



Strategic Advisors in Global Energy

The Asia – Middle East Energy Nexus: More than Meets the Eye

By Fareed Mohamedi, Partner and Head of Markets and Country Analysis

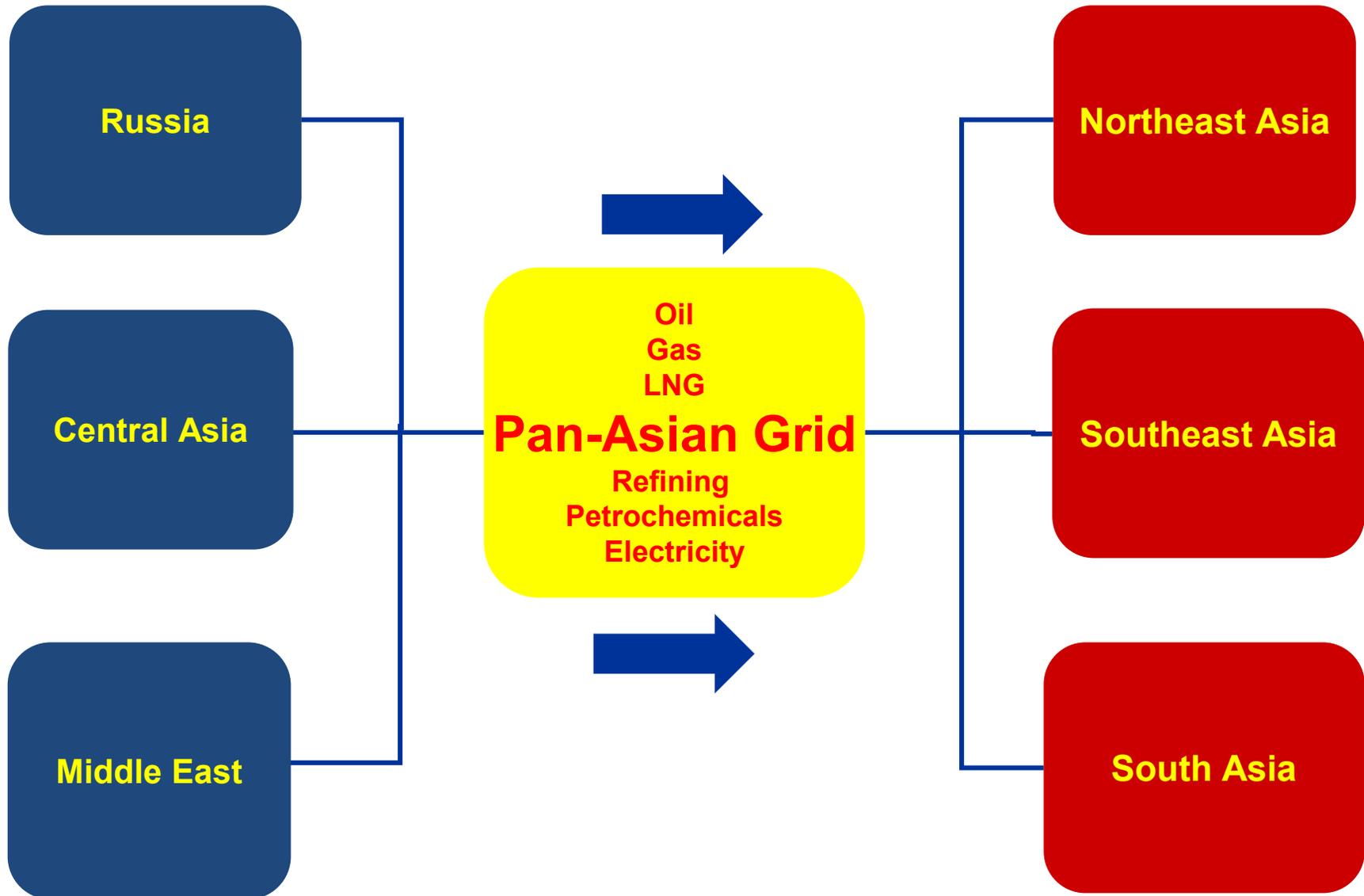
18 May 2009



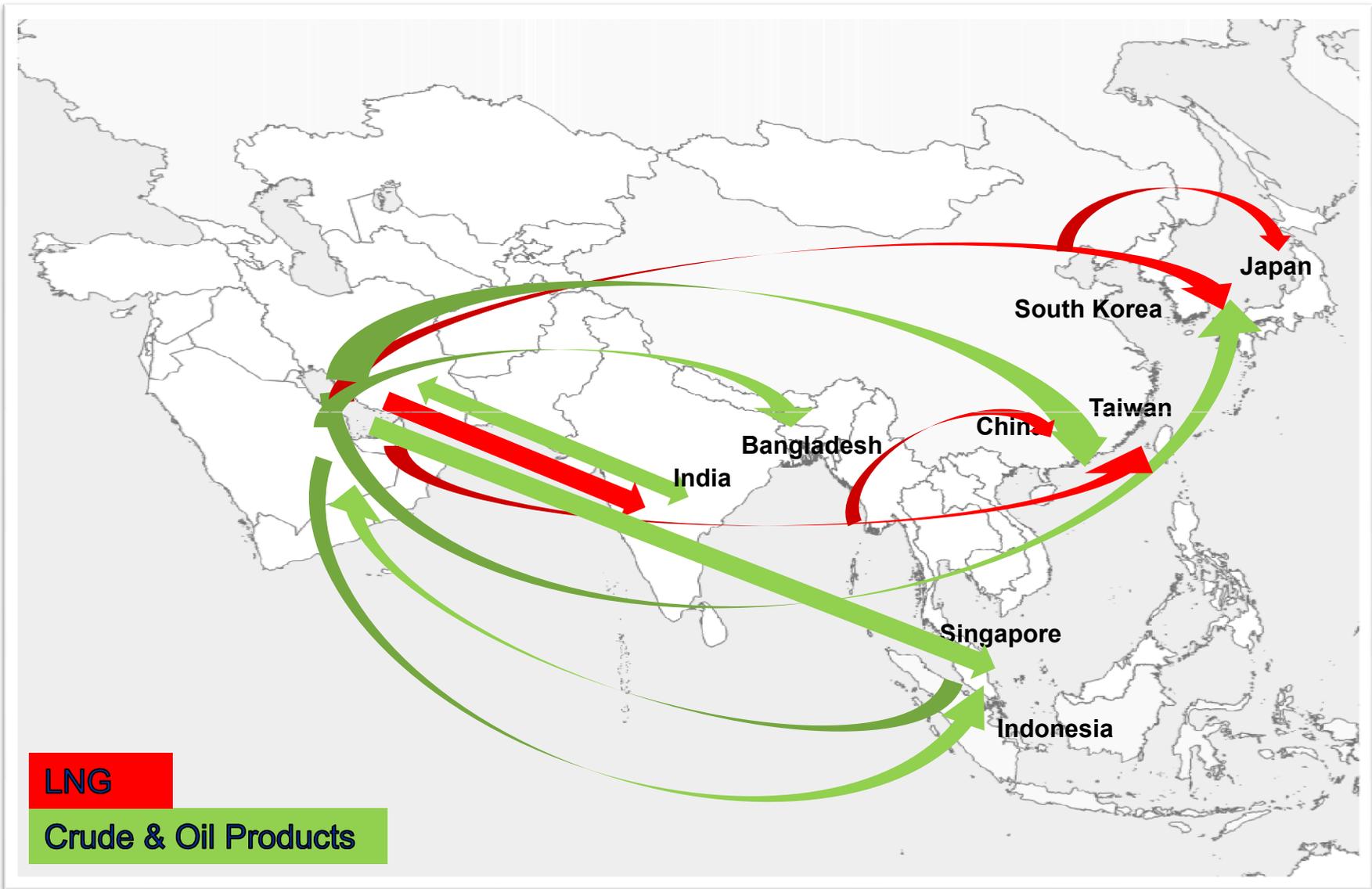
Executive Summary

- **The Pan Asian Grid: The new oil and gas order**
- **The Gulf will provide the world with more crude oil and gas capacity**
- **Energy trade has created deep-rooted ties among the Gulf States and Asia's largest energy consumers**
- **But the Gulf is becoming an important consumer as much as an important producer**
- **Energy trade extends beyond crude oil and includes refined products, petrochemicals feedstock and LNG supplies**
- **As European and US oil demand charts a downward trend, the Middle East's focus on Asian nations will intensify and ties could manifest themselves in new areas**

