

STRUCTURING SMALL to MID FSRU PROJECTS

PT NUSANTARA REGAS

FSRU Jawa Barat - Indonesia

Pioneer Leader Innovator

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FLNG GLOBAL
May 15th 2018, Amsterdam

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 - **KEY CHALLENGES**

17.100 Island

300 Ethnic

51 National Parks

Asia



Australia

Language



Official : Indonesian
Regional : 742 language

Currency



Rupiah (IDR)

Capital
City

Jakarta

2010

2045

238,5 Mio



Population

318,7 Mio

49,9%



Urban population

69,1%

17



GDB Rank

4

“This condition indicates an increase in Energy demand”

GEOGRAPHIC



NATURAL RESOURCES



SUMATERA

Sumatera is the sixth largest island in the world. It is the center of Muslim Malay culture. It also has a lot of natural resources such as coal, natural gas, bauxite, and many others minerals. Found fertile peat soil makes the palm oil very suitable to be planted here. Virgin tropical rain forest is the origin of Sumatran tiger, elephant, rhino, and orang utan.



KALIMANTAN (BORNEO)

Kalimantan is the largest island in Indonesia. Geographically it is dominated with Tropical Rain Forest which is the original habitat of Orang Utan. It is the home of Mystical Dayak Tribe that already assimilated with many immigrants.



Economy and Transportation are dependable with the existence of many large Rivers

SULAWESI (CELEBES)

Sulawesi is a unique island. It has 4 peninsulas that, separated by 3 gulfs. Geographically, it is an independent island, which made it has many unique local creatures that cannot be found on other places, such as Tapir. It has many natural resources such as gold and nickel. On colonial era, it is the central of herbs & spices trading venue.



MALUKU

Maluku Islands are located at east of Sulawesi, west of New Guinea, and north east of Timor. The islands were the historical core of the Spice Islands known to the Chinese and Europeans that sparked colonial interest from Europe in the 16th century.



INDONESIA

Indonesia is the largest (volcanic) archipelago in the world, with more than 17.500 islands and 400 volcanos which 100 remain active.

Strategically positioned on Equator, between Indian - Pacific Oceans and Asia - Australia Continents.

JAVA

Java is the fifth largest island and home to almost 60% of the Indonesian population. It is the most populous island on Earth. The Indonesian capital city, Jakarta, is located on western Java. Almost large industries and companies are located on this island and contributed to almost 60% of Indonesia economy. The mixing of tradition values and openness to modern life makes Java become the most developed area in Indonesia.



BALI

Bali island is a popular tourist destination. Bali fosters its own distinct culture from outside the world. Hinduism has flourished here for nearly 2,000 years and has shaped the iconic Balinese culture. Bali is part of the Coral Triangle, in this area alone over 500 reef building coral species can be found. With miles of luxurious coastline and a range of accommodation in Bali, this small island has room enough for everyone.



NUSA TENGGARA

Nusa Tenggara is a group of islands in Maritime Southeast Asia, north of Australia. Geologically, the northern is volcanic and southern is non-volcanic. It is the driest place in Indonesia, and dominated with savanna habitat. The economy is derived from the fisheries, livestock, and tourism.



PAPUA

Papua is the largest province and easternmost island of Indonesia. Papua is bordered by the nation of Papua New Guinea to the east and comprising most of western New Guinea Island. Almost of its area is still a virgin tropical forest where homes of Asmat Tribes. Its natural resources are various such copper and gold minerals, and also natural gas.



One-horned (Javan) Rhinoceros



Ujung Kulon National Park



Prambanan Temple

CULTURE



WORLD HERITAGE



Flag



Symbol



wonderful indonesia



Independence Day

August 17th 1945

Ideology

Pancasila (*Ancient Javanese: Five Good Values*)

Motto

Bhinneka Tunggal Ika (*Ancient Javanese: Unity in Diversity*)

Anthem

Indonesia Raya (*Bahasa: Great Indonesia*)

Government

Unitary Presidential Constitutional Republic

Language

Bahasa Indonesia (*with more than 700 local languages*)

Capital City

Jakarta

Religion

Islam (*Majority ~ 90%*), Christian, Catholic, Hinduism, Buddhism, Confucianism, Ancient Cults

Climate

Tropical

- Rainy on October - March
- Summer on April - September

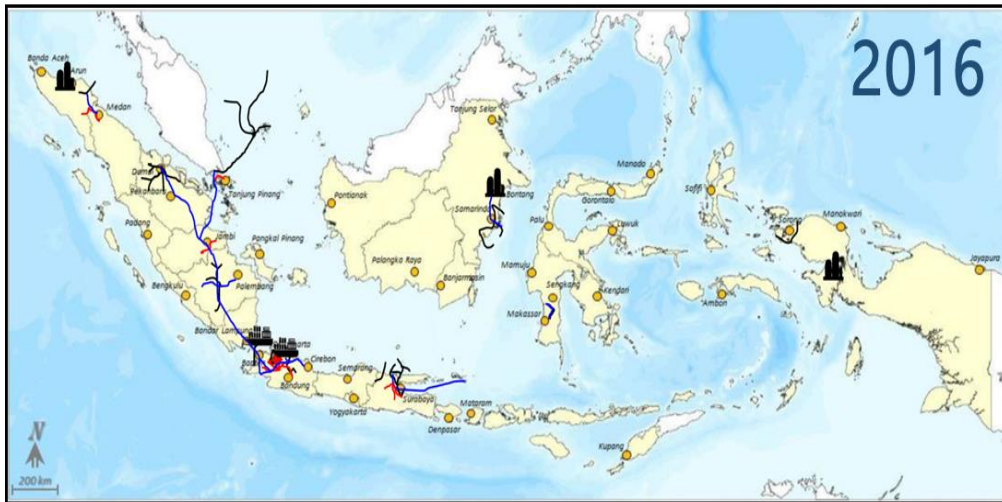


Prepared by:



a joint venture company between PERTAMINA & PGN

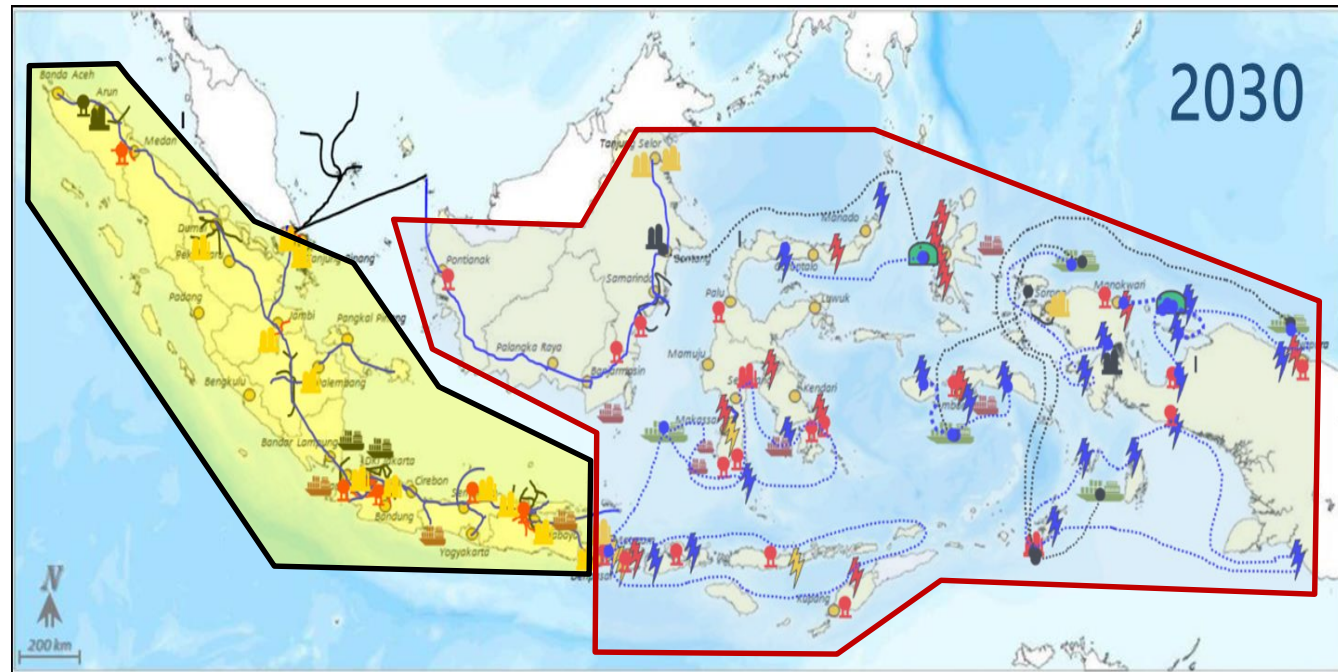
EAST MEET WEST



☐ **West part** is the center of gas demand. Then, it will be supplied by gas pipe with combination of virtual pipe as a support.

☐ **East part** has promising potential demand, but scattered. Then, it will definitely be supplied using virtual pipe networks.

