NATURAL GAS INDUSTRIAL POLICY OF KOREA

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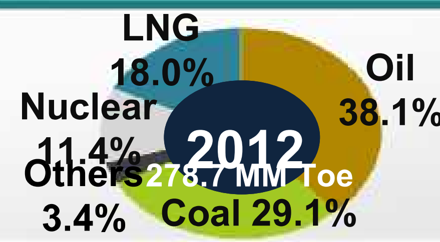
1. Characteristics of Korean Natural Gas Industry

Natural gas`s prominent role in the energy mix

- Natural gas accounts for 18% of our energy mix
- 27% of the power generation mix
- 78% city gas penetration rate



High rate of dependence on imports

- About 98% of domestic natural gas demand depends on imports
  - ➡ World`s 2nd largest importer of LNG, after Japan

Procurement of liquefied natural gas

- Difficult to procure pipeline natural gas due to North/South divide
  - ➡ Importing 100% of liquefied natural gas

Progress of Korean Natural Gas Industry

Base Building

- 1983 Establishment of Korea Gas Corporation
- 1983 Construction of 1st “Pyeongtaek” Storage Tank and Trunkline
- 1986 Enactment of “City Gas Business” Act

Expanding Growth

- 1986 First Procurement of LNG for Generation
- 1987 Beginning of LNG Supply in Seoul Metropolitan Area
- 1997 Construction of 2nd “Incheon” Storage Tank

Becoming a Leading Energy Source

- 2004 Number of LNG Users Reaches 10 Million Mark
- 2013 Completion of National City Gas Pipeline

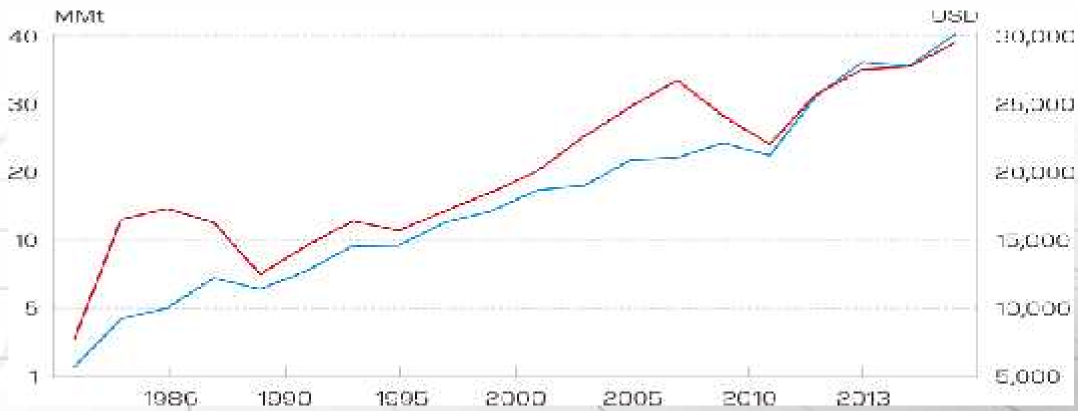
Natural Gas
As a Driving Engine for Economic Growth

	1986	2013	Growth
GDP Per Capita (USD)	2,800	24,000	↑ 10x
Natural Gas Imports (Tons)	1.68mn	40.7mn	↑ 20x

Korea's Natural Gas Imports & GDP Per Capita

Natural Gas Imports

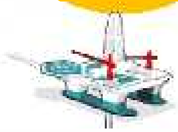
GDP Per Capita



Source : World Bank, Korea Customs Service

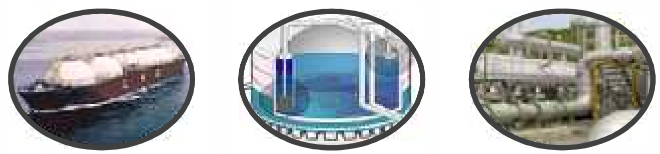
3. Structure of Natural Gas Industry

Gas Sources



- Australia
- Brunei
- EgyptW
- Indonesia
- Malaysia
- Oman
- Qatar
- Russia
- Yemen
- Domestic Field (Donghae-1)

Middle Stream

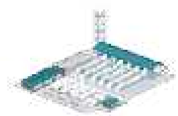


Import → Storage → Transmission

- KOGAS is in charge of natural gas import, storage and transmission as a wholesaler
- POSCO and SK import LNG for their own power plants

