



ASIA LP GAS SUMMIT 2016

OVER 800 DELEGATES
FROM ALL OVER THE REGION

Tokyo, Japan 3-4 March 2016

Topic

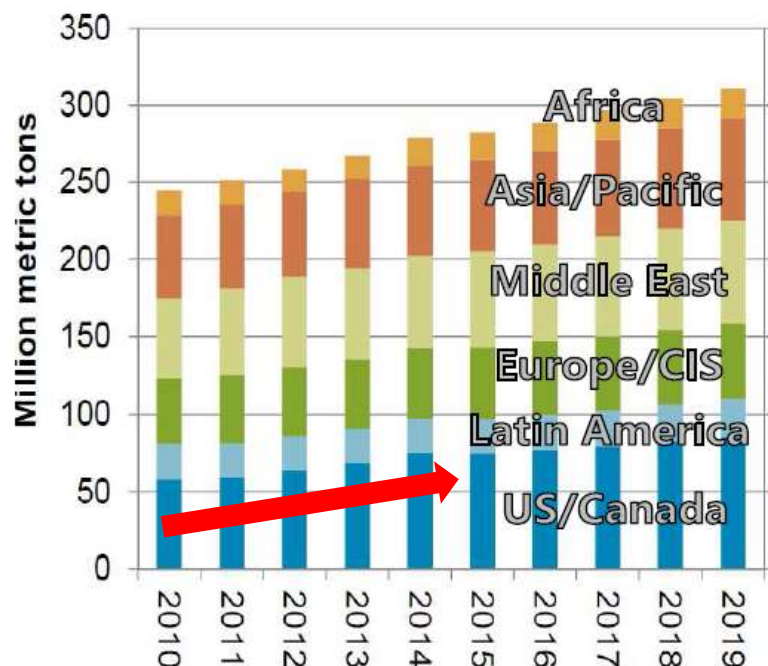


- Global LPG Demand & Supply
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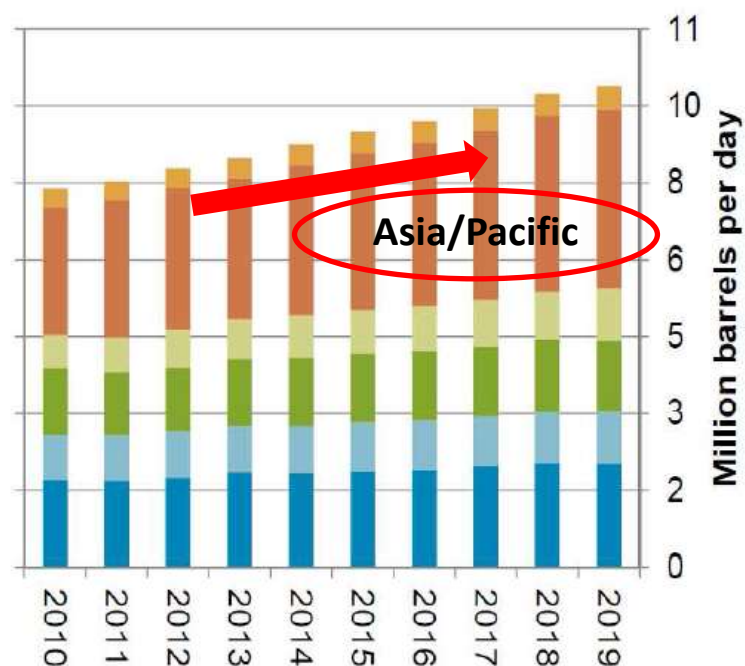
Global LPG Demand & Supply

Global LPG Demand & Supply

Global LPG Production



Global LPG Demand

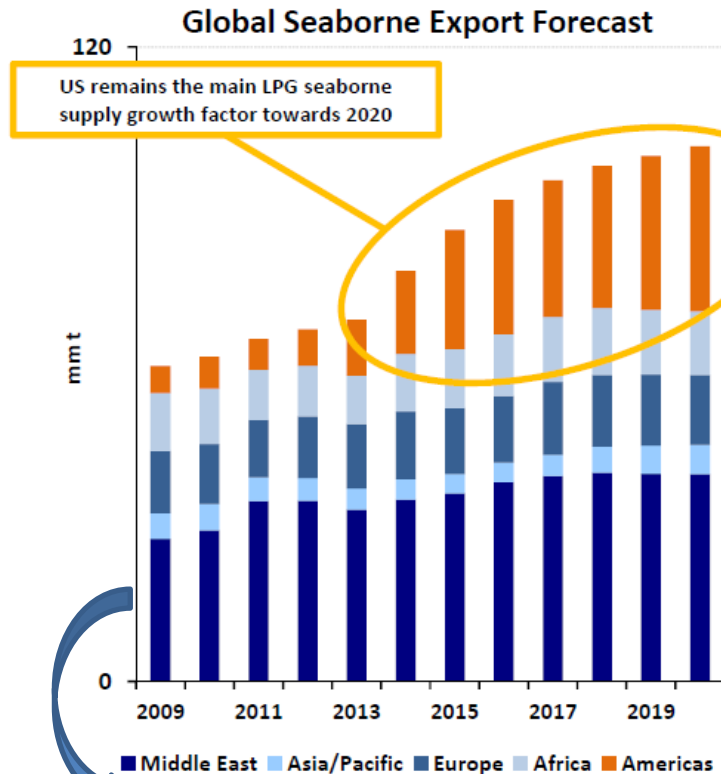


Source: IHS

US LPG Production will increase from 2015 while middle east production growth moderately
However additional supply will be balancing by Asia/Pacific region demand

