Future Perspective of LNG Markets & Changes in Value Chain Management

Northeast Asia Petroleum Forum

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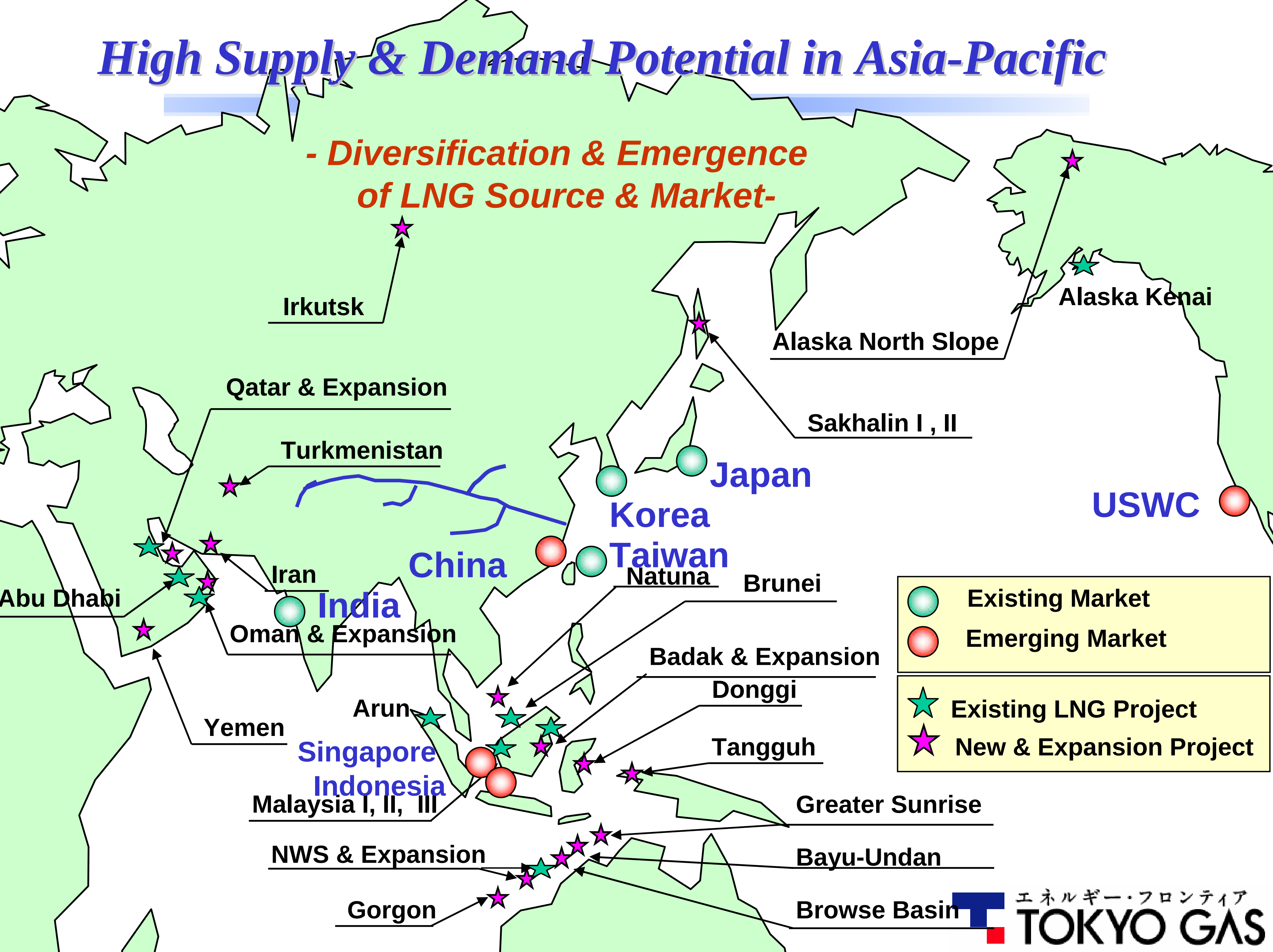
Tokyo Gas Co., Ltd.