Down Stream

31 City Gas Companies



- Residential
- Commercial
- Industrial

17 Power Plants

- Power generation
- IPP
- CES (**C**ommunity **E**nergy **S**ystem)

3. Structure of Natural Gas Industry

Wholesaler

KOGAS

- KOGAS, a state owned company, is sole natural gas wholesaler in Korea
- Monopolizes procurement of LNG and operates gas supply facilities
- Supplies power companies and city gas companies with LNG

Retailers

Samchully

- 31 city gas companies (regional monopolies) are gas retailers in Korea
- Supply end-users (residences, industry, etc.) with LNG via branch pipelines

Direct Importers

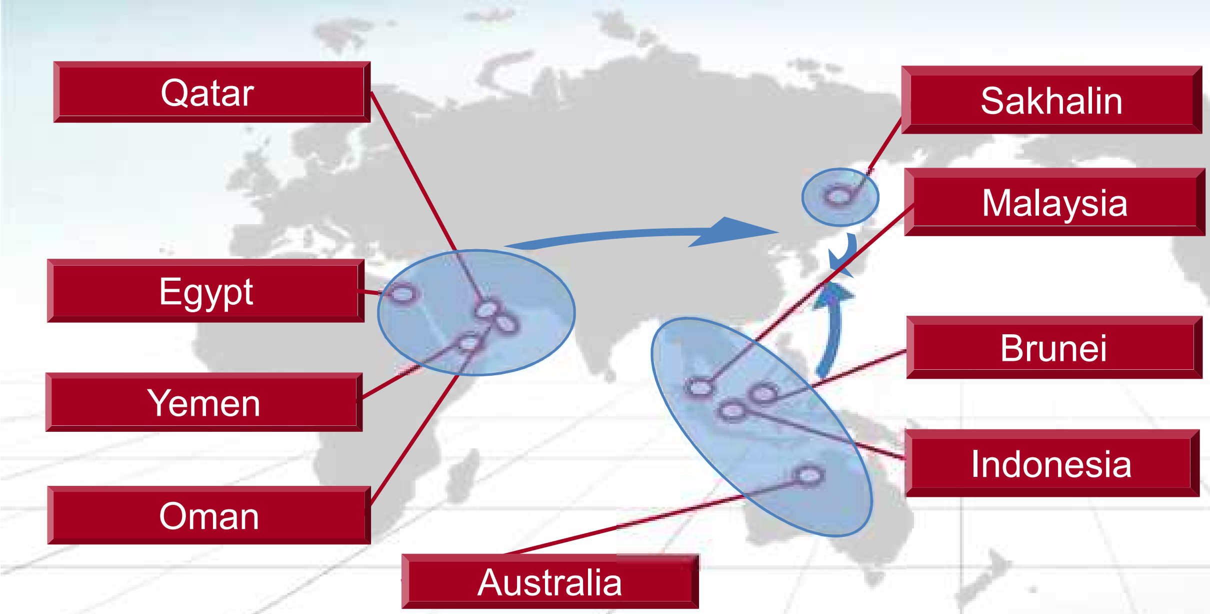
SK E&S

- Companies with storage facilities can import LNG directly for their own consumption
- State regulates disposal of imported LNG and supply facility access

