

Challenges and Opportunities for Japanese players in the Globalizing LNG Market

20 November 2014, Bratislava, Slovakia

PGC B SG1

Hiroshi Hashimoto

Institute of Energy Economics, Japan - IEEJ

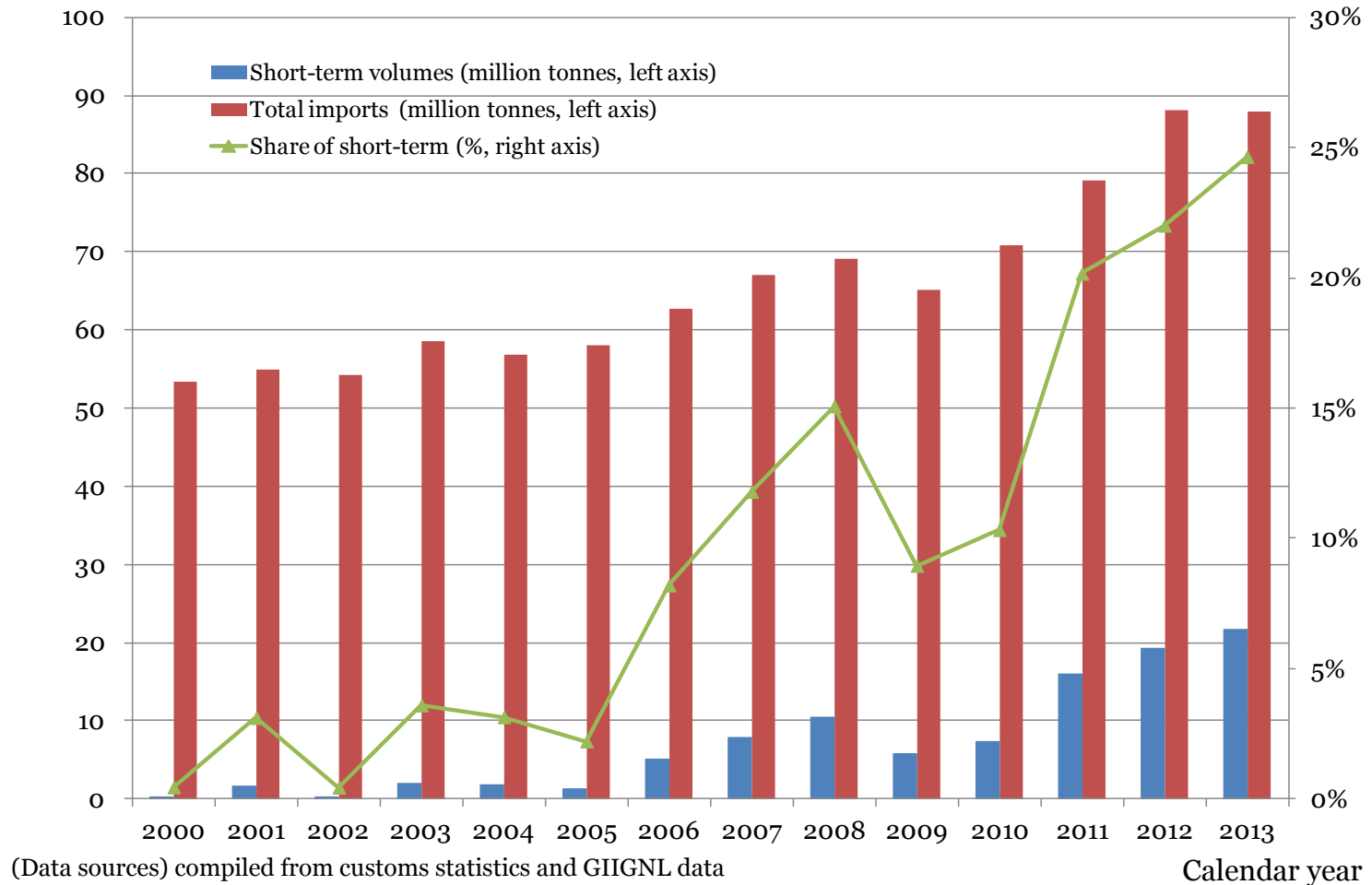
hiroshi.hashimoto@tky.ieej.or.jp

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Evolving LNG procurement patterns

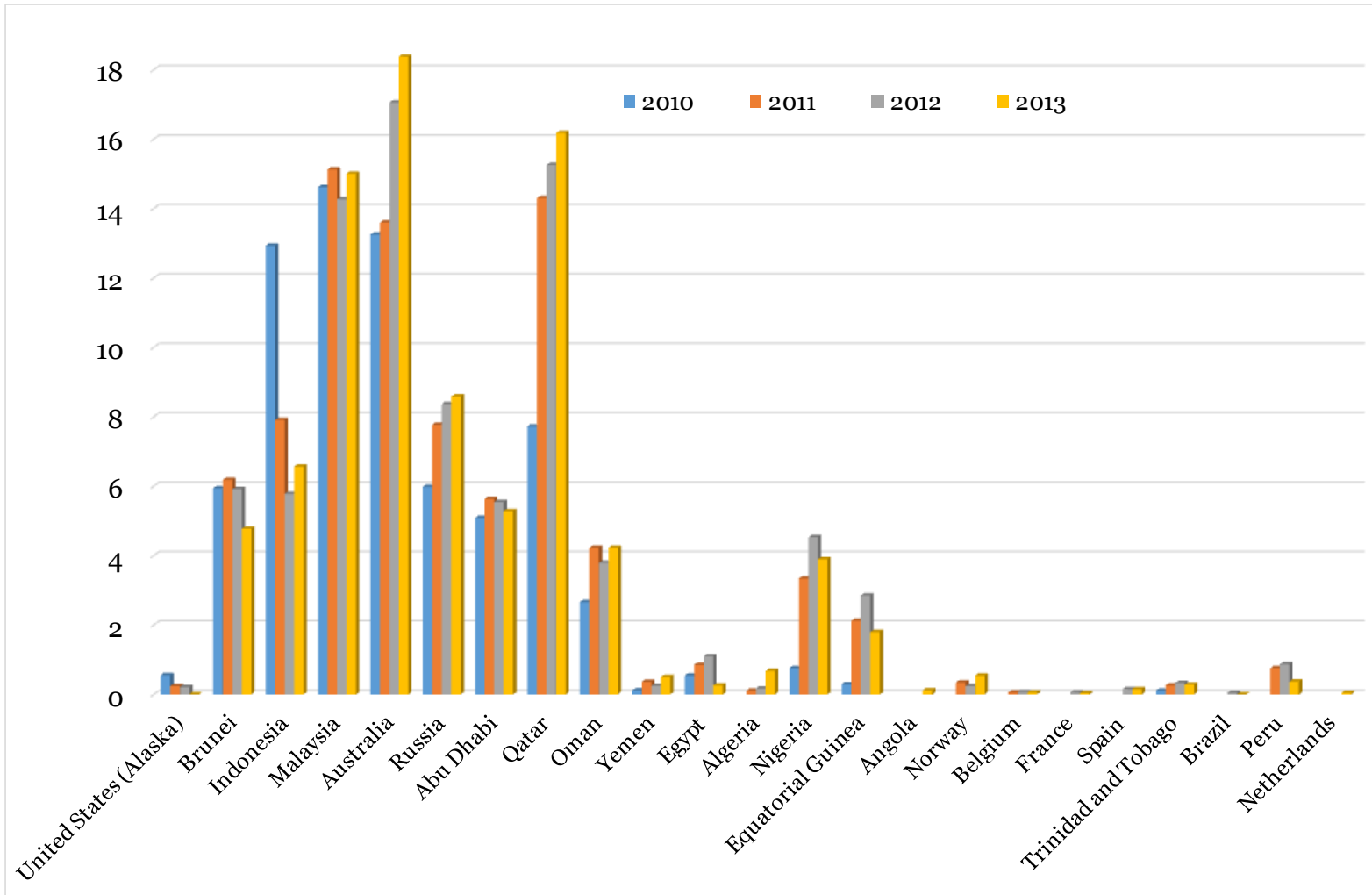
Share of short-term volume in the total imports in Japan



Shifting supply sources are observed

(million tonnes)

Japan's LNG supply sources 2010-2013



(Data sources) Custom statistics of Japan

Changing behaviour

	City gas and electric power utility companies	Trading companies (Sogo-shosha)	Upstream players
-1990s	LNG buyers simply receiving cargoes on DES basis	Liaison between buyers and sellers	Few LNG upstream activities
2000-2011	Some upstream appetites with minority investment, preference to FOB procurement	Diversification of LNG activities	Some involvement in both upstream and downstream
2011-	Total value-chain approach	More active involvement in LNG project development	

February 2019

(Ishikari Power Station)

April 2015

(Hachinohe)

2023

(Joetsu Power Station)
[name to be decidedn the future]

July 2016

(Shin Sendai Power Station)

2018 or later

(Toyama Power Station)

2018

(Soma)

2016

(Hitachi)

Himeji 1
Himeji 2

Senboku 1
Senboku 2

Higashi Ohgishima

Ohgishima

Sodegaura

Futtsu

Mizushima
Hatsukaichi

Negishi

Shimizu Sodeshi

Chita 1
Chita 2
Chita Midorihama

November 2014

(Hibiki)