“Eastern Indonesia will be grew higher in the next year”



Pioneer, Leader and Integrated Domestic LNG Solution

Successfully
delivered more than
150 cargo in 6 years

Operational
Performance
Excellent

One of the National
Vital Objects

1st

150



Nationality

Reliability

Safety
First

ObVitNas

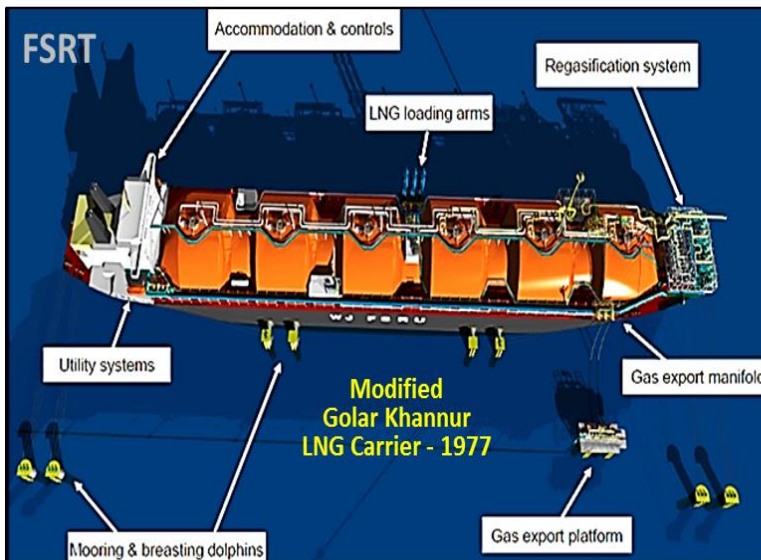
Pioneer in operating
FSRU in Indonesia

Focusing in
Nationality Market
Needs

Safety is Our Culture

Company Profile

Shareholders



History

- ❑ PT. Nusantara Regas was established in 14 April 2010
- ❑ Main user is PLN Power Plants
- ❑ Initial start-up of LNG Regasification was on May 2012
- ❑ The first LNG SPA was 1,1 million tones
- ❑ The business scopes are:
 - FSRU operation
 - LNG Transport, Storage, and regasification
 - LNG Sales and Purchase
 - Delivering re-gasified LNG to end users
- ❑ PT Nusantara Regas was the implementation of Presidential Instruction No. 1 / 2010 for:
 - Overcoming the problem of gas supply to PLN Power Plants especially in Jakarta Bay Area
 - Accelerating the development of national energy infrastructures
 - Synergizing the Energy State Owned Companies (Pertamina - PGN - PLN) for Indonesia peoples wealth
 - Reducing the burden of the state budget for fuel subsidies

Our Location



- ☐ 5° 58' 28.920" S
- ☐ 106° 47' 57.960" E
- ☐ 24 inches Sub-sea Pipe Diameter
- ☐ At 22 - 23 meters Water Depth
- ☐ 15 km from Muara Karang Shore

Type	Steam and Gas Power Plant
Area	Muara Karang - Jakarta
Kind of Fuel	Natural Gas
Power Capacity	908.58 MW
Owner	PT. PJB
Shareholders	PT. PLN (Persero)
Activity Since	1979



PT Pertamina Gas



Type	Gas and Diesel Power Plants
Area	Tanjung Priok - Jakarta
Kind of Fuel	Natural Gas
Power Capacity	PLTG = 52.00 MW PLTGU = 1,180.00 MW
Owner	PT. Indonesia Power
Shareholders	PT. PLN (Persero)
Activity Since	PLTG - 1976 PLTGU - 1994

Type	Gas Power Plant
Area	Bekasi - West Java
Kind of Fuel	Natural Gas
Power Capacity	PLTG Block 1 = 640 MW PLTG Block 2 = 280 MW PLTG Block 3 = 420 MW PLTG Block 4 = 420 MW PLTG Block 5 = 384 MW
Owner	PT. PJB
Shareholders	PT. PLN (Persero)
Activity Since	1997





LNG Carrier

FSRU



ORF & Metering Station



Tug Boats

Being able to deliver gas for Our Main Customer (PLN Power Plants), NR has operated 5 main facilities, which are:

1. LNG Carrier

We have chartered a dedicated LNG Carrier to bring LNG from LNG Sources to Our FSRU in Jakarta Bay. Several PLN's own cargos also brought to Our FSRU by DES scheme using Sellers' LNG Carrier.

2. Tug Boat

As an LNG Receiving Terminal, we have chartered dedicated Tug Boats to support FSRU needs, such as Berthing & Un-berthing of LNG Carriers to FSRU, Area Patrol, and supporting operation as needed.

3. FSRU

Our off-shore LNG Receiving Terminal is utilizing a Floating Storage and Regasification Unit with 125.000m³ storage capacity and 500 MMscfd regasification capacity.

4. Offshore Pipeline

Our 24" Sub-sea Transmission Pipeline is able to deliver up to 500 MMscfd natural gas from FSRU to Muara Karang shore.

5. ORF & Metering Station

The ORF has 1 input from FSRU and 5 output to PLN Muara Karang 620 psi, PLN Muara Karang 350 psi, PLN Tanjung Priok, PGN West Java Distribution, and Pertagas Transmission to PLN Muara Tawar.

Subsea Pipeline & Onshore Receiving Facilities



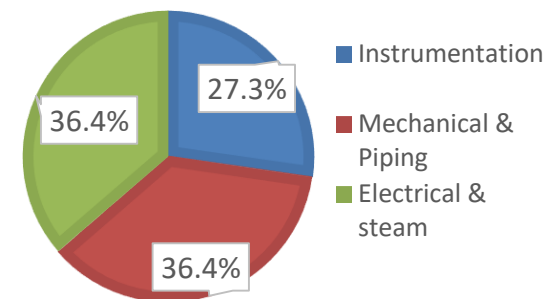
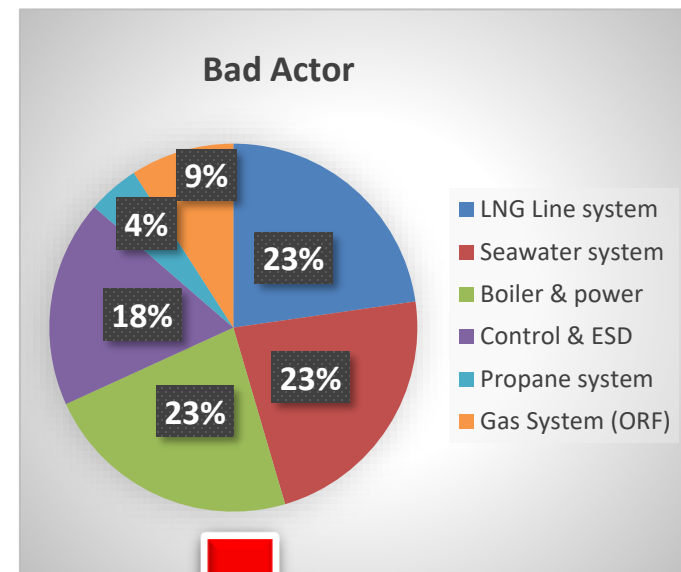
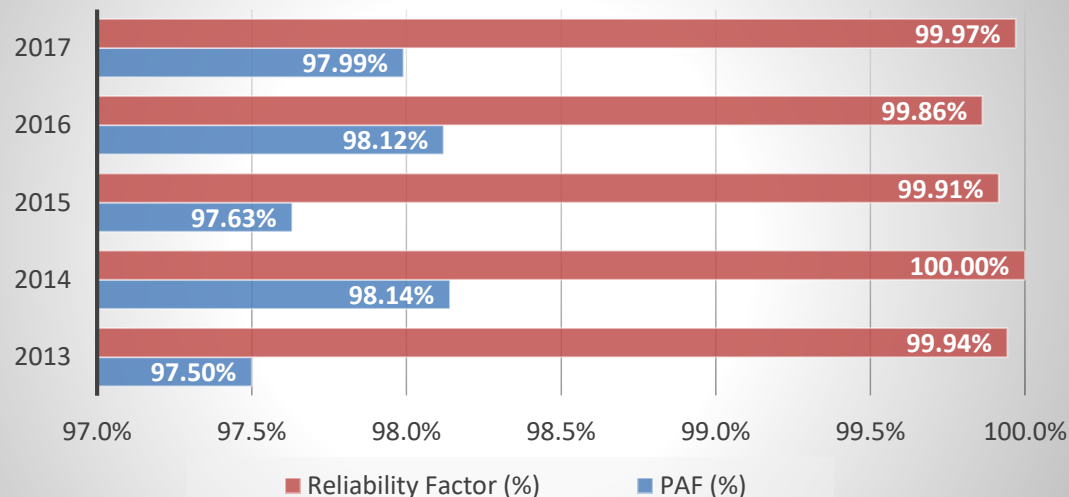
Subsea Pipeline

- Design Specification : DNV OSF101 2007
- Pipeline Length : approx. 15 km
- Material Grade : DNV Grade 450
- Coating : 3LPE & Concrete Weight
- Cathodic Protection : Galvanic Anode as per DNV F103

