 1. Rich Gas, Oil and Coal resources that could be utilized as Petrochemicals feedstock.**
- 2. Industries that use petrochemicals products such as textiles are developed.**
- 3. Low Labor cost**

B. WEAKNESS :

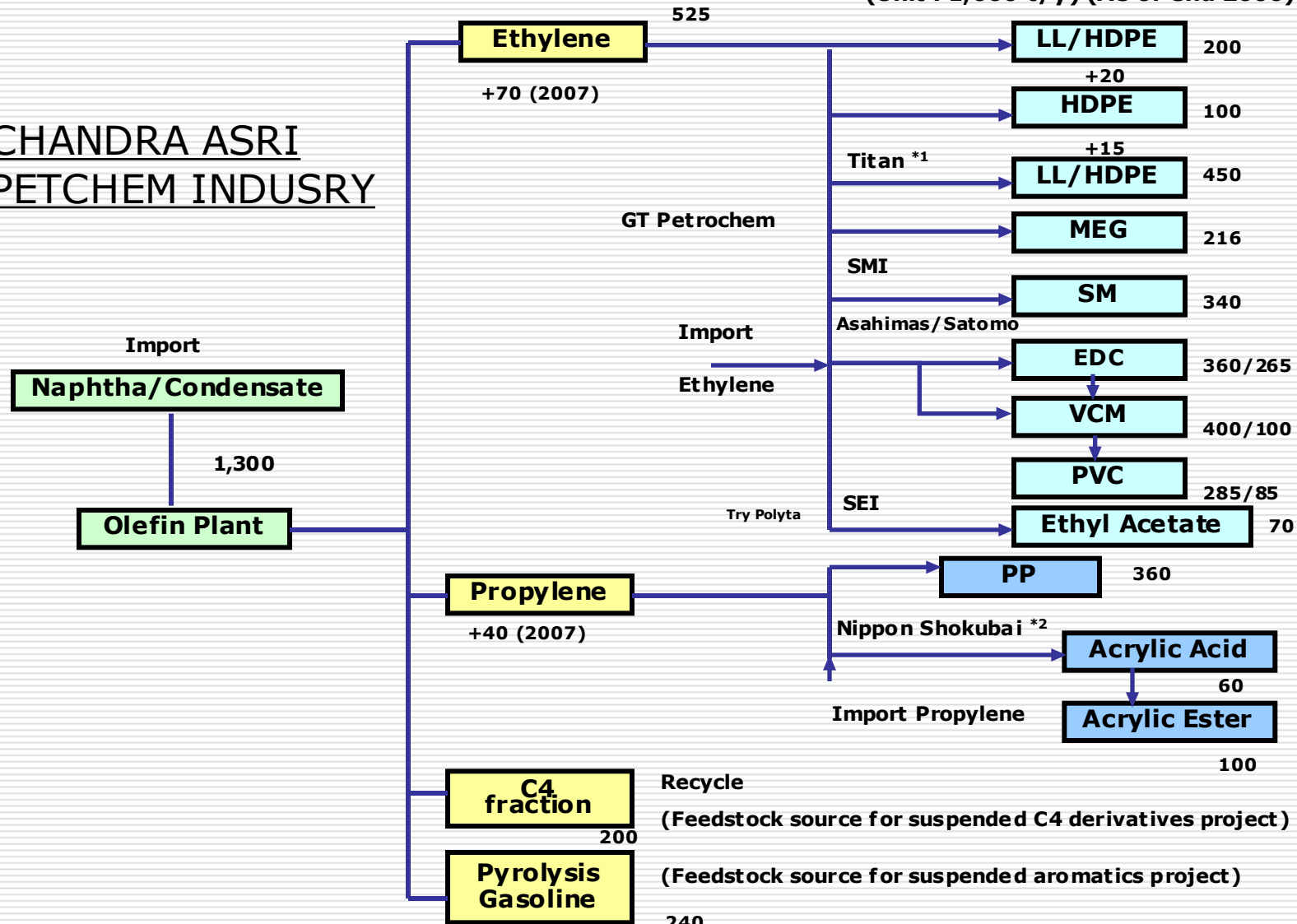
- 1. Petrochemicals Industry and it's feedstock are not so linked, due to some feedstock still imported.**
- 2. Infrastructure support such as Power Generators to be continued developed to support Petrochemicals Industries zone.**
- 3. Some Petrochemicals Industries still stand alone (not integrated yet between upstream-midstream and downstream Chain)**

Source : PTM, 2006

II.3 MAIN PETROCHEMICALS INDUSTRY PROFILE IN INDONESIA

(Unit : 1,000 t/y) (As of end 2006)

