



# “Out line of MIGAS and overview of Gas in Indonesia”

**Presented on:**  
**Program Formulation Course**  
**Meeting on JCCP HRD & Technical Cooperation Program For MIGAS**

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**Republic of Indonesia**

**JCCP Course Program**  
**Japan, July 23 – August 1, 2018**



# VISION AND MISSION

## DIRECTORATE GENERAL OF OIL AND GAS



**VISION**

Being a policy and regulation creator which is competence and also being a good service executor in industrial Oil and Gas area



# VISION AND MISSION

## DIRECTORATE GENERAL OF OIL AND GAS



### MISSION

- Improve the interest, human resource integrity and professionalism
- Improve the coordination and togetherness
- Create conducive environmental and good image
- Produce a policy and regulation appropriately and precisely prima service and also good services in industrial Oil & Gas area



# DUTY AND FUNCTION

## DIRECTORATE GENERAL OF OIL AND GAS

### THE DUTY

Directorate General Oil and Gas has duties to formulate and implement technical standardization and policy in Oil and Gas sector

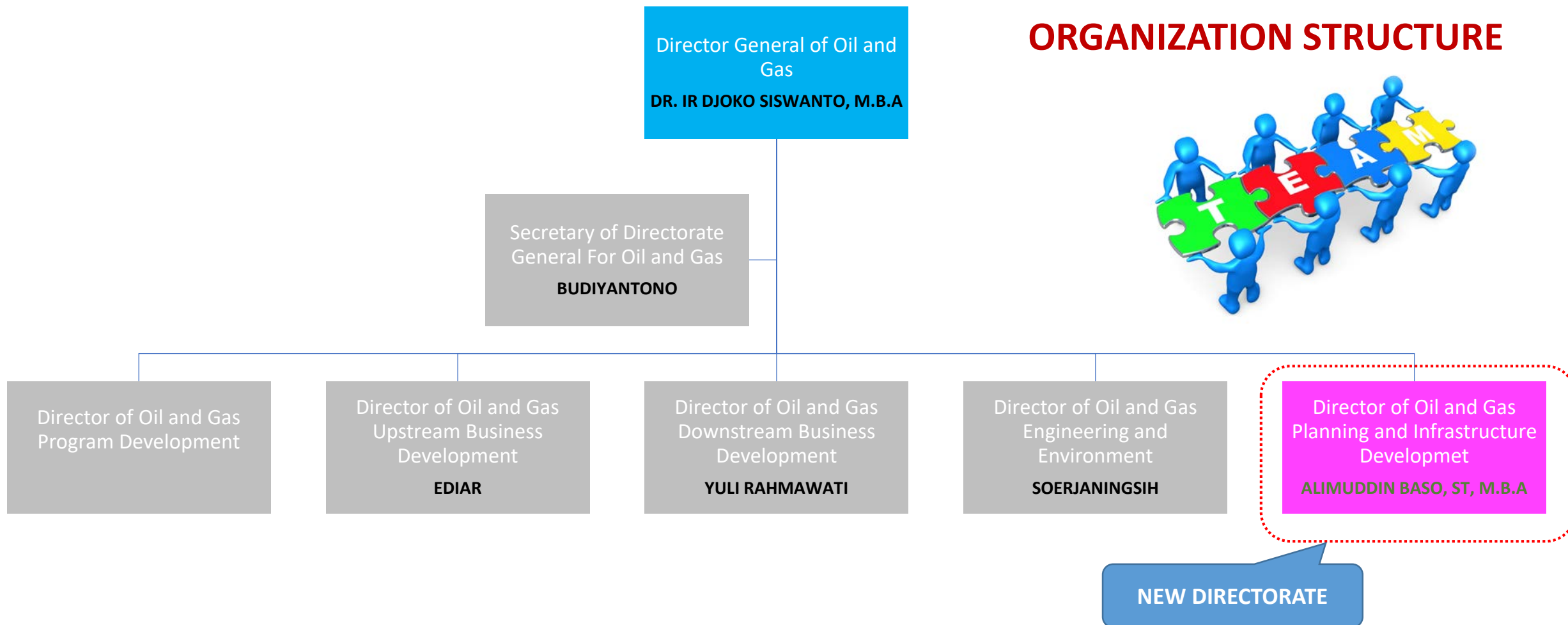
### THE FUNCTION

- Preparation of policy formula Department in Oil and Gas sector.
- Implementation of policy in Oil and Gas sector.
- Compilation of standard, norm, guidance, criterion, and procedure in oil and gas sector.
- Giving of technical tuition and evaluation.
- Implementation administration of Directorate General Oil and Gas



# DIRECTORATE GENERAL OF OIL AND GAS

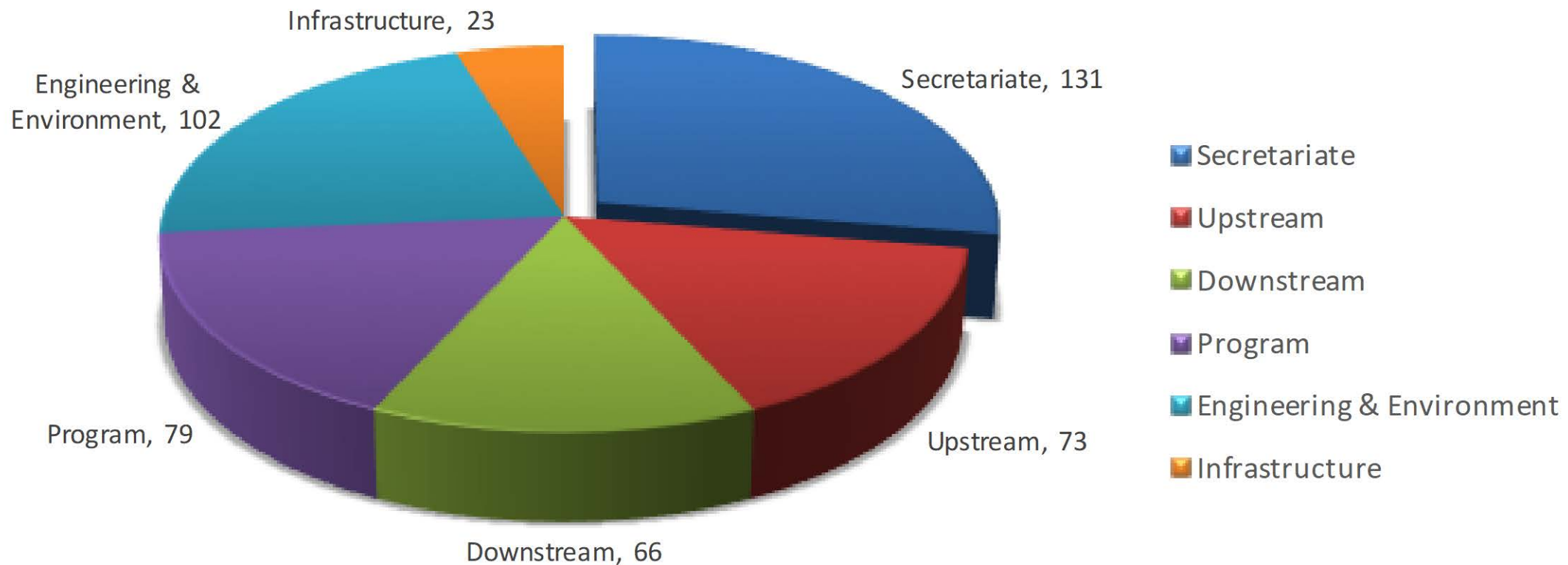
## ORGANIZATION STRUCTURE



# GENERAL OVERVIEW OF HUMAN RESOURCE

## DIRECTORATE GENERAL OF OIL AND GAS

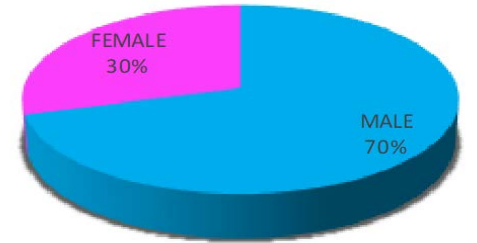
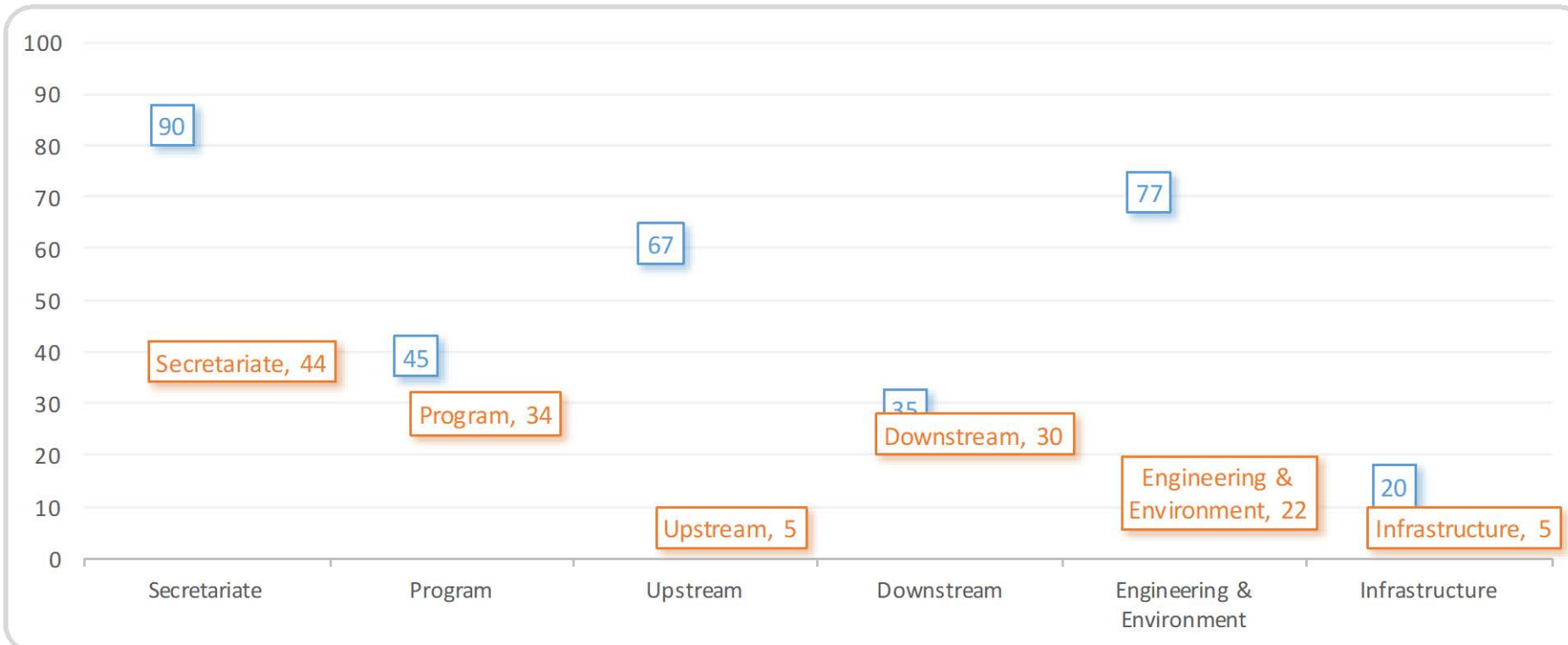
UNIT



