

LNG Demand Potential and Infrastructure in the EAS Region

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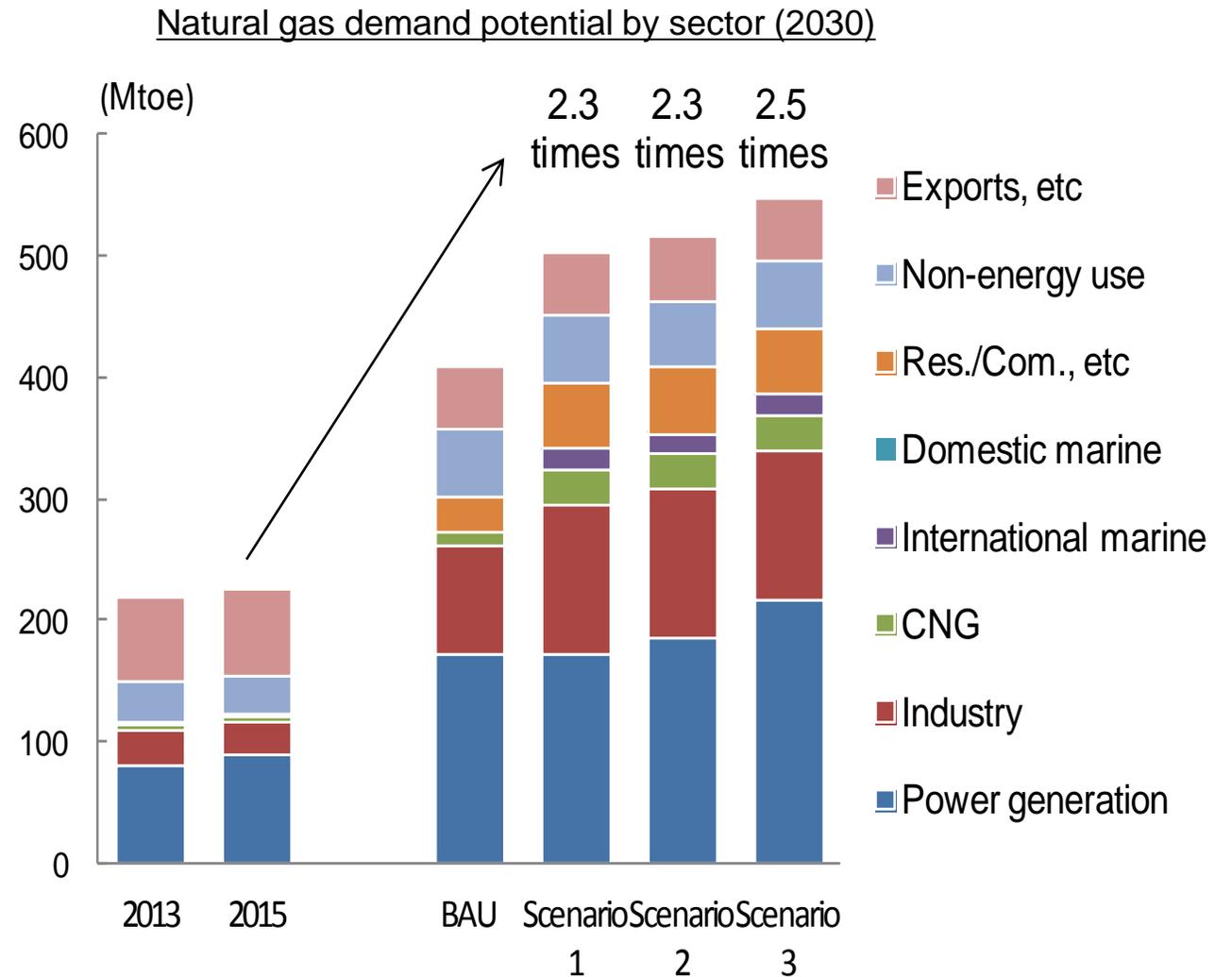
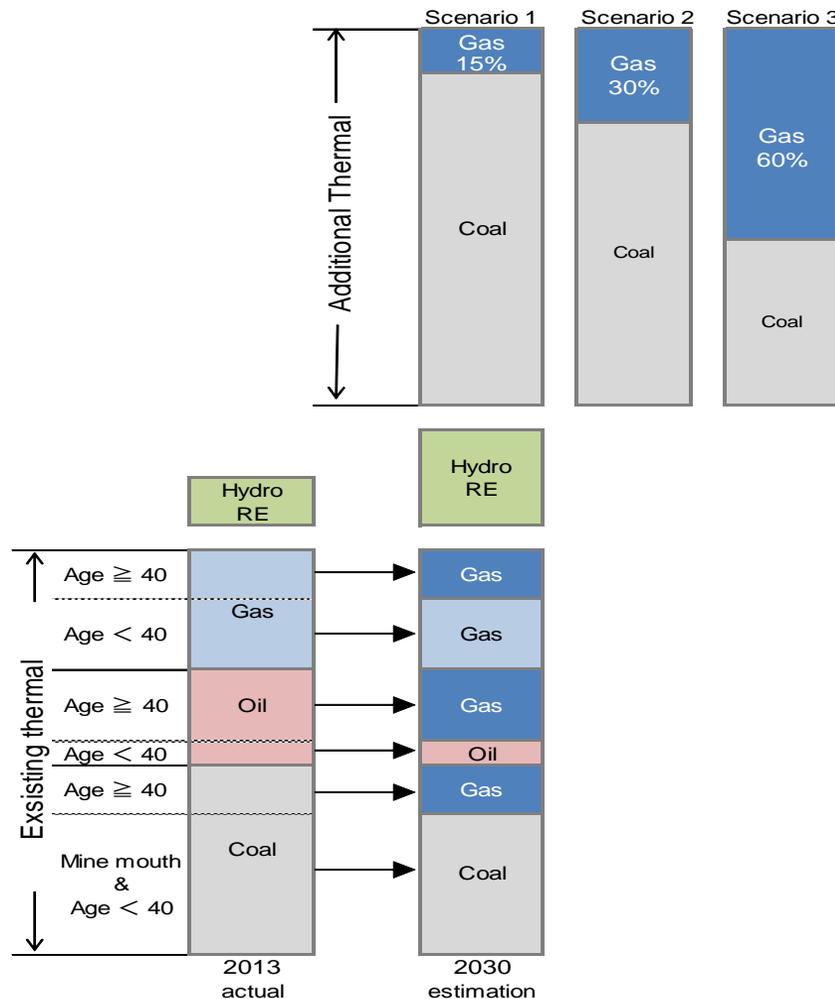
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Large Gas Demand Potential in ASEAN + India