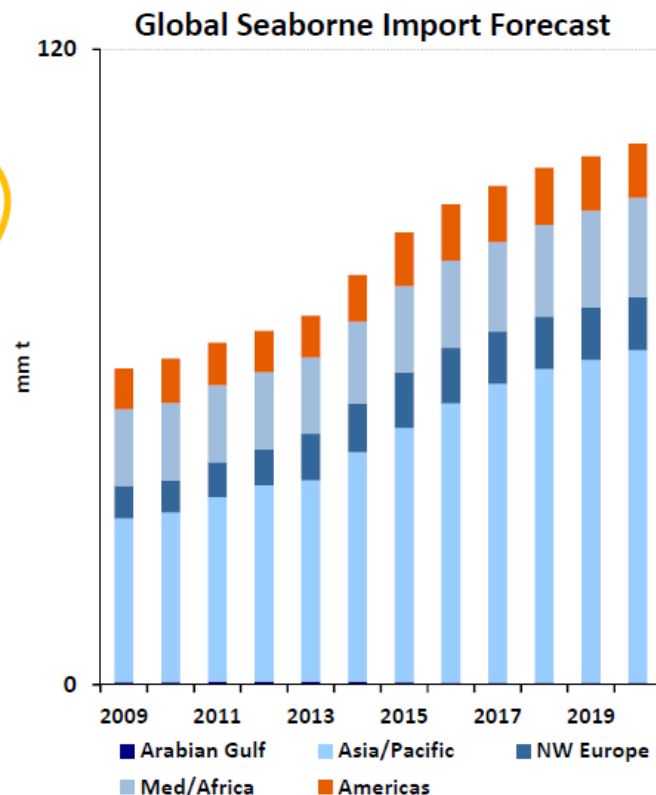
Global LPG Export & Import

Global LPG Export & Import



Middle East is a major seaborne exporter

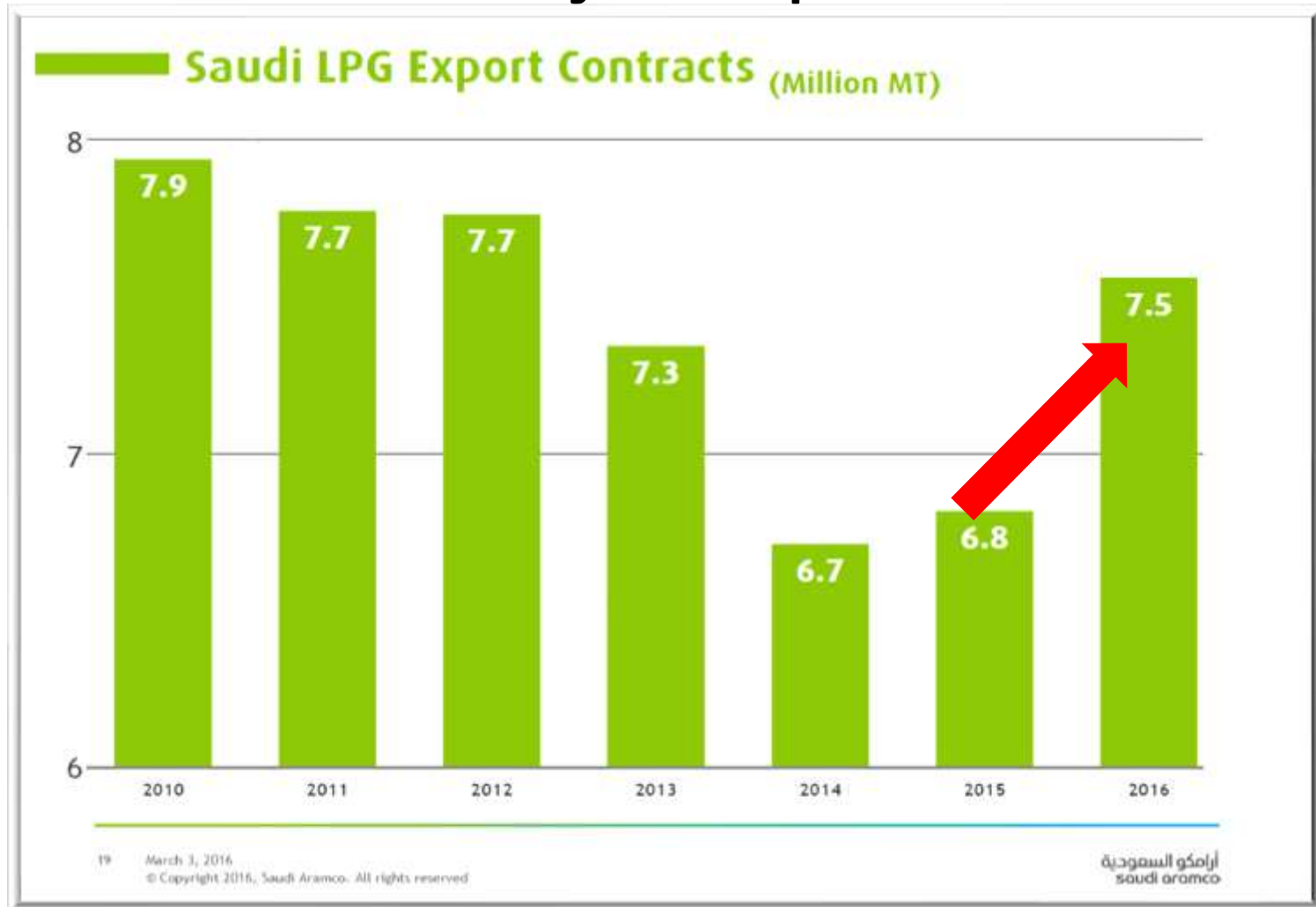
*Base case scenario



— Source, Poten & Partners

Middle East still be the major exporter with moderately growth while US (2nd exporter) will remain LPG seaborne supply growth towards 2020 and major importer of LPG is Asia/Pacific region.