# GENERAL OVERVIEW OF HUMAN RESOURCE

## DIRECTORATE GENERAL OF OIL AND GAS

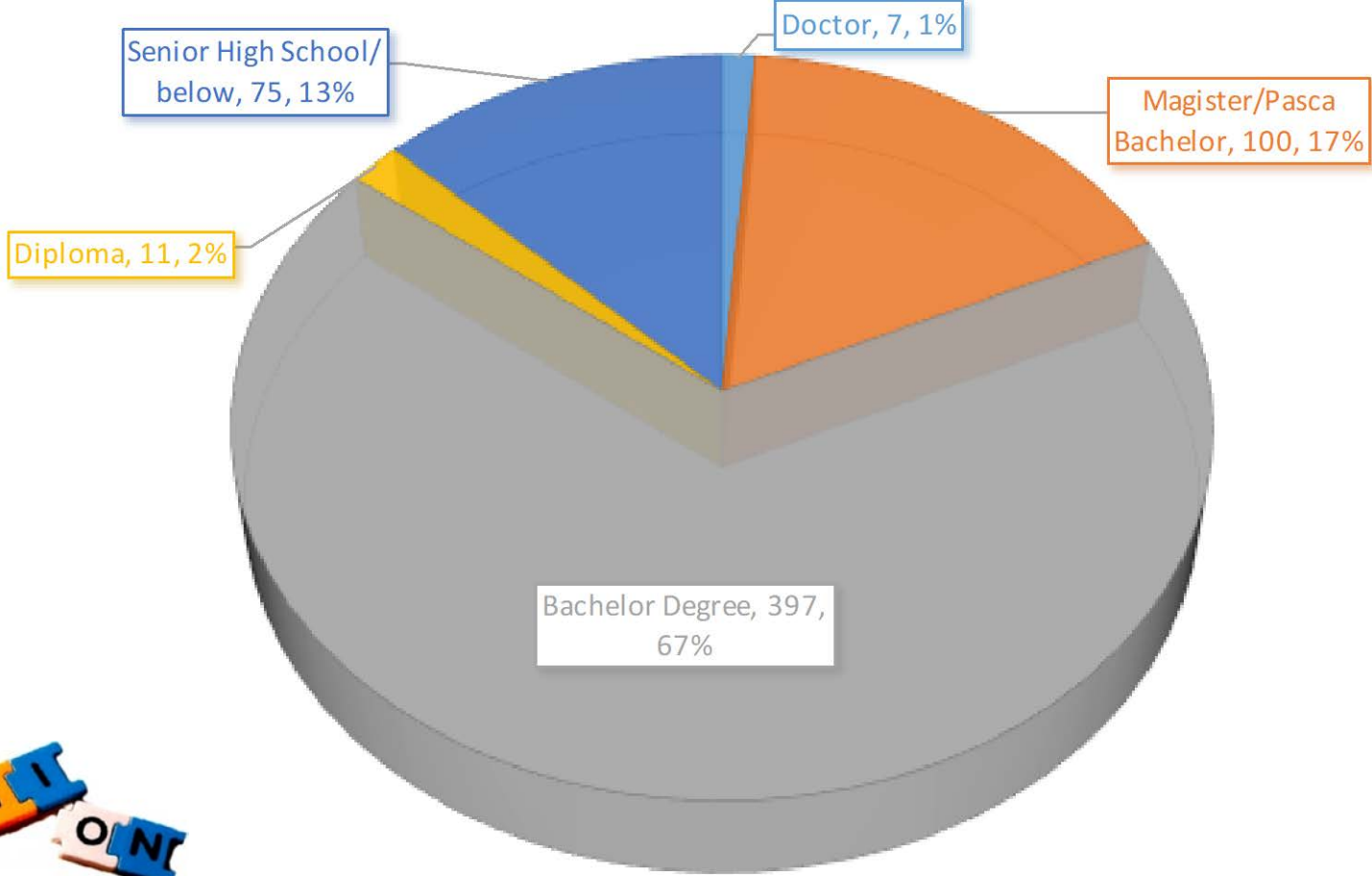
### SEX



# GENERAL OVERVIEW OF HUMAN RESOURCE

## DIRECTORATE GENERAL OF OIL AND GAS

### EDUCATION





# EDUCATION BACKGROUND



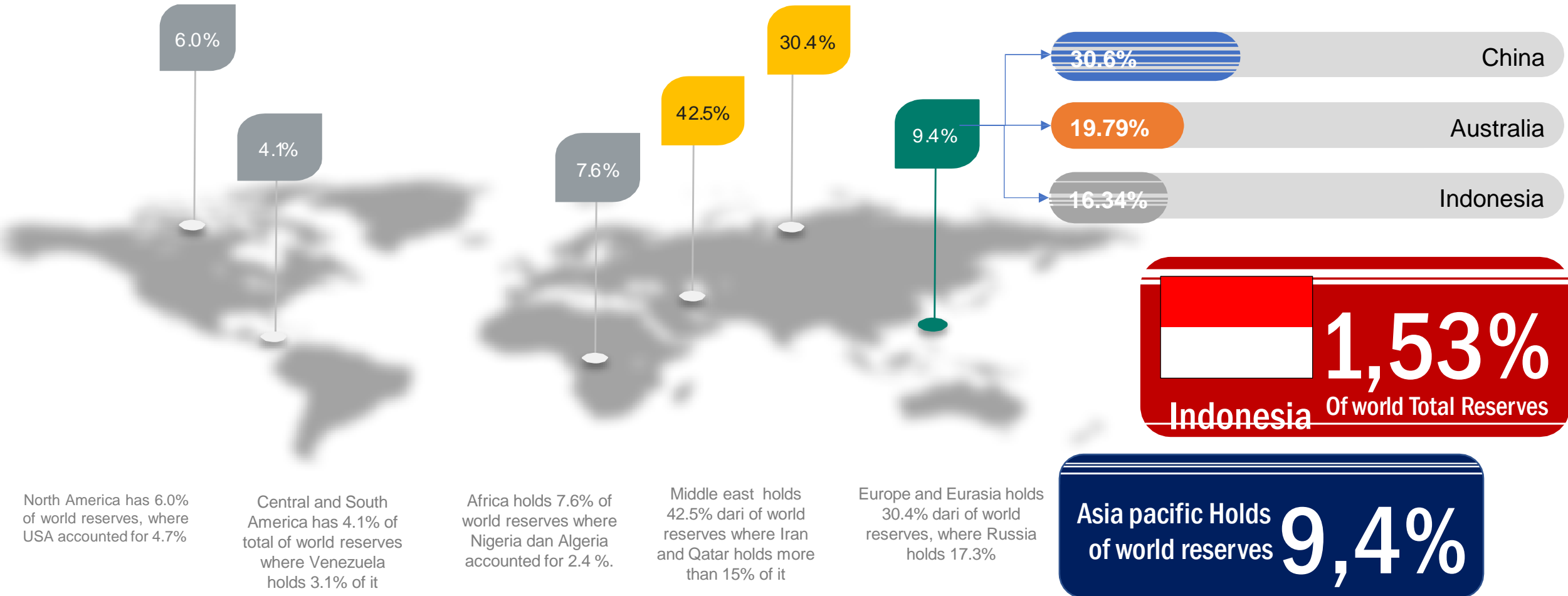
BACKGROUND EDUCATION	TOTAL
Sekolah Dasar	8
SLTP	6
SLTA	61
<b>Diploma (20)</b>	
Teknik Mesin Kilang (AKAMIGAS)	0
Teknik Mesin	1
Teknik Pemboran (AKAMIGAS)	0
Teknik Instrumentasi & Elektronika (AKAMIGAS)	0
Teknik Listrik Perminyakan (AKAMIGAS)	0
Teknik Perminyakan	0
Teknik Sipil	0
Teknik Elektro	0
Teknik Informatika/Komputer	1
MIPA Statistika	0
Pengolahan (AKAMIGAS)	0
Ekonomi Perusahaan	1
Manajemen Keuangan	1
Manajemen Informatika	1
Kearsipan	1
Manajemen Informasi dan Dokumen	1
Administrasi Negara	1
Akuntansi (AKAMIGAS)	1
Manajemen Perkantoran/TataPerkantoran (ASMI)	1
Sekretaris	1
<b>Doctor</b>	
Engineering Mechanics	1
Ilmu Hukum	1
Metalurgi dan Material	2
Teknik Perminyakan	1
Manajemen Bisnis	0
Petroleum Engineering	0
Energy Economics	1
Teknik Kimia	1

BACKGROUND EDUCATION	TOTAL
<b>Bachelor Degree (290)</b>	
Teknik Perminyakan	56
Teknik Geologi	17
Teknik Mesin	22
Teknik Metalurgi	4
Teknik Elektro	5
Teknik Sipil	1
Teknik Kimia	54
Teknik Fisika	6
Teknik Kelautan	3
Teknik Pertambangan	2
Teknik Industri	2
Teknik Gas dan Petrokimia	0
Teknik Lingkungan	2
Teknik Geofisika	6
Teknik Manajemen Industri	1
Teknik Komputer	2
Ilmu Komputer	1
Teknik Informatika	11
Sistem Informatika	1
MIPA Fisika	2
MIPA Statistika	4
Sastra Inggris	3
Ekonomi Manajemen	11
Ekonomi Perusahaan	1
Ekonomi Akuntansi	13
Ekonomi Keuangan	1
Ekonomi Umum	1
Ekonomi Pembangunan	1
Manajemen Perusahaan	2
Manajemen Informatika	3
Manajemen Keuangan	1
Statistik	1
Hukum Perdata	4
Ilmu Hukum	13
Administrasi Negara/ Publik	21
Ilmu Administrasi	1
Administrasi Fiskal	1
Perpustakaan	1
Sosial Politik	2
Filsafat dan Sosiologi Pendidikan	1
Psikologi	0
Ilmu Komunikasi	0
Hubungan Internasional	3
Komunikasi Massa	1
Kedokteran Umum	1
Kedokteran Gigi	1

BACKGROUND EDUCATION	TOTAL
<b>Master/ Pasca (40)</b>	
Magister Manajemen	12
Magister Manajemen Pemasaran	1
Magister Manajemen SDM	1
Magister Manajemen Ekonomi Publik	1
Magister Perencanaan dan Kebijakan Publik	5
Magister Perencanaan Kota dan Daerah	1
Magister Ilmu Material	2
Magister Ilmu Administrasi	6
Magister Administrasi Publik	1
Magister Administrasi Bisnis	1
Magister Ekonomi	0
Magister Ekonomi Sumber Daya dan Lingkungan	1
Magister Ilmu Ekonomi & Economic of Develepoment	1
Magister Akuntansi	3
Magister Keselamatan dan Kesehatan Kerja	10
Magister Sains Pengelolaan Sumber Daya Pesisir dan Kelautan	1
Magister Hukum Ekonomi	2
Magister Ilmu Hukum	2
Magister Teknologi Informasi	3
Magister Studi Pembangunan	3
Magister Teknik Kimia	13
Magister Teknik Mesin	1
Magister Teknik	0
Magister Teknik Geologi	1
Magister Teknik Perminyakan	8
Master of Engineering Management	1
Master of Gas Engineering & Management University of Saliport	0
Master of Engineering	1
Master of Laws Petroleum and Policy	0
Master of Energy & Environmental Economic & Management (Medea)	8
Master of Environmental Development	0
Master of Science in Envrionmental Impact Assesment & Auditing	1
Master of Science	2
Master of Science in Earth Science	1
Master of Environmental and Resource Economics	1
Master of Oil and Gas Engineering	1
Master of Petroleum Engineering	1
Master of Public Policy	1
Master of International Management	1
Master of Science in Electrical Engineering	1



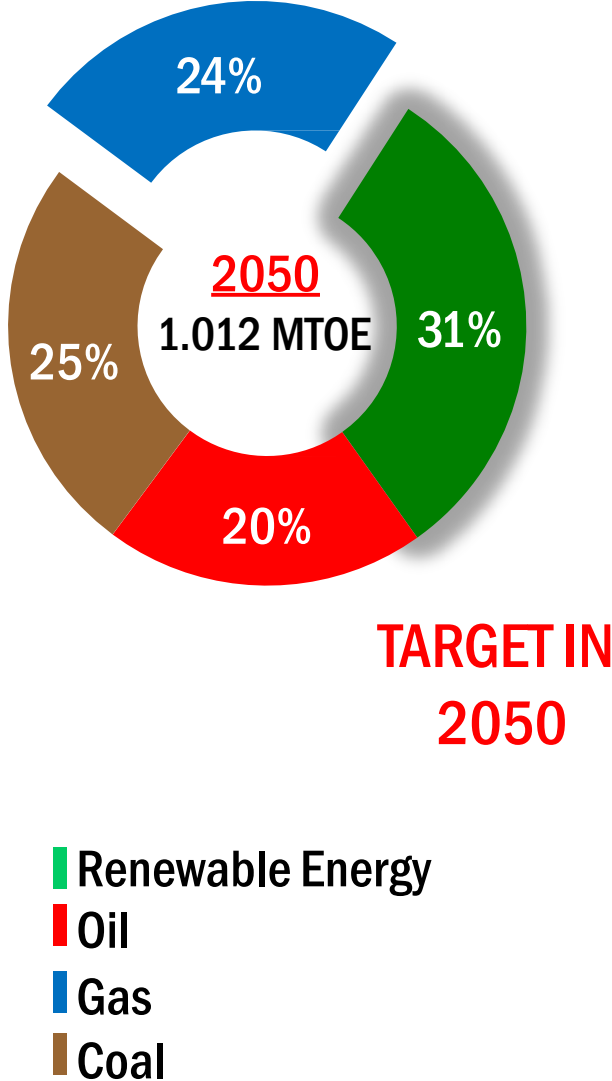
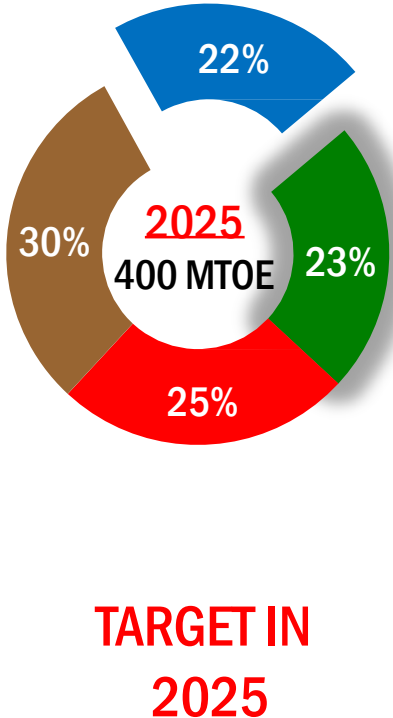
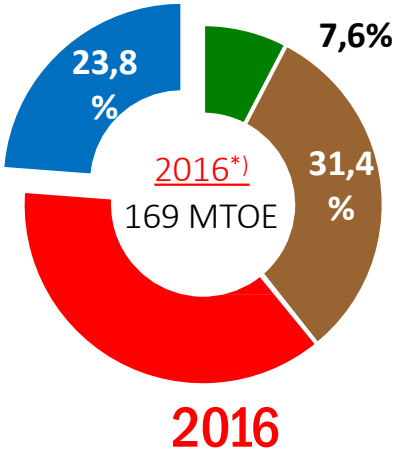
# CURRENT ISSUES ABOUT NATURAL GAS

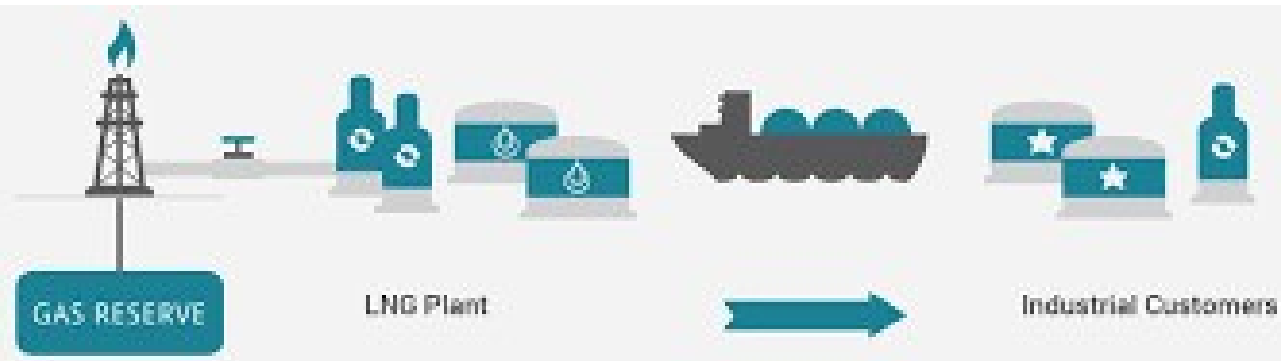


Status: end of 2016

# Referring to Indonesia's General Plan of National Energy (RUEN)

Target in the National Energy Policy (KEN)	2025	2050
Role of Energy	Driver of economic growth	
Portion of Gas in Energy Mix	22%	24%
Energy Supply	> 400 MTOE	> 1.000 MTOE
Power Generation	> 115 GW	> 430 GW
Energy Elasticity	< 1	< 1
Power/capita/year	2.500 kWh	7.000 kWh
Electrification Ratio	~100%	~100%





supply natural gas to industries, electricity generation plants, and commercial & residential customers.