High Supply & Demand Potential in Asia-Pacific



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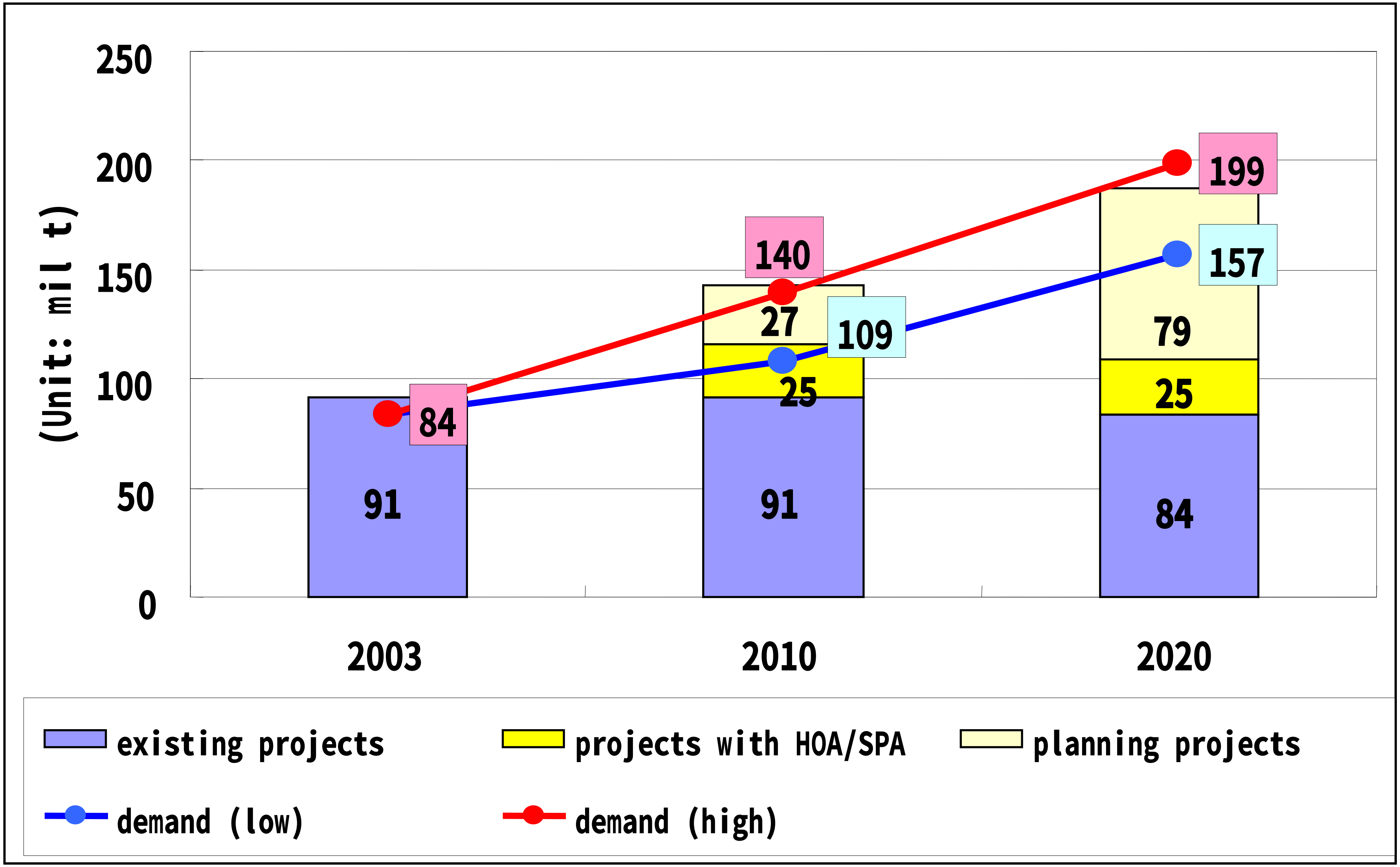
LNG Supply & Demand Outlook in Asia-Pacific Market



Source: IEEJ, Tokyo Gas Estimates

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Influential Events for Supply and Demand Balance

