

**Greg Priddy**

Director, Global Energy and Natural Resources

[priddy@eurasiagroup.net](mailto:priddy@eurasiagroup.net)

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# Asian Energy Security & Post-Peak Geopolitics

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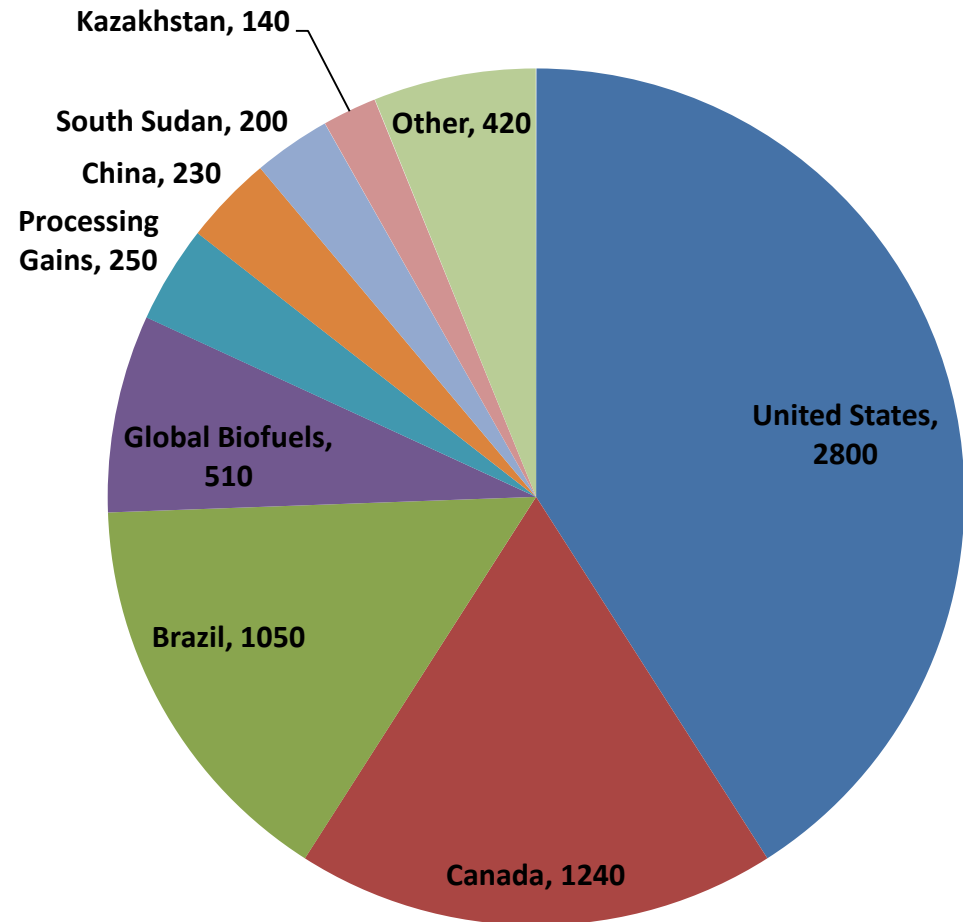
May 2013

**POST-PEAK OIL GEOPOLITICS:  
North American unconventional supply  
boom reshaping energy security  
landscape for Asia**

