



Major Developments in the East of Suez Oil and Gas Markets in a Global Context

Presented to Saudi Aramco

By Dr. Fereidun Fesharaki, Chairman

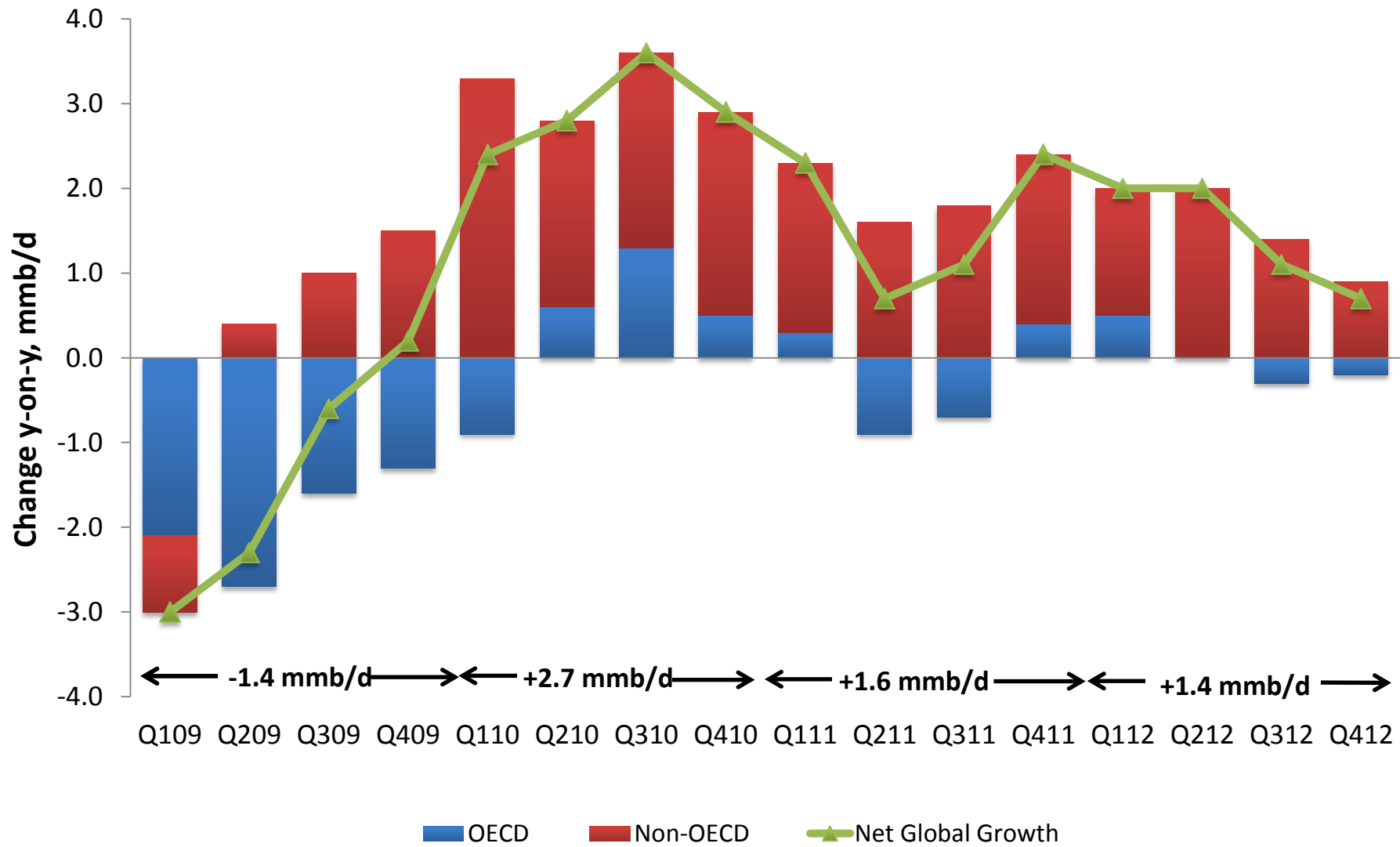
FACTS Global Energy

October 18, 2011

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Short-Term Oil Market: MENA Unrest and OPEC Spare Capacity

Oil Demand in 2011 and 2012 Continues to be Strong



The Libya Situation

Libya's Main Crude Export Streams & Export Terminals

Damage reported		No damage
Export Stream	Loading Terminal	Estimated Capacity (kb/d)
Es Sider	Es Sider	350
El-Sharara	Zawiyah	340
Sarir	Marsa El-Hariga	200
Amna	Ras Lanuf	180
Mellitah	Mellitah	140
Abu Attifel	Zueitina	120
Sirtica	Ras Lanuf	75
Brega	Marsa El-Brega	70
El-Bouri	Offshore	45
Al-Jurf	Offshore	40
Zueitina	Zueitina	40

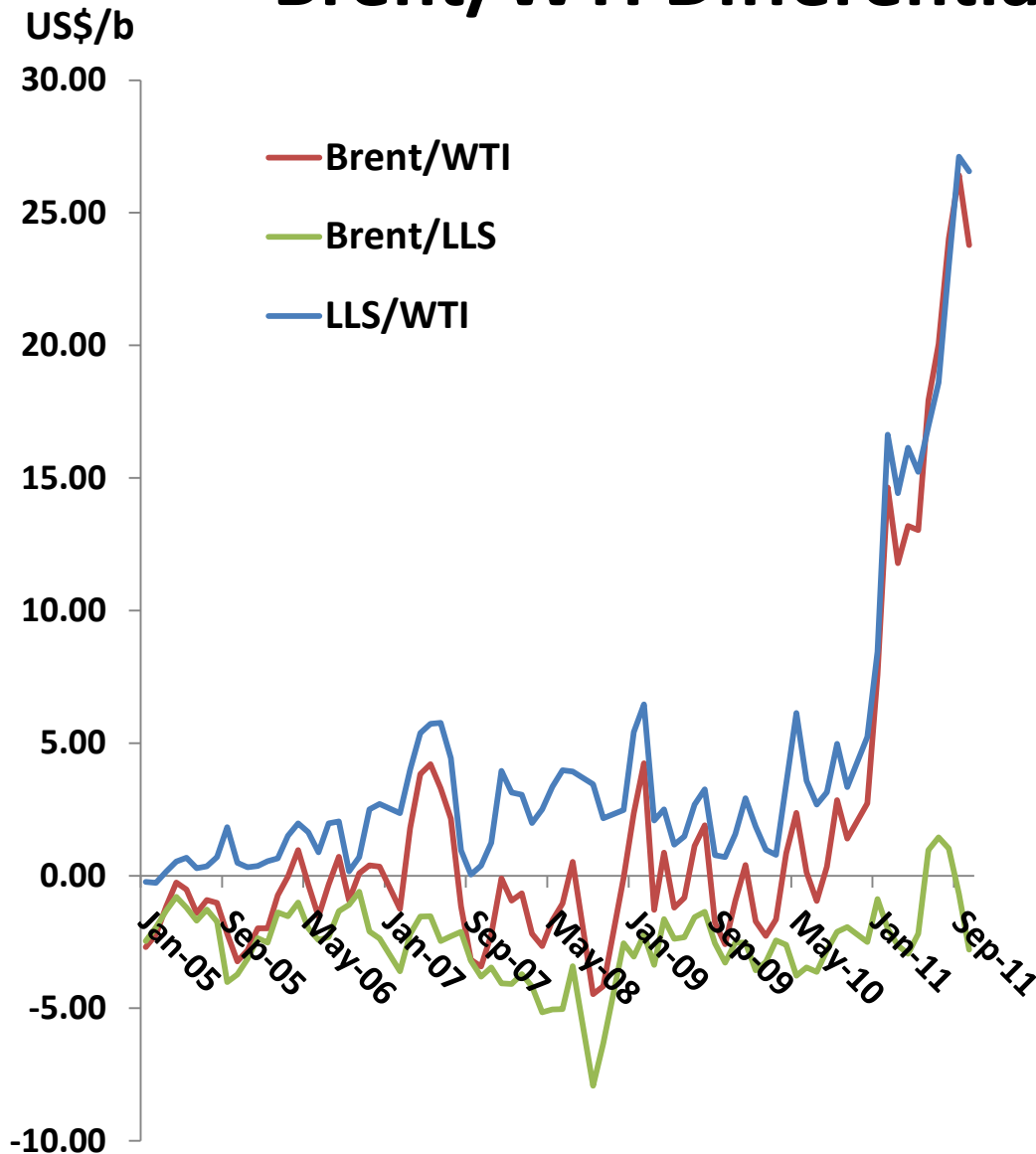
Sources: IEA, Lloyds Marine, various reports

Libya Updates:

1. Libya's oil fields, the 220 kb/d Ras Lanuf and 120 kb/d Zawiyah refineries are almost unscathed.
2. Three export terminals in central Libya (Es Sider, Ras Lanuf, and Marsa El-Brega) are severely damaged, accounting for 675 kb/d of Libya's crude loadings.
3. Other export terminals at Marsa El-Hariga (Tobruk) in eastern Libya, Zueitina near Ajdabiya, Mellitah in western Libya, Zawiyah west of Tripoli, and offshore terminals are known to be functional (totaled 925 kb/d).

FGE expects Libya oil production to reach 800 kb/d by end 2011 and 1.6 mmb/d by end 2012.

Brent/WTI Differential to Stay High?



Factors on Future Brent/WTI Spread in Medium Term:

- Liquid production from the US shale gas plays – up from ~700 kb/d in 2011 to 1.3 mmb/d in 2013 and 1.9 mmb/d in 2015.
- Increase in western Canadian crude exports to US – up by 700 kb/d by 2015.
- Progression on the two proposed major pipelines: Keystone XL pipeline (500 kb/d) and Enbridge Monarch pipeline (expand from 150 kb/d to 350 kb/d).

The Japanese Disaster has Limited Impact on Oil Markets

FGE's forecast: **Total oil demand in 2011 will remain at almost the same level as 2010**

Unit: kb/d	2010	2011	Comment
Gasoline	1,006	935	Down by 7% due to weaker consumer spending
Gasoil	835	837	Up slightly due to reconstruction of infrastructures
Fuel oil for power	183	303	Up significantly to make up for lost nuclear power generation capacity
Direct crude use for power	75	110	

Shutdown of refineries after the disaster

	Capacity (kb/d)	Restart Date
JX Group Kashima	-253	Restarted in June 2011
JX Group Sendai	-145	Summer 2012
Cosmo Oil Chiba	-220	Unknown

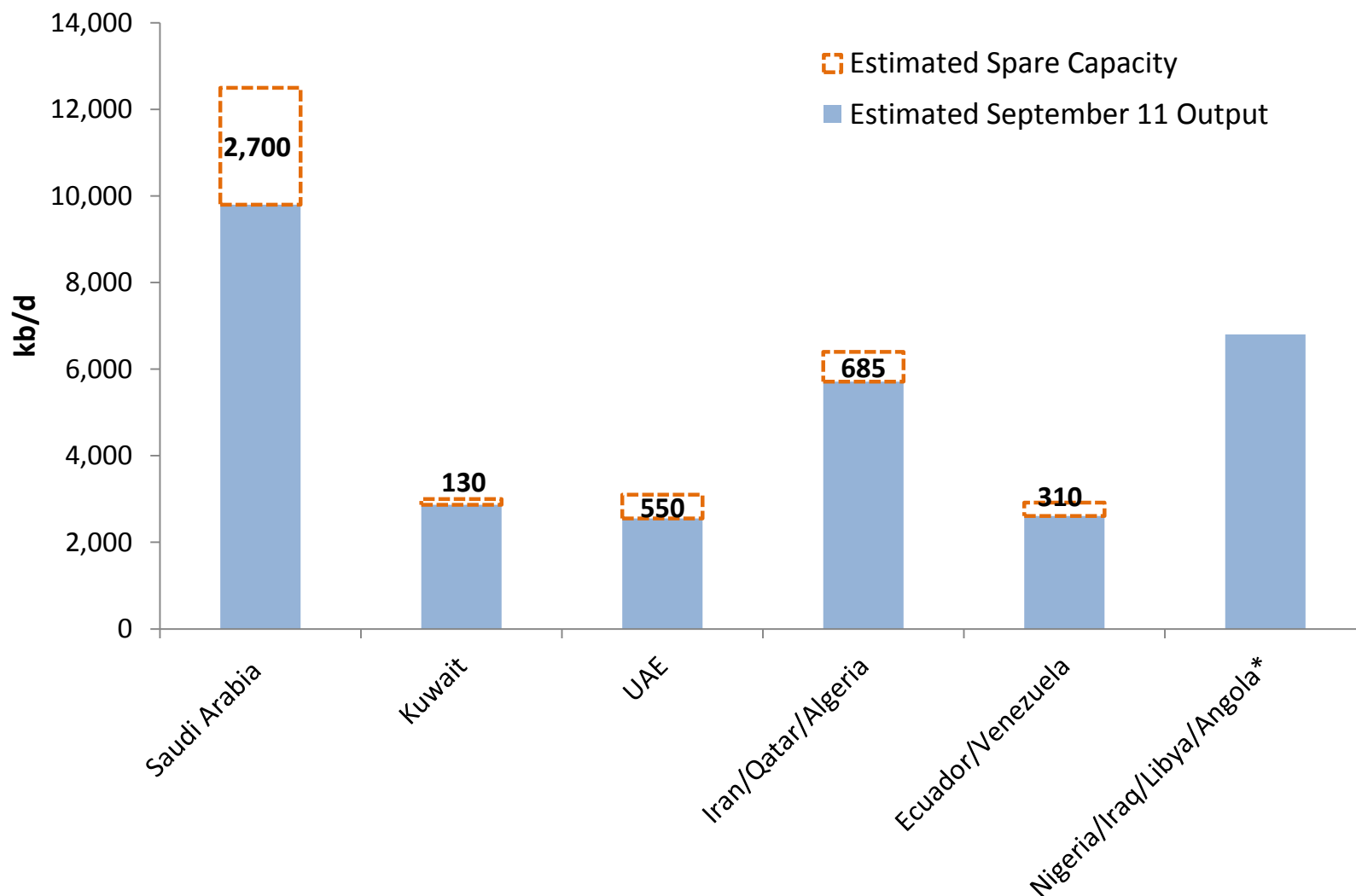
Temporary Expansions

	Capacity (kb/d)
Cosmo Oil Yokkaichi	50
Cosmo Oil Sakaide	30
JX Group Mizushima	20
Total	100

Japan Refineries & Throughputs:

1. There is enough spare refining capacity.
2. JX Kashima refinery restarted in early June 2011.
3. Immediate shortage of gasoline and kerosene in devastated districts is due to logistic bottlenecks, not lack of products availability.
4. Refiners are being asked to **produce more LSFO for power generation.**

OPEC Spare Capacity Estimated Below 5 mmb/d



*Nigeria/Iraq/Libya/Angola – output constrained by temporarily unavailable capacity.

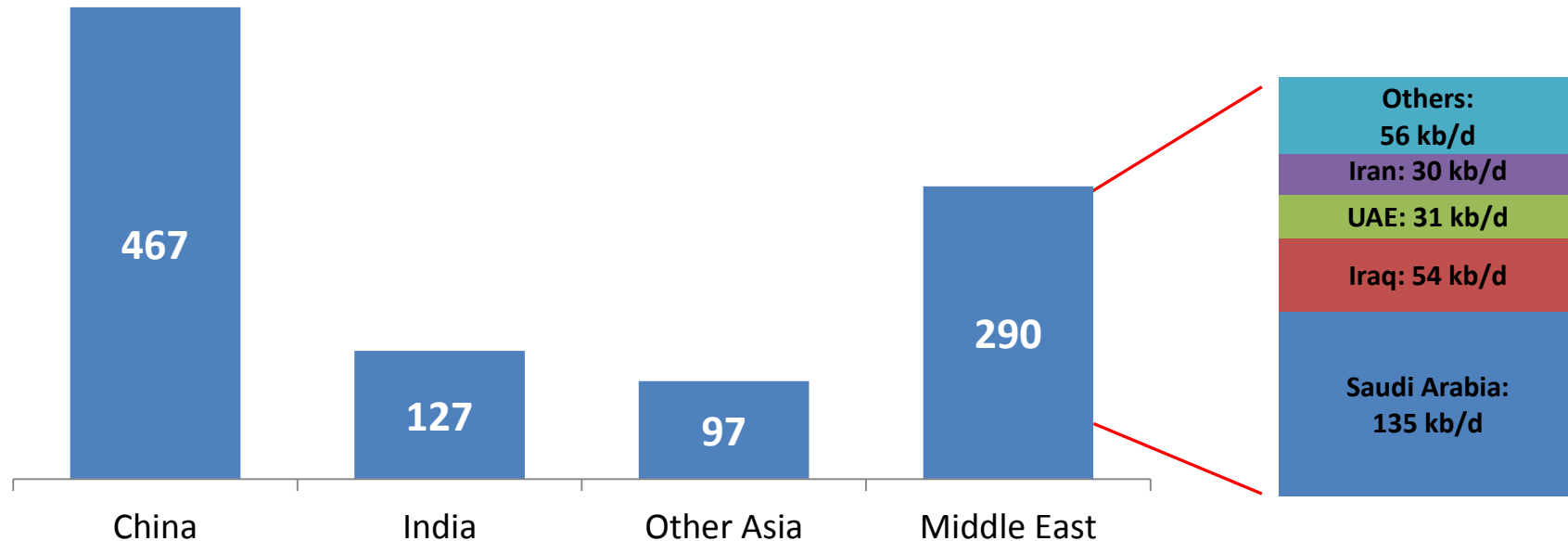
Price Will Stay at US\$100-110/b in 2011 and 2012

Base Case Dubai Crude (US\$/b)				
	Q1	Q2	Q3	Q4
2009	\$44.27	\$59.12	\$67.93	\$75.43
2010	\$75.83	\$78.12	\$73.90	\$84.31
2011	\$100.49	\$110.72	\$107.10	\$99.00
2012	\$101.33	\$111.83	\$109.17	\$104.50

***Long Term: Market Tightness to
Return and OPEC Holds the Cards for
Additional Supply***

Long Term: Market Tightness Will Return

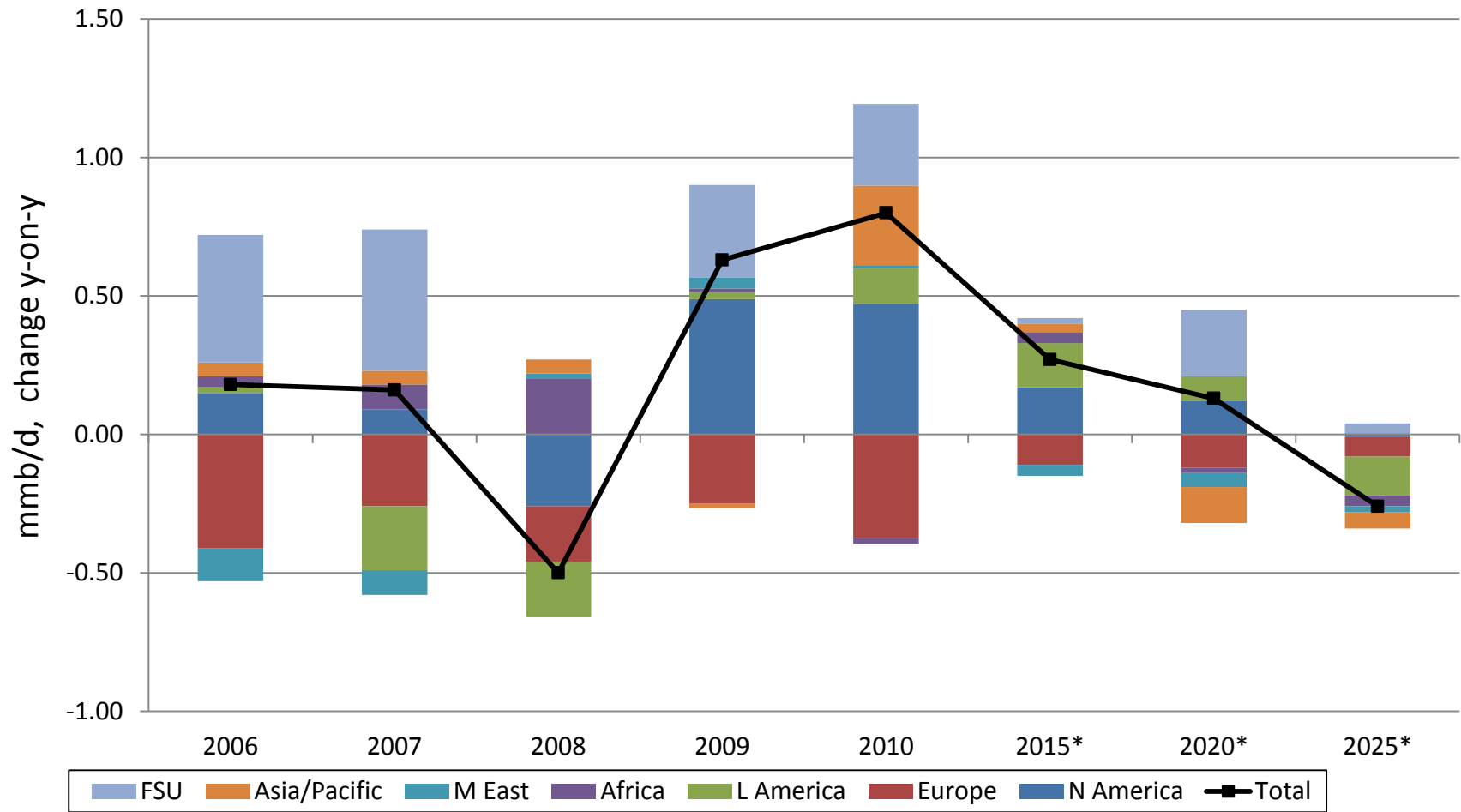
Annual “Base-Load” Demand Growth: 2010-2020, kb/d



Structural Demand Shift:

- OECD countries – Oil demand has peaked;
- Non-OECD countries – Strong “base-load” demand growth of ~**1.0 mmb/d** in the next decade.

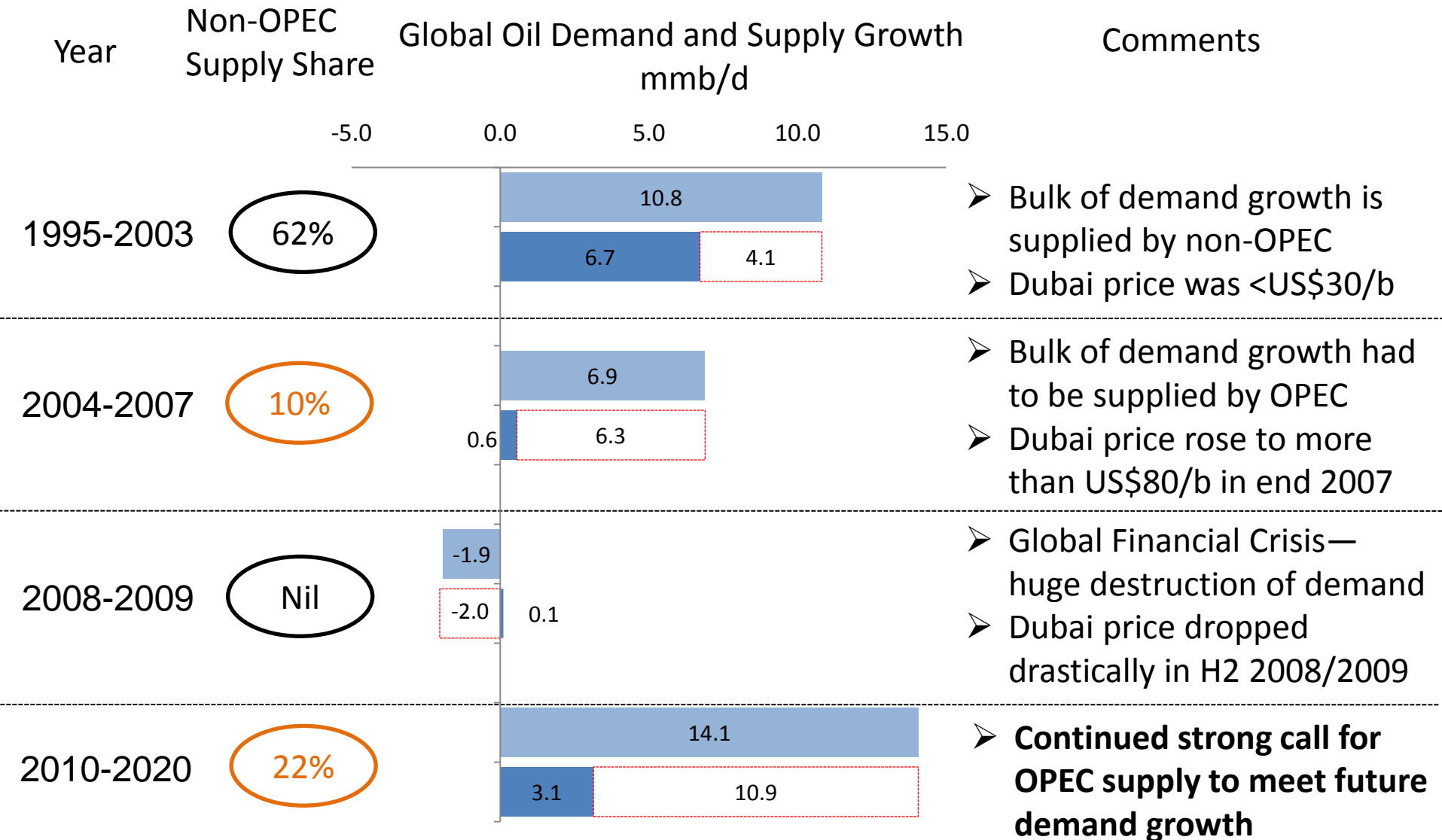
Non-OPEC Production Plateau



* Annual average of 5 years change

But what will be the impact of shale gas related oil?

Additional Supplies Have to be From OPEC



OPEC Coming to Fill the Supply/Demand “Gap”?

1. Clear lesson from 2004-2008 oil price run-up...

Non-OPEC supply plateau

2. OPEC faces a natural decline of some 1.5 mmb/d

Much new capacity is needed...

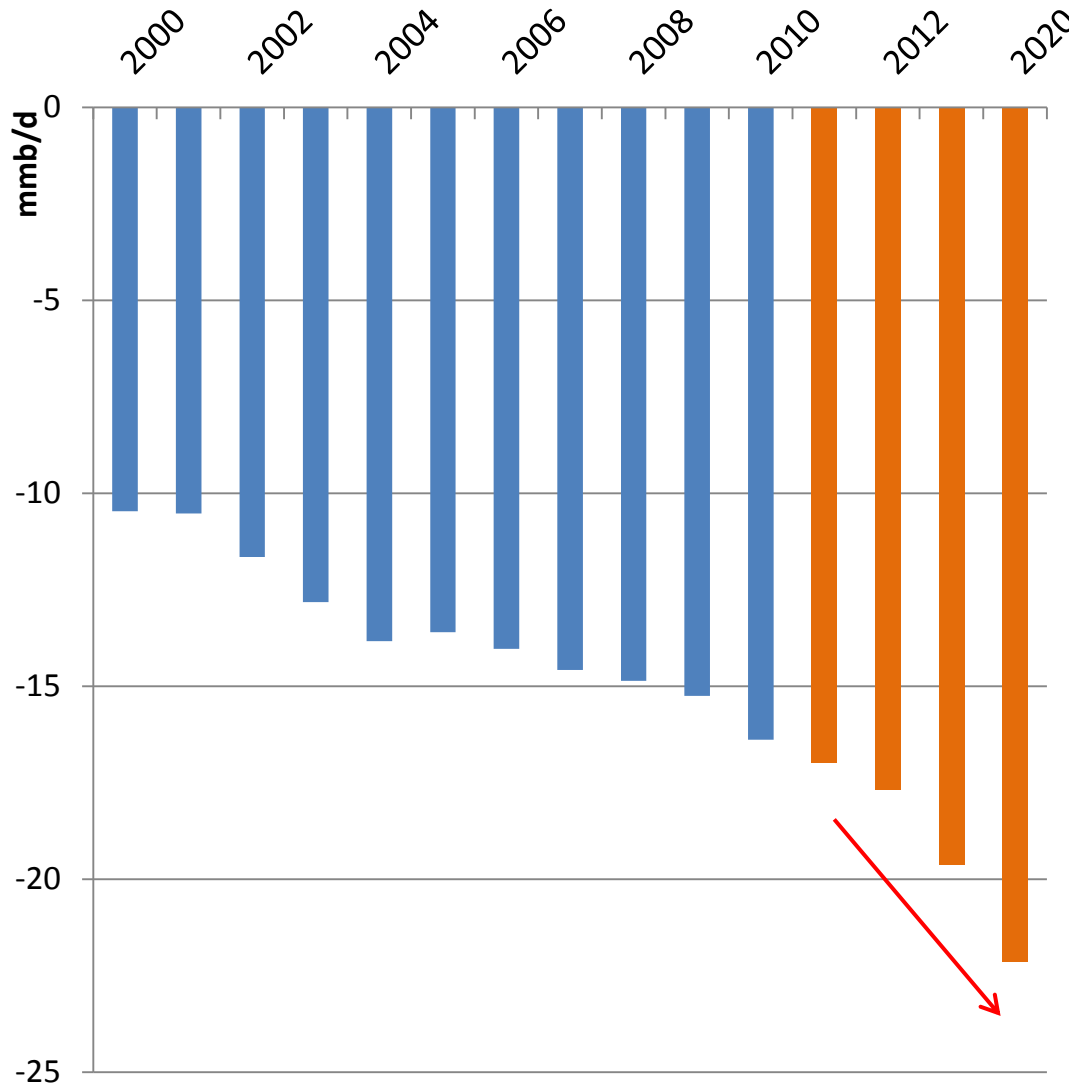
...just to stay in the same place

3. Global oil demand set to grow by some 1-1.5 mmb/d

4. OPEC will eventually have trouble adding 1-1.5 mmb/d of **additional** capacity annually...which may be required as non-OPEC plateaus.

