

**NATURAL GAS AND NITROGEN FERTILIZER PRODUCTION  
IN INDONESIA  
(CURRENT SITUATION AND PROSPECTS)**

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*IFA Crossroad Asia – Pacific Conference  
Bali, 17 – 19 December 2007*

**CONTENTS**

1. Introduction
2. Vision & Mission of PT Pusri
3. Natural Gas Reserves in Indonesia
4. Supply Demand of of Natural Gas in Indonesia
5. Consumers of Natural Gas in Indonesia
6. Production System
7. Indonesia Fertilizer Plant Locations
8. Technology & Efficiency of Ammonia and Urea Plant
9. Ammonia / Urea Production
10. Contract Period of Natural Gas
11. Production Cost of Urea
12. Development of Urea Fertilizer
13. Obstacles Each Location of Urea Production v/s Gas Availability
14. Environmental Scanning
15. Internal Scrutiny
16. Projection of Urea Product by Considering NG Availability
17. Strategies
18. Conclusion

## INTRODUCTION

- ❑ Indonesia Fertilizer industry has been developing since 1959, beginning with PUSRI I Urea Plant, which commenced production in 1963.
- ❑ Now, PT Pupuk Sriwidjaja (PUSRI) Holding has 14 urea plants, 3 ammonium sulphate plants, 2 SP-36 plants and 1 NPK plant.
- ❑ Statistic Indicators in Indonesia 2006 is :
  - Total area of land Indonesia is 186 million Ha, and land use is only 60,8 million Ha (33%)
  - GNP 2000 – 2006 grew by 4.88%.
  - Population ± 230 million people (worker in agriculture sector ± 41.9 million)
  - Food Crops area is 22.5 million Ha (Paddy field is 7.7 million Ha) ~ (12% of Indonesia's land)
  - Plantation area is 19.5 million Ha (palm oil, rubber, tea, tobacco, coffee and chocolate) ~ (10.4% of Indonesia's land).
  - Area of plantation between 1995 – 2005 grew by 7.69% p.a.
  - Production of plantation between 1995 – 2005 grew by 8.96% p.a.
  - Urea fertilizer growth (1995 -2006) average is **-(0.06)** % p.a.

Source : Indonesian Statistic and Pusri Holding, 2007

3

## VISION & MISSION PT PUSRI

### VISION

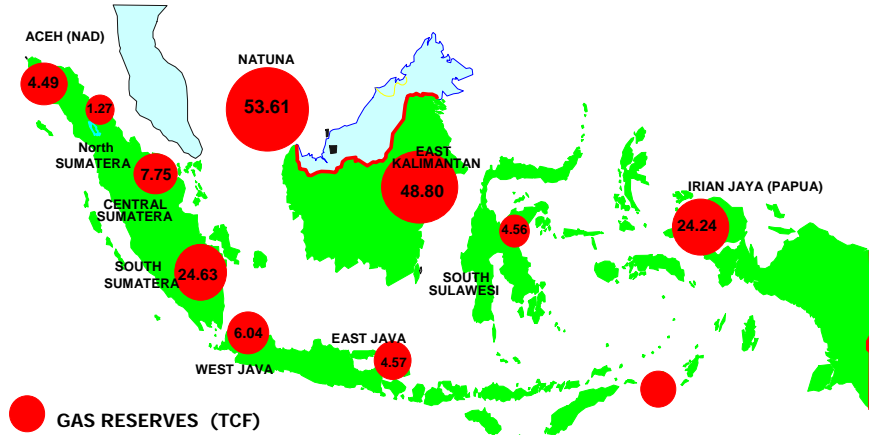
“To become a world - class company specialized in fertilizer and petrochemical industries as well as technical services through maximization of values for both company and customers satisfaction”

### MISSION

"To produce and market fertilizers in order to support national food endurance, to produce petrochemical products and technical services in national and global markets emphasizing on overall quality.”