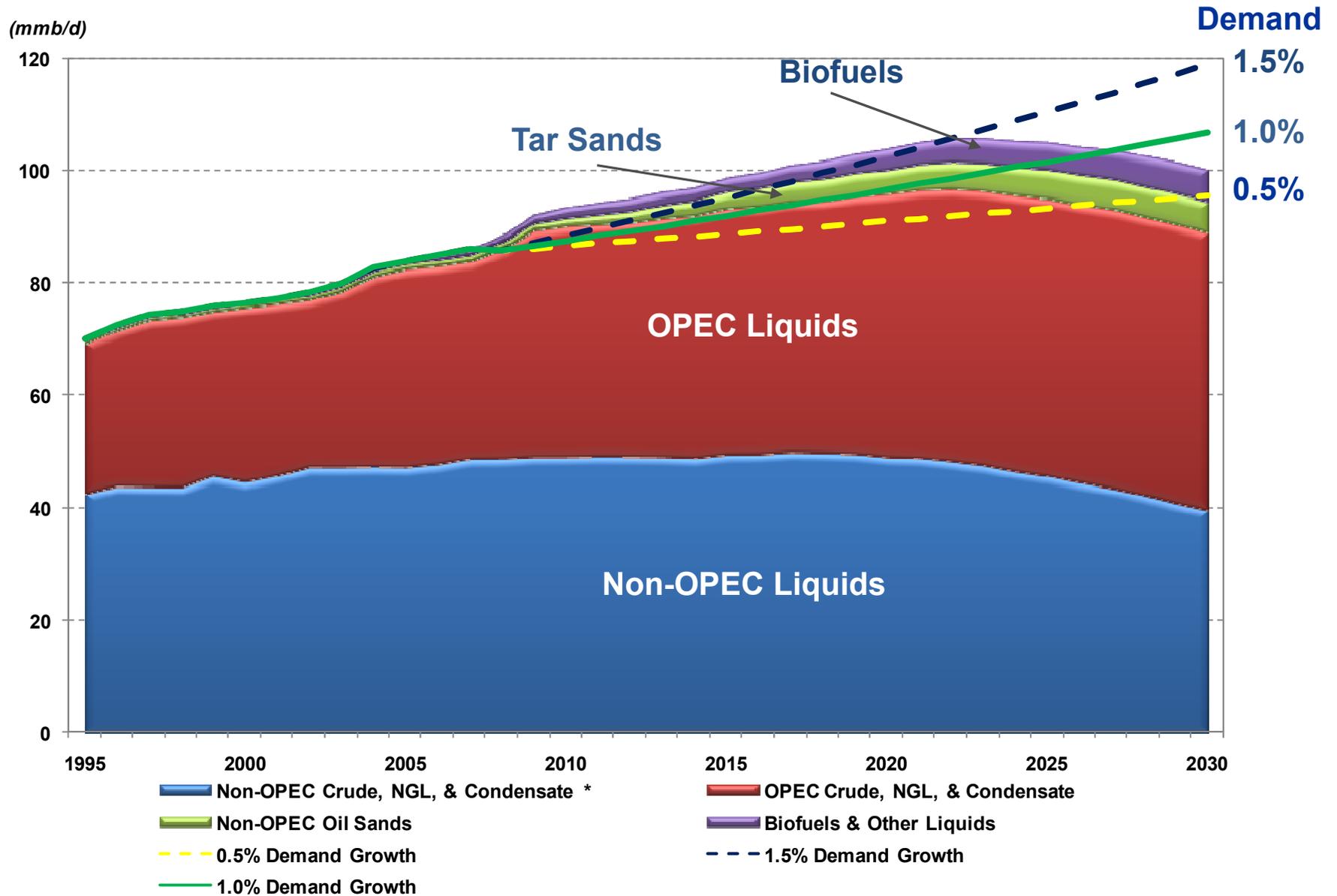
Future Energy Flows Will Shift East



The Middle East – Asia Energy Trade Paradigm

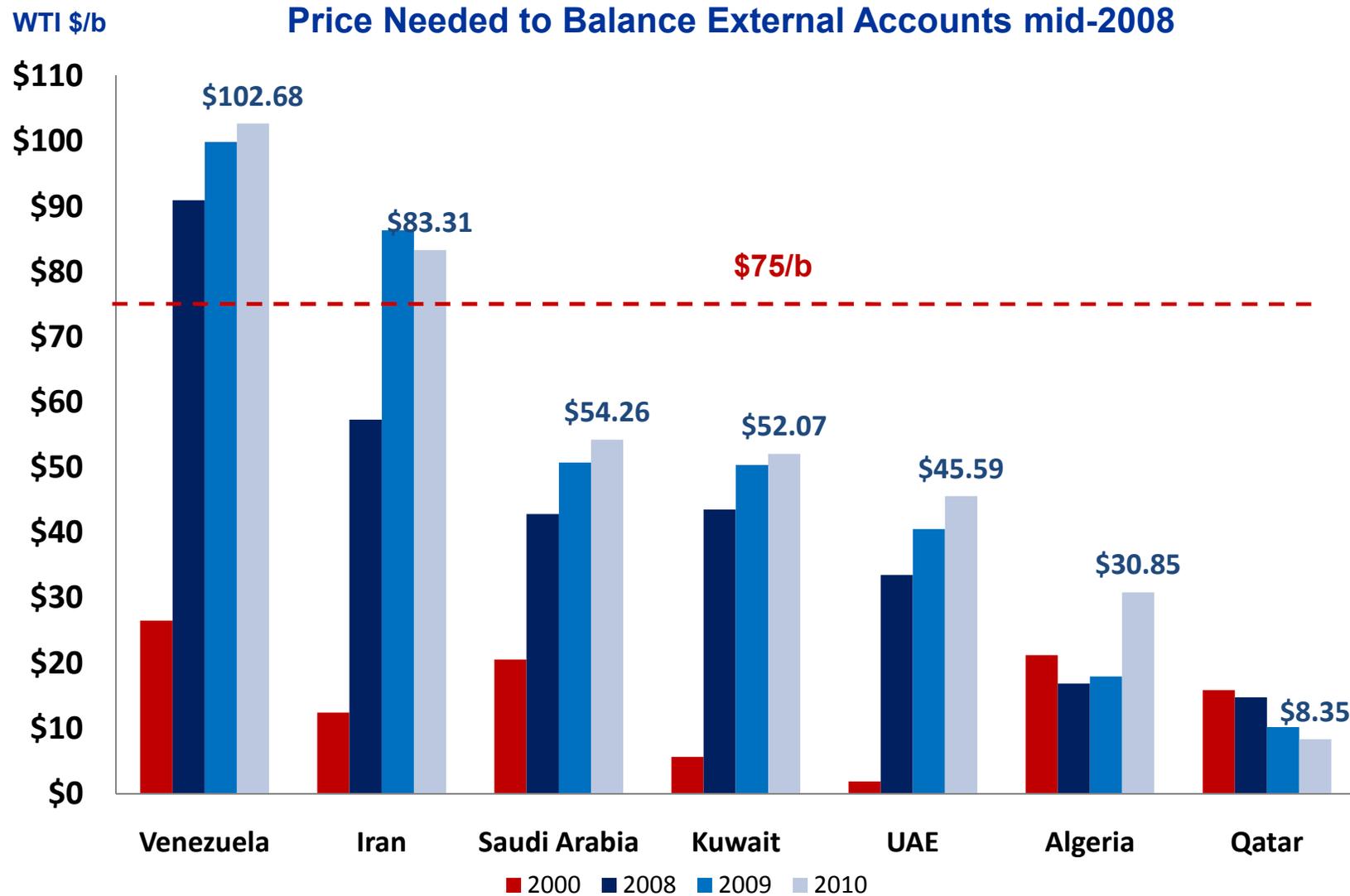


Supply Crunch Still Exists But Has Now Become a Post-2020 Issue



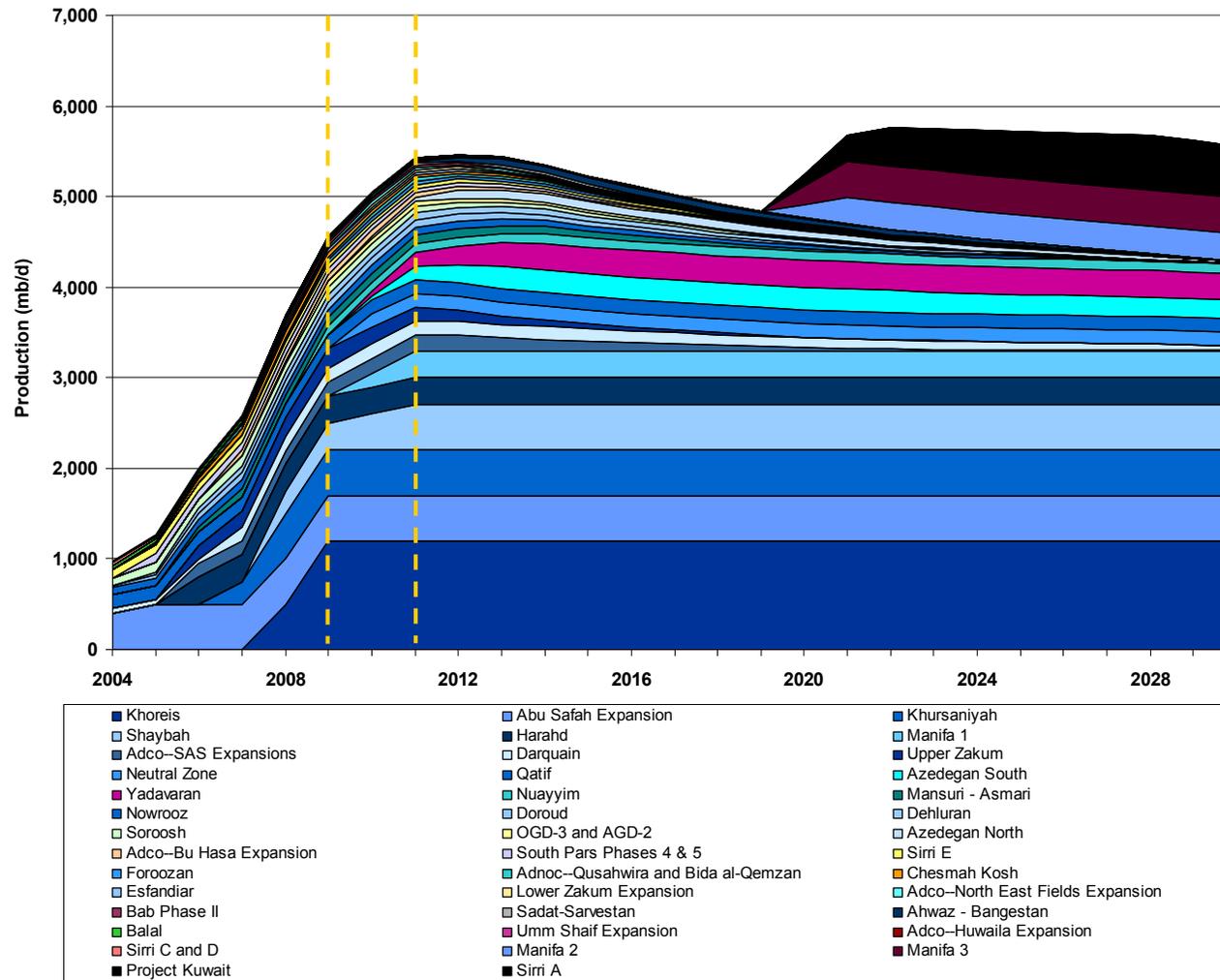
* Includes Refinery Gain

OPEC Threshold Prices: Not Enough For Some



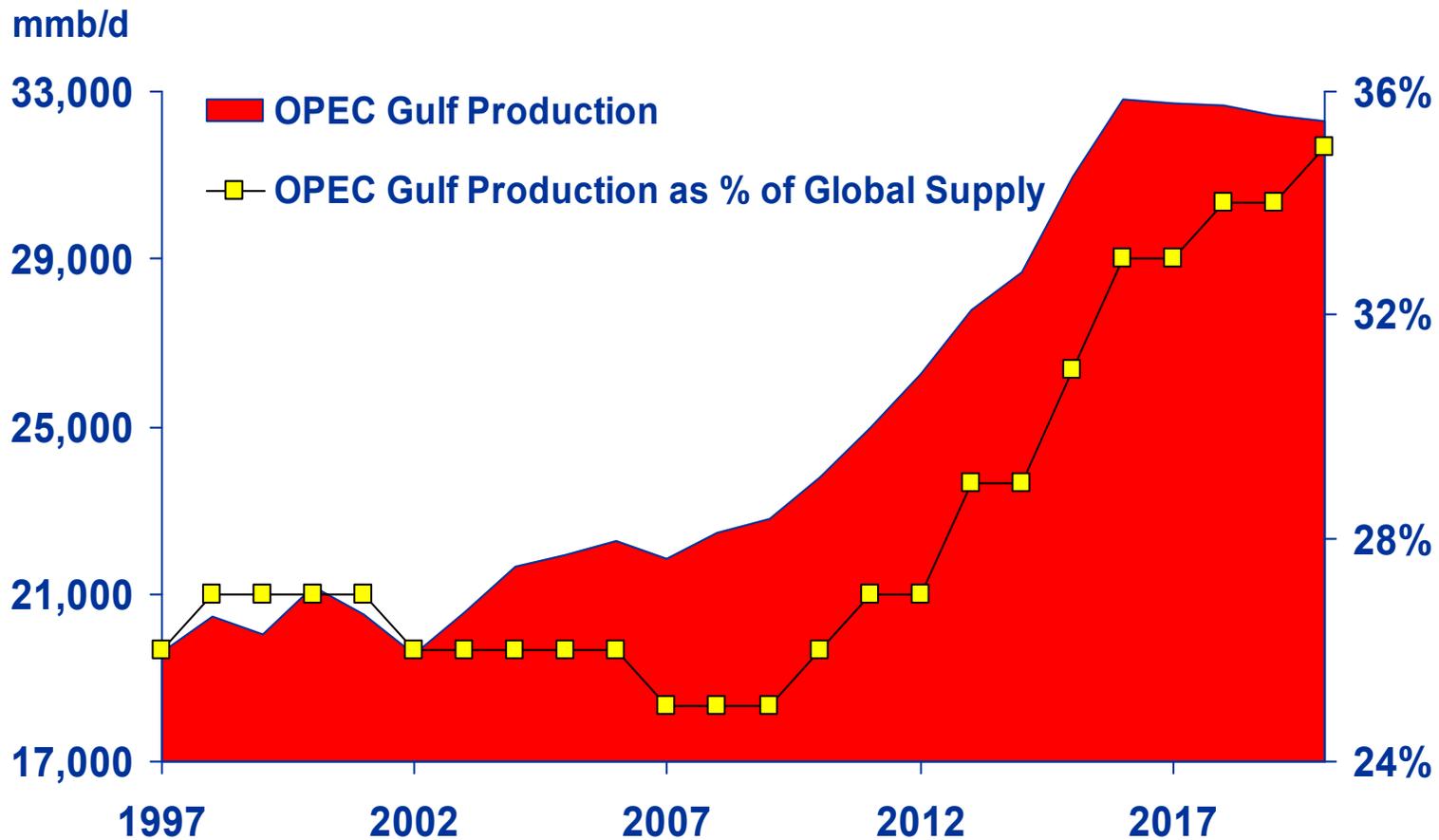
(Imports of Goods & Services – Non-oil Exports)/
Total volumes of Liquids Exports

New OPEC Supply is Coming: Capacity Expansions are Mostly Complete or Underway



- 3.5 mmb/d of new capacity added from Saudi Arabia, Iran, and UAE over the last 5 years.
- Another 1 mmb/d will come onstream in the next 2 years.
- Only 3 discretionary projects that could be significantly delayed which equal only 1 mmb/d: Project Kuwait, Manifa 2, and Manifa 3.