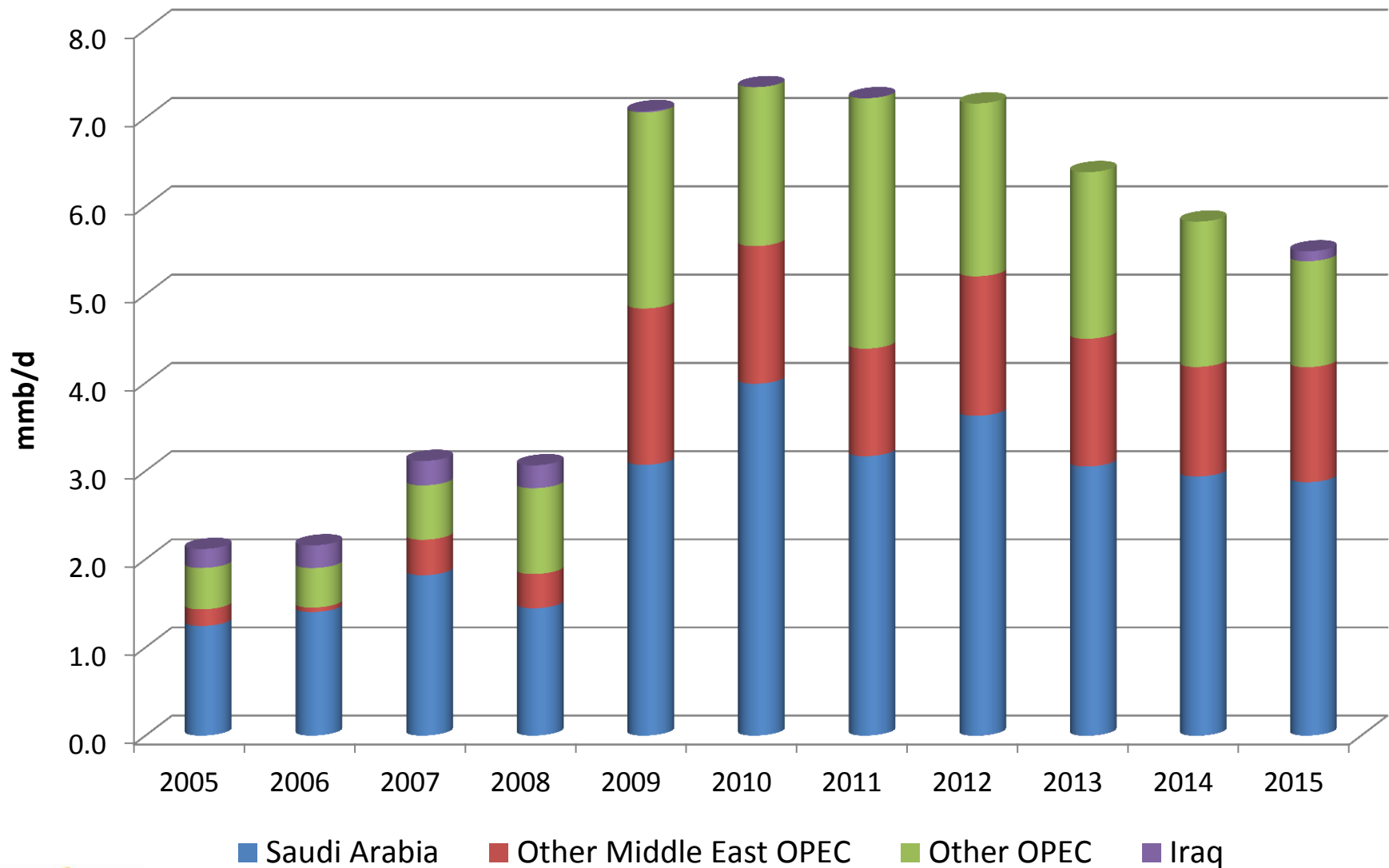
Global oil production likely to reach plateau of 95-100 mmb/d by mid-decade. This is not a geological limit, but a geopolitical limit.

Asia Net Crude Imports Rising Fast



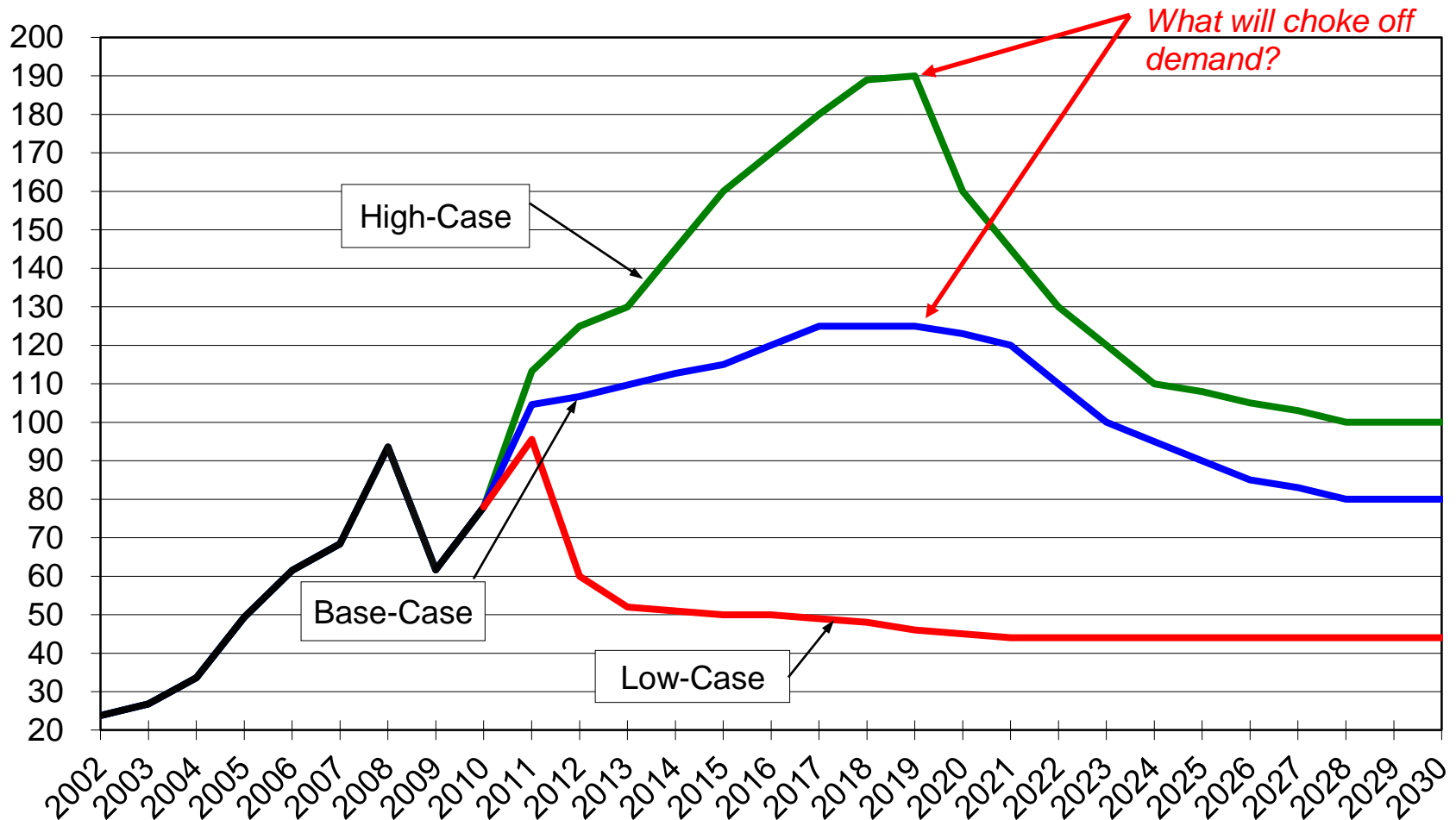
- **Diversifying sources of crudes supplies**, but Asia has to **import more from OPEC (especially Middle Eastern countries)**.
- **Asian NOCs aggressively acquiring overseas upstream assets.**
 - China spent more than US\$50 billion in overseas upstream oil and gas acquisitions in 2009 and 2010 alone;
 - India, Korea, and Japan are also aggressive in their overseas acquisitions.
- **Establishing global trading network.**

Wild Card: Sustained OPEC Spare Capacity?



Longer-Term Oil Market Still Seen as Bullish

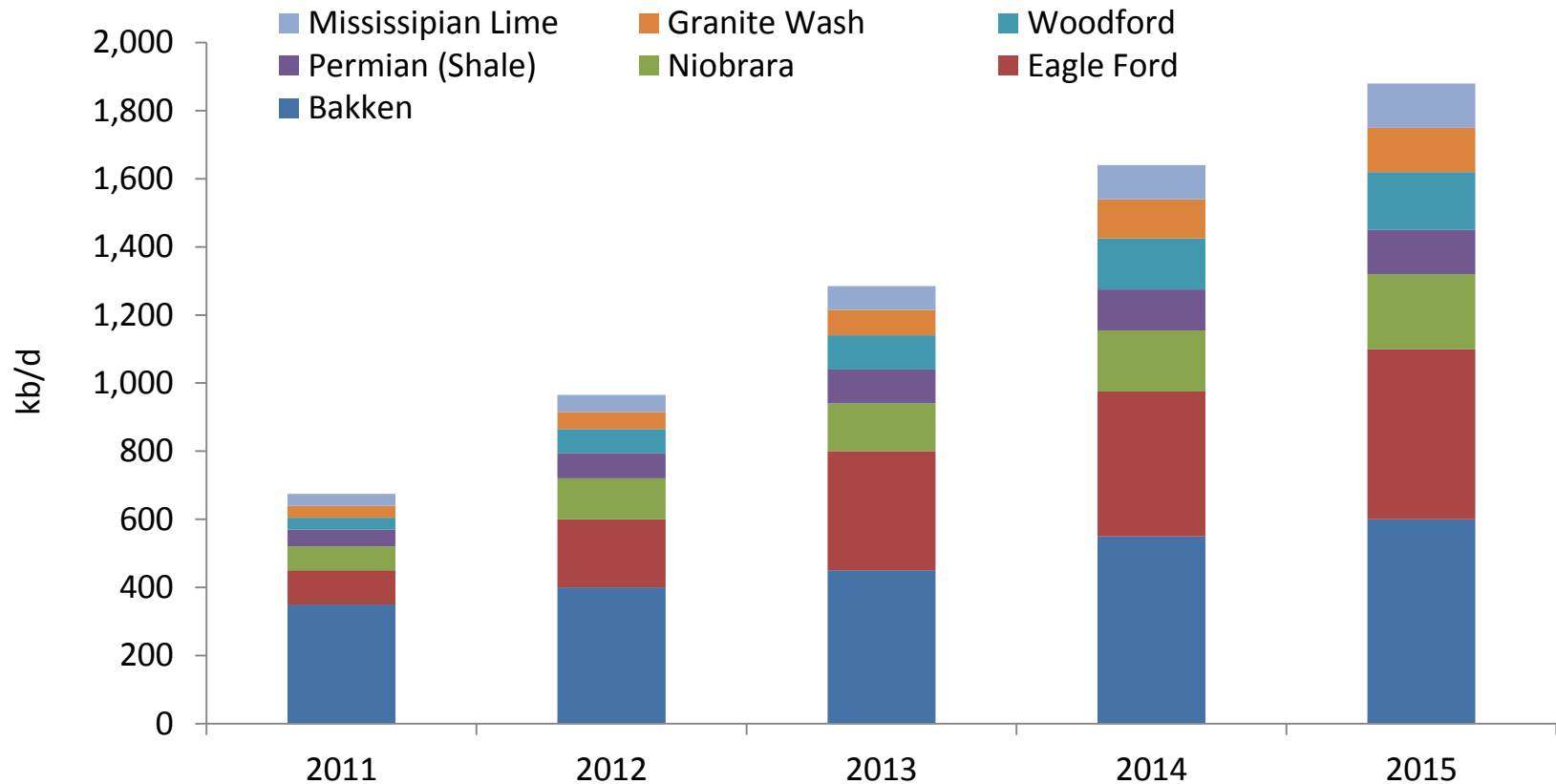
High, Base, and Low Price Forecasts for Dubai, US\$/b



Note: Actual up to 2010 and forecasts in 2011\$ thereafter.

A Real Game Changer: Liquids Production from Shale Gas Projects

Real Game Changer: Liquid Production from Shale



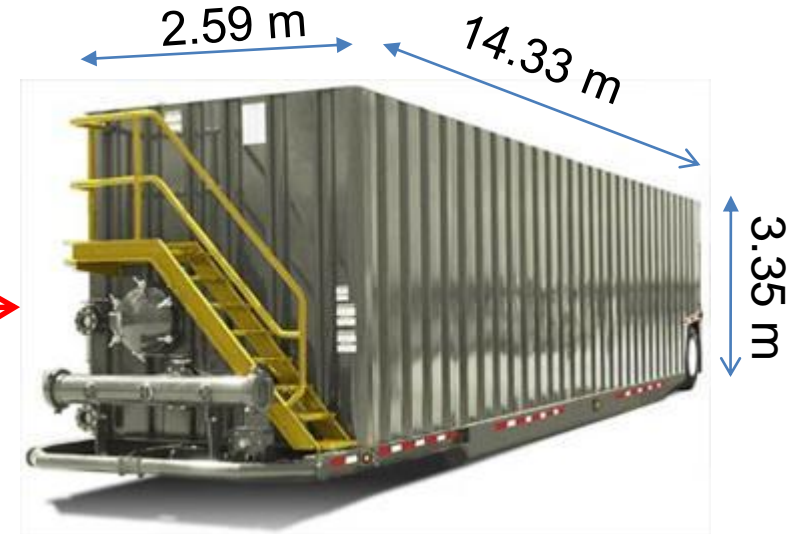
- US crude production declined from ~6 mmb/d in 2003 to 5 mmb/d in early 2009, but light crude production associated with shale gas plays has reversed the trend.
- Current liquid production from shale is ~700 kb/d with projections to nearly 2 mmb/d by 2015.

Size & Scale of Operations – Huge!

Fracturing Operation: Bakken tight oil well



Source: Sundance Energy Ltd.



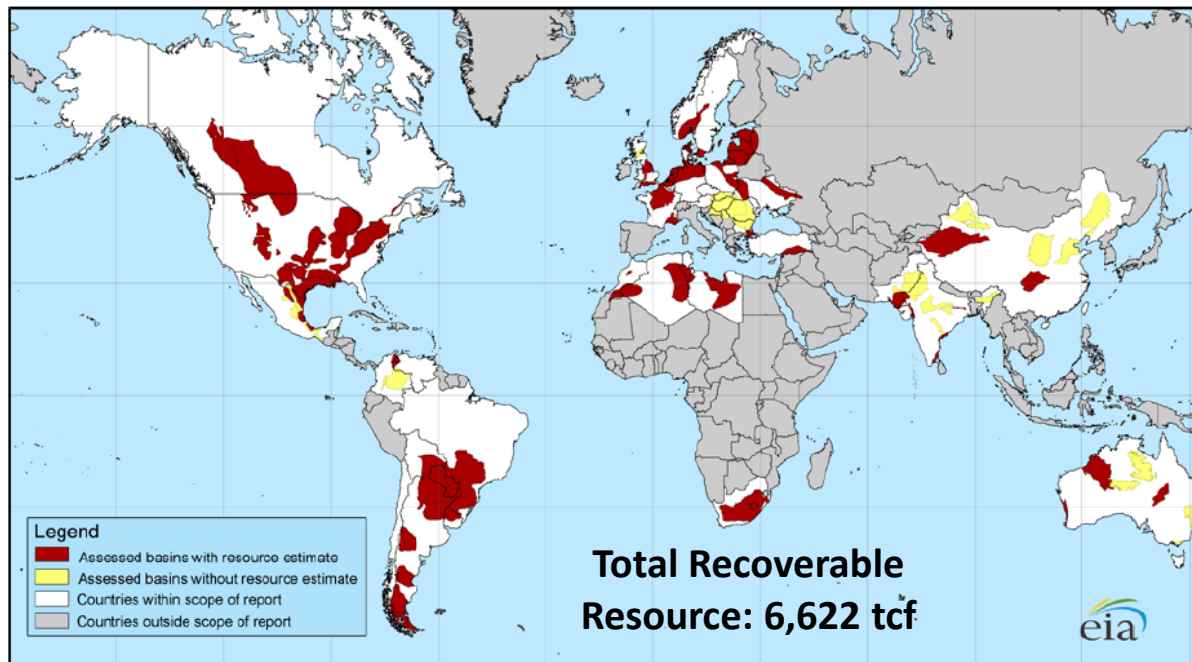
Frac Tanks – can hold up to 500 barrels of water or proppants!

- More than 200 frac tanks at the drilling site.
- 87,000 barrels of water to frac one tight oil well with 80-100 people working 24 hours per day for up to 5 days.
- Average recoverable reserves for Barnett, Fayetteville, Haynesville, Marcellus, and Bakken ~2 to 5 bcf per well; therefore many wells.

Environmental Impact – New York Case

- Fracking activity leads to severe 18-wheeler truck traffic.
- According to the New York State Department of Environmental Conservation “895 to 1,350 truckloads are required for rig mobilization, site preparation, demobilization, and well completion.”
- Increased traffic due to fracking truck convoys lead to local traffic standstills, lowering of property values, and safety hazards.
- Many tanker trucks also known to carry toxic chemicals/waste – labeled “hazardous” by NY DEC.
- Air pollution, noise pollution, and water pollution.

EIA Latest Shale Study



Europe	Proven	Technically
	Natural Gas Reserves (tcf)	Recoverable Shale Gas Resources (tcf)
France	0.2	180
Germany	6.2	8
Netherlands	49	17
Norway	72	83
UK	9	20
Denmark	2.1	23
Sweden		41
Poland	5.8	187
Turkey	0.2	15
Ukraine	39	42
Lithuania		4
Others*	2.71	19
Total		639

* Bulgaria, Hungary, and Romania.

South America	Proven	Technically
	Natural Gas Reserves (tcf)	Recoverable Shale Gas Resources (tcf)
Venezuela	178.9	11
Colombia	4	19
Argentina	13.4	774
Brazil	12.9	226
Chile	3.5	64
Uruguay		21
Paraguay		62
Bolivia	26.5	48
Total		1,225

Africa	Proven	Technically
	Natural Gas Reserves (tcf)	Recoverable Shale Gas Resources (tcf)
South Africa		485
Libya	54.7	290
Tunisia	2.3	18
Algeria	159	231
Morocco	0.1	11
Western Sahara		7
Mauritania	1	0
Total		1,042

Asia (incl. AU)	Proven	Technically
	Natural Gas Reserves (tcf)	Recoverable Shale Gas Resources (tcf)
China	107	1,275
India	37.9	63
Pakistan	29.7	51
Australia	110	396
Total		1,785

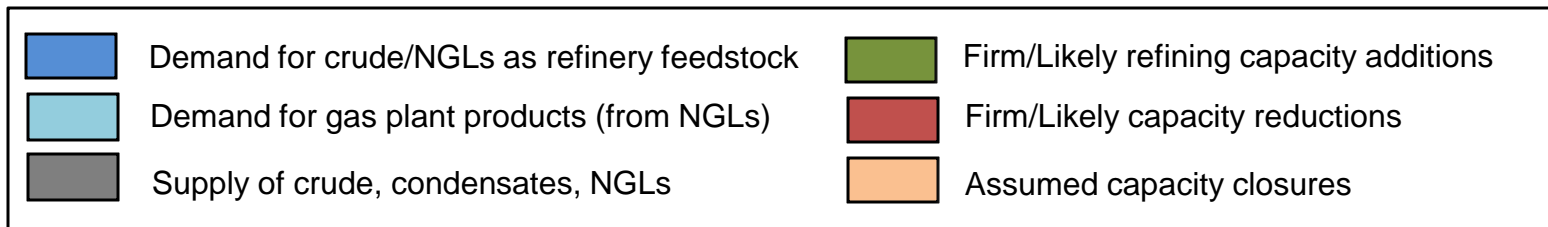
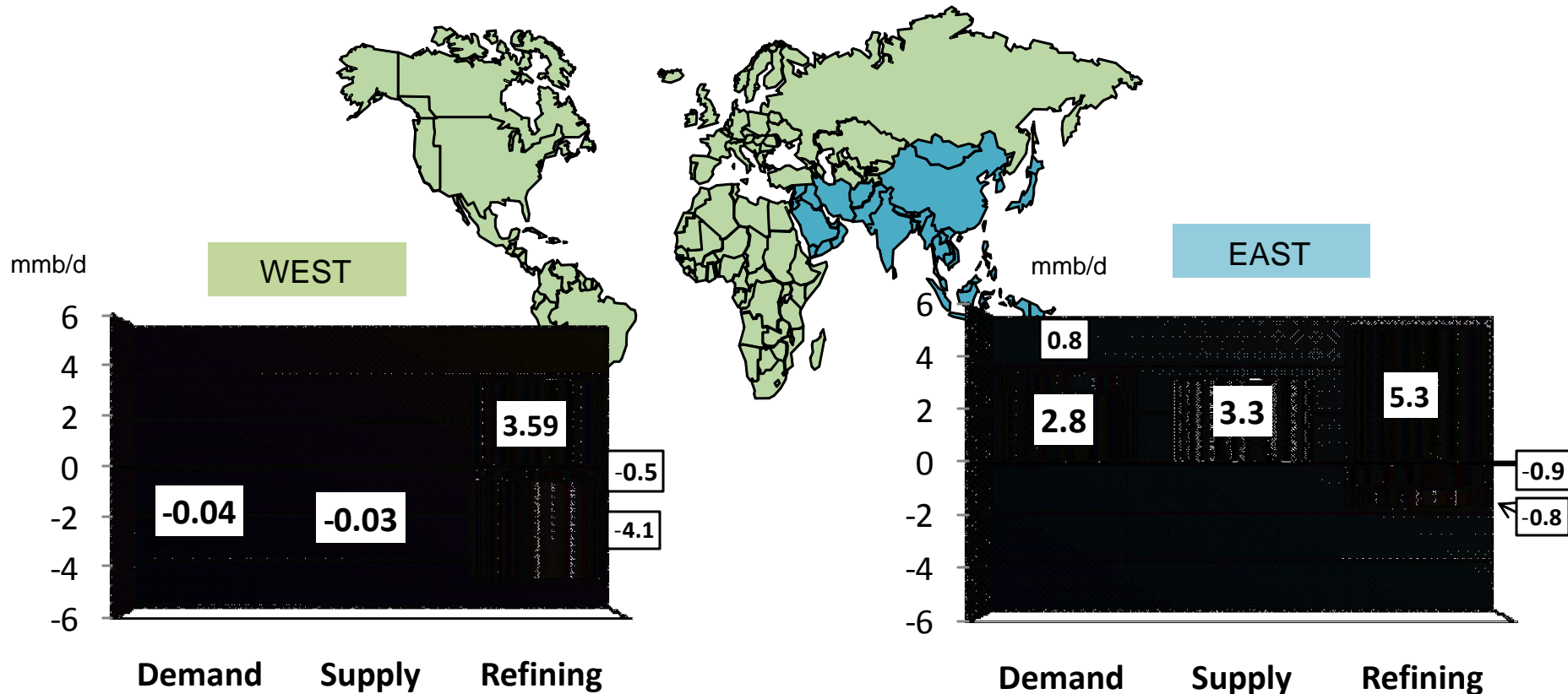
North America		
US	272.5	862
Canada	62	388
Mexico	12	681
Total		1,931

Future of Shale Gas Liquids Outside the US

- The US resources are less than 8% of global resources.
- Very little non-US information on organic content.
- Speed of development outside the US will be slow due to lack of well servicing infrastructure.
- Shale gas requires pipeline infrastructure and a market.
- Shale gas exploration in China, Australia, Poland, and Argentina.
- What is potential for shale gas liquids by 2020-25? 5 mmb/d? 10 mmb/d? Equivalent of Iraq or Saudi Arabia **production**?

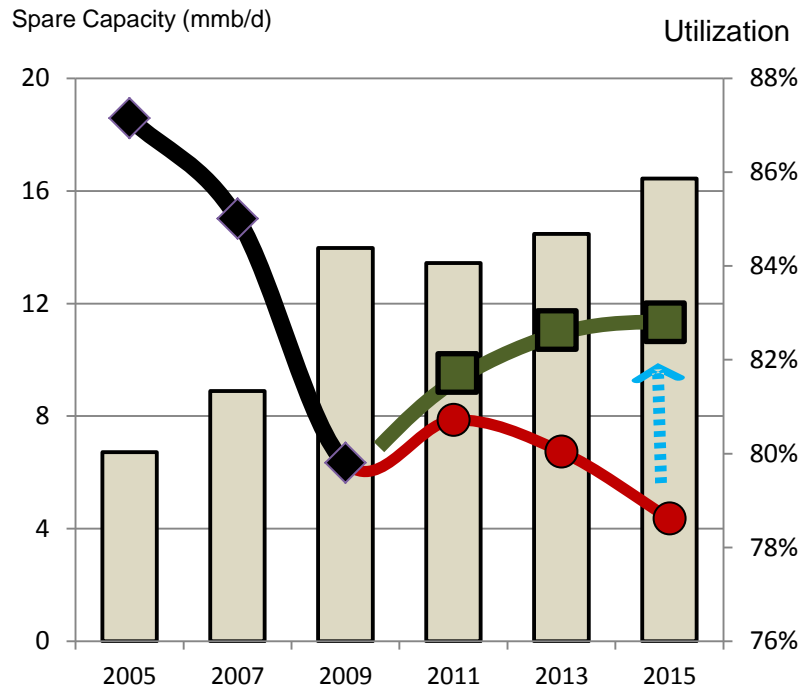
***Refining Sector: Near-Term Outlook OK,
but 2015-17 will be Difficult.
Will Enough Capacity be Closed?***

The Unbalanced World: Oil Demand, Supply, and Refining Capacity Growth, 2011-2015



Pressure on Refining Sector—Falling Utilization

Global Refining Capacity and Utilization Rates



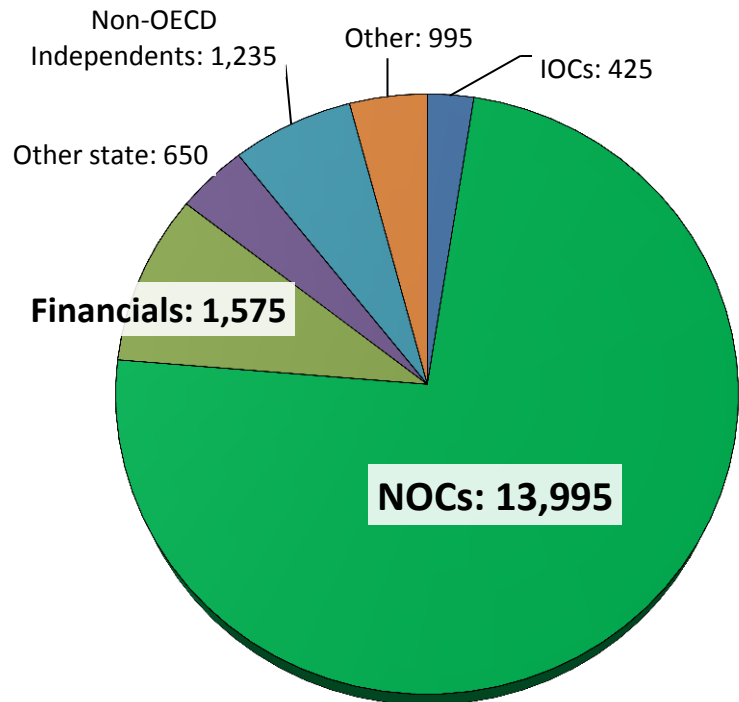
To bring utilization rates back up to 82-83% globally will require closure of around 7 mmb/d of capacity between 2009 and 2015. *(2 mmb/d already confirmed)*

On the basis of current capacity + scheduled expansions, global utilization rates are set to fall to about 78% by 2015.

This is not feasible on a sustainable basis!

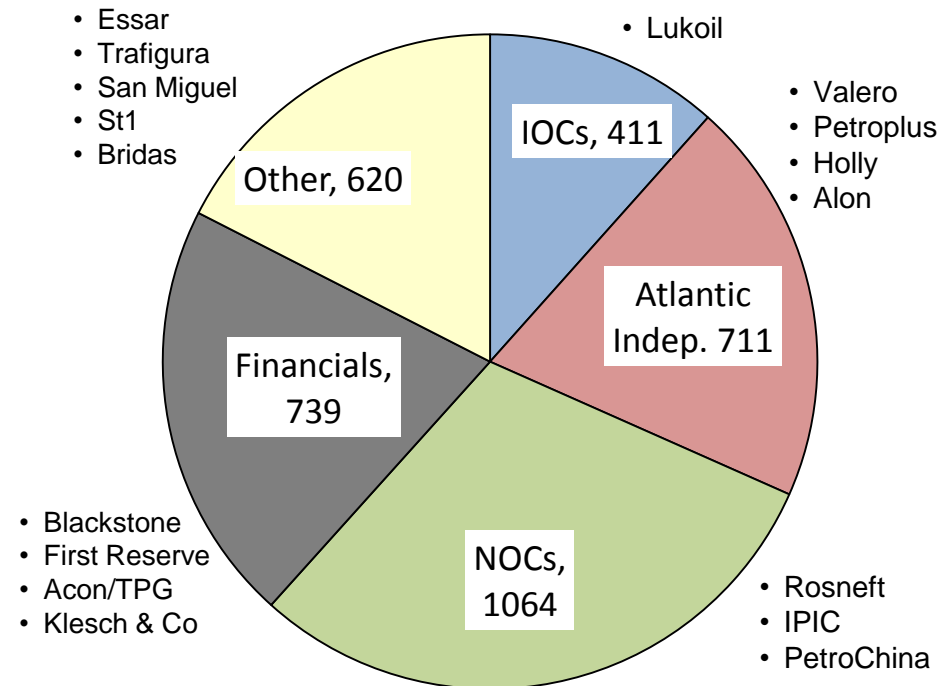
Who is Still Investing in Refining?