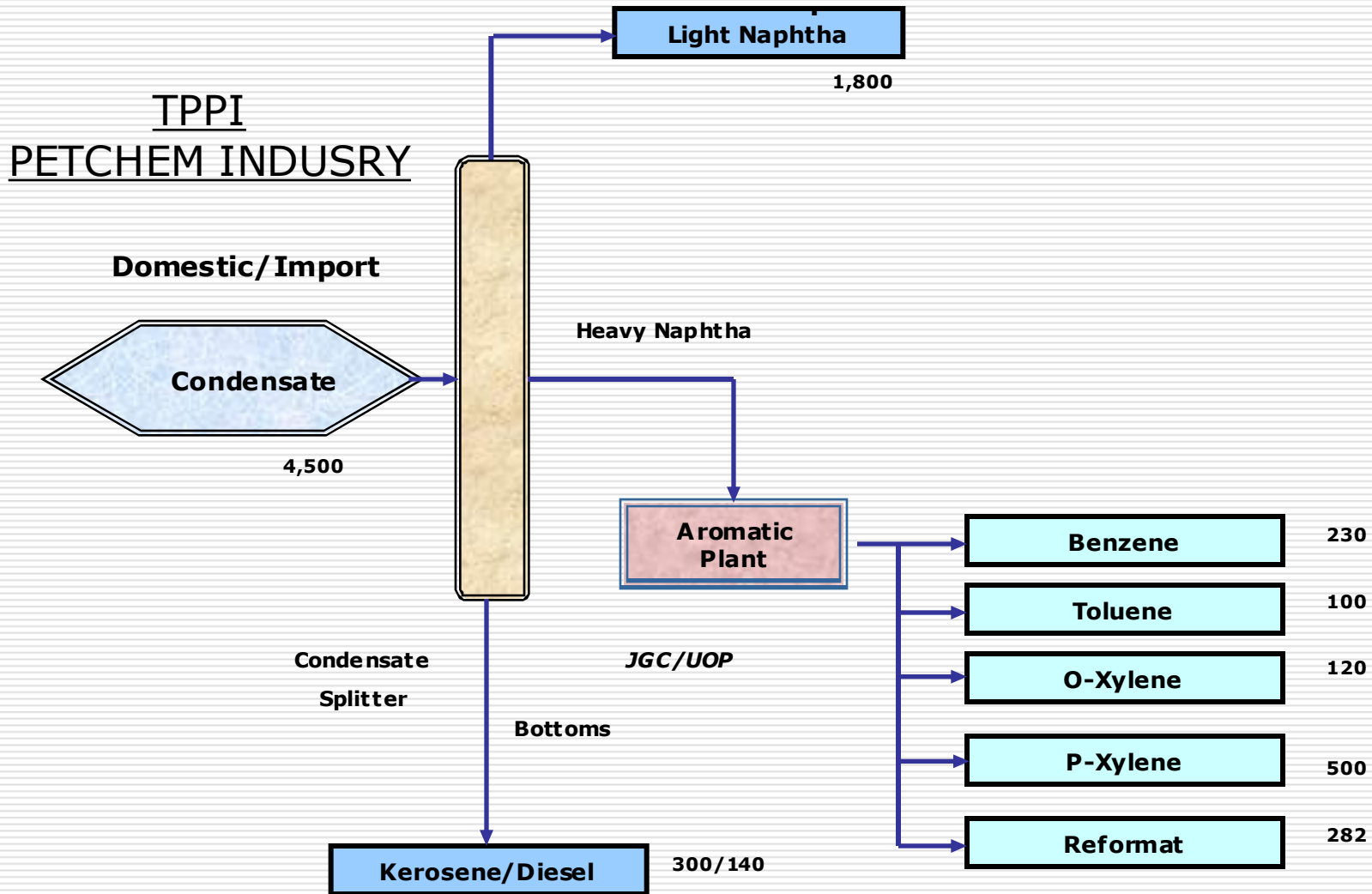
**CHANDRA ASRI
PETCHEM INDUSRY**



Source : Deperin, 2007

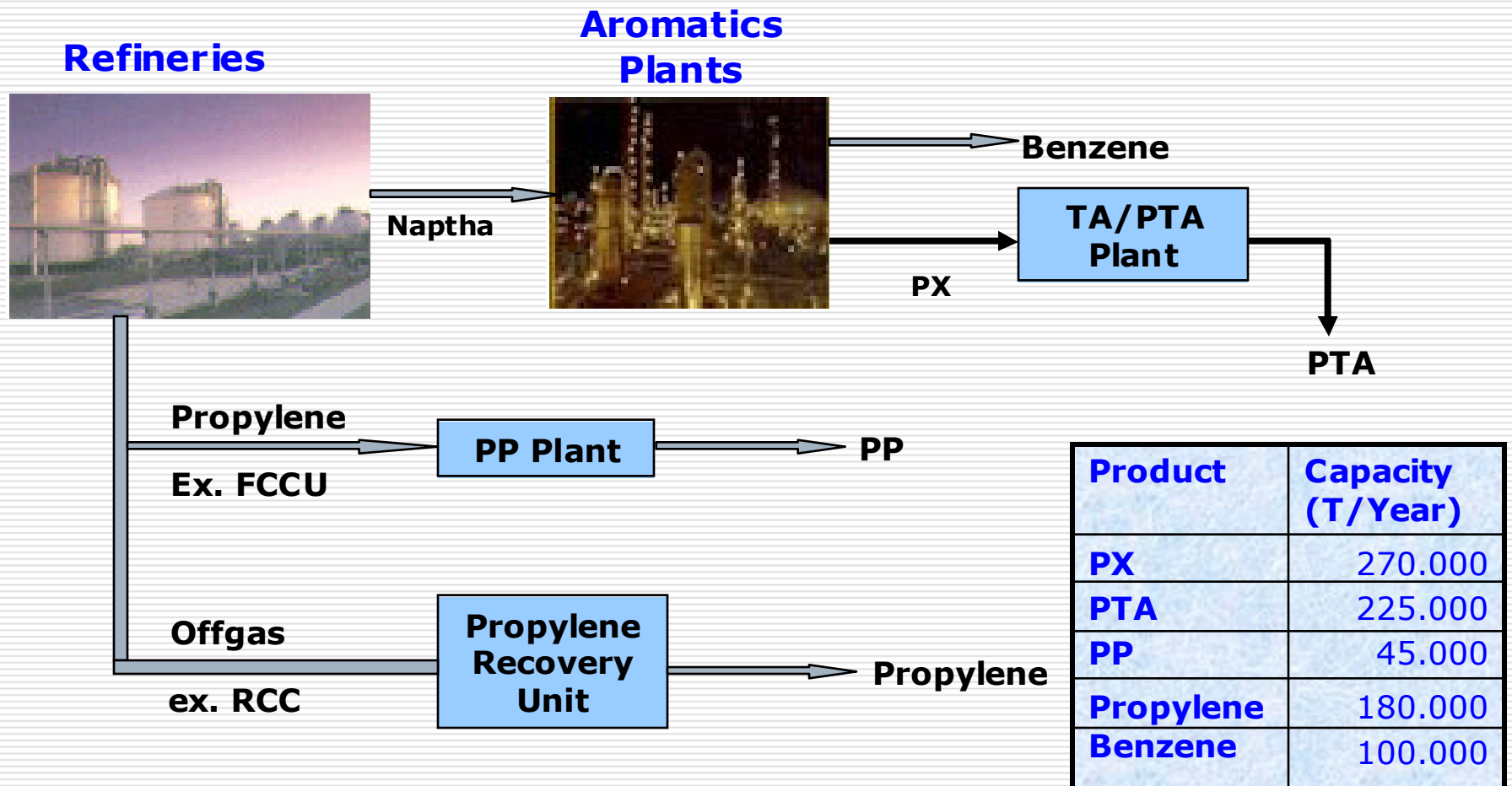
II.3 MAIN PETROCHEMICALS INDUSTRY PROFILE IN INDONESIA (continued)

(Unit : 1,000 t/y) (As of end 2006)