Yanai

Tobata

Fukuhoku

Nagasaki

Kagoshima

Sakaide

Oita

Kawagoe

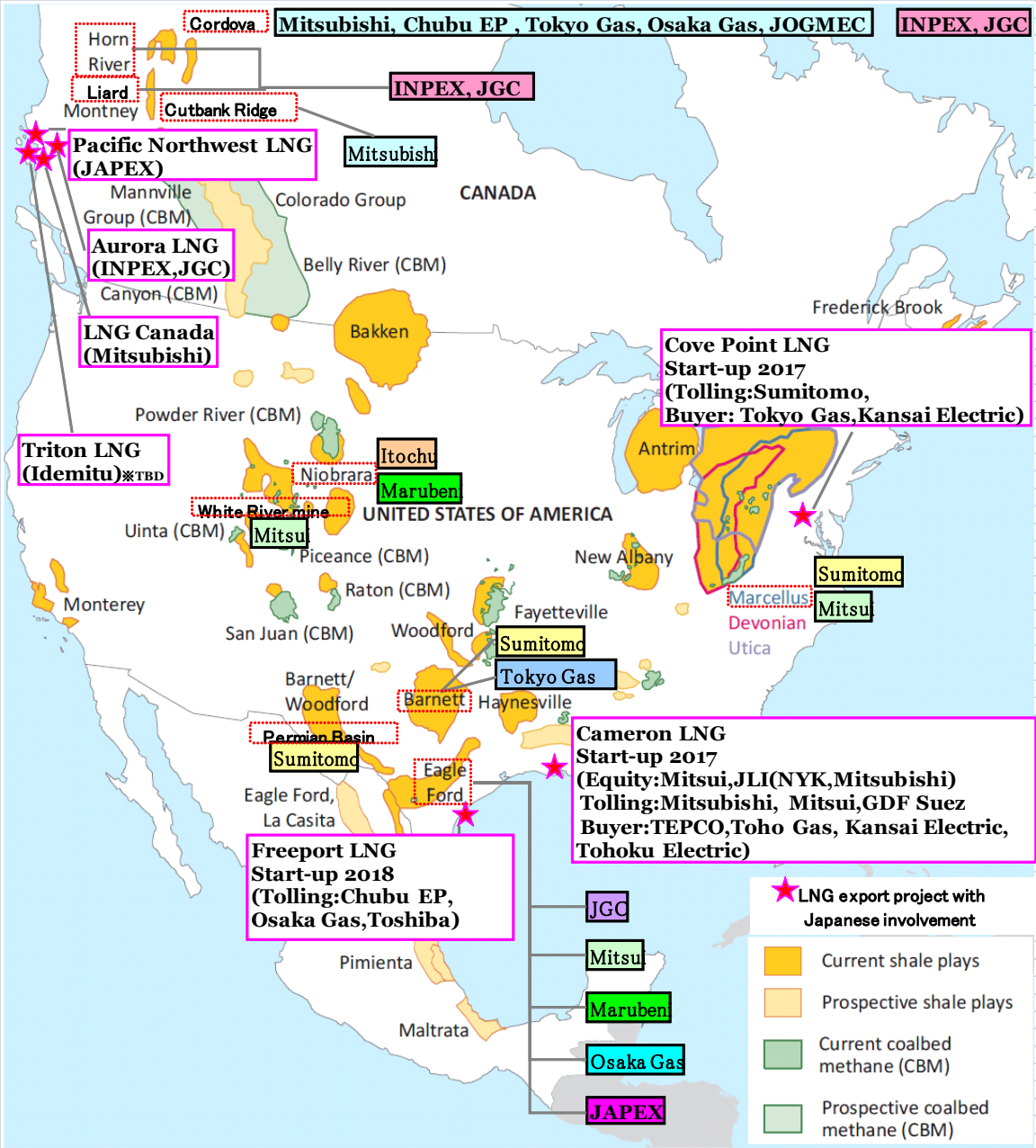
Yokkaichi 1
Yokkaichi 2

Sakai

(Wakayama Power Station)

2023 or later

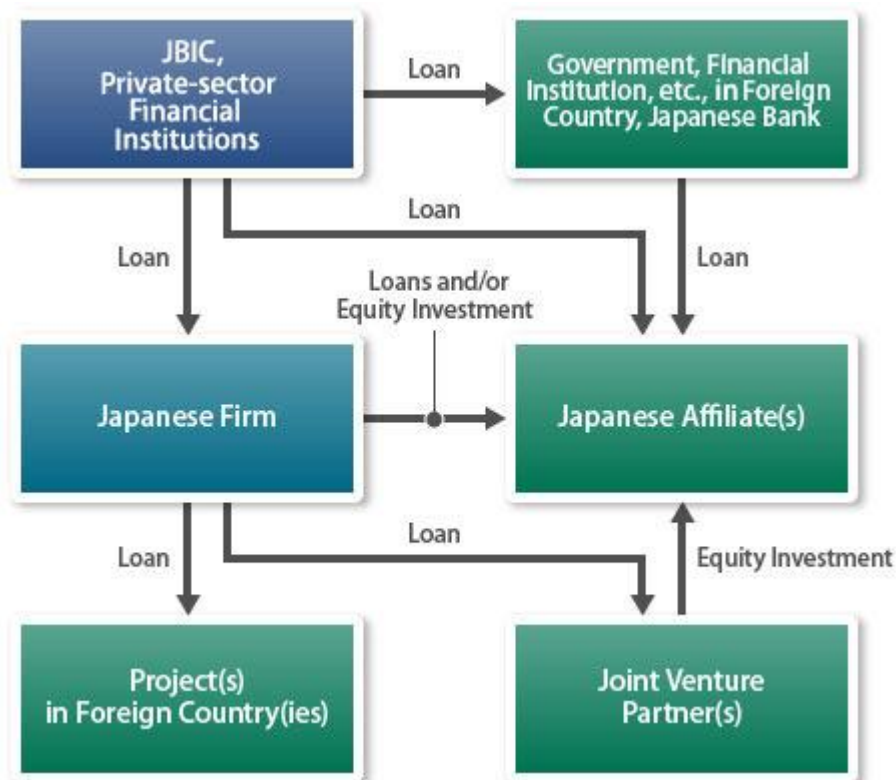
Yoshinoura



- Canada
 - Mitsubishi
 - Inpex and JGC
 - Idemitsu
 - Japex
- United States
 - **Cameron** - Mitsubishi and Mitsui (as well as GDF Suez) + Tepco, Toho Gas, Tohoku, Kansai, Tokyo Gas
 - **Freeport** - Osaka Gas and Chubu Electric Power, as well as Toshiba
 - **Cove Point** - Sumitomo + Tokyo Gas and Kansai Electric

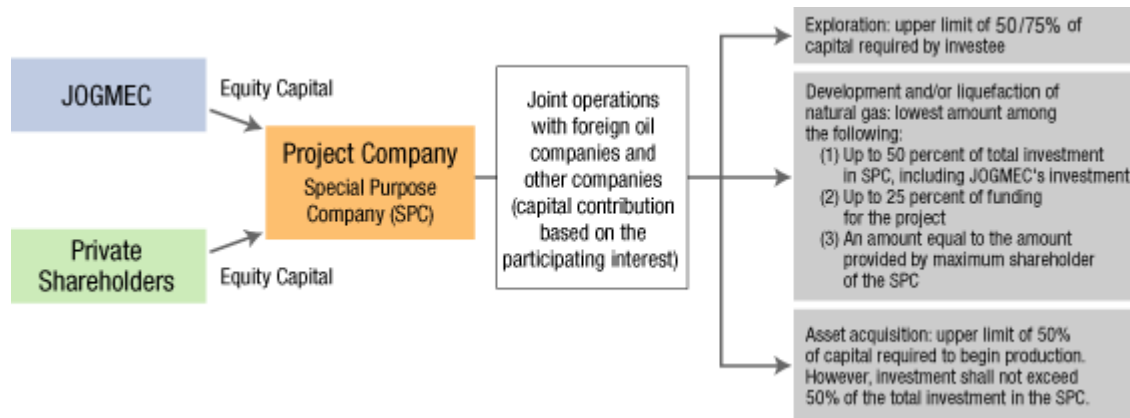
(Source) Compiled from company announcements and “Golden Rules for a Golden Age of Gas, World Energy Outlook Special Report on Unconventional Gas”, International Energy Agency (IEA), 29 May 2012 and company announcements.

JBIC provides supports

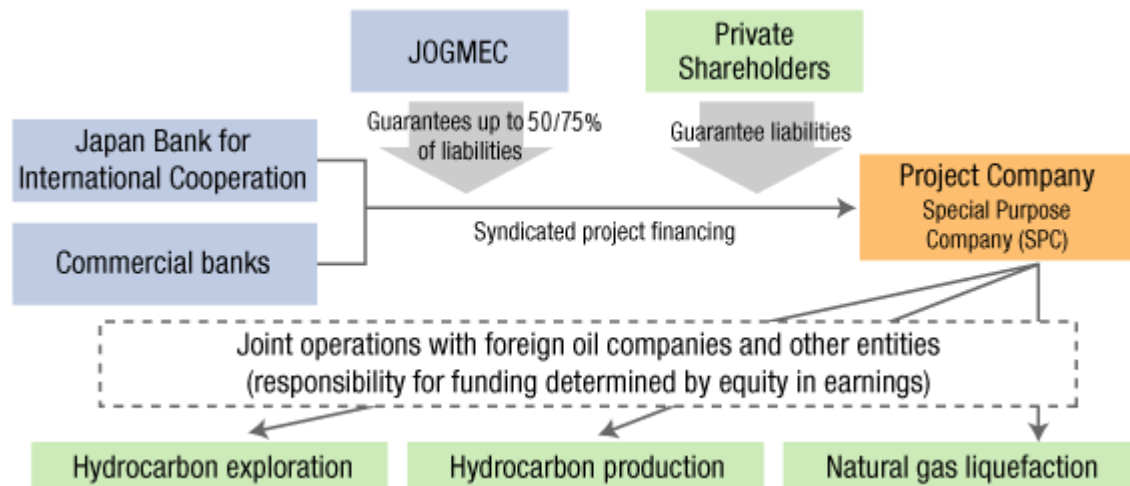


- New LNG delivery from PNG and progress of LNG projects in Australia
- Financial support to realize LNG projects in the United States and Indonesia
- Dialogues with new supply sources including East Africa
- Financing for LNG carrier ship building