New Refinery Announcements Since Mid-2008 (kb/d)



Total since mid-2008: 19 mmb/d

Purchasers of Existing Refining Capacity Since 2008 (kb/d)

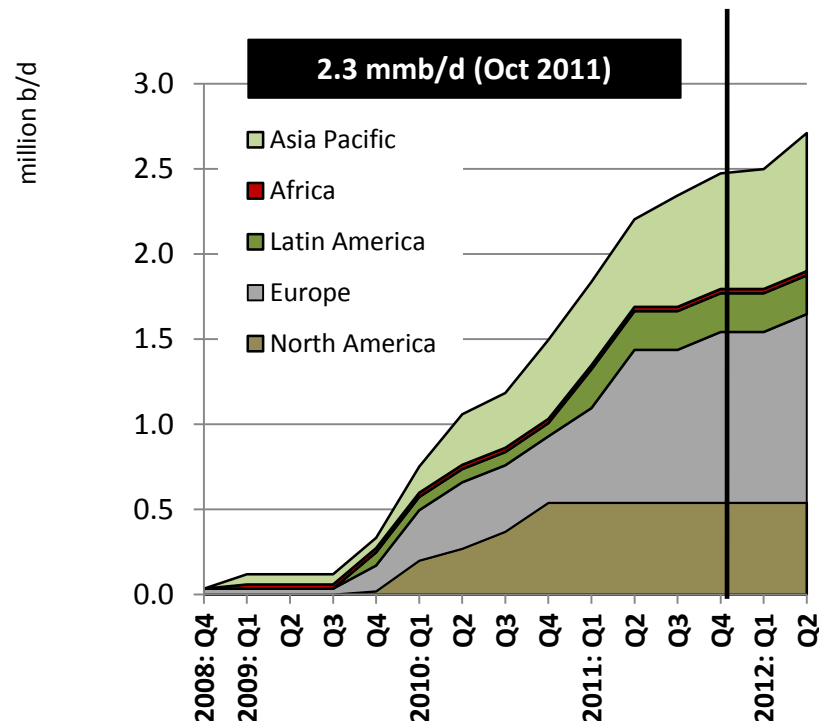


Total since mid-2008: 3.4 mmb/d

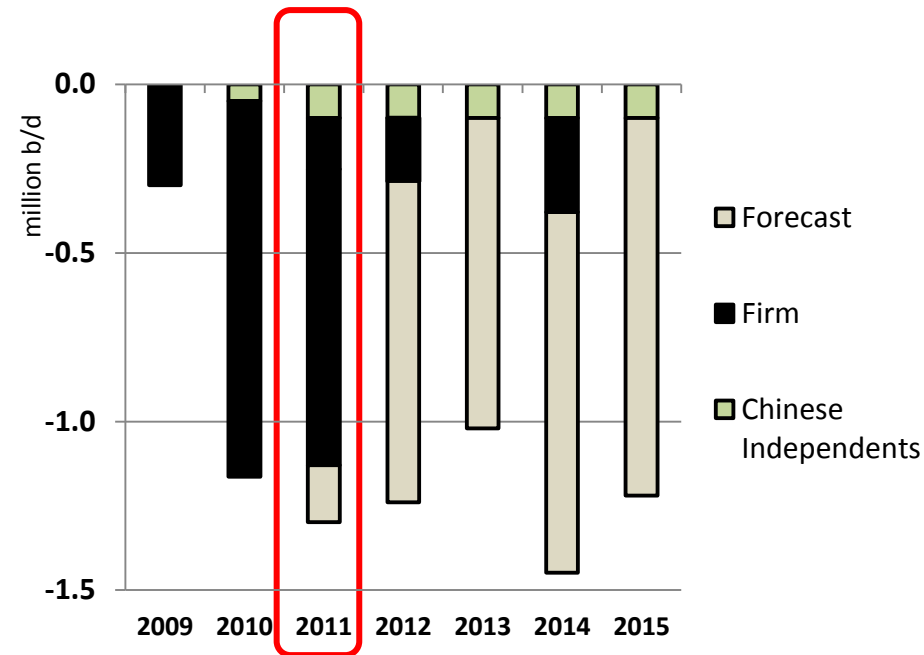
Refining Sector's Response to Downturn: Closures

- Between 2008 and mid-May 2011, 2.3 mmb/d of refining capacity was permanently shut (1 mmb/d this year).
- A further 200 kb/d is confirmed to close by mid-2012, with another 450 kb/d of unspecified Japanese reductions by 2014, and up to 700 kb/d of US capacity.
- In total, we consider another 4.2 mmb/d will close by 2015, bringing the total to around 7 mmb/d.

Refinery Shutdowns (Cumulative)

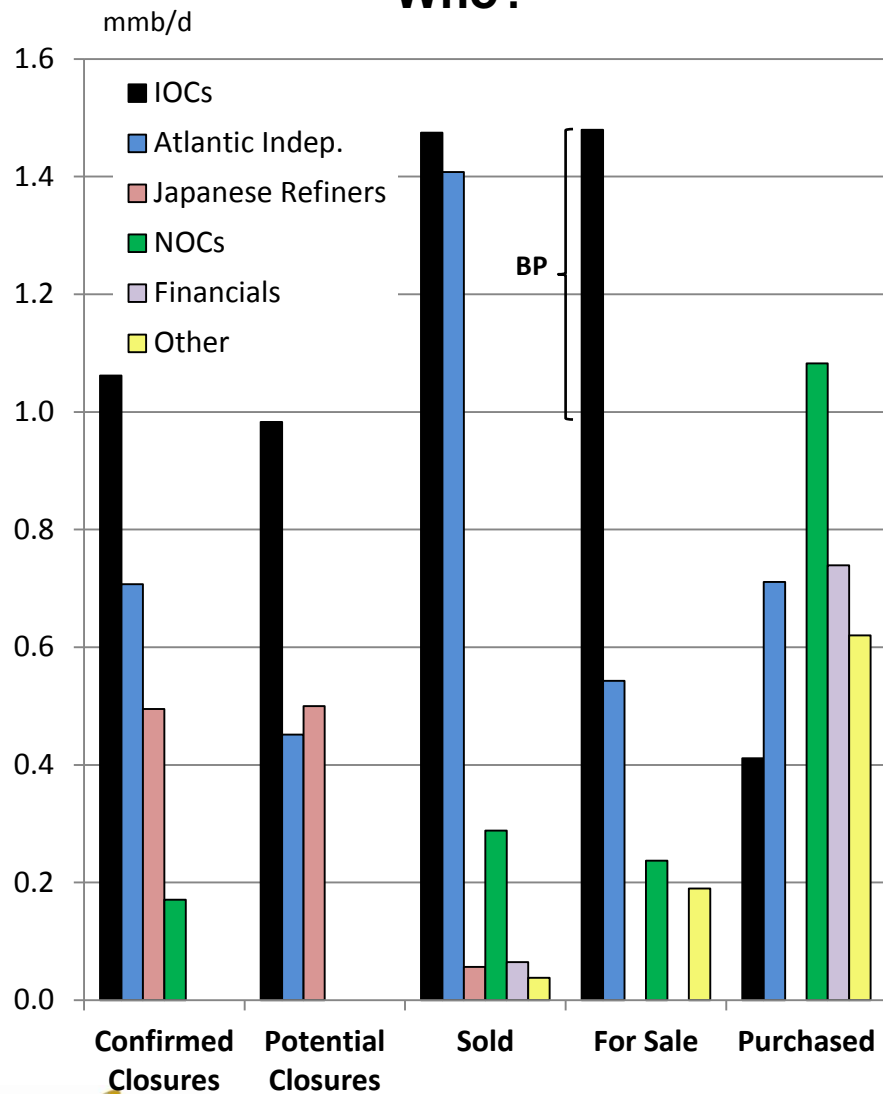


Forecast Refinery Closures by Year

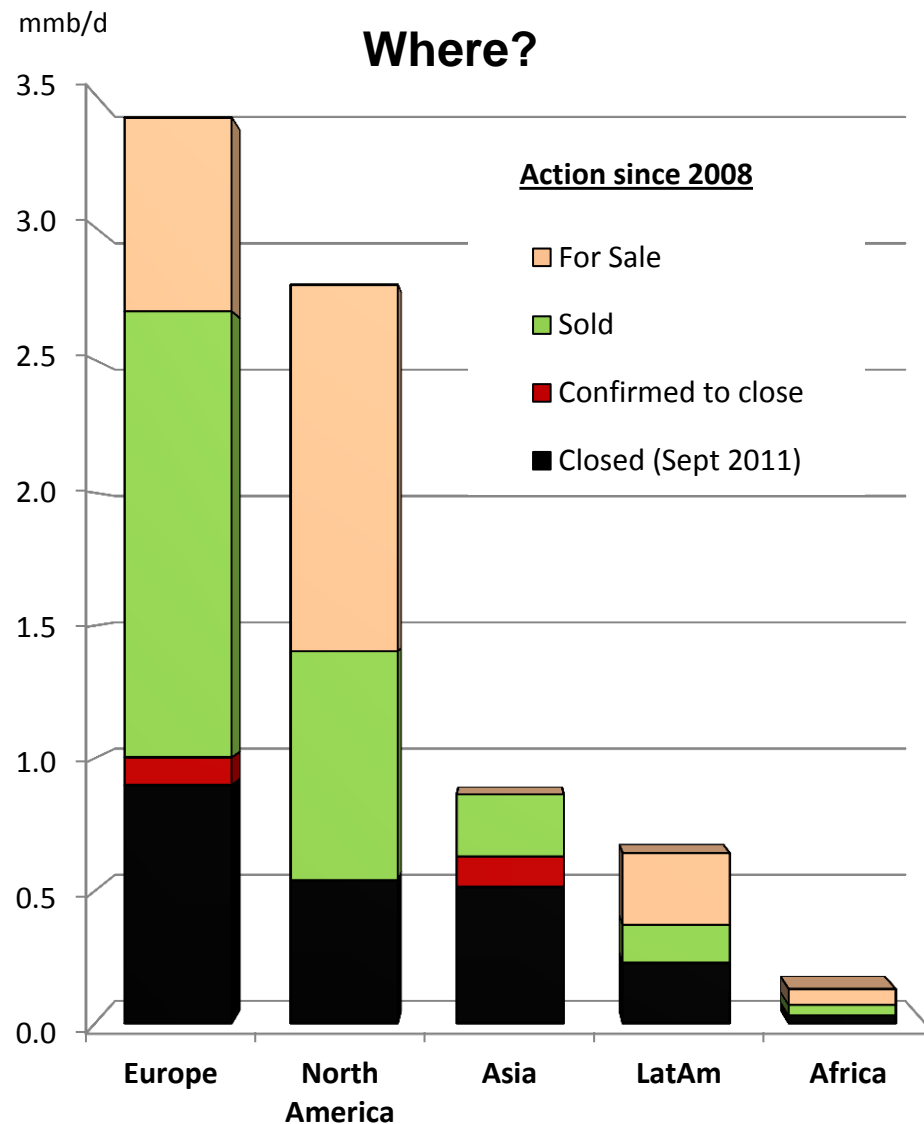


Refinery Closures and Sales Since 2008

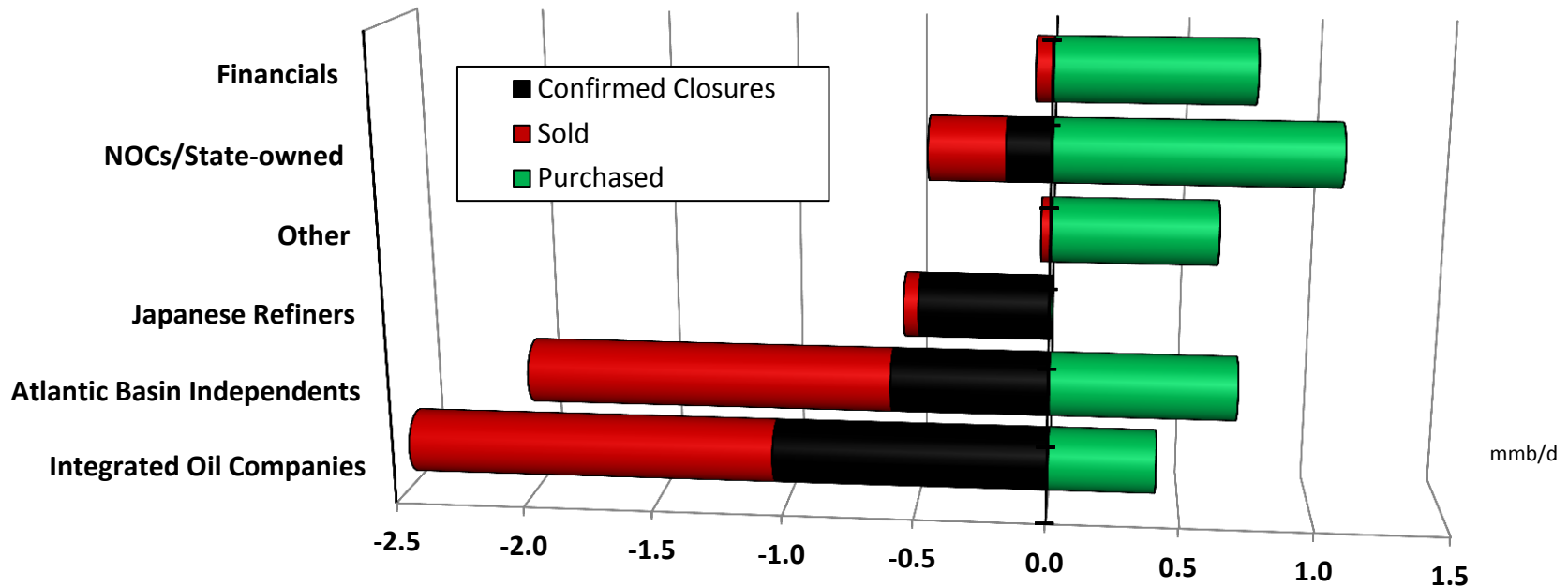
Who?



Where?

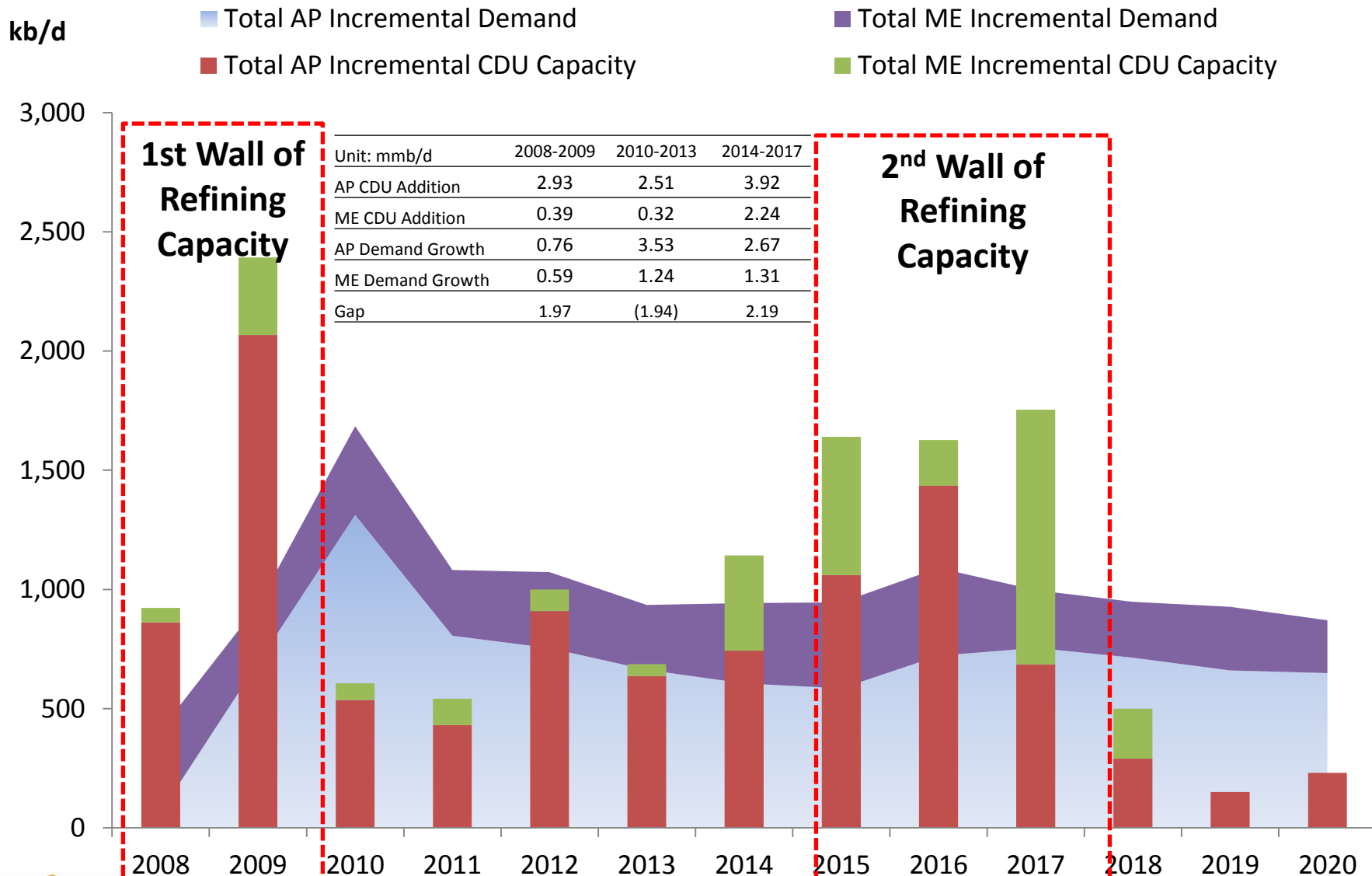


How is Consolidation Affecting Structure of Refining Sector?



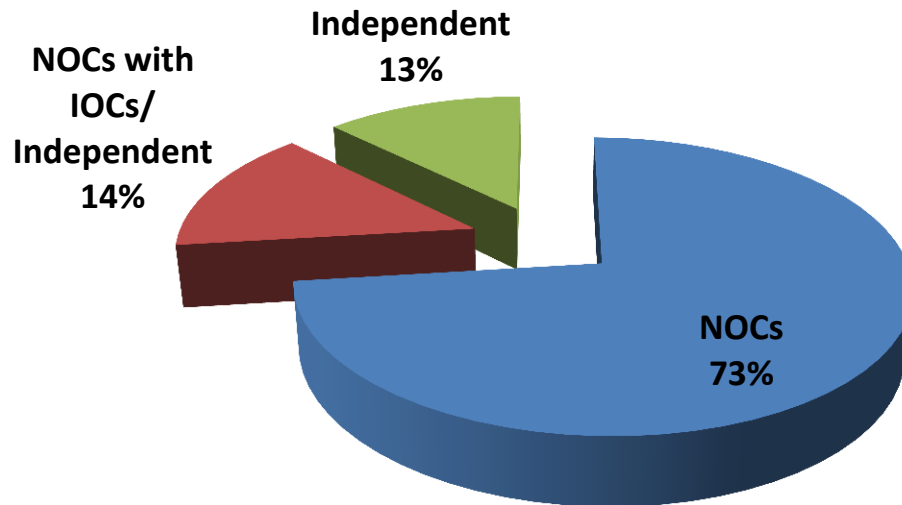
- Reducing refining exposure:
 - IOCs: disposed of 2.3 mmb/d of capacity, purchasing only 300 kb/d (Lukoil).
 - Independents: disposed of 2 mmb/d (plus 550 kb/d by Japanese refiners).
- Increasing refining exposure:
 - State-owned oil companies and wealth funds (IPIC, Rosneft, and PetroChina).
 - Financials/private equity.
 - Essar, traders, local operators.

East of Suez Refinery Build and Demand Growth



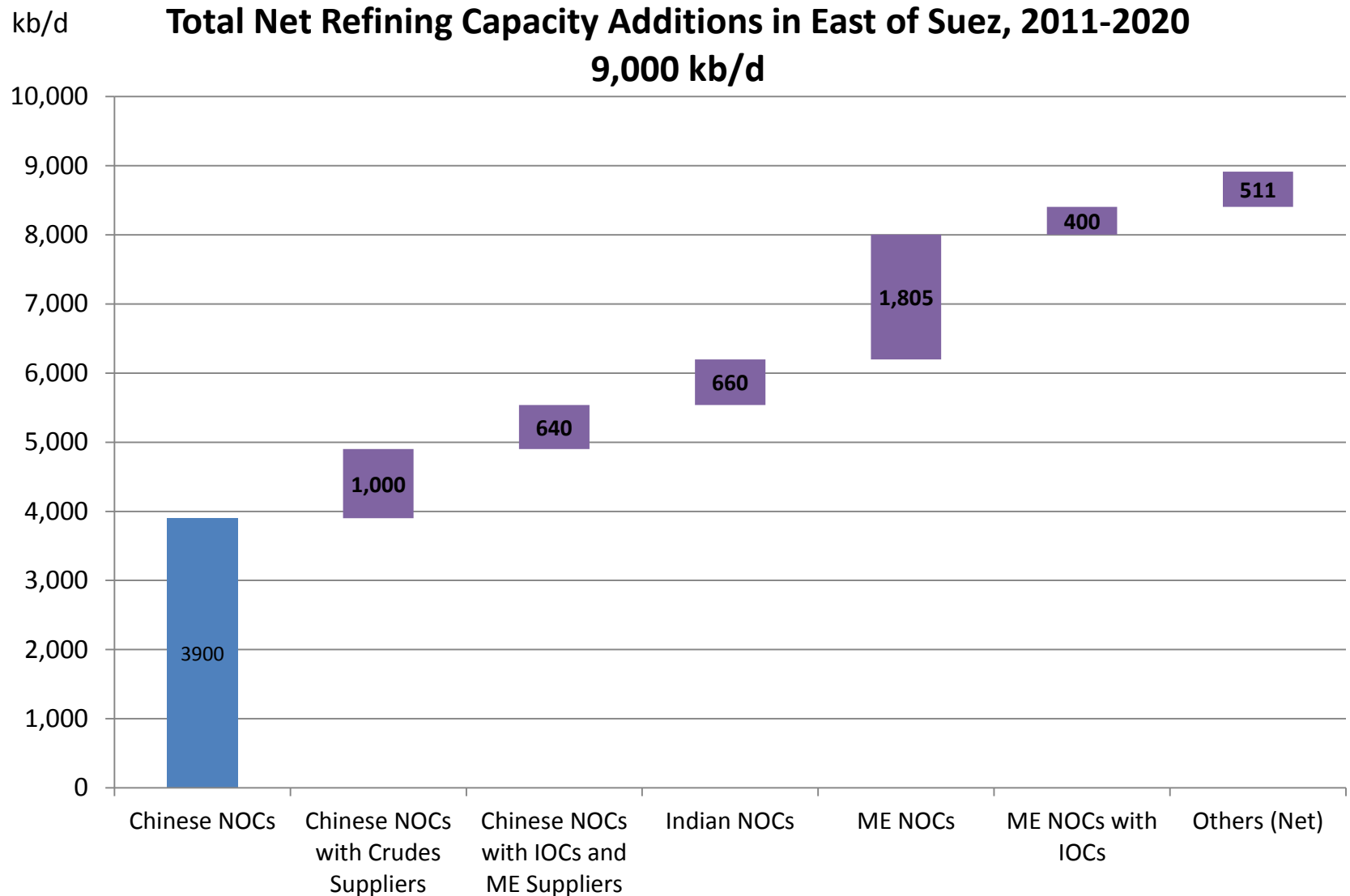
Who is Building in the East of Suez?

Firm and Likely CDU Addition in East Suez (2011 - 2020)
11 mmb/d

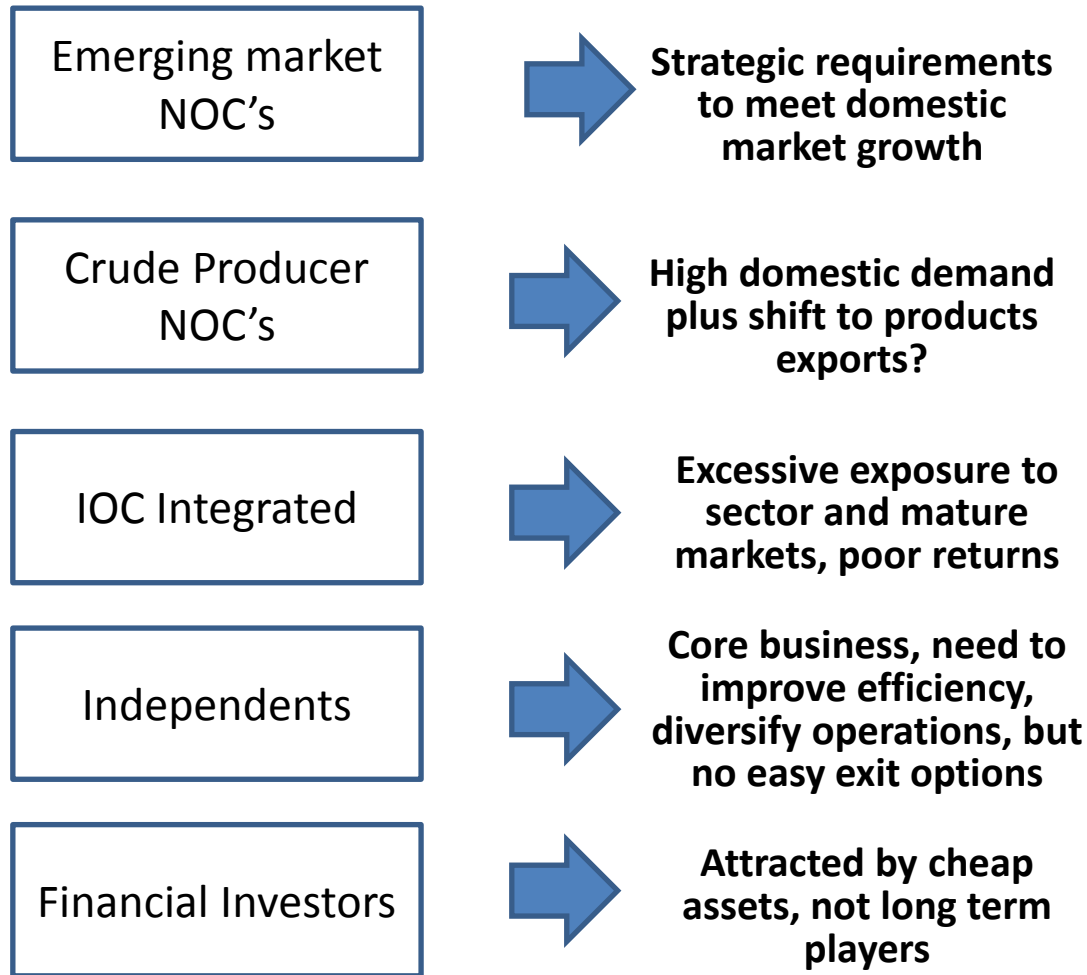


- **NOCs** will be involved in **~90%** of the refining capacity expansions in 2011-2020.
- Unlike the 2001-2010 period, independents will build much less refining capacity.
- IOCs are only involved in joint-venture projects with Chinese NOCs in China.

Who is Building in the East of Suez?



Refining Industry – Structural Pressures



NOCs vs IOCs

Upstream

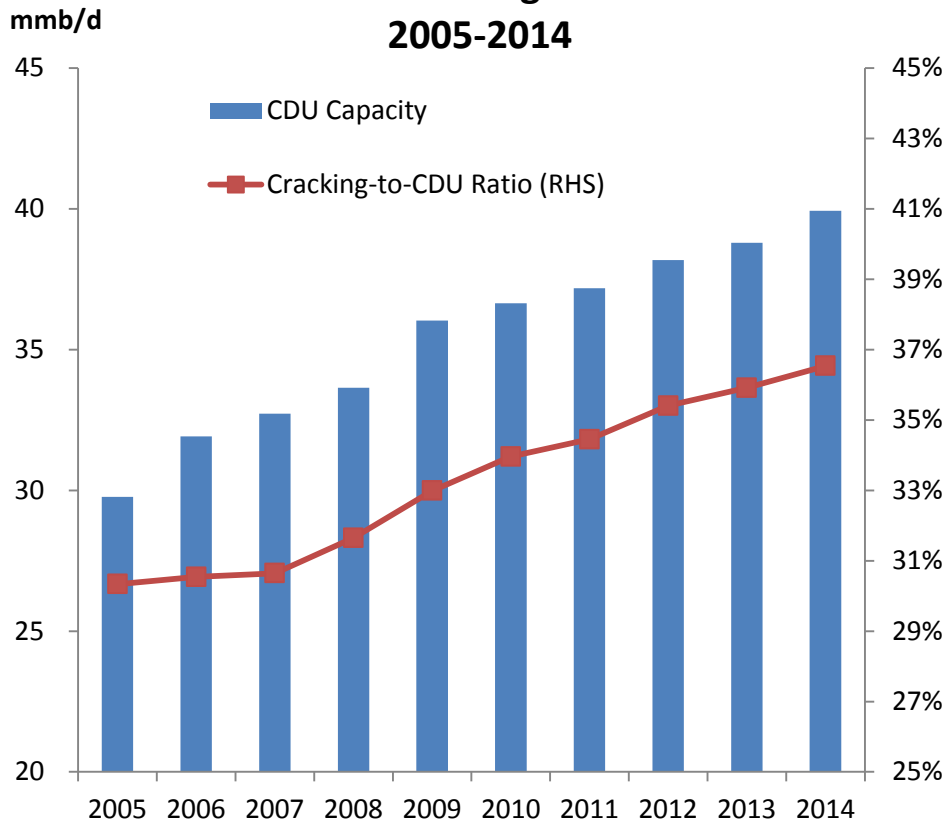
- IOCs – Experienced in mega projects requiring sophisticated coordination of complex technologies and financing.
- NOCs – Aggressive in upstream acquisitions (e.g., Chinese NOCs) with access to relatively cheap capital and strong government support in the name of “energy security.”
- IOCs and NOCs are not necessarily competing with each other (co-operation in the upstream developments in Iraq).

Downstream

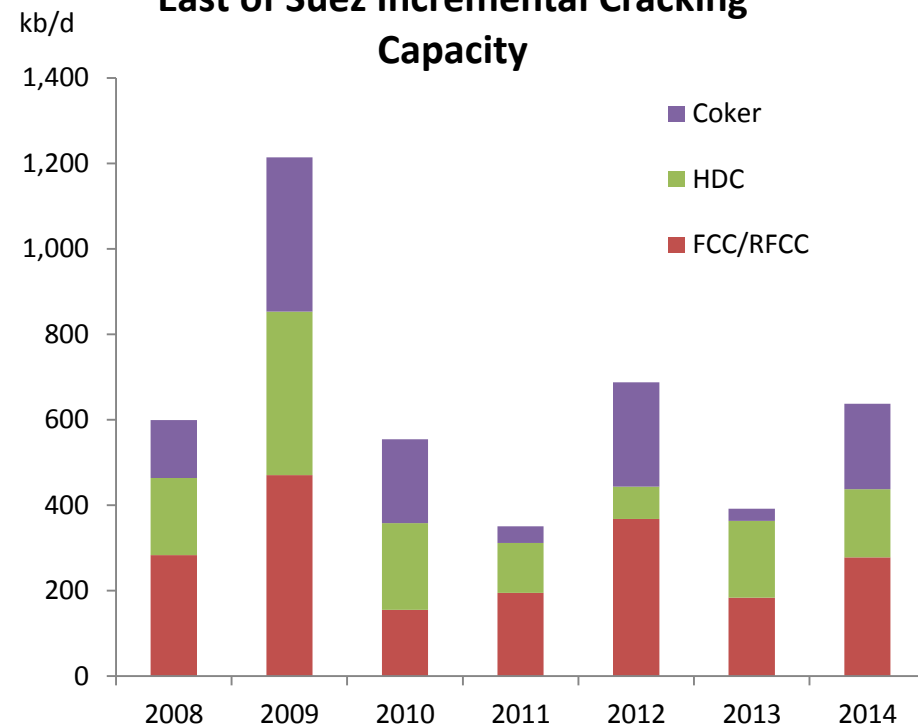
- IOCs, NOCs, and independents have similar capabilities.
- Rates of return in the refining sector are much lower than the upstream.
- IOCs are exiting the downstream sector:
 - BP only has small refining assets in Australia and New Zealand.
 - Shell is planning to shutdown refineries in Australia (Clyde), Japan (Showa Shell), and the Philippines.
- NOCs are aggressively expanding in the downstream sector (either for strategic reasons or as a heavy crude disposal avenue).