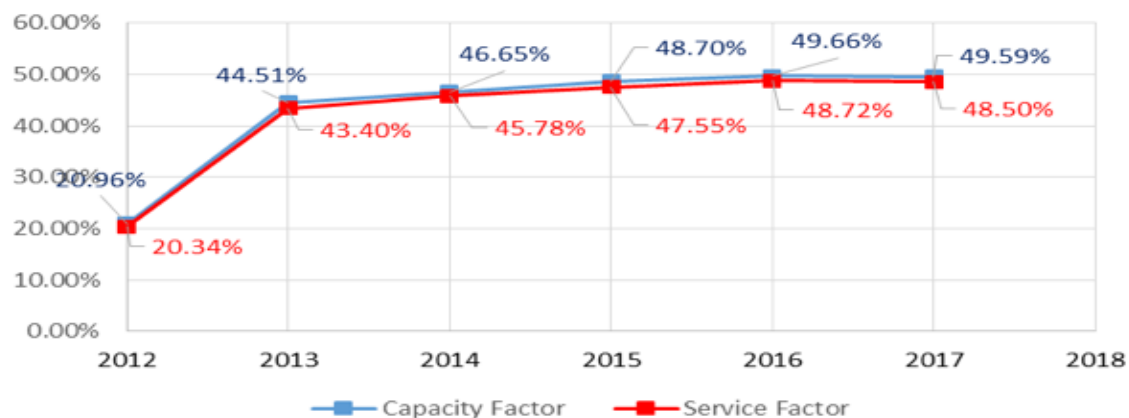
Onshore Receiving Facilities

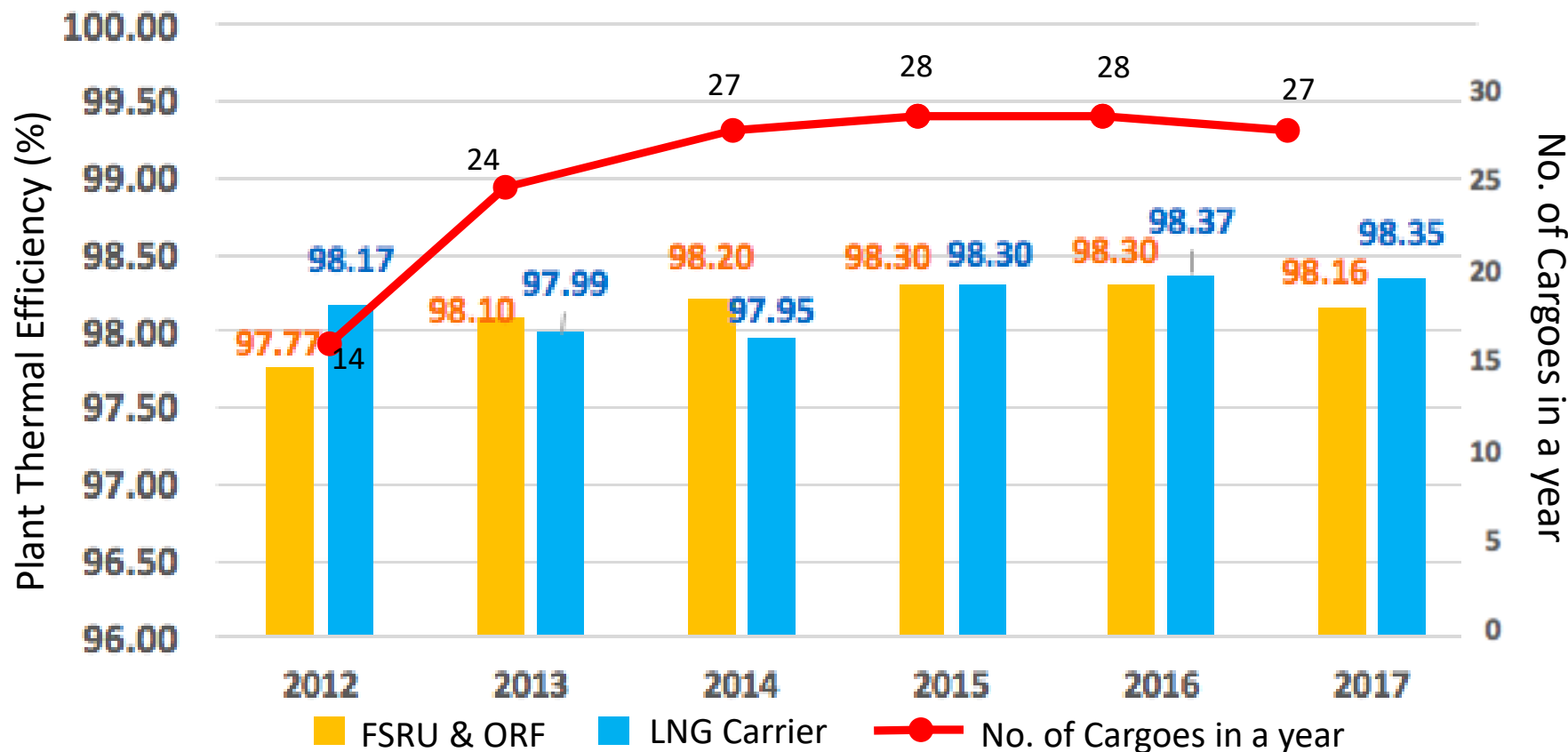
- Pig Receiver
- Gas Filter 2x500 MMscfd
- Gas Heater
- Gas Metering System
- Letdown / Regulating System
- Gas Distribution Piping system to customer

Plant Availability Factor (PAF) & Reliability Factor



Capacity & Service Factor



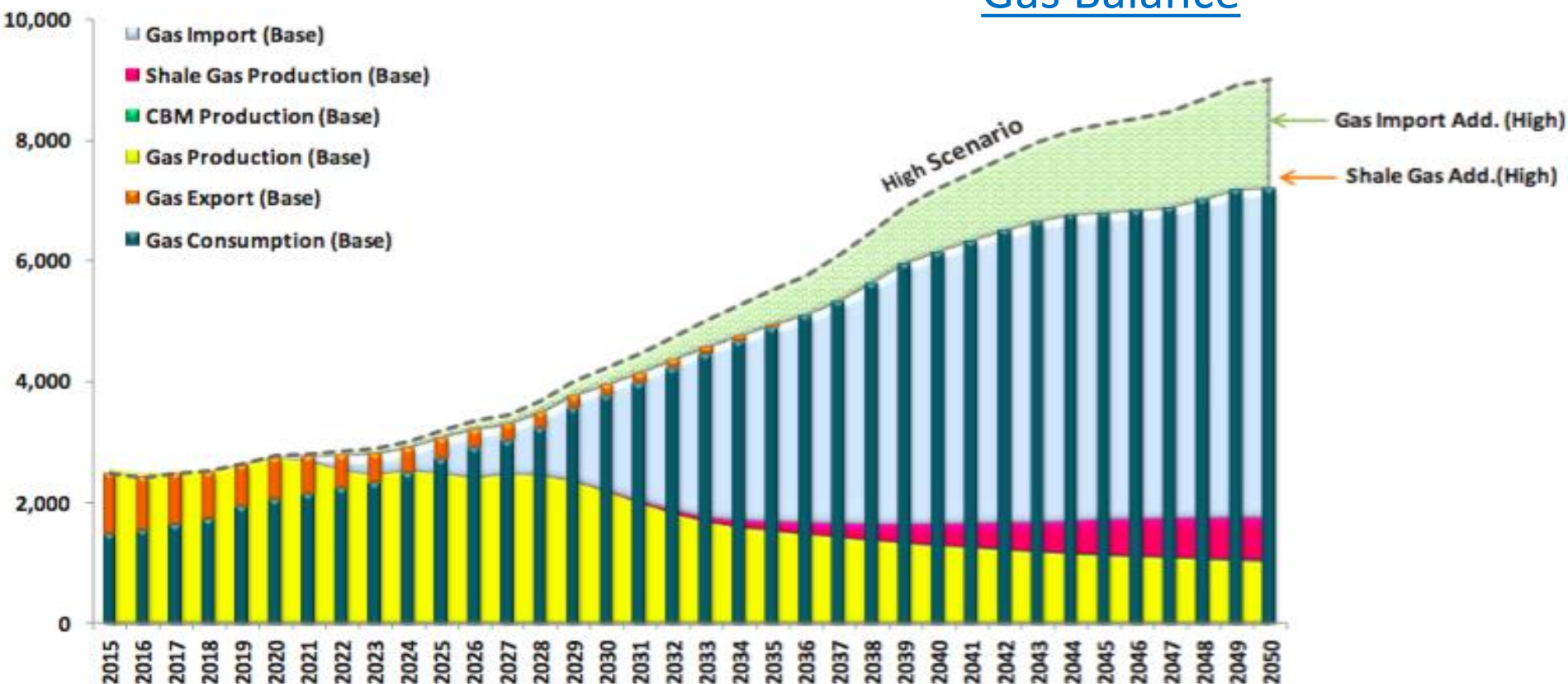


- High efficiency operation is always a good business.
- The increase of FSRU utilization could enhance regasification process efficiency.
- High efficiency operation in LNGC is achieved by an excellent LNG shipping & schedule management.