- ◆ 3 Scenarios as to the share of natural gas in the additional thermal power plants (15%, 30%, 60%)
- ◆ Natural gas demand for ASEAN + India in 2030 may expand by 2.3 to 2.5 times compared with 2015
- ◆ By sector, the power generation sector has the largest potential, followed by the industrial sector.



Economic/Environment Benefit of Natural Gas.

Power generation

Case	Fuel import cost			Construction cost (Billion USD)	CO ₂ emission (Million tons-CO ₂)	
	LNG: USD 11.9/MMBtu (Billion USD)	LNG: USD 9/MMBtu (Billion USD)	LNG: USD 6/Mbtu (Billion USD)			
Scenario 1	+0.7	+0.5	+0.4 *	+0.1 *	+6.4	(+0%)
Scenario 2	+7.5	+4.9	+2.2	-0.5	-55.8	(-2%)
Scenario 3	+20.7	+13.3	+5.6	-1.7	-176.5	(-6%)

Other sectors total

Fuel import cost			CO ₂ emission	
LNG: USD 11.9/Mbtu (Billion USD)	LNG: USD 9/Mbtu (Billion USD)	LNG: USD 6/Mbtu (Billion USD)	(Million tons-CO ₂)	
-23.2	-33.7	-44.6	-0.047	(-2%)

Enabling Policy Environment is Crucial for Expanded Use of Gas

- **Clear policy indication for promoting natural gas use.**
 - ◆ **Energy / electricity mix target.**
 - ◆ **Climate and environmental regulation. (promote lower carbon energy)**

- **Enhance economical competitiveness of natural gas.**
 - ◆ **Reduce/eliminate energy price subsidies.**
 - ◆ **Mechanism to internalize environmental value of natural gas.**

- **Support for developing supply infrastructures (LNG receiving terminal, pipeline, etc.).**
 - ◆ **Dialogue with stakeholder to gain acceptance.**
 - ◆ **Present clear regulatory framework.**
 - ◆ **Financial support. (e.g. low interest rate loan, tax benefit)**

- **Institutional and human capacity building.**
 - ◆ **Development of law/regulation/standard**
 - ◆ **Controlling and monitoring of market. (i.e. enforcement of regulations, change of price)**
 - ◆ **Gas business operation. (commercial and technical operation)**
 - ◆ **Gas utilization technology.**

Investment Need for LNG Supply Chain by 2030

- ◆ More primary LNG terminals necessary by 2030
- ◆ Estimated investment for additional LNG supply chain by 2030 is 81 billion USD altogether.
- ◆ Utilization of existing infrastructure like national railway system and ports.
- ◆ Primary LNG terminal in ASEAN could cover other countries' area.

LNG primary terminal location (existing, planned and added)