## Non-OPEC supply to increase by 6mbpd by 2018

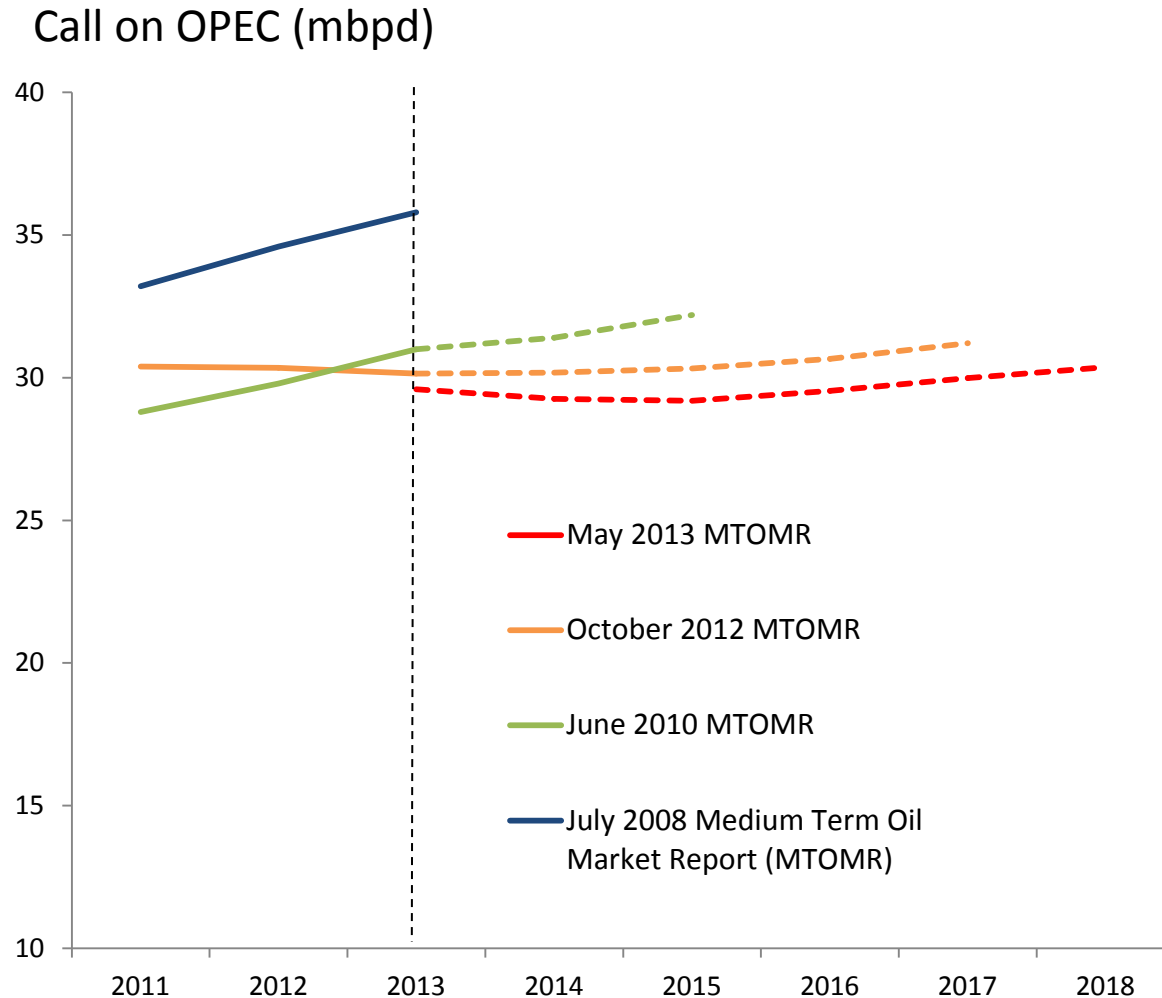
Non-OPEC supply growth, 2012-2018 (kbpd)

- According to IEA, non-OPEC supply to increase from 53.3 mbpd in 2012 to 59.3 mbpd by 2018
  - US tight oil will grow by 2.3mbpd bringing US total crude output to 8.4mbpd
  - Annual non-OPEC supply growth will average 990,000bpd (1.9% annually) from 2012-2018