Malaysia

### Virtual Pipeline

Deliver Natural Gas to markets without pipeline access to compliment the conventional supply of gas via pipeline networks



Indonesia

### Virtual Pipeline Cluster Concept

Intend to develop Virtual Pipeline Cluster Concept (VPCC) to supply LNG to scattered islands in Indonesia by small scale LNG distribution

**Virtual Pipeline systems** are arranged shipments of gas from one point to another



geographically challenging to justify an investment in pipeline construction or too small for normal LNG large-scale carriers



The global virtual pipeline systems market is likely to be worth US\$1,821.3 m by the end of 2025 from US\$1,070.0 m in 2016.

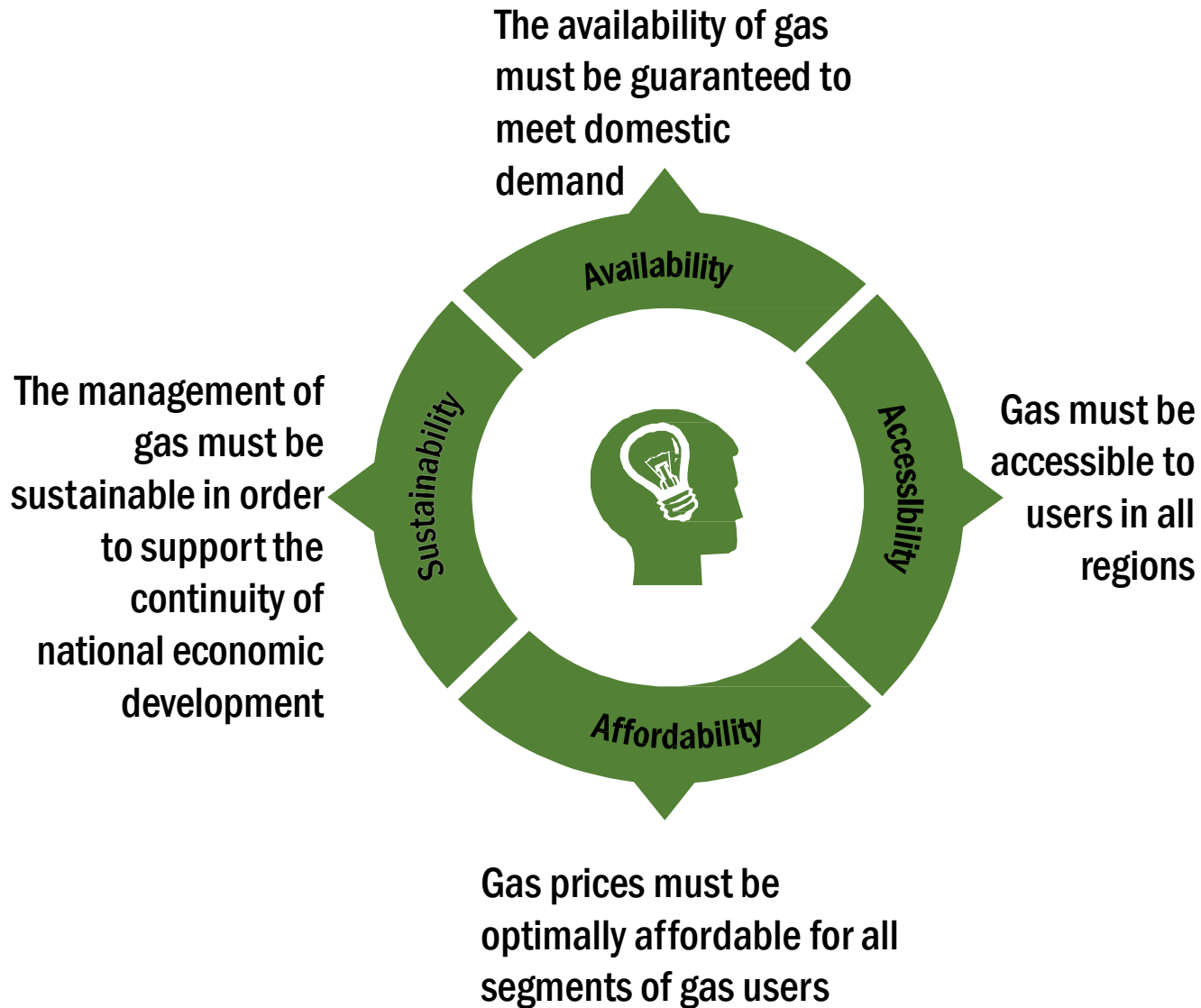
### Virtual Pipeline of Tanker Trucks

Using trucks to supply LNG directly to end-users started gaining traction with Chinese smokestack industries – such as steel and cement manufacturer



China

Source: Transparency Market Research Analysis, 2017



## Gas Regulations in Indonesia

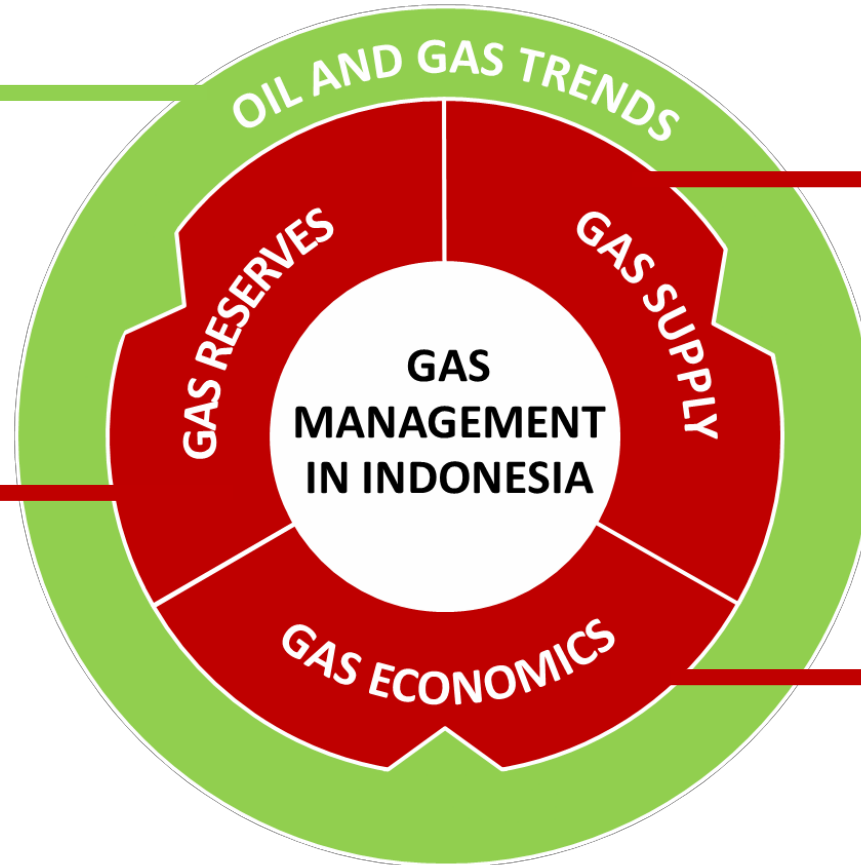
- Provision & Procedure of Gas Allocation, Utilization, & Pricing
- Stipulation of Gas Prices
- Procedure of Stipulation of Particular Gas Users & Prices
- Gas Prices for Particular Industries
- Gas Prices for Industries in Medan & Surrounding Areas
- Utilization of Gas for Power Generation
- Acceleration of Gas Utilization for Transportation
- Utilization & Prices of Flare Gas in Upstream Oil & Gas Industry
- Stipulation of Gas Allocation & Utilization for Power Generation

**There is shifting energy from oil dominant to gas dominant**

- Maintaining the oil production using EOR and IOR

**Finding more gas resources and how we can transfer it to add to the proven reserves**

- Maintaining exploration to find hydrocarbon and adding more gas reserves



**Developing gas supply to meet the ever growing demand**

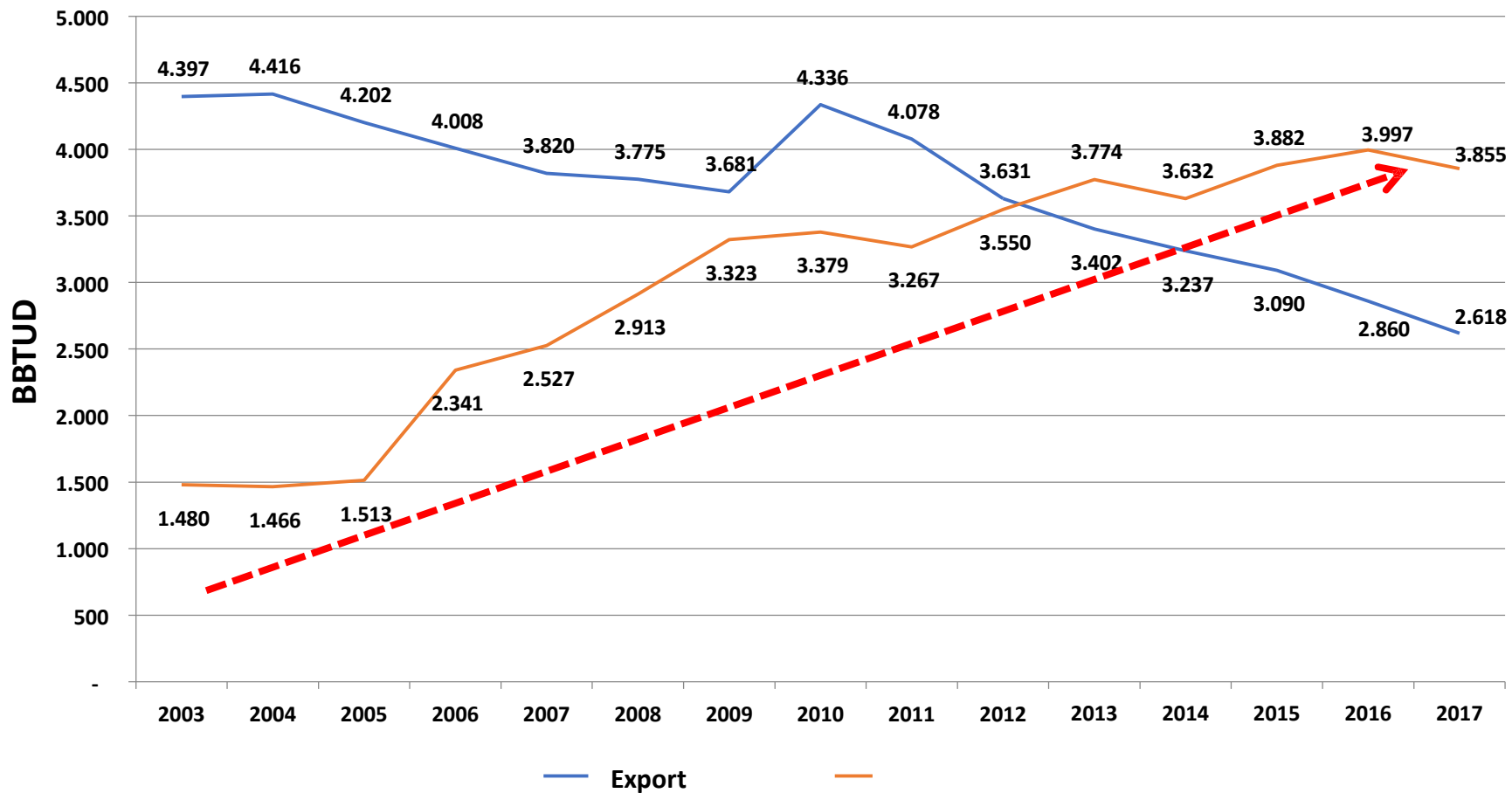
- Gas Supply and Demand Management

**Ensuring attractiveness of upstream gas activities**

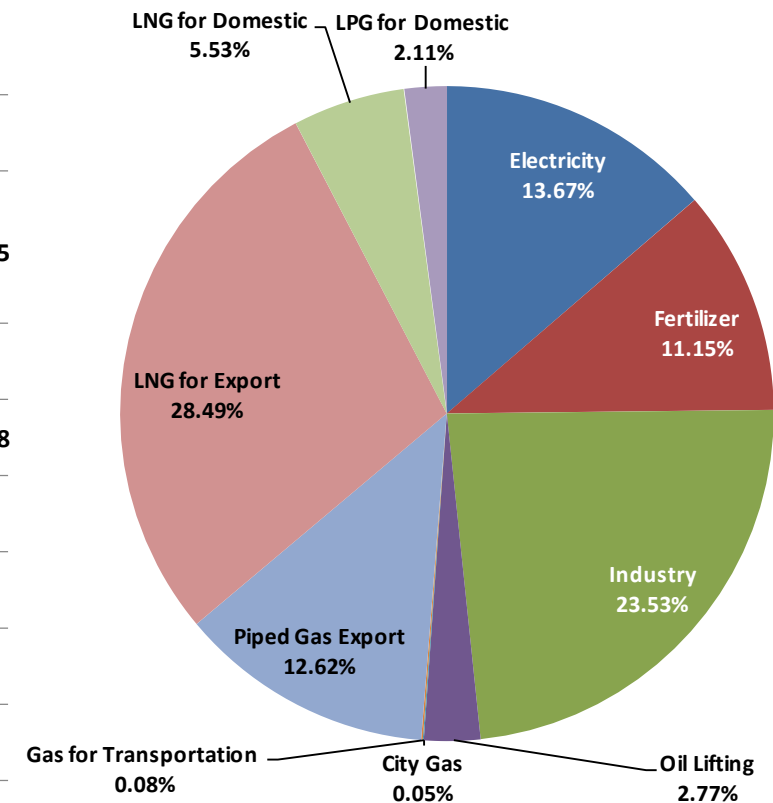
- Low production cost
- Fair share of revenue