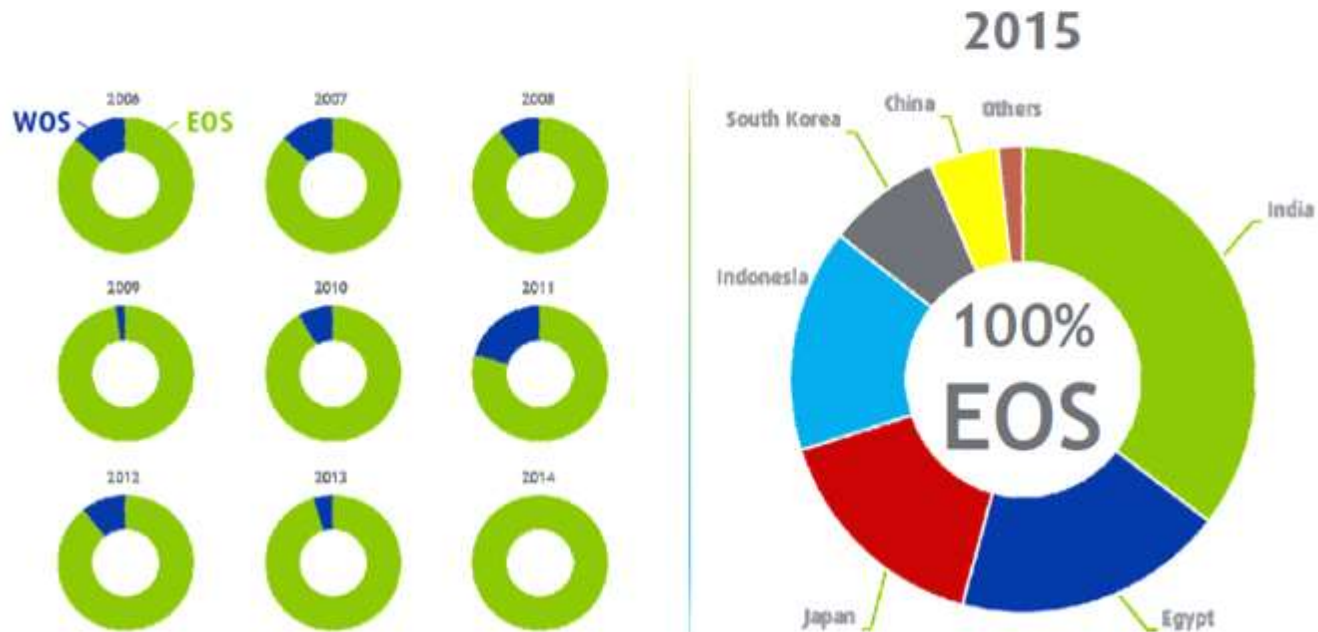
Middle east major exporter contract



Saudi LPG export contract is increase in 2016 to 7.5 MMT from 6.8 MMT in 2015

Middle east major exporter contract

LPG Exports – Asia is the Main Market



17 March 3, 2016
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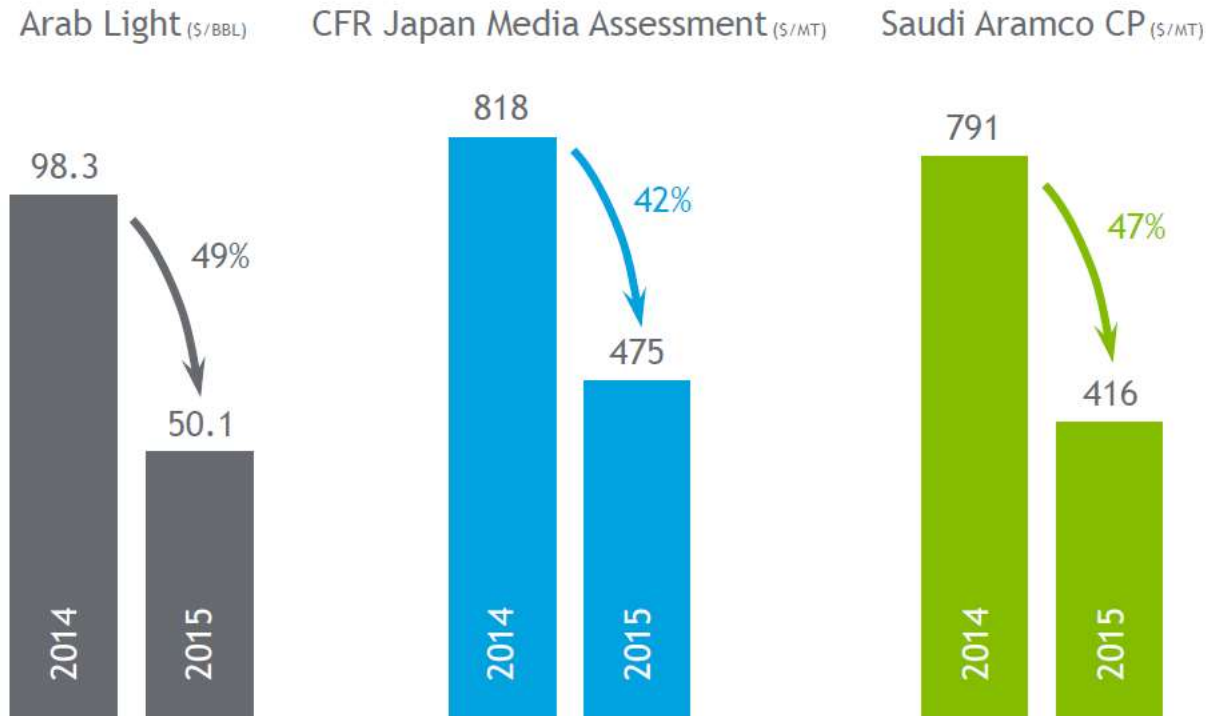
أرامكو السعودية
saudi aramco

Main market of Saudi LPG export contract is Asian market which is India Indonesia Japan and also Egypt.