Source: IEA

# The Post-Peak Oil World: Spare Capacity + non-OPEC surge + weaker demand

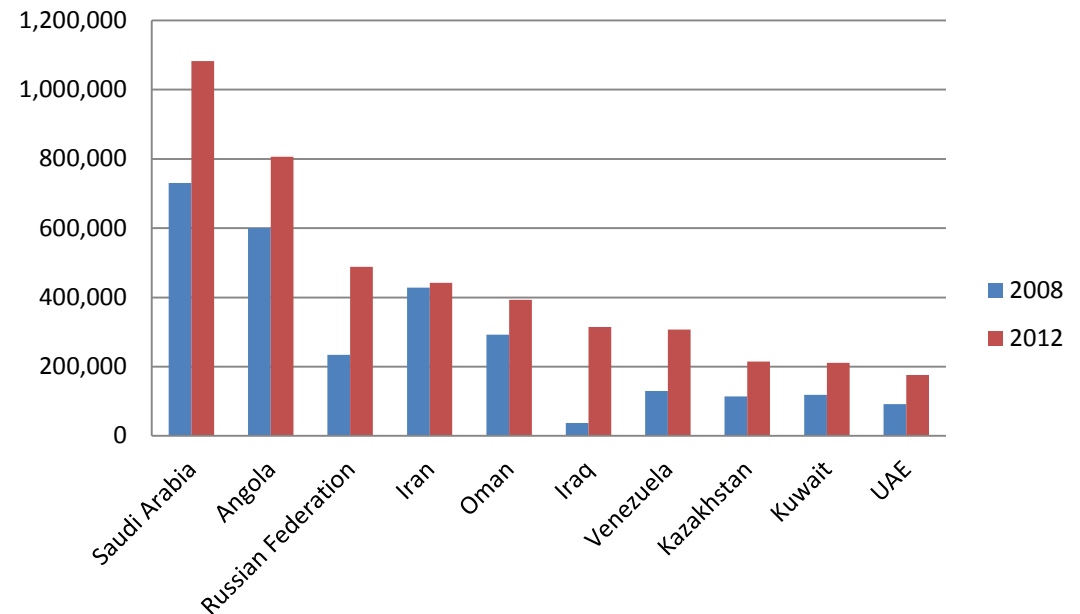


Source: IEA

# Increasing US energy security vis-à-vis China

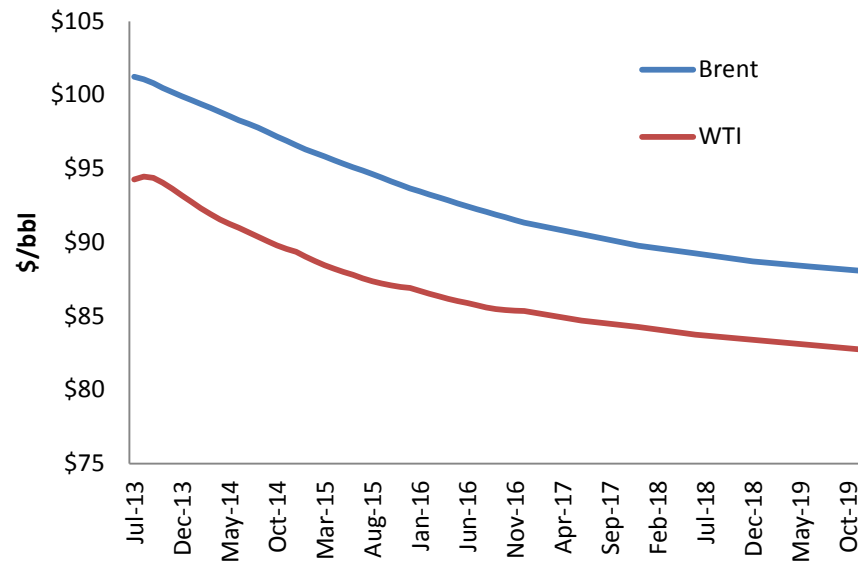
- US energy “self-reliance” has improved, while China’s geopolitical vulnerabilities remain
- China increasing level of oil imports from OPEC/resource nationalistic/unstable regimes since 2008