Average growth of domestic gas demand (2003 – 2016): 9%

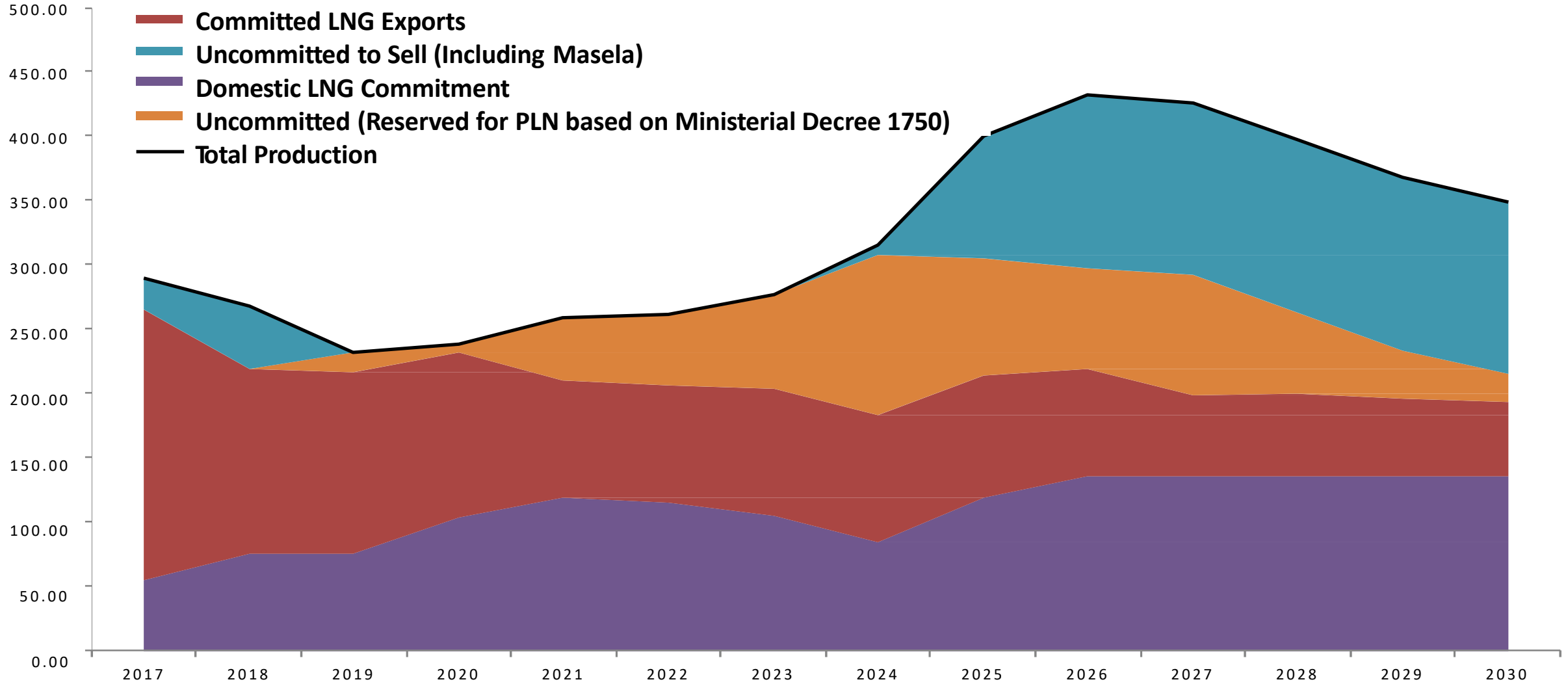
Portion of domestic gas demand in 2017 : 58%



## Utilization of Gas in Indonesia (2017)



*in Cargo*



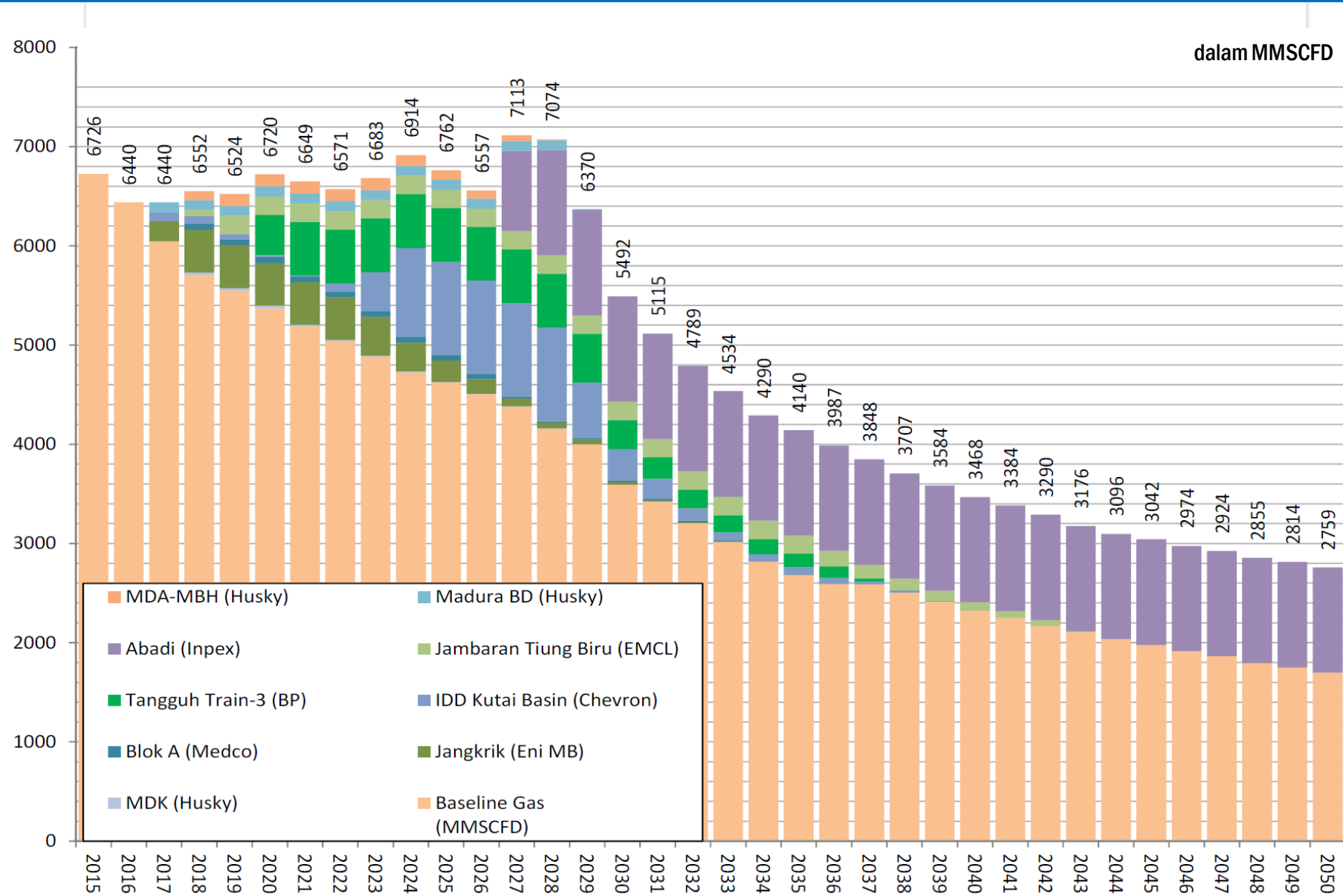


# 1. Indonesia Gas Balance

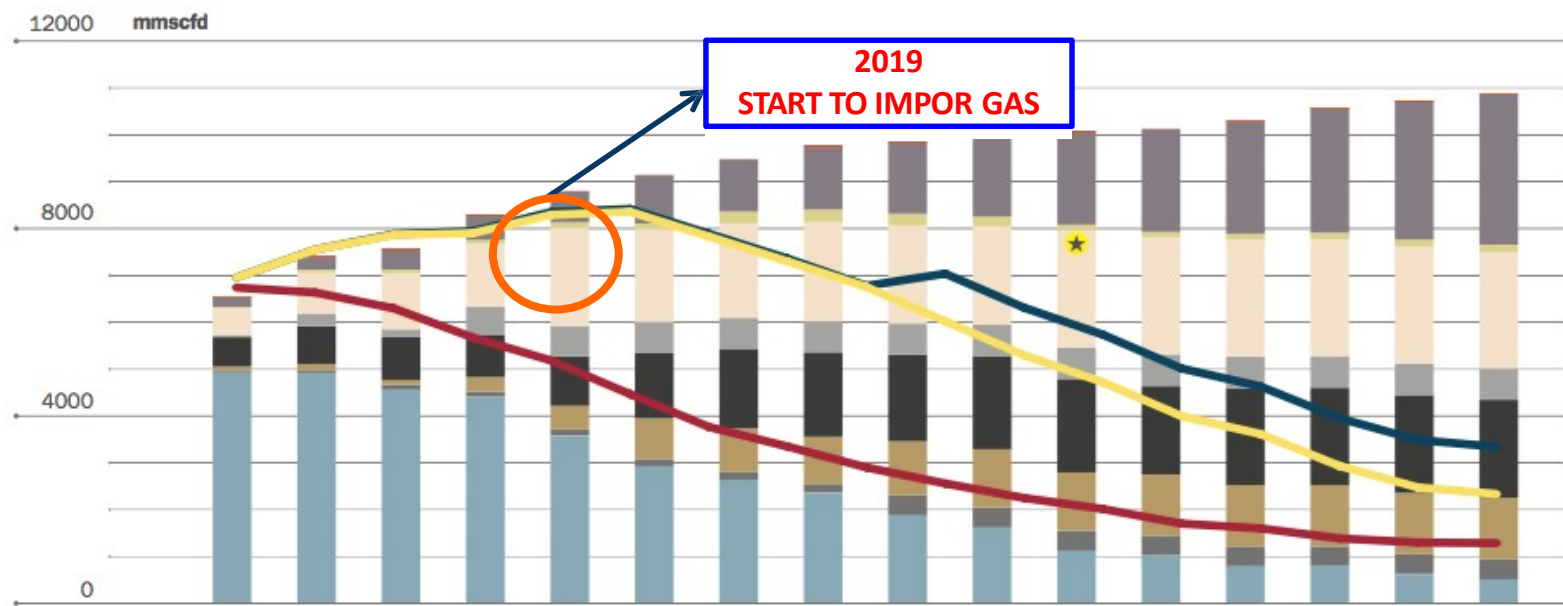
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# GAS PRODUCTION PROJECTION 2015 – 2050



# GAS BALANCE INDONESIA 2015 – 2030

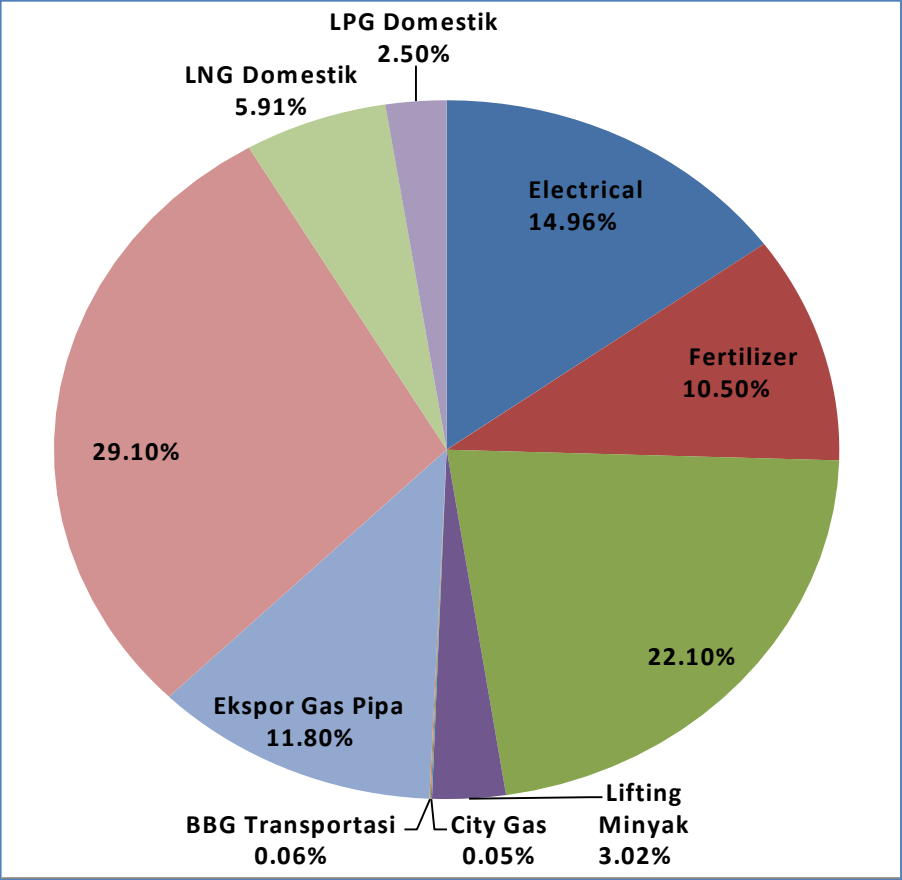


	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
City Gas (Committed)	1	3	5	7	9	10	10	10	10	10	10	10	10	10	10	11
Potential Demand Industry	198	258	396	504	622	966	1049	1260	1443	1661	1855	2064	2260	2496	2762	3022
Transportation (Committed)	20	63	75	79	104	116	231	260	243	196	118	111	120	130	142	154
Industry (Committed)	541	819	1120	1263	1975	1870	1904	1988	1960	1977	2349	2350	2347	2348	2349	2329
Kelistrikan (Committed)	589	761	870	857	990	1309	1598	1698	1743	1871	1880	1780	1950	1958	1964	1974
Pupuk (Committed)	86	139	97	290	476	819	884	949	1083	1175	1175	1230	1230	1230	1230	1236
Lifting and Own Used (Committed)	27	27	90	98	128	139	150	176	396	396	396	396	396	396	396	397
Domestic (Contracted)	4640	4675	4321	4154	3349	2777	2492	2216	1786	1534	1071	962	761	753	583	489
Potential Supply	2	17	42	61	61	61	61	25	22	22	22	22	1022	1022	1017	1014
Project Supply	264.5	693.5	1428.5	1866.1	2127.3	2635.6	2586.5	3206.6	3199.7	2975.3	3699.9	3482.1	3082.1	2776.5	2488.4	2047.3
Existing Supply	6434	6508	6020	5431	4887	4327	3933	3486	3086	2719	2239	1891	1812	1344	1270	1202

