
Global Competition for Natural Gas Supplies

A Focus on the Pacific Basin LNG Market

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Paris, February 22, 2007

Agenda

1. Introduction

2. Structure of the Natural Gas Industry of Asia-Pacific Countries

3. Corporate Strategies

4. Case Studies

5. Conclusions

Backup

Research Questions

The objective of the paper will be two-fold in

i) Corporate strategies

- Are natural gas supply structures in Asia really different from those in the other two large importing regions, i.e. Europe and North America?
- Which types of companies invest in Asia-Pacific natural gas infrastructures?
- Which corporate strategies can be identified?

ii) Competition policy

- Is supply security compatible with liberalized natural gas markets?

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2. Structure of the Natural Gas Industry of Asia-Pacific Countries

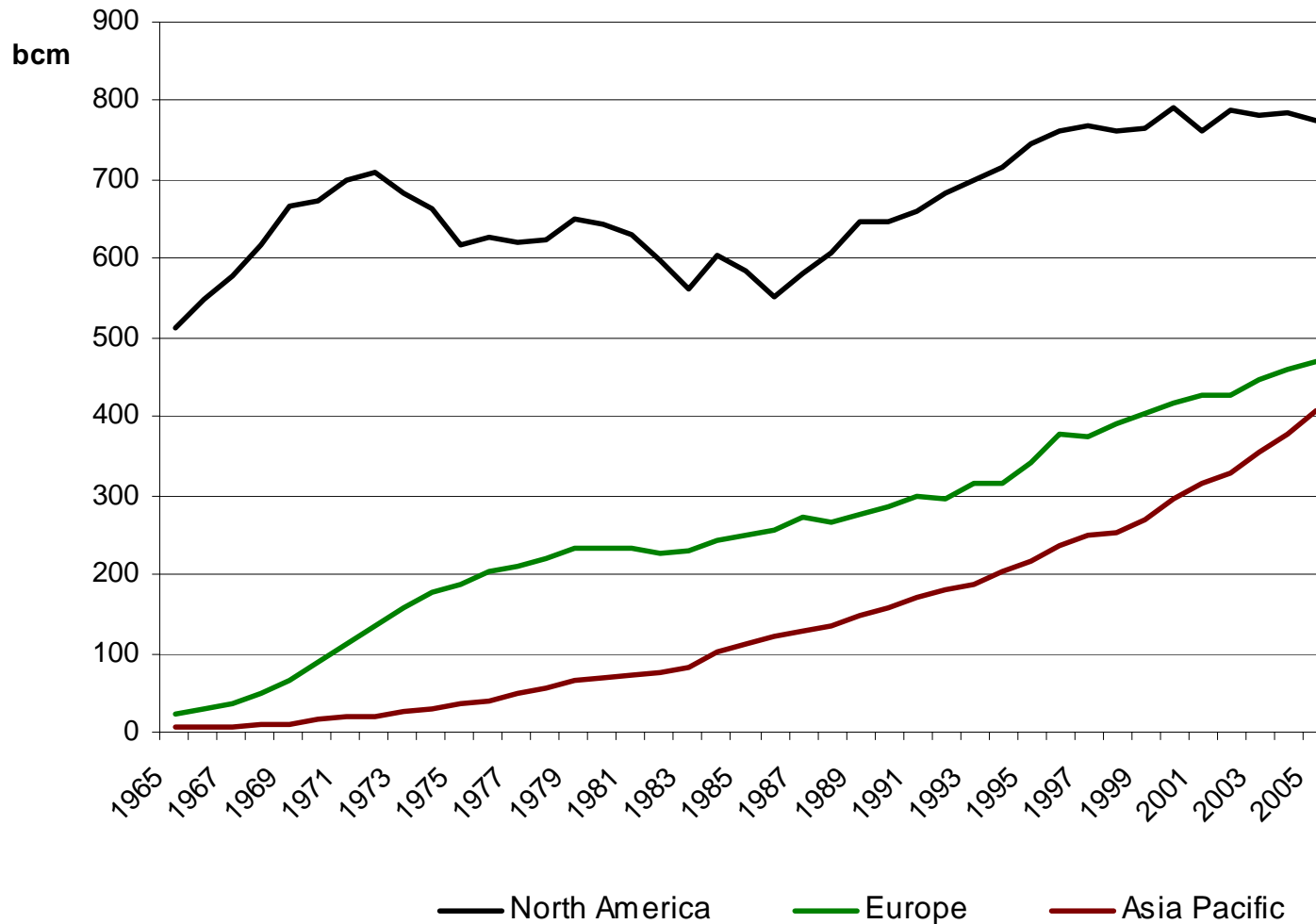
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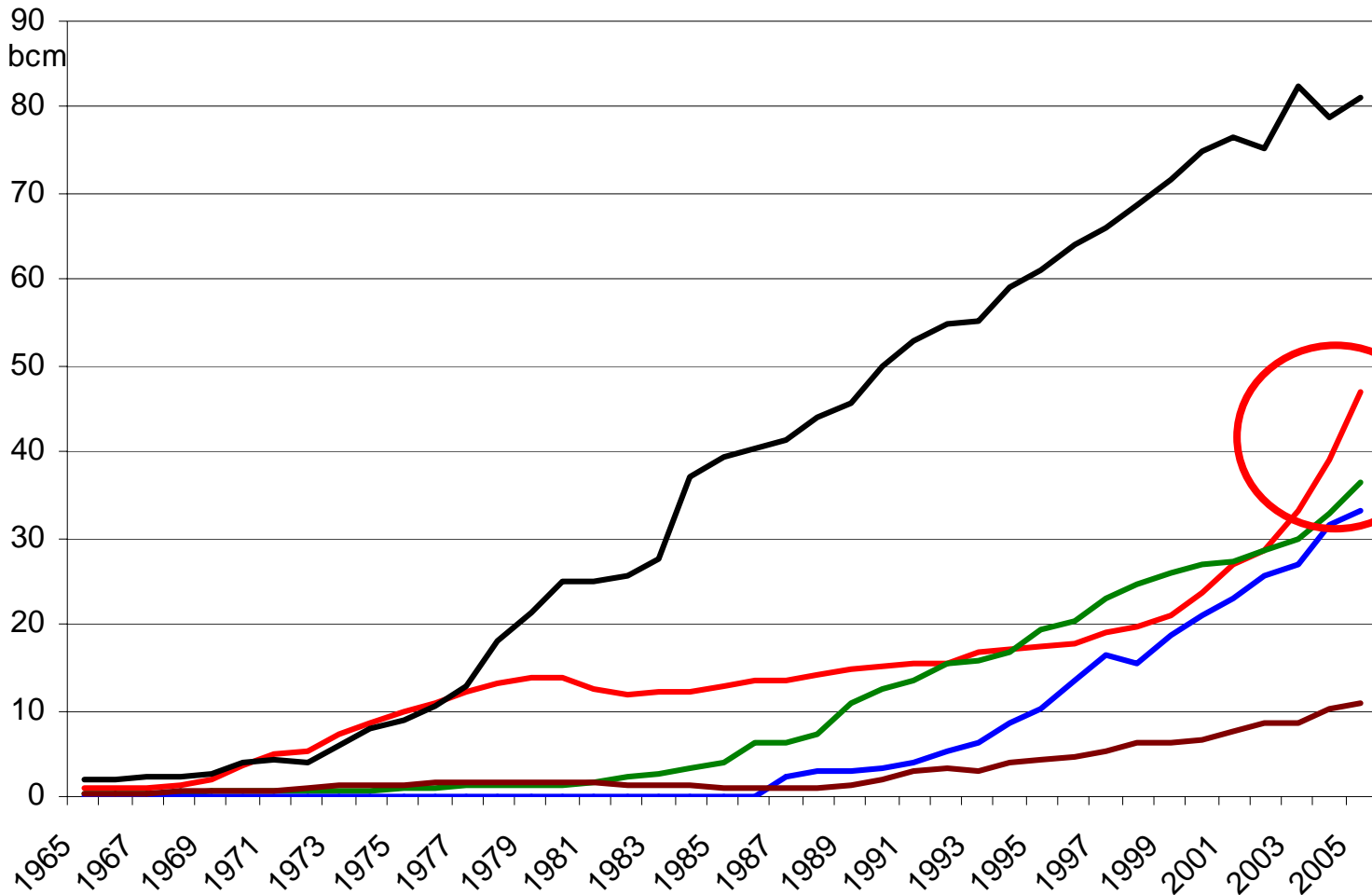
World Natural Gas Consumption by Region