Long Term Worries: World Depends On The Gulf



The Emerging Energy Architecture

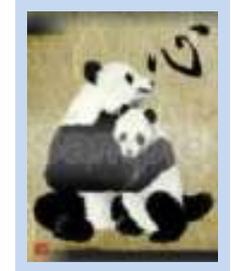
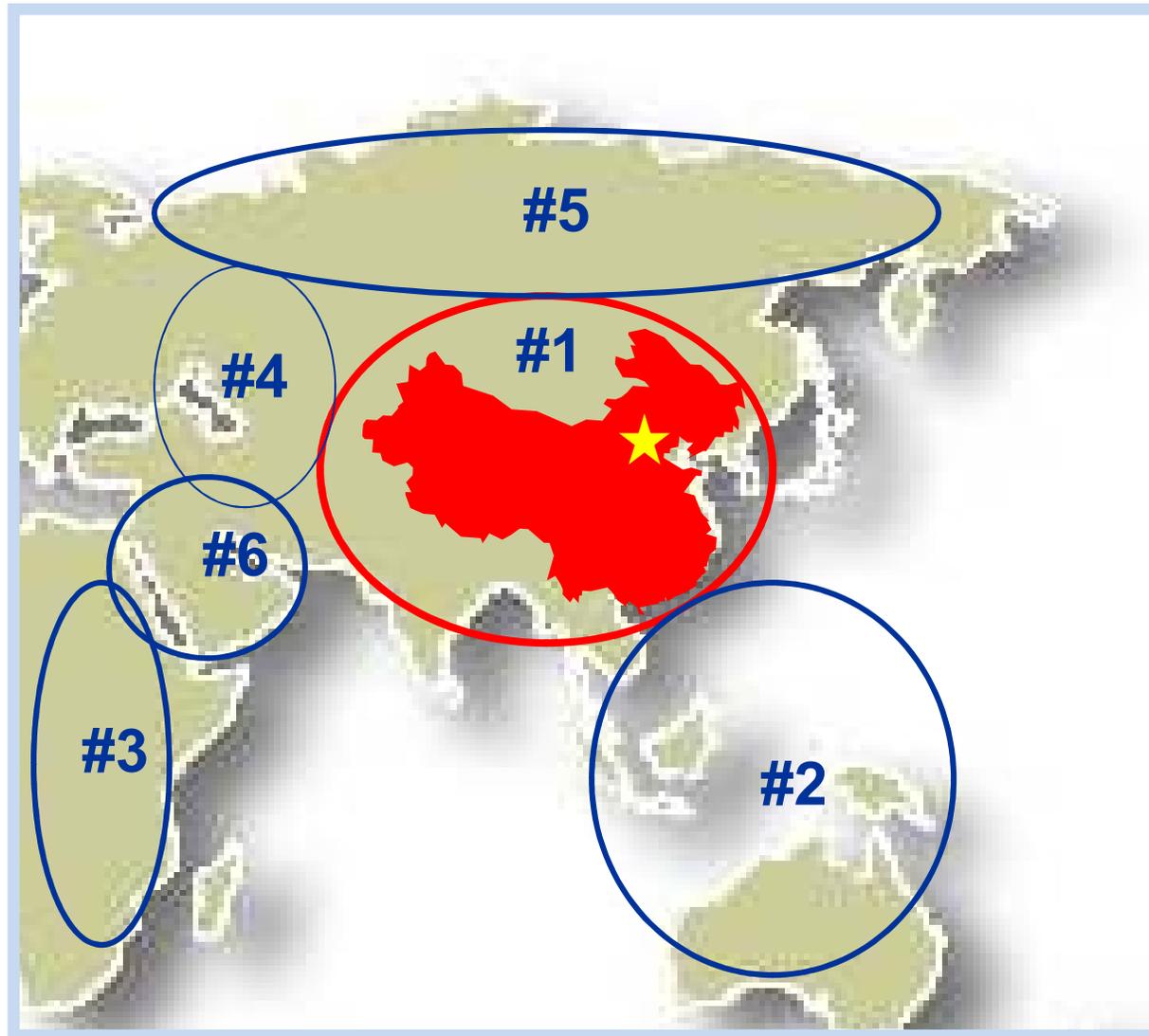


- Neo-Globalization requires a new energy architecture
- A number of multi-lateral efforts are already underway to this end

China: Regional Preferences For Sourcing Oil



Dragon Zone
(Local)

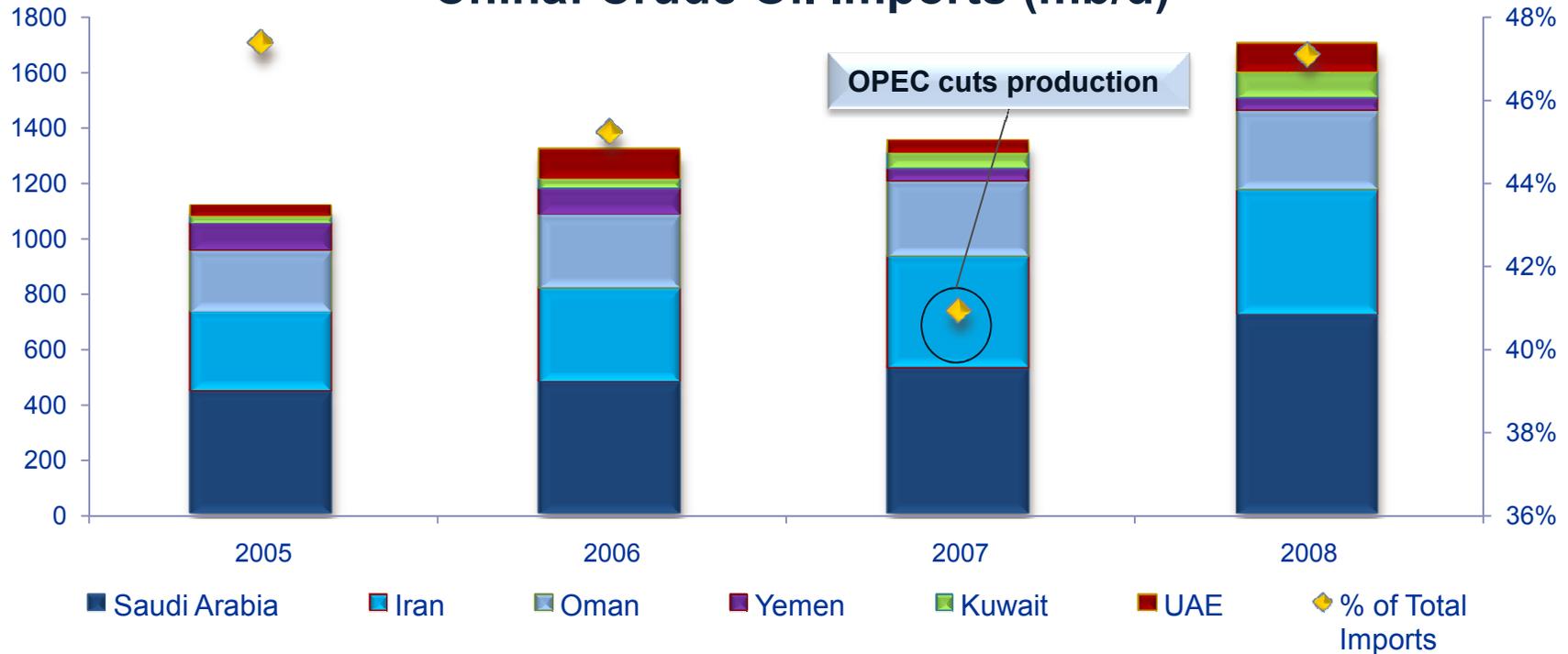


Panda Zone
(Global)

China is the Key Strategic Market



China: Crude Oil Imports (mb/d)