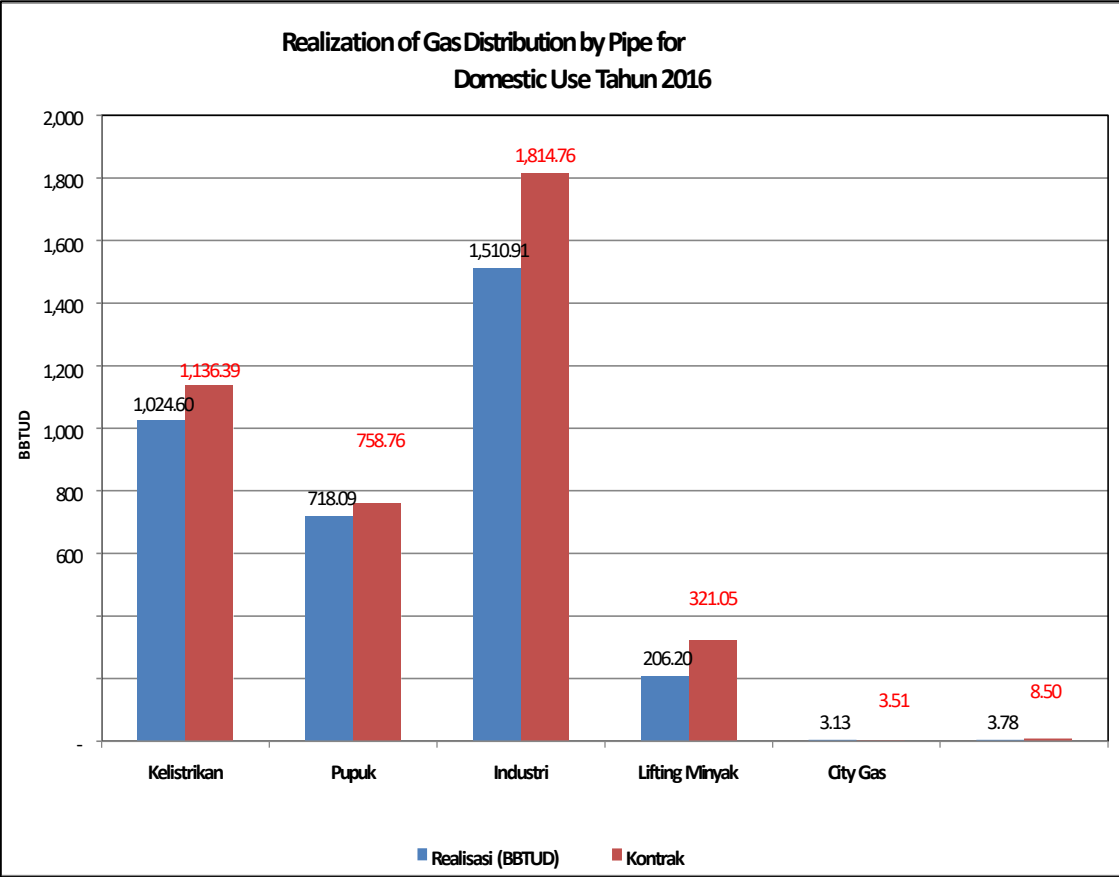
★ Forecast DEN: Kebutuhan Gas tahun 2025 diperkirakan sebesar 20% dari Bauran Energi Nasional (7134 BOED), setara 8248 BBTUD

● National Energy Agency Forecast: Gas demand in 2025 will make up to 20% of National Energy Mix (7,134 BOED), or 8,249 BBTUD

# GAS UTILIZATION IN INDONESIA 2016



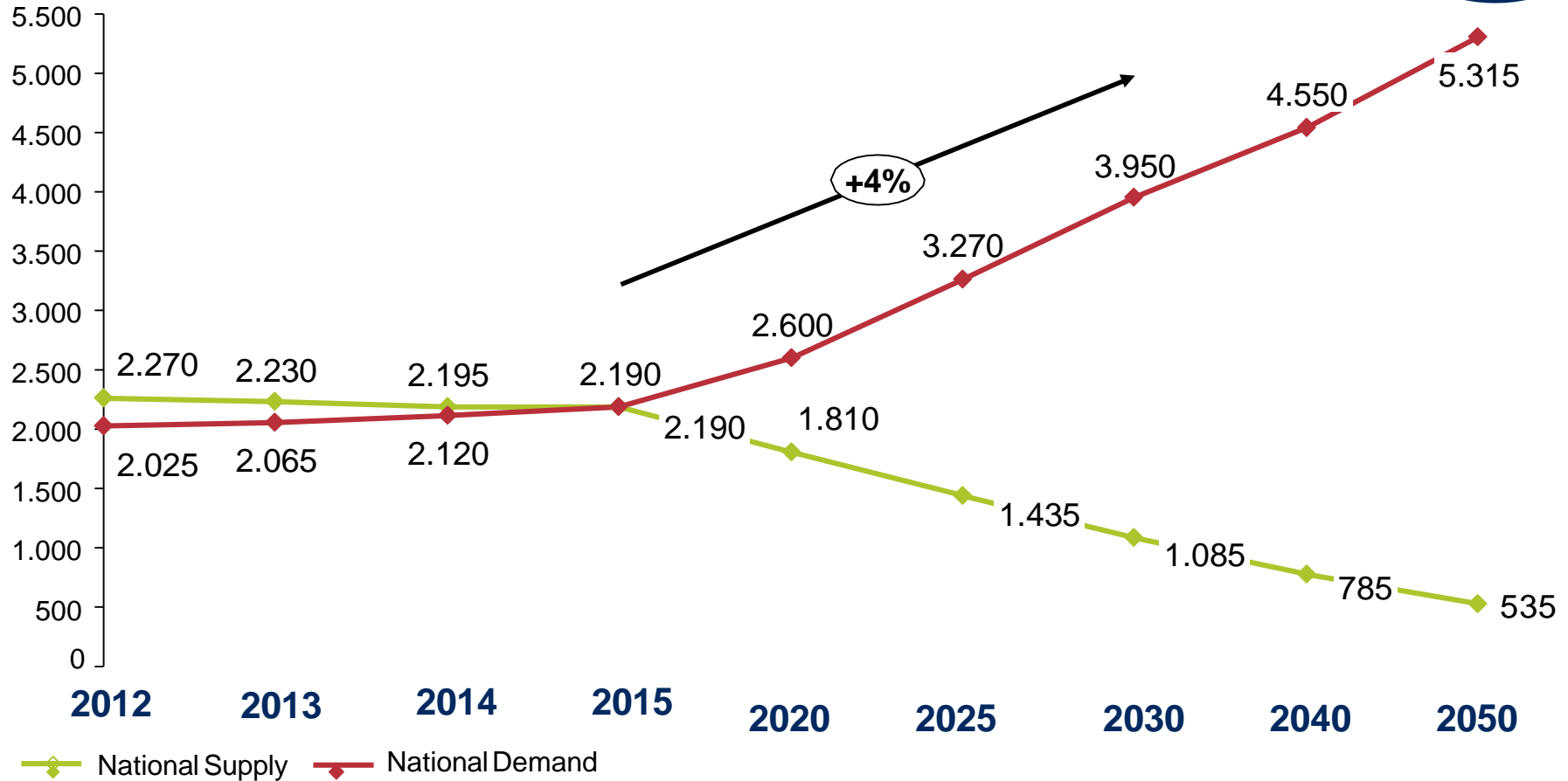
Status s.d. Mei 2016



In mboepd

In 2015 the gap between national supply and demand begins.

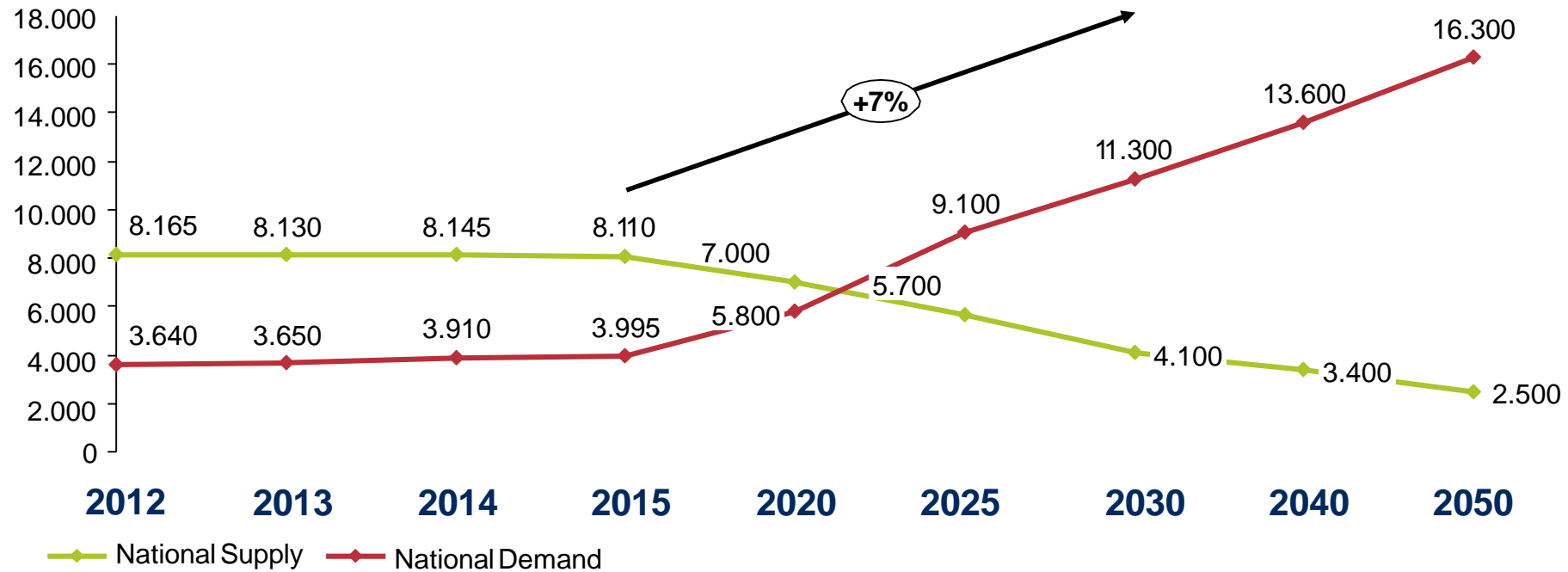
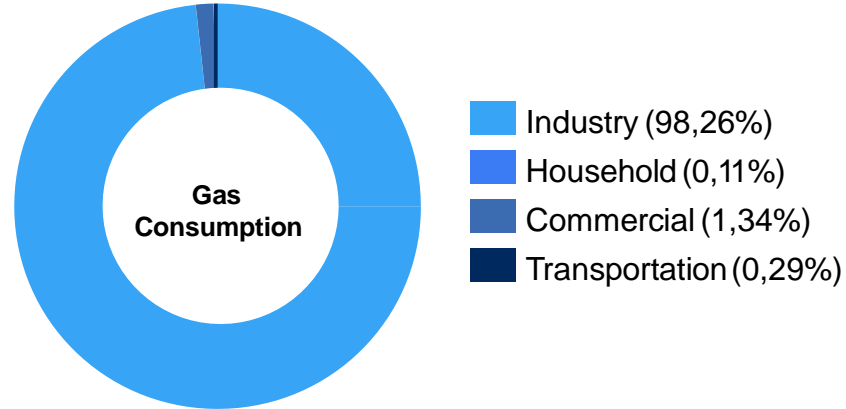
15 Years  
AVE CAGR  
OE Production  
**4%**



In mmscfd

In 2021 the gap between national supply and demand begins.

15 Years  
CAGR Average  
**7%**



## 2. Gas Infrastructure Existing



# MOSQUITO GUARANTEE OF LIQUID GAS (LNG) IN INDONESIA

## PT. Arun Natural Gas Liquefaction

Known as PT Arun NGL is Indonesia's natural liquid producer company. In the 1990s, the Arun refinery is one of the largest LNG producers in the world, PT Arun is a Pertamina subsidiary located in **Ihokseumawe Aceh, North Aceh**. Gas supply reached 17.1 trillion cubic feet with a pressure of 499 kg / cm, 177°C temperature, with a thickness of 300 meters. The amount is estimated to supply six units of processing kitchen (train) with capacity of 300 millions SCFD each (standard cubic feet day), currently PT Arun only mengeperasikan 2 units train or processing kitchen, because the reserve mentioned above has been thinned.





## PT. badak natural gas liquefaction



The largest LNG plant in Indonesia and one of the largest in the world. Its located in bontang **east Kalimantan**. The refinery has 8 processing kitchens (Train) A-H. which is capable of producing 22.5 Mtpa LNG (Millions of LNG matrices per year). And is the largest contributor of foreign exchange for the city and Indonesia.

# LNG Tangguh

The tough LNG is a mega project that builds an LNG plant in **Bintuni bay in western Papua**, to accommodate natural gas coming from several blocks around bay bintuni, such as berau block, wiriagar blog and muturi block. Currently the strong LNG still has 2 train or processing kitchen for the third train is still in the development stage. Currently, with a strong 1 and 2 LNG train already generating 3.8 million tonnes per year is expected when train 3 is completed to produce 11.4 million tonnes per year.