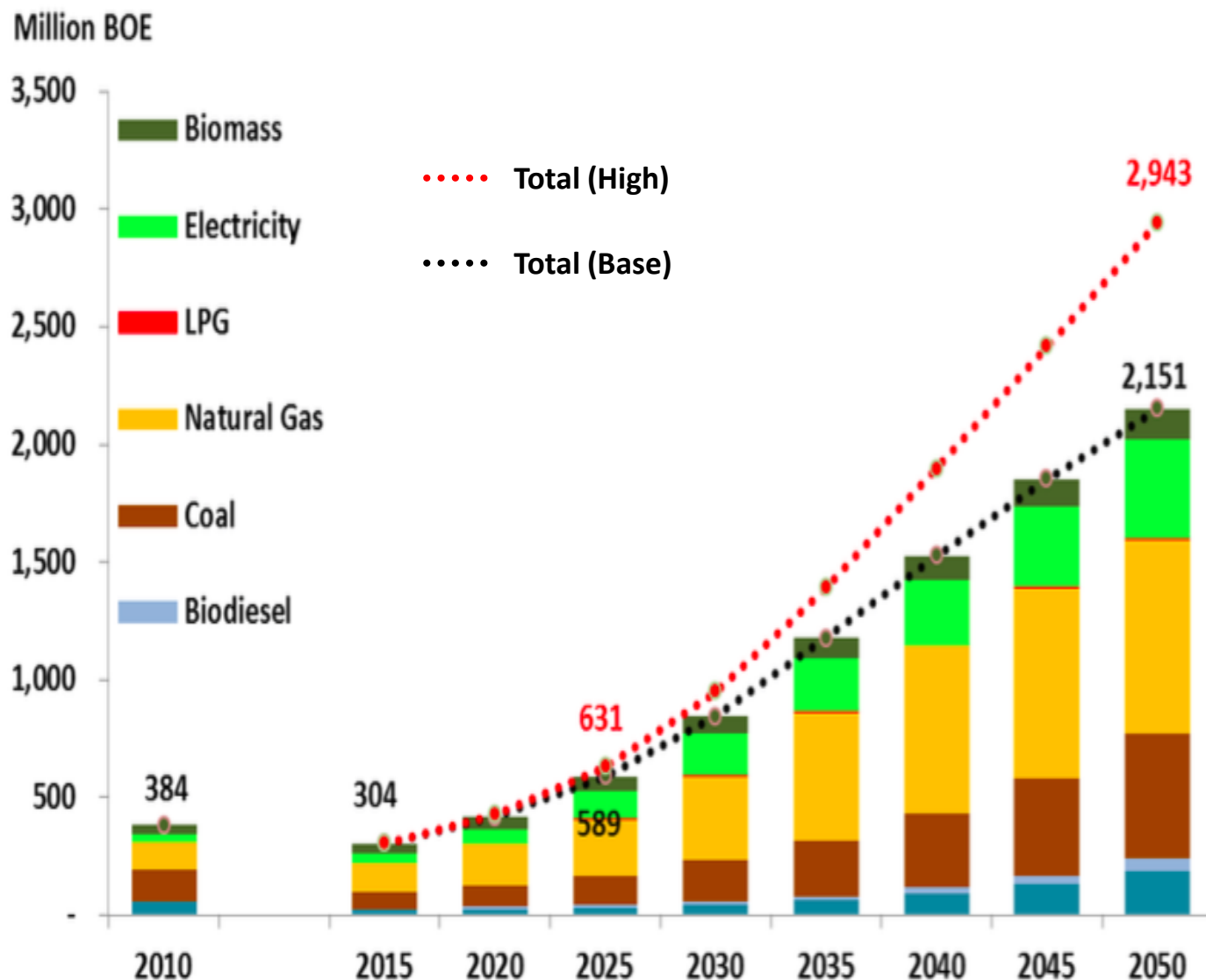
Gas Balance

BSCF



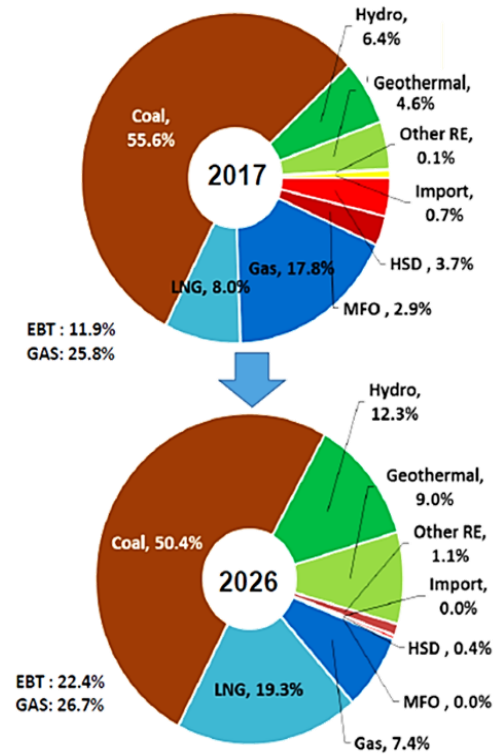
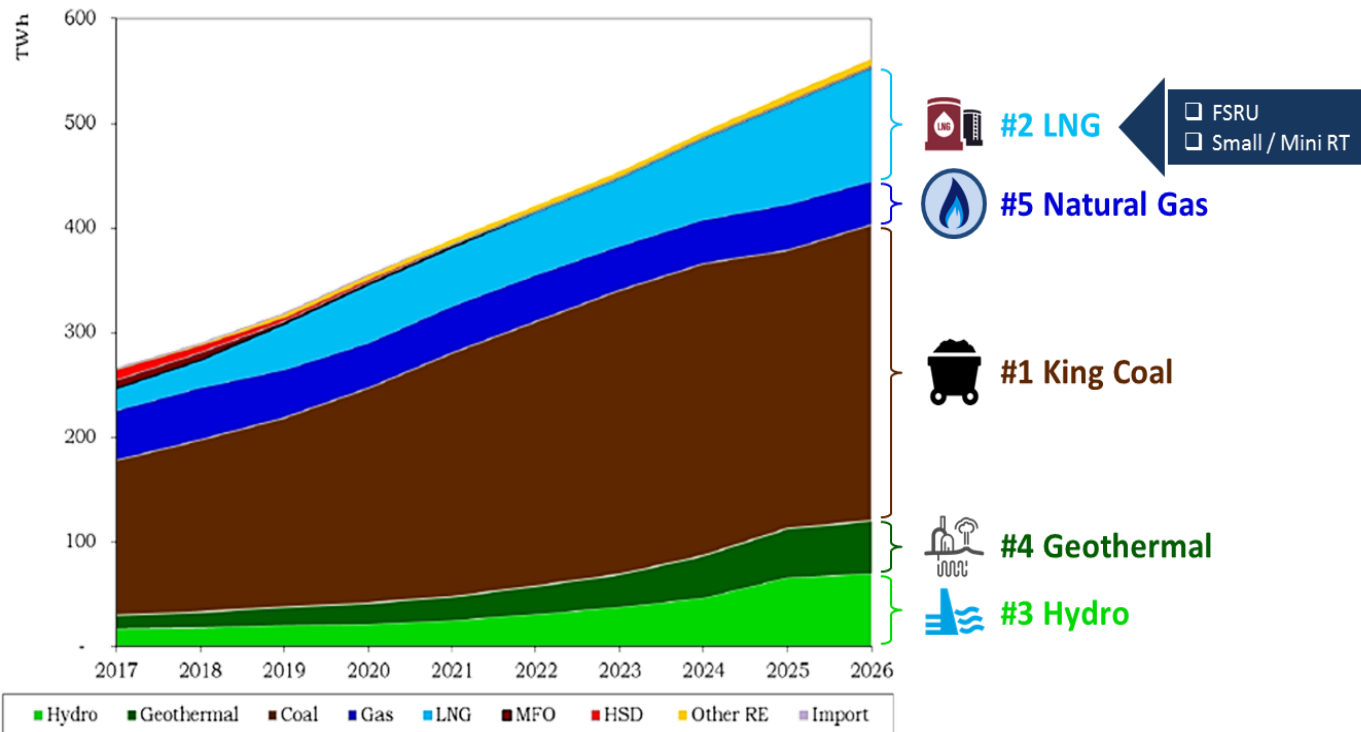
Natural gas production is estimated to decline as most of the production is obtained from mature fields. Import of natural gas is expected to increase and will dominate the supply of natural gas in the long run. High imports of natural gas require infrastructure support especially the Floating Storage Regasification Unit (FSRU).

Indonesia Energy Demand in Industry Sector



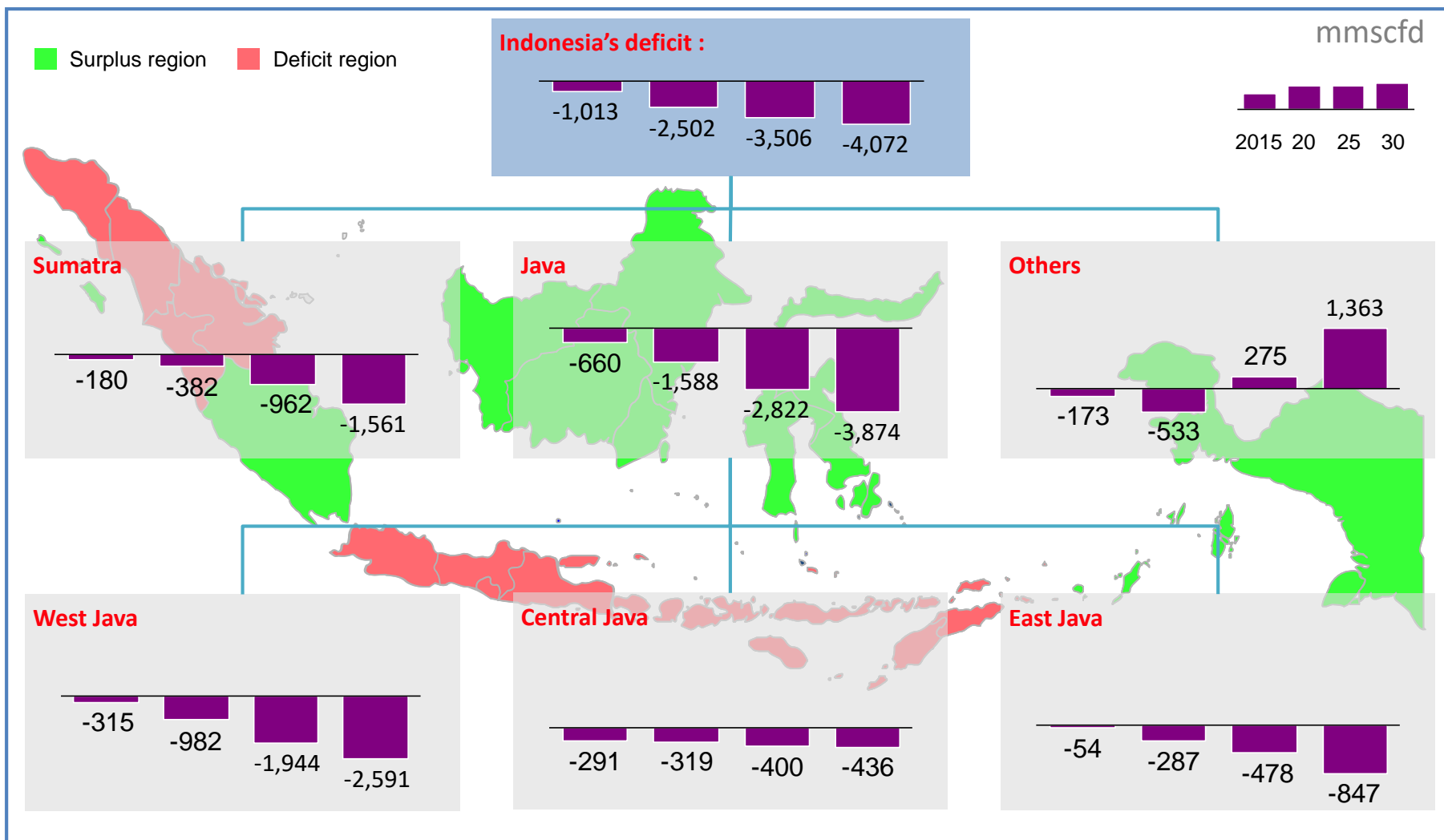
Energy demand in 2050 increase sharply by more than 7 times (base scenario) and more than 10 times (high scenario) compared to 2015