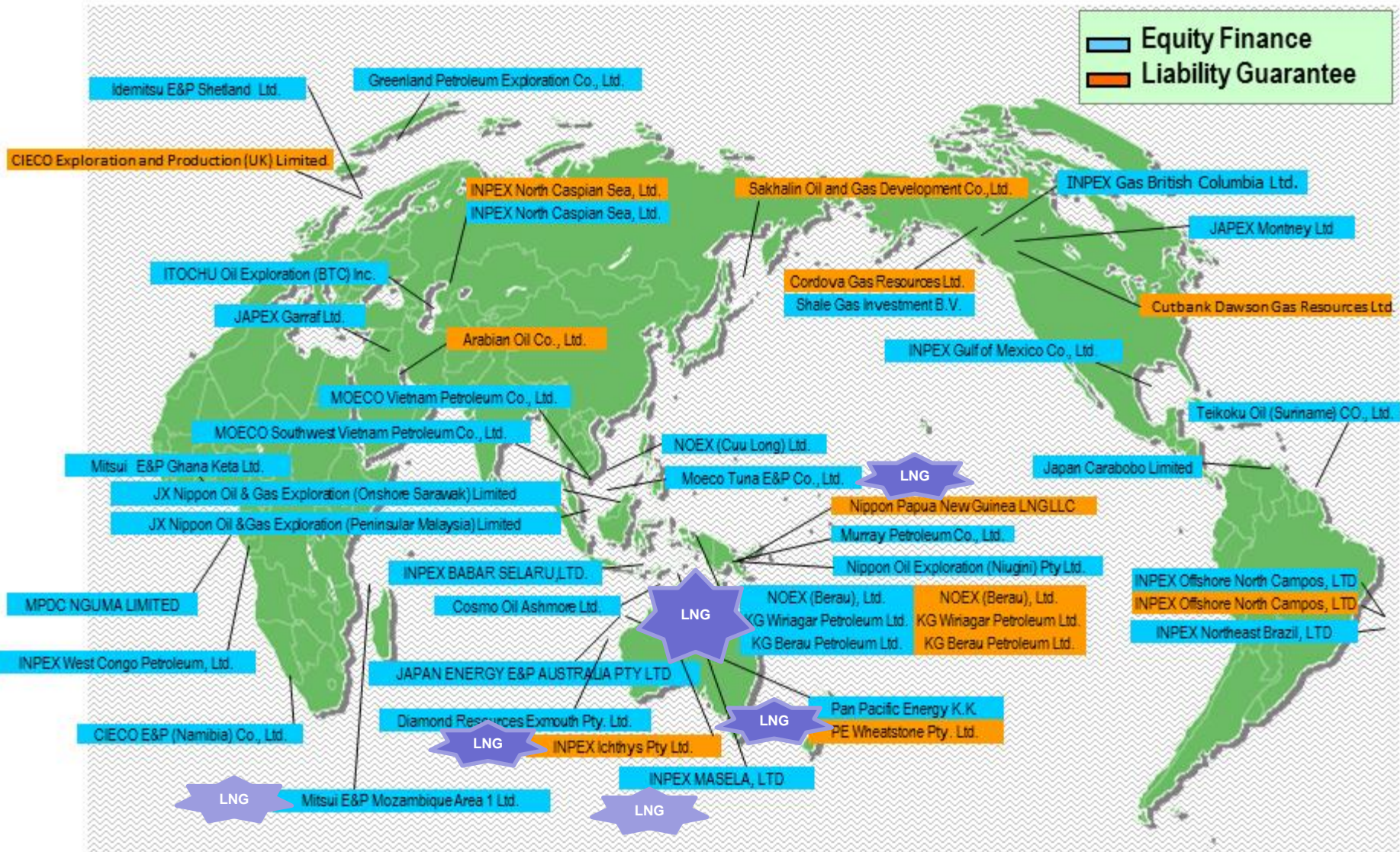
JOGMEC provides supports



- In addition to promote investment to upstream business, technology development and research are also the key of development of potential energy resources.



JOGMEC E&P Projects (March, 2013)



Japan's Strategic Energy Plan

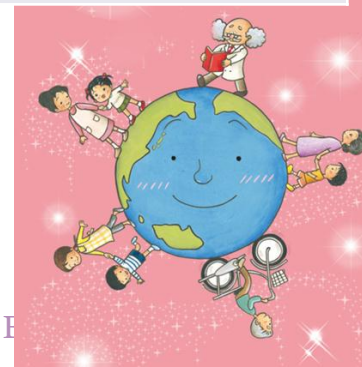
- Promoting comprehensive policies for securing of resources
 - Promoting multilayered “resource diplomacy” with natural resource exporting countries.
 - Facilitating diversification of supply sources and upstream development through risk money supply.
 - Promoting new styles of joint procurement such as comprehensive business partnership.
 - Establishing a stable and flexible LNG supply-demand structure with a long-term strategy that Japan would be a hub of a coming Asia LNG market.
 - Developing domestic seabed mineral resources such as methane hydrate and rare metals.
- Realization of an advanced energy–saving society
- Accelerating Introduction of Renewable Energy: Toward Grid Parity in the Mid/Long Term
- Re-establishment of nuclear policy
- Environmental arrangement for the efficient/stable use of fuel fossils
- Promotion of reforms in supply structure to remove market barriers
- Enhancing resilience of domestic energy supply network
- Future of a secondary energy supply structure
- Energy leading Growth Strategy : creation of new energy enterprises etc
- Strengthening comprehensive international energy cooperation

Thank you for your attention.

What will drive changes in Japanese players' behaviour in the future LNG markets?

	Supply	Demand
To date	Expansion of shale gas in the United States LNG capacity expansion in Qatar and others	Deregulation in the downstream electricity and gas markets Emergence of portfolio players Nuclear difficulty
Thereafter	More expansion of LNG capacity in Australia, North America and others Strong commitment continues being important	More Japanese and other Asian buyers, as well as trading houses and upstream companies, becoming more proactive in project participation Government policy

Contact: Hiroshi Hashimoto
hiroshi.hashimoto@tky.ieej.or.jp





Nord Stream, status

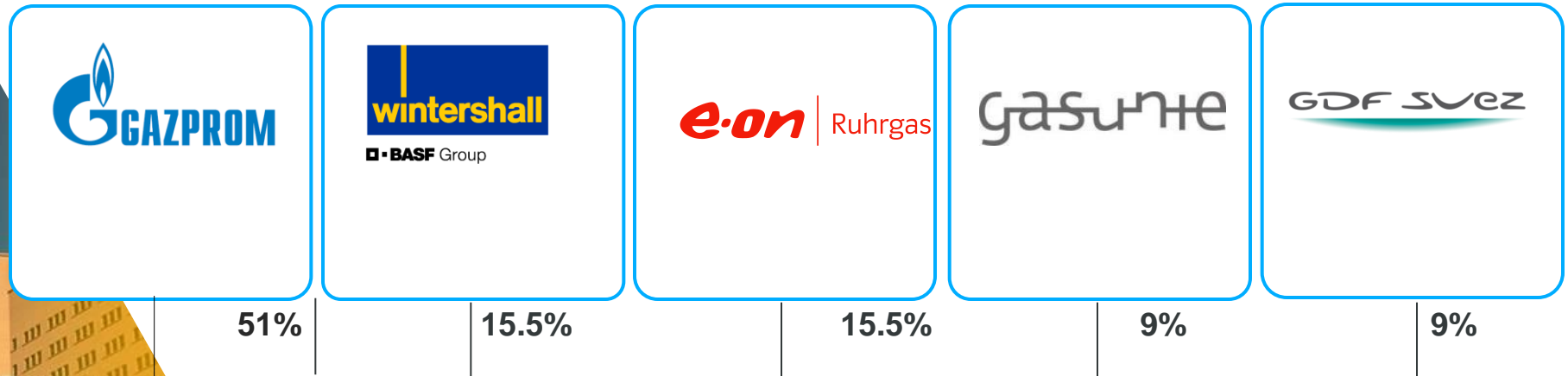
Amsterdam, 24/25 April 2014

Ulco Vermeulen,
Managing Director Business Development and Participations

Description Nord Stream project

- Two off shore gas pipelines in the Baltic Sea from Russia to Germany, each of 1220 km, inner diameter 1153 mm
- Capacity: 27.5 bcm/year each, total of ~ 55 bcm/year
- Ownership: Gasunie (9%), OAO Gazprom (51%), Wintershall (15.5%), E.ON Global Commodities SE (15.5%), GDF Suez (9%)
- Commercial: Take or pay obligation by shipper Gazprom Export
- Financial: Total project costs: EUR 8.45 bln; project finance/equity 70/30%

Nord Stream AG and its shareholders



Supervisory Level

Shareholders Committee

Management Level

Managing Director

Technical
Director

Project
Director

Financial
Director

Communications
Director

Objectives of Gasunie

Participation in Nord Stream contributes to the long term objectives of Gasunie:

- Development of the gas round about, aiming at facilitating the gas market by further development of gas infrastructure and transport grid and by directing new gas flows to NW-Europe;
- Participation in profitable activities within an international gas infrastructure and a relevant market area;
- Extension and strengthening of the cooperation with one of the biggest, international companies on the gasmarket: Gazprom

Project players – a true European endeavour

Nord Stream & Shareholders

- | | |
|------------------|------------------------------------|
| 1 Nord Stream AG | 4 BASF SE/Wintershall Holding GmbH |
| 2 OAO Gazprom | 5 E.ON Ruhrgas AG |
| 3 GDF SUEZ S.A. | 6 N.V. Nederlandse Gasunie |

Nord Stream Gas Purchasers

- | | |
|---|------------------------|
| 1 Gazprom Marketing and Trading Ltd, UK | 3 GDF SUEZ S. A. |
| 2 DONG Energy A/S | 4 WINGAS GmbH & Co. KG |
| | 5 E.ON Ruhrgas AG |

Logistics

- | | |
|---------------------------|----------------------|
| 1 EUPEC | 4 Port of Hanko |
| 2 Port of Sassnitz-Mukran | 5 Port of Slite |
| 3 Port of Kotka | 6 Port of Karlskrona |

Pipes & Materials*

- 1 EUROPIPE
- 2 OMK
- 3 Sumitomo**
- 4 PetrolValves

Construction*

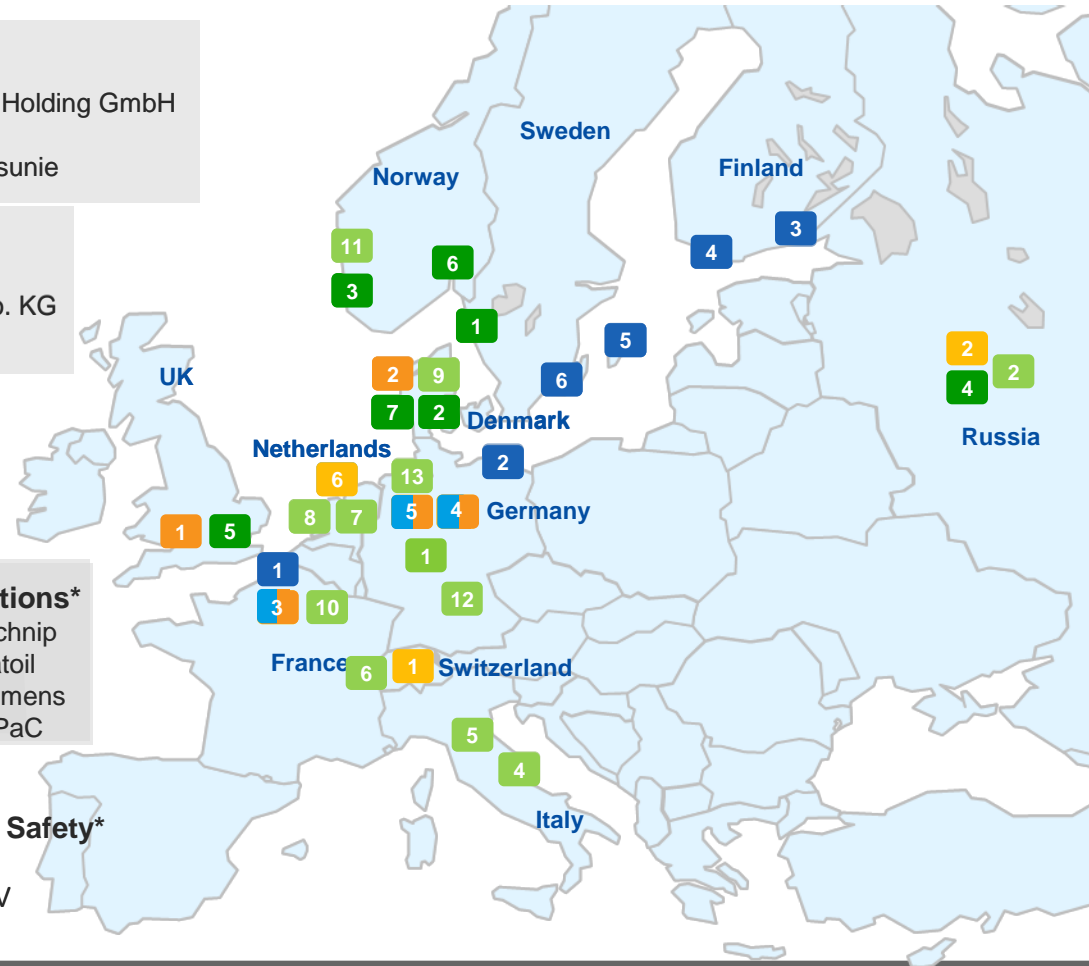
- 5 Saipem
- 6 Allseas
- 7 Van Oord
- 8 Boskalis-Tideway
- 9 Rohde Nielsen