**Chinese Crude Oil Imports By Country of Origin (bpd)**



# Markets pricing in post-peak oil scenarios

Brent & WTI Forward Curves



## Saudi Arabia begins pullback in output

- Saudis produced around 9.3 million bpd in April 2013; supportive of prices in short-term, but begins a trend toward growing spare capacity
- Additional cuts beyond 9 million bpd probably necessary later this year given capacity growth exceeding demand growth worldwide
- For now, Saudis can prevent a precipitous price drop and the pullback is relatively easy from such high production levels. Saudi budget balances in the low \$90s for Brent
- Longer-term, the trend is troubling for them, given future capacity growth trends. Implies tensions with other OPEC members, particularly Iraq, about burden sharing
- Implies subdued capex for oil by Saudis and shift toward gas

# **REFINER'S PERSPECTIVE: Rethinking the outlook for Asia**



## Asian bet on complex refining

- Asia, like USGC in 1990s, building out heavy conversion capacity
- Bet on wide light-heavy spread (Dubai discount versus Brent)
- Expected growth of medium sour supply (Saudi, Iran, Russia) + growing scarcity of light sweets
- Growing diesel demand in region also spurring refiner appetite for heavier crudes

**Global upgrading capacity additions (thousand bpd)**

	2013	2014	2015	2016	2017	2018	Total
China	462	112	231	642		90	1537
Other Asia	317	161	20		180	31	709
Middle East	394	196	40	95	241	221	1187
Rest of world	207	464	666	250	550	355	2492

*Source: IEA*

## Less complex/competitive OECD Asia refiners squeezed

- Restructuring of OECD Pacific refineries (esp. Australia, Japan) to culminate in 2014
- Closure of older, less complex units boosting overall conversion ratio in the region
- BC refinery “Clean Fuels” proposal is a wild card for supply

Selected Asia/Pacific crude distillation projects, 2013-2018

	<b>Δ capacity (kbpd)</b>
Australia	-124
Bangladesh	80
China	4200
China,Taiwan	-205
India	500
Japan	-535
Malaysia	300
Pakistan	262.4
Thailand	50
Vietnam	195
<b>Total</b>	<b>4723.4</b>