4

## NATURAL GAS RESERVES IN INDONESIA



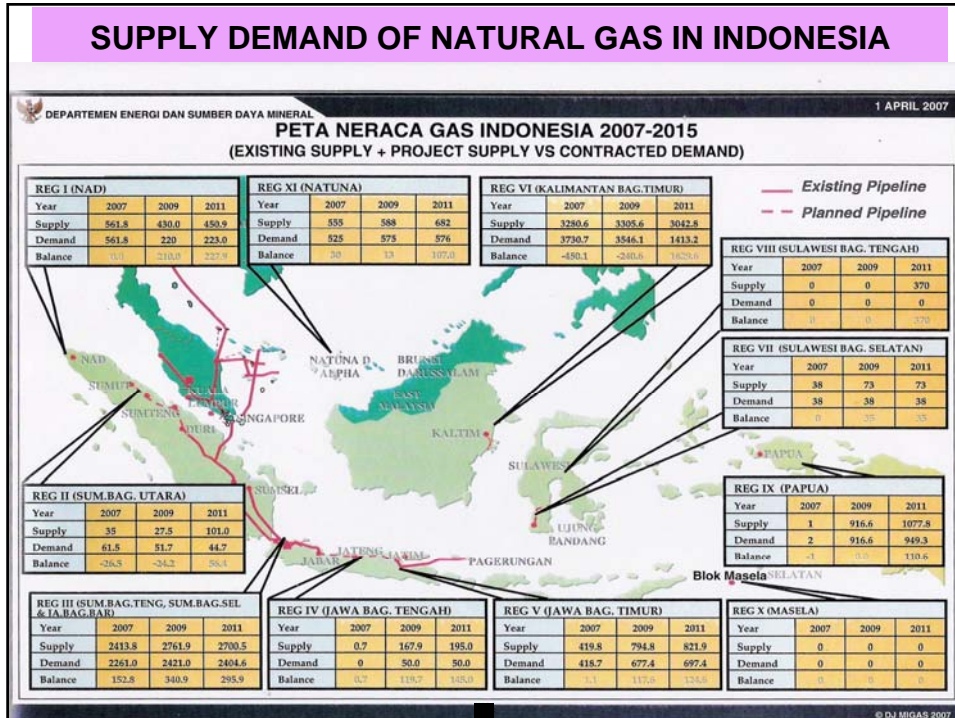
**PROVEN** = 97.26 TCF (1.5% WNG)  
**POTENTIAL** = 82.70 TCF  
**TOTAL** = 179.96 TCF

Note :  
 Total "World Natural Gas" (WNG) Proved Reserves = 6,348.1 TCF

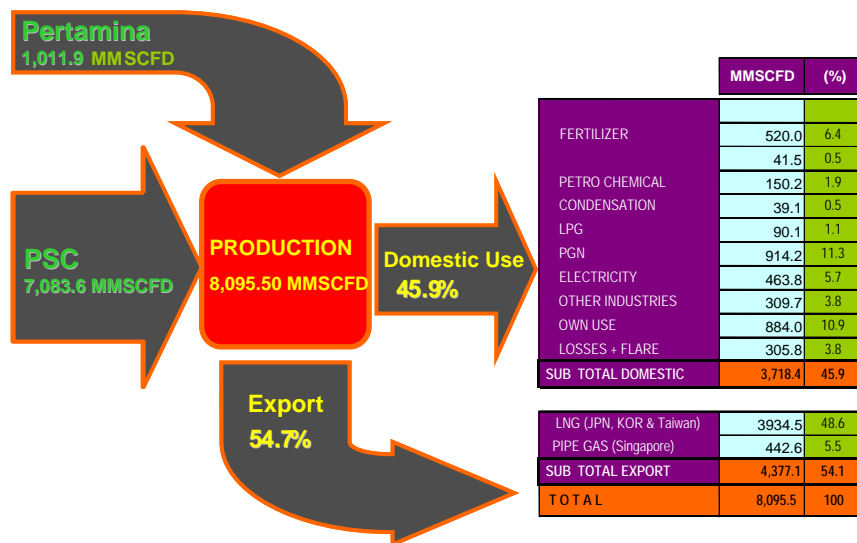
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Source : Min. of Energy and Natural Resources, 2006 & OPEC