Source : Deperin, 2007

II. 3 MAIN PETROCHEMICALS INDUSTRY PROFILE IN INDONESIA (continued)



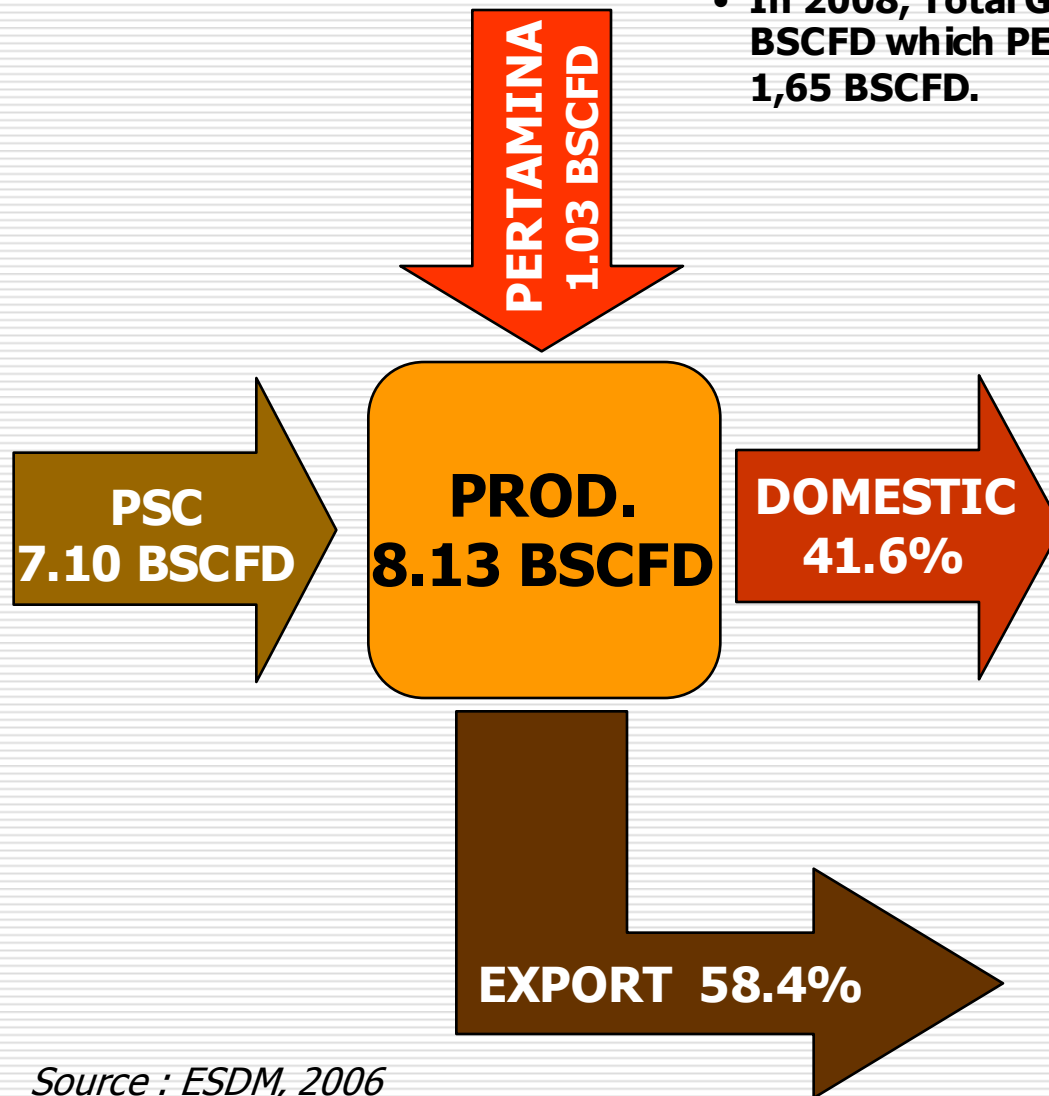
PERTAMINA'S PETROCHEM INDUSTRIES

Source : PTM, 2007

II.4. Domestic Petchem Feedstocks Balance

Case : Gas Balance, in 2005

- Main Gas consumption as feed of LNG Plants
- In 2008, Total Gas Production will be around 9,15 BSCFD which PERTAMINA Production is expected = 1,65 BSCFD.

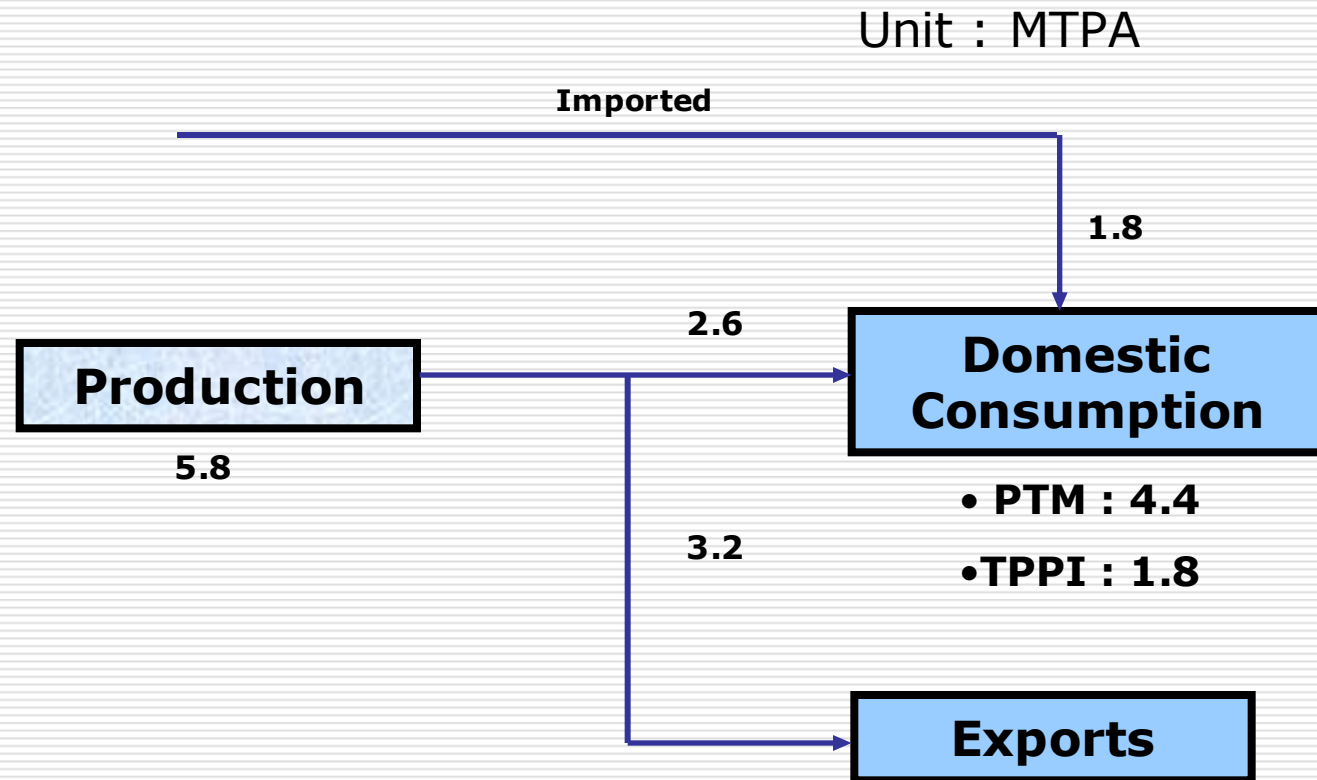


| CONSUMPTION | (%) |
|--------------------------|-------------|
| FERTILIZER/PETROCHEMICAL | 7.3 |
| REFINERY | 0.5 |
| L P G | 0.9 |
| PGN | 7.69 |
| PLN / ELECTRICITY | 5.4 |
| STEEL INDUSTRY | 0.0 |
| OTHER INDUSTRIES | 5.8 |
| OWN USE | 10.4 |
| LOST / FLARE | 3.7 |
| TOTAL | 41.6 |