Source: BP (2006)

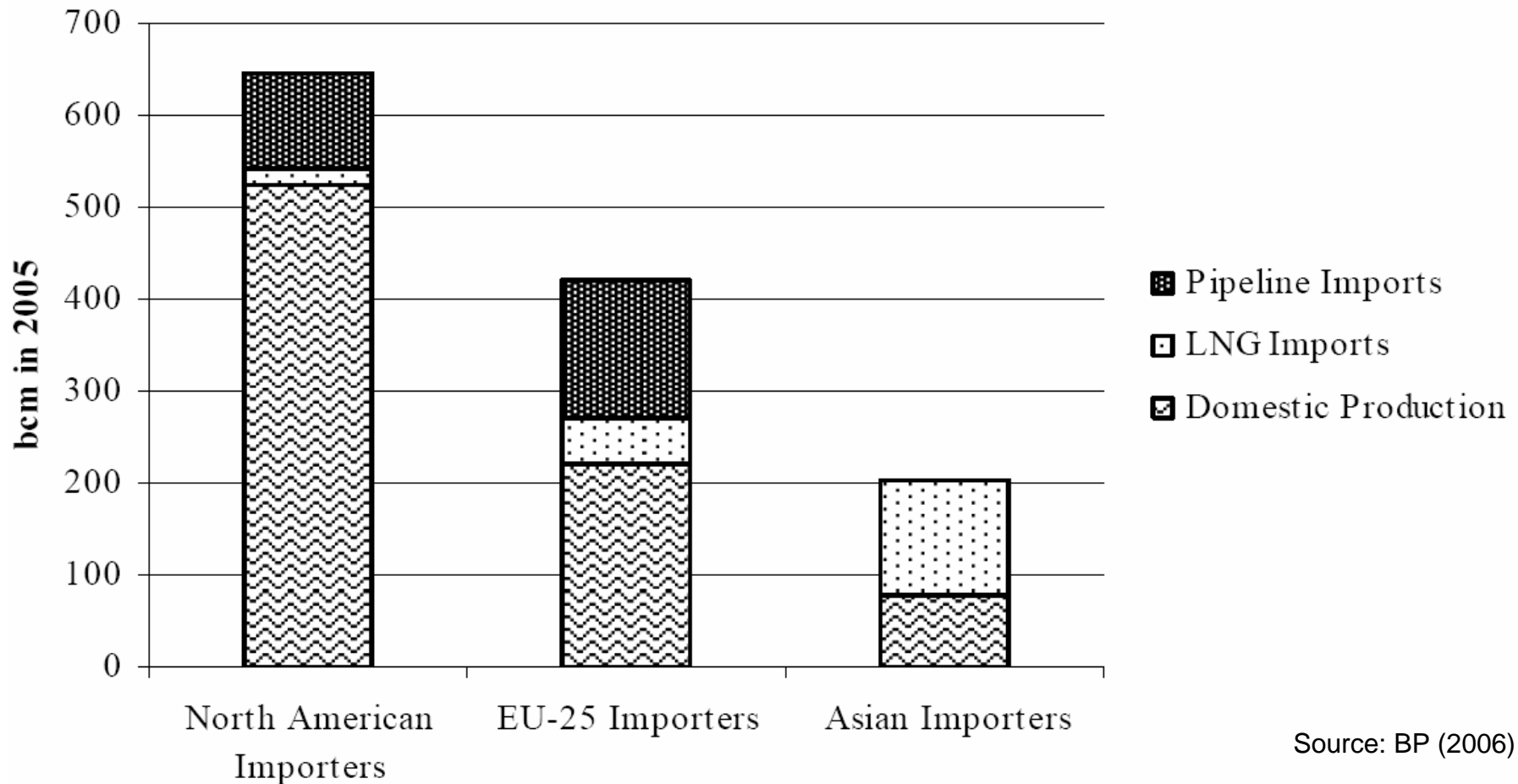
Continuous growth in Europe and in the Asia-Pacific region during the last decade.