East of Suez Refineries Becoming More Complex

East of Suez Cracking to CDU Ratio
2005-2014



East of Suez Incremental Cracking Capacity



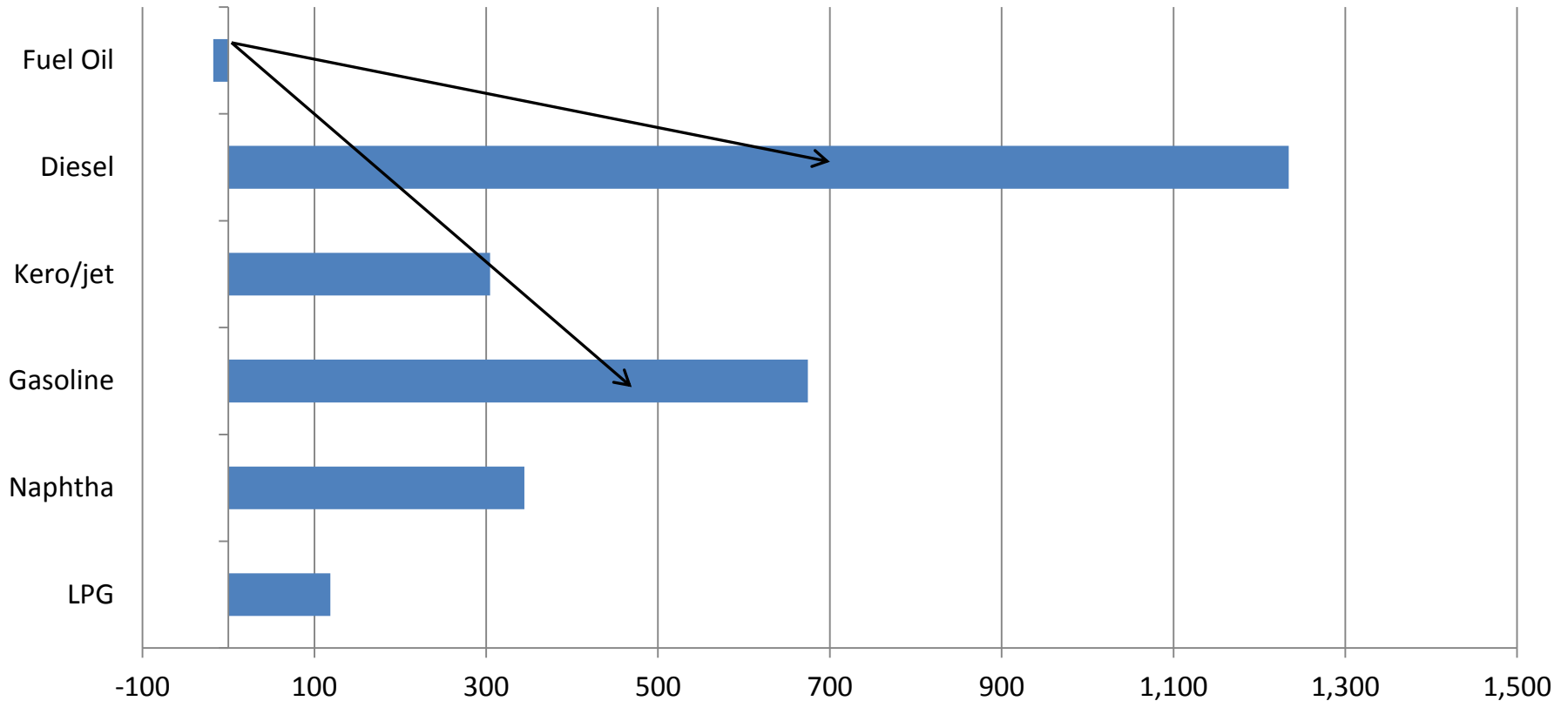
Thermal cracking/Vis-breaking is not included because almost no new builds/expansions

East of Suez refineries are becoming more complex with higher conversion ratios, thus **more fuel oil will be converted to gasoline and diesel**, leading to **higher surplus of transportation fuels and larger deficit of fuel oil**.

Incremental East of Suez Refinery Supply: 2010-2013

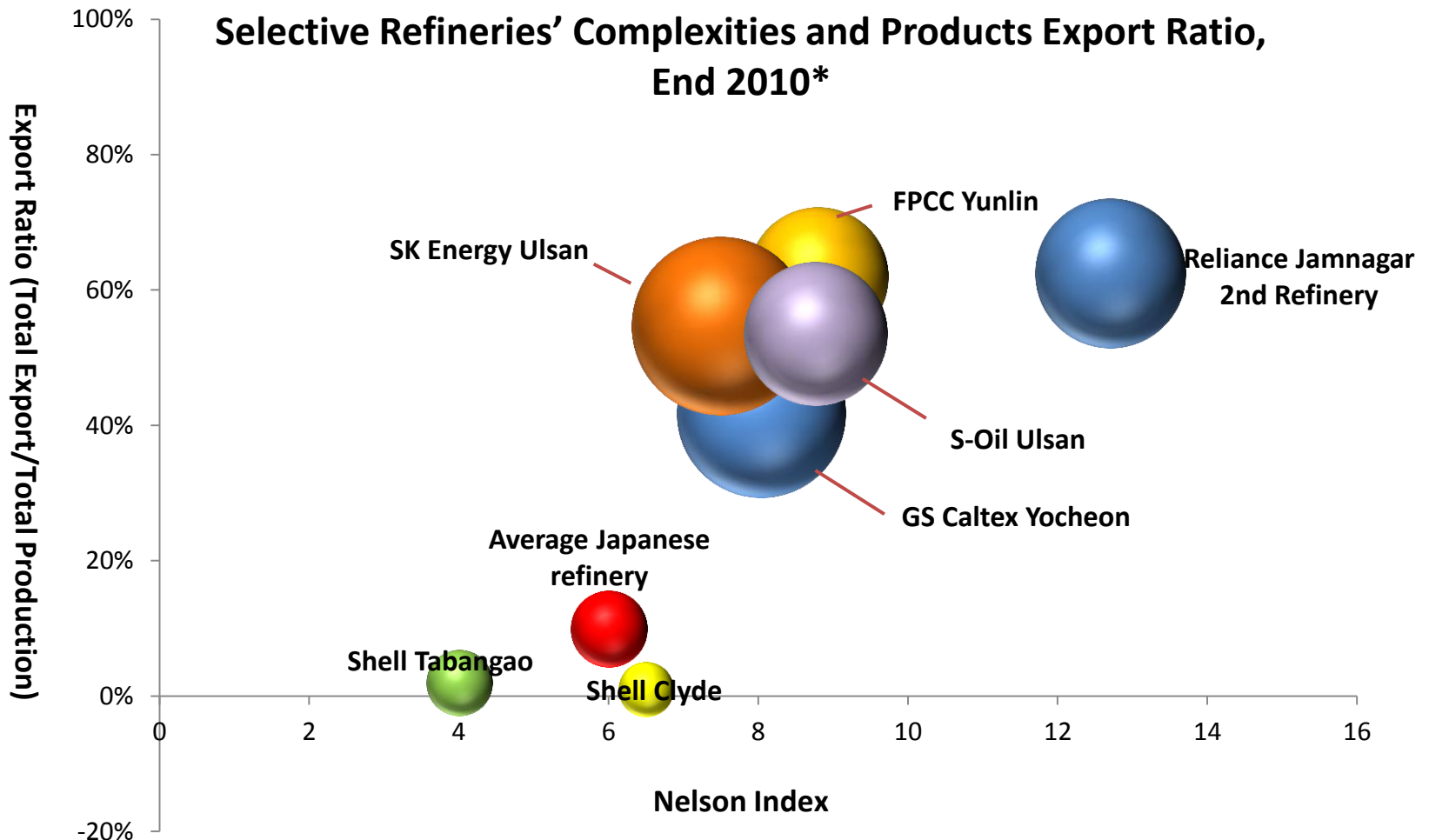
Additional upgrading capacity increases East of Suez gasoline and diesel/gasoil supply significantly between 2010-2013, but also reduces fuel oil supply.

Has too much upgrading been planned?



Additional Refinery Supplies in East of Suez: 2010-2013, kb/d

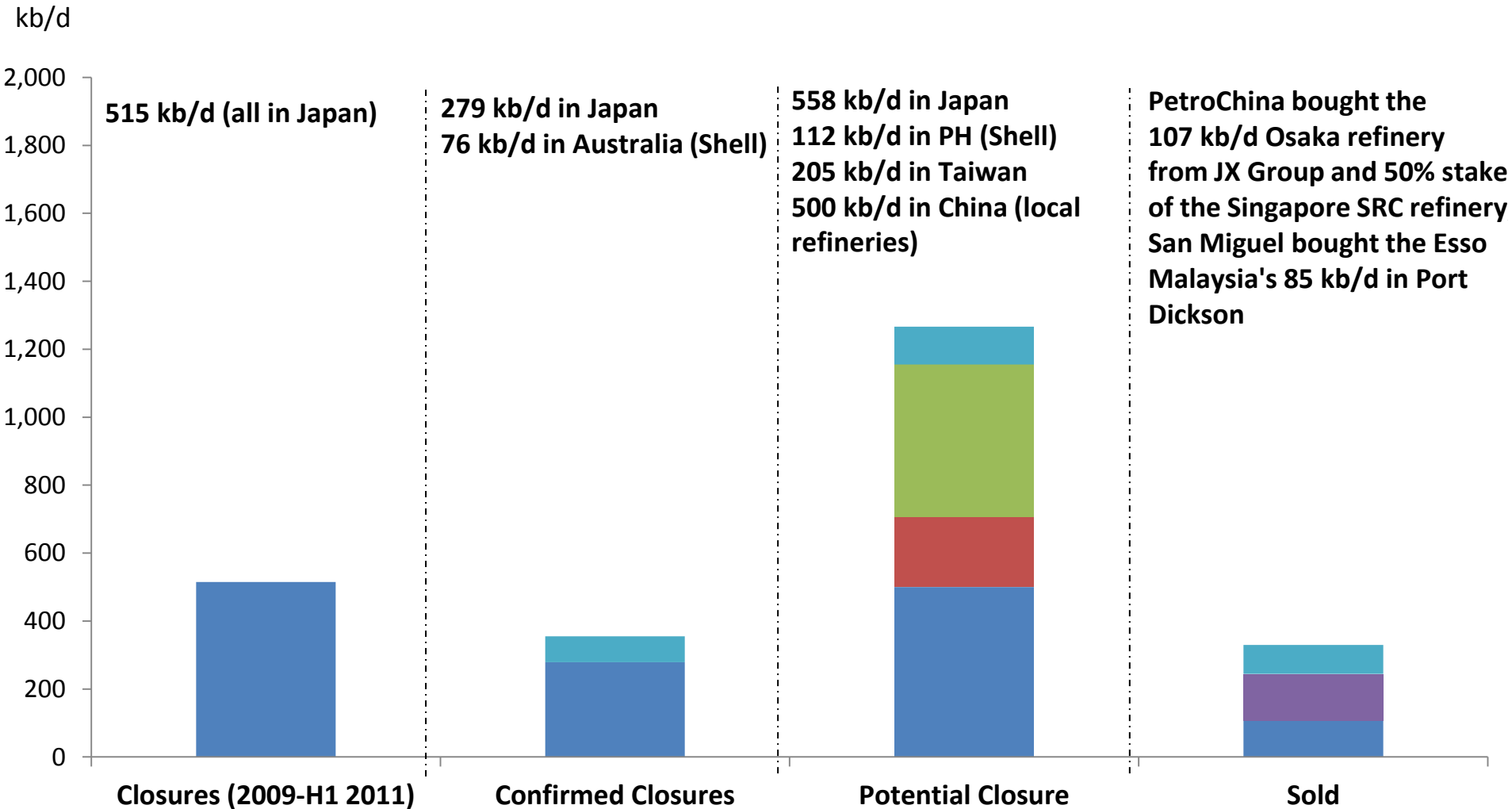
Survival of the Fittest?



* Note: the bubble size represents the size of the refinery

Refinery Closures and Sales in Asia

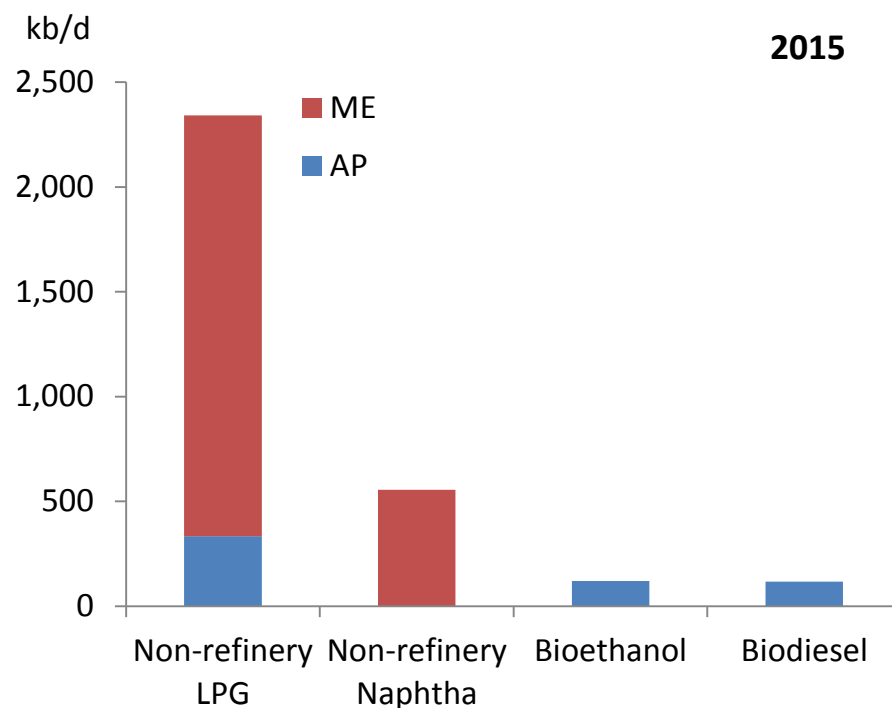
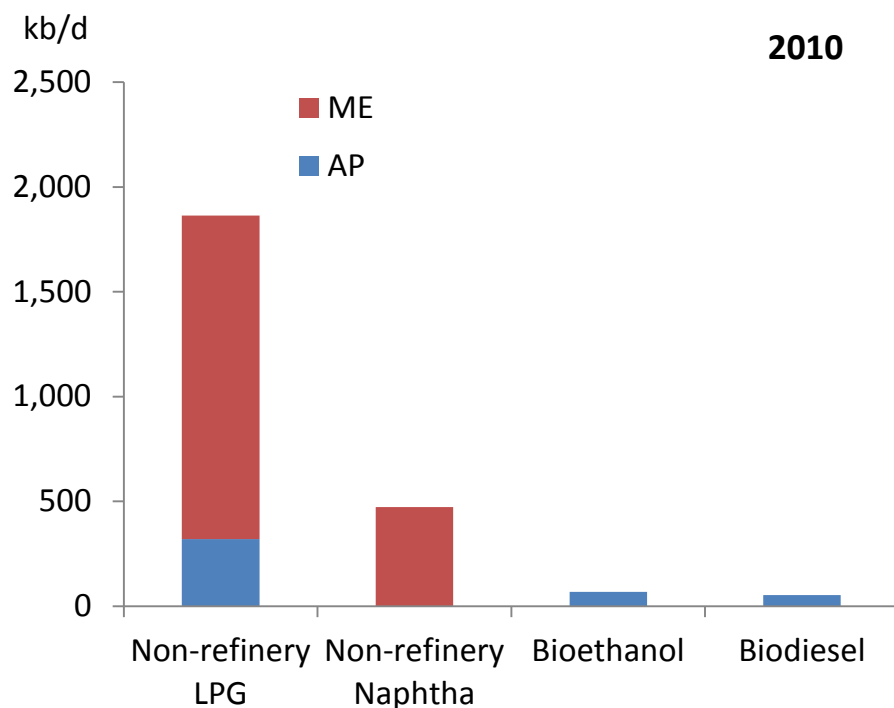
Japan Taiwan China Singapore IOCs (Ex-Japan)



Non-refinery Supply in East of Suez

Middle East will increase non-refinery LPG and naphtha supplies significantly

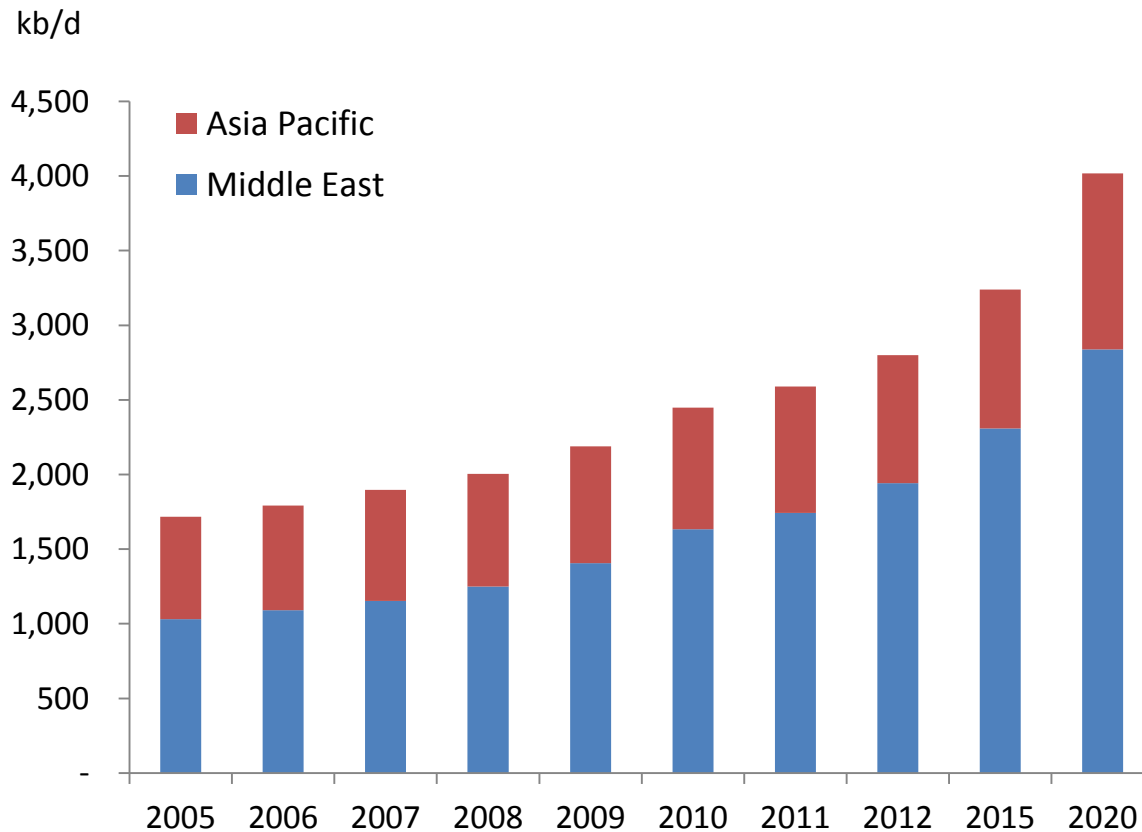
- Non-refinery LPG – up by 14 kb/d in AP and 465 kb/d in ME in 2010-2015
- Non-refinery naphtha – up by 83 kb/d in ME in 2010-2015
- Biofuels will still be relatively small by 2015



Condensate Production in East of Suez

1.7 mmb/d of additional condensate supply in East of Suez is expected by end of the decade.

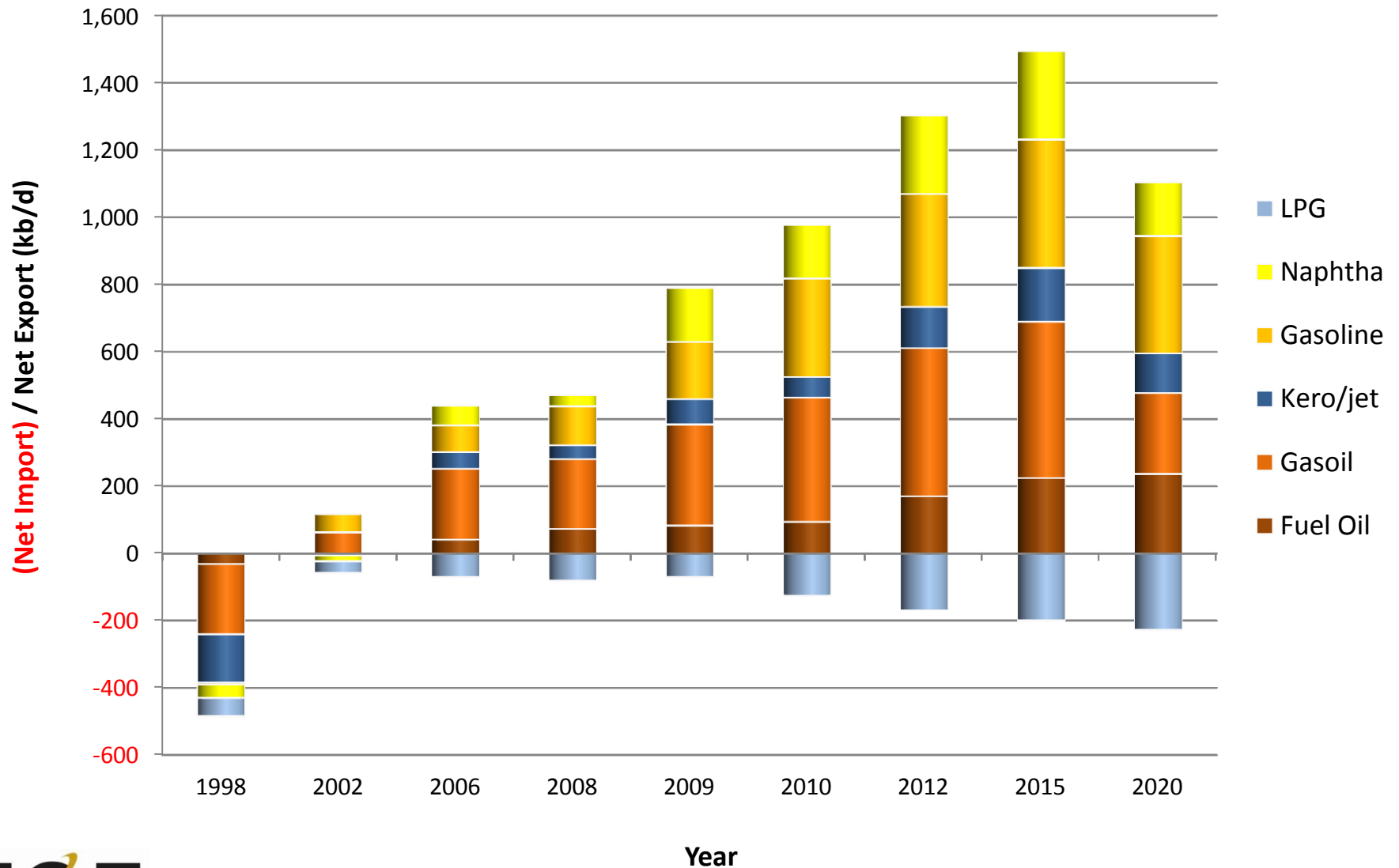
- Only ~1 mmb/d of new condensate splitters are under construction/plan in East of Suez
- **Where will the other 700 kb/d of condensates go?**



East of Suez Products Trade: More Gasoline and Diesel Must Leave the Region

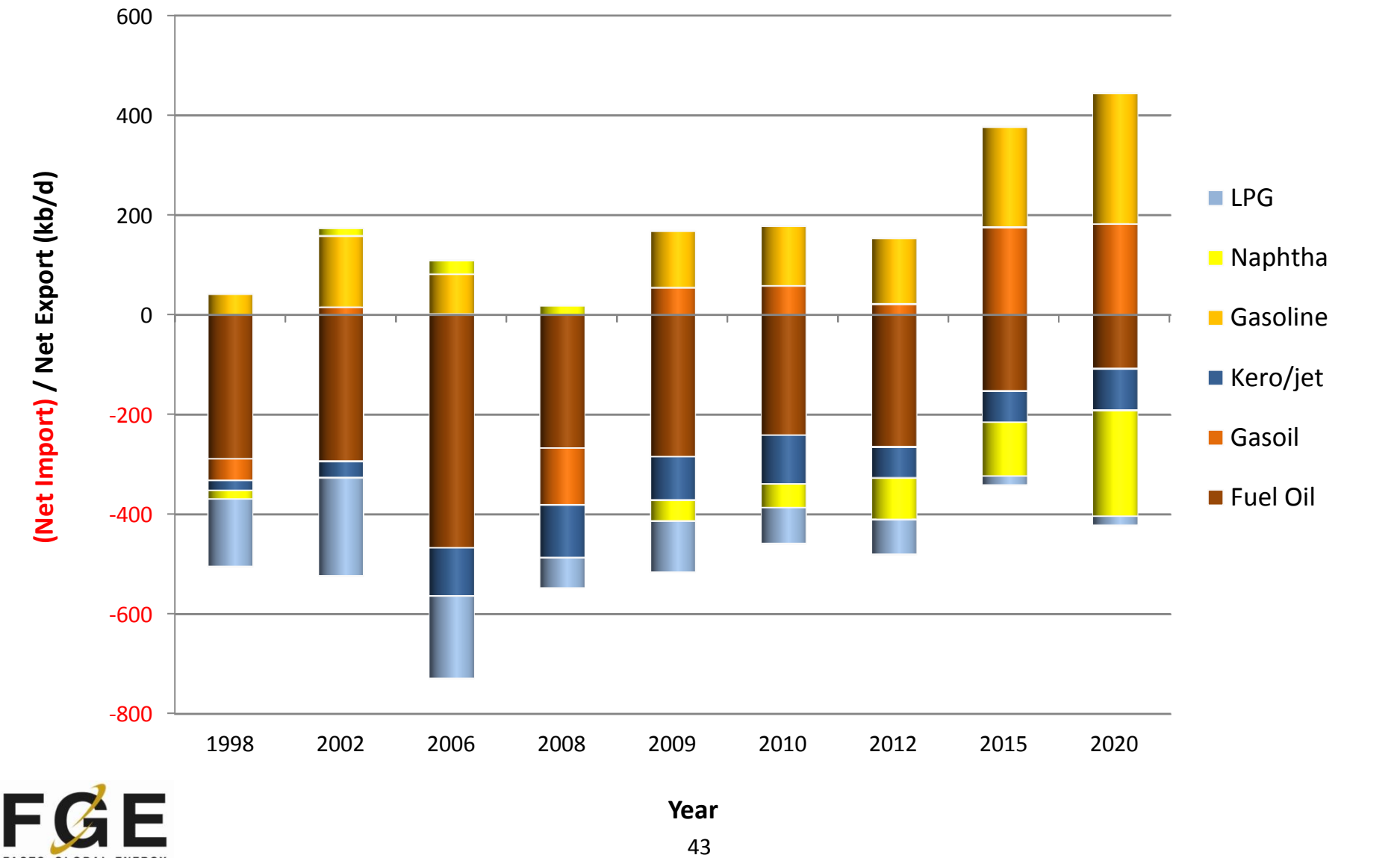
India—Fearless Push Forward

India Petroleum Product Balance



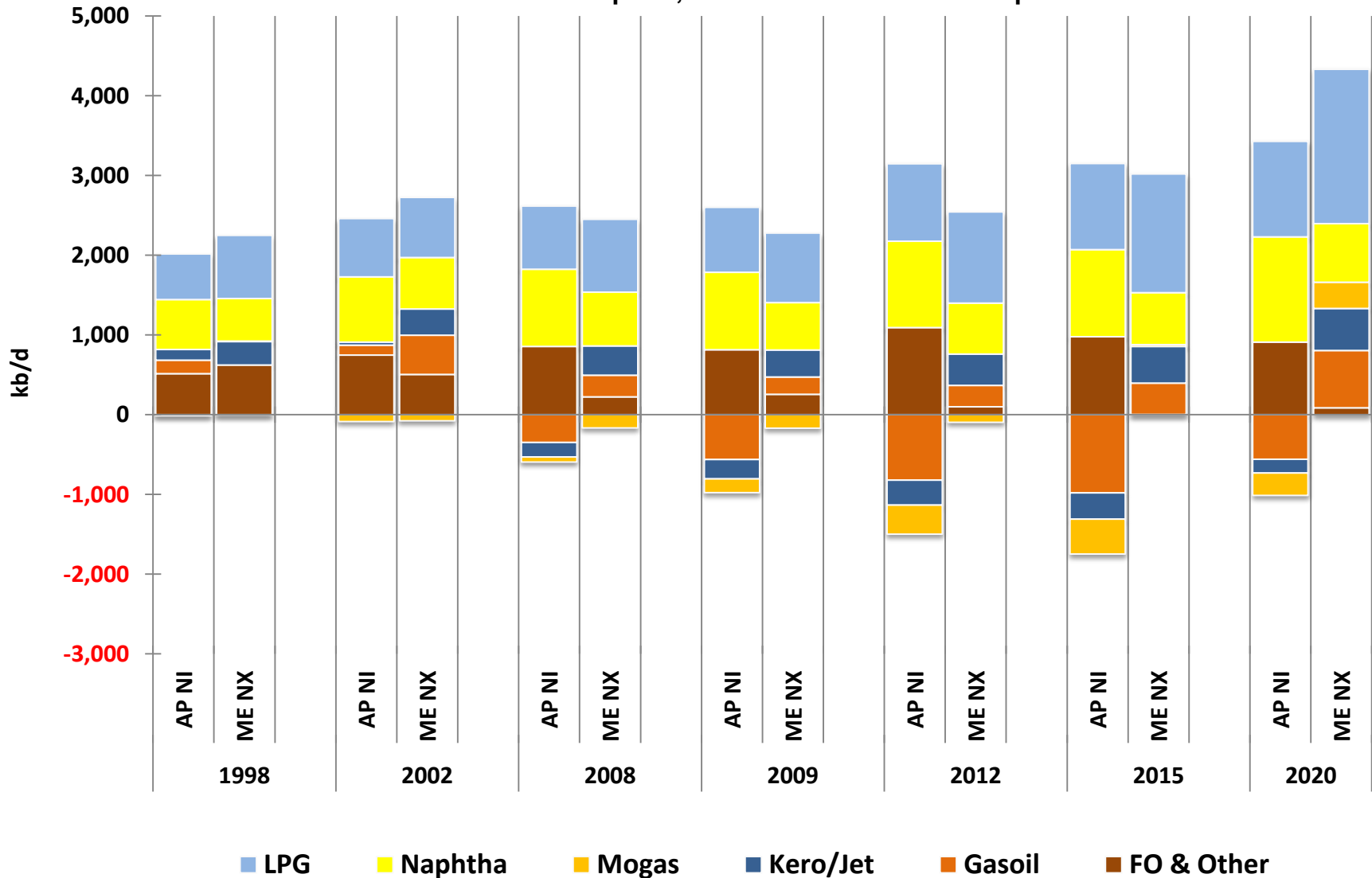
China – Becoming a Larger Exporter of Gasoline and Diesel