Supply side		Demand side
NWS-exp, Malaysia-III	*2004*	India (Dahej)
	2005	Korea (Kwangyang), India (Hazira)
Darwin	*2006*	China (Guandong), India (Dabhol) Japan (Mizushima)
Sakhalin-II	*2007*	China (Fujian)
Tangguh, Yemen	*2008*	Taiwan (Taichu), Indonesia China (many proposed terminals)
	2009	***NWS (7.5mtpa re-contract)***
Gorgon	*2010*	***Indonesia (12mtpa re-contract)***
Iran (4 projects)	*2011*	
Browse, Greater Sunrise, Donggi	*2011~*	Singapore

Rasgas II

Expansion (Qatar2~4)

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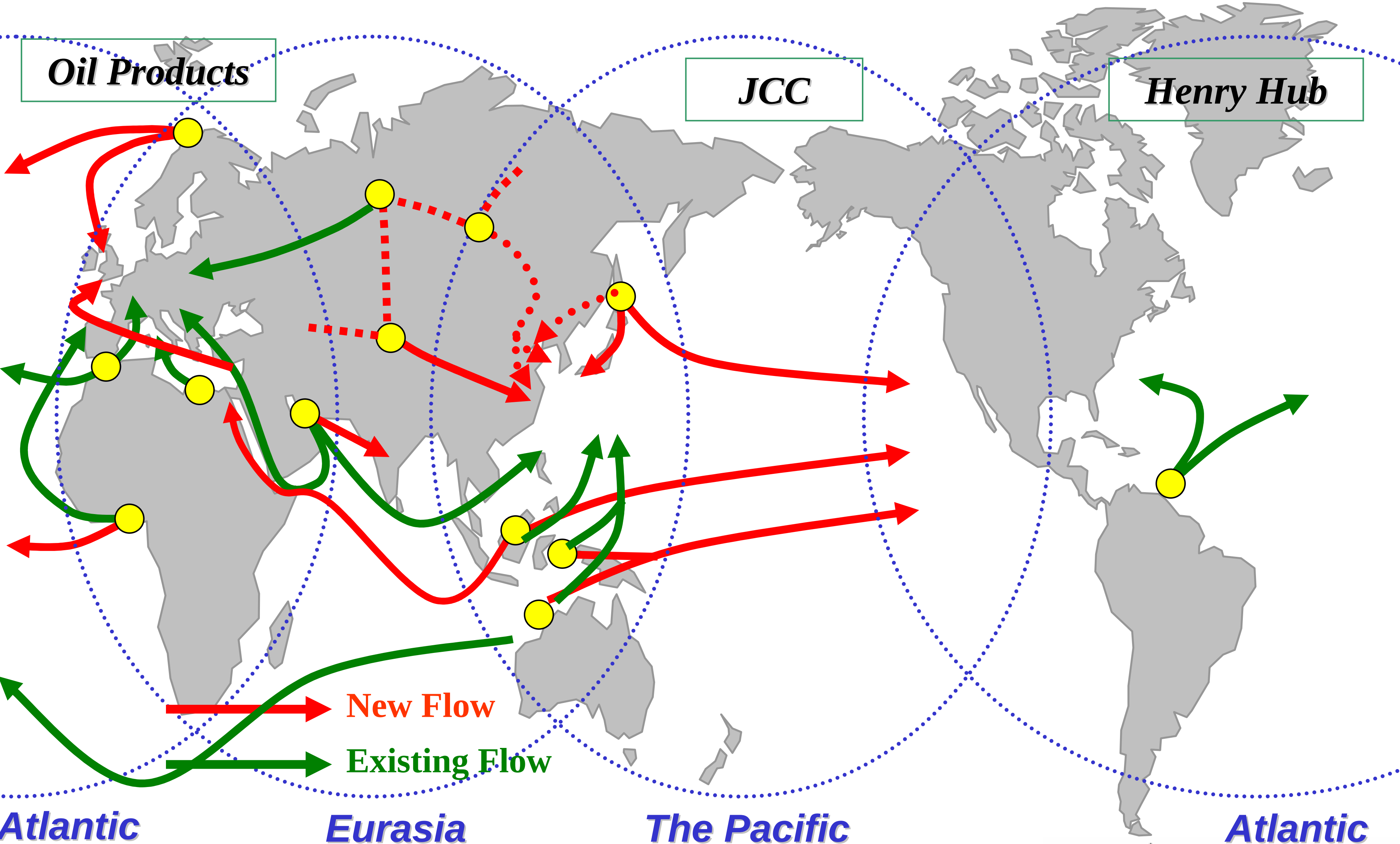
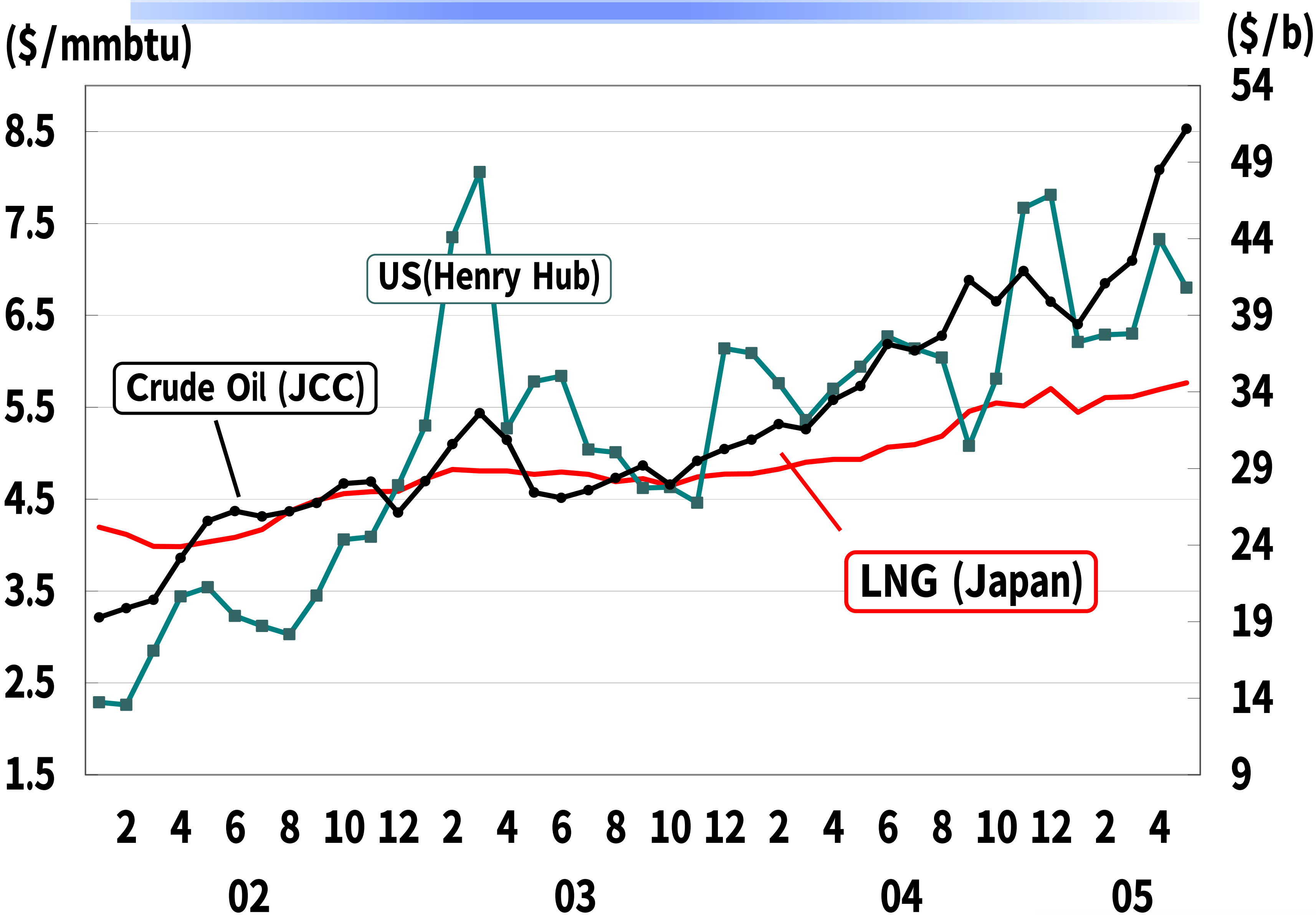
Changes in Natural Gas Trade Flow



The Gas Price Transition



Source: World Gas Intelligence, Trade Statistics, etc.