## LNG Donggi senoro

This refinery is one of the mega projects that completed in this year, this refinery is located banggai district precisely in the uso village of central Sulawesi. The refinery is the work of Pertamina, Medco Energy, Mitsubishi, Korean Gas Corporation. And the refinery produces 2 million tons per year



## 3. Gas Infrastructure Development



# OUR CONDITION



## UPSTREAM

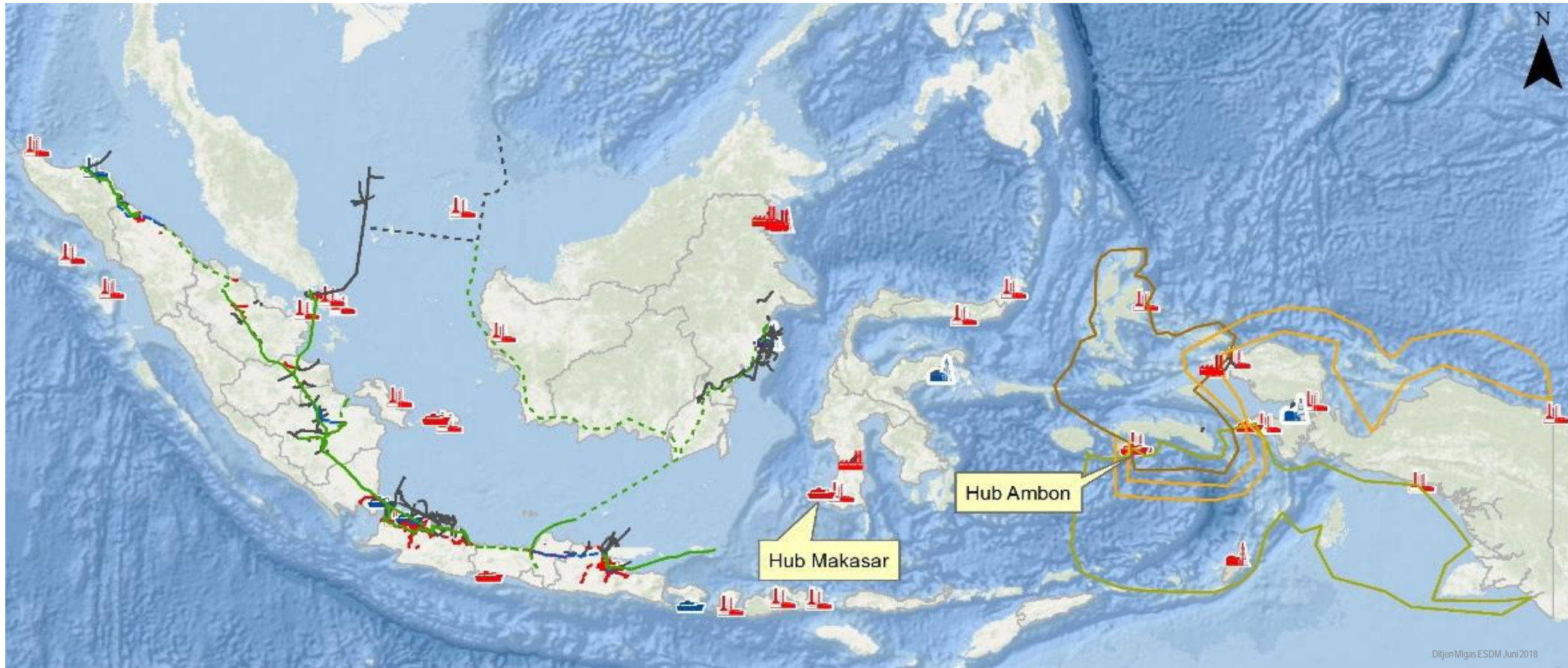
1. Lack of large gas reserves, Reserves Replacement Ratio (R3)  $< 1$ , where the gas production rate is greater than the rate of reserves discovery
2. The discovery of natural gas reserves shifted to Eastern Indonesia with deep water characteristics
3. With the current oil price conditions some marginal gas fields are not yet economical to monetize



## DOWNSTREAM

1. Indonesia's geographical is a challenge in integrating Indonesia's natural gas infrastructure
2. The location of natural gas sources is far from natural gas consumers (high transportation costs)
3. Fluctuation of gas absorption, depends on industrial growth and other substitute energy prices such as oil and coal
4. Growth of gas consumers has been stagnant in recent years

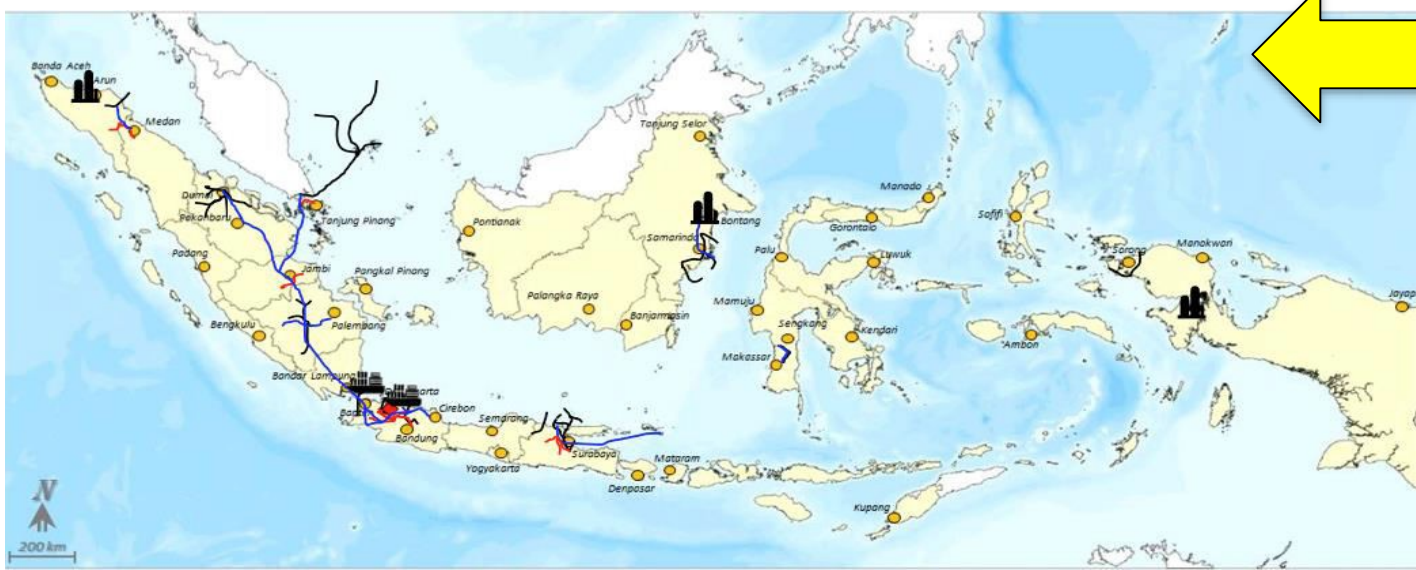
# INDONESIA'S GAS INFRASTRUCTURE ROADMAP



- ✓ Indonesia's existing infrastructure is mostly located in Western Indonesia
- ✓ Due to geographical conditions in Eastern Indonesia (deep sea and scattered demand in remote areas), LNG is the preferred mode of energy to be utilized

Legend		
Open Access Pipeline (Existing)	FSRU/FSU/Hub (Existing)	<b>Virtual Pipeline</b>
Open Access Pipeline (Planning)	FSRU/FSU/Hub (Planning)	
Open Access Pipeline (On Going)	LNG Plant (Existing)	
Own Used Pipeline (Existing)	LNG Plant (Planning)	Cluster Utara Maluku
Own Used Pipeline (Planning)	Receiving and Regasification Unit (Existing)	Cluster Utara Papua
Upstream Pipeline (Existing)	Receiving and Regasification Unit (Planning)	Maluku - Papua
Upstream Pipeline (Planning)	LNG Small Scale (Planning)	
Distribution Pipeline (Existing)		
Distribution Pipeline (Planning)		

# Natural Gas Infrastructure Existing & Planning

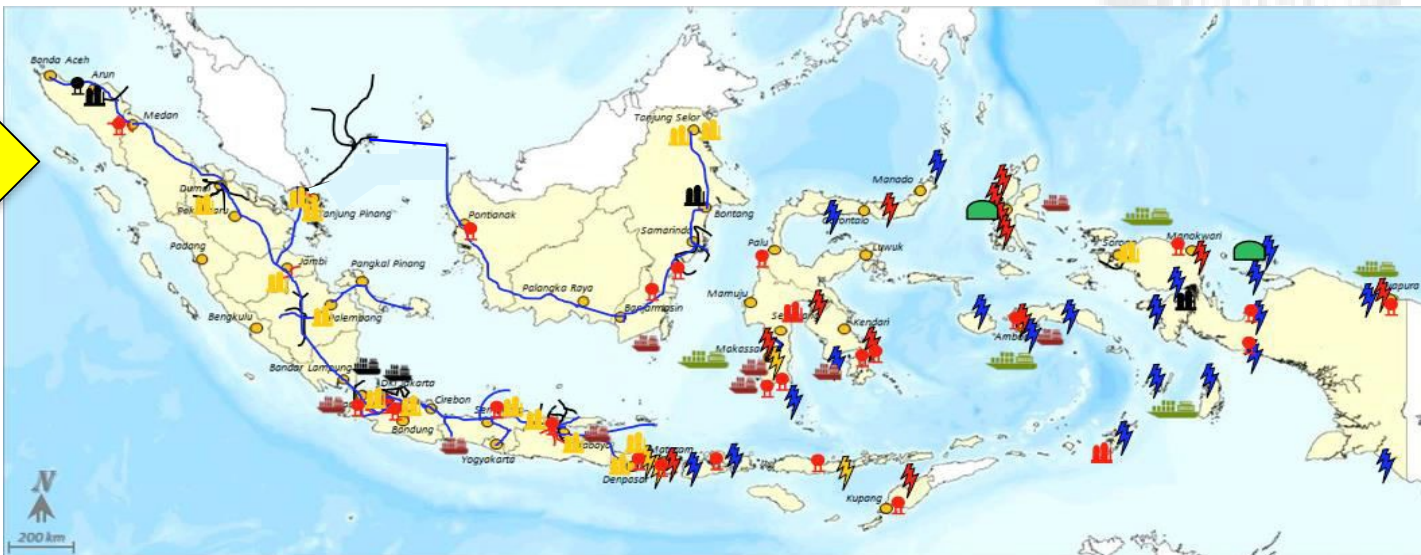


**EXISTING**

**Legend**

- Existing Dedicated Upstream Pipeline
- Existing Transmission Pipeline
- Virtual Pipeline from Supply
- Virtual Pipeline to final distribution
- Virtual Pipeline (Plan)
- Primary Hub
- Primary Hub (Plan)
- Plan FSRU
- Existing FSRU
- Mobile Power Plant (MPP) Plan
- Pembangkit Listrik Tenaga Gas - Uap (PLTGU) Plan
- Pembangkit Listrik Tenaga Minyak - Gas (PLTMG) Plan
- Secondary Hub/LNG Storage Tank
- Planning LNG Plant
- Planning Mini LNG Plant
- Existing Land-based Regasification
- Planning Land-based Regasification