Consumption in Selected Asia-Pacific Importing Countries



— China — India — Japan — South Korea — Taiwan Source: BP (2006)

Strong Dependence on LNG in Asia



Asian natural gas importers rely strongly on LNG imports, pipeline infrastructure from Russia or Central Asia may only be constructed in the long-term.

Structural Data of Selected Asia-Pacific Countries

Country	Reserves (trillion m ³)	Production (bcm)	Consumption (bcm)	Production/Cons.
Australia	2.52	37.1	25.7	1.44
Bangladesh	0.44	14.2	14.2	1.00
China	2.35	50.0	49.2	1.02
India	1.10	30.4	36.6	0.83
Indonesia	2.76	76.0	39.4	1.93
Japan	0.00	0.0	81.1	0.00
Malaysia	2.48	59.9	34.9	1.52
Pakistan	0.96	29.9	29.9	1.00
South Korea	0.00	0.00	33.3	0.00
Taiwan	0.00	0.00	10.7	0.00
Thailand	0.35	21.4	29.9	0.72

Source: BP (2006)

 Major exporters

 Major importers

Increasing Liquefaction Capacities in the Pacific Basin

Country	Trains operational (sites)	Total nominal capacity (mtpa)	Trains under constr. / planned / proposed (sites)	Total potential nominal capacity (mtpa)
Australia	5 (NWS; Darwin)	14.7	12 (NWS; Gorgon; Timor; Pilbara; Sunrise; Browse; Pluto; Ichtys)	47.0
Brunei	4 (Lumut)	7.2	1 (Lumut)	4.0
Indonesia	8 (Arun; Bontang)	28.2	9 (Tangguh, Bontang, Donggi, East Kalimantan, Senoro, Padang)	29.4
Malaysia	8 (Bintulu)	23.3	1 (Bintulu)	26.9
Russia	0	0	2 (Sakhalin II)	9.6
US	2 (Kenai)	1.1	0	0
Peru	0	0	1	4.4
Papua New G.	0	0	1	4.5
Total	27	74.5	+ 27	Sum: 200.3

Increasing Regasification Capacities in the Pacific Basin

Country	Plants operational	Total nominal capacity (mtpa)	Plants under constr. / planned / proposed	Total potent. nominal capacity (mtpa)
China	Guangdong	3.7	Guangdong, Fujijan, plus 13 additional sites proposed	54.5
India	Dahej, Hazira	7.5	Dabhol, Dahej, Kochi	12.5
Japan	27 projects	150	Joetsu, Wakayama	tba
South Korea	Incheon, Pyeong-taek, Tongyoung, Kwangyang	24.5	Yosu	3.0
Taiwan	Yungan	7.2	Taichung, Tuntex	6.0
Mexico	0	0	Energia Costa Azul	7.5
Chile	0	0	Quintero	2.7
Pakistan	0	0	Floating Terminal, Karachi	5.0
Total		192.9		Sum: 284.4