## SUPPLY DEMAND OF NATURAL GAS IN INDONESIA



## CONSUMERS OF NATURAL GAS IN INDONESIA (2006)



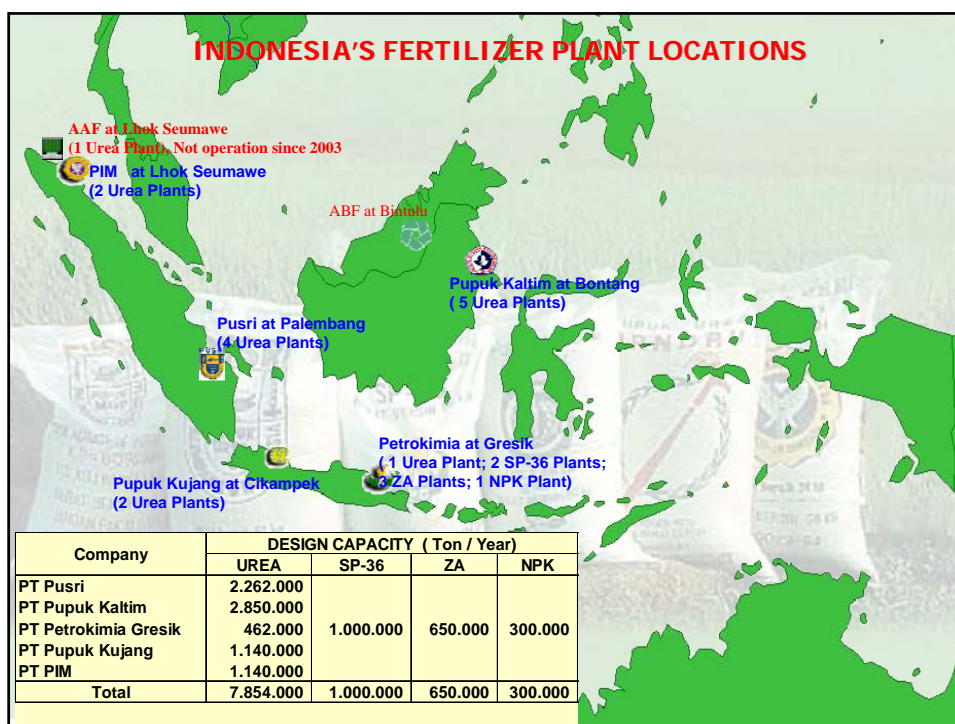
Source : Min. of Energy and Natural Resources

7

## PRODUCTION SYSTEM

- Fertilizer production, mainly Nitrogen fertilizer production is based on Ammonia (NH<sub>3</sub>).
- The source of raw material and utilities are natural gas which are reacted with water and air at high pressure & high temperature.
- Location of plant is usually based on proximity to raw material sources.
- Plant is constructed progressively in tandem with domestic demand growth.