# Global crude oil flows will adjust to account for US LTO

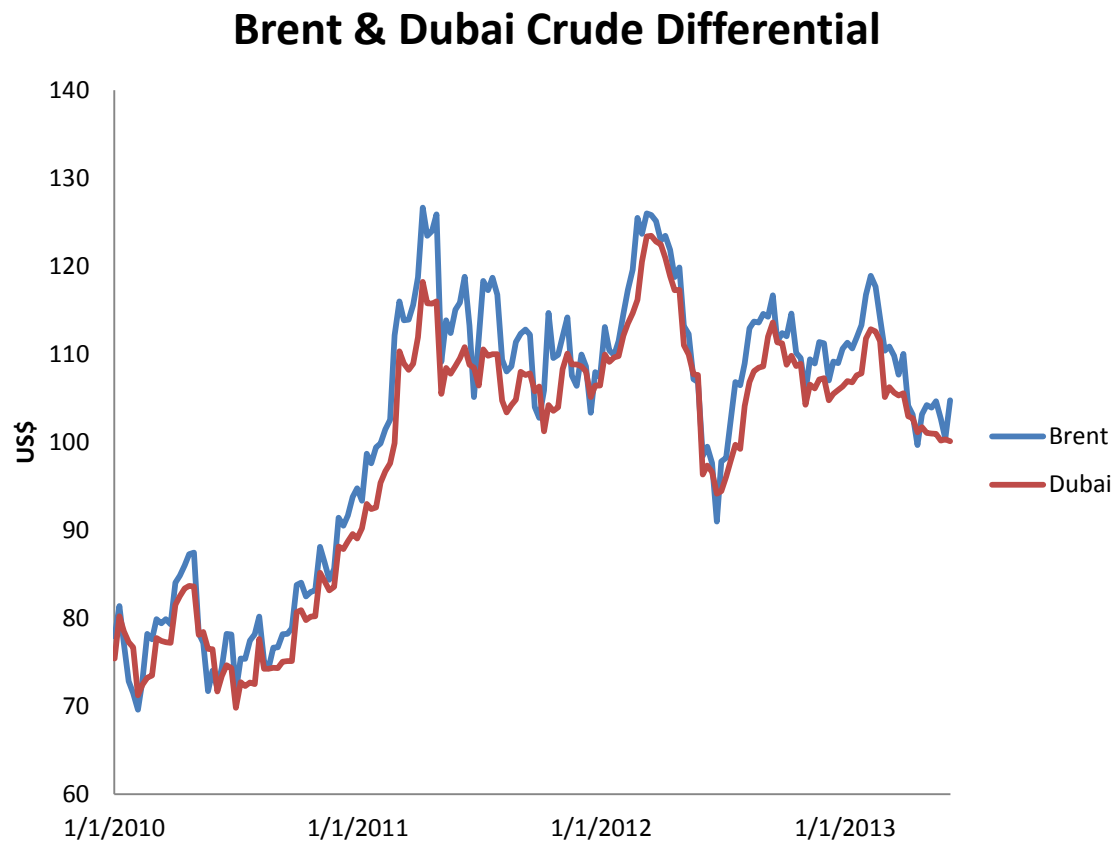
- The Middle East's share of global crude trade is set to increase from 49% in 2012 to 50% in 2018, while Africa is set to retain its role as the world's number two exporting region, with 21% of the market by 2018
- However, as a result of reduced US imports and falling OECD Europe demand, Arab and African crudes will increasingly flow east
- Over time this will reshape downstream investment & optimization strategy in Asia

## Crude Oil Flows From The Middle East And Africa (mn bpd)

Crude Oil Exports in 2018 and Growth Over 2012-2018 For Key Trade Routes				
	To OECD Europe	To OECD Americas	To China	To Asia
Africa	3.1 (-0.6)	0.3 (-0.8)	1.6 (+0.4)	1.5 (+0.8)
Middle East	1.3 (-0.3)	1.7 (-1)	2.9 (+0.3)	6.2 (+0.8)

Source: IEA

# How will increased volumes of light sweet in Asia affect light-heavy spreads & refinery configurations?



## China: investing for heavier barrels

- China's crude distillation capacity reached 13.4mbpd by year-end 2012 (14% world topping capacity)
  - Net refining additions in 2012 totaled 390,000bpd
  - Another 730,000bpd of net capacity additions expected in 2013: Sinochem's 240,000bpd Quanzhou refinery; Petrochina's 200,000bpd Pengzhou refinery; 100,000bpd expansion at Huabei refinery
- Rationalization of refining sector: new tax regulations in effect since 1 Jan 2013 to impact profitability of teapots

### China refining capacity: bottom of the barrel processing (mbpd)

	2012	2013	2014	2015	2016	2017	2018
FCC/RFCC	3.12	3.35	3.39	3.44	3.46	3.46	3.46
Hydrocracking	1.2	1.4	1.45	1.5	1.77	1.77	1.81
Coking	1.82	1.85	1.87	1.97	2.31	2.31	2.37
Thermal Crack/VBU	0.13	0.13	0.13	0.13	0.13	0.13	0.13

Source: IEA

## Russia-China deal increases light sweet ESPO flows

- Rosneft-CNPC loans-for-crude to expand exports to China to as much as 1mbpd over 25 years
- China becomes top Russian crude buyer; significant shift in Russian export dynamics
- Eastern Siberian Pacific Ocean (ESPO) pipeline capacity expansions key to export growth
- New Chinese refineries configured to run mediums & heavy sour but ESPO volumes are relatively light/sweet