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Changes in Natural Gas Business

Sources

Project Development
Finance

Long-term Contract
Price linked to JCC & ICP
T/P, Supply Obligation

Markets

Regulated Market
Energy Security

Upstream Evolution — High Demand Potential — Liberalization

Diversification of Sources & Markets in LNG Trade

Competitive
Flexible

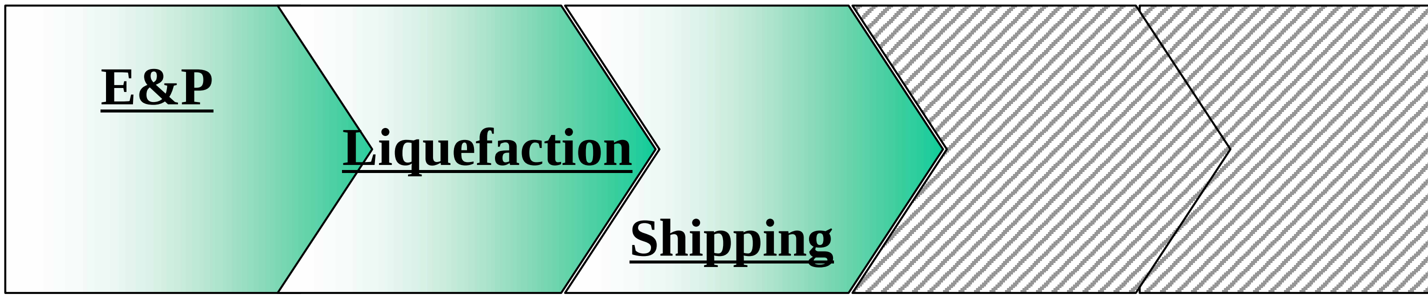
- Emergence of Trading Market
  - Short-term, Spot, Swap, Backhaul, Arbitrage
  - Strategic Transportation
- Tailoring Pricing Mechanism
  - Gentle slope, Fixed price, Oil-product link, Power link
  - New Entrants
  - P/L vs. LNG
- Players
  - Marketers, Traders, Aggregators
  - Value Chain Management