8

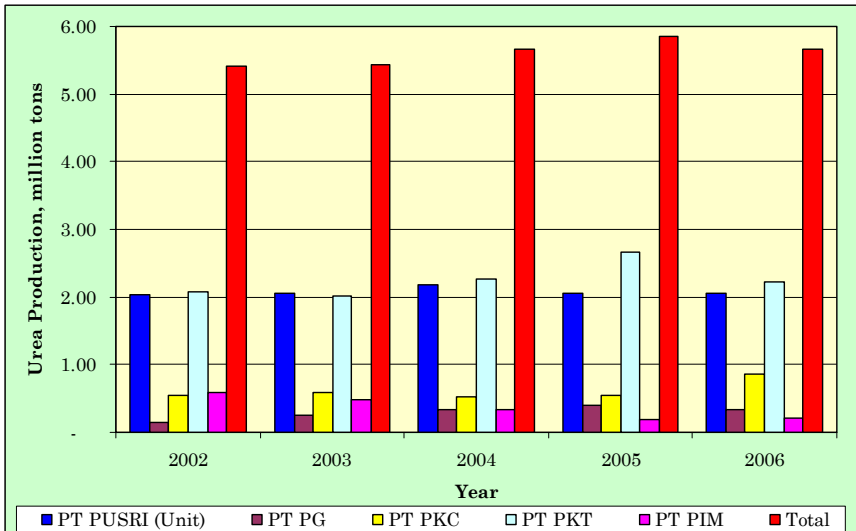


### TECHNOLOGY & EFFICIENCY OF AMMONIA AND UREA PLANT

Established	PLANT	Start of Operation	Urea Capacity (T/Y)	Technology (Process Licensor)		Natural Gas Consumption (MMBTU/ton)-Actual *)	
				Ammonia	Urea	Ammonia	Urea
<b>1959</b>	<b>PT Pusri</b>						
	PUSRI II	1974	552,000	Kellogg	TEC	44.92	33.51
	PUSRI III	1976	570,000	Kellogg	TEC	41.90	33.51
	PUSRI IV	1977	570,000	Kellogg	TEC	41.30	34.21
	PUSRI IB	1993	570,000	Kellogg	TEC Aces	35.10	29.84
<b>1972</b>	<b>PT Petrokimia G.</b>						
	Amm. & Urea Plant	1995	462,000	Kellogg	TEC Aces	31.37	26.00
<b>1975</b>	<b>PT Pupuk Kujang</b>		586,000				
	Kujang I	1979	586,000	Kellogg	TEC	41.39	33.91
	Kujang 1B	2005	570,000	Kellogg	TEC Aces 21		27.00
<b>1977</b>	<b>PT Pupuk Kaltim</b>						
	Kaltim 1	1984	700,000	Lurgi	Stamicarbon	40.50	37.65
	Kaltim 2	1985	570,000	Kellogg	Stamicarbon	39.20	29.16
	Kaltim 3	1989	570,000	Chiyoda/Haldor Topsoe A/S	Chiyoda / Stamicarbon	32.73	25.37
	Popka	1999	570,000	--	Chiyoda / Stamicarbon	-	28.96
	Kaltim 4	2002	570,000	MHI/Haldor Topsoe A/S	Snamprogetti SpA / Hydroagri	31.00	29.00
<b>1982</b>	<b>PT PIM</b>						
	PIM -1	1984	600,000	Kellogg	TEC	42.00	36.14
	PIM-2	2005	570,000	Kellogg	TEC Aces	32.00	28.00

\*) Average last 5 year

## UREA PRODUCTION (2002 – 2006)



11

## CONTRACT PERIOD OF NATURAL GAS

PLANT	VOLUME (MMSCFD)	CONTRACT PERIOD														CONTRACT PRICE (USD/MMBTU)		
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		2021	2022
<b>PT PUSRI*</b>																		
- PUSRI II	43,50	[New Contract]														2,30		
- PUSRI III	61,50	[New Contract]														2,30		
- PUSRI IV	61,50	[New Contract]														2,30		
- PUSRI B	55,00	[New Contract]														2,30		
<b>SUB TOTAL</b>	<b>221,50</b>																	
<b>PT PUPUK KALTIM</b>																		
- KALTIM 1	82,19	[Existing Contract]														Formula (2.40 – 3.25) Formula (2.40 – 3.25) >4.0, Formula Formula (2.26 – 3.23)		
- KALTIM 2	90,41	[Existing Contract]																
- KALTIM 3	55,00	[Plan]																
- KALTIM 4	49,73	[Existing Contract]																
<b>SUB TOTAL</b>	<b>277,33</b>																	
<b>PT PUPUK KUJANG</b>																		
- KUJANG-1	60,00	[New Contract]														3,63		
- KUJANG-IB	48,00	[Existing Contract]														2,55		
<b>SUB TOTAL</b>	<b>108,00</b>																	
<b>PT PETROKIMIA GRESIK</b>																		
- PIM-1 & PIM-2	60,00	[Existing Contract]														2,00		
<b>SUB TOTAL</b>	<b>60,00</b>																	
<b>PT PIM</b>																		
- PIM-1 & PIM-2	50,00	[Plan]														±3,50		
<b>SUB TOTAL</b>	<b>50,00</b>																	

\* New Contract PT Pusri for Jan 2008 - 2012 priced USD 3.30/MMBTU with escalation 2.5% per year

— Existing contract  
 — New contract  
 ··· Plan

12

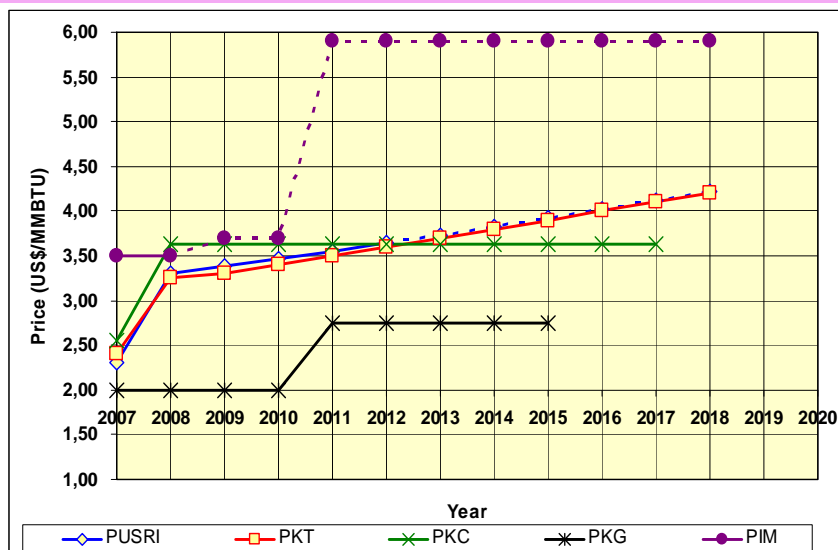
## NATURAL GAS CONSUMPTION (2007)