| | |
|--------------|-------------|
| L N G | 47.2 |
| L P G | 3.7 |
| GAS PIPELINE | 7.5 |
| TOTAL | 58.4 |

Source : ESDM, 2006

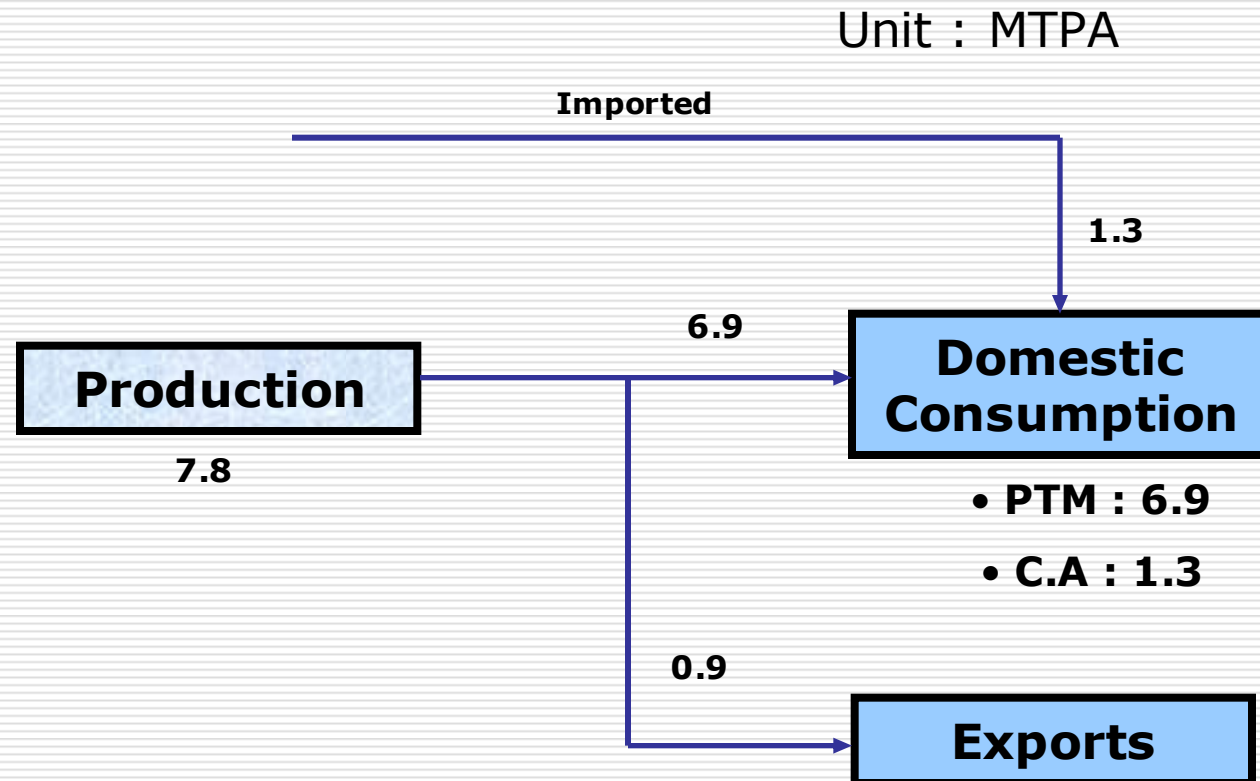
II.4. Domestic Petchem Feedstocks Balance Case : Condensate Gas Balance, in 2006



PTM : PERTAMINA
TPPI : TRANS PACIFIC PETROCHEMICALS IND.

Source : Deperin, 2007

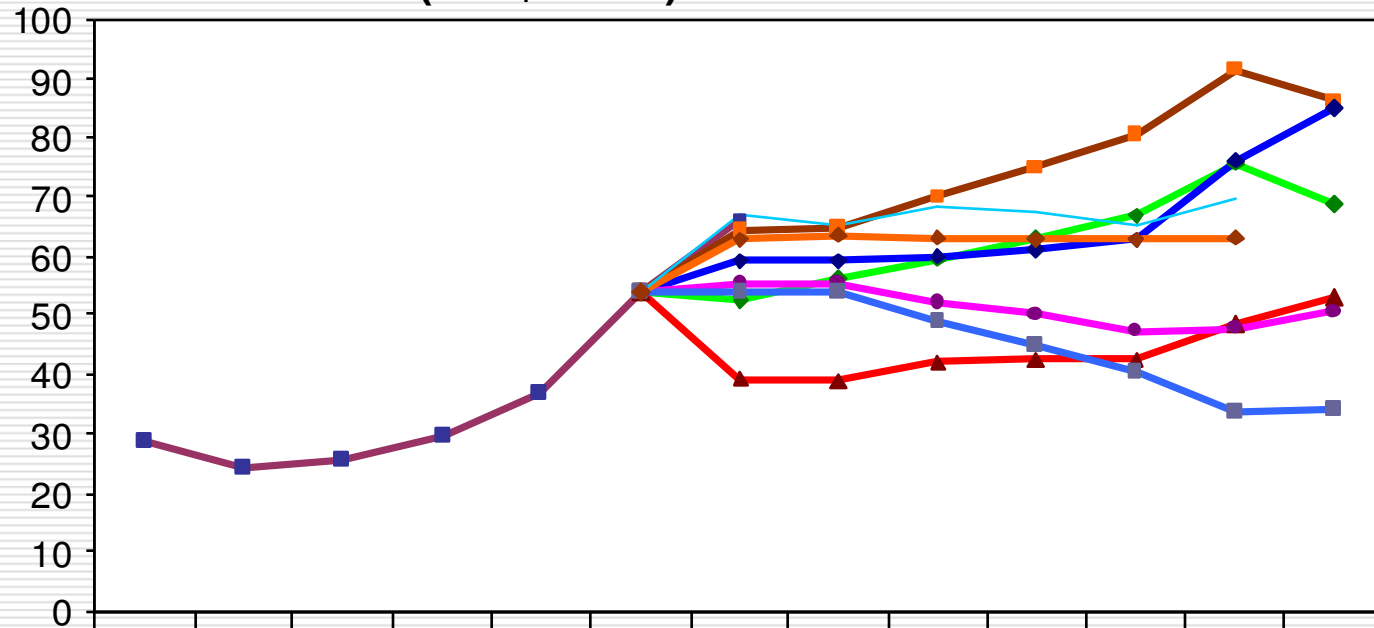
II.4. Domestic Petchem Feedstocks Balance Case : Naphtha Balance, in 2005



Source : Deperin, 2007

PT.PERTAMINA
CA : CHANDTA ASRI PETROCHEM INDUSTRY

II.5 OIL PRICE PREDICTION BY SOME INSTITUTIONS (US \$ / bbl)



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2015 | 2020 |
|-----------------------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Actual Price | 28.74 | 24.11 | 25.6 | 29.52 | 36.85 | 54.01 | 65.80 | | | | | | |
| FACTS, High Price | | | | | | 54.01 | 64.50 | 64.75 | 69.90 | 74.95 | 80.40 | 91.65 | 86.40 |
| FACTS, Base Price | | | | | | 54.01 | 52.68 | 56.13 | 59.69 | 63.08 | 66.68 | 75.61 | 68.99 |
| FACTS, Low Price | | | | | | 54.01 | 39.30 | 39.00 | 42.20 | 42.40 | 42.65 | 48.70 | 53.00 |
| EIA, High Price, WTI | | | | | | 54.01 | 59.10 | 59.26 | 59.87 | 61.12 | 62.65 | 76.30 | 85.06 |
| EIA, Ref. Price, WTI | | | | | | 54.01 | 55.46 | 55.62 | 52.30 | 50.14 | 47.29 | 47.79 | 50.70 |
| EIA, Low Price, WTI | | | | | | 54.01 | 53.70 | 53.86 | 48.88 | 44.91 | 40.29 | 33.78 | 33.99 |
| PERTAMINA, Ref. Price | | | | | | 54.01 | 62.90 | 63.60 | 63.26 | 62.91 | 62.57 | 63.26 | |
| PERTAMINA, High Price | | | | | | 54.01 | 66.92 | 65.25 | 68.35 | 67.63 | 65.03 | 69.81 | |