Risks & Opportunities for Sustainable LNG Market

Conventional LNG Value Chain Model

Sellers' Model

note: Not participated

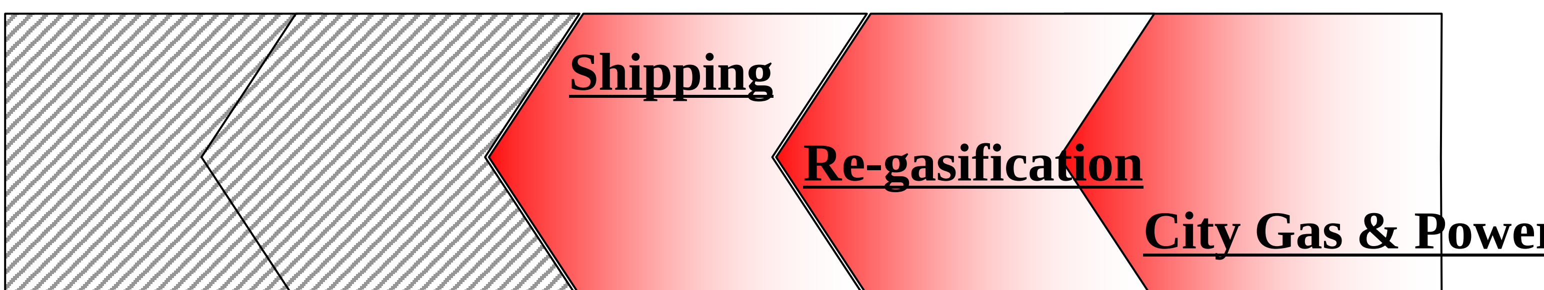


Issues

Destination restriction

Access to receiving terminal

Buyers' Model



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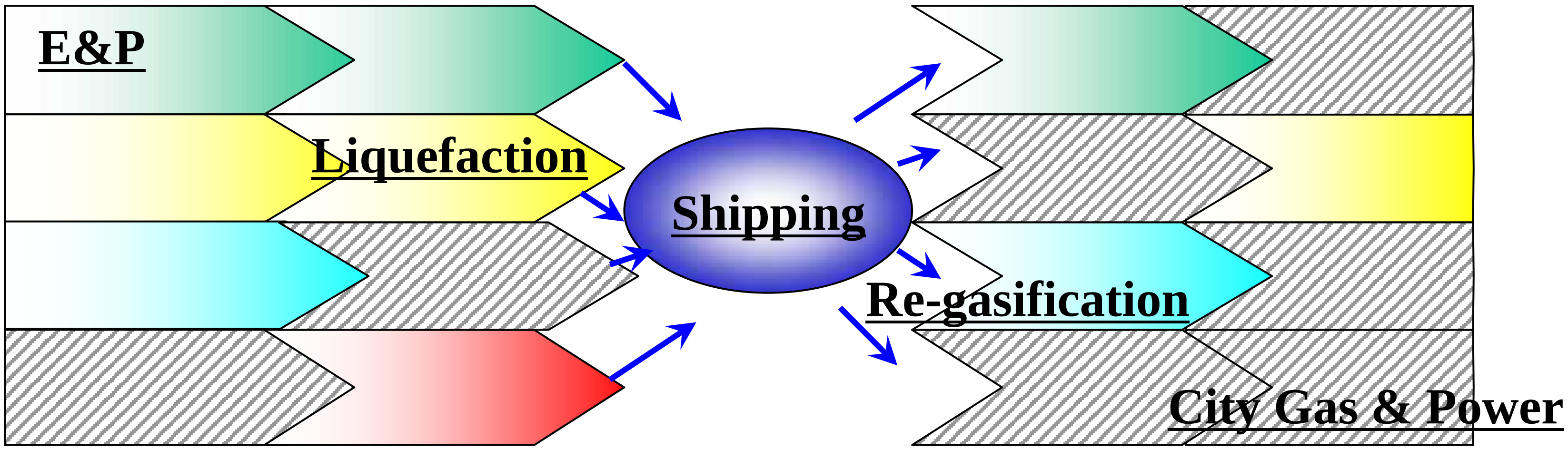
Changes in LNG Value chain model