4. Status of Korean Natural Gas Industry

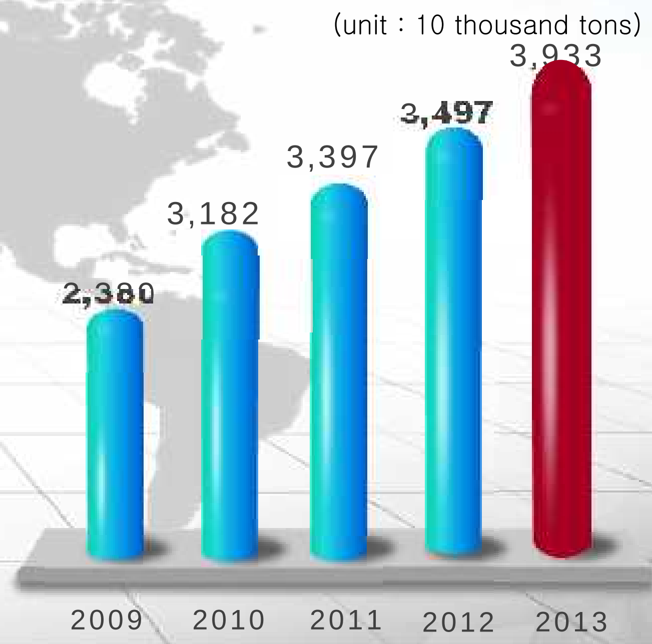
Import Portfolio

- 16 long-term and 3 mid-term contracts in 10 countries around the world



Sabine Pass (USA) : 2.8mn tons/yr from 2017

LNG Imports



4. Status of Korean Natural Gas Industry

Storage Tanks

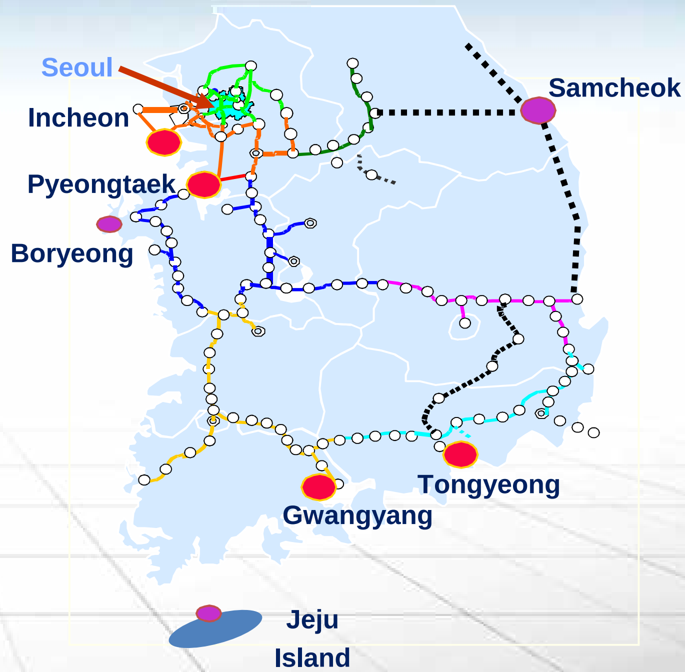
KOGAS

Receiving Terminal	# of Tanks	Capacity (M^3)/Tank	Sub-Total Capacity (M^3)	Remarks
Pyeongtaek (23)	10	100,000	1,000,000	
	4	140,000	560,000	
	9	200,000	1,800,000	
Incheon (20)	10	100,000	1,000,000	
	2	140,000	280,000	
	8	200,000	1,600,000	
Tongyeong (17)	13	140,000	1,820,000	
	4	200,000	800,000	
Samcheok (12) (4th Terminal)	*3*	*200,000*	*600,000*	*by '14*
	4	*200,000*	*800,000*	*by '15*
	2	*200,000*	*400,000*	*by '16*
	3	*270,000*	*810,000*	*by '17*
Total Capacity	**60 + 12**	**8,860,000 (4.0 MMton) + 2,610,000 (1.1 MMton)**		

* Small size terminal in Jeju Island targeting Dec 2017 : 1 Tank(25,000M^3)

POSCO

Receiving Terminal	# of Tanks	Capacity (M^3)/Tank	Sub-Total Capacity (M^3)	Remarks
Gwangyang (3)	2	100,000	200,000	
	1	165,000	165,000	
	1	*165,000*	*165,000*	
Total Capacity	**3 + 1**	**365,000 (0.17MMton) + 165,000 (0.7MMton)**		