Indonesia Crude Oil (SLC) Price will be in the range of 56 - 65 US/bbl (in 2007) as per FACTS Prediction

II. 6. LIMITATION OF GAS, NAPHTHA AND CONDENSATE SUPPLIED FOR DOMESTIC PETCHEM FEEDSTOCKS

A. GAS SUPPLIED AND PRICE :

- **Most of Natural Gas utilized as feed of LNG, LPG (58 %) and only 7,3 % for Petchem Feedstock .**
- **Different Gas Price for Fertilizer Plant (Government Subsidy) and Petrochemical Plants)**
- **High World Oil and Gas Price and it's impact to Feedstock distribution**

B. CONDENSATE SUPPLIED.

Mainly Condensate Supplied by PSC's (Upstream Production Sharing Contractors) and mostly is exported . For Pertamina's production is own use.

C. NAPHTHA SUPPLIED.

Mainly Naphtha Supplied by PERTAMINA. Beside own use , it is also exported due to Project Financing Agreement (Product Swap to Lenders), so some Domestic Industries should import for their requirements.

III. OPTIMALIZATION OF NATIONAL PETCHEM FEEDSTOCKS (Solution required)

A. Domestic Petchem Feedstocks Optimalization :

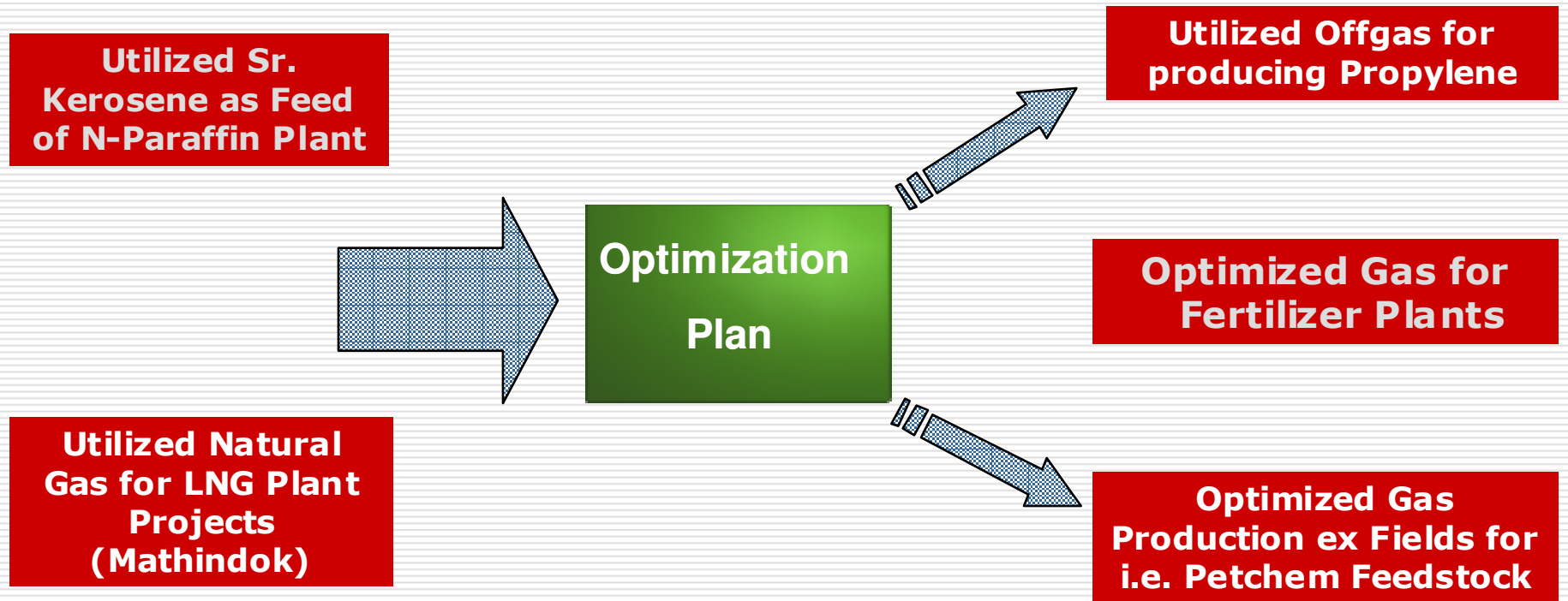
Optimize the utilization of Gas, Naphtha and Condensate ex Domestic Production for Fertilizer Plants, Olefin/Aromatic Plants, due to the facts that there is still huge export of Gas, Naphtha and Condensate but contrary it is also still high quantity imported of naphtha and Condensate for Domestic Petchem feedstock.

B. GAS PRICING POLICY FOR PETROCHEMICALS PLANTS.

Government to be have the same treatment for Gas Price Policy both utilized as Petchem Feedstock (Fertilizer Plants) and as fuel gas for Power Generation.