Energy Mix Projection



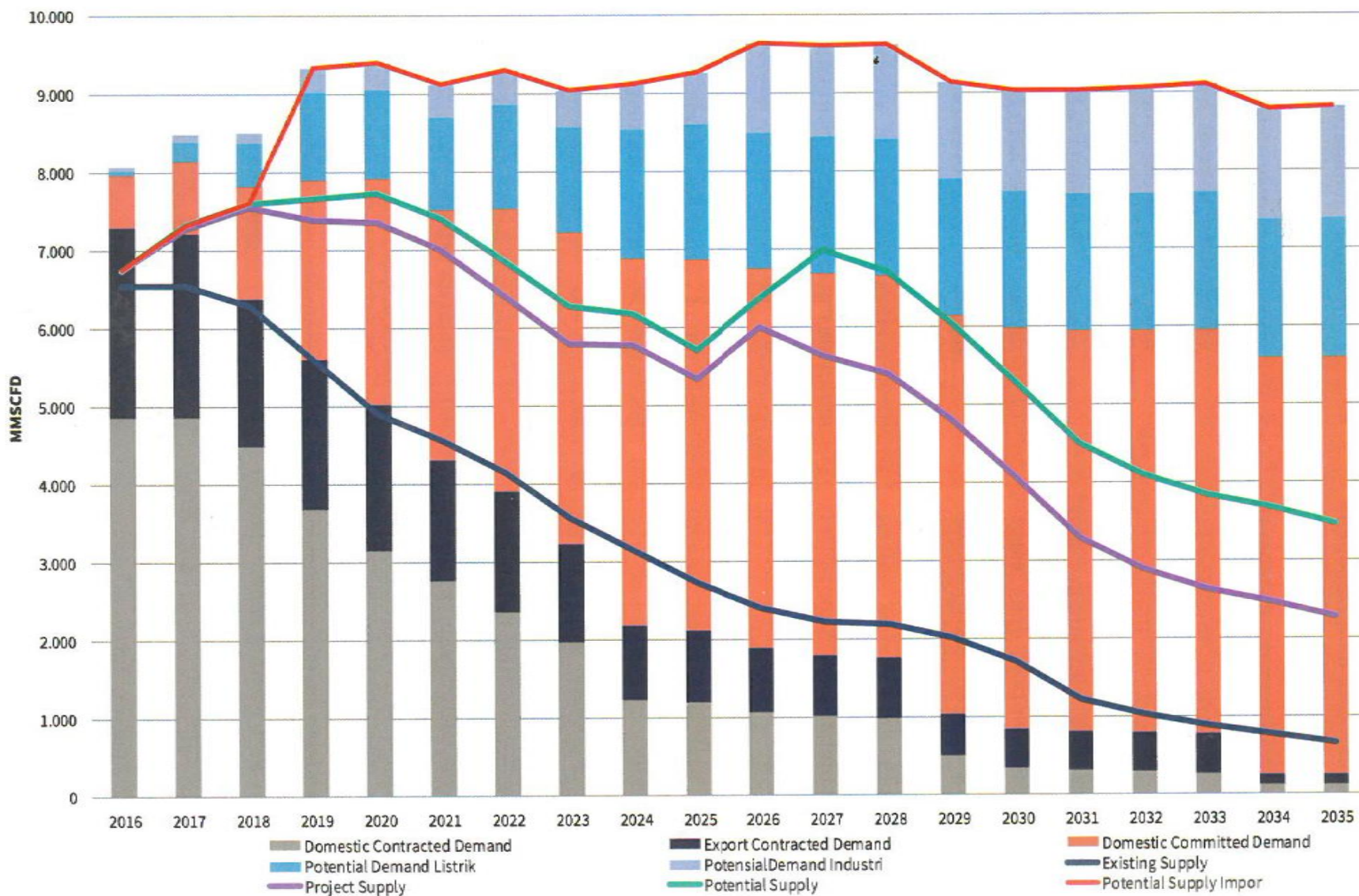
Regarding to information on RUPTL 2017-2026, it shows an increasing of LNG demand for power generation about 19,3% till 2026 in Indonesia. FSRU become one of alternative solution for this future opportunities

Indonesia Gas Supply Demand Balance



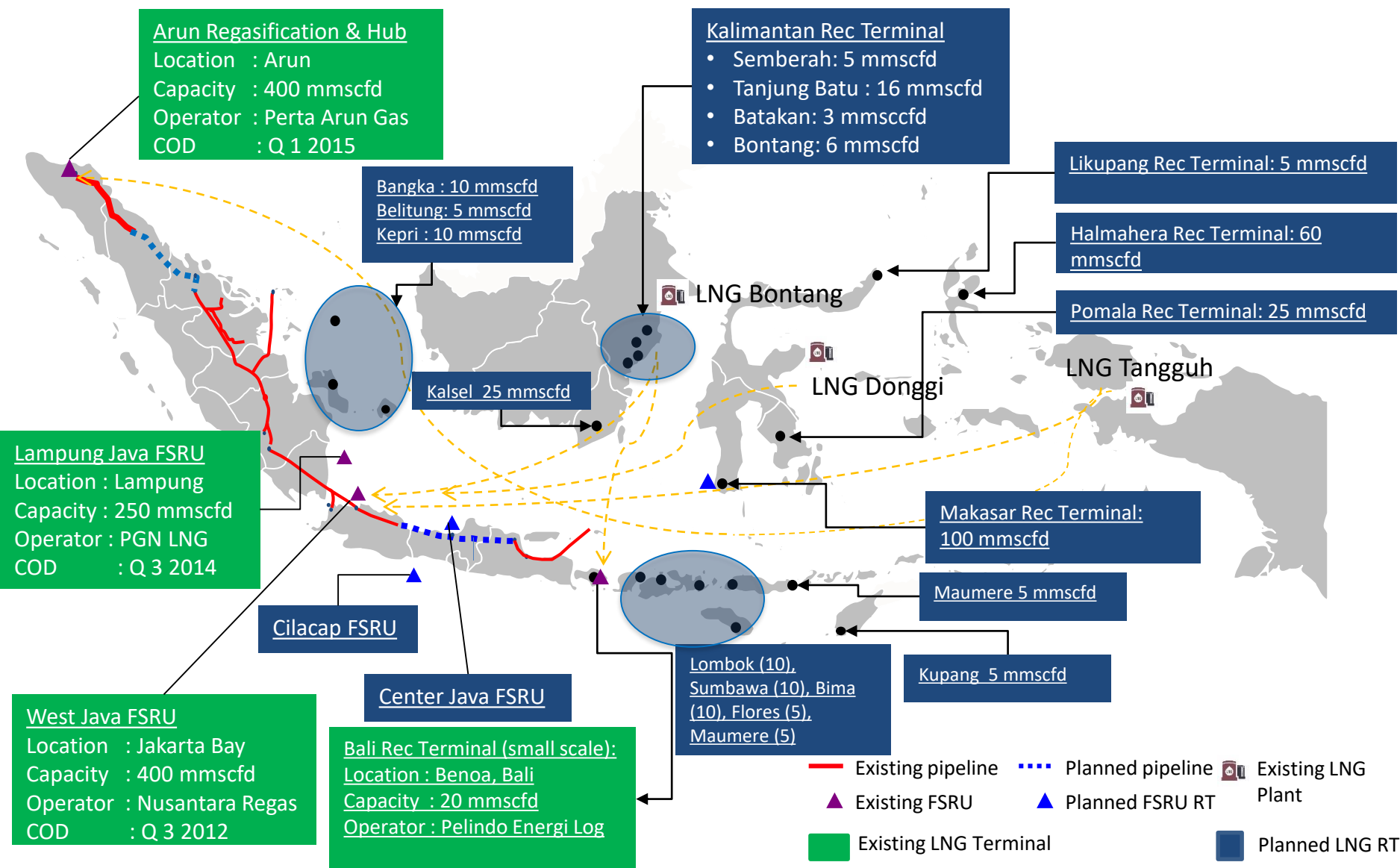
In order to integrate gas supply and demand among regions, it is required to accelerate gas infrastructure development, not only in strategic location but also in scattered location.