LNG Trade Movements – Middle East as Swing Producer

Billion cubic metres To	From													Total
	USA	Trinidad	Oman	Qatar	UAE	Algeria	Egypt	Libya	Nigeria	Australia	Brunei	Indonesia	Malaysia	
North America														
USA	-	12.4	0.1	0.1	-	2.8	2.1	-	0.2	-	-	-	0.3	17.9
S. & Cent. America														
Dominican Republic	-	0.3	-	-	-	-	-	-	-	-	-	-	-	0.3
Puerto Rico	-	0.7	-	-	-	-	-	-	-	-	-	-	-	0.7
Europe														
Belgium	-	0.1	-	-	-	2.9	-	-	-	-	-	-	-	3.0
France	-	-	0.1	-	-	7.5	1.1	-	4.2	-	-	-	-	12.8
Greece	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Italy	-	-	-	-	-	2.5	-	-	-	-	-	-	-	2.5
Portugal	-	-	-	-	-	-	-	-	1.6	-	-	-	-	1.6
Spain	-	0.5	1.7	4.6	0.3	5.2	3.5	0.9	5.0	0.1	-	-	0.2	21.9
Turkey	-	-	-	-	-	3.9	-	-	1.0	-	-	-	-	4.9
UK	-	0.1	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Asia Pacific														
India	-	-	0.1	5.8	-	-	-	-	-	0.2	-	-	-	6.0
Japan	1.8	-	1.3	8.4	6.8	0.1	-	-	-	13.1	8.4	19.0	17.7	76.3
South Korea	-	-	5.9	8.3	0.1	-	0.3	-	-	1.2	0.8	7.5	6.4	30.5
Taiwan	-	-	0.2	-	-	-	-	-	-	0.4	-	5.0	4.1	9.6
TOTAL EXPORTS	1.8	14.0	9.2	27.1	7.1	25.7	6.9	0.9	12.0	14.9	9.2	31.5	28.5	188.8

Varying Levels of Competition

- Benefits from liberalization:

- Higher productivity
- Lower prices
- Greater output

- Extent to which Asian natural gas markets are liberalized varies:

- **Japan** certain degree of wholesale competition in natural gas market, but only 14% of the LNG comes from economies with competitive gas markets (**Australia, US**), other suppliers are state-owned vertically integrated monopolies
- **South Korea**: Kogas is the state-owned monopoly importer, privatization plans stalled (uncertainty about future company structure, strong opposition)
- **Malaysia**: very limited plans to liberalize natural gas industry
- **Indonesia**: regulatory authorities downstream and upstream established (to introduce competition); Law Concerning Oil and Natural Gas (2001): state-owned integrated monopoly Pertamina no longer has to be included in production sharing contracts
- **Thailand**: gas production open for foreign investment, state-owned gas company (holding transport and supply monopoly) buys domestic production from international oil companies at “international market prices”, the government is considering to open the network to TPA

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Shareholders of Liquefaction Projects

Competitive industries (US, Australia):

- **Private companies are active in exploration & production and operate LNG export terminals**

- US: ConocoPhillips, Marathon
- Australia: BHP Billiton, BP, Chevron, Shell, Woodside Energy, Mitsubishi/Mitsui

Non-competitive industries:

- **Public-Private-Partnerships: state-owned national energy company (with major share) and foreign private majors**

- State interests are secured
- Global majors have technical and operational knowledge, governments not → participating in the projects provides government with influence; information; learning
- E.g. Brunei (Lumut): Government (50%), Shell (25%), Mitsubishi (25%)
- E.g. Malaysia (Bintulu): Petronas & local government (major share), Shell (15%), others
- E.g. Indonesia (Bontang): Pertamina (main share), Total Fina Elf, BP, others

Shareholders of Regasification Projects

„Old World LNG Import Terminals“

- Owned by national companies

- Japan: i) Gas companies: Tokyo Gas, Sendai Gas, Osaka Gas, etc.
ii) Electricity companies: Tokyo Electric, Chubu Electric, Kansai Electric, etc.
- South Korea: Kogas (state-owned monopoly importer, privatization plans stalled)
- Taiwan: Chinese Petroleum Corporation (CPC, controlling the whole gas business)

„New World LNG Import Terminals“

- Typical shareholder group: state-owned oil and gas company with a significant share and one or more local gas companies that also are major offtakers

- Participation of foreign private companies, e.g.:

- India (Dahej LNG, 2005): Petronet, Indian companies, RasGas, **GDF**
- India (Hazira LNG, 2004): **Shell, Total**
- [China (Guangdong LNG, 2006): CNOOC, Guangdong Province, **BP**, others]

Vertical Integration

Traditional long-term contracts

- Between LNG export project as seller and import project as buyer (so called Sales-and-Purchase agreements with inflexible Take-or-Pay- and destination clauses)