**Capacity expansion plans for Skovorodino-Daqing ESPO spur**

Route	2013	2014	2015-2017	from 2018
ESPO (Skovorodino-Daqing spur)	300,000	340,164	400,400	600,000

Other options	Potential capacity
Rail via Mongolia	60,200-80,300
Kozmino	ESPO can send as much as 600,000bpd to Kozmino
Atasu-Alashankou pipeline	via Kazakhstan; pipeline already running near capacity at 280,000bpd

Source: IEA, Eurasia Group research

# **GLOBAL GAS: Can oil-linked pricing construct in Asia evolve?**

# Asia: importers challenging traditional gas pricing systems

- The evolution of global gas prices is a slow-moving story in Asia
- Three emerging dynamics will help begin the shift:
  - 1) A surge in output which will foster gas-on-gas competition**
    - Risks: growing domestic demand in several producing countries; a lack of new export projects from long-standing suppliers; regulatory overreach
  - 2) Government support:**
    - Governments reformulating acquisition strategies, pressuring utilities to negotiate more favorable pricing terms; helping with financing
  - 3) The development of an Asian gas hub**



# US LNG offers buyers a new pricing benchmark

- Offtakers for US LNG represent European, Asian, and portfolio participants
- While not all US LNG is destined for Asia, European buyers will be much more sensitive to Henry Hub price increases

Projects' reported customer contracting/offtaking

Export project	Operators	Buyers	Country	Volume (MTPA)	Contract length (years)	Start date	Agreement type
Sabine Pass	Cheniere Energy	BG	Global, UK	5.5	20	2015-2018	Contract
		Gas Natural	Global, Spain	3.8	20	2015/2016	Contract
		Kogas/Total	South Korea	3.8	20	2017/2018	Contract
		GAIL	India	3.8	20	2017/2018	Contract
		Total (train 5)	Global, France	2.0	20	2018/2019	Contract
		Centrica (train 5)	UK	1.75	20	2018/2019	Contract
Freeport I & II	Freeport	Osaka Gas	Japan	2.2	20	2018	Tolling contract, gas to be sourced by buyer
		Chubu Electric	Japan	2.2	20	2018	Tolling contract, gas to be sourced by buyer
		BP	Global, UK	4.4	20	2019	Tolling contract, gas to be sourced by buyer
Lake Charles	BG/Southern Union	BG	Global, UK	15.0			
Cameron	Semptra	Mitsubishi	Japan	4.0	20	2017	Binding agreement to negotiate tolling contract
		Mitsui	Japan	4.0	20	2017	Binding agreement to negotiate tolling contract
		GDF Suez	Global, France	4.0	20	2017	Binding agreement to negotiate tolling contract
Cove Point	Dominion	Sumitomo (to serve Tokyo Gas and Kansai Electric)	Japan, trading	1.15	20	2017	Tolling contract, gas to be sourced by buyer
		GAIL	India	1.15	20	2017	Tolling contract, gas to be sourced by buyer
Elba Island	Shell/Kinder Morgan	Shell	Global, US transportation sector	2.5			
Golden Pass	Exxon Mobil/Qatar Petroleum	Exxon Mobil/Qatar Petroleum	Global	15.6			
<b>Total</b>				<b>61.25</b>			