Crude Oil Price Forecast

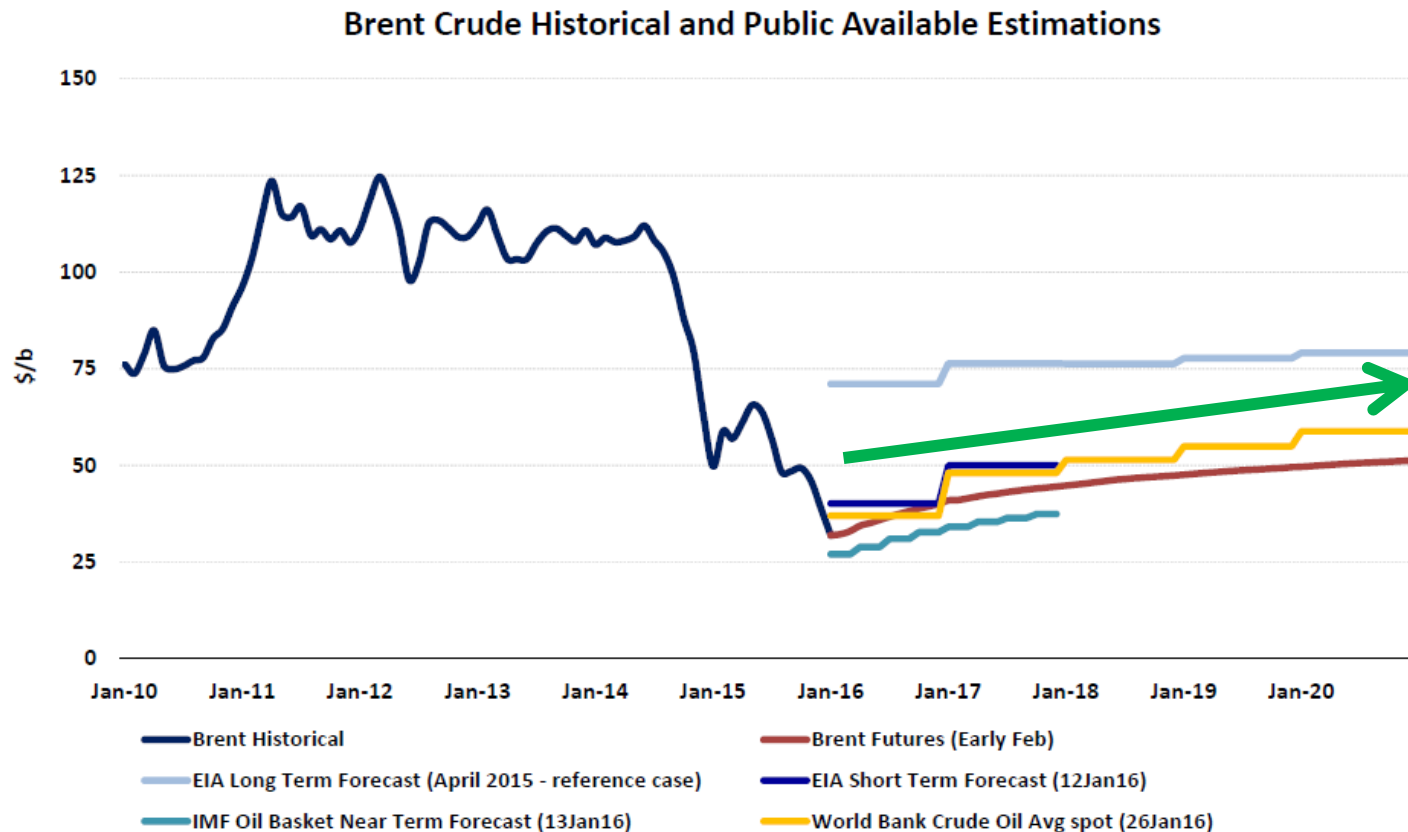
Reference Price Fluctuation Situation

Asian Crude and Propane Prices' Comparison



Forecast Crude Oli Price Change

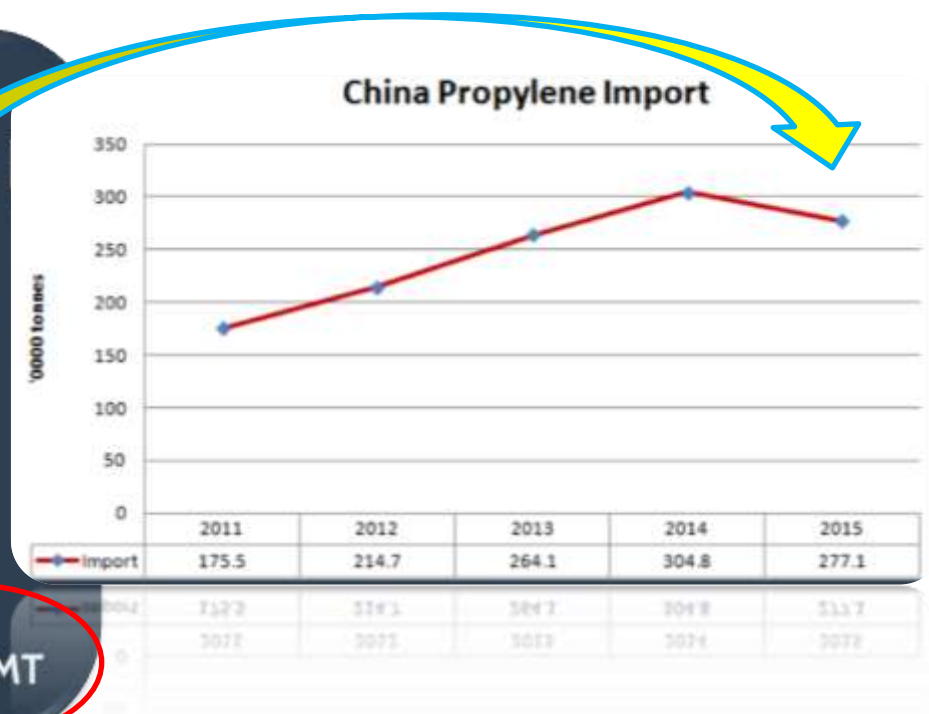
Crude oil price drop changes market perception