Vertical integration via ownership of various stages of the value chain

- Asian-based companies are increasingly engaging along all stages of the value chain, e.g.:
 - Tokyo Electric, Tokyo Gas and Osaka Gas contracted own ships (IEEJ, 2005)
 - Russia (Sakhalin II): Mitsui and Mitsubishi hold significant shares

Extended value chain – vertical integration into power generation sector

- **Advantages: a part of the capacity is off taken, increasing the likelihood that the terminal gets financed and built, co-development achieves synergies and cost savings**
 - Japan: gas companies are launching into the electricity generation sector and reverse (e.g. Osaka Gas active in wholesale electricity supply, Tokyo Electric active in wholesale gas supply, etc.)
 - China: e.g. Guangdong terminal supplies two gas-fired power plants

Issues of Concern

Competitiveness of LNG

- Current high price levels lead to decreasing competitiveness of natural gas in comparison to coal
- “Recent LNG price increases have delayed some LNG plans while the companies try to negotiate long-term LNG supply agreements.” (EIA, 2007)

Infrastructure

- Often limited transmission and distribution networks
 - Indonesia: networks have limited interconnectivity, plans to build four additional pipelines until 2010 („Integrated Gas Transportation System“)
 - India: to a major part concentrated in producing regions, little interconnection between regions → concerns that this situation will constrain consumption
 - Japan: due to geographical constraints on the one hand and limited investment incentives on the other hand
- Financing and amortization of large scale projects
- Technical and operational knowledge

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Differing Supply Structures and Legal Frameworks in Asian Import Countries

(2005 values)	Japan	China	South Korea
Share of natural gas	14%	3%	13%
Domestic production	~ 0	50 bcm	~ 0
Domestic consumption	81 bcm	50 bcm	33 bcm
Main consuming sectors	Power generation sector	Industrial sector	City gas (heating, etc.)
Supply sources	27 LNG plants	Northeastern gas fields, Guangdong LNG (2006)	4 LNG plants
Transmission system	Very limited (terminals are closed to demand centers, networks like "islands"),	West-East-Pipeline, still lack in infrastructure in eastern/southeastern provinces	Early decision to develop a national transm. network → rapid expansion of NG industry
Players	Gas/power companies, start integration along whole value chain	CNPC (upstream), Sinopec (downstream), CNOOC (offshore)	State-owned Kogas (imports & distribution)
Liberalization	Under way (large volume customers are free of choice)	No liberalization process, lack of comprehensive regulatory framework	Privatization plan (Kogas) stalled (uncertainty about future company structure, opposition)



Source maps:

IEA (2006);

http://www.eia.doe.gov/oiaf/ieo/images/figure_chinabox.jpg

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Conclusions on Market Structure

Global competition for natural gas supplies!

- We have to think in global terms analyzing natural gas markets, since demand is increasing worldwide whereas domestic resources in Europe and North America are declining → **sellers' market**
- Furthermore, exporting countries think about the trade-off between export and domestic production (e.g. Indonesia)

Are supply structures in Asia different from those of western economies?

- Yes, since these countries rely strongly on deliveries via LNG and the natural gas markets are partly still in an „infant stage“

What are typical company characteristics and strategies?

- We still observe a huge influence of state-owned oil and gas companies in non-liberalized countries, but:
- Increasing participation of foreign private firms and
- Companies are increasingly engaging along the whole value chain of LNG production

To Be Discussed During Further Research

Competition policy

- **PRO:** “The creation of a competitive internal market will allow the Union’s energy companies to operate in a market of a larger dimension, which will improve their ability to contribute security of supply.” (EC, 2007)
- **CON:** “Kogas argues that at least one supply company should be under state control to provide security of supply.” (Wybrew-Bond/Stern, 2002)
- Asian natural gas markets are particularly lagging behind market-oriented restructuring, which is often justified by the need to secure supplies.
- Transition from regulated regional monopoly to fully liberalized market with stable regulatory regime could easily take 10 to 15 years and does only function in maturing markets (IGU, 2006)
- Power generation accounts for main gas demand share in Asia, hence any regulation of the gas market should be coordinated with the regulation of the electricity market

Is supply security compatible with liberalized natural gas markets?