China Petroleum Product Balance



The Trade Balance is Shifting

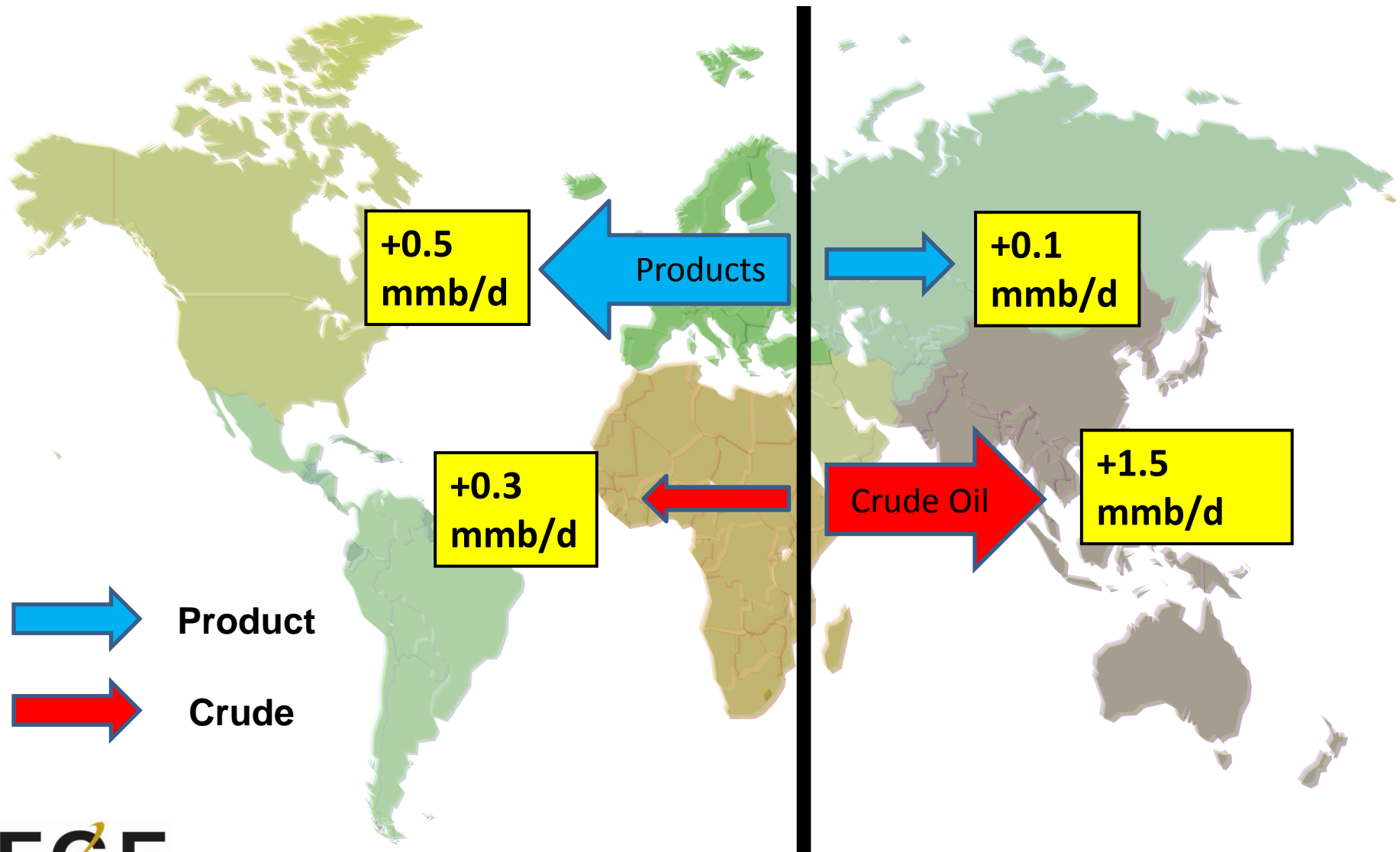
AP NI: Asia Pacific Net Imports, ME NX: Middle East Net Exports



Can West of Suez handle the imbalance?

Global Oil Trade: More Imbalances Across the Barrels and Regions

Crude & Product Trade Flow Changes (2010-15)

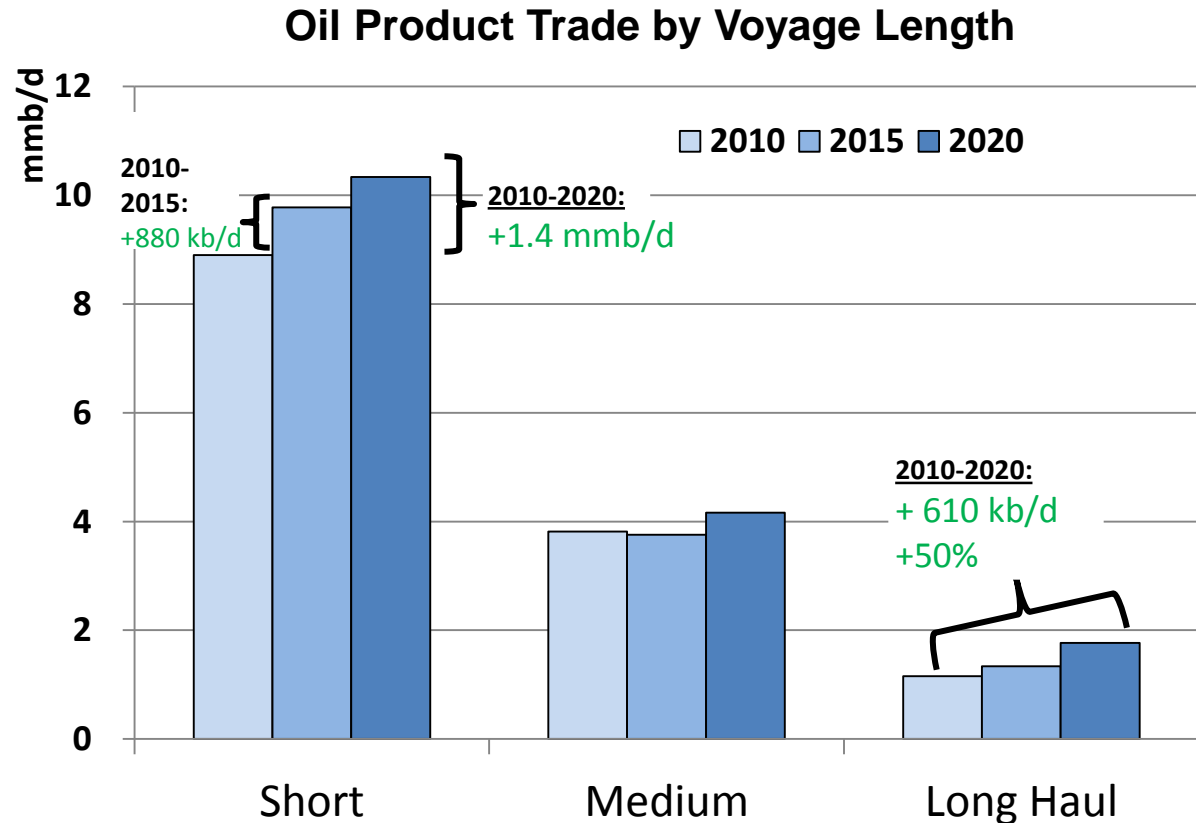


Product Trade Outlook

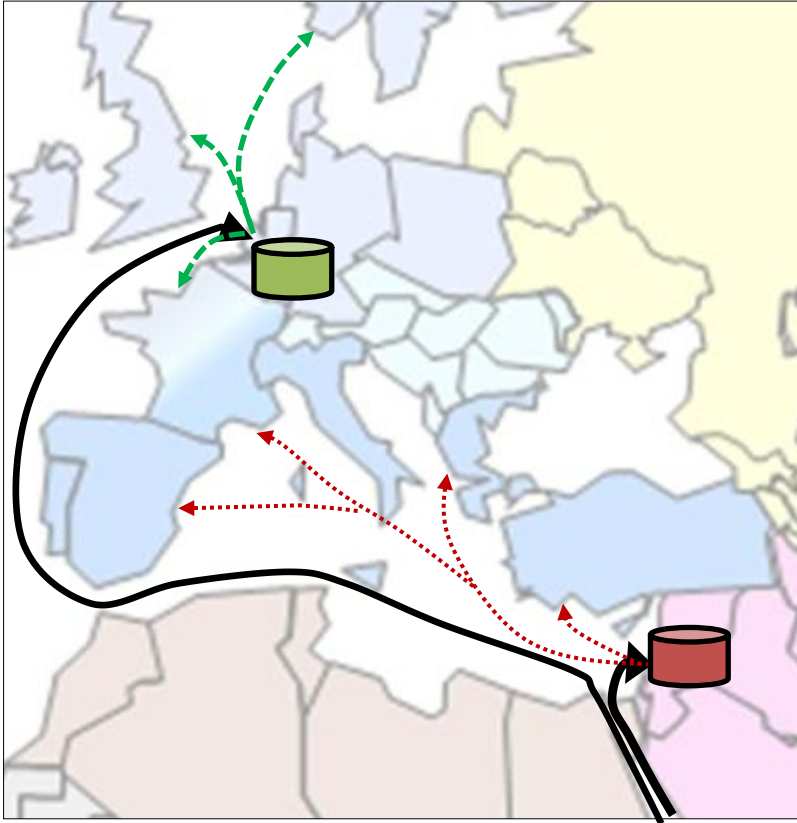
- More product trade—short and long haul
- Diesel/gasoil and LPG dominate growth
 - Europe: more gasoil imports
 - Asia: more LPG and naphtha imports
 - US: gasoline imports
- New players involved
 - Eastern heavyweights
 - Traders
- Larger tankers, plus small for shuttling
- More storage needed
 - Higher price volatility
 - More trading plays (contango, new players)
 - Make/break bulk
 - Receive larger cargoes

Implications of Higher Product Trade

- Greater product trade means more storage will be needed around exporting and importing hubs.
- For make/break bulk, terminals that can receive larger vessels will have an advantage.
- Depth.
- Discharge/load full cargo.
- Price volatility is expected to lead to more arbitrage and contango plays.



Implications of Higher Product Trade

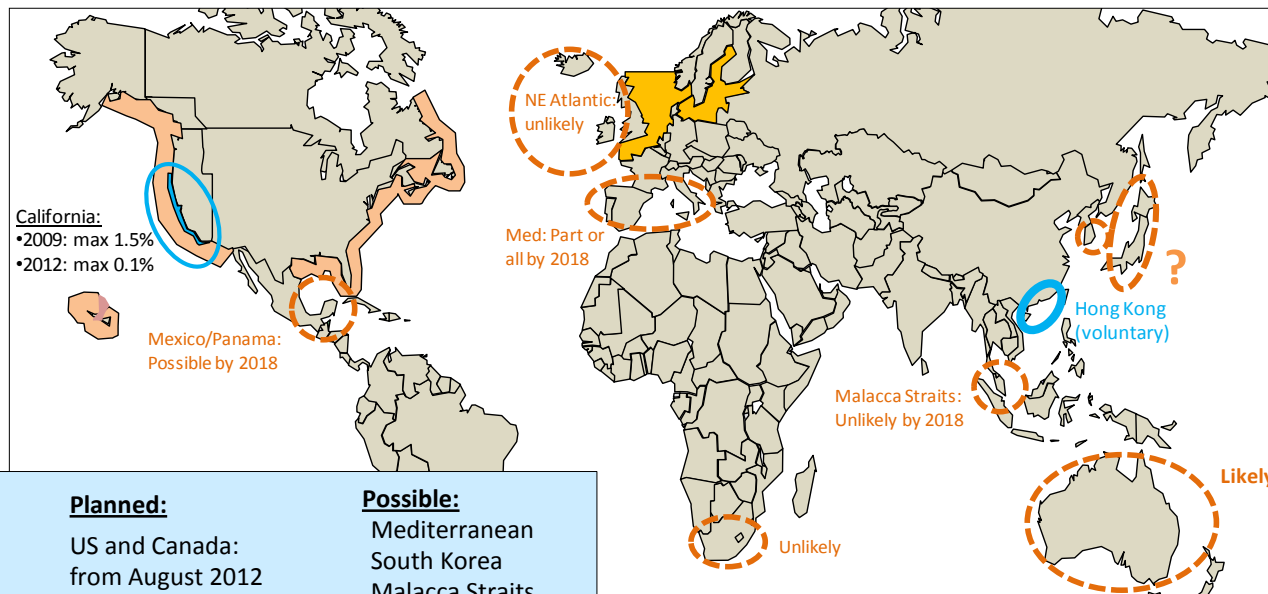


Greater global product trade means:

- Larger tankers needed to exploit scale economies;
- Therefore more make/break bulk.
- Increased role of trading hubs and opportunities for new ones if there is sufficient depth, size, and location.
- More commercial storage required.
- More strategic storage required.

Bunker Sector Changes—Major Challenge for Refiners

Existing and Planned Emission Control Areas



Existing:

Baltic Sea (2006)
North Sea (2007)

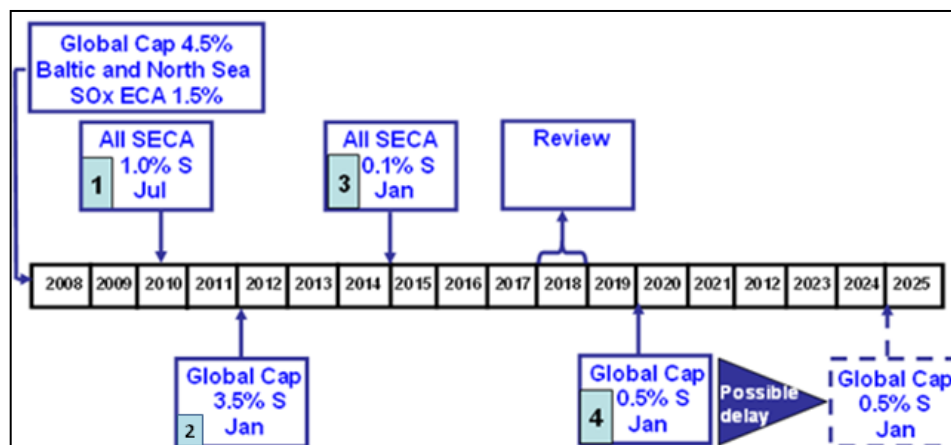
Planned:

US and Canada:
from August 2012

Possible:

Mediterranean
South Korea
Malacca Straits

Timeline for Bunker Specification Changes



Residual bunker fuel demand:

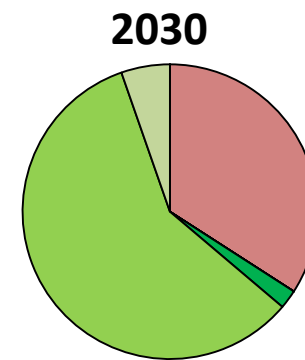
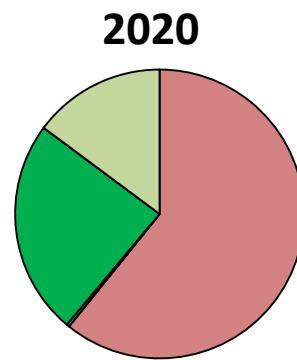
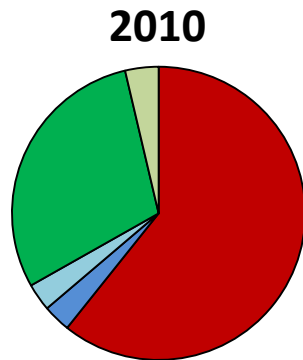
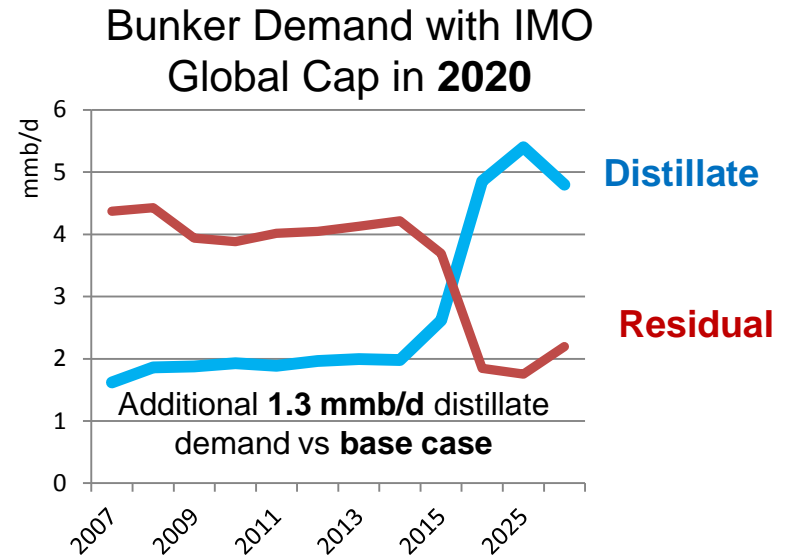
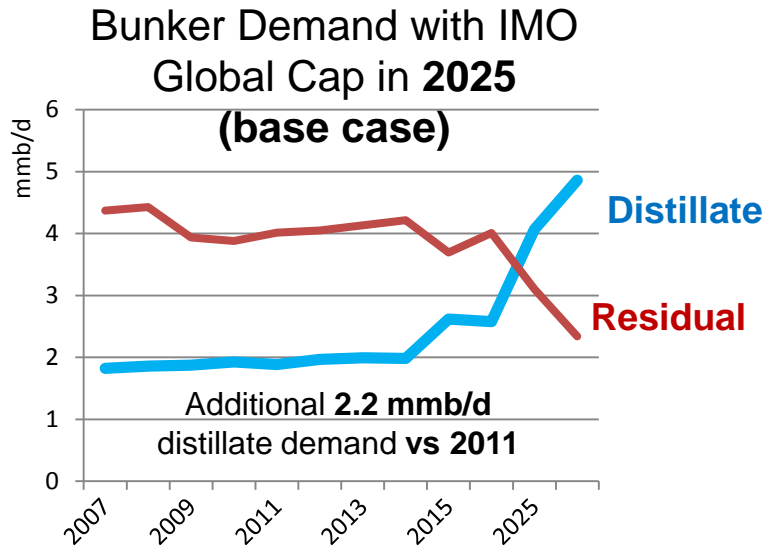
2011: 4.9 mmb/d

2030: 2.3 mmb/d?

Yet to determine whether to use scrubbers or alternative fuels

Source: Outlook for Marine Bunkers and Fuel Oil to 2030 (FGE/Robin Meech)

How will Specification Changes Impact Bunker Demand?



FO >4%

FO 3.5%

FO 1.5%

FO 1%

Distillate >0.5%

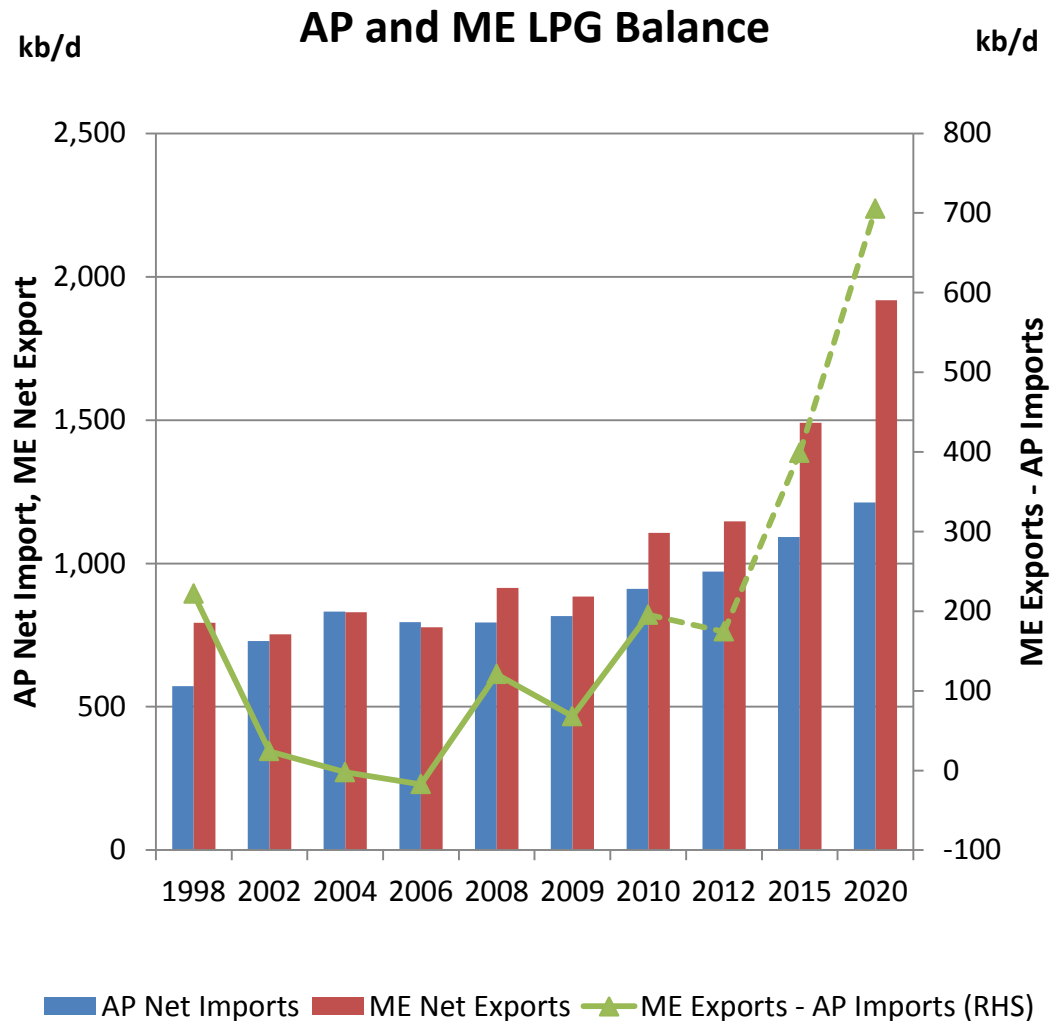
Distillate 0.1-0.5%

Distillate <0.1%

Source: Outlook for Marine Bunkers and Fuel Oil to 2030 (FGE/Robin Meech)

Price Pressures: Bearish in LPG but Bullish in Diesel

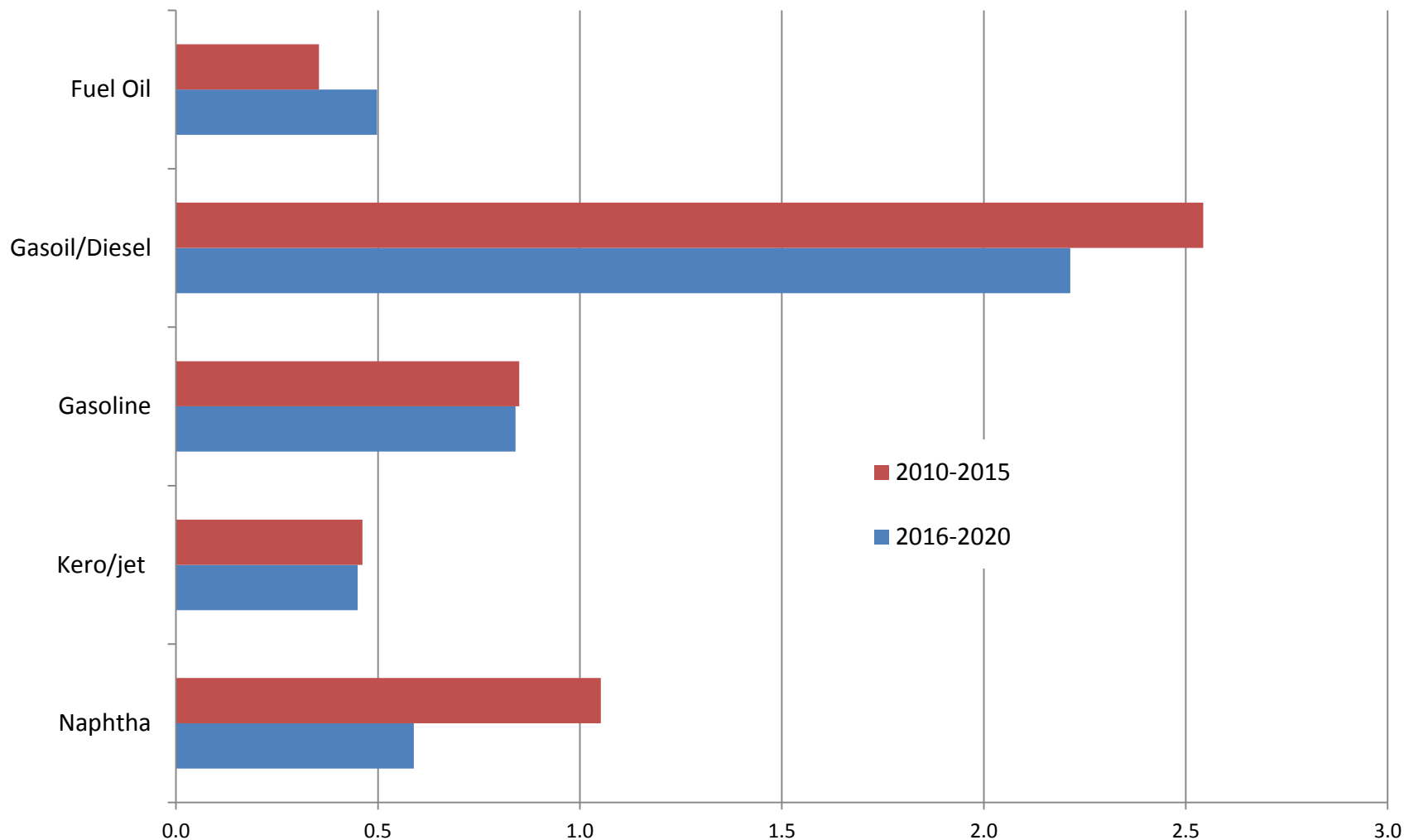
LPG Expected to be in Huge Surplus in East of Suez



- **ME non-refinery LPG production to surge, driven largely by gas projects.**
 - Qatar LNG projects and other gas projects;
 - Iranian LNG projects (South Pars) and domestic associated gas production;
 - UAE gas production (third NGL train at the Ruwais plant).
- **More LPG used as feedstock for ethylene plants in Asia?**

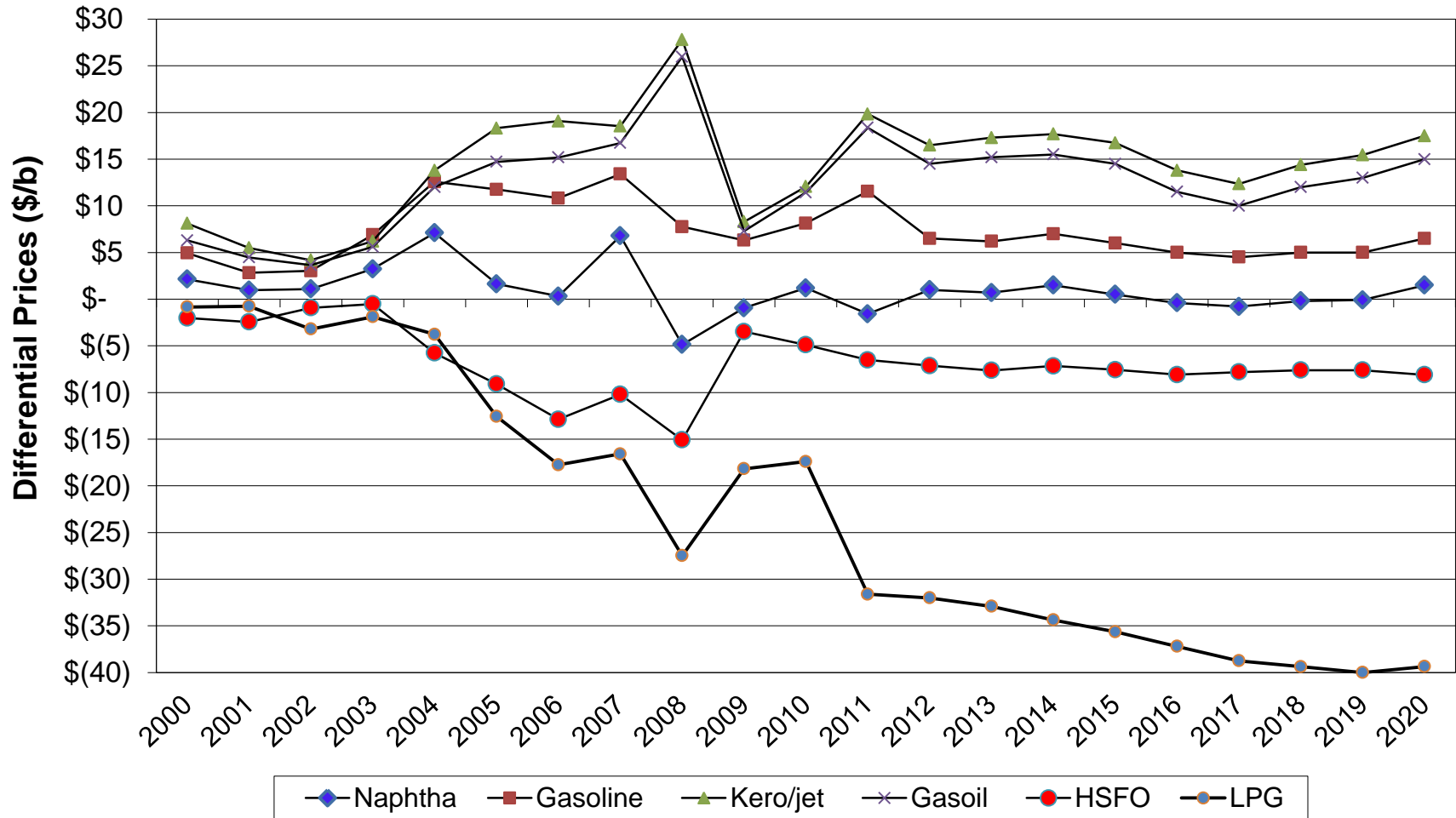
Gasoil/Diesel Leads Global Demand Growth