Brent Crude oil Price from 3 sources (World Bank, Brent Future and EIA) forecast to increase slowly in the range of 40-45 \$/BBL during 2016 and up to 50 \$/BBL in 2017

News Update

Propylene Market in China



PDH PRODUCER	LOCATION	START	PROPYLENE CAPACITY (KT)	DOWNSTREAM
BOHAI	TIANJIN	SEP.2013	600	PO,BUTANOL
HAIYUE	NINGBO	AUG.2014	600	-
SATELLITE	JIAXING	AUG.2014	450	ACRYLIC ACID
SANYUAN	SHAOXING	SEP.2014	450	PP
YANGZUJIANG	ZHANGJIAGANG	MAY.2015	660	PP,BUTANOL
WANHUA	YANTAI	AUG.2015	750	PO,BUTANOL,ACRYLIC ACID
HAWEI	HENGSHUI	NOT YET	500	PP
SOFT PACKAGING	FUQING	NOT YET	660	PP

Operate PDH
Plant in China

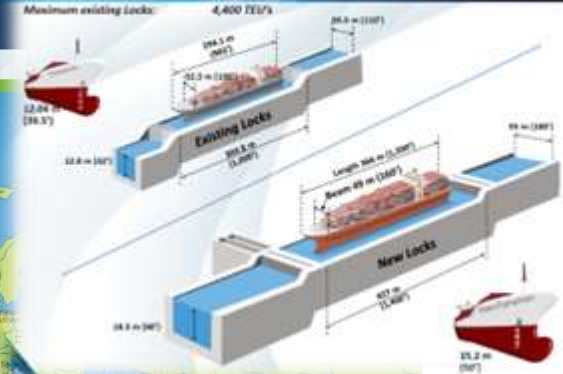
Panama Canal Project Update

The Panama Canal | 1914 – 2015



96% Completion
Opening in Q2/2016

Dimensions of Locks and Ships



New Markets for the Expanded Canal



Containers

Neopanama from West Coast USA, traffic recovery from Suez and Latin America

Dry Bulk

Coal from Colombia, Metallurgical Coal from Vancouver, Brazilian iron ore from Brazil in Minicapsize vessels

Liquid Bulk

Athenas and Suezmax tankers carrying crude to Asia

LNG/LPG

LNG up to 173,000 m³ and VLGC carrying LNG/Propane from USA to Asia

Total of transits: +1.05 millions

Total Cargo: +9,600 millions LT

Panama Canal Project Update

The Panama Canal Trade and Main Users

36% of the cargo transported through the Panama Canal in 2015 came from the main routes (Asia-East Coast of the United States)



70.2% of Canal cargo traffic originates in or is destined to the United States

Total Cargo Movement FY 2015

USERS	FY 2014*	FY 2015*
United States	155.5	160.8
China	49.9	48.4
Chile	30.1	29.5
Japan	21.8	22.9
Peru	17.0	18.8
South Korea	19.2	18.5

* Measured in Million of Long Tons

Panama Canal Project Update

LPG Tanker Toll Structure

Proposed LPG Toll Structure		
Bands in m3	Laden	Ballast
First 5,000	\$ 5.50	\$ 4.40
Next 20,000	\$ 2.35	\$ 1.88
Next 30,000	\$ 2.30	\$ 1.84
Rest	\$ 1.80	\$ 1.44

- The ballast rate will apply to LPG gas tankers carrying up to a maximum of two (2) percent of the total cubic meters (m3) of cargo capacity.



VLGC (82,000 m³)