Indonesia Gas Supply Demand Balance 2016 - 2035

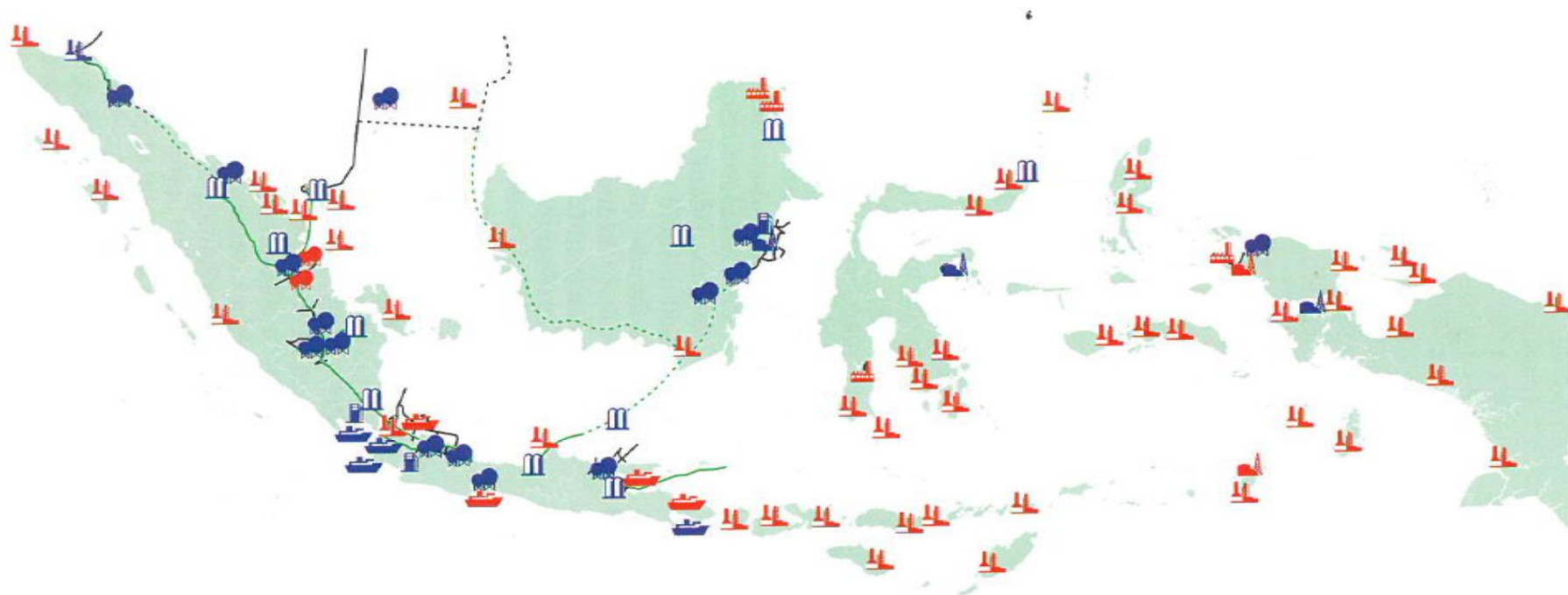


Sumber : Ditjen Migas, 2016

Indonesia LNG Supply - Demand Balance Points



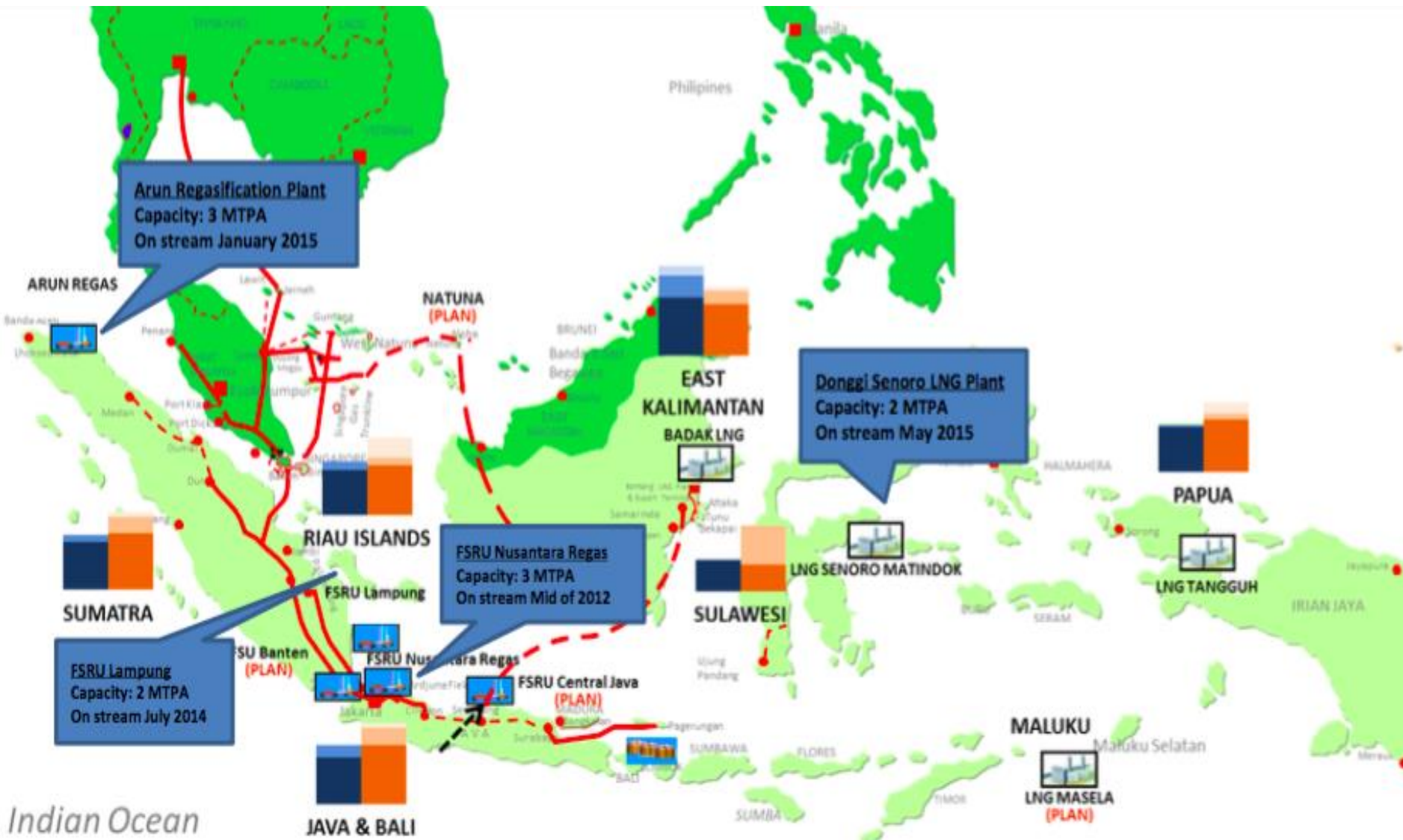
Indonesia Gas Infrastructure Roadmap 2016 - 2035



- | | | |
|---|--|---|
|  FSRU (Eksisting) |  CNG (Eksisting) |  Mini LNG (Rencana) |
|  Kilang LNG (Eksisting) |  SPBG (Eksisting) |  Infrastruktur Rencana |
|  Terminal Regasifikasi (Eksisting) |  Pipa <i>Dedicated Hulu</i> (Eksisting) |  Pipa Rencana |
|  Kilang LPG (Eksisting) |  Pipa <i>Open Access</i> (Eksisting) | |

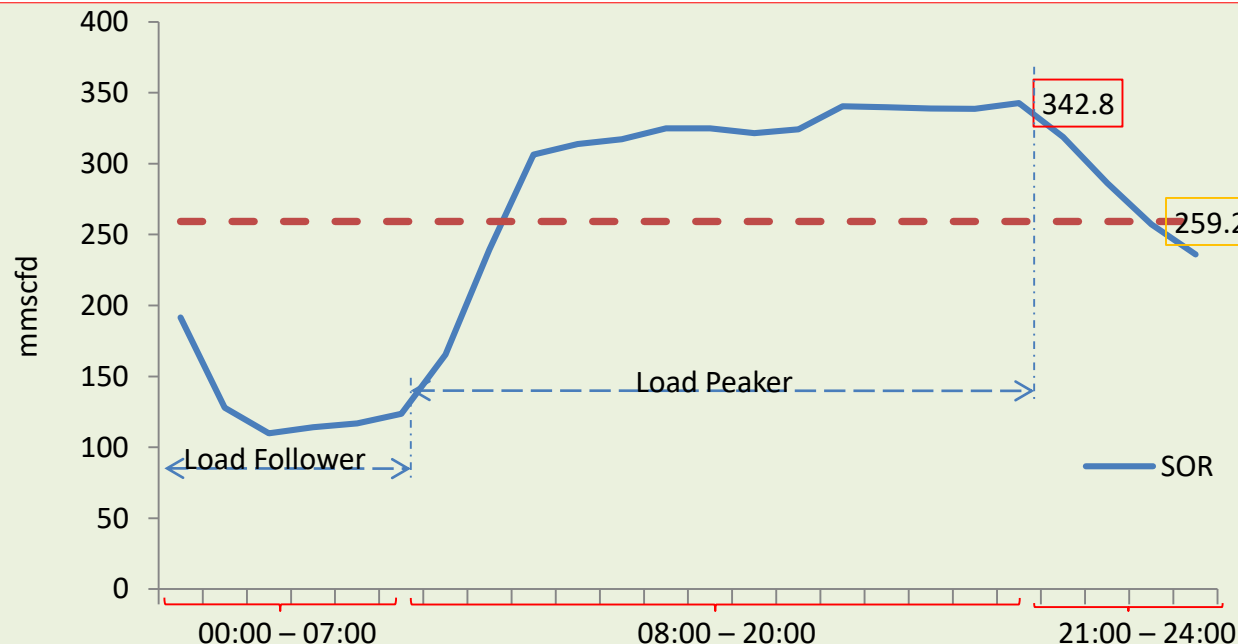
Roadmap infrastruktur gas bumi Indonesia 2016-2035

Indonesia Gas Infrastructure (LNG/Regas Plants, Gas Pipelines, FSRUs) to Support Domestic Demand



LNG Demand Profile

- 1. Load Follower** - Gas from FSRU is not base load follower depending downstream needs
- 2. Load Peaker** - Gas from FSRU is used as peaker, means gas is used to increase electricity production during peak time on top of base fuel used.