Changes in Demand for Oil Products 2010-15 and 2016-20 (mmb/d)



Middle Distillates at a Premium to Gasoline

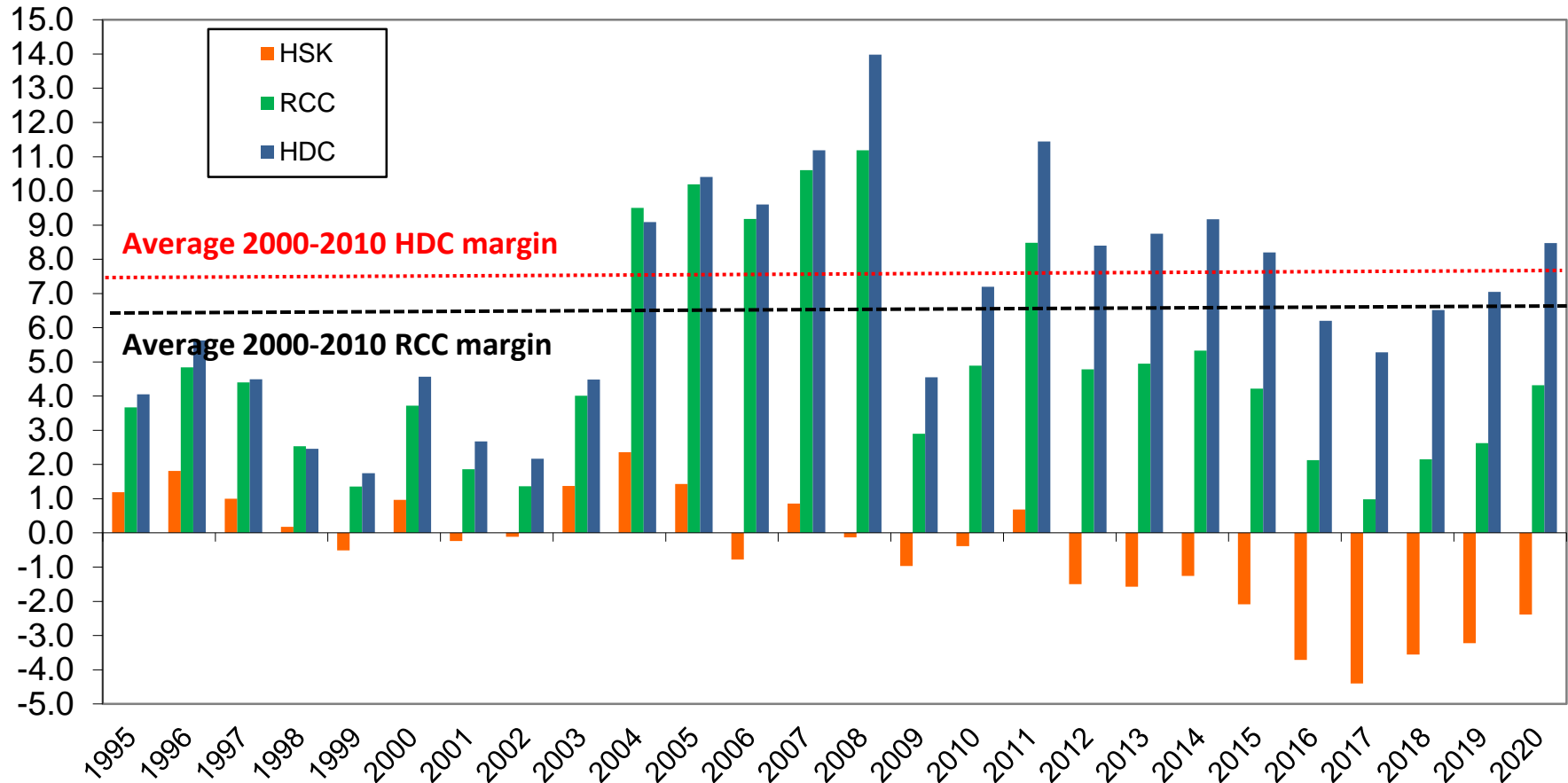
Price* Differentials Against Dubai Crude (Annual Averages)



*Singapore spot vs Dubai (FOB); actual prices up to 2010 and forecasts in 2011\$ thereafter.

Refining Margins to Remain Moderate in Near Term

Past and Projected Refining Margins for Dubai Crude, Singapore Market (US\$/b)*



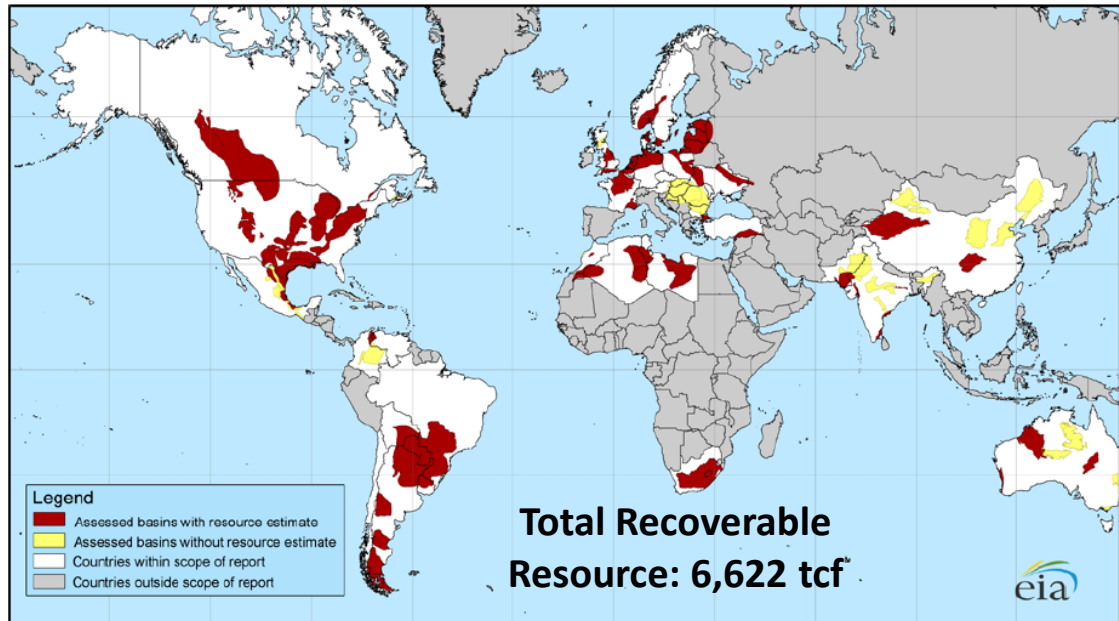
* Actual up to 2010 and forecasts in 2011\$ thereafter.

Relative Winners/Losers

Winners	Losers
<ul style="list-style-type: none">• Upstream• Trading/storage• Secure access to supply• Targeted upgrades where feasible?	<ul style="list-style-type: none">• Less complex refiners in mature markets• Refiners without feedstock/integration/logistics advantage

Unconventional Gas Beyond the US

Non-Conventional Supply: Shale Gas Revolution Continues



Europe	Proven Natural Gas Reserves (tcf)	Technically Recoverable Shale Gas Resources (tcf)	
France	0.2	180	12
Germany	6.2	8	Already banned!
Netherlands	49	17	
Norway	72	83	
UK	9	20	
Denmark	2.1	23	
Sweden		41	11
Poland	5.8	187	
Turkey	0.2	15	
Ukraine	39	42	
Lithuania		4	
Others*	2.71	19	
Total		639	

* Bulgaria, Hungary, and Romania.

South America	Proven Natural Gas Reserves (tcf)	Technically Recoverable Shale Gas Resources (tcf)	
Venezuela	178.9	11	3
Colombia	4	19	
Argentina	13.4	774	
Brazil	12.9	226	10
Chile	3.5	64	
Uruguay		21	
Paraguay		62	
Bolivia	26.5	48	
Total		1,225	

Africa	Proven Natural Gas Reserves (tcf)	Technically Recoverable Shale Gas Resources (tcf)	
South Africa		485	5
Libya	54.7	290	8
Tunisia	2.3	18	9
Algeria	159	231	
Morocco	0.1	11	
Western Sahara		7	
Mauritania	1	0	
Total		1,042	

Asia (incl. AU)	Proven Natural Gas Reserves (tcf)	Technically Recoverable Shale Gas Resources (tcf)	
China	107	1,275	1
India	37.9	63	6
Pakistan	29.7	51	
Australia	110	396	
Total		1,785	
North America			2
US	272.5	862	7
Canada	62	388	
Mexico	12	681	4
Total		1,931	

EIA Latest Shale Study (2)

Focus: **Shale gas potential beyond the US**

- EIA Shale Gas Study in April estimates technically recoverable shale in 32 countries outside the US
- China holds the largest reserves of 1,275 tcf

FGE's forecast: **China**

China Shale Resources (tcf)	
Total resource	3,532
Recoverable	918 - 1,589
Proven geological reserves	nil

... but this still lags behind CBM production:

China CBM Resources (tcf)	
Total resource*	1,300
Recoverable	385
Proven geological reserves	7

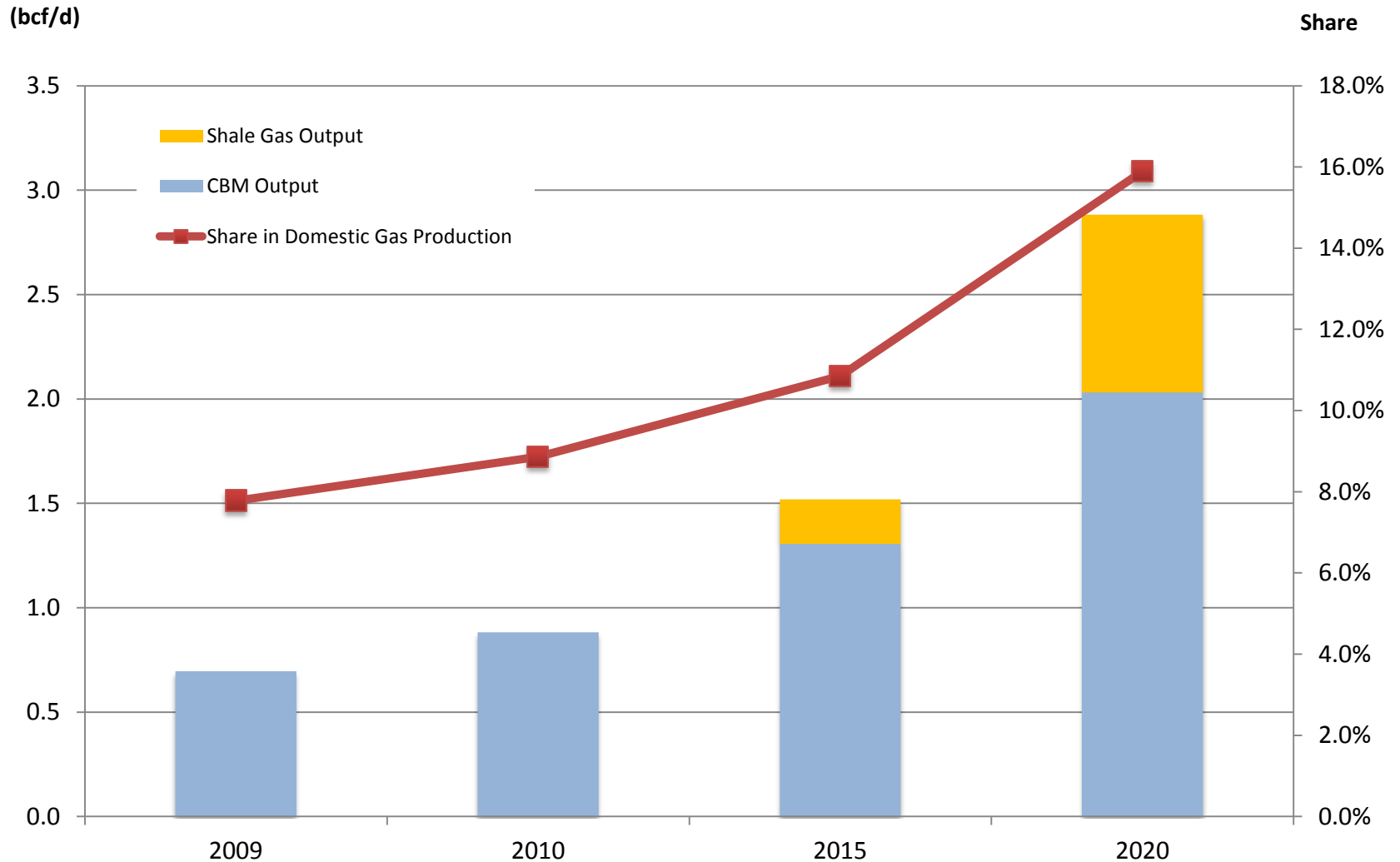
*Within depth of 2,000 m

Current Production (bscf/d)	
2005	Under 0.04
2009	0.7
2010	0.9

China's production limited by:

1. Industry still in initial stages of development with a wait-and-see approach by investors
2. Limited technical know-how
3. Infrastructural constraints (e.g., pipeline access)
4. Potential acreage access conflicts with coal miners

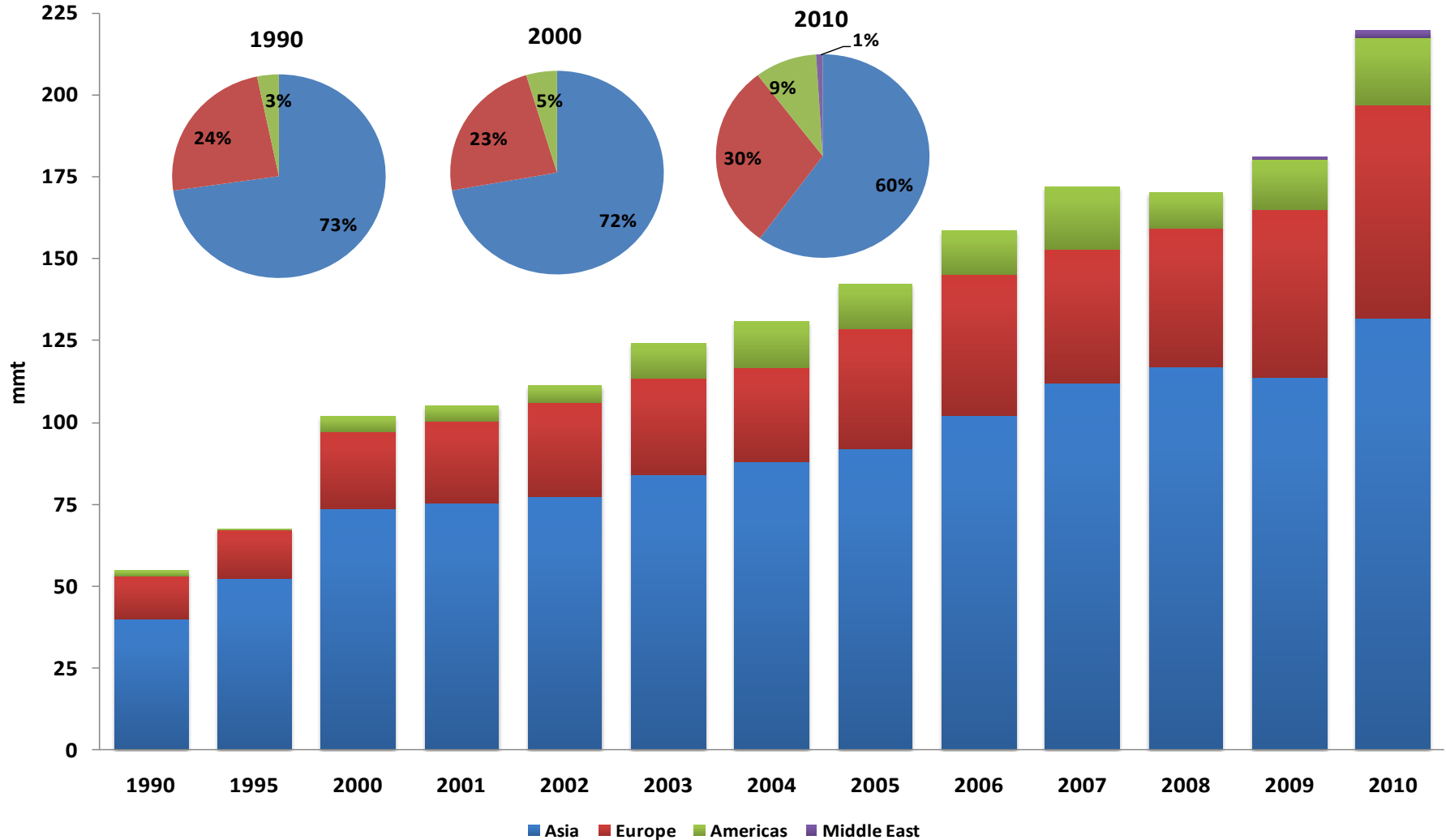
Outlook For China's Unconventional Gas



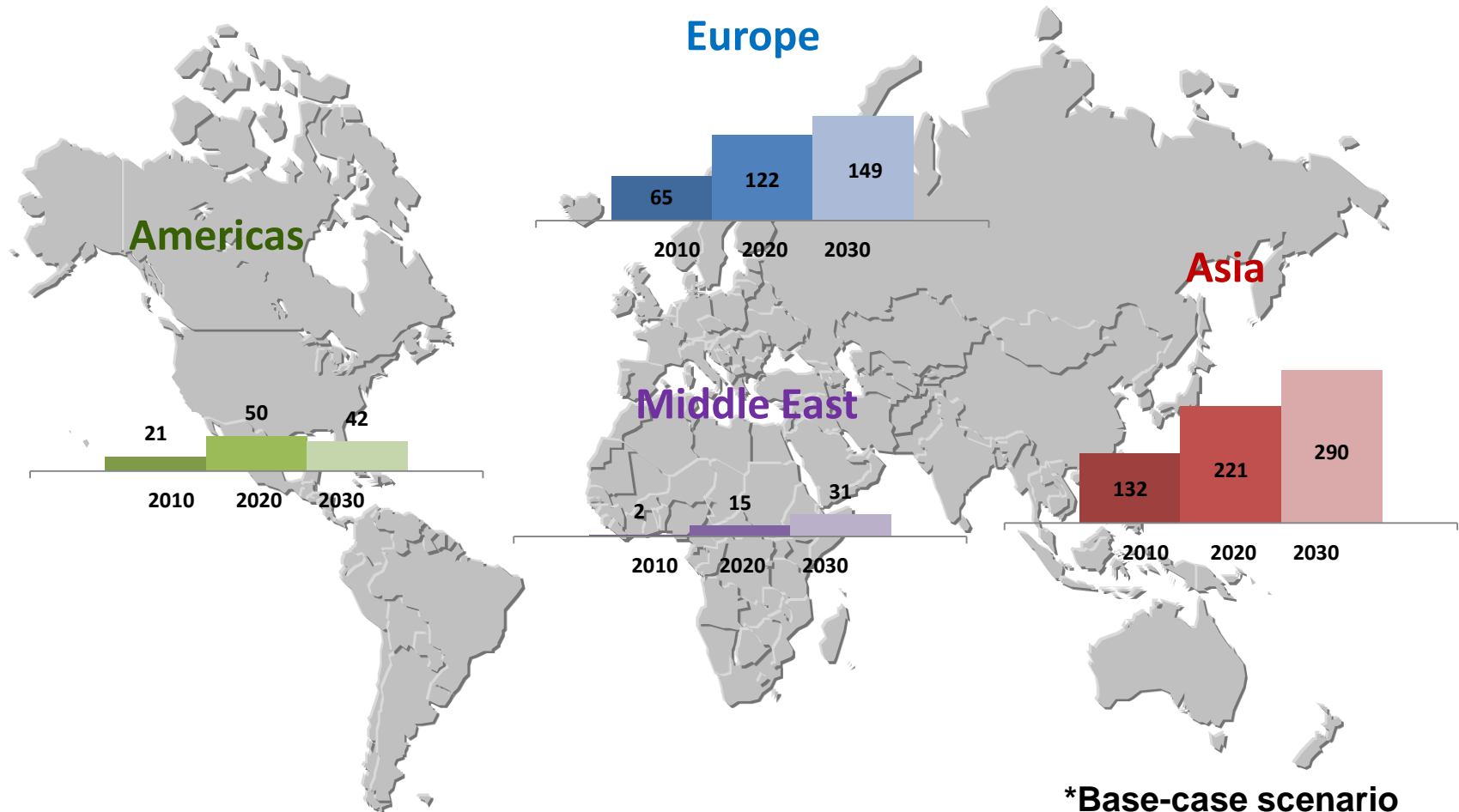
Asian LNG Imports: Focus on Post-Japan Disaster

Global LNG Trade: Asia is Still King

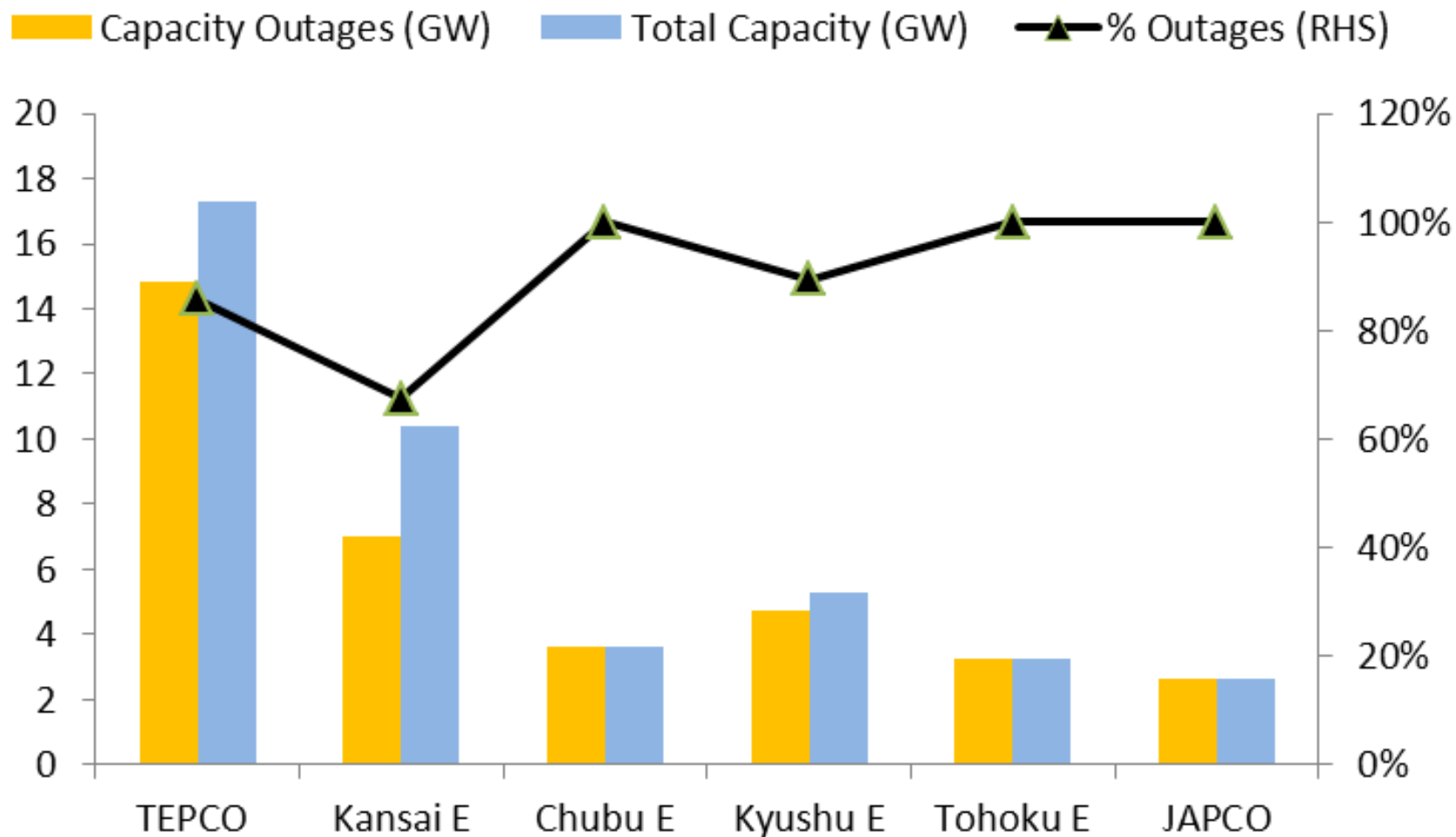
Global LNG Trade: 1990-2010



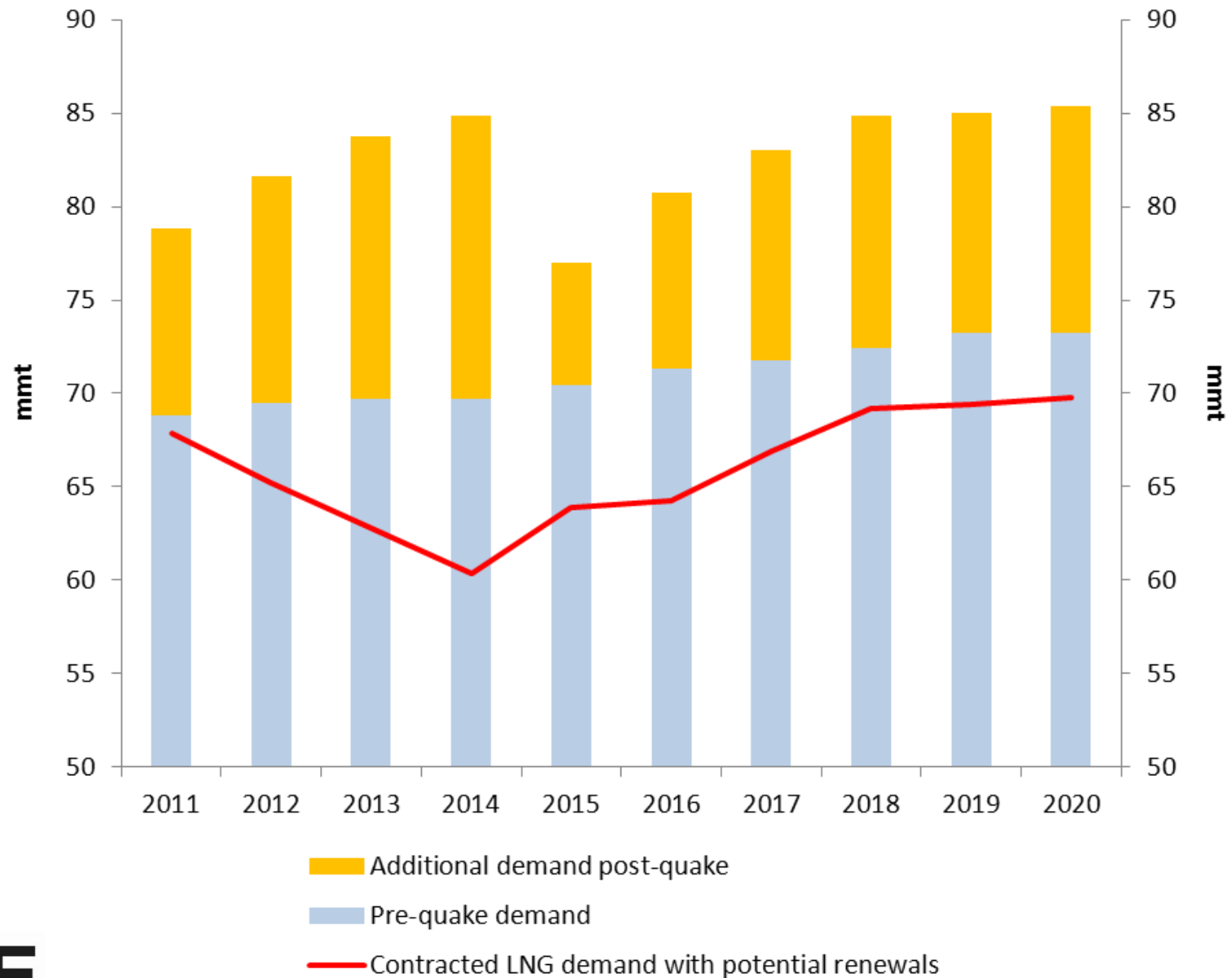
Regional LNG Import Outlook (mmtpa)*



Snapshot of Japan's Nuclear Power Situation: Most Affected

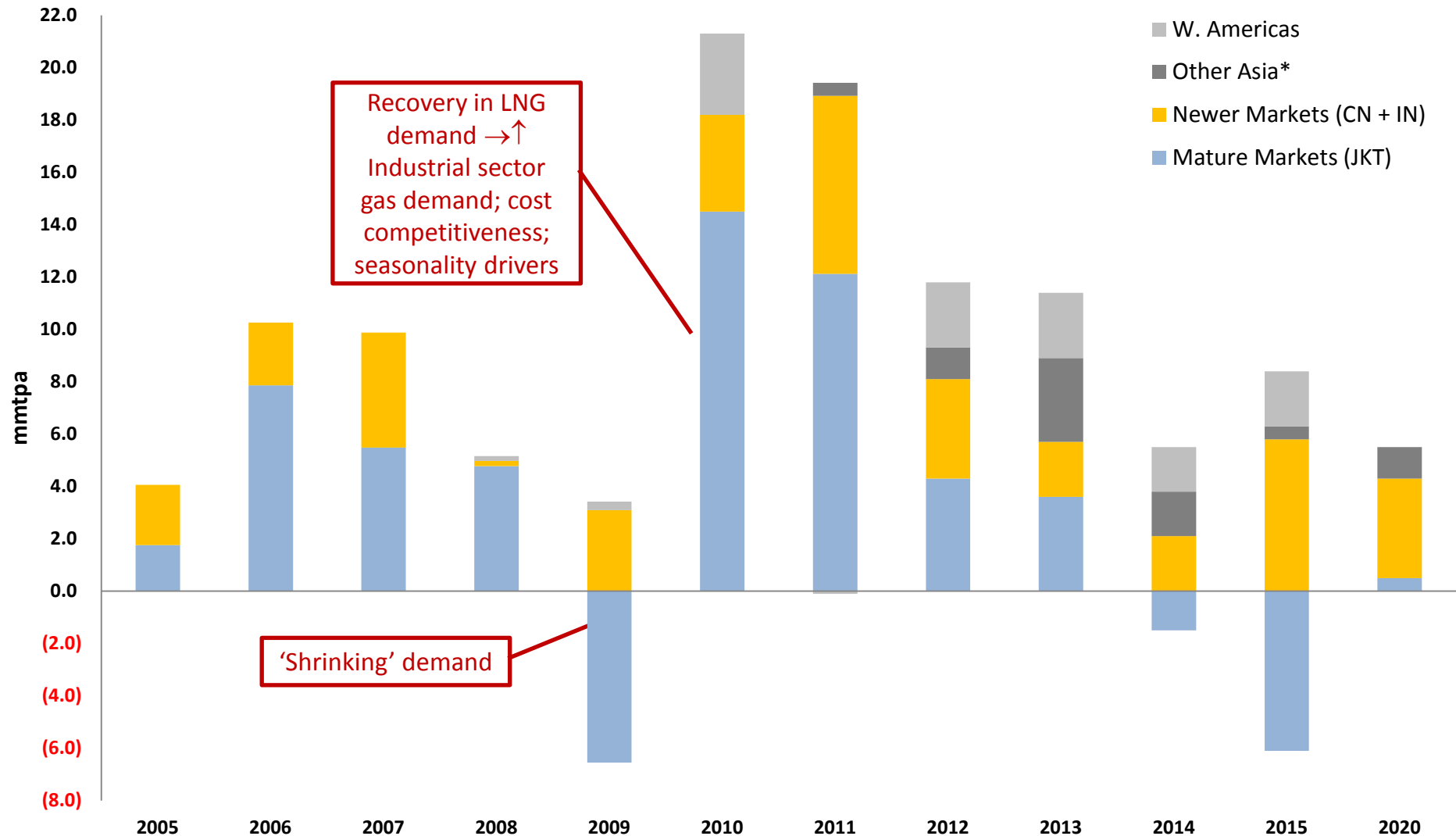


Japan on the Lookout for Longer-Term Supplies



Longer-Term Outlook: Who Leads the Growth?