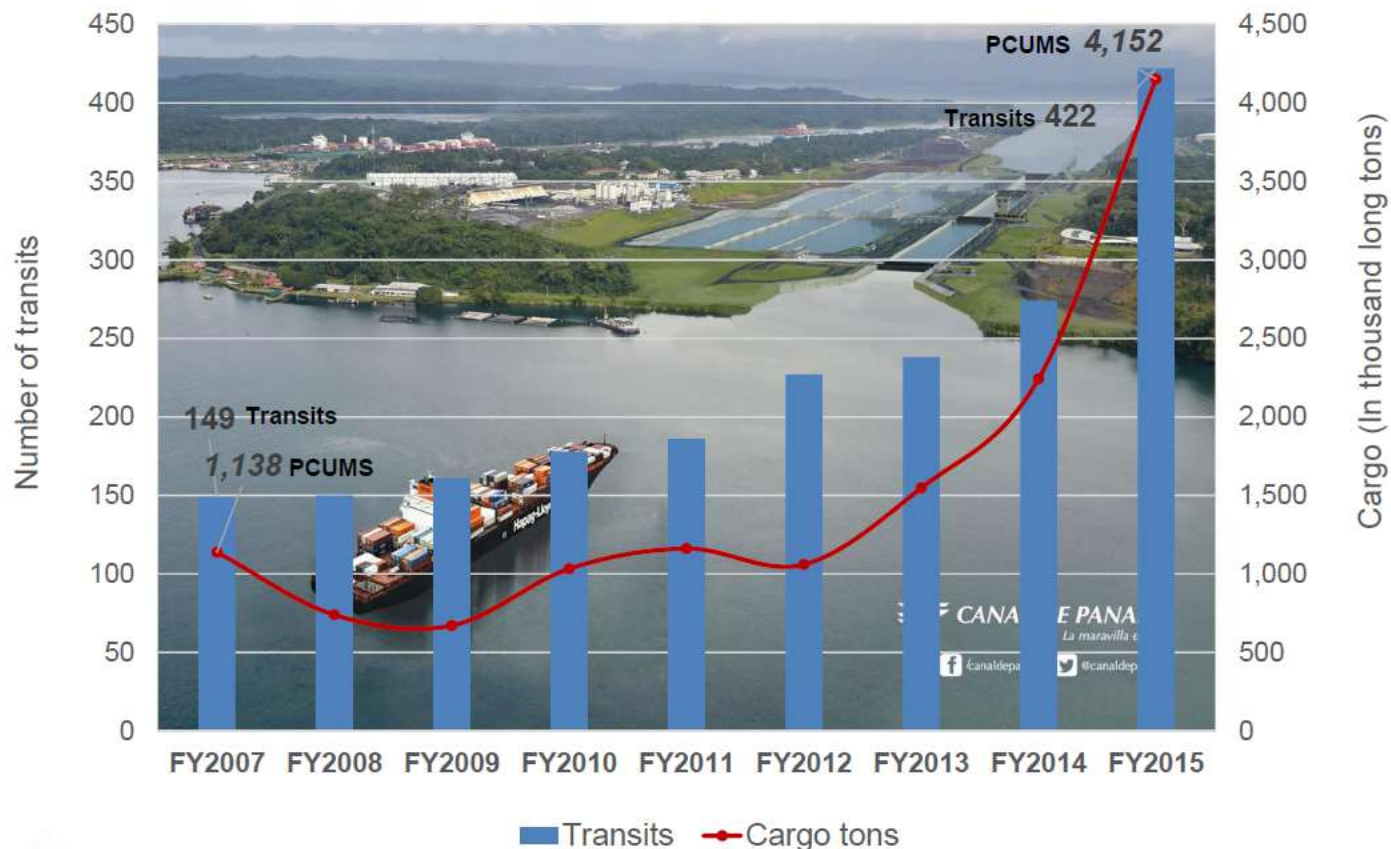
Laden: \$ 192,100

Ballast: \$ 153,680



Panama Canal Project Update

LPG Transits and Cargo Tonnage FY2007 - FY2015



LPG Transits in Panama Canal growth from 149 transits in 2007 to 422 transits in 2015⁷

Other New Project : Russia

GAZPROM AND SIBUR – JOINT INVESTMENT PROJECT ON CONSTRUCTION OF GAS PROCESSING AND CHEMICAL HUB IN AMUR REGION



Notes:

(1) Billion cubic metres.