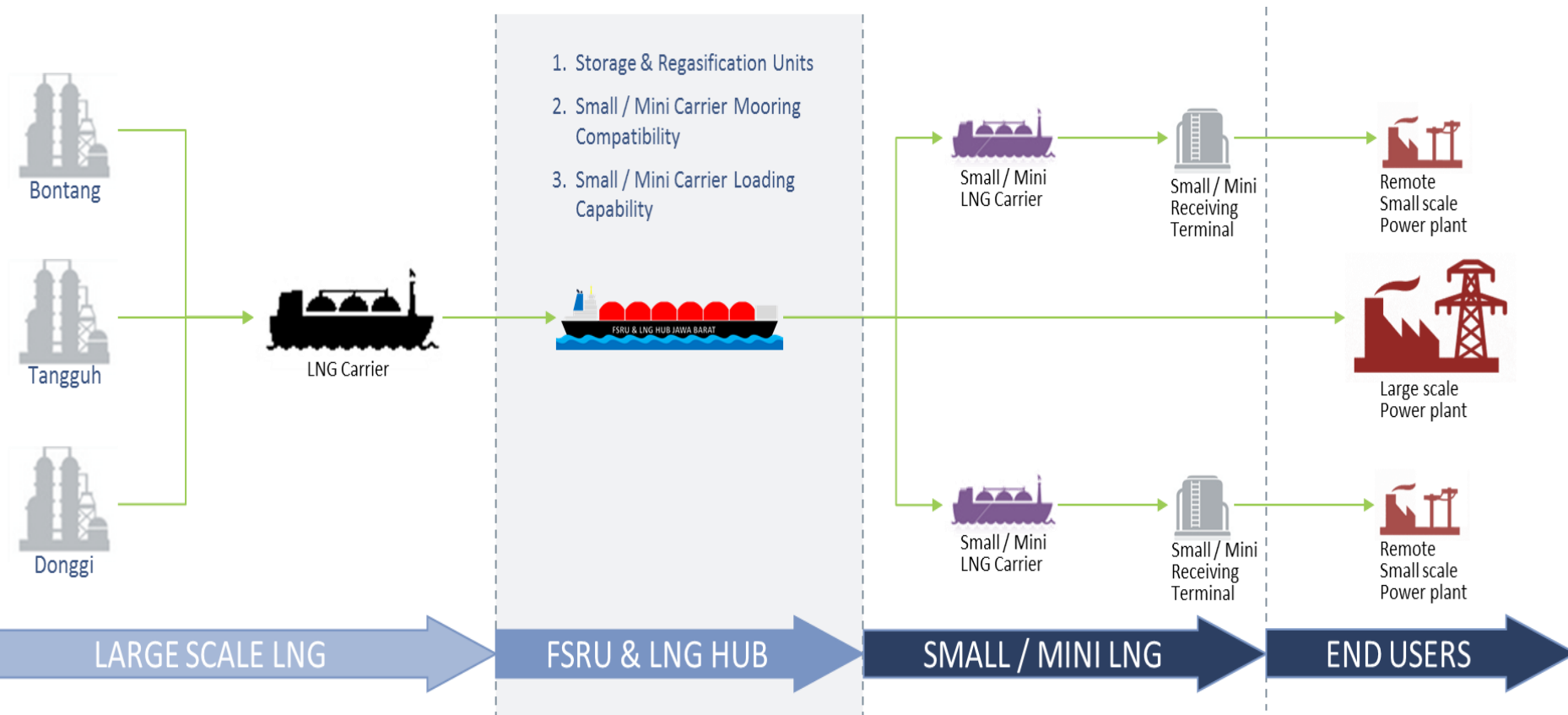
□ SOR : Send Out Rate

□ Extracted data was obtained from daily operational report of 24 April 2014

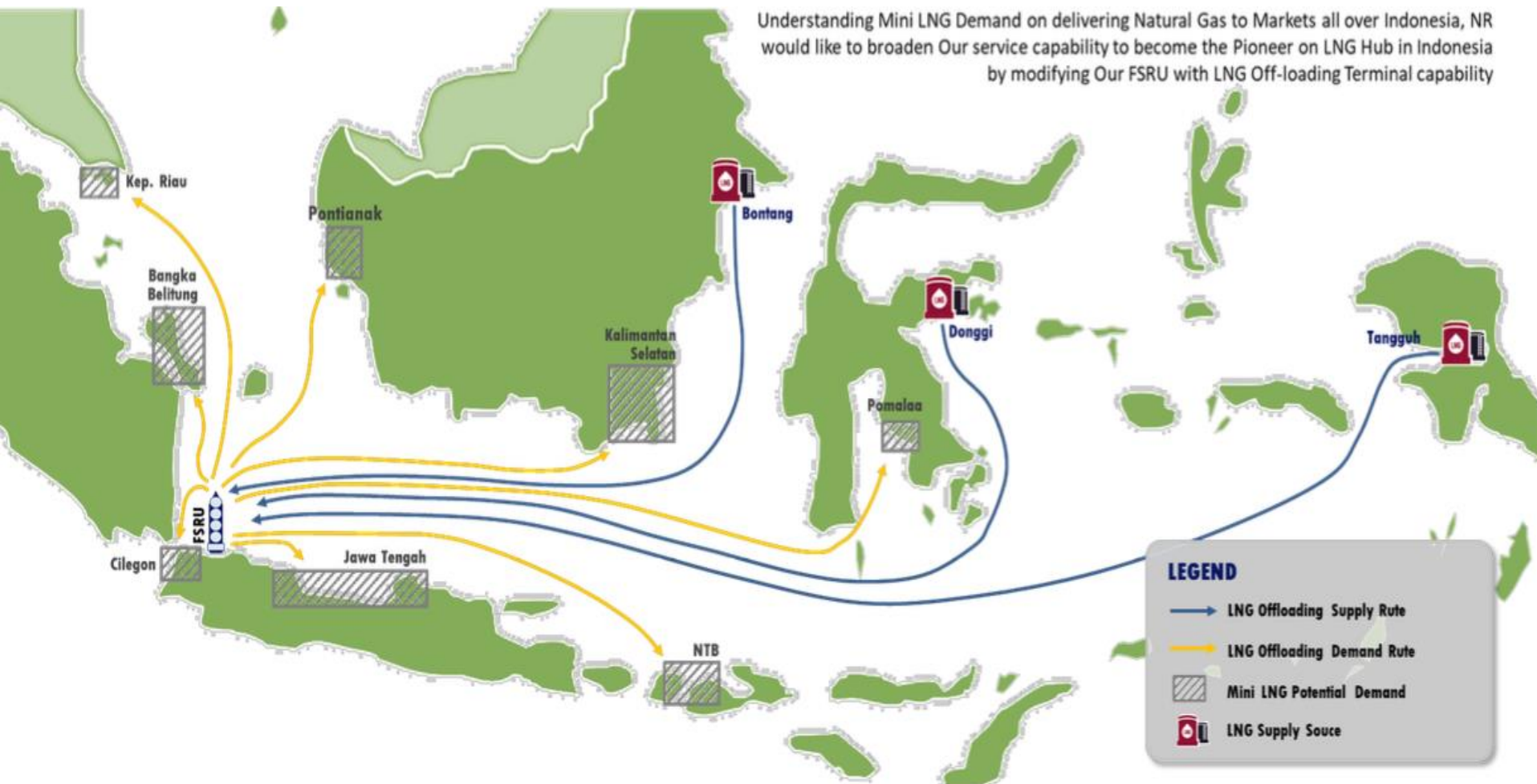
- The highest ramp up was achieved from 123.7 to 306.4 mmcsfd within 4 hours or 45.6 mmcsfd per hour.
- The guaranteed ramp up is from 60 mmcsfd to 500 mmcsfd should less than 2 hours.
- Gas nomination from Buyer is average 220 mmcsfd (weekday) and 150 mmcsfd (weekend).