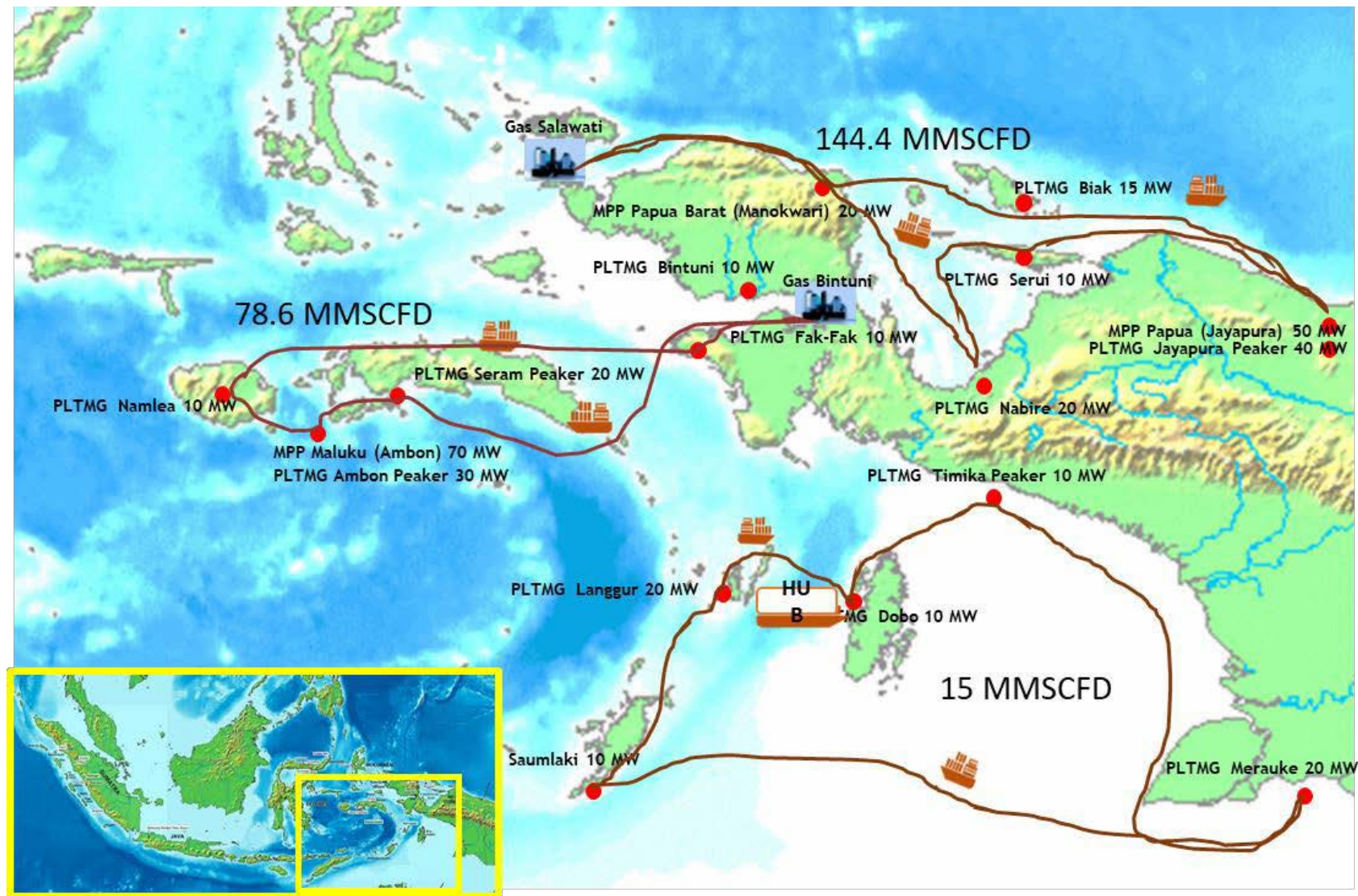
**ROADMAP  
2016 - 2030**



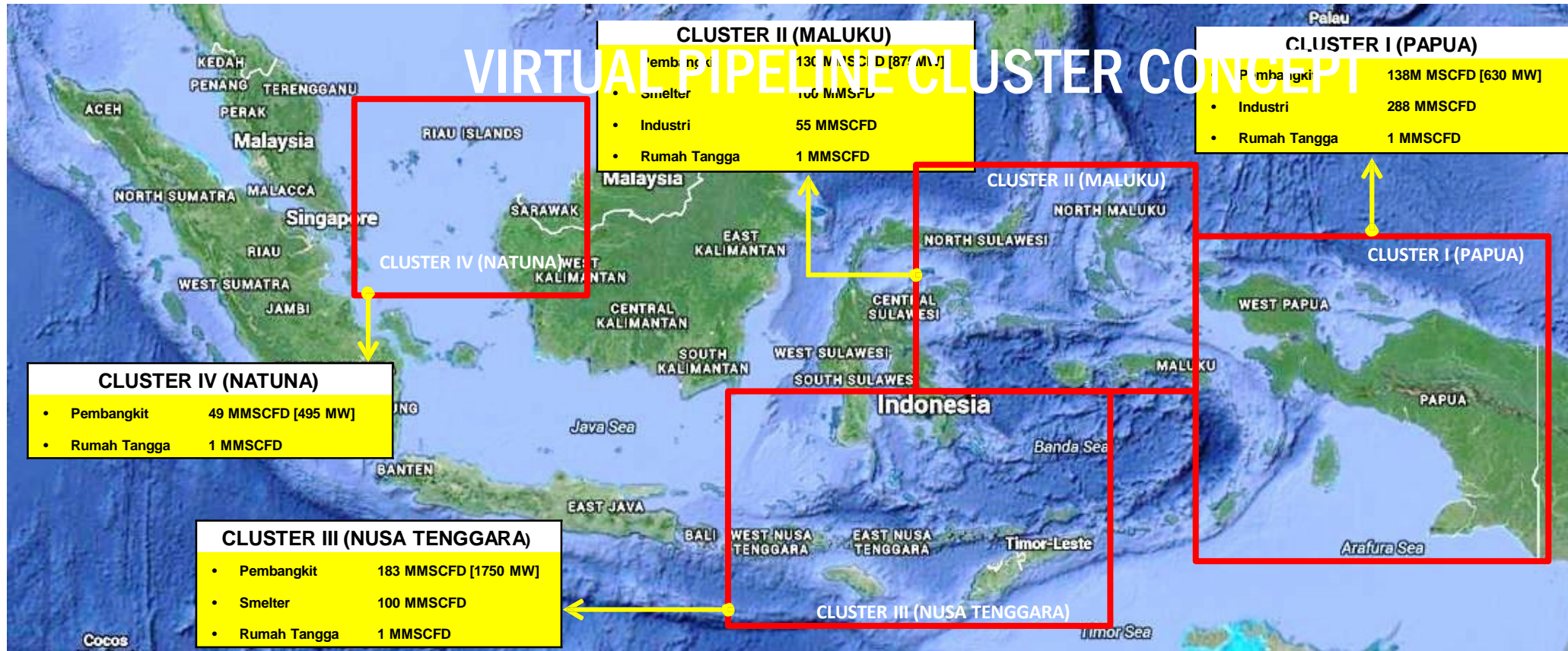
KEBUTUHAN INVESTASI (Miliar USD)			TOTAL 48.2
Pipa 12	Liquefac tion 25.6	SPBG + CNG 1.93	
Regasific ation 6.1	Jargas 2.2	LPG 0.4	

Scattered  
Demand,  
Small  
Scale,

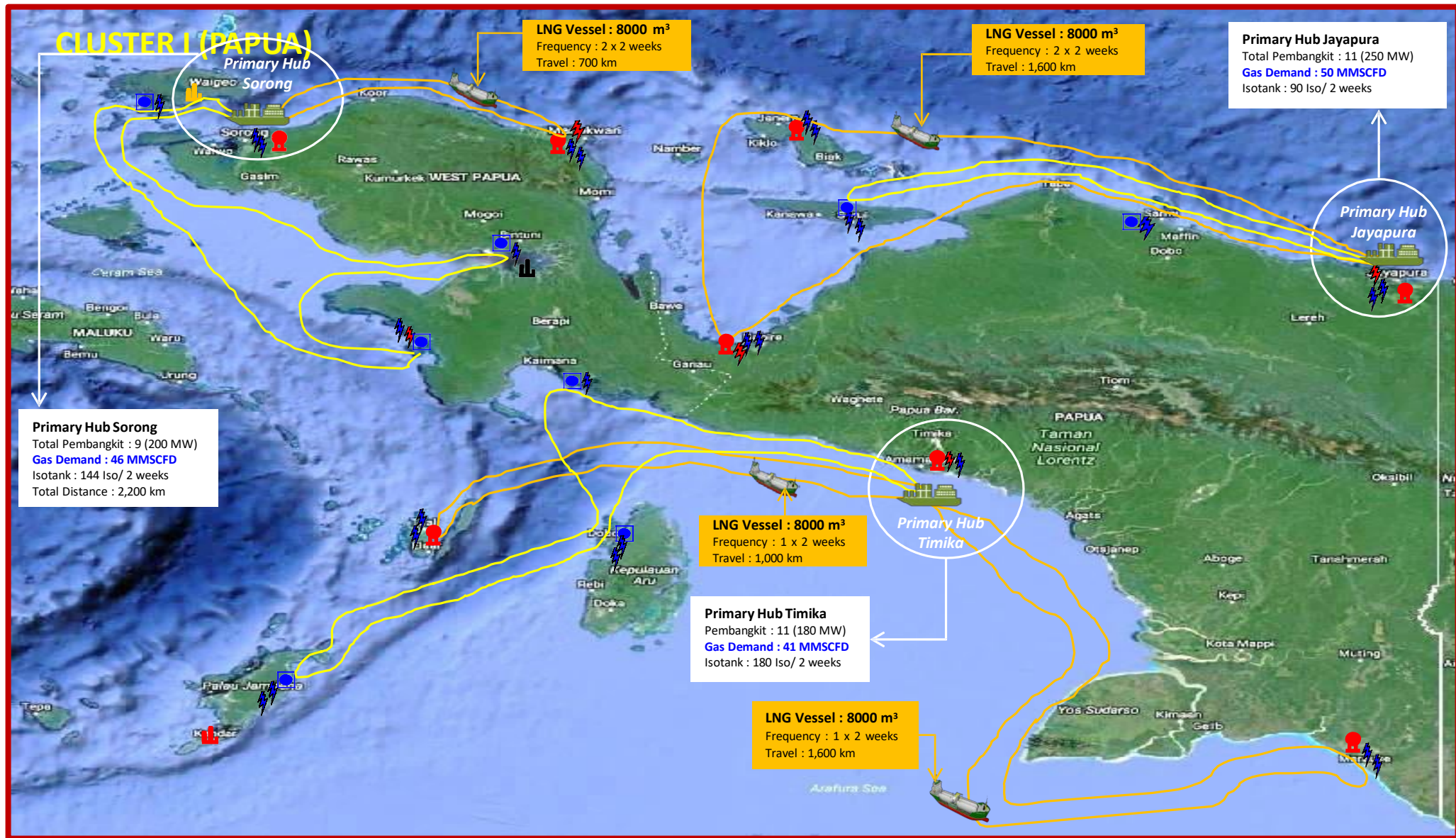
Mini LNG is an  
option


















- Cluster I** → Papua dan Papua Barat
- Cluster II** → Maluku, Maluku Utara, Sulawesi Utara, Sulawesi Tengah
- Cluster III** → Nusa Tenggara Timur, Nusa Tenggara Barat, Sulawesi Selatan
- Cluster IV** → Natuna dan Kalimantan Barat

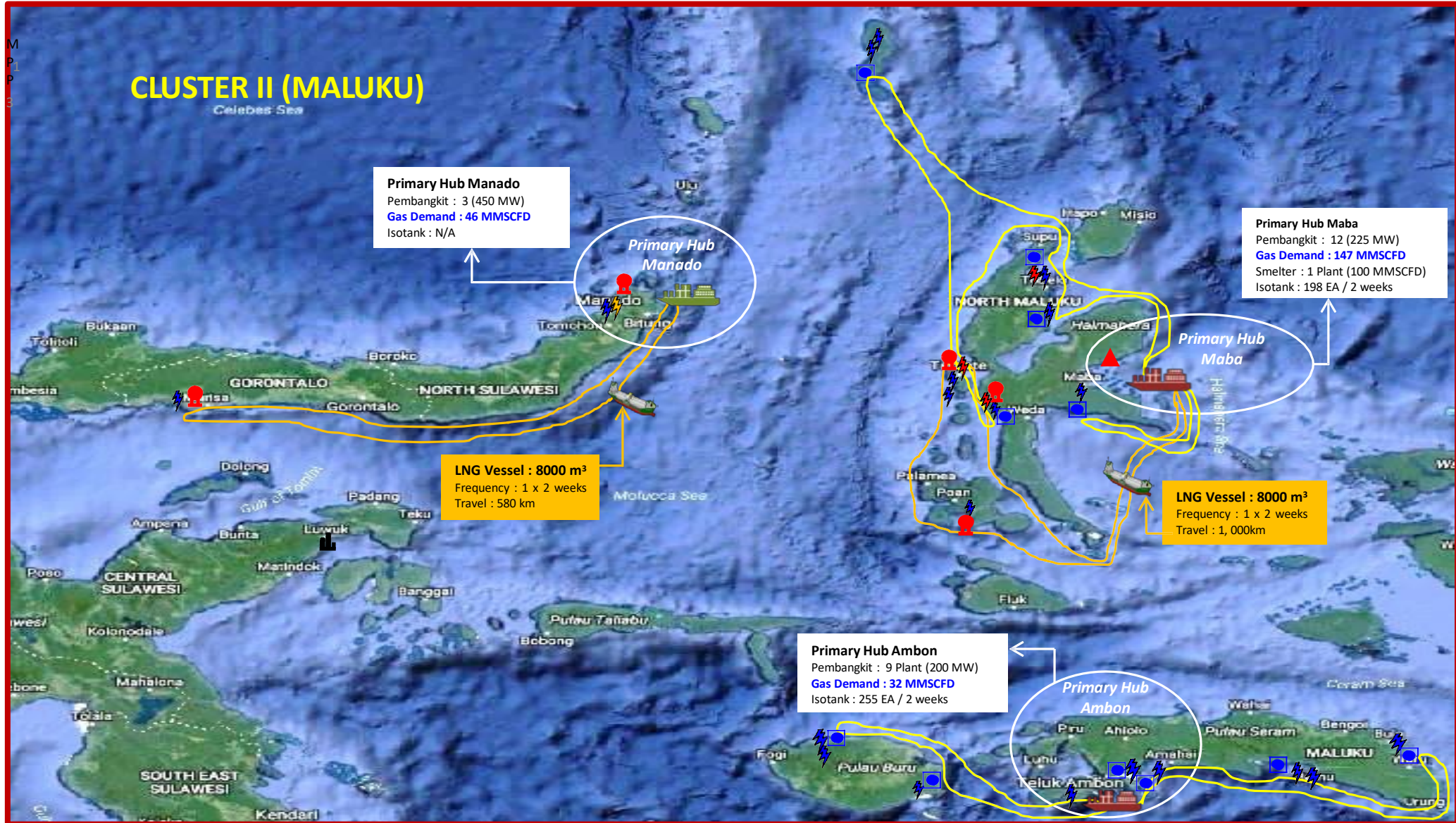


Pembangkit	31	Lokasi
FSRU/FSU/FRU	3	Lokasi
Land Based Regas	8	Lokasi
Iso Tank Regas System	8	Lokasi

Rencana Pembangkit	630 MW
Kebutuhan Gas	138 MMSCFD

-  FSU
-  FSRU
-  Liquefaction Plant
-  PLTGU/MGU
-  Secondary Hub/Land based Storage
-  PLTG/MG
-  Smelter
-  Small Vessel Route
-  Land based Regas Terminal
-  Isotank Barge Route
-  LNG Iso tank Regas System

# CLUSTER II (MALUKU)



**Primary Hub Manado**  
 Pembangkit : 3 (450 MW)  
 Gas Demand : 46 MMSCFD  
 Isotank : N/A

**Primary Hub Maba**  
 Pembangkit : 12 (225 MW)  
 Gas Demand : 147 MMSCFD  
 Smelter : 1 Plant (100 MMSCFD)  
 Isotank : 198 EA / 2 weeks