COMPANY	DEMAND (MMSCFD)	AVAILABLE (MMSCFD)
PT PUSRI	221.5	221.5
PT PUPUK KALTIM	277.33	240.0
PT PETROKIMIA GRESIK	60.0	50.0
PT PUPUK KUJANG	108.0	92.0
PT PUPUK ISKANDAR MUDA	110.0	50.0 *)
<b>TOTAL</b>	<b>776.83</b>	<b>653.5</b>

\*) Only for 3 month / year, since 2006 by Swap gas for PKT, compensate by LNG for PIM

13

## TREND OF NATURAL GAS PRICE (CONTRACTUAL) FOR INDONESIAN FERTILIZER



14

## PRODUCTION COST OF UREA

- Natural gas price contribution for production cost is very significant.
- Urea Plant has to compete with other natural gas consumers.
- If operation expenditures (opex) is US\$ 40/Ton and capital expenditures (capex) for new technology plant's is US\$ 50/Ton and for old technology plant's is US\$ 20 / Ton, the variation of production cost are shown in the table.

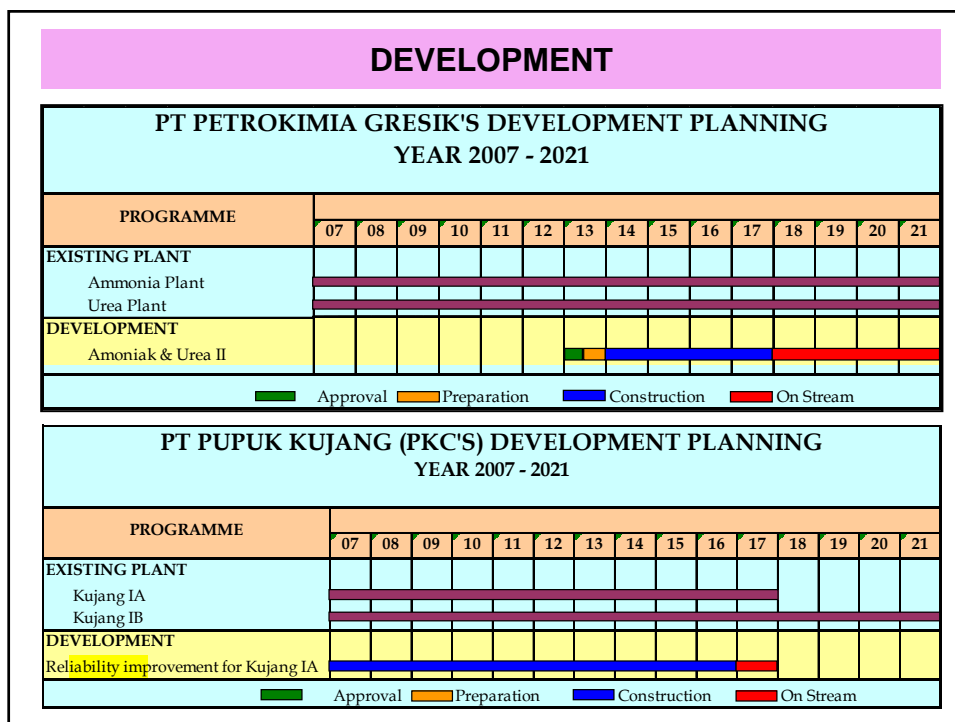
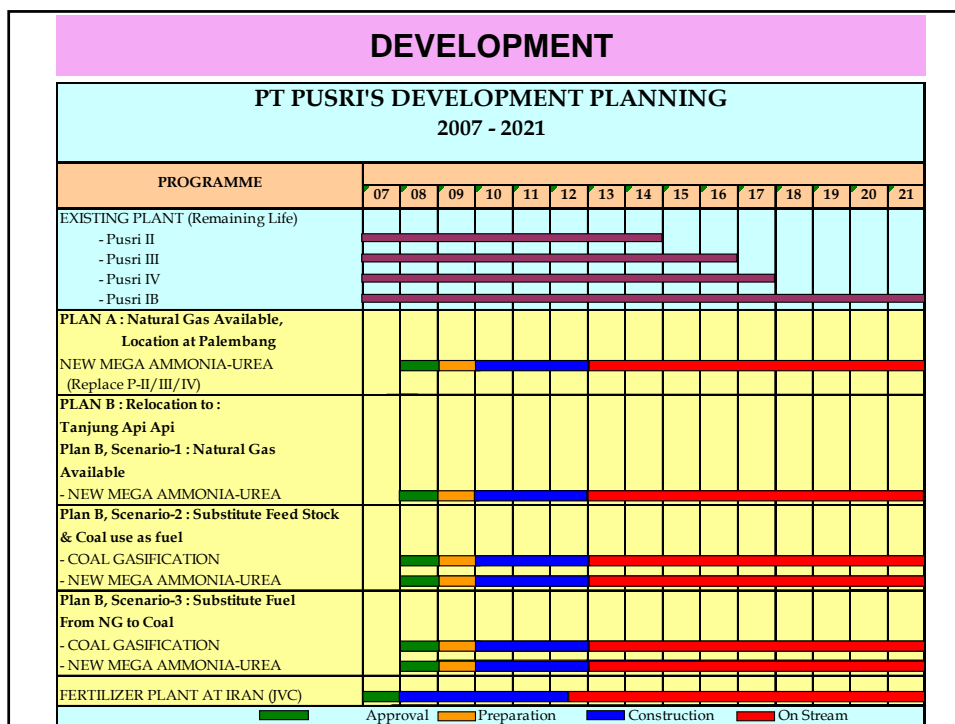
Natural Gas Price (\$/MMBTU)	Production Cost (US\$/Ton)	
	New Technology	Old Technology
2.0	140	130
3.0	165	165
4.0	190	200
5.0	215	235
6.0	240	270
7.0	265	305
8.0	290	340