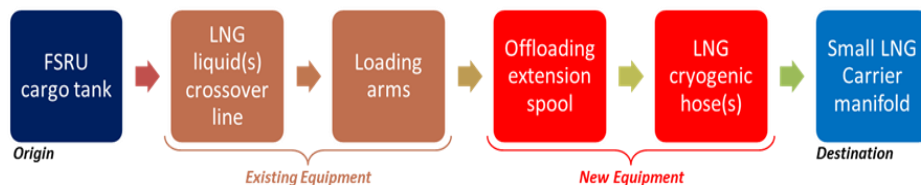
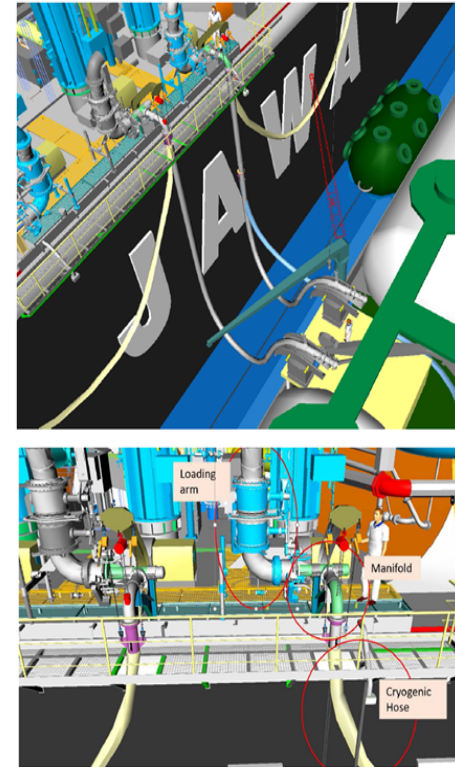
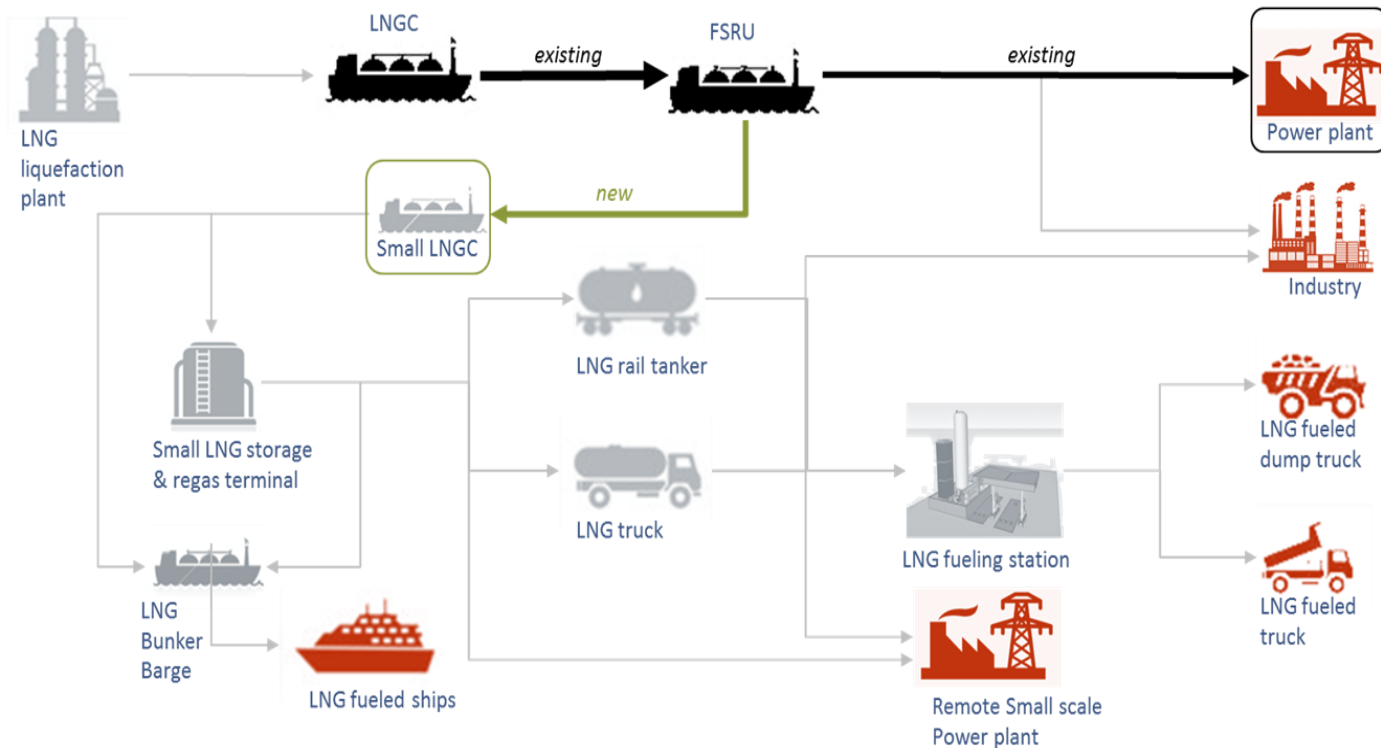
FSRU & LNG HUB as a Solution

To Accommodate LNG needs of both LNG FSRT and Small / Mini LNG Receiving Terminals, then Nusantara Regas has been preparing a total solution as the main enabler of Small / Mini LNG Distribution, by developing the first LNG Off-loading Terminal which able to store and load LNG for Small / Mini LNG Carriers.



LNG Offloading Supply - Demand

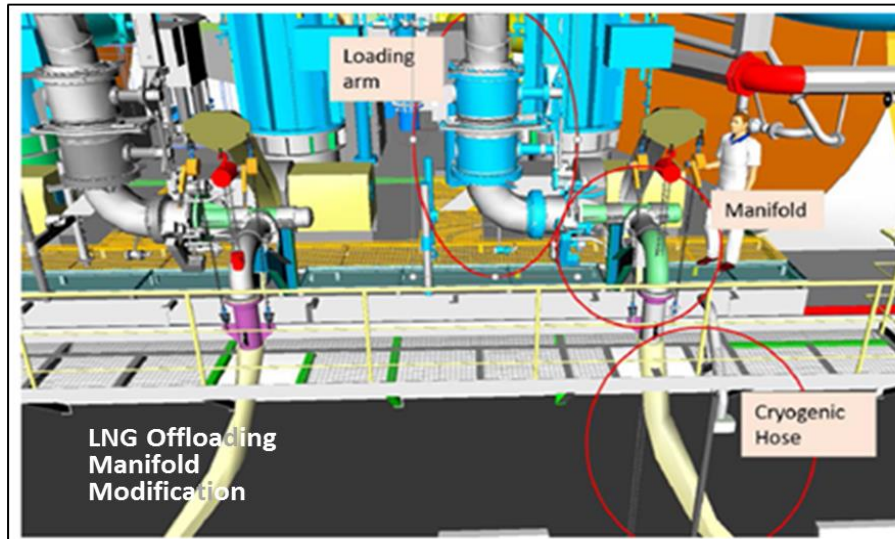




To enhance our existing FSRU capability to be a LNG Hub, we are preparing to modify the existing loading arm to be able to off-load LNG using flexible hose to Small / Mini LNG Carrier.

LNG Ship-To-Ship Offloading Initiative

To enhance our existing FSRU capability to be a LNG Hub, we are preparing to modify the existing loading arm to be able to off-load LNG using flexible hose to Small / Mini LNG Carrier. This initiative will serve Customer Demand on Small / Mini LNG Distribution Network as needed.



Multi-LNG White STS Composite Hose

Bore diameter		Max. work. pressure		Weight		Available lengths	
inches	mm	PSI	bar	lbs/Ft	Kg/m	Ft	m
8	200	150	10,5	13,5	20,1	100	30
10	250	150	10,5	16	23,9	100	30

Operational and technical support in the provision and procurement of ship-to-ship transfer systems:

- ☐ Emergency Release Couplings (ERC'S)/Systems
- ☐ Hoses
- ☐ Saddles
- ☐ Fall Arrestors,
- ☐ Rubber Fenders,
- ☐ Ancillary Items,
- ☐ Offloading Manifold Modification
- ☐ Quick Release Hook (QRC'S) Specification
- ☐ Mooring Systems

TYPICAL ESD COMMUNICATION SYSTEM LAYOUT



Optimizing Development and Efficiency: Managing Paradox



- * Cost Efficient
- * Competitive Gas Price

- * Pioneering Risk – Uncertainty
- * Investment Assurance
- * Acceleration in Infrastructure Development

- Current competition requires competitive gas price
- Transparency on cost and pricing structure
- Effective and precise gas allocation

- Penetrate New area
- Pioneering risk due to uncertainty of gas and infrastructure utilization
- Requires Coordination and integrated approach

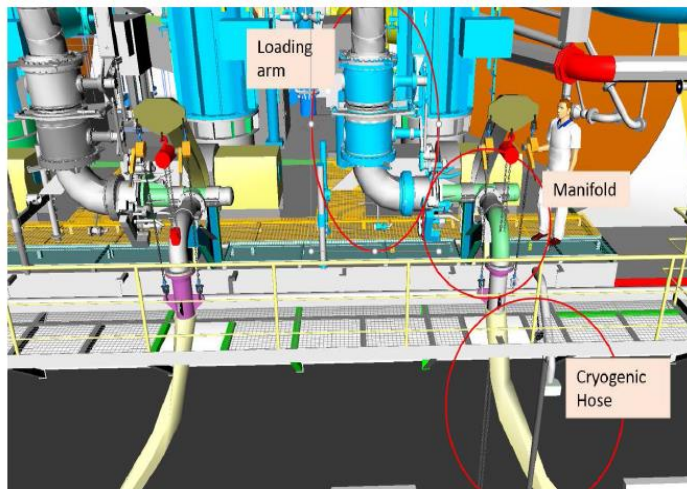
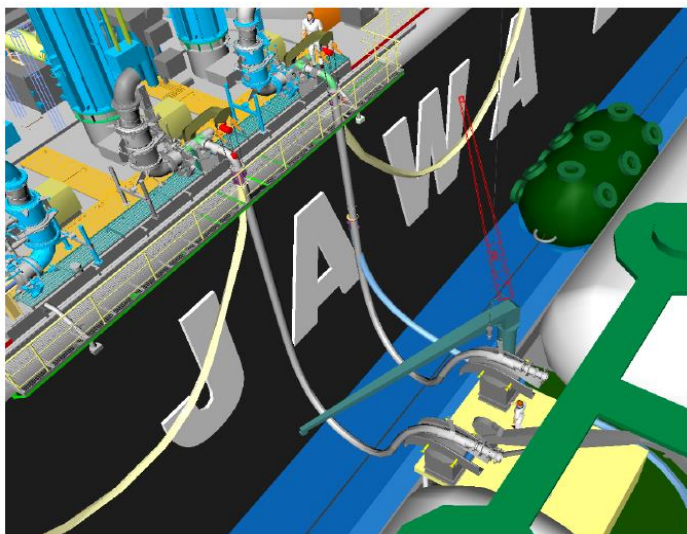
NR is committed to face Pioneering Risk on Indonesia LNG Infrastructure

Modify Gas Management Model
(Ambidexterity Solution/Somewhere in the middle solution)

Source: PGN



NR FSRU LNG Offloading Terminal



- ❑ Target operating : Q4 2018
- ❑ Our existing customer still on Top Priority, then LNG Offloading Operation would be adjusted to Our Priority Customer's delivery program
- ❑ In normal scheduling, we are expected 11 up to 15 LNG Offloading Operation to Small LNG Carriers / Barges within a month
- ❑ Each LNG Offloading Commitments, will be treated as *First Book-First Served*, with necessary adjustment to our priority customer delivery program as a Top Priority
- ❑ We are pleased for any questions and future cooperation

[CONTACT US](#)

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Thank you