Source : PTM, 2006

IV. OPTIMALIZATION OF PERTAMINA'S PETCHEM FEEDSTOCKS FOR OPTIMAL RETURNED

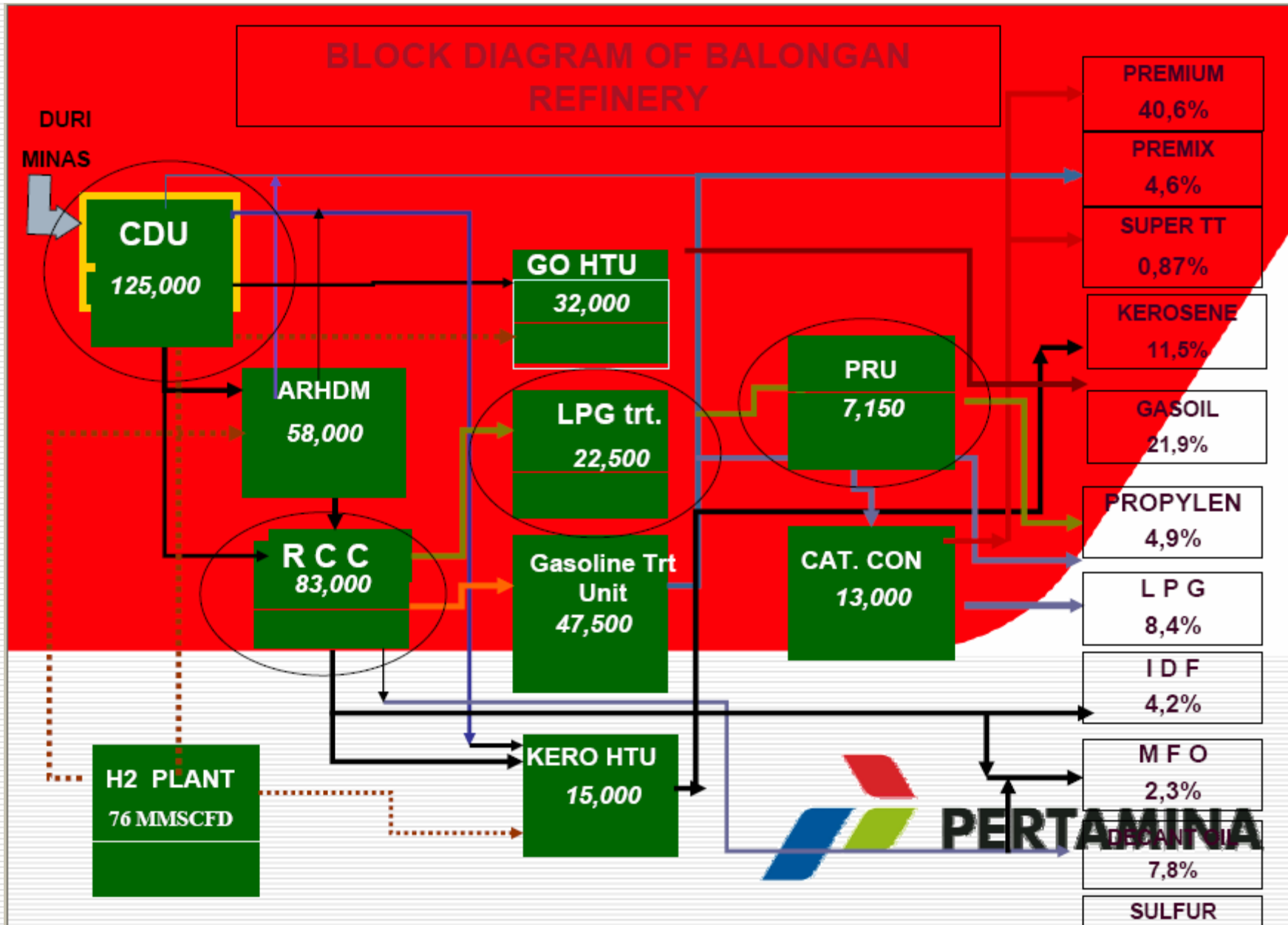


Source : PTM, 2006

IV. 1. Utilizing Off gas ex RCC for Propylene Production

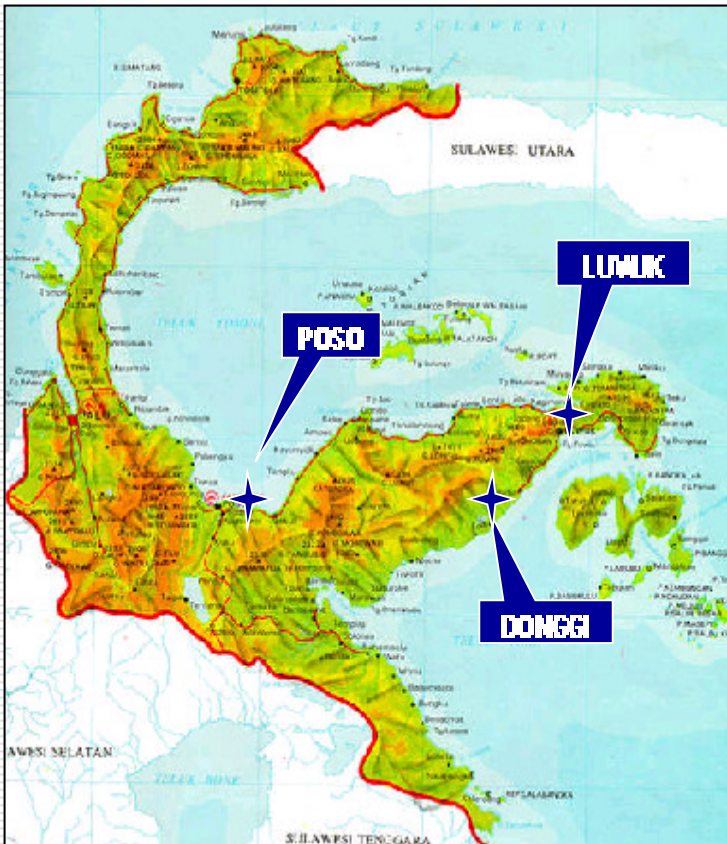
- **Off gas ex RCC utilized as feed for Propylene Recovery Unit for getting Propylene product.**
- **PRU should be modified Including Catalyst Cooler, Butane Column etc**