Operations*

- 10 Technip
- 11 Statoil
- 12 Siemens
- 13 IMPaC

Environmental Studies, Quality Management & Safety*

- | | | |
|-------------------|------------|-----------|
| 1 Marin Mätteknik | 4 PeterGaz | 7 FOGA |
| 2 Rambøll | 5 ERM | 8 SGS TÜV |
| 3 DoF | 6 DNV | |



Downstream facilities of Nord Stream

- Downstream pipelines:
NEL and OPAL for 20 and 35 bcm/yr.
- OPAL shareholders: 80 %
Wingas and 20 % E.ON.
- OPAL started operation in
November 2012.
- NEL shareholders: 51% Wingas,
25% Gasunie, 24% Fluxys.
- NEL started full operation in
November 2013.

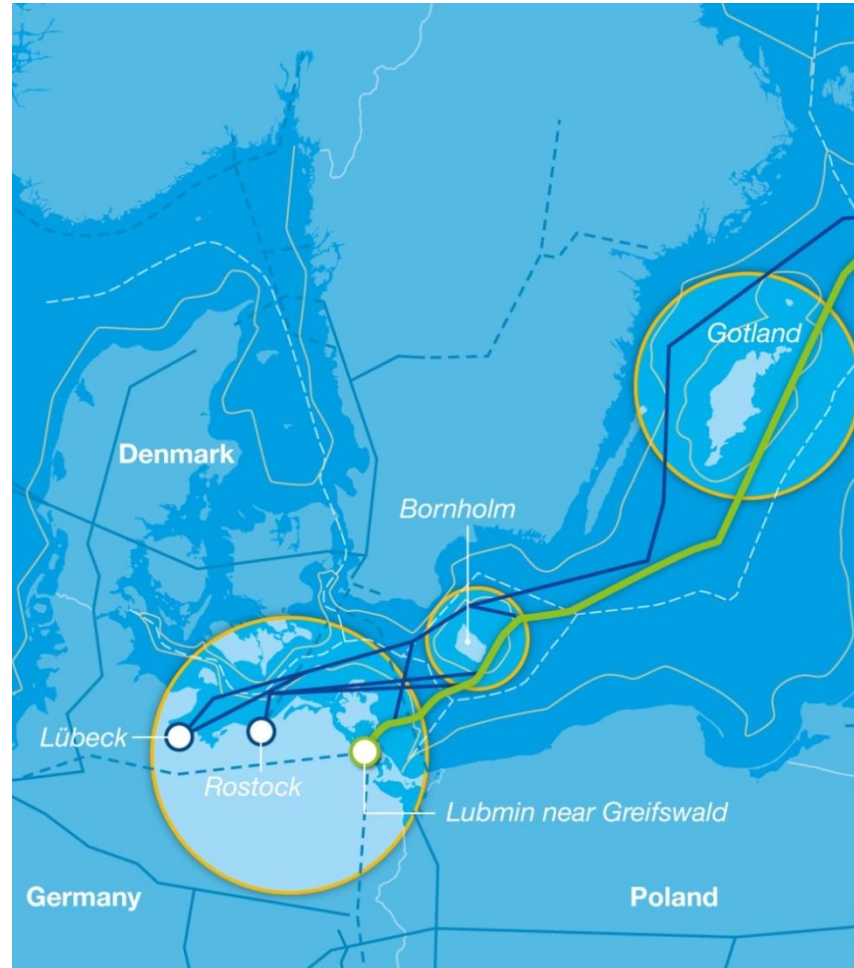


Safest route with least environmental impact based on stringent criteria

- **Environmental criteria**
 - Minimise pipeline length
 - Avoid environmentally sensitive areas and Natura 2000 sites
- **Socio-economic criteria**
 - Minimise restrictions on marine users such as fishing and shipping
 - Avoid munitions, cultural heritage sites and planned and existing infrastructure
- **Technical criteria**
 - Control construction time
 - Optimise free spans and curves
 -

— Green: Nord Stream final route

— Blue: proposed route





Work in progress Nord Stream passes half-way







CROATIA- ADRIATIC OFFSHORE

Phd. Dražena Kreković, Ljiljana Postružin

Amsterdam, 23rd-25th April 2014., IGU 4th PGCB SG B.3 meeting



- First seismic of Adriatic offshore started 1968.
- First meters were drilled in 1970., by hired drilling platform Neptun - 1st exploratory well Jadran-1
- 1970.-1974. – 20 000 m were drilled
- Because offshore operations were too expensive and technologically too demanding, INA's Upstream found foreign partners for offshore projects:
 - Agip & Chevron - Project Jabuka
 - Texaco & Agip - Project Mljet
 - Chevron, Agip & Repsol - Project Palagruža
- Then unfortunately, were no commercial discoveries