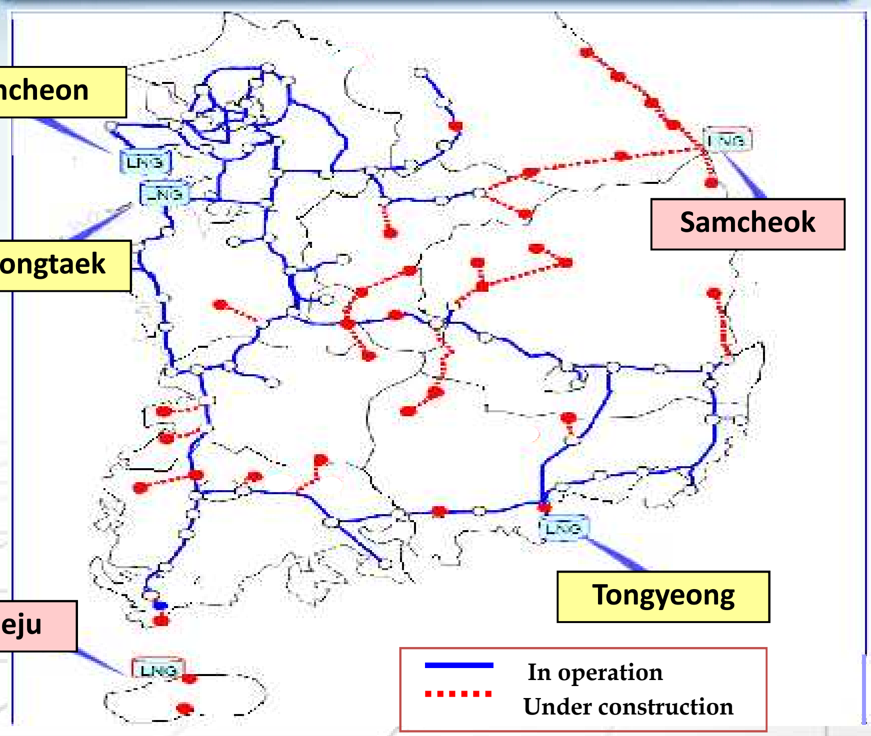


GS Caltex & SK E&S

Plan to build 3 Storage Tanks (20KM^3) in Boryeong

Trunklines

Ring-shaped nationwide pipeline network



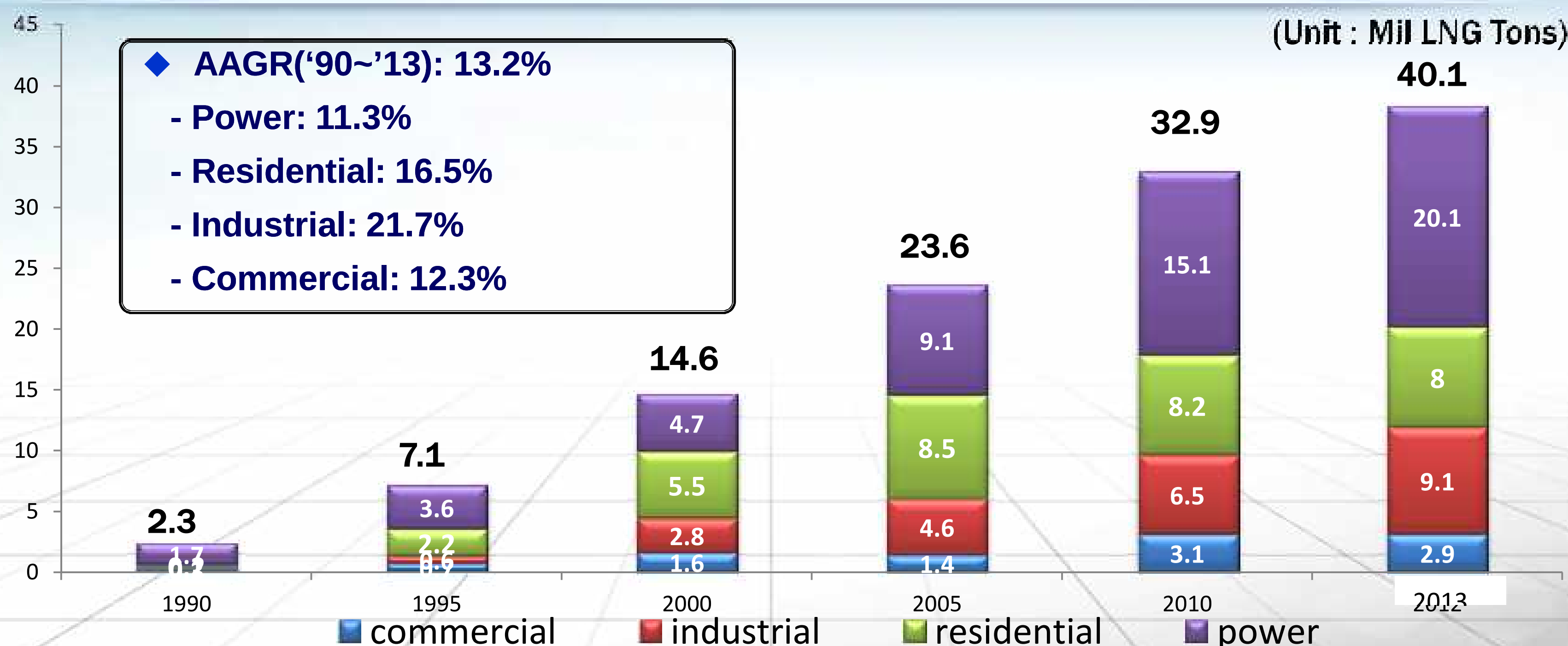
- **Ring-shaped pipelines for stable and safe supply.**