IV.1.a. Simplified Process Flow Diagram of Propylene Plants



IV. 2, Utilizing Natural Gas as feed of GTL or LNG Plant for Petrochemicals or LNG Production

Case : Mathindok Gas Reserves , Central Sulawesi



PLANNING FOR MATINDOK GTL PROJECT

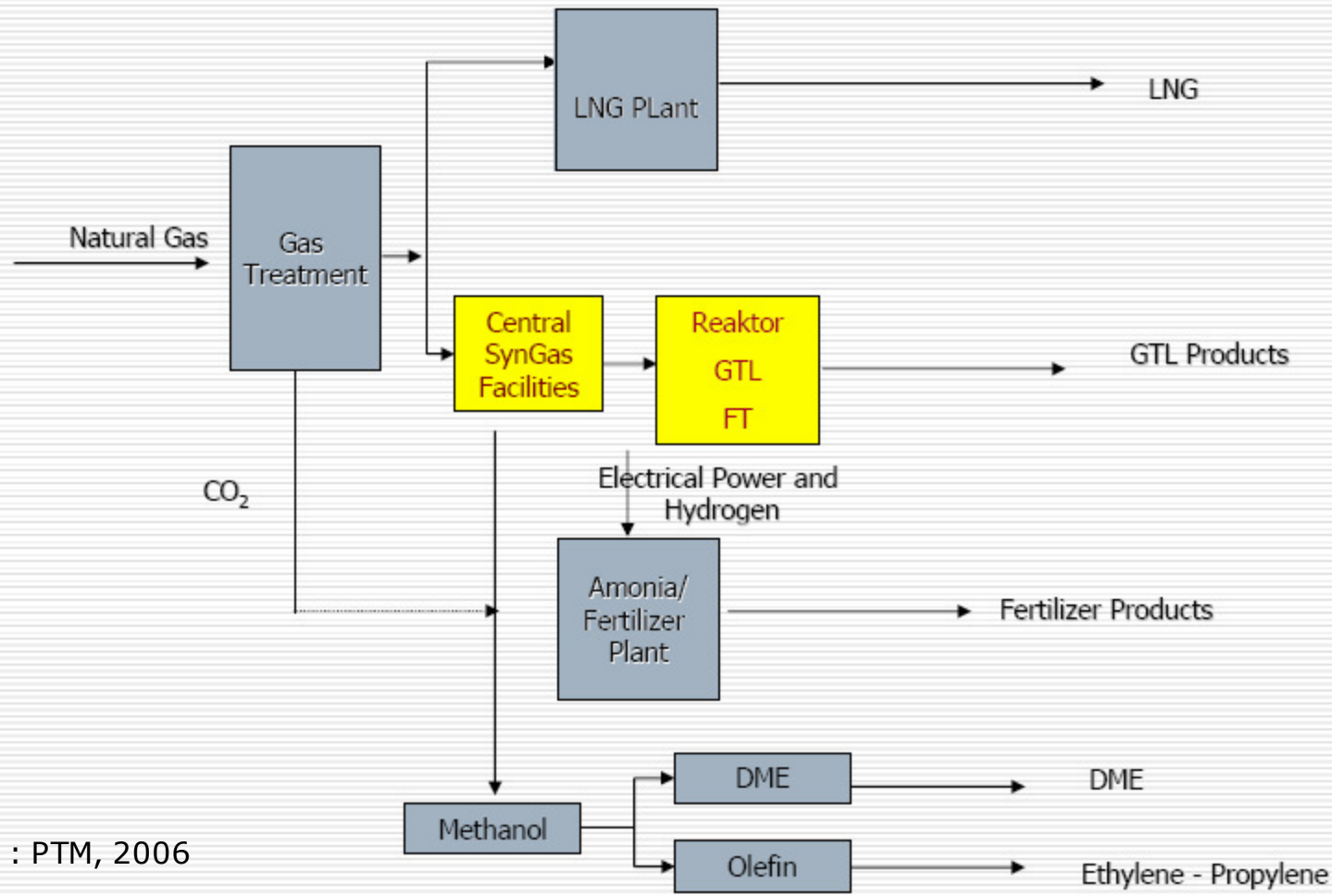
LOCATION : MATINDOK, SULAWESI



IV.2.a. GTL Mathindok Technology

GTL Matindok:

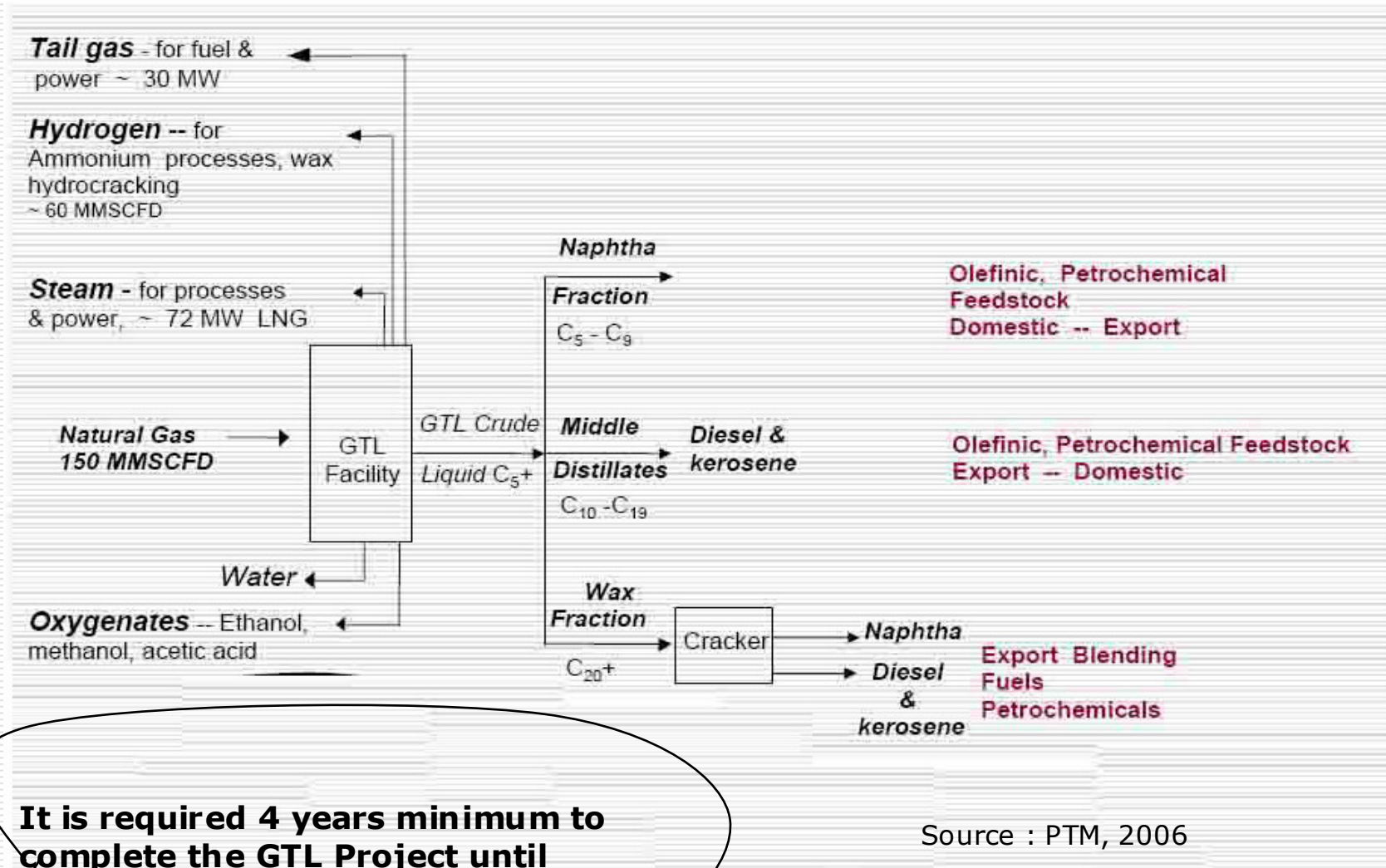
Technology Integration of gas Utilization



Source : PTM, 2006

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Matindok GTL Technology (Continued)