Source: Eurasia Group Research

## For now, Asian firms investing in US gas (and technology)

Asian investment in US unconventional				
Date	Investor	Country	Company	Stake
Mar-13	Tokyo Gas Co.	Japan	Quicksilver Resources	25%
Mar-13	JAPEX	Japan	Petronas	10%
Feb-13	Sinopec	China	Chesapeake Energy	50%
Feb-13	GAIL	India	partnership w/EDF	NA
Oct-12	OIL and Indian Oil	India	Carrizo Oil & Gas	30%
Aug-12	CIC, GIC	China, Singapore	Cheniere Energy	NA
Aug-12	Sumitomo	Japan	Devon	30%
Aug-12	JAPEX	Japan	Marathon	5%
Mar-12	ONGC	India	Conoco Phillips	NA
Jun-12	Osaka Gas	Japan	Cabot	35%
Jan-12	Sinopec	China	Devon	33%
Jan-12	Marubeni Corporation	Japan	Hunt Oil	35%
Dec-11	GAIL	India	Sabine Pass Liquefaction	NA
Nov-11	Itochu	Japan	acquisition	25%
Sep-11	GAIL	India	Carrizo Oil & Gas	20%
Jun-11	Mitsui	Japan	Andarako	13%
Jun-11	Nikki	Japan	Chesapeake	10%
Apr-11	Marubeni Corporation	Japan	Marathon	30%
Jan-11	CNOOC	China	Chesapeake Energy	NA
Oct-10	CNOOC	China	Chesapeake Energy	33%
Oct-10	Itochu	Japan	MDU	25%
Sep-10	Sumitomo	Japan	Rex Energy	30%
Aug-10	Reliance Industries	India	Carrizo Oil & Gas	60%
Jun-10	Reliance Industries	India	Pioneer Natural Resources	45%
Apr-10	Reliance Industries	India	Atlas Energy	40%
Mar-10	BGP (CNPC)-ION joint venture	China	INOVA Geophysical Equipment	51%
Aug-10	Mitsubishi	Japan	PennWest	50%
Feb-10	Mitsui	Japan	Ana, Chesapeake	15%
Dec-09	Sumitomo	Japan	Carrizo	13%

Source: Eurasia Group research

# Non-US LNG projects likely require oil-linked pricing

- Post-2015 LNG supply options center around Australia, North America, East Africa, Eastern Mediterranean
- But all markets must overcome different types of obstacles, ranging from resource nationalism to piracy
- Tighter market conditions will be eased after 2015 depending on trajectory of developing these new pillars of supply

New LNG supply risk map 2015-2020

Key variables	Australia	United States	Canada	Cyprus	Israel	Mozambique	Tanzania	Iraq
Domestic political risk	Regulatory risk	◆	◆	□	◆	□	◆	◆
	Change in tax take (including carbon tax)	◆	◆	□	◆	◆	◆	◆
	Labor shortage	◆	□	◆	◆	◆	◆	◆
	Resource nationalism	□	◆	◆	□	◆	◆	◆
	Bureaucratic inertia	□	□	□	◆	□	◆	◆
	Domestic demand needs	◆	◆	□	□	◆	◆	◆
	Lack of infrastructure	◆	□	□	◆	◆	◆	◆
	Environmental and local opposition	◆	◆	□	◆	◆	□	□
	Top security threat	Militantism/terrorism	□	□	□	◆	◆	◆
Piracy		□	□	□	◆	◆	◆	◆
Disputed maritime borders		□	□	□	◆	◆	◆	□
	Low risk	□						
	Medium risk	◆						
	High risk	◆						

Source: Eurasia Group research

# “Golden Age of Gas” faces political headwinds

New LNG supply risk map 2015-2020

Key variables	Australia	United States	Canada	Cyprus	Israel	Mozambique	Tanzania	Iraq
Domestic political risk	Regulatory risk	◆	◆	□	◆	□	◆	◆
	Change in tax take (including carbon tax)	◆	◆	□	◆	◆	◆	◆
	Labor shortage	●	□	●	◆	◆	●	◆
	Resource nationalism	□	●	◆	□	◆	◆	●
	Bureaucratic inertia	□	□	□	◆	□	●	●
	Domestic demand needs	◆	◆	□	□	◆	◆	●
	Lack of infrastructure	◆	□	□	●	●	●	●
	Environmental and local opposition	◆	◆	□	◆	◆	□	□
Top security threat	Militantism/terrorism	□	□	□	◆	●	□	●
	Piracy	□	□	□	◆	●	●	◆
	Disputed maritime borders	□	□	□	●	●	◆	□