Asia Pacific LNG Imports by Country (Year-on-Year Change)



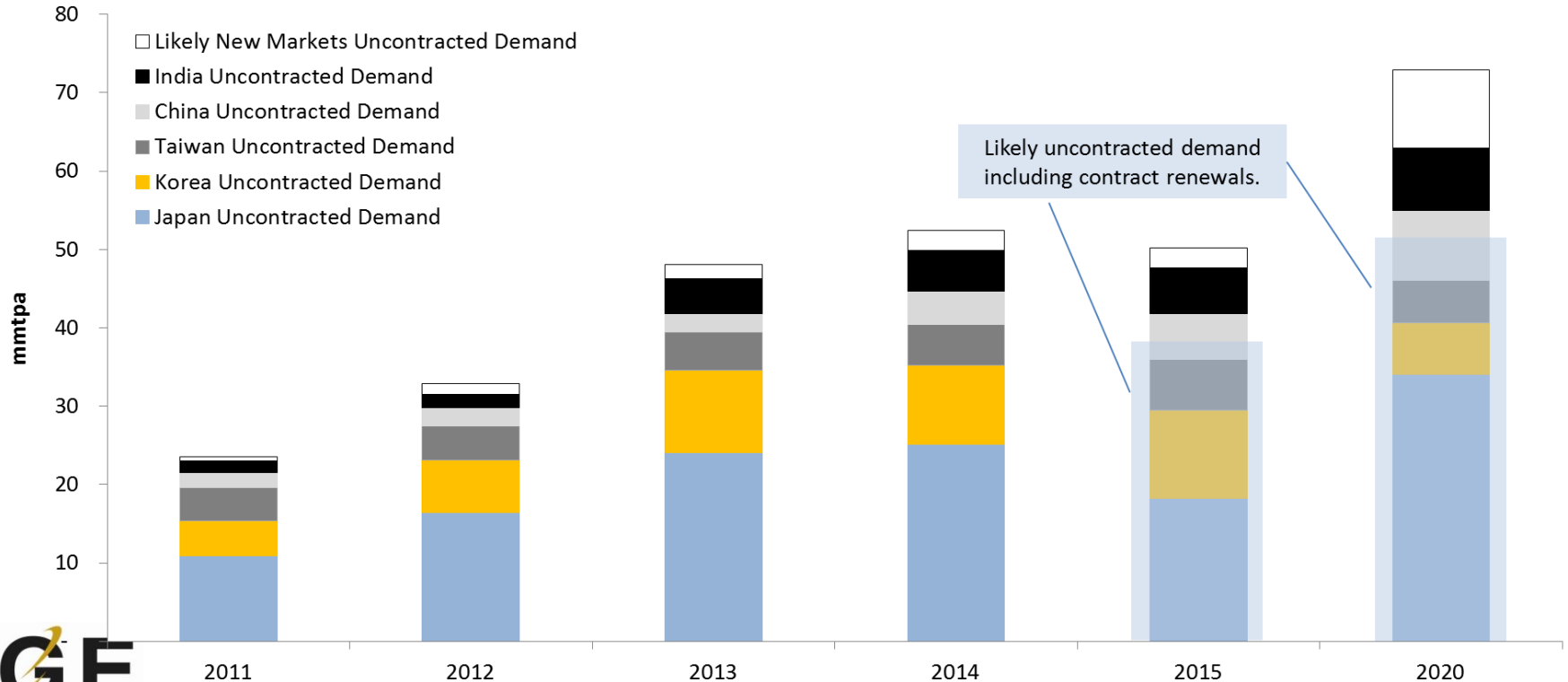
* Includes Indonesia, Malaysia, Singapore, and Thailand.

Asia Overview: Imports and Uncontracted Demand

Asia Pacific LNG Import Forecasts Scenarios (mmtpa)										
Base Case							Total Asia			
	Japan	South Korea	Taiwan	India	China	Likely New Markets*	Mature Markets	Emerging Markets	Other Potential Markets	Total Asia Pacific Potential
2008	69.3	27.3	9.0	8.2	3.3	0.0	105.5	11.5	117.0	0.2
2009	64.6	25.8	8.6	9.1	5.5	0.0	99.0	14.6	113.6	0.5
2010	70.1	32.6	10.8	8.9	9.4	0.0	113.5	18.3	131.8	3.6
2011	78.8	35.3	11.5	12.1	13.0	0.5	125.6	25.6	151.2	3.5
2012	81.6	36.8	11.5	12.5	16.4	1.7	129.9	30.6	160.5	6.0
2015	77.0	36.2	12.7	13.4	25.5	7.1	125.9	46.0	171.9	12.3
2020	85.4	36.6	14.6	16.9	40.0	18.0	136.6	74.9	211.5	14.3

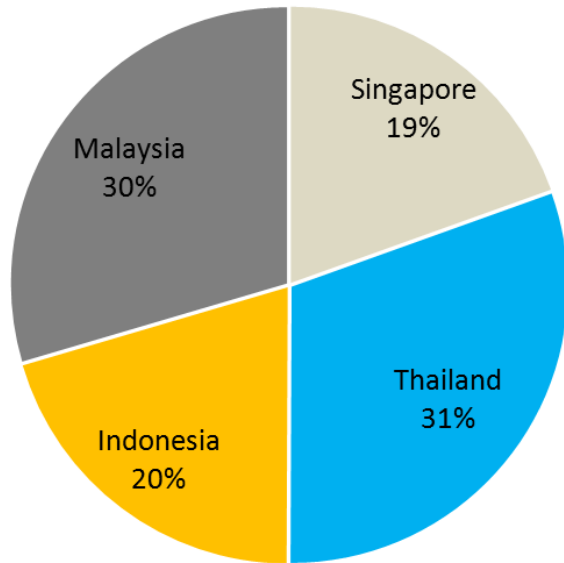
*Includes Indonesia, Malaysia, Singapore, and Thailand.

LNG Uncontracted Demand

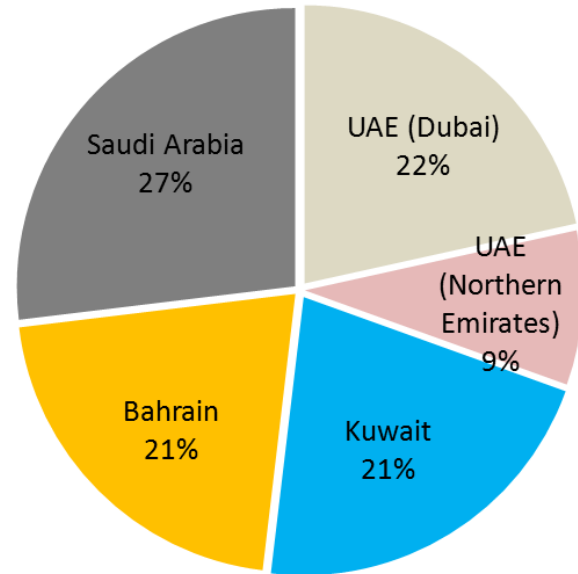


Other Markets To Keep An Eye On...

Southeast Asia LNG Import Forecast (2020)
18 mmtpa



Middle East LNG Import Forecast (2020)
15 mmtpa



- Southeast Asia is an increasingly exciting market that complements the growth from existing LNG market players.
- Total imports from the above four countries alone are expected to represent roughly 9% of existing LNG importer's requirements by 2020.
- Another quiet but emerging player is the Middle East--domestic market is growing fast and is expected to have an influence not only on Middle East LNG exports, but also imports for the region.

Where Are The Supplies?

The Big Picture

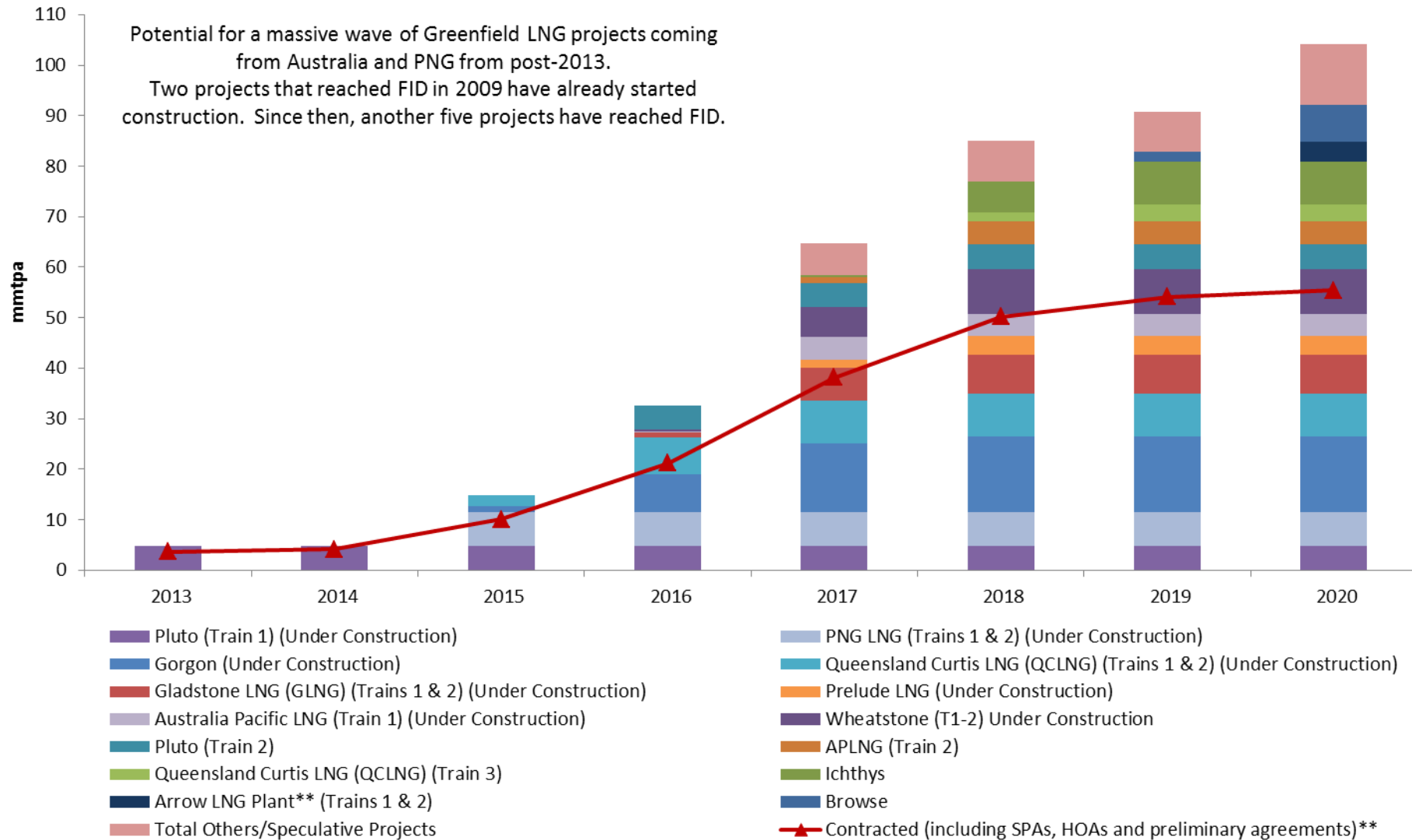
Liquefaction Capacity (in mmtpa)

	In Operation/Under Commissioning	Under Construction	Announced	Total
Qatar	77.1			77.1
Nigeria	22.2		8.5 - 45.9	30.7 - 68.1
Australia	20.3	53.1	29.2 – 102.6+	102.6 – 176.0+
Russia	9.6		80.4	90.0
Iran			40.8*	40.8

*Iran LNG (2X5.4 mmtpa) is supposedly “under construction” but progress has only been made to jetty and storage tanks and not the liquefaction units.

> 3/4 of planned capacity globally

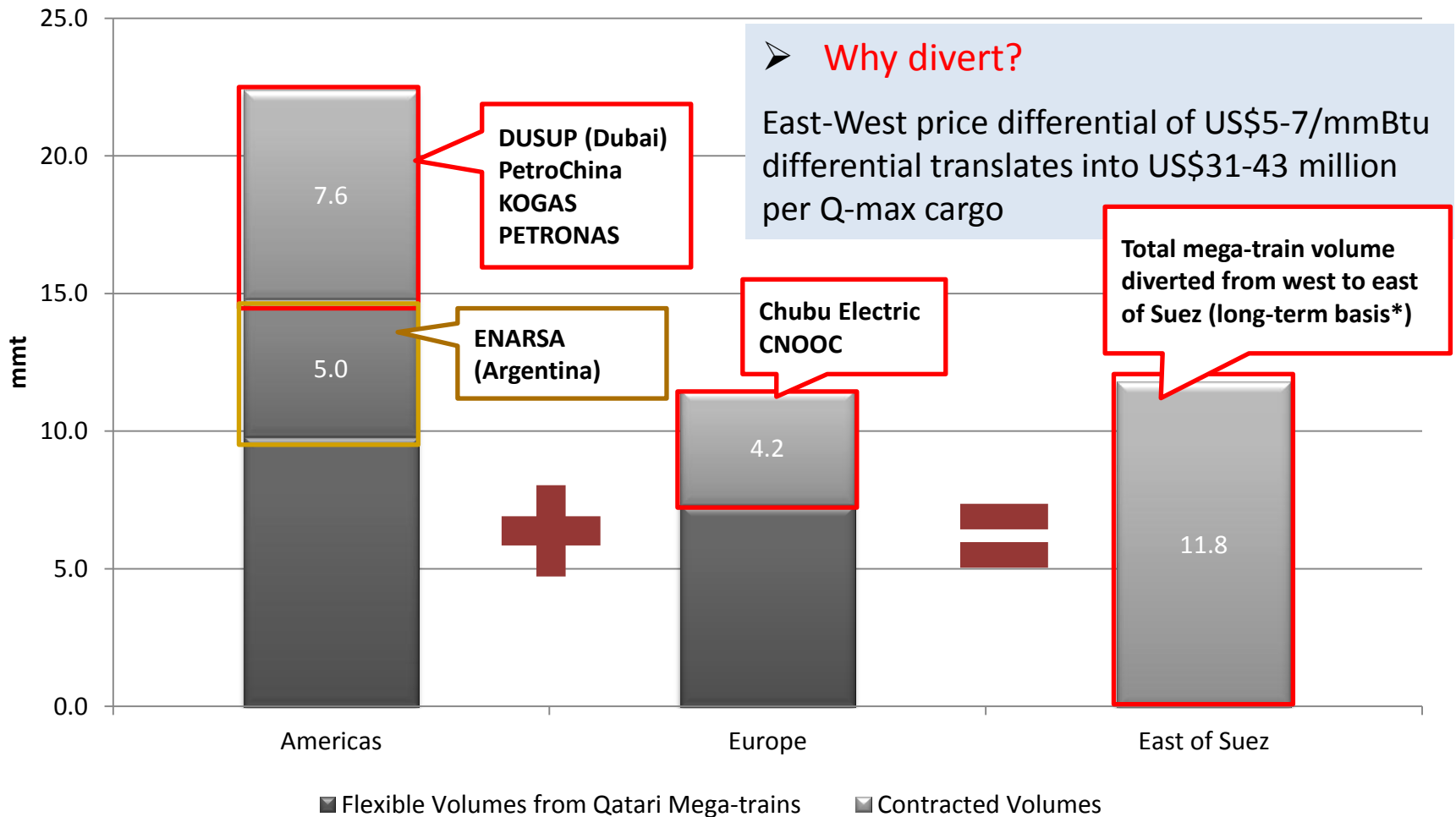
Massive Wave of Planned Australasia Projects*



* Indicative commissioning dates and non-exhaustive list.

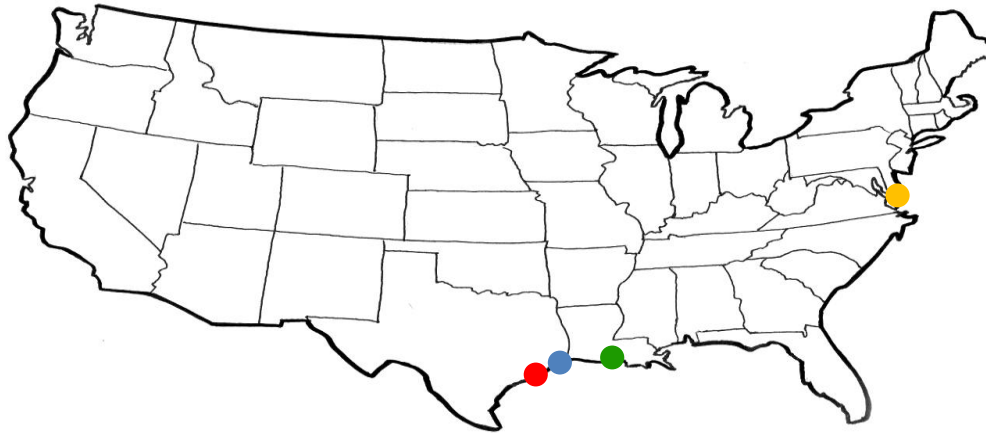
** Excludes LNG from Asian buyers' equity stake in LNG projects.

Contracted Flexible Qatari Volumes



*Qatargas announced in mid-April 2011 that it will supply more than 60 conventional size cargoes to Japan (equivalent to 4 mmt of LNG) for one year. The first cargo was discharged prior to the official announcement.

New Supply Source: US LNG Exports



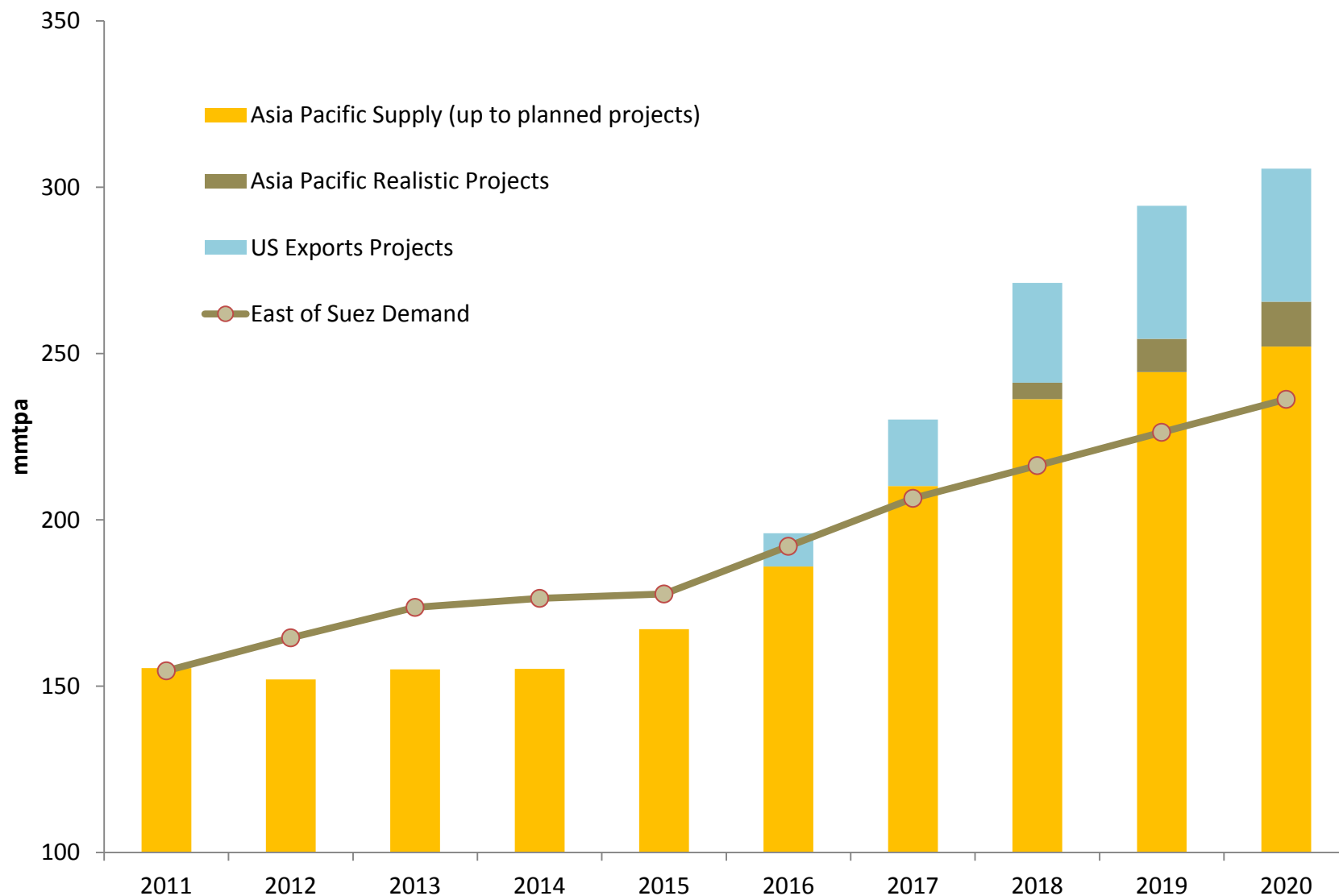
Planned Bi-Directional Terminals

- Cove Point
- Sabine Pass LNG
- Freeport LNG
- Lake Charles

- FGE forecasts that a minimum of 7.5 mmtpa could potentially be exported from the US.
 - US LNG exports will come into the market over next 3-5 years. However, the size and direction of exports will depend on:
 - i. Consumer comfort levels.
 - ii. Continued confidence in smooth growth of US shale production.
 - iii. Free Trade Agreements:
 - LNG exports are limited to countries with existing US FTAs.
 - Exports to other countries awaiting DOE approval.
- Countries with existing US FTAs:

Australia	Bahrain
Canada	Chile
Costa Rica	Dominican Republic
El Salvador	Guatemala
Honduras	Israel
Jordan	Mexico
Morocco	Nicaragua
Oman	Peru
Singapore	
 - Countries pending congressional approvals for FTAs: South Korea, Panama, and Columbia.

Soft Market Expected to Emerge Later This Decade



Outlook for LNG Prices


Pre-Quake: “Latest Trends” of the Asian LNG Contract Negotiations

**What was on the table
– *besides* price?**

SPAs less standard =

More flexibility on both
sides =

**More negotiation space
apart from slopes and
constants**

- 
- Relaxed Destination Clauses
 - Price reviews
 - Creative pricing mechanisms: Step-up, tranche pricing
 - Shipping terms (FOB/DES)
 - Dedicated + Portfolio Supplies
 - Increased DQT

Japan Disaster: Impact on Asian LNG Price Discussions

- Slopes ~15ish
negotiated/concluded

- 'S'-curves ✕

Pre-Quake

Post-Quake

- Slopes discussed ↑
- 'S'-curves – high kinks

2009

2010

2011

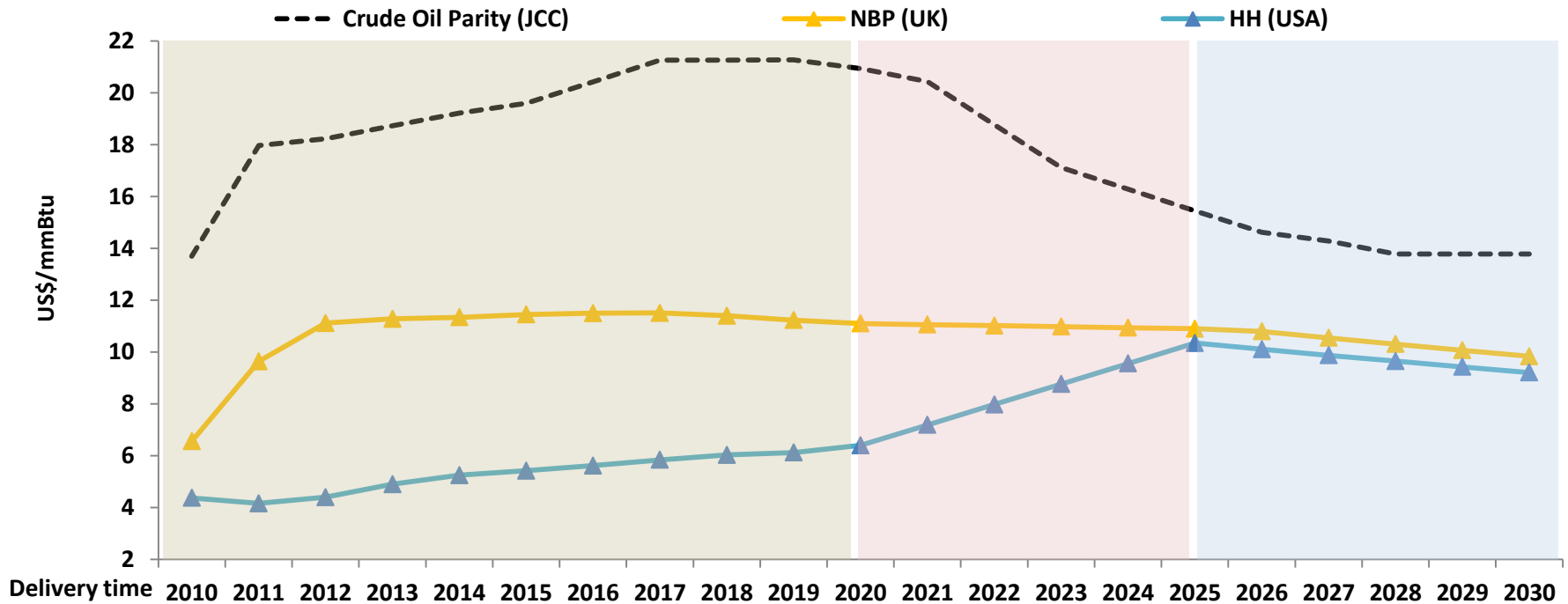
H1 2010

- Slopes negotiated ↓
- 'S'-curves ✓
(unconventional)

H2 2010

- Slopes weakened further ↓
- 'S'-curves ✓ (unconventional)

Projected Price HH, NBP, and JCC (\$2011)



2010-2020

- Widening differential between oil and gas prices.
- Driven by gas-on-gas competition.
- While US shale gas production is expected to grow, FGE's projections are less bullish compared to EIA's.

2020-2025

- Market starts adjusting itself after years of disconnect between oil and gas prices.
- Steeper upward trend in HH reflective of higher costs from rising oil prices and limit on domestic surplus situation.
- More shale gas production expected but increasingly "unfriendly" investment environment increases costs.
- Potential LNG exports may also contribute to narrowing differentials in Atlantic Basin prices.

2025-2030

- Gas prices in the US start to track oil product prices more closely—as they have in the past.
- Forecasts follow a more methodological approach: dual product-price-based method, closely linked with FGE projections of gasoil and fuel oil prices.

FGE Asian Long-Term Contract Price Definition

Long-term Asian LNG price at time X: the agreed price at time X for a long-term contract (contract duration of **10 years** or more) from a project sanctioned (FID taken) or under construction with first delivery scheduled in approximately **4 years**.

i.e., delivered price in 2010 reflects price negotiations from 2006.