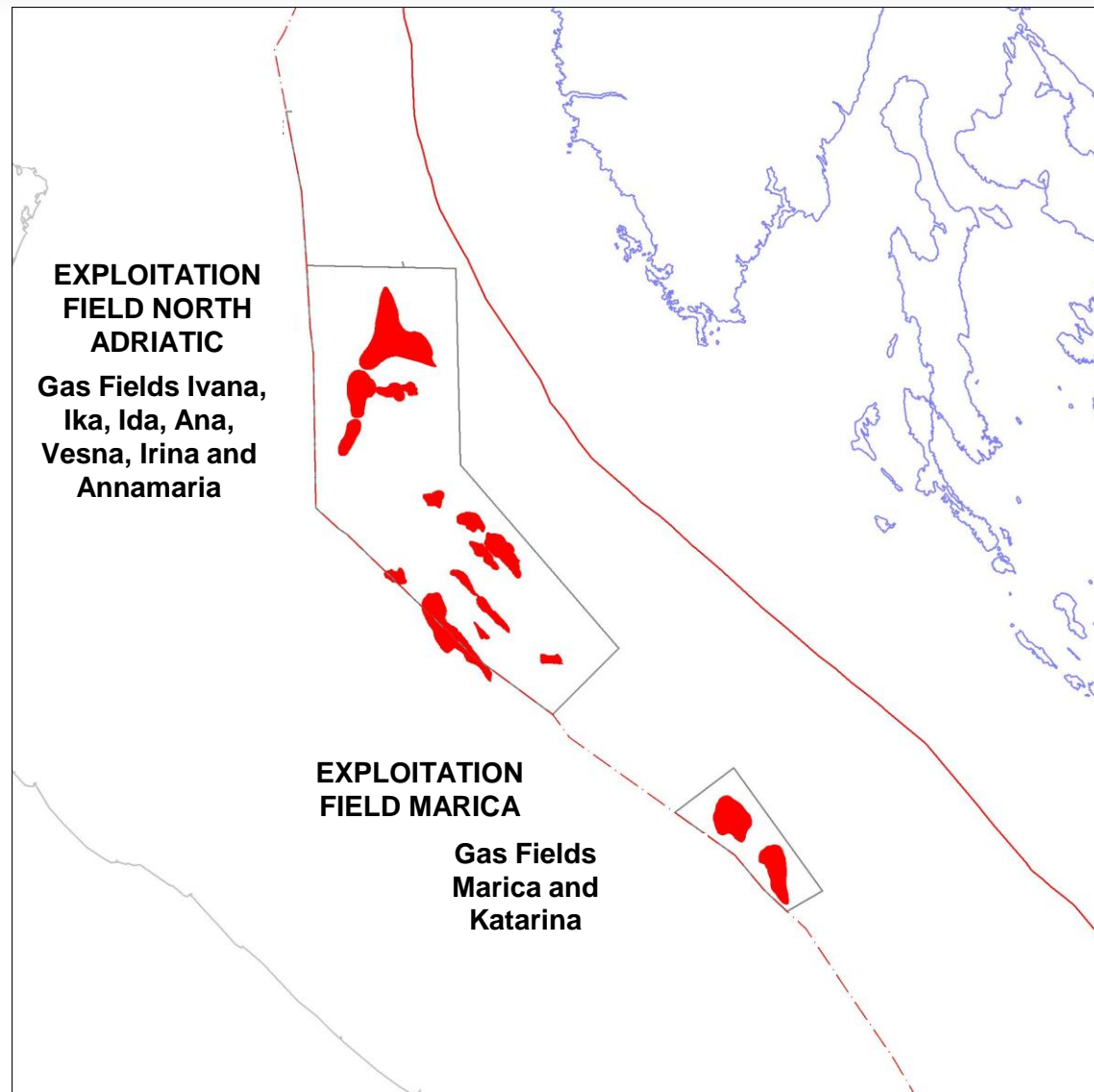


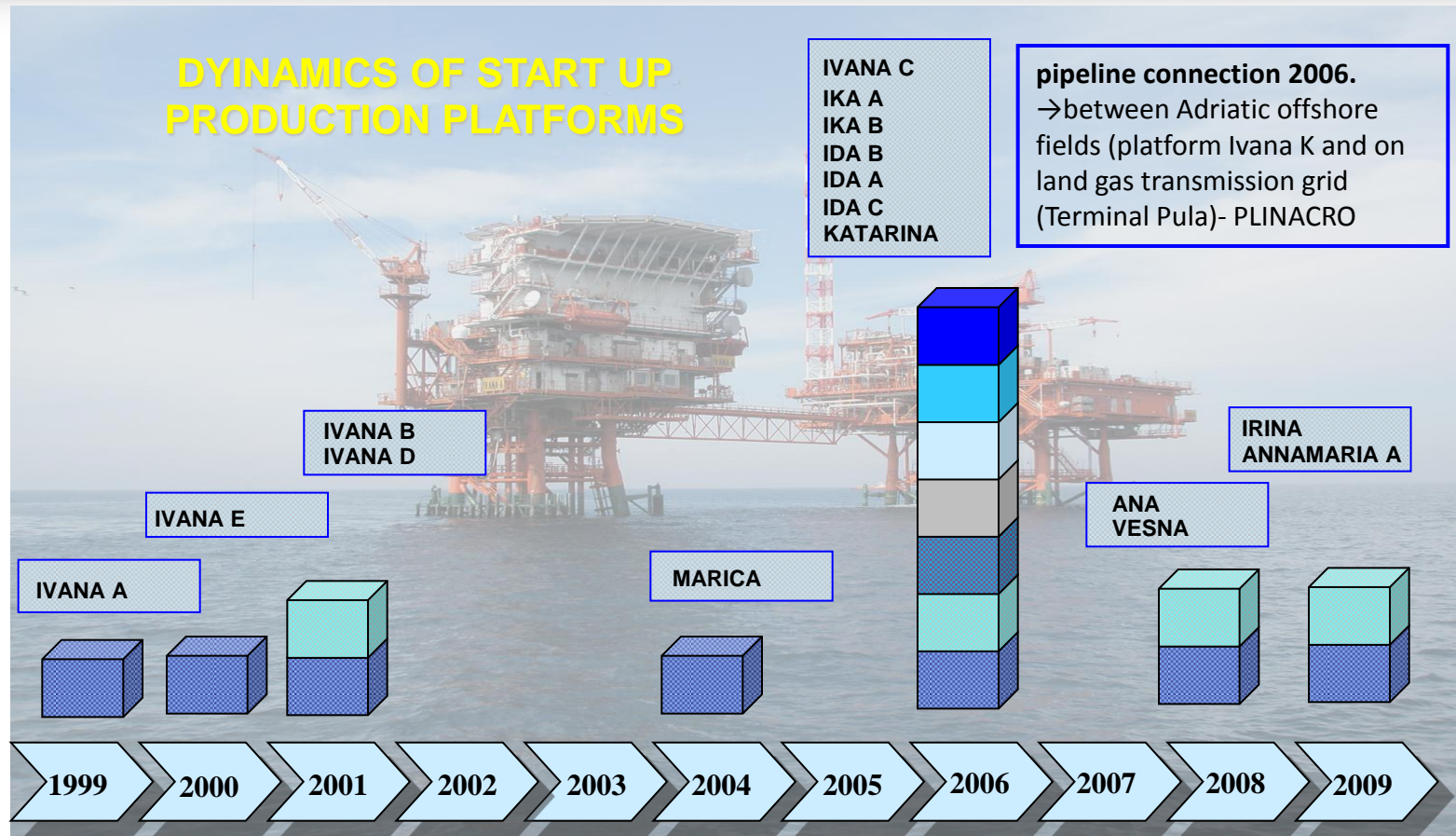
- First gas discoveries were 1970-1974, including currently the largest gas field Ivana
- Since then the focus was on oil (gas discoveries were marginalized), as well as the lack of appropriate technology solutions for the exploitation and transport of gas, its exploitation was postponed to 1999.

- **Production Share Agreement- 1996.** between the **INA INDUSTRIJA NAFTE d.d.**, Zagreb, a company established and existing under the laws of Croatia and **AGIP CROATIA B.V.**, a company established and existing under the laws of The Netherlands
- In 1996. INA was NOC but after the privatization became IOC
- **Operating Company INAGip-** Participating Interests of the parties INA 50% - ENI (AGIP) 50%
- All Petroleum Costs incurred by the Operating Company and charged to the Joint Account and all proceeds derived by the Operating Company are shared by the parties respecting their Participating Interests
- The Operating Company conduct the Petroleum Operations pursuant to any applicable laws (within the Republic of Croatia in compliance with the Croatian Law and outside the Republic of Croatia in compliance with any applicable laws), to PSA and in accordance with good international petroleum industry practice

Exploitation Fields

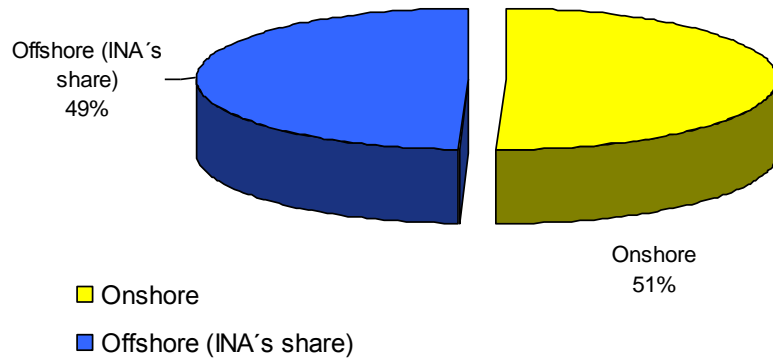
- INA's exploration and production activities in the Adriatic are carried out together with its Italian partners. On the exploitation fields "North Adriatic" and "Marica", Ina's partner is ENI, and joint operating company is INAgip.
- Currently- 9 gas fields in production



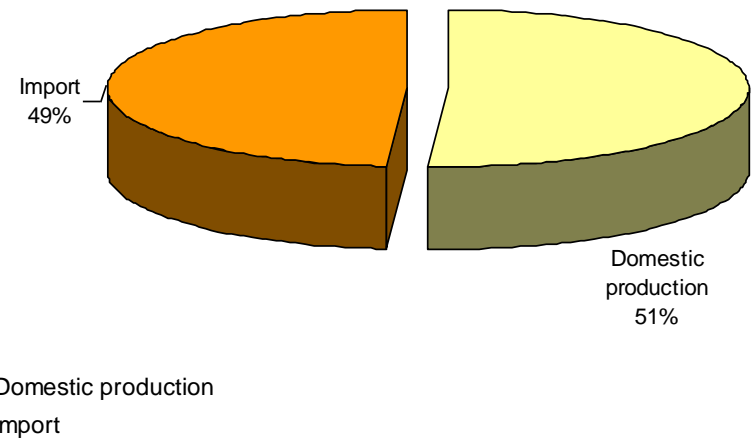


- Currently there are 17 platforms in the exploitation field “North Adriatic” and “Marica” in the Adriatic, 16 of them are production platforms and one is processing platform (Ivana K) on which are located facilities for receiving, processing and compression of gas.

Structure of Croatian NG production in 2013.



Structure of Croatian NG supply in 2013.



INA

- **All mineral resources**, including Oil & Gas, in **the jurisdiction** (on land territory and offshore-Adriatic sea) **of Republic of Croatia**, are the **property of the Republic of Croatia**
- **INA has received** from the Government of the Republic of Croatia the **exclusive licence for the right to explore, develop and produce hydrocarbons from the area covered by the Production Share Agreement**
- **INA pays** , vis a vis any Croatian Competent Authorities within the periods and in the manner prescribed by any applicable Croatian Law, **all period payments, royalties, taxes, fees and other payments** pertaining to the Petroleum operations

ENI

- ENI, an Italian Company organized and existing under the law of the Republic of Italy, has a **long term experience and expertise in development and production of the similar characteristics gas fields in the Italian part of Adriatic sea** and in the same area **disposes with existing production-transportation system connected with onshore Italian gas network**, which could be utilized for the maintenance of the necessary constant level of the production of the INA's fields
- **ENI is ready to transfer its experience and knowledge through the Operating Company as well as to put at disposal to INA its existing production-transportation facilities**

- **Exploitation fields of hydrocarbon "North Adriatic" & "Marica"** are located in epi-continental sea of Republic of Croatia
- **In addition to compliance with Croatian laws are respected and international conventions:**
 - **Convention on Environmental Impact Assessment in a Transboundary Context** (Espoo Convention)
 - **Convention on the Prevention of Pollution from Ships** (MARPOL)
 - **Convention on the Protection of the Mediterranean Sea against Pollution** (Barcelona Convention)
- **Environmental Impact Study :**
 - Identification and analysis of environmental impacts due to the exploitation of natural gas
 - Adapting technology of exploitation to any change in - environment / conditions of exploitation
 - Defining the environmental monitoring program as well as the protection measures that reduce the impacts within statutory framework
- Continuous environmental monitoring and timely response to perceived changes → **No incidents in 15 years of exploitation**

- The balance of the growing number of people and economic growth on the one hand and the consequences for the environment on the other → the biggest challenge

Sustainability of Adriatic offshore projects:

- In the oil industry, efforts to establish a sustainable energy system is primarily related to higher production of those energy sources with lower CO₂ emissions - **natural gas**
- Contribution to sustainable development by managing upstream business activities in a way to improve economic growth, while ensuring an increase in environmental protection and promoting social responsibility, including consumer interests in both countries

- **Increase of domestic gas production**
- **Higher level of energy security of supply**
- After constructed **pipeline connection 2006.**, between Adriatic offshore fields (platform Ivana K for gas treatment & processing) and on land gas transmission grid (Terminal Pula)- PLINACRO→ **INA's production share became available to Croatian market**
- **Lower dependence on gas import**
- **Engagement of domestic industry** like shipyards, service companies etc.
- **Contribution to employment** (especially experts)

- **Royalty-** total produced amount of gas is the base for royalty payment
- **Income tax-** higher tax as per higher income
- **Contribution to Croatian economy and prosperity in general**

- **INA improves its knowledge and get experience:**
 - in doing business in global competitive environment
 - In new business area (joint venture, petroleum and other advanced technologies,...)
- **Sharing risks with partner**
- **Possible improvements:** by redefinition of PSA in accordance to changed Company's status and new relevant legislation

Thank you very much for your attention!

If you have any questions, please don't hesitate to ask!
(via e-mail)



CROATIA- ADRIATIC OFFSHORE

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Gladstone LNG

Presentation to IGU PGCB SG.3
20th November 2014, Bratislava, Slovakia



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- Use of the contents in this presentation shall be limited to the activities of the International Gas Union (IGU).

Project Overview.