Low risk	□
Medium risk	◆
High risk	●

Source: Eurasia Group research

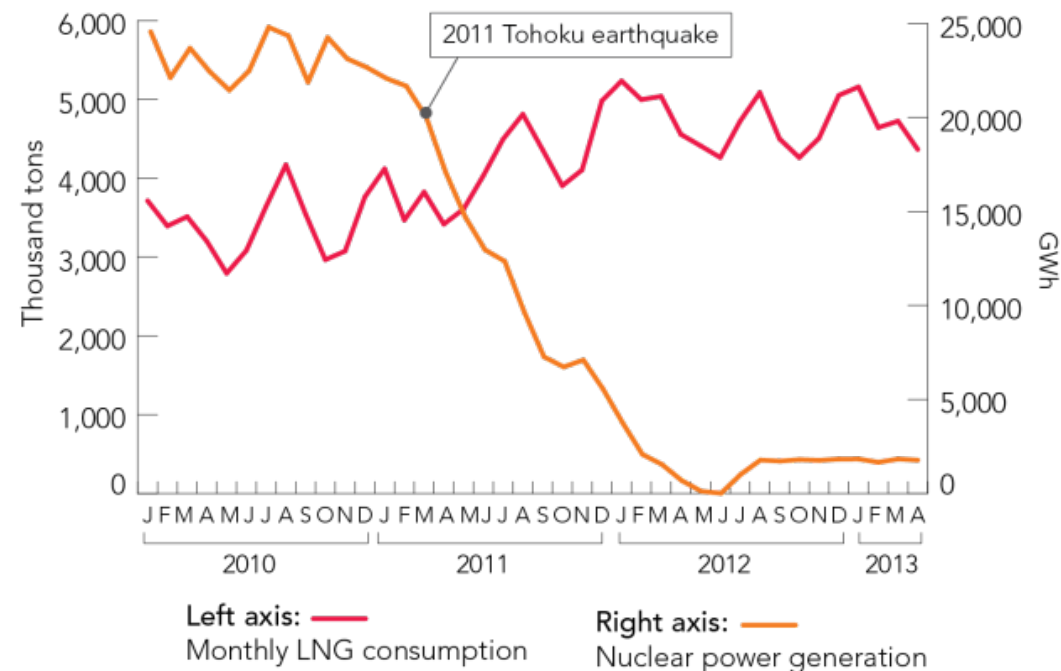
## Asian gas supply wildcard: Chinese shale gas build-out

- Gas is a key part of efforts to decrease dependency on coal in power and heating
- China's 12th Five-Year Plan (FYP) aims to raise the share of natural gas in energy mix from 3.9% in 2010 to 8.3% in 2015 (6.5 BCM by 2015)
- China's oil-linked pilot pricing scheme a boost for shale but may slow demand growth
- Actual target seems overambitious and is likely meant to be used as a tool to negotiate more favorable prices for LNG and pipeline imports

# Asian gas demand wild card: Japan nuclear

- Japan's formal entry into Trans-Pacific Partnership negotiations this summer is a complicating factor for the US LNG outlook
- Given politicization of US LNG under current Non-FTA approval process, FTA access to TPP countries will face opposition
- But the use of resurgent US hydrocarbons capacity as given rise to the use of gas as a diplomatic tool, and Japan will want free trade access to gas
- No decision has yet been made over whether to include natural gas in TPP as discussions are still ongoing within the administration

Japan's Fukushima effect



Source: Federation of Electric Power Companies

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**Executive office**

149 5<sup>th</sup> Avenue, 15<sup>th</sup> floor  
New York, NY 10010

**Washington office**

1818 N Street NW, 7<sup>th</sup> floor  
Washington, DC 20036

**London office**

30-31 Great Sutton Street, 1st floor  
London EC1V 0NA  
United Kingdom