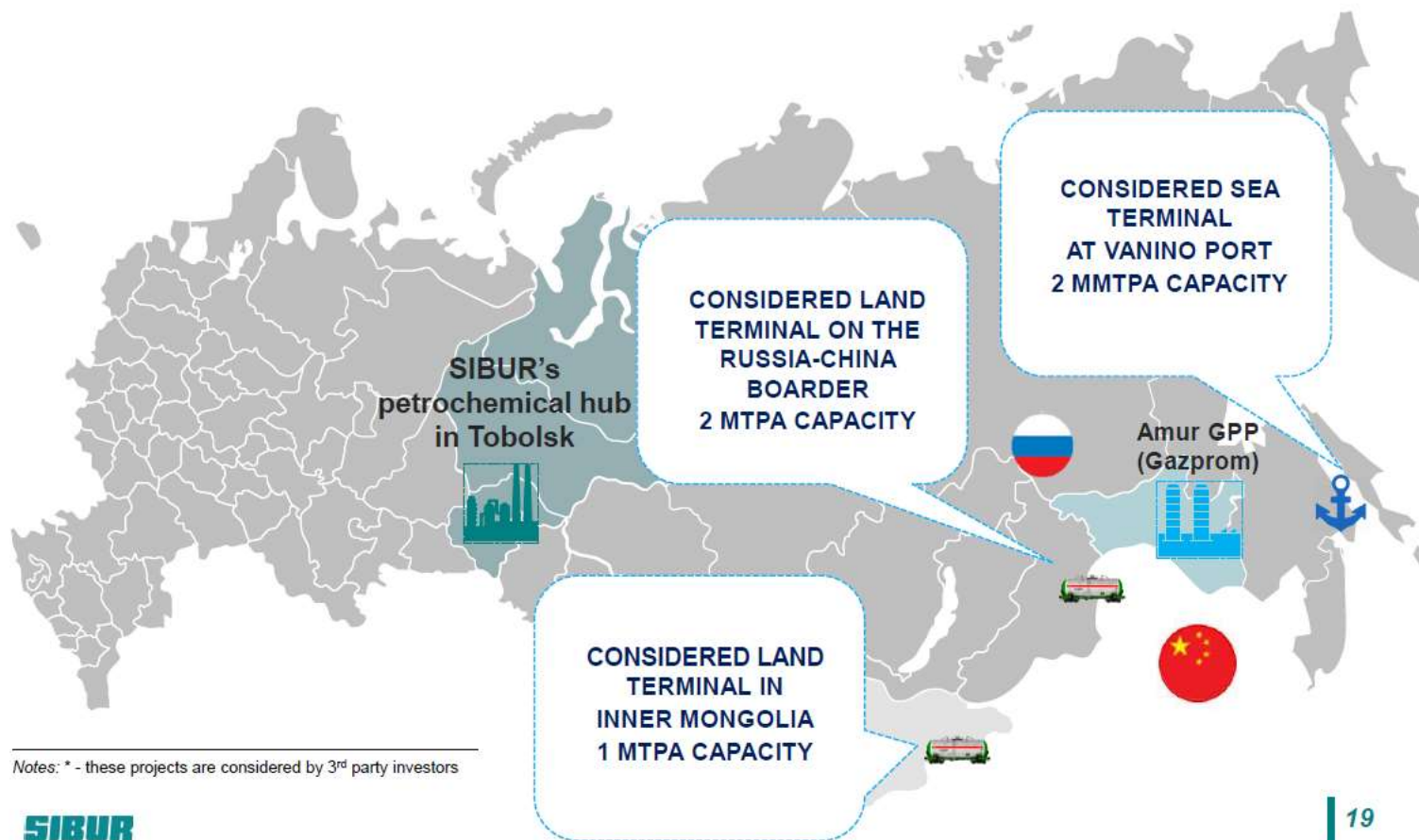
(2) Million cubic metre

* - the decision on the project will be made not earlier than in 2017.

SIBUR

Other New Project : Russia

WITH POSSIBILITY TO EXPORT THROUGH POTENTIAL
LAND AND SEA TERMINALS AT FAR EAST*



Other New Project :US

ANNOUNCED/UNDER CONSTRUCTION - LPG MARINE TERMINALS

CURRENTLY OPERATING LPG MARINE TERMINALS



0 75 150 300 Miles



Source: IHS, December 2015.

Other New Project :US

Announced and under construction LPG marine terminals

Major Announced and Under Construction NGL & LPG Terminal (Export) Projects							
Project Sponsor - Company Name	Status	City	State	Product	Total LPG Export Capacity Thousand Barrels per day	Total LPG Export Capacity (mtpa)	LPG Rate (Average) Million barrels per month
American Ethane	New Build	Shady Grove	LA	Ethane	380	8	11.4
Enterprise	New Build	Houston	TX	Propane/Butane	133	3	4.0
Enterprise	Expansion	Houston	TX	Propane/Butane	117	2.4	3.5
Enterprise	Expansion	Houston	TX	Propane/Butane	50	1.0	1.5
Enterprise	Expansion	Houston	TX	Propane/Butane	233	4.8	7.0
Enterprise	Expansion	Houston	TX	Ethane	240	4.9	7.2
Intercontinental Terminals Company (ITC)	New Build	Pasadena	TX	Propane/Butane	60	1.2	1.8
Philadelphia Energy Solutions	New Build	Philadelphia	PA	Propane/Butane	223	4.6	6.7
Phillips 66	New Build	Freeport	TX	Propane/Butane	147	3.0	4.4
Sunoco Logistics	Expansion	Marcus Hook	PA	Propane/Butane	70	1.4	2.1
Sunoco Logistics	Expansion	Marcus Hook	PA	Ethane	15	0.3	0.5
Sunoco Logistics / Lone Star	New Build	Nederland	TX	Propane/Butane	100	2.1	3.0
Targa	Expansion	Houston	TX	Propane/Butane/Ethane	133	2.7	4.0
Targa	Expansion	Houston	TX	Propane/Butane	67	1.4	2.0
Williams/Boardwalk Pipeline Partners (Moss Lake)	New Build	Lake Charles	LA	Propane/Butane	600	12.4	18.0
AltaGas	New Build	Fort St. John	BC	Propane/Butane	25	0.5	0.8
Waterside Energy (WEST)	New Build	Longview	WA	Propane/Butane	75	1.5	2.3
Total NGL/LPG					2,668	55	Not applicable
Total Propane/Butane					1,800	37	Not applicable
Total Ethane					635	13	Not applicable