- **Main pipelines: 4,065km**
- **Under construction: 879km**

  → Total: **4,944** km by 2017

Korea`s LNG Demand (by specific use)

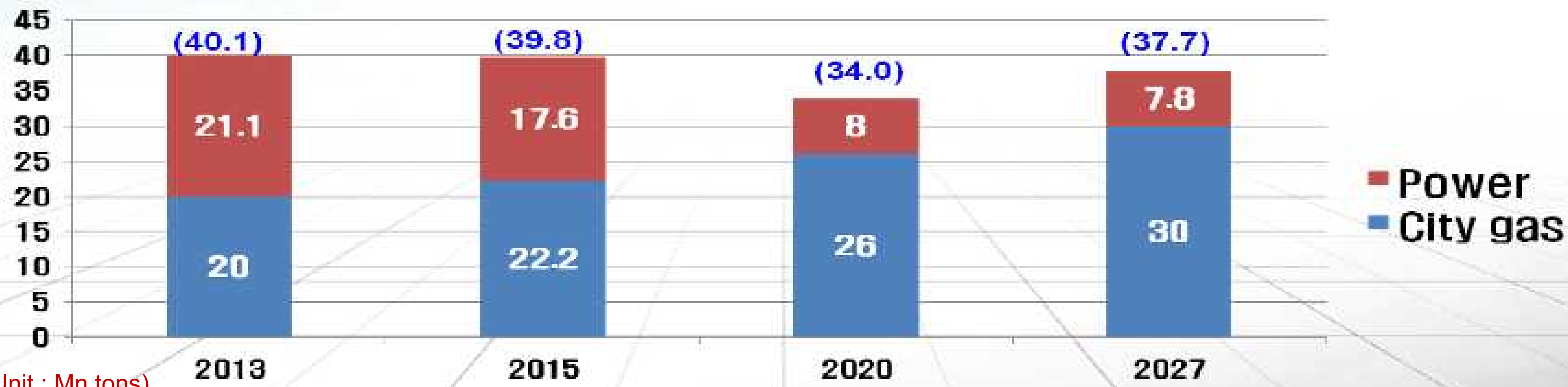
- Steady Increase in LNG Demand
- Demand Share: Power 50.1%, Industrial 22.7%, Residental 20%



Source: KOGAS Internal Report 2013

5. Korea`s LNG Demand (Long-term Forecast)

- **Overall natural gas demand** in Korea is expected to decrease by **0.4%** annually from 2013 to 2027.
- **City gas demand** will **increase** by **3%** annually during that period.
- **Power demand** will **drastically decrease** by an annual average of **6.8%** from 2013 to 2027 due to growth of nuclear and coal power generation for base-load.



(Unit : Mn tons)

(Source : 11th Long-term Natural gas Demand-Supply Forecast by MOTIE)

6. Natural Gas Industry Policy

Stable and Efficient Supply of Natural Gas for the Public

LNG Procurement Approval

- L-T Demand Forecast
- L-T Contract Apporval
- Spot Contract Apporval

Supply & Demand Management

- Enlargement of Piplines and Storage Facilities
- Inventory Management
- Gas Rate by Specific Use

Gas Rate Regulation

- Rate related to Fuel Cost
- Regulate Suppliers' Costs
- Usage Fees for Facilities