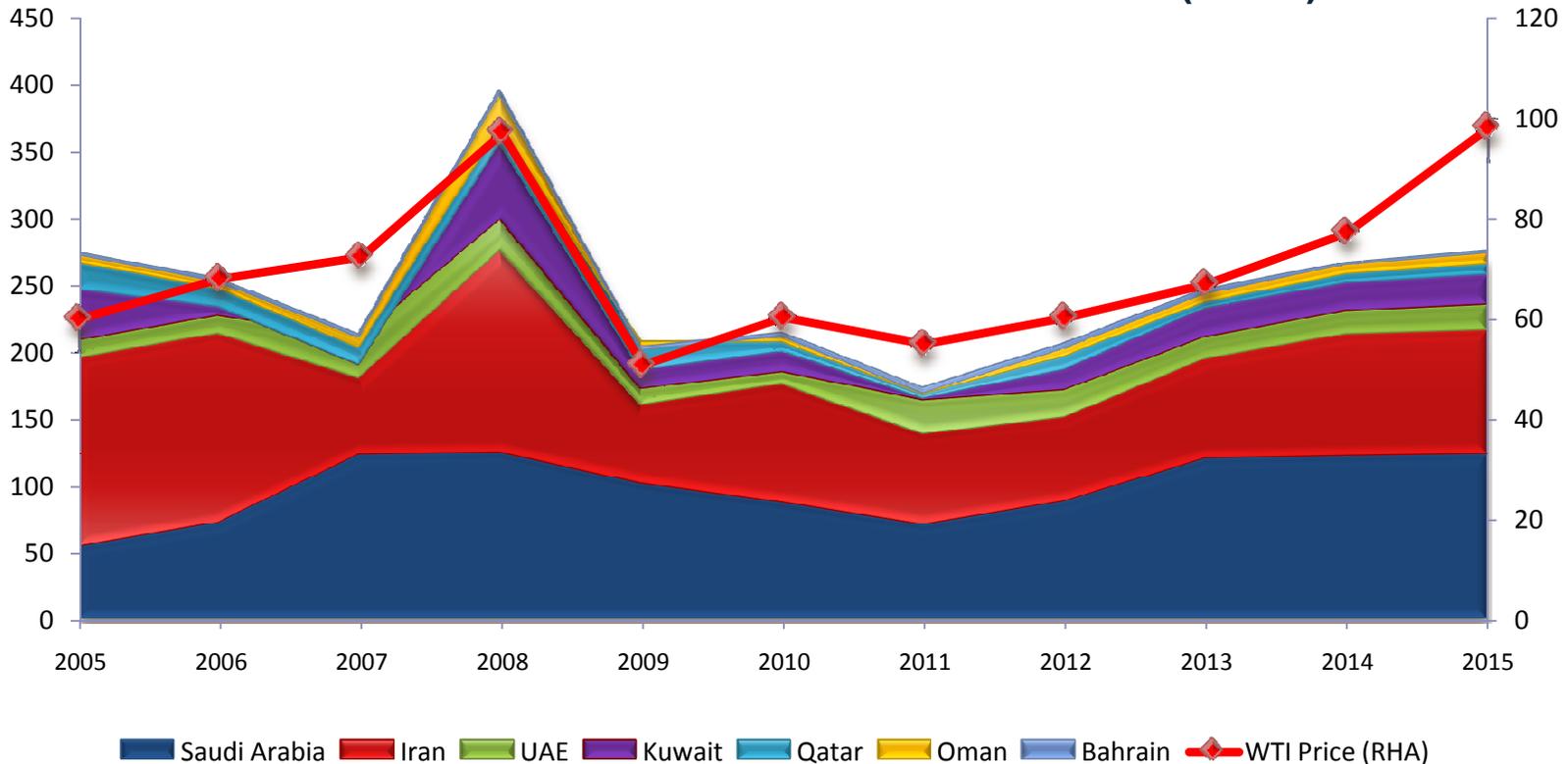
- **As the world's fastest-growing oil market, China provides OPEC's Gulf State members with increasingly attractive export opportunities**
- **Saudi Arabia has secured captive demand for its crude by investing directly in China's downstream sector**
- **Kuwait is pursuing a JV refinery with Sinopec and intends to triple its crude exports to China by 2012**
- **Could China become the stage for inter-OPEC tensions during periods requiring stringent oil market management?**

Gulf Demand Growth

Setting the pace for global oil consumption



Gulf States: Total Product Demand Growth (mb/d)



- **The Gulf continues to experience robust oil demand growth supported by energy-intensive development strategies, price subsidies and burgeoning populations**
- **As a function of economic growth, energy consumption has tracked rising oil prices but the growth in non-oil GDP has also been an important factor**

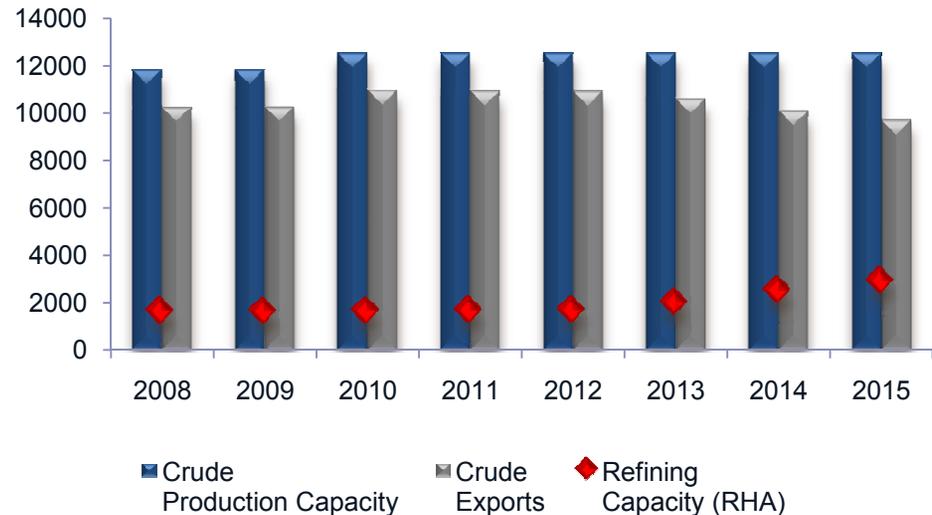
Saudi Arabia: Still Dominant Crude Exporter

But less will be available for third-party customers

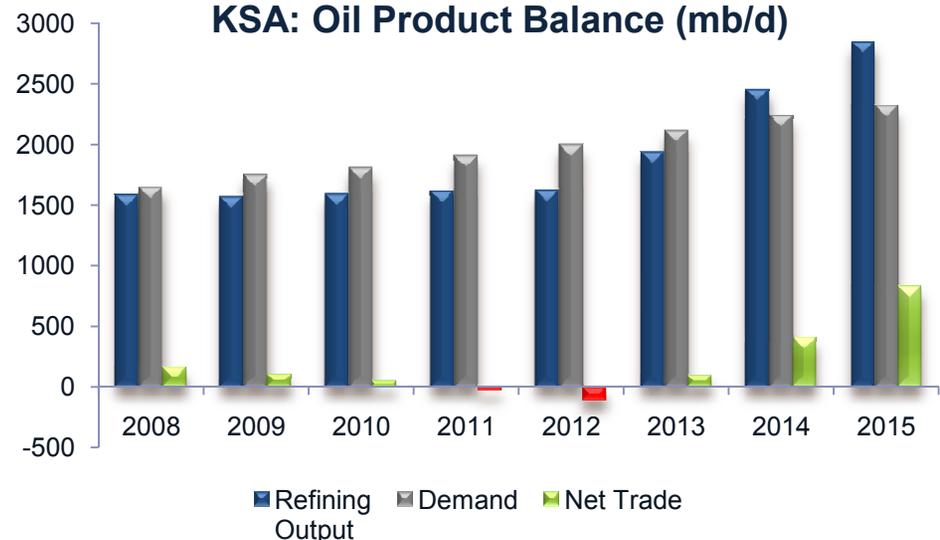


- Based on crude production capacity of 12.5 mmb/d, an additional 1.2 mmb/d of refining will reduce the availability of crude exports by 5% in 2015 from 2008 levels
- Depending on *actual* production levels, exports to third parties could fall to below 5 mmb/d compared to 7 mmb/d in 2008
- Completion dates for three flagship refineries (Yanbu, Jubail & Ras Tanura) have been delayed beyond 2013; while Jizan looks less certain

KSA: Crude Export Availability (mb/d)



KSA: Oil Product Balance (mb/d)



Saudi Arabia's Ambitious Refining Plans

Delayed, but not derailed...