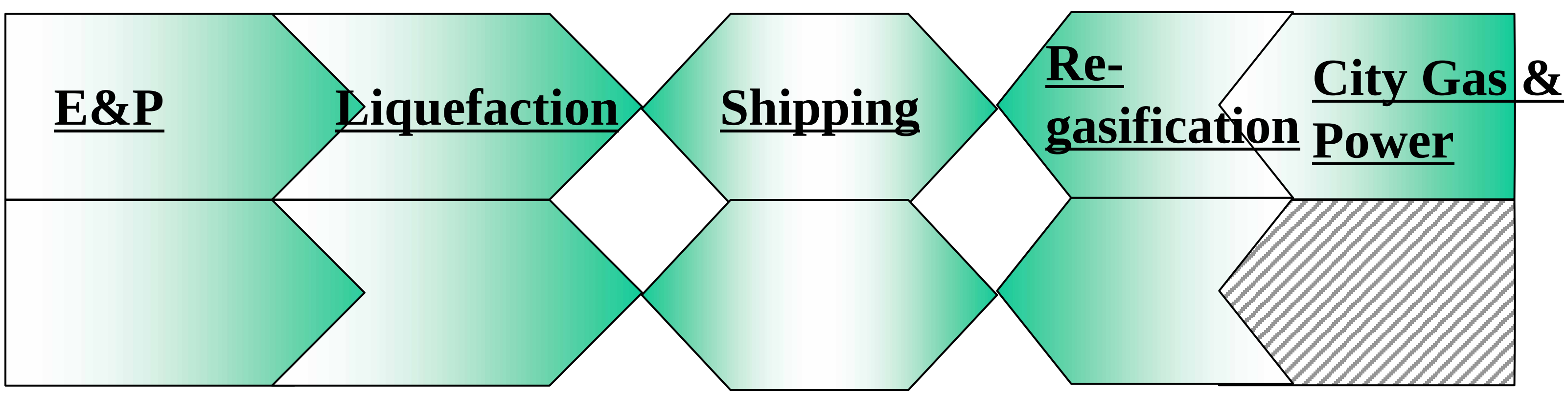
Aggregator Model

To launch new project by combining demand

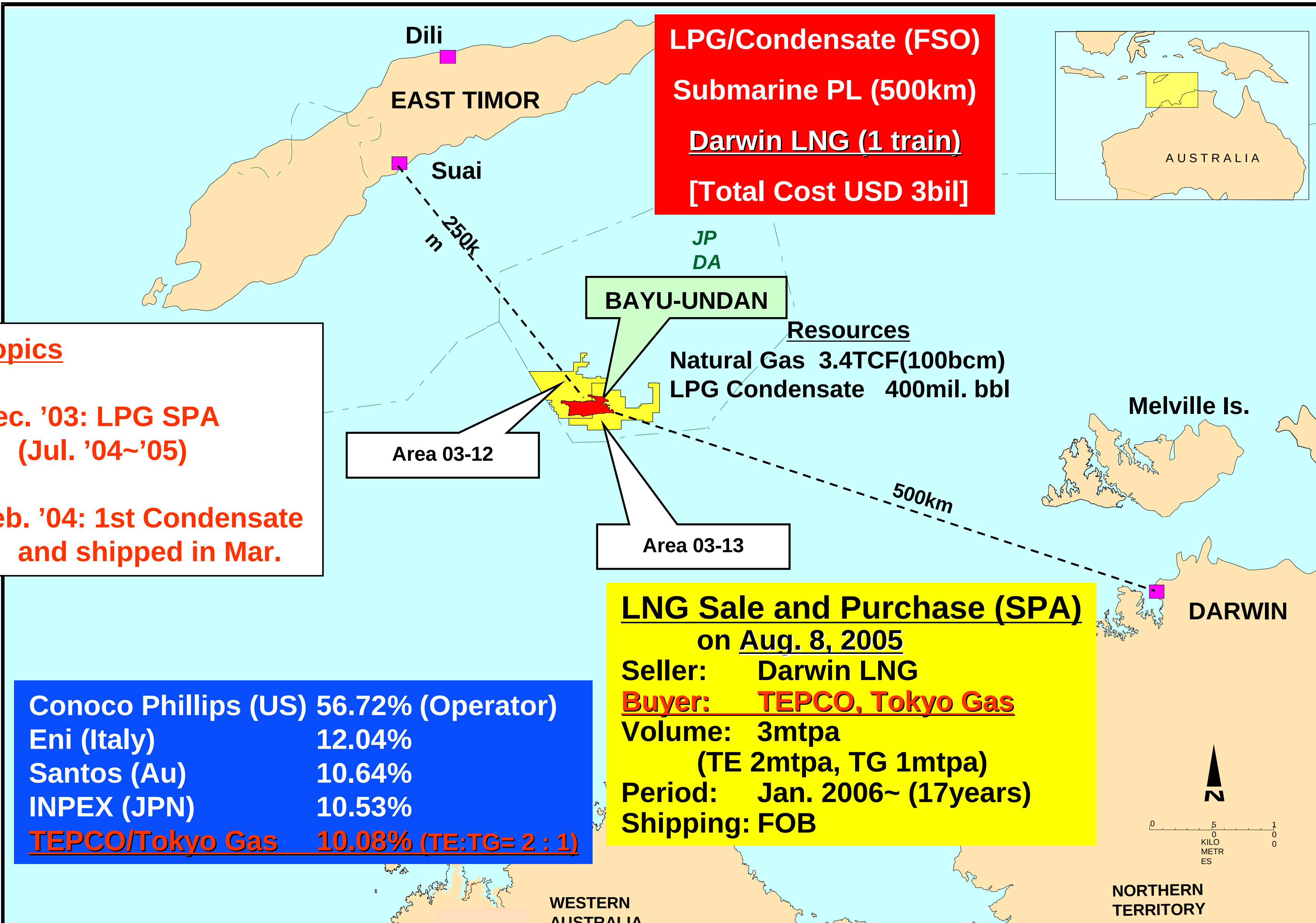


Integrator Model

To pursue scale merit & consistent management



Buyer's Strategy Example ~ Upstream ~



LPG/Condensate (FSO)