15

## CASH COST FOR UREA PRODUCTION (PROJECTION 2008)

	PUSRI	PKG	PKC	PKT	PIM
Natural Gas (US\$ / MMBTU)	3.30	2.00	3.63	3.25	3.50
Natural Gas Cost (US\$ / ton Urea)	109.6	52.0	113.9	97.3	136.7
Other's Cost (US\$ / ton)	40.3	83.6	44.6	66.0	100.4
Cash Cost (US\$ / ton Urea)	<b>149.9</b>	<b>135.6</b>	<b>158.5</b>	<b>163.3</b>	<b>237.1</b>

16



## DEVELOPMENT

PT PUPUK KALIMANTAN TIMUR DEVELOPMENT PLANNING 2007- 2021																
NO.	PROGRAMME	YEAR														
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>EXISTING PLANT</b>																
1	Kaltim 1															
2	Kaltim 2															
3	Kaltim 3															
4	POPKA															
5	Kaltim 4															
<b>OPTIMIZATION</b>																
1	Kaltim 2															
2	Kaltim 3															
<b>REPLACEMENT</b>																
1	Kaltim 1 → Kaltim 1-B Integrated (based NG-Coal)															
	- Ammonia Plant + Gasification Plant (1800 mtpd)															
	- Urea Plant (2125 mtpd)															
2	Kaltim 2 → Kaltim 2-B (based on batubara) (NH3 2000mtpd, Urea 1725 mtpd)															
<b>DEVELOPMENT</b>																
1	Kaltim 5 (Based on NG-COAL) (NH3 3000mtpd, Urea 3500 mtpd)															
2	Urea Slow Release															

19

## DEVELOPMENT

PT PUPUK ISKANDAR MUDA (PIM'S) DEVELOPMENT PLANNING YEAR 2007 - 2021																
PROGRAMME	YEAR															
	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	
<b>EXISTING PLANT</b>																
PIM-1																
PIM-2																
<b>DEVELOPMENT</b>																
Coal Gasification for PIM 1 & PIM2																

20

## OBSTACLES OF UREA PRODUCTION VS GAS AVAILABILITY

- Lhokseumawe NAD,  
Available NG for LNG Plant. No gas available for Fertilizer. The only gas available from Block A with limited resource and high gas price. To going concern coal gasification after 2013 should be considered.
- Palembang South Sumatera,  
Gas is available, but problem is purchasing power.
- Cikampek West Java,  
Limited resource of NG with high gas price.
- Bontang East Kalimantan,  
Gas resource mostly dedicated for LNG, no further allocation for Fertilizer Plant.
- Gresik, East Java,  
Limited resource of NG with high price.
- Tangguh, Papua,  
Gas mostly dedicated for LNG (for export), not feasible for urea fertilizer.
- Senoro, Central Celebes,  
Gas mostly dedicated for mini LNG (for export), not feasible for urea fertilizer.