2008: Domestic Refining Capacity	
Domestic	mb/d
Ras Tanura	550
Rabigh	400
Yanbu	235
Riyadh	120
Jiddah	88
SAMREF (JV)	400
SASREF (JV)	305
Total	2098

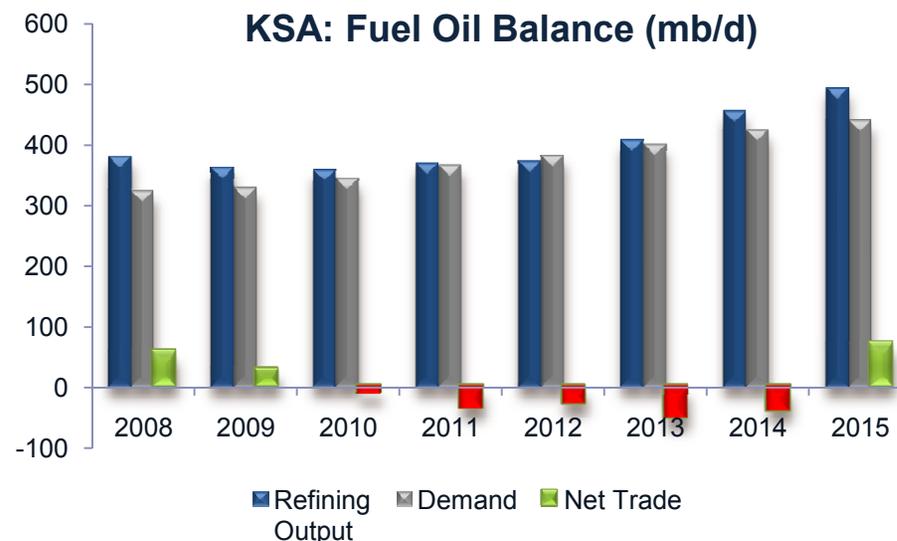
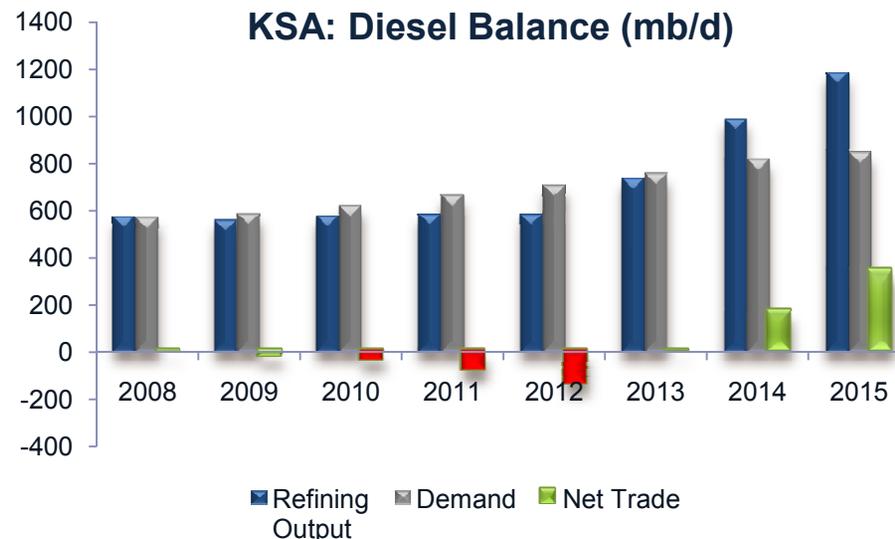
2014 ++: Additional Capacity	
Domestic	mb/d
Ras Tanura	400
Yanbu JV	400
Jubail JV	400
Jizan*	250
Yanbu (expansion)	125
Total	1575

*in question

- Since 2005, the kingdom has laid out an impressive domestic downstream program totaling 1.5 mmb/d
- While all projects are said to be still moving forward, deteriorating refining margins, and credit retrenchment will push completion dates back by 12 – 18 months
- Jizan was always seen as the dark horse, having been unable to attract foreign interest; as a result, its future remains uncertain

Saudi Arabia: A Shift in Product Flows

- **Diesel accounts for 35% of Saudi Arabia's oil use, and is a key component of demand growth**
 - PFC Energy forecasts average demand growth of 5.8% over the next five years, underpinned by the government's commitment to a large slate of industrial, infrastructure and mix-used developments
- **A Royal Decree in 2006 converted most of the country's new gas fired power plants to run on oil including fuel oil**
 - Only 11% of the new power generation capacity in Saudi Arabia between 2005 and 2008 was configured for gas-use, and all in combination with diesel
 - Gas use in the power sector has been declining since a high point in 2005 with more use of fuel oil
- **With new JV refineries geared toward middle distillates and light ends, Saudi Arabia's ability to supply its domestic fuel oil requirements will fall on Ras Tanura, which we expect to be online in 2014**
- **Refining delays will exacerbate a negative trade balance before rebounding to a net export position of over 300 mb/d by 2015**



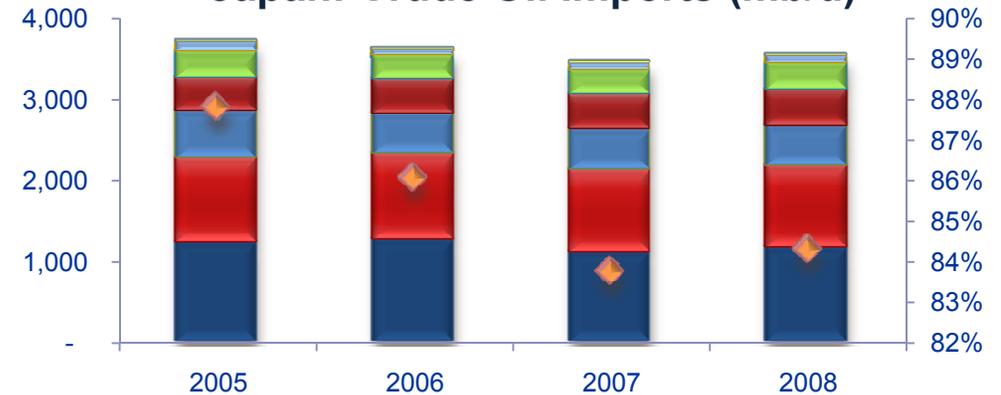
Gulf Crude Oil Exports

Japan and South Korea have long been reliable markets



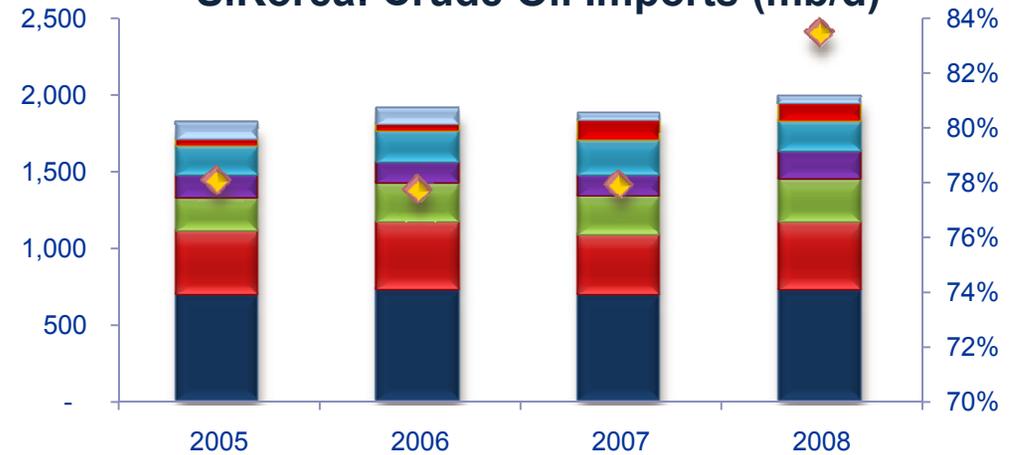
- **South Korea and Japan have provided the Middle East with reliable oil markets since the 1970's**
 - In both countries, the Middle East accounts for over 75% of total crude imports needs
- **In order to assure its market position, the UAE government-owned International Investment Petroleum Company has made investments worth \$1.3 billion for a 70% and 21% stake in South Korea's Hyundai Oilbank and Japan's Cosmo Oil respectively**
 - These markets account for 65% of the UAE's total crude exports
- **Japan's Inpex Corp. is a partner in two of Abu Dhabi's principal concessions; ADMA-OPCO and ZADCO**

Japan: Crude Oil Imports (mb/d)



■ Saudi Arabia ■ UAE ■ Iran ■ Qatar ■ Kuwait ■ Oman ■ Yemen ◆ % of Total Imports (RHA)