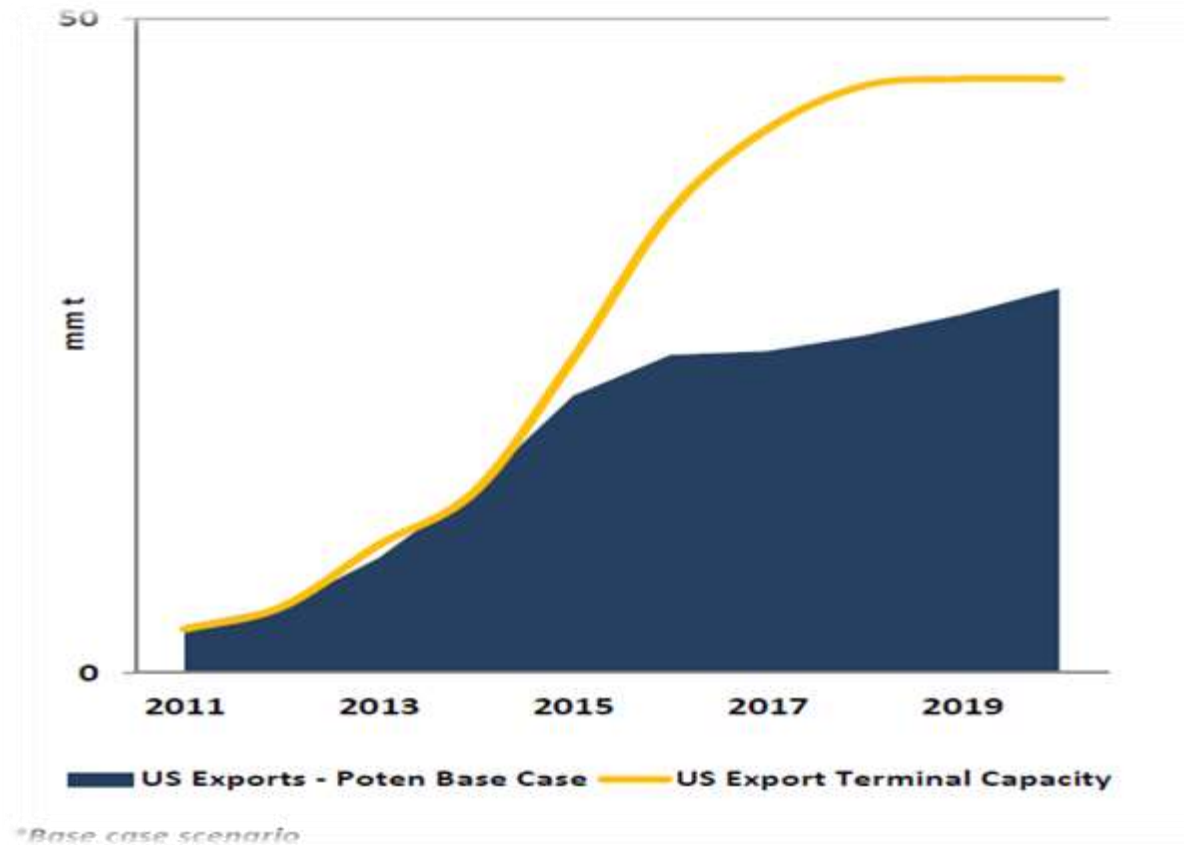
Note: mtpa = million tonnes per annum

Source: IHS Energy



Other New Project :US

US LPG Terminal Capacity Vs Estimated Export Volume



US exports will define global supply growth to 2020 with additional LPG terminal capacity at nearly twice of an estimated export volume.

Innovation Product of LPG in Japan

- FRP (Fiber Reinforced Plastic) cylinders are lighter than conventional steel cylinders (about half the weight), allow users to visually check the remaining LPG level and are safer (non-explosive in fires and non-rusting).
- FRP cylinders facilitate the use of gas heaters, etc. in homes with no gas plumbing. Their introduction is therefore expected to create fresh LPG demand in Japan.
- It is necessary to overcome distribution challenges, e.g. securing storage safety, to promote their proliferation. (The Natural Resources and Energy Agency plans to allocate a budget for the task.)

Steel cylinder



FRP cylinders



Examples



Fan-assisted gas heater (front)



Fan-assisted gas heater (rear)



Laundry dryer

Innovation Product of LPG in Japan

- The technologies and business know-how, that Japan's LPG utilities has nurtured to strengthen the domestic LPG industry, can be applied to other Asian markets, where demand is rapidly increasing, in a safety contribution to other Asian countries.
- In addition to device exportation, it is also important to adopt the approach of packaging together Japan's superior technologies and services to provide value-added 'LPG supply service business.'



With growing market recognition of the safety and quality of Japanese manufacturers' gas equipment, gather information about countries with strong needs and carry out PR for Japanese LPG equipment and LPG safety equipment.



LPG leak sensor



Home-use LPG alarm



Commercial-use LPG alarm

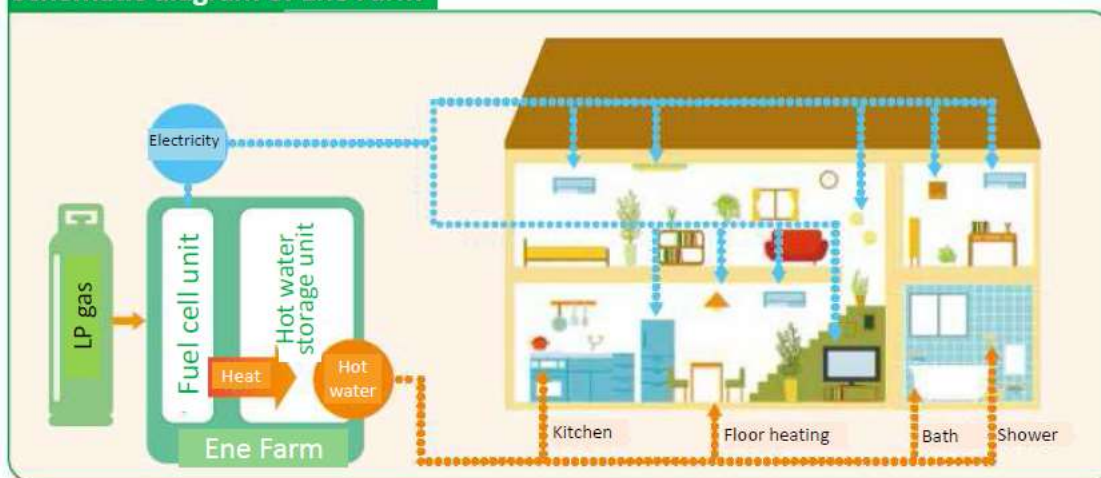
Innovation Product of LPG in Japan

- Ene Farm (residential-use fuel cell) is a system that uses a chemical reaction between hydrogen, extracted from LPG, and ambient oxygen to generate electricity and capture residual heat to heat water.
- Ene Farm has high energy efficiency (over 70%), achieving energy conservation and CO2 reduction at home.
- The system will be marketed via LPG retailers to expand sales.
(The Natural Resources and Energy Agency plans to allocate a budget for the task.)

ENE / FARM



Schematic diagram of Ene Farm



Thank You...