Submarine PL (500km)

<u>Darwin LNG (1 train)</u>

[Total Cost USD 3bil]

<u>Resources</u>

Natural Gas 3.4TCF(100bcm)

LPG Condensate 400mil. bbl

<u>Topics</u>

Dec. '03: LPG SPA
(Jul. '04~'05)

Feb. '04: 1st Condensate
and shipped in Mar.

Conoco Phillips (US)	56.72% (Operator)
Eni (Italy)	12.04%
Santos (Au)	10.64%
INPEX (JPN)	10.53%
<u>TEPCO/Tokyo Gas</u>	<u>10.08% (TE:TG= 2 : 1)</u>

<u>LNG Sale and Purchase (SPA)</u>
on <u>Aug. 8, 2005</u>

Seller: Darwin LNG
<u>Buyer: TEPCO, Tokyo Gas</u>
Volume: 3mtpa
(TE 2mtpa, TG 1mtpa)
Period: Jan. 2006~ (17years)
Shipping: FOB

Buyer's Strategy Example ~ Transportation ~

Purpose of FOB/Owing Ship

1. Increase of Trading Opportunities

- **for spot trading by Master Agreement**
- **for cargo diversification based on SPA**

2. Transportation for other Buyers

- **North West Shelf Expansion: transportation by Tokyo Gas for co-Buyers**

1. Two LNG Tankers owned by Tokyo LNG Tanker

- **145,000 m^3 Moss type**
- **Shipyard: Kawasaki Shipbuilding**
- **Operator: Mitsui O.S.K. Lines (MOL)**
- **Service In: Energy Frontier - Sep.2003 / Energy Advance - Mar. 2005**

2. Third (2006) and Fourth Ship (2008)

*** Line: Malaysia-I, M-III (Short-term), North West Shelf Expansion, Darwin, Sakhalin-II, Spot, and new projects (?)**

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Feature & Structure in LNG Industry

- ***Huge Investment***
  - **E&P, liquefaction, transportation, storage**
- ***Role & requirement***
  - **Environmental friendliness, security of supply**
  - **Stability for supply, procurement, price**
- ***Delivery structure***
  - **Lack of flexibility**
    - **small gap → huge impact (esp. spot trade)**
  - **Commodity in the future?**
    - **Two markets; spot trading & long-term market (NE Asia)**
- ***Confusion on LNG S/D outlook***
  - **Difference between short-term and long-term view**

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Requirement & Business Innovation for LNG Development

- ***Supply and demand gap minimization***
  - **Requirement for precise demand prediction**
  - **Well-timed launching new & expansion project**
  - **Information sharing among sellers & buyers, B & B**
- ***Requirement for LNG growth***
  - **Competitiveness & stability**
    - **Indispensable for natural gas growth in NE Asia**
  - **Volatility mitigation**
    - **Significance of long-term contract with price formula**
- ***Contractual arrangement***
  - **Flexibility in long-term contract (DQT / UQT / Destination)**
  - **Innovative price formula**

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Significance of Buyers' Cooperation

- ***S/D balance optimization***
  - **Risk share & market development**
    - **Brown field expansion & green field launching**
    - **Cooperation between sellers and buyers**
- ***Shipping & delivery arrangement through cooperation***
  - **Seasonal swap, ACQ transfer (only within co-buyers)**
  - **Need for contractual flexibility in order for shipping & delivery cooperation**
- ***Significance of cooperation in the future***
  - **Buyers' cooperation in all aspects**
  - **Significance of value chain participation for buyers**
  - ***Sharing of market strategy***
  - ***Reinforcement of bargaining power***

Buyers  *cooperation*
for LNG market growth in NE Asia

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