LNG Procurement Approval

LONG-TERM PROCUREMENT

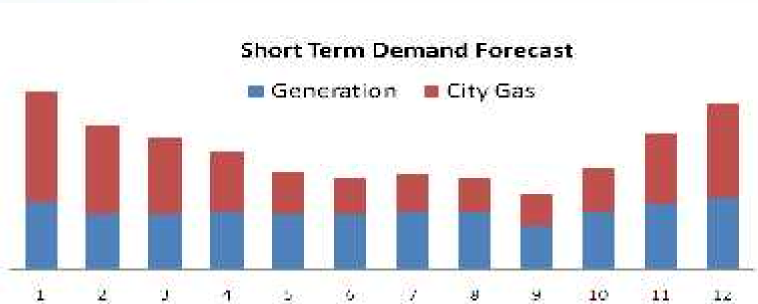
Long-Term Demand Forecast (MOTIE, every 2years) → Negotiation (KOGAS) → Contract Screening (Advisory Committee) → Contract Approval (MOTIE)

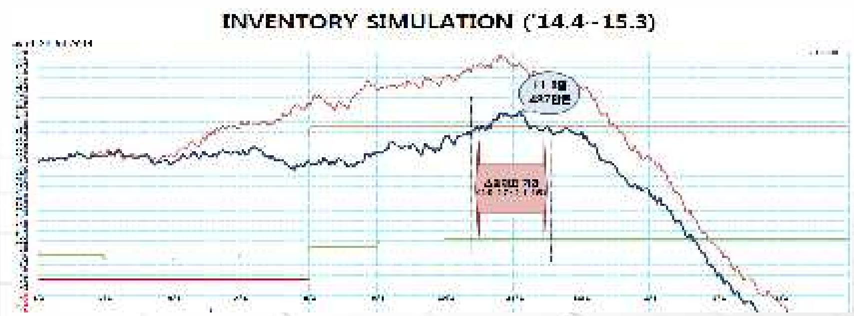
- **MOTIE announces** long-term **LNG demand forecast** every 2 years
- **KOGAS** selects supply candidates and **negotiates terms and conditions**
- **Advisory Committee** evaluates the terms and conditions
- **MOTIE approves the LNG contract**

LNG Procurement Approval

BALANCING SHORT-TERM SUPPLY & DEMAND

Short-Term Demand Forecast (MOTIE, every year) → Negotiation (KOGAS) → Contract Screening (Advisory Committee) → Contract Approval (MOTIE)





- **MOTIE** monitors short-term **LNG supply and demand and gives administrative guidance on short-term or spot procurement to KOGAS**

6. Natural Gas Industry Policy

Demand & Supply Management

Facilities

- Make plans to enlarge pipelines and storage tanks based on long-term demand forecast
- Storage rate of 20% by 2027, 745 km of pipelines by 2017

Inventory

- Maintain safety inventory rate based on Crisis Response Manual
- Monitor factors that can influence gas demand

Gas Rate

- Operate a seasonally-differentiated rate policy to improve winter-high and summer-low demand pattern
- Provide discounts for consumers who contribute to enhancing gas demand in summer

Gas Rate Regulation

Natural Gas Rate Structure in Korea

- Gas rate consists of material cost, wholesale & retail supply cost
- Government controls gas suppliers' costs by approving adjustment of gas rate

Retail Price		Material Cost		Wholesale Supply Cost		Retail Supply Cost
	=	(LNG import cost + supplementary cost)	+	(KOGAS fair cost + fair return)	+	(City gas company fair cost + fair return)
100%		*88%*		*6%*		*6%*

Gas Rate Regulation

Natural Gas Rate Adjustment in Korea

① Material Cost: **Adjusted every two months if fluctuations in the raw material cost exceed 3%, but gov't can stop this for price stabilization**

② Wholesale Supply Cost: **Adjusted yearly based on "Natural Gas Rate Standard," subject to approval of government and committee**

③ Retail Supply Cost: **Adjusted yearly in accordance with "City Gas Company Rate Standard," subject to approval of local government**

7. Future Policy Challenges

Diversification of LNG Procurement Sources

- **Conventional gas from Middle East**
  - ➡ **unconventional gas from North America, etc.**
- **Procurement through self-developed projects**

Improvement of Direct Import Policy

- **Encourage private investment in national LNG storage facilities and competitive procurement**
- **Deregulation of restrictions on direct import facilities**

Expansion of Bio-gas and SNG Supply

- **Make a law that allows production of bio-gas and SNG and verify stability**


Thank you !