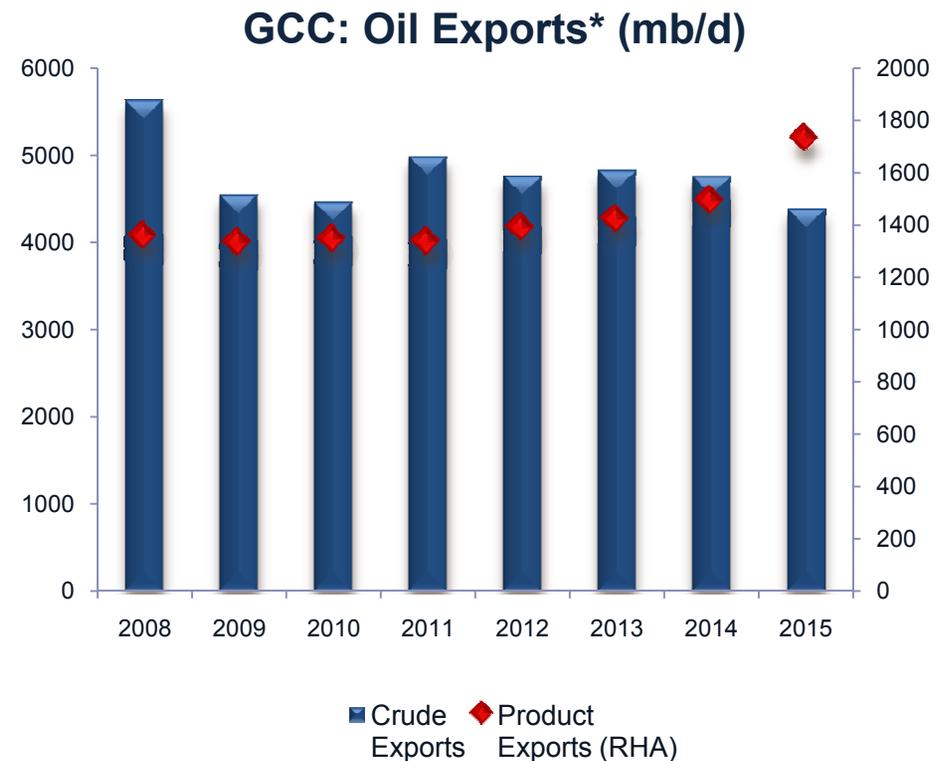
S.Korea: Crude Oil Imports (mb/d)



■ Saudia Arabia ■ UAE ■ Kuwait ■ Qatar ■ Iran ■ Iraq ■ Oman ◆ % of Total Imports (RHA)

Other GCC: Declining Crude Exports

- **Of the other Gulf states Kuwait, UAE and Qatar have announced plans to add a combined 1.265 mmb/d of refining capacity within the next 5 – 6 years**
 - Kuwait's dysfunctional political system has put the 615 mb/d refinery in doubt
 - The UAE has extended the deadline of a 400 mb/d expansion to its Ruwais refinery beyond 2013
 - Qatar remains committed to a new 250 mb/d refinery but is currently revising its timeline
- **Of these projects, PFC Energy does not expect the Kuwaiti refinery to move forward within the forecast period**
- **The UAE and Qatar projects are likely to move forward with a two-year delay; as such pushing back full ramp-up to late-2015**
- **Availability of crude for third parties could decline by as much as 1.2 mmb/d in 2015 from 2008 levels**
 - Qatar will experience a drop in crude exports to 200 mb/d from 700 mb/d in 2008
 - UAE crude exports will decline to 2 mmb/d from 2.45 mmb/d in 2008
 - Oman should see crude export levels shrink to below 300 mb/d based on a mature reserves basin

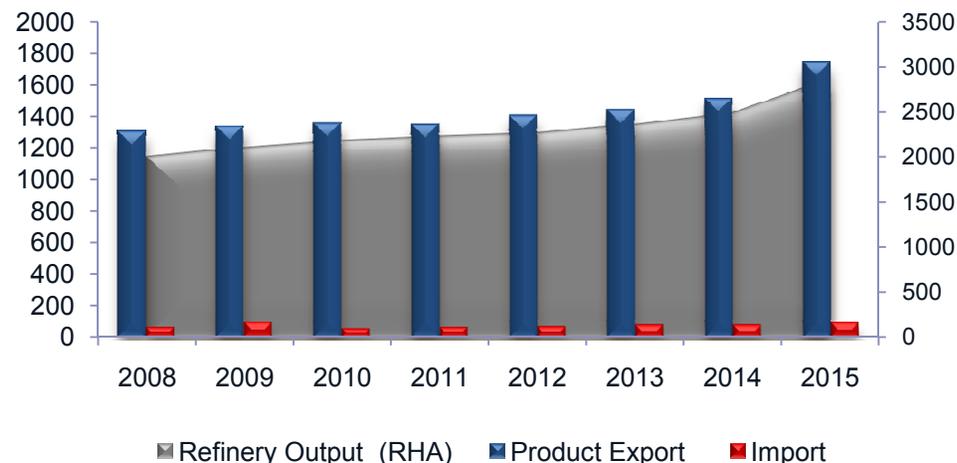


*excludes Saudi Arabia and Iran

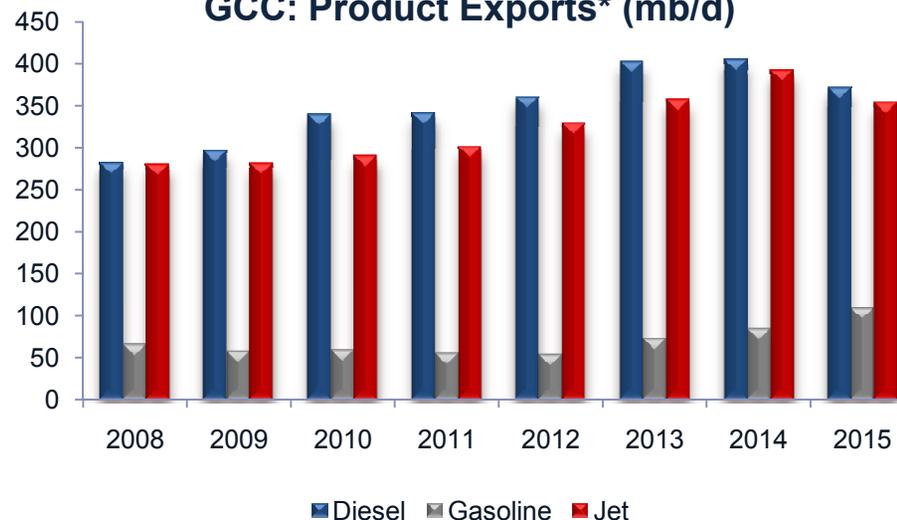
Other GCC: New Focus on Products

- **Product exports (dominated by gasoline and middle distillates) will increase by over 300 mb/d to 1.7 mmb/d**
 - A full ramp-up in refining will extend those volumes by at least 100 mb/d the following year
- **Product export losses from Kuwait in the interim will be offset by Qatar's condensate splitter due online this year, excess condensate splitting capacity in Abu Dhabi and Oman's full ramp-up at its Sohar refinery initially commissioned in 2008**
- **While consumption of fuel oil is expected to continue rising in Kuwait, Oman and Dubai, new refineries are designed with complex configurations targeting higher value products**
 - Kuwait could become a sporadic importer of fuel oil as soon as 2011 given its tightening balances
 - Dubai and Oman will also continue importing small volumes of fuel oil

GCC: Refined Product Balance* (mb/d)



GCC: Product Exports* (mb/d)