- Integrated LNG project with coal seam gas extraction from Fairview, Arcadia, Roma and Scotia fields in the Bowen and Surat Basin in Queensland, Australia⁸
- Joint Venture between:
 - Santos (30%)
 - PETRONAS (27.5%)
 - Total (27,%)
 - Kogas (15%)
- 7.8MTPA via 2 LNG Trains
- First LNG in 2015



GLNG Project Map.

Wallumbilla

Approximately 50km from Roma, Wallumbilla Hub is a well-established central area used by a number of energy companies to process natural gas before it is sent for use in the domestic market. A specialized facility designed to treat and compress gas has been proposed



Arcadia Valley

GLNG has gas fields to the eastern side of Arcadia Valley. Gas from these operations will be piped to Gladstone via underground gas transmission pipeline



Curtis Island

On just 3% of Curtis Island will our gas liquefaction plant and export hub be constructed. Once completed, the plant will convert CSG to LNG for export to international markets by 2015



Injune / Fairview

Over an area of 5000km², 50km from Injune, lays Fairview; GLNG's main gas fields and operational area. The region is home to gas production, cattle and on-site accommodation.



Roma

Our partner, Santos, has been producing natural gas in the Roma region for more than 50 years, and coal seam natural gas for 16.



Gladstone





Gladstone is a well-established industrial hub, with a history of attracting big industry. It is also home to a world-class natural deep water harbor, across which our pipeline will travel 1.8km from the mainland to Curtis Island.



Calliope

Calliope is located along our 420km underground gas transmission pipeline. The pipeline has been designed to minimize impact and will be buried at depths of between 0.75m and 1.2m to allow farming practices to continue over the land area





GLNG is a partnership of equals ...

 <p>Santos We have the energy.</p>	<ul style="list-style-type: none">• One of Australia's largest domestic gas producers¹⁵
 <p>PETRONAS</p>	<ul style="list-style-type: none">• Malaysia's national oil and gas company and the world's second largest LNG exporter¹⁵
 <p>TOTAL COMMITTED TO BETTER ENERGY</p>	<ul style="list-style-type: none">• World's fifth largest publicly traded integrated international oil and gas company¹⁵
 <p>KOGAS KOREA GAS CORPORATION</p>	<ul style="list-style-type: none">• World's largest buyer of LNG¹⁵

... each with their strengths ...

	<ul style="list-style-type: none">• Familiarity with local Australia
	<ul style="list-style-type: none">• Enhances GLNG project delivery and marketing strategy given PETRONAS strength of technical expertise and market position¹⁴
	<ul style="list-style-type: none">• Technical competence as one of the largest producers of LNG with multiple production sites³⁴
	<ul style="list-style-type: none">• LNG Off-take guarantee

... and will benefit all members.

	<ul style="list-style-type: none">• Consistent with strategies; Delivery of base business (mainly domestic production and sales of hydrocarbons), Focused growth in Asia, Growth of an LNG portfolio⁵
	<ul style="list-style-type: none">• First coal seam gas project³⁵• Offers long term LNG supply security³⁶
	<ul style="list-style-type: none">• First coal seam gas project consistent with strategy of investing in high quality unconventional assets².• Project is a good application of strategy to remain a leading LNG player and strengthens portfolio of unconventional gas⁸
	<ul style="list-style-type: none">• Boast South Korea gas supply diversity and security^{31, 8,13}

There are many COSTLY challenges ...

Costs^{5,9}

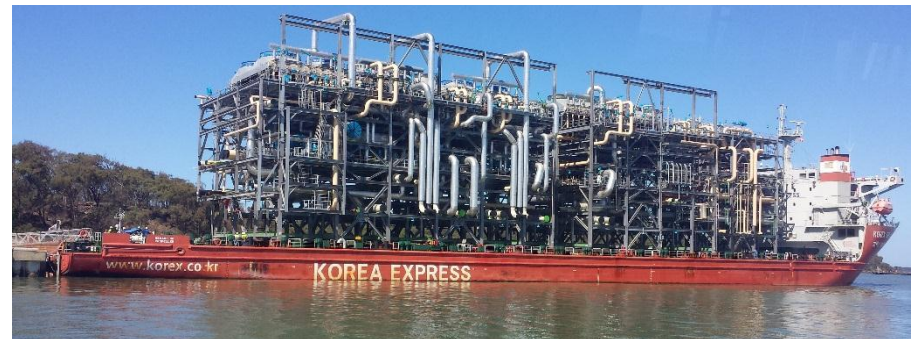
- Labour and Equipment costs^{10,17,23}
- Strong Australian currency^{9,17}
- Low Worker Productivity²²
- Gas supply shortage^{4,5}
- More wells required than originally anticipated^{7,17}
- Facilities Duplication¹⁰
- Regulatory Framework^{3,23}
- Royalties and other taxes¹⁶
- Environmental Concerns¹⁶
- Land access and landowner rights¹⁶

Costs have risen due to ...

	FID	FID First Cargo	2014 First Cargo	Capacity (mtpa)	FID Budget (USD\$Bn)	2014 Budget (USD\$Bn)	Increase (%)	USD\$/mt
Gorgon	Sep 09	2014	2017	15.6	37.0	54.0	46%	3,460
Wheatstone	Sep 11	2016	2018	9	26.4	29.7	13%	3,300
Prelude	May 11	2017	2017	3.6	12.0	12.0	-	3,330
Ichthys	Jan 12	2017	2018	8.4	34.0	44.0	29%	5,240
QCLNG	Oct 10	2014	2014	8.6	15.0	20.4	36%	2,370
GLNG	Jan 11	2015	2015	8.0	16.0	18.5	16%	2,310
APLNG	Jul 11	2016	2016	9.0	20.0	22.5	13%	2,500

... materials & construction ...

- Modularisation used to reduce site impact¹⁷
- This is however proving to be very expensive¹⁷
- 116 modules fabricated in Batangas in the Philippines and then shipped to Gladstone¹⁹

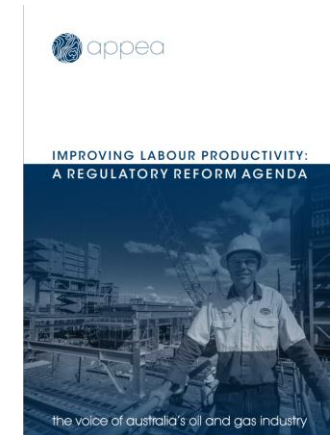


... currency & restrictive labour ...



Australian Dollar has risen 100% since 2000

Labour issues have been documented by the industry in a report “Improving Labour Productivity: A Regulatory Reform Agenda”²⁰

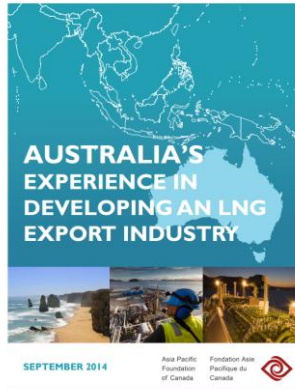


... reserves & facilities duplication ...

	Wells needed for 2 trains	Q2 2013	Q3 2013	Q4 2013	Total wells since FID	% of total required
QCLNG	2000	196	225	205	1900	95%
GLNG	1100	87	105	108	610	55%
APLNG	1400	56	67	38	398	28%
Arrow	2500	0	0	0	0	0%

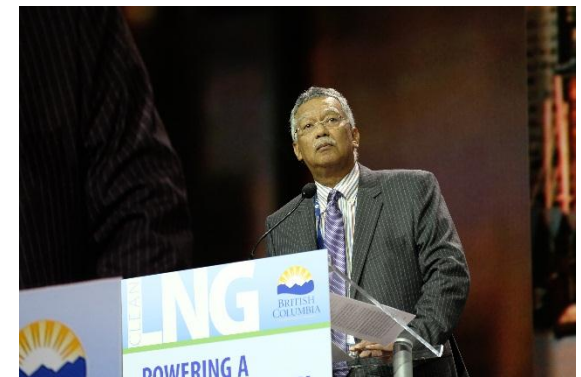
Duplication in ports, pipelines, storage tanks and perhaps even ... LNG trains²¹

... regulatory frameworks & taxes ...



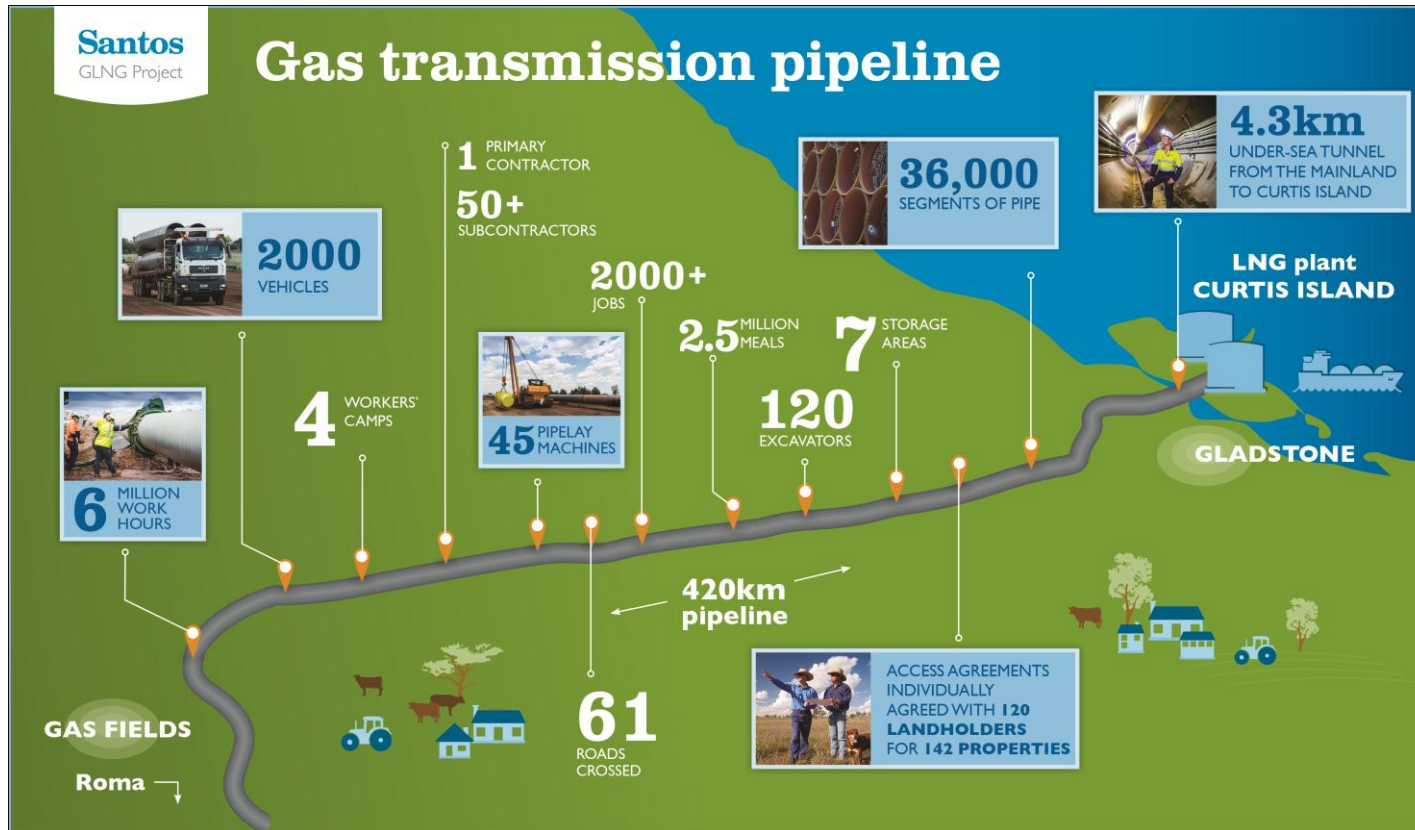
Regulatory issues have been documented by the industry in a report “Australia’s Experience in Developing An LNG Export Industry”²³