Thank you very much for your attention!

Any questions or comments?

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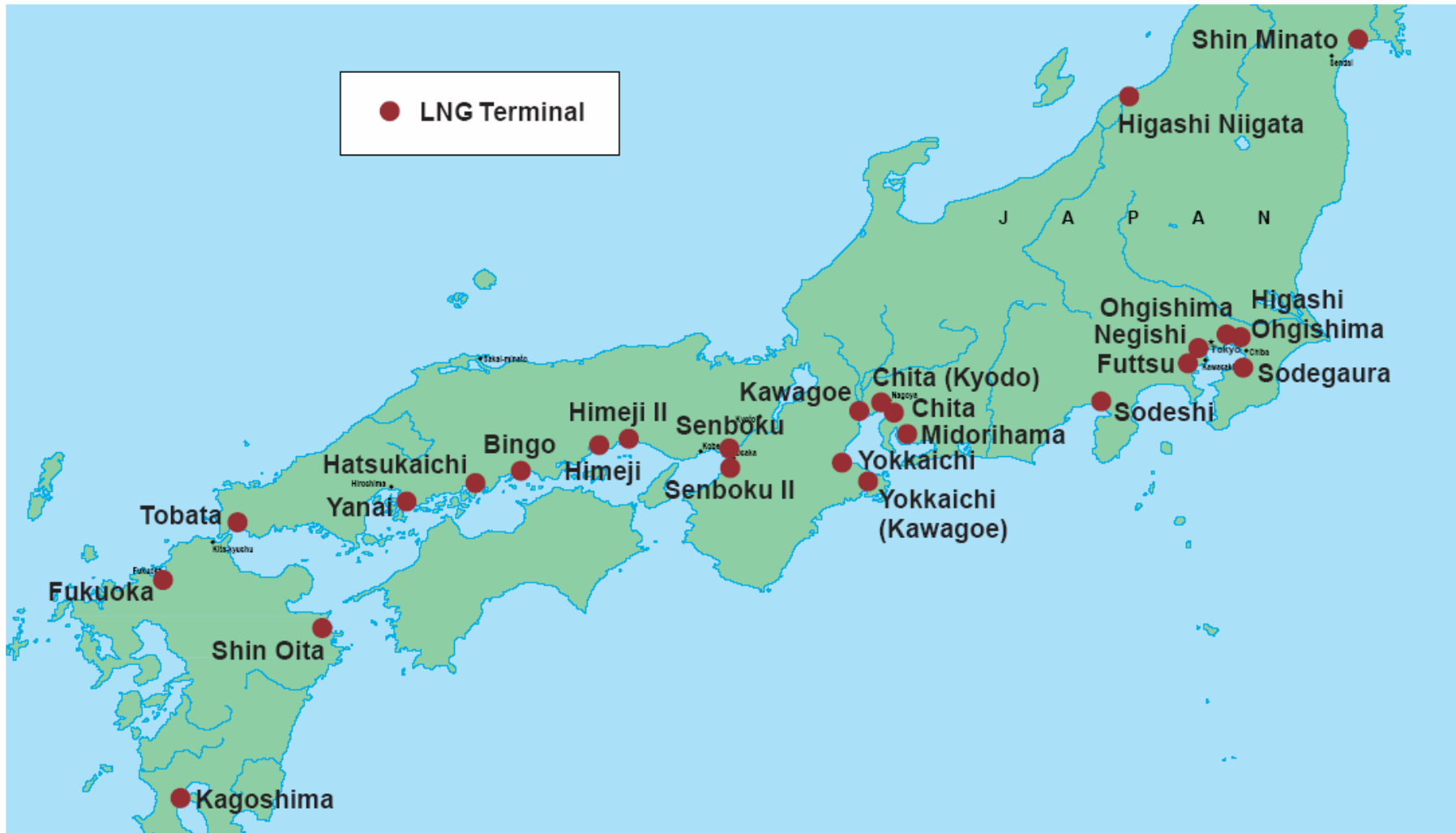
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