## ENVIRONMENTAL SCANNING

External analysis Indonesia's Fertilizer company :

### **Threats :**

1. Natural gas price is increasing very fast following the rising energy price trend, resulting in significant production cost increase.
2. Plants are located near residential area. The Industries could be source of pollution.
3. The company does not have enough equity to develop new business.

### **Opportunities :**

1. Urea's domestic market demand and international market growth.
2. Demand growth in India, ASEAN and Pacific Countries.
3. Plant relocation from rich countries to countries rich with natural gas resource.
4. Coal gasification and availability coal bed methane as feed stocks.

## INTERNAL SCRUTINY

Internal analysis of Indonesia's fertilizer company

**Weaknesses :**

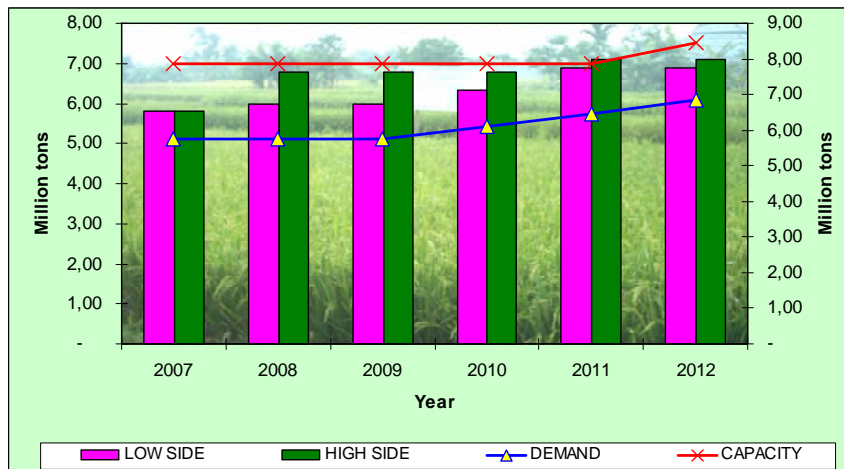
1. Old technology plant .
2. Aging population of human resources.
3. Fat and big organization structure.
4. Part of business system is obsolete.

**Strengths :**

1. Design capacity of urea plant is 7.84 million tons per year, with good in performance.
2. Experience in the production and distribution of urea in domestic and international markets since 1960.

23

## PROJECTION OF UREA PRODUCT BY CONSIDERING NG AVAILABILITY (2007 – 2012)



24

## STRATEGIES

### SHORT TERM:

1. Maintain and increase reliability to achieve the name plate capacity of the plants.
2. Inspect and conduct plant audit to establish a proper preventive maintenance schedule.
3. Improve plant efficiency to get energy saving
4. Optimizing the plant resource to find optimal solution.
5. Using coal to produce power, steam and utility.
6. Keep the waste level on standard to maintain relationship with the community.
7. Strengthen R & D, as well as learning and application of coal technology / coal gasification.
8. Plan to global and rational use of resources.

### MEDIUM TERM :

Establishment of Urea fertilizer business through alliance with The Iranian Company (NPCI). With the development of urea plant in Iran, natural gas prices at US\$ 1+(plus)/MMBTU under a 25-year contract.

### LONG TERM :

Backward Integration, Industry will get "mining concession" of Coal and Coal Bed Methane (CBM) in domestic.

25

## CONCLUSION

- As agriculture country will consume huge of fertilizer.(70-75)% of Urea Fertilizer is necessary to maintain rice production of the country.
- The Natural gas price in Indonesia is based on economic mechanism for each location of the gas as a consequence fertilizer industry has low purchasing power compare to other consumers because fertilizer for domestic market is sold base on subsidy.
- To build new fertilizer plants, long term contract of feed stocks (natural gas and coal) is required as a prerequisite.
- Maintain the existing plants is a must as long as the production cost can compete with the new plants. It can be done by good equipment replacement program or revamping project.
- Go global to find natural gas sources with abundant reserves and reasonable price and make alliance with natural gas products.

26

**THANK YOU**

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