**LNG Vessel : 8000 m<sup>3</sup>**  
 Frequency : 1 x 2 weeks  
 Travel : 580 km

**LNG Vessel : 8000 m<sup>3</sup>**  
 Frequency : 1 x 2 weeks  
 Travel : 1, 000km

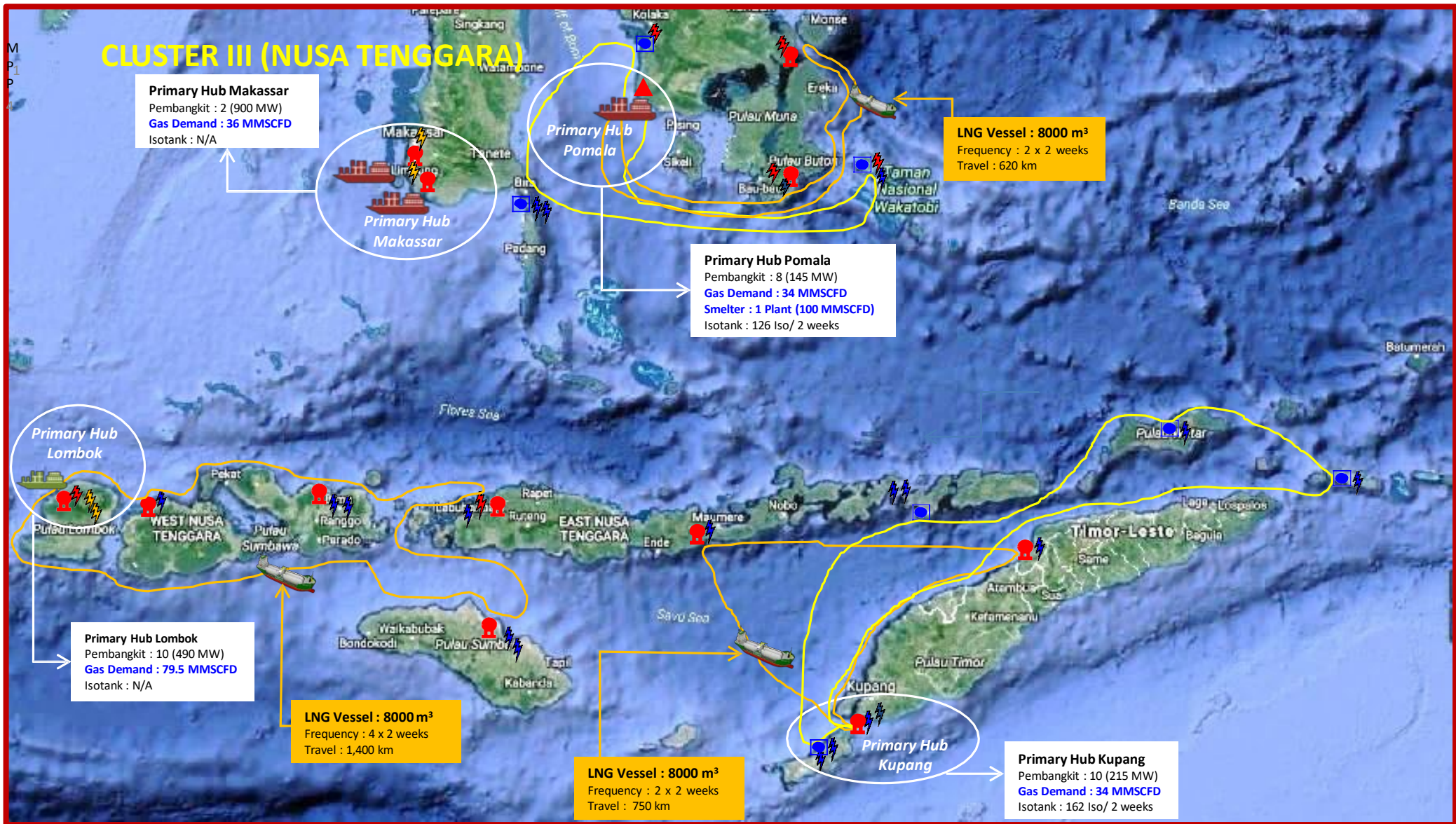
**Primary Hub Ambon**  
 Pembangkit : 9 Plant (200 MW)  
 Gas Demand : 32 MMSCFD  
 Isotank : 255 EA / 2 weeks

Pembangkit	24	Location
FSRU/FSU/FRU	3	Location
Land Based Regas	5	Location
Iso Tank Regas System	10	Location

Rencana Pembangkit	875 MW
Kebutuhan Gas	130 MMSCFD
Kebutuhan Gas Smelter	100 MMSCFD

- Liquefaction Plant
- Secondary Hub/Land based Storage
- Smelter
- Land based Regas Terminal
- LNG Iso tank Regas System
- FSRU
- PLTGU/MGU
- PLTG/MG
- Small Vessel Route
- Isotank Barge Route

# CLUSTER III (NUSA TENGGARA)

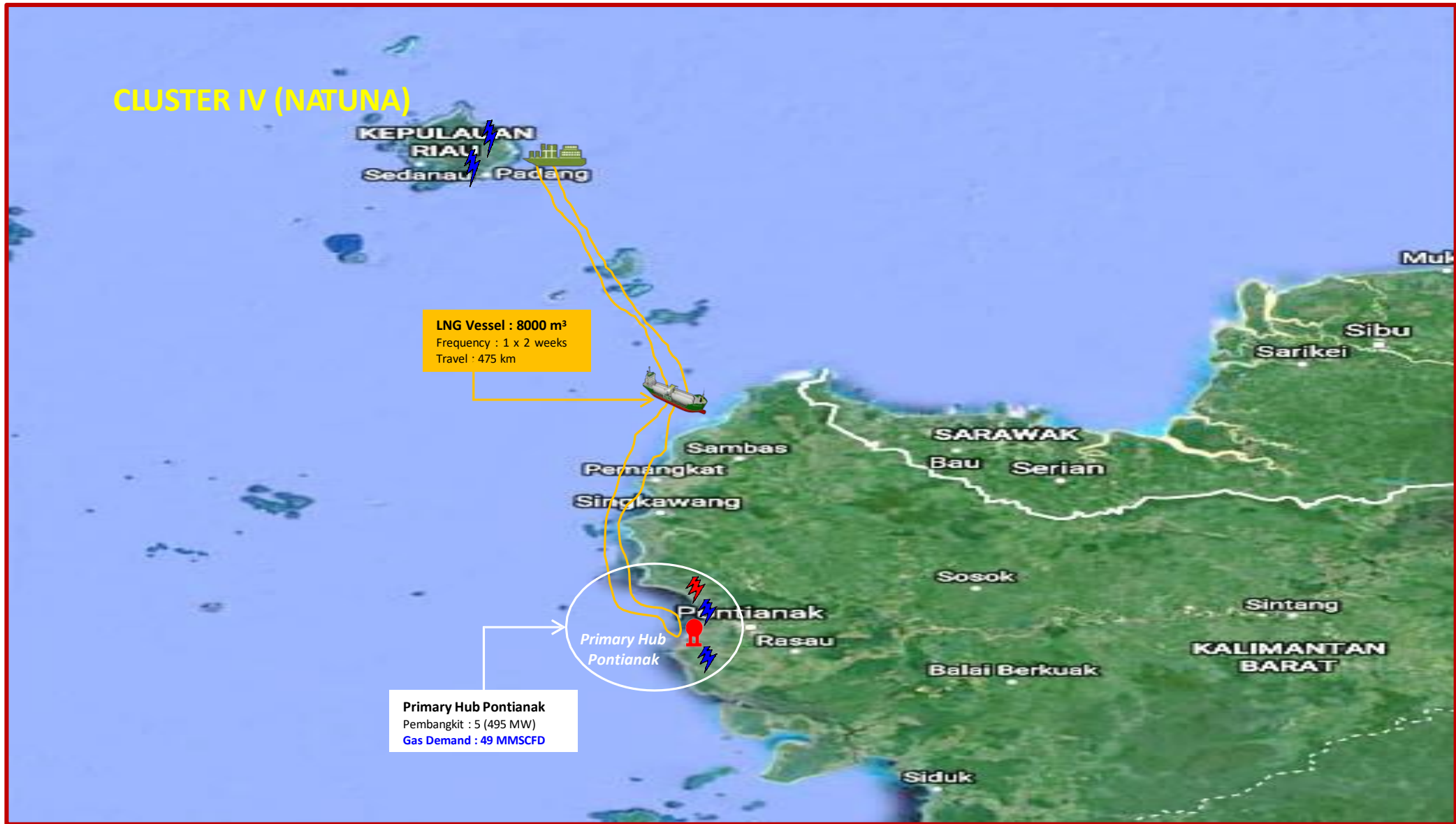


Pembangkit	30	Location
FSRU/FSU/FRU	4	Location
Land Based Regas	12	Location
Iso Tank Regas System	7	Location

Rencana Pembangkit	1,750 MW
Kebutuhan Gas	183 MMSCFD
Kebutuhan Gas Smelter	100 MMSCFD

- Liquefaction Plant
- Secondary Hub/Land based Storage
- Smelter
- Land based Regas Terminal
- LNG Iso tank Regas System
- FSRU
- PLTGU/MGU
- PLTG/MG
- Small Vessel Route
- Isotank Barge Route

**CLUSTER IV (NATUNA)**



Pembangkit	5	Location
FSRU/FSU/FRU	1	Location
Land Based Regas	1	Location
Iso Tank Regas System	-	Location

Rencana Pembangkit	495 MW
Kebutuhan Gas	49 MMSCFD

# LNG for Marine Transportation

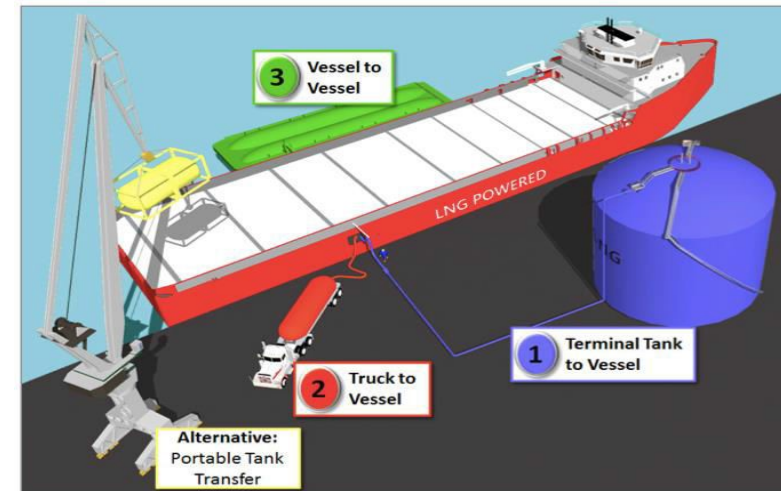
Based on Indonesian Regulation\*  
 (referring to Marine Safety Committee 95,  
 International Marine Organization):  
 Sulphur Content for marine fuel must not exceed 3,5% m/m\*\* before  
 January 1<sup>st</sup> 2020 and 0,5% m/m after January 1<sup>st</sup> 2020

Existing Ships in Indonesia		Existing Ports in Indonesia	
Passenger Ship	535	Commercial Ports	112
Cargo Ship	20,346	Non-Commercial Ports	1,129
Fishing Ship	16,028	Special Purpose Terminals	1,045
<b>Total</b>	<b>36,909</b>	<b>Total</b>	<b>2,289</b>



LNG – Fueled Ship

## LNG for Marine Potential



\*) Transportation Ministerial Regulation No. 29 / 2014 about Maritime Environment Pollution Prevention

\*\*\*) m/m: microgram/milliliter

# GAS INFRASTRUCTURE ROADMAP 2016 – 2030 \*)

No.	URAIAN		Period I					Period II	Period III	
			Existing	2016	2017	2018	2019	2020	2021 – 2025	2026 – 2030
1	Pipeline [KM]	Open Access	3,665	6,153	6,153	6,215	6,776	7,390	9,604	12,580
		Upstream Dedicated	4,110	4,123	4,123	4,123	4,123	4,123	4,123	4,123
		Downstream Dedicated	4,213.54	9,177	9,211	9,431	11,546	11,546	13,480	13,584
		Own Use	46	66	66	66	66	66	66	66
2	Liquefaction [UNIT]	Large Plant	2	4	5	5	5	5	6	6
		Mini Plant	0	3	5	7	7	9	10	12
3	Regasification [UNIT]	FSRU	2	2	5	9	10	11	11	12
		Land based	1	17	24	46	62	64	66	68
4	CNG Application [UNIT]	Inland	14	68	72	72	106	108	108	161
		Marine	2	4	6	9	12	15	20	30
5	GAS FUELING STATIONS [UNITS]	CNG	84	136	163	189	210	289	800	1,300
		LNG	0	0	0	0	2	4	7	12
		LGV	27	27	77	80	100	120	200	400
6	Distribution Network Area [AREA]		0	8	12	16	20	25	75	150
7	City Gas [CONNECTION]		197K	326K	608K	924 million	1.308 million	1.5 million	3 million	5 million
8	LPG Plant [MTPA]		4,594	4,754	4,754	4,755	4,755	4,755	6	7
9	LPG Storage [MT]		486K	500K	510K	492K	530K	540K	620,000	800,000

\*) cumulative total



# PLAN OF POLICY



**Integrated Plan of Gas for  
infrastructure (electricity,  
industry, SPBG, etc)**



**Determination of  
Distribution Area  
Network**



**Creating Demand  
(KEK, RIPIN, RUPTL)**



**Deregulation to boost  
O&G Industries  
investment climate**



# CHALLENGE OF POLICY



- **Supply & demand gap for natural gas will start in 2019 in which Indonesia will start importing gas.**
- **Until 2025, there will be surplus & deficit of LNG Cargo. This calls for a strategy to manage supply and demand of LNG.**
- **The gas infrastructure roadmap until 2030 needs US\$ 48.2 billion of investment.**
- **Virtual pipeline will supply gas using shipping routes in 4 clusters, in which key components for successful virtual pipeline implementation: *State Owned Enterprise, PLN, experienced companies, & local content.***
- **Current challenge: formulating gas prices to stimulate economic growth.**
- **Acceleration of regulatory reform is currently under progress to increase investment attractiveness, simplify permitting processes & promote safety.**

# HRD Programs and Technical Cooperation

## Our HRD Programs

- Involving employees to training, courses & seminars outside the company
- Involving employees to international training courses, seminars & fairs (e.g. jccp, ADIPEC and etc.),
- Scholarship for Employees which is cooperate with University in domestic and abroad



# Key Agenda with JCCP Cooperation

- Keep Maintain recruiting and training our Human Resources

“Through this meeting / course, we hope for good cooperation established and more staff assistance training program from JCCP”

- conduct appropriate training for any level tittle of employee in the Directorate General Oil and Gas and dealing with performance issues and helping to manage people so that people and the organization are performing at maximum capability in highly fulfilling manner
- Providing training and development opportunities to improve employees' skills will be achieved morale, productivity, performance and maximaze results

# Programs are expected from JCCP

group of training programs which we expect establish according to our human resources background





どうもありがとうございました

— Dōmo arigatōgozaimashita —

- Terima Kasih -

- Thank You -



2018年7月25日プレゼンの様子@JCCP