“There are pivotal lessons to be learned from the Australian experience ... Let’s not slaughter the goose before it has a chance to hatch the golden egg”²⁴
“ ... severe fiscal and regulatory policies ... As a result, the anticipated second wave of investors shield away, and even current investors are scrutinizing project viability”²⁴



23 Grafton, R.Q. & Lambie, N. R., 2014. *Australia’s Experience in Developing An LNG Export Industry*. [online] The Australian National University. Available at <http://www.asiapacific.ca/research-report/australias-experience-developing-lng-export-industry>
24 Province of British Columbia, [online] BC Gov Photos. Available at <https://www.flickr.com/photos/bcgovphotos/14216967386/in/photostream/>


... and the Environment & Rights.



Water management

Land access agreements

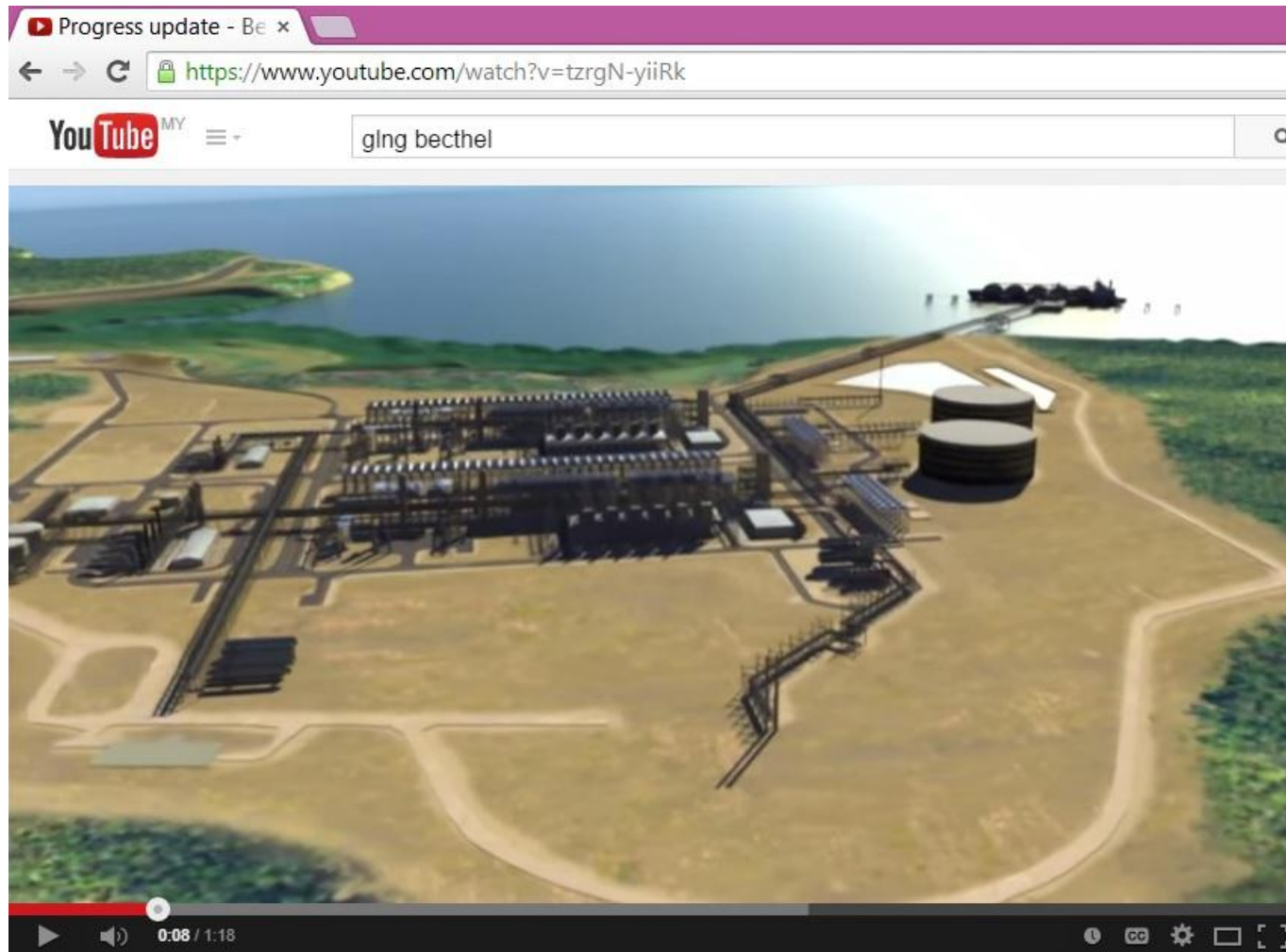
Initiatives to overcome challenges ..

<p>Engagement with Stakeholders</p>	<ul style="list-style-type: none">• Invested AUS\$50 million in local community projects²⁷• Developed extensive water monitoring system⁶• Strong positive relationship with landholders (86% positive)²⁸
<p>Collaboration with Competitors</p>	<ul style="list-style-type: none">• Gas purchased from 3rd party suppliers such as Origin Energy^{5,29,33}• Shared pipeline between Santos and BG^{10,12}  A photograph showing two men in business suits standing in an office. The man on the left is holding a white hard hat with the Santos logo. The man on the right is holding a white hard hat with the QGC logo. They are both smiling. In the background, there are computer monitors and a large screen displaying a network diagram.

GLNG benefits Australia to date ...



.. and will have its 1st cargo in 2015.



The possible magic formula of GLNG.

Strong Partnership / Contractors

Project partners have industry leading expertise providing end to end supply chain coverage...



Predominantly fixed price EPC contracting strategy with world-class contractors



... GLNG leveraging strength of partnerships

- Partners bring unique strengths which complement each other
- Partners have strategic goals that are not in conflict
- Partners have a long term view of and commitment to the project



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Thank You

20th November 2014

Success Stories Between IOCs, NOCs and Service Providers: **Atlantic LNG Case Study**

IGU – PGC B Study Group Sessions
Study Group 3: Strategy and Regulation

Antonio Pérez Collar

DEPUTY EXECUTIVE DIRECTOR G&P

REPSOL

Former Atlantic LNG Director of the Board

Amsterdam, 23 – 25 April 2014

1995: artist illustration of a Dream



The Proto-History

- **Oil was discovered in Trinidad in 1886 and has been extracted since 1907.**
 - ✓ *In fact, the steel drums characteristic of Caribbean music originated in Trinidad due to the excess of empty oil barrels on the island.*
- **Oil has been the backbone of the island's economy.**
- **The first attempt to develop an LNG project in Trinidad occurred in the early 1970s when Amoco and the GORTT spent two years negotiating with People's Gas of Chicago.**
- **Tenneco attempted to promote an LNG project for the second time in the early 1980s. It was an unfortunate moment.**
 - ✓ *Demand for gas fell in the U.S.*
 - ✓ *After two years of negotiations, the project was suspended and later abandoned.*
- **Finally, at the beginning of the 1990s, Amoco initiated negotiations with the NGC and Marine Gas Transport towards exporting LNG to Puerto Rico for power generation.**
 - ✓ *However, the project was abandoned when the parties failed to secure adequate marketing agreements.*

The Atlantic LNG Project

- While petroleum has held the preeminent position in the local economy since the mid 1970s, the policymakers had tried to diversify the economy by using natural gas.
- The successful completion of the Atlantic LNG project in April 1999 represented a further evolution in this goal.
- The Government of the Republic of Trinidad & Tobago (GORTT) created a political and economic environment for the project that compared favorably with that faced by its competitors.
- The Atlantic LNG project was expected to increase aggregate gas usage significantly, as gas input requirements for the Train 1 amount to 450 MMSCF/D at full rated production.
- More importantly, the output of LNG is expected to impact positively on the country's output of goods and services.