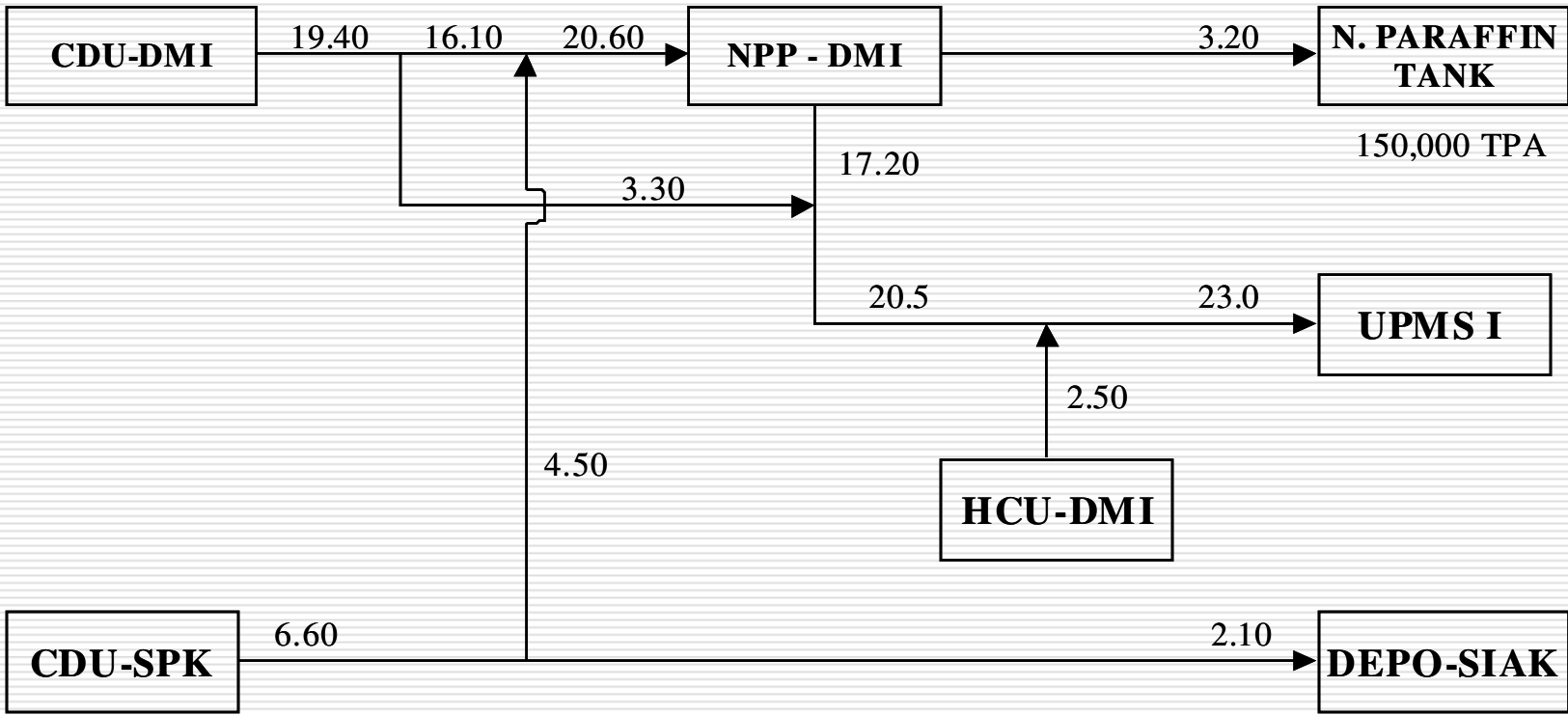


Source : PTM, 2006

It is required 4 years minimum to complete the GTL Project until commercial stage

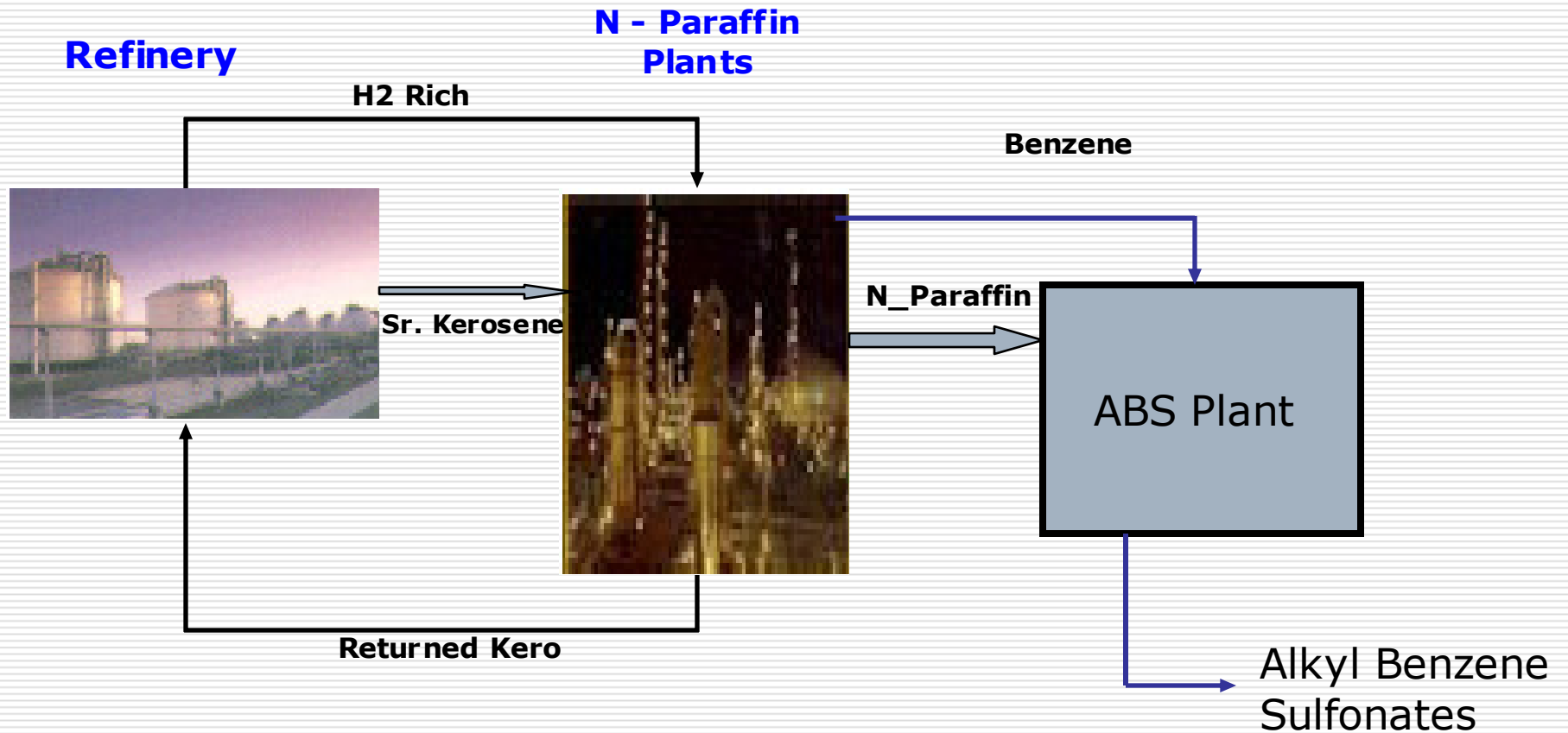
IV. 3. Utilizing Sr. Kerosene as feed of N-Paraffin Plant

RAW MATERIAL BALANCE (SR. KEROSENE)



Source : PTM, 2007

IV.3.a. ABS Process Flow Diagram (Benzene and N-Paraffin as feed)



Source : PTM, 2007

IV. 4. Optimizing Gas Production from new fields

| No | PROJECT | Location |
|----|--------------------------------------------------------|--------------------------------|
| 1 | South Sumatera Gas Development (just on production) | South Sumatera (300 MMSCFD) |
| 2 | Cepu Gas Development | Central & East Java |
| 3 | NGL Gas | Plaju, South Sumatera |

Projects are required for increasing gas supply for domestic market i.e Fertilizer Plants, City Gas and other industries.

Source : PTM, 2006

CONCLUSIONS

- There is potential for further development of the Petrochemicals Industry since Indonesia is a producer of feedstock and also there are various that can utilizes petrochemicals products.
- Condensate and Naphtha for Domestic Supply should be increased in order to match with the requirements, finally it will optimizing the petrochemicals industry
- Gas Pricing Policy for Petrochemicals Plants beside Fertilizer Plants to be reviewed that also considering the high world oil price and it's utilization for Petrochemicals Industry.
- Promoting of more effective for the utilization of Ethane rich gas resources both for LNG Plants, Public City Gas and as Petrochemicals Feedstock
- PERTAMINA also has and in progress to get an optimum return by optimalization of Gas, Naphtha and Condensate for Oil and Petrochemicals products.