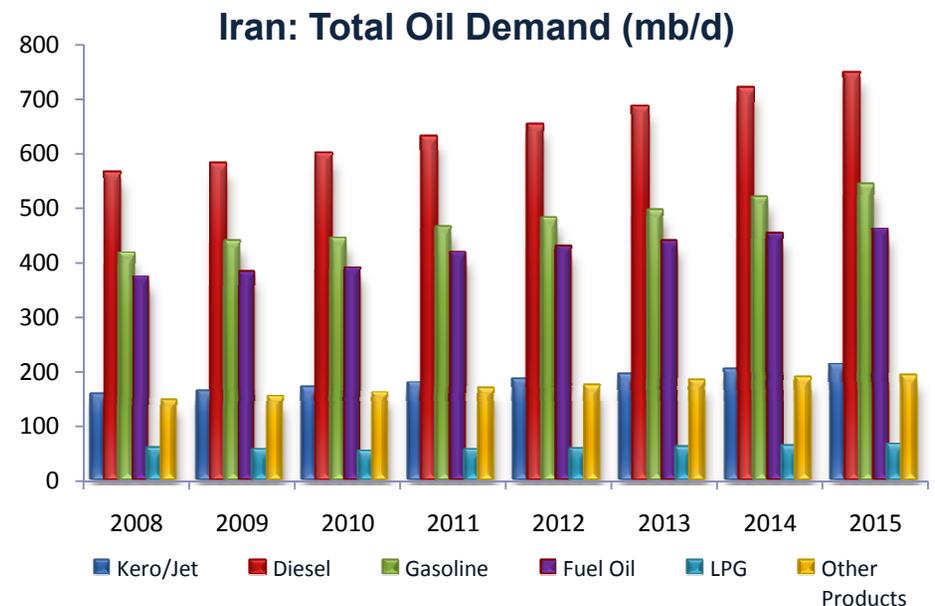
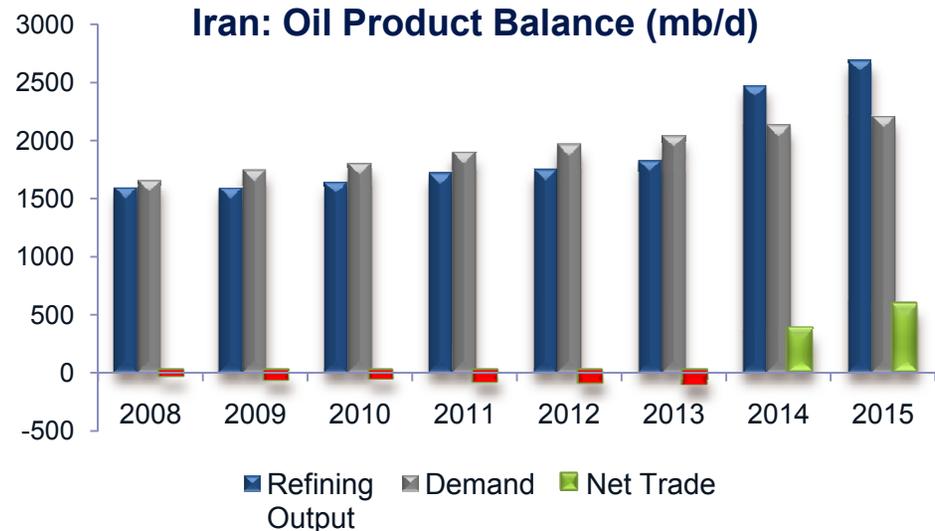
*excludes Saudi Arabia and Iran

Iran: Running Product Deficits

Not only gasoline and diesel, but also jet fuel and fuel oil



- Iran's balance deficit will peak in 2013, when domestic demand exceeds refining capacity by over 200 mb/d
- Contingent on a number of refining additions, a considerable easing of balances should materialize by 2014
- The country's chronic shortage of refining capacity could see sporadic imports of jet fuel begin in 2010
- Given the push towards producing more gasoline and middle distillates, Iran might be forced to import fuel oil by 2012 if current consumption patterns persist
- Diesel shortages could be temporarily alleviated by incremental natural gas supplies, but longer-term structural demand trends should remain



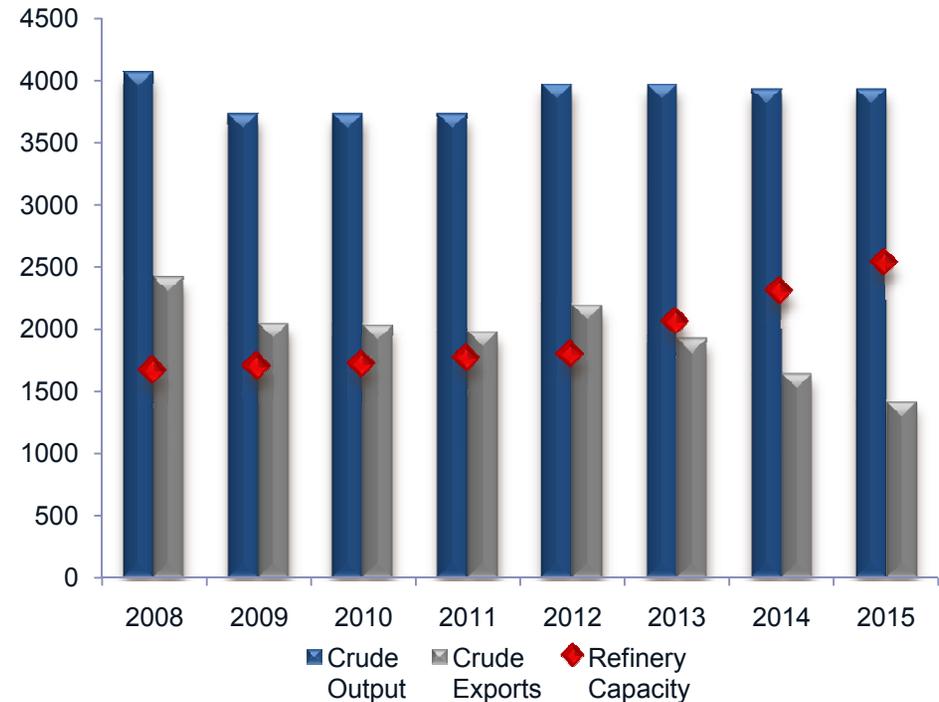
Iran: Easing Product Tightness

At the cost of crude exports...



- Iran's capacity to finance its €20bn downstream program was already in question given the 'call' on NIOC funds by multiple stakeholders
 - NIOC's predicament is considerably worsened during a prolonged period of low oil prices
 - PFC Energy envisages 1 mmb/d of additional capacity out of the 1.5 mmb/d announced to be completed

Iran: Crude Export Availability (mmb/d)



Given Iran's stagnant production profile and increasing domestic oil requirements, net crude exports will decline from 2.45 mmb/d to approximately 1.4 mmb/d by 2015

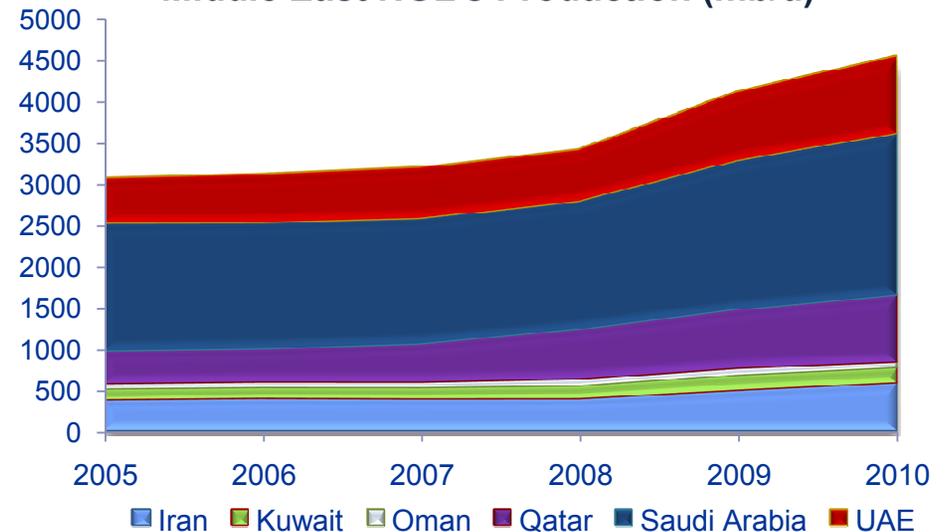
Supplying Asia's Petrochemicals Industry

But Gulf States are also competitors...



- **The Middle East produces 3.4 mmb/d of NGL's**
 - NGL's are processed in condensate splitters which produce a high yield of naphtha, the key Asian feedstock for basic petrochemicals manufacture
- **There is approximately 2 mmb/d of condensate splitting capacity in the Middle East and Asia, with a further 1 mmb/d expected online by 2011**
- **South Korea, Japan and Taiwan depend on the Gulf States for base-load supplies of naphtha; a key component of their petrochemicals industry**