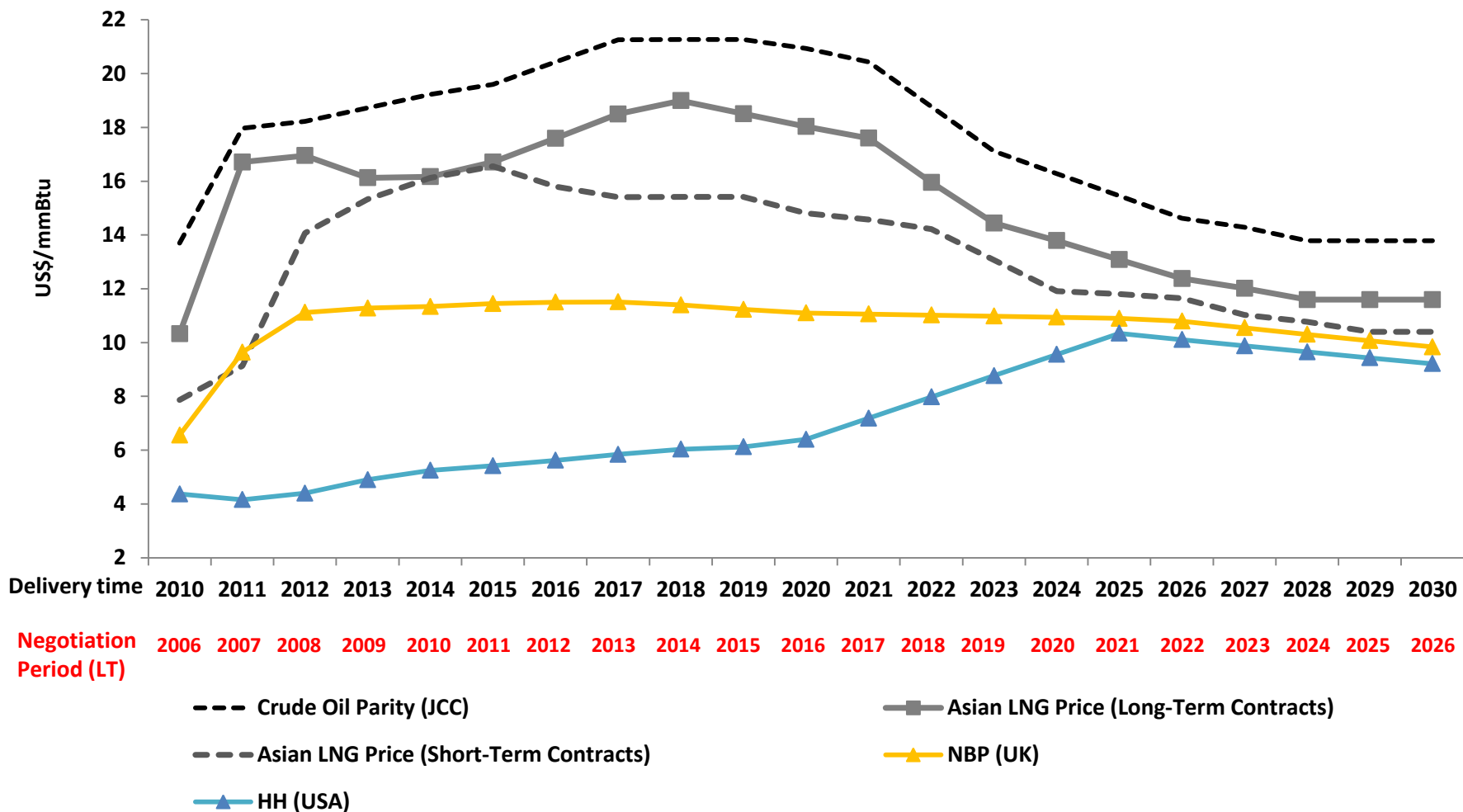
Note: For the purposes of the following projections, we assume a 20-year contract duration.

Short-term Asian LNG price at time X: the agreed price at time X for a short-term contract (contract duration of **2 years or less**) from an existing project or one under construction with first delivery scheduled in approximately **1 year**.

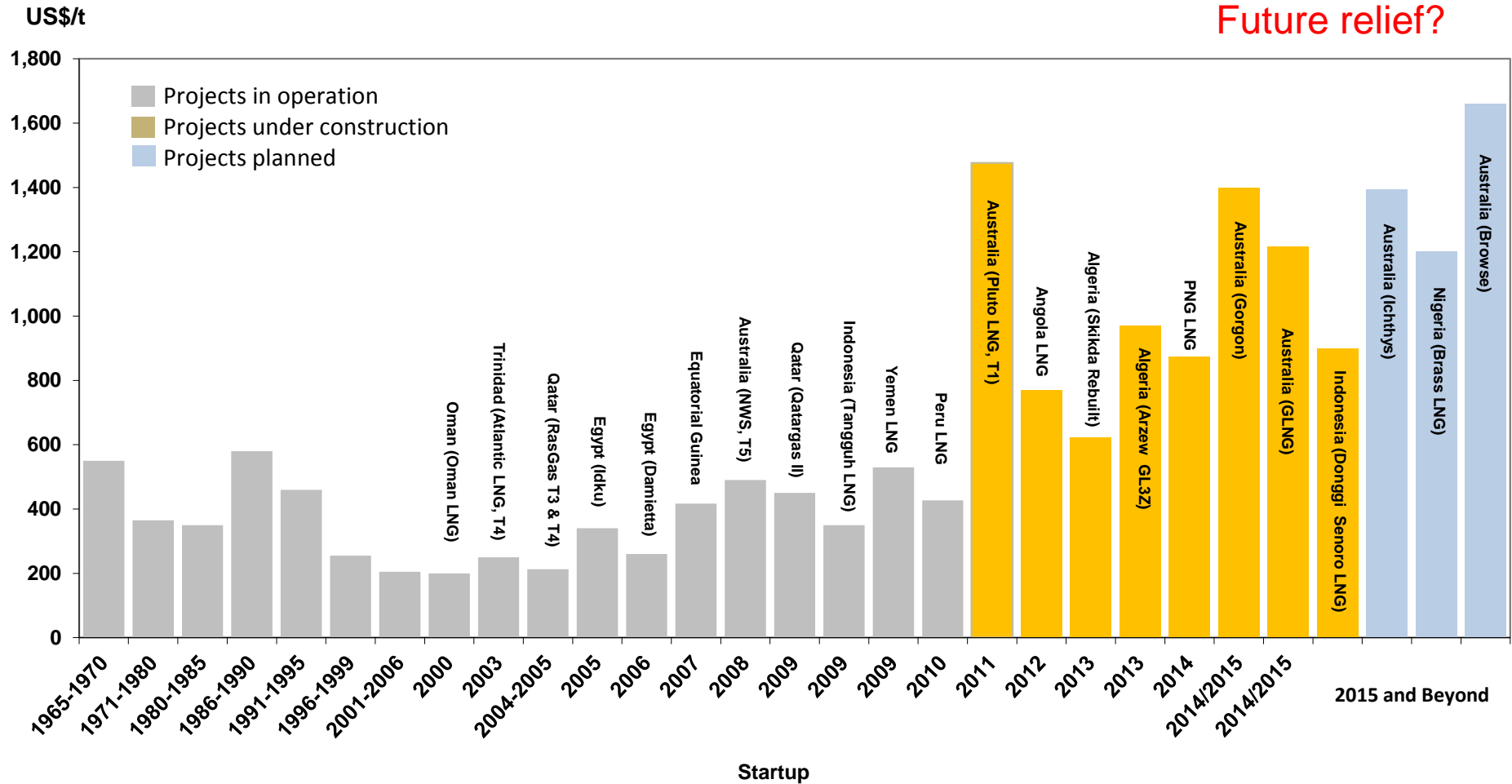
i.e., delivered price in 2010 reflects price negotiations from 2009.

Note: For the purposes of the following projections, we assume a 2-year contract duration.

Projected Price of New Asian LNG Contracts vs HH, NBP, and JCC (\$2011)



Future Capital Expenditures for Liquefaction Plants?



High Cost Greenfield Projects

- Hypothetical cost breakdown for a US\$1,000/tonne of capacity with a 12% rate of return on investment:

	US\$/mmBtu
Upstream	1.5-2.5
Liquefaction costs	3.5
Minimum FOB price	5-6

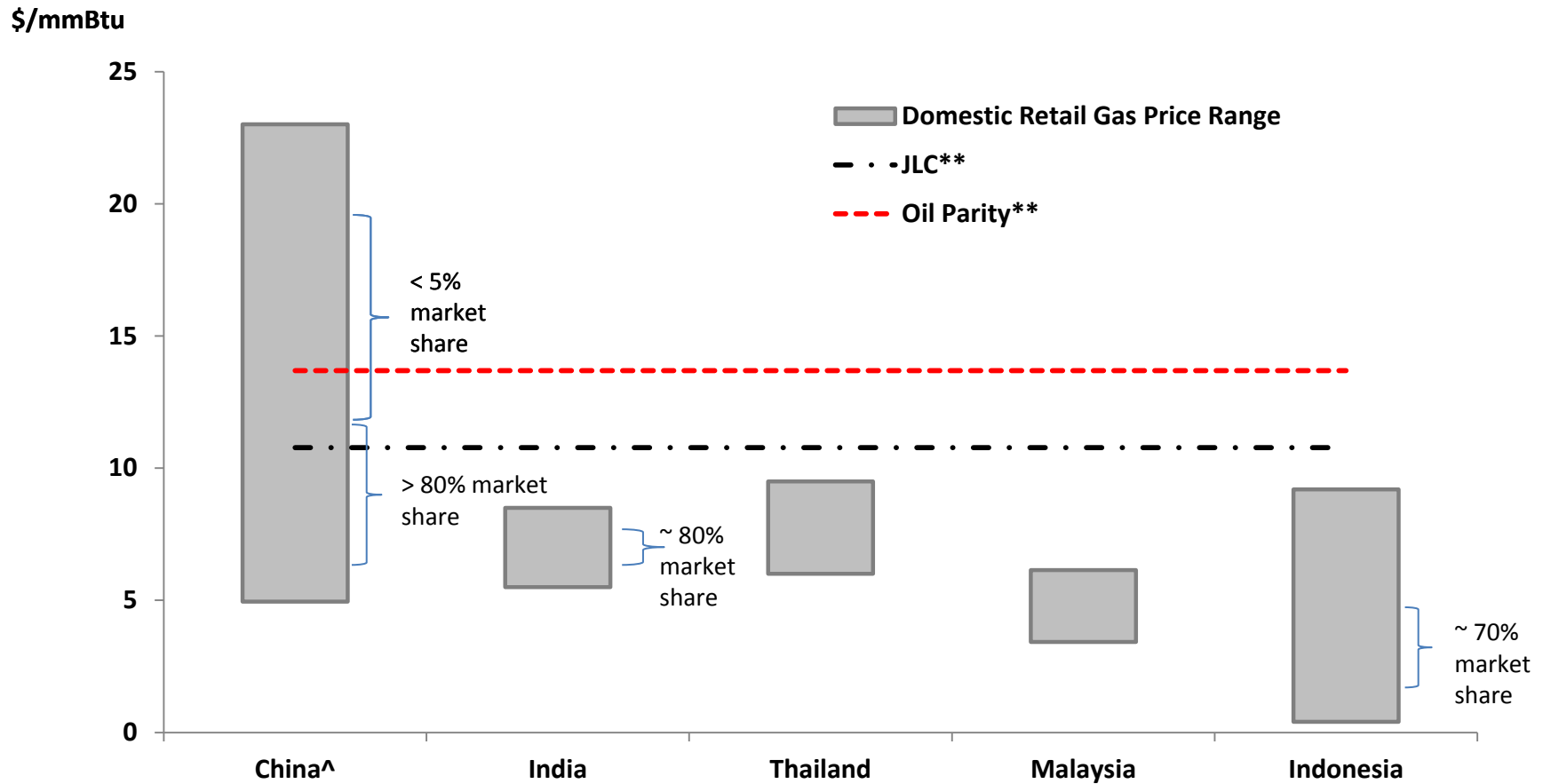
Assumptions:

- Capex: US\$/tonne spread over 4 years
- Opex: 3% Capex
- Project Life: 30 years
- Conversion Factor: 1 tonne per annum = approx 52 mmBtu per annum

- Which markets will pay such high prices?
- Eastern markets still the best option.

Asia's Domestic Gas Pricing Conundrum

Domestic Gas Prices “Catch-Up” To Regional Benchmark Prices*

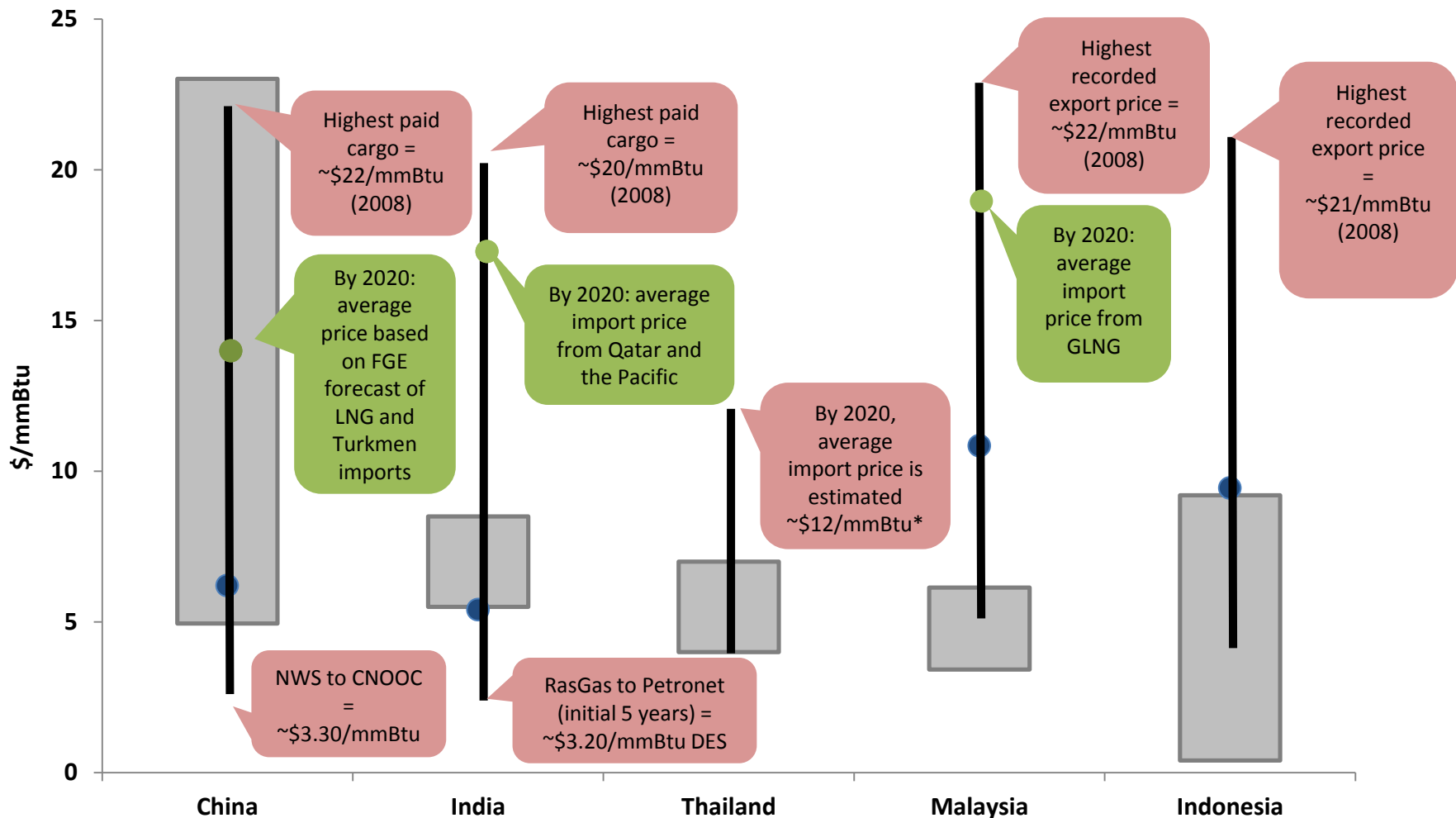


* Range based on retail prices to city gas (residential, commercial, and industrial) and power sectors.

** 2010 JLC and JCC levels.

^Estimated from average prices paid by various sectors in Beijing, Shanghai, Tianjin, Sichuan, Shenzhen, and Guangxi as of July 2010.

Historical/Future Price Range vs Current Retail Prices



■ Domestic Retail Gas Price Range

● Average 2010 LNG Import/Export Price

■ Historical price range

*Pipeline gas imports from Myanmar

Middle East: An Exciting Market to Watch

Middle East Gas Exports—Feast or Famine?

Iraq has a potential to export gas by pipeline to Europe (500-700 mmscf/d) and/or Syria (300-500 mmscf/d).

However, gas exports availability would be eliminated if the rehabilitation of Iraq progresses quickly.

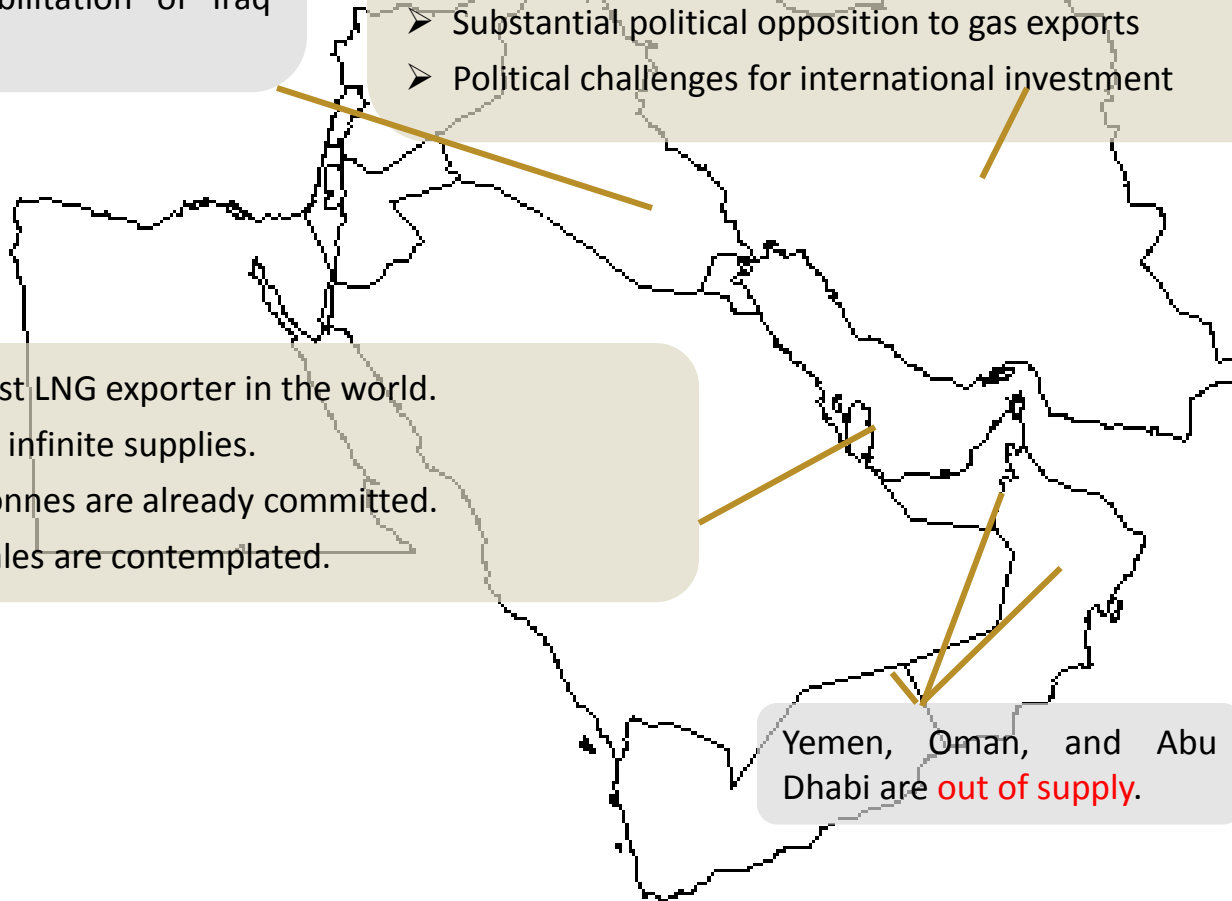
Iran's gas export volumes will be small.

- Large domestic gas market-price was \$0.45/mmBtu; recently ~\$2/mmBtu
- Massive gas re-injection of over 8-9 bscf/d
- Substantial political opposition to gas exports
- Political challenges for international investment

Qatar is now the largest LNG exporter in the world.

- We cannot assume infinite supplies.
- About 77 million tonnes are already committed.
- For now, no new sales are contemplated.

Yemen, Oman, and Abu Dhabi are **out of supply**.

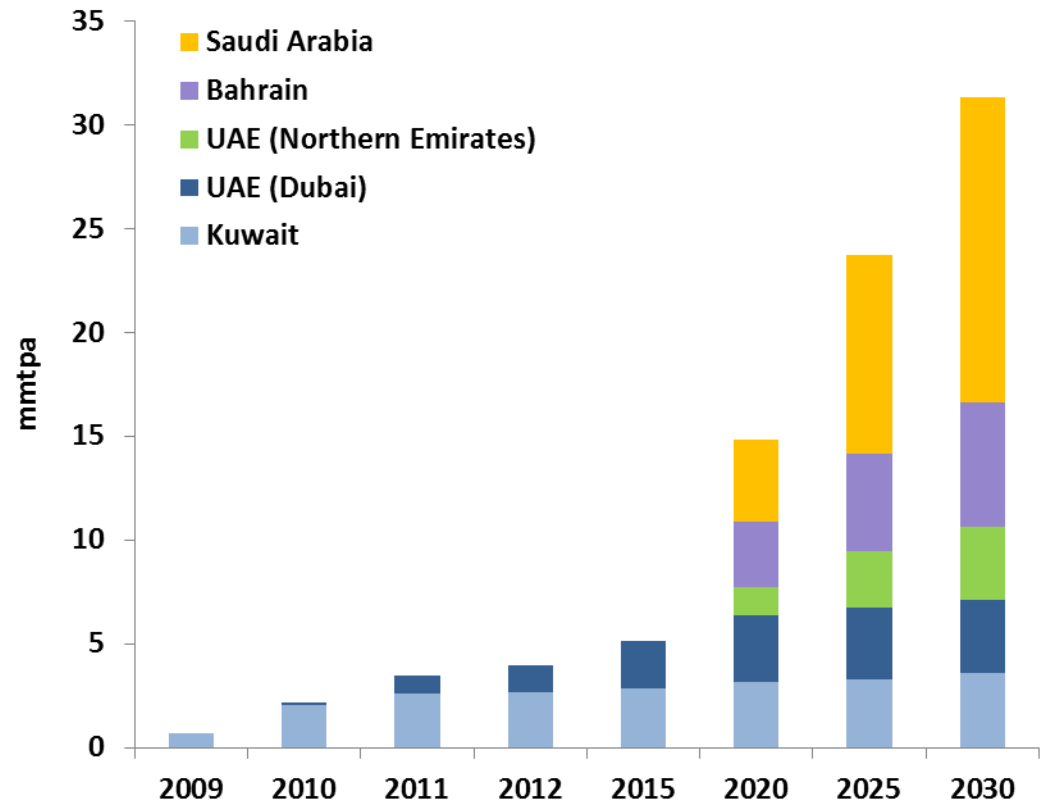


Middle East: From Exporter to Importer

Despite the region's massive petroleum reserves, gas production in **almost all Middle East countries are struggling to keep abreast with demand**, especially for the industrial and power sectors.

Middle Eastern energy market **dynamics shifted dramatically in 2009** as a result of the commencement of Kuwaiti LNG imports. Kuwait's status as an LNG importer illustrates the **Middle East's strong dependence on natural gas** and the rapidly increasing gap between supply and demand.

Middle East LNG Imports



This is evidenced by the fact that other countries like the UAE, and possibly Bahrain, will **use LNG to augment domestic gas supply in the coming years**.

Challenges in Middle East Gas Projects

High costs are still an important challenging issue in upstream and downstream gas projects.

Upstream Projects

- Massive Increase in Drilling Costs (compared to 2003)
- Massive Cost Increase in Equipment

Pipelines

- 80-100% Increase in Construction Costs for Gas Pipelines (Offshore and Onshore Pipelines)

Gas Processing Plants

- 100-120% Increase (compared to 2003) in Construction Costs for New Gas Processing Plants

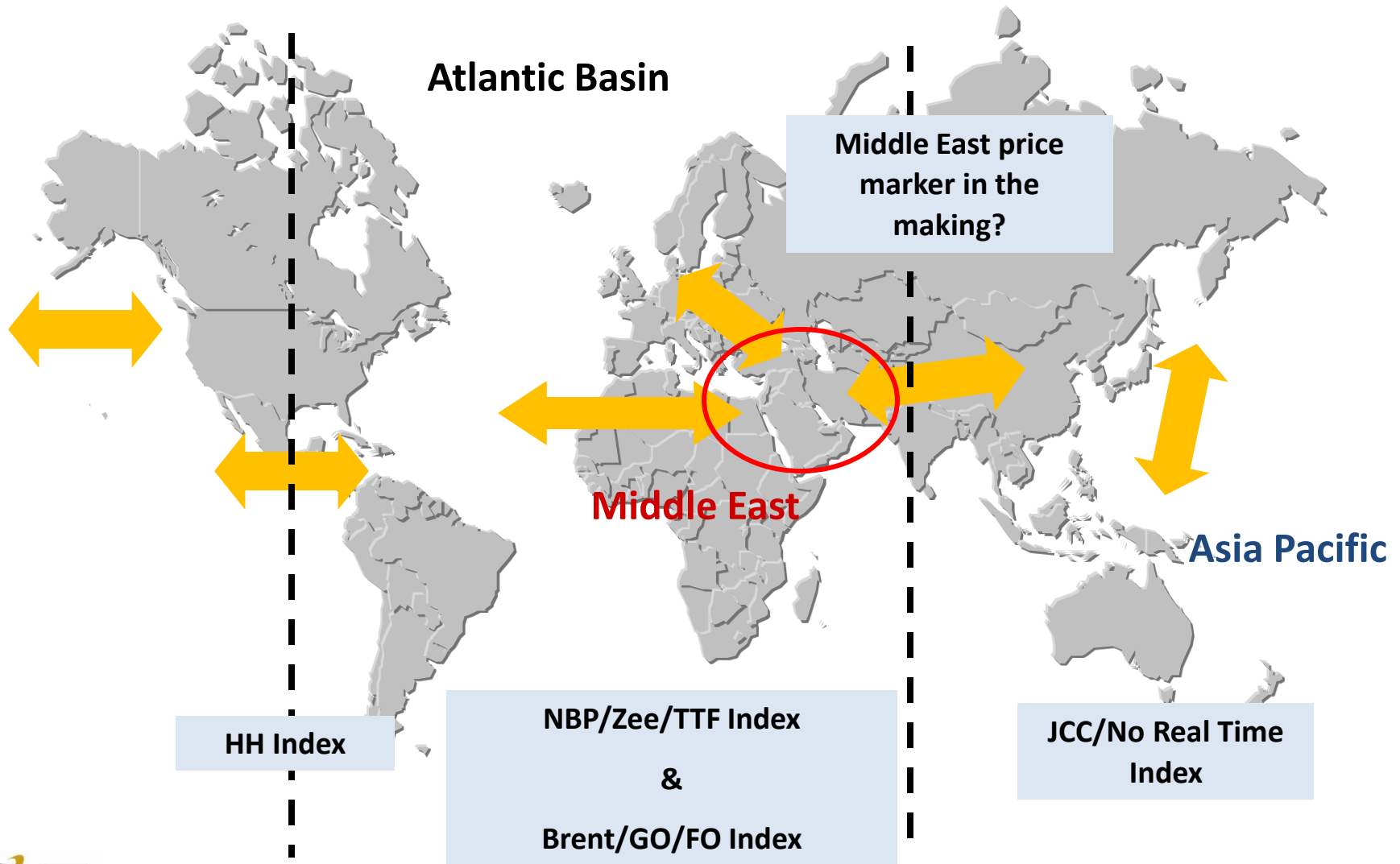


More Expensive Gas Prices in Middle East Import Projects

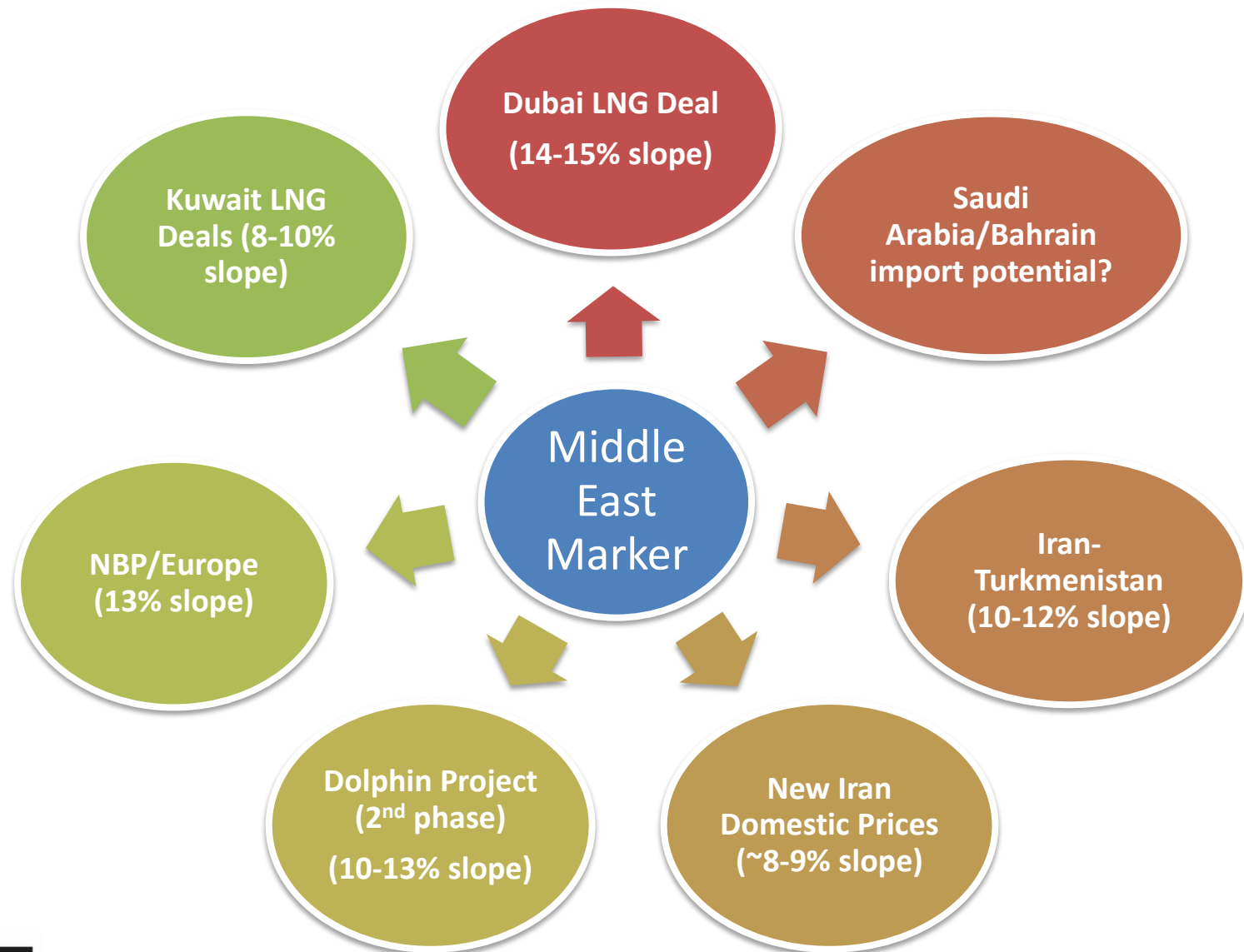


More Pressure on Governments to Set Higher Prices for Their Domestic Consumers

A New Price Marker in the Making?



What Could Be the Middle East Price Marker?



Slopes estimated at US\$80/b oil price scenario

Thank You

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