The Initial Approach

- In 1992 Cabot LNG approached the government of Trinidad and Tobago (GORTT) about developing a new LNG export project.
- **Some other key factors impacting the scenario at the time are:**
 - ✓ *Amoco's desire to find outlets for its stranded gas reserves.*
 - ✓ *British Gas's desire to market the gas in its Trinidad acreage.*
 - ✓ *Active involvement by the National Gas Company of T&T (NGCTT)*
- **The GORTT also was anxious to see the development of LNG as well as local industry.**
 - ✓ *The prospect of LNG was a real spur to exploration and far more gas has been discovered than was expected.*
- **As a result, Cabot LNG Corporation, Amoco Trinidad Oil Company, British Gas Trinidad Inc. and the NGCTT signed a Memorandum of Understanding in late 1992 to investigate the feasibility of establishing a small LNG export project based in Trinidad and Tobago.**

The Atlantic LNG Train 1: Commercial

- **The final actor, Spain's gas company Enagas was brought in after the project had decided to increase its scale to reduce cost and Cabot's price risk.**
 - ✓ *Although Cabot was the first driver the project would not be viable on the Henry Hub price alone.*
 - ✓ *Most LNG supplies had been sold to traditional utility buyers in East Asia or Europe, such as Enagas (now Gas Natural) in Spain, which can buy LNG on long-term take-or-pay contracts and are characteristically large and impeccably credit worthy.*
- **Also there was a strong feeling that unless we got LNG to Boston in the time window ending around 1998, both this market and its price premium would disappear.**
 - ✓ *This perceived pressure was to have a key impact on the speed at which the Atlantic partners acted.*
 - ✓ *And have a clear impact on many LNG project precedents, not least being the flexibility offered to the buyers.*
- **Cabot and Enagas, who had long relations with each other as fellow buyers, rapidly established a letter of intent to co-operate and asked for considerable destination flexibility.**

The Atlantic LNG Train 1: Technical

- **Atlantic LNG was developed as a single train LNG plant designed to produce 3 Mtpa (around 4 bcma) of LNG for export, plus 6,000 bpd of Natural Gas Liquids (NGLs).**
 - ✓ *The plant was located at Point Fortin in the southwest of the island of Trinidad.*
- **Of all the cost reducing measures taken by the Train 1 sponsors, none had as great an impact on costs as what is now called the “dual FEED” strategy.**
 - ✓ *Bechtel had just finished working in Alaska to refurbish and upgrade the Kenai LNG plant owned by Phillips and Marathon that had been operating since 1969.*
 - ✓ *Phillips and Bechtel had realized the potential of the Phillips cascade technology used on the plant and decided to try to interest the industry in an optimized version.*
- **The final investment decision was made in June 1996. The plant started up in March 1999 and delivered its first cargo of LNG at the end of April of that same year.**
- **It was owned by Atlantic 1 Holdings LLC, whose shareholders were BP (formerly Amoco, 34%), BG (26%), Spain's Repsol (20%), Belgium's Tractebel (formerly Cabot, 10%) and Trinidad's government owned NGCTT (10%).**

The Atlantic LNG Train 1: GORTT

- **The project team came to negotiate with the government relatively late in 1995 when it tabled a wish list of terms for the agreement.**
 - ✓ *The sponsors envisaged some taxation relief as well as more general assurances from government.*
 - ✓ *In principle, the government was supportive of Atlantic LNG.*
 - **Almost immediately a change in government concurred with the timing for the FID**
 - **Finally, the government agreement only came after a long and tough negotiation in June 1996.**
 - **Because Atlantic LNG was seen as a pioneer industry and with LNG prices expected to be low, it was granted a 10-year tax holiday partially compensated with local support commitments and other project related benefits.**
-

The Atlantic LNG Train 1: Start - up

- The Train 1 project, driven by a time deadline and a limited market, had unusually strong drivers for speed and cost reduction. This resulted in a number of commercial innovations that led to greater flexibility being offered to buyers, to picking a competing LNG process technology, which provoked a much more vigorous competition amongst contractors, and a brilliant project execution on budget and schedule.

ATLANTIC LNG AT A GLANCE- CONSTRUCTION

Nameplate Capacity	Single train, 450 mmcf/d gas 3 million metric tonnes/year
Location	Point Fortin
Project Cost	US \$950 million
Main contractor	Bechtel International
Engineering process	Phillips Petroleum (optimized cascade liquefaction process)
Local input into project	US \$150 million on local goods and services
Financier	<p>Project financing loan of US \$600 million. (60 per cent limited recourse financing). The joint lead arrangers for the facility were Citibank, ABN Amro NV and the Barclays Capital Fund. Thirty-two (32) banks subscribed to the offering, which was oversubscribed by 52 per cent.</p> <p>Political risk coverage from the US EX-IM bank and OPIC for up to US \$500 million of debt</p> <p>Three tranches of debt: Tranche A - US \$280 m (supported by EXIM); Tranche B - US \$200 m (supported by OPIC); Tranche C - US \$120 m (unsupported).</p> <p>Repayments commence June 2000, and end in December 2009.</p>
Final investment decision	Quarter 1 1996
Startup	April 1999



Sources: Petroleum Economist, various issues; International Gas Report, various issues.

The Expansion of Atlantic LNG

- **Almost immediately after the plant began processing LNG, the company's shareholders were once again in negotiations for an expansion of two additional trains.**
 - ✓ *Enagas' parent, Repsol, also had ambitions to expand its upstream gas activities and saw an opportunity to gain a stake in the Trinidad project.*
- **On March 13, 2000, the Government of Trinidad and Tobago and Atlantic LNG signed an agreement for a two-train expansion.**
 - ✓ *Train 2 & 3 are supplied from BP acreage off the east coast of Trinidad and from BG-operated acreage off the north coast.*
 - ✓ *Train 2 first loading was on August 12, 2002 and Train 3 was on April 28, 2003.*
- **Trains 2 and 3 operate on a quasi-tolling basis. The gas suppliers have entitlements to LNG production in proportion to their gas supply.**
 - ✓ *BP and Repsol: 50% of Train 2 and 75% of Train 3. Main off-takers were Repsol, Gas Natural and Gas de Euskadi.*
 - ✓ *BG's share the remainder of the capacity and the LNG was sold to the U.S.*
- **Atlantic 2/3 Company of Trinidad and Tobago Unlimited shareholders were BP (42.5%), BG (32.5%) and Repsol (25%) and includes Repsol 30% farming in to Amoco's upstream acreage.**

The Atlantic LNG Train 2&3

- **Internal discussion of an expansion started in 1997, and a two-train expansion was flagged in mid-1998. Discussions with government over terms started in June 1999 and the final approval to proceed was given in March 2000.**

ALNG EXPANSION AT A GLANCE

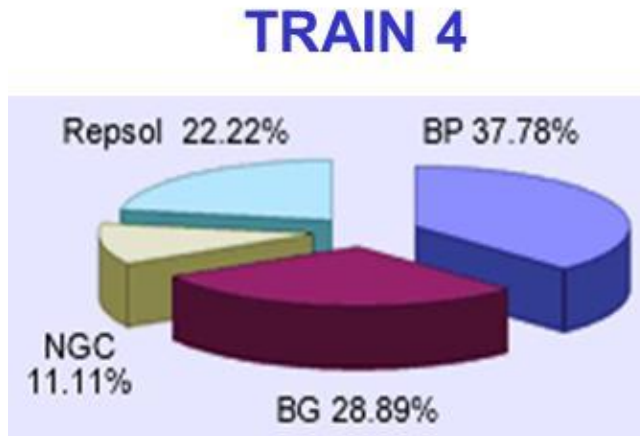
Nameplate Capacity	Two additional trains, 900 mmcf/d gas 6 million metric tonnes/year
Location	Point Fortin
Project Cost	US \$1,300 million
Main contractor	Bechtel International
Engineering process	Phillips Petroleum (optimized cascade liquefaction process)
Local input into project	US \$300 million on local goods and services
Final investment decision	Quarter 4 1999
Estimated Startup	Train 2: 2002 (assuming construction starts in mid-2000, and lasts 18 months) Train 3: 2003 (assuming construction starts in mid-2001, and lasts 18 months)
Gas sales	65 % (5 bcm/yr) Enagas 35% (Other US gas buyers)
Gas Pricing	35% US Natural gas 65% variable : (3 bcm/y electricity pool; 2 bcm/y oil price linked conventional pricing)
Shareholding	Repsol to purchase up to 30 per cent of BP Amoco's Trinidad and Tobago assets.
Employment	2,000 – 3000 during construction.



Source: *Energy Day*, (#226, June 18, 1999;. Special Supplement on the Atlantic LNG project).

Atlantic LNG Train 4

- In 2003, construction began on a fourth train, and was completed in December 2005, the largest train in the world at the time.
 - ✓ *With a capacity of 5.2 Mtpa and 12,000 bpd of NGLs, was the largest train in the world at the time.*
- Train 4 operate on a tolling basis with gas suppliers entitled to LNG production in proportion to their gas supply.
- Today, the facility's total production capacity is 15 Mtpa.



Current Ownership 2014

- Over the years, there have been shifts in ownership resulting today :

Train 1: Atlantic LNG Company of Trinidad and Tobago, a locally incorporated company whose sole shareholder is Atlantic 1 Holdings LLC:

BP (Barbados) Holding SRL	34%
BG Atlantic 1 Holdings Limited	26%
Shell LNG Port Spain BV	20%
NGC Trinidad and Tobago LNG Limited	10%
Summer Soca LNG Liquefaction S.A.	10%

Trains 2 and 3: Atlantic LNG 2/3 Company of Trinidad and Tobago Unlimited, a locally incorporated company whose sole shareholder is Atlantic 2/3 Holdings LLC:

BP Train 2/3 Holding SRL	42.5%
BG 2/3 Investments Limited	32.5%
Shell LNG Port Spain BV	25%

Train 4: Atlantic LNG 4 Company of Trinidad and Tobago Unlimited, a locally incorporated company whose sole shareholder is Atlantic 4 Holdings LLC.

BP (Barbados) Holding SRL	37.78%
BG Atlantic 4 Holdings Limited	28.89%
Shell LNG Port Spain BV	22.22%
Trinidad and Tobago LNG Limited	11.11%

Impact of the Project

- **Atlantic is often described as “The Trinidad Model”, which refers to the unique venture partnership between four energy majors and the Government of T&T to form an bankable LNG company.**
 - **The Company is the largest single contributor to Trinidad and Tobago’s exports and a significant contributor to the country’s gross domestic product (GDP).**
 - **Only Train 1 generated 14 million man hours in Trinidadian employment during construction (over 3000 employed on site) and delivered in local content more than US \$160m .**
 - **At the operational level, the project remains as a world class business. Atlantic LNG and GORTT developed and give permanent support to the National Energy Skills Center (NESC).**
 - **The company is not just an energy producer and a profitable business, but it also is a catalyst for the continued growth and development of hydrocarbon industry in Trinidad and Tobago.**
 - **On September 22, 2010, the company launched a new corporate identity, moving from Atlantic LNG Company of Trinidad and Tobago, to Atlantic, in recognition of the role not only as a global LNG producer, but as a corporate entity committed to creating sustainable opportunities for T & T .**
-

Lessons Learned

- **The achievement of the promoters of Atlantic LNG was truly mould-breaking and for very many in the LNG business, unexpected.**
 - **The LNG project launched in Trinidad and Tobago had unique features both commercially and technically which were even more exceptional in the world at that time.**
 - **This project in many ways also demonstrates that a host government can, via its policies, confer a competitive advantage to projects in its country vis-à-vis the policies of competing projects.**
 - **The combination of small scale, low cost, and capturing the vital U.S. niche market are interrelated and a product of the vision of the project developers.**
 - **Also a significant contributory factor to the success of Trinidad was Spain's desire to diversify gas supply and develop a totally integrated LNG project in the expansion process.**
 - **Last but not least, the other major factor was far more consistent government support and encouragement.**
-

Thank you !

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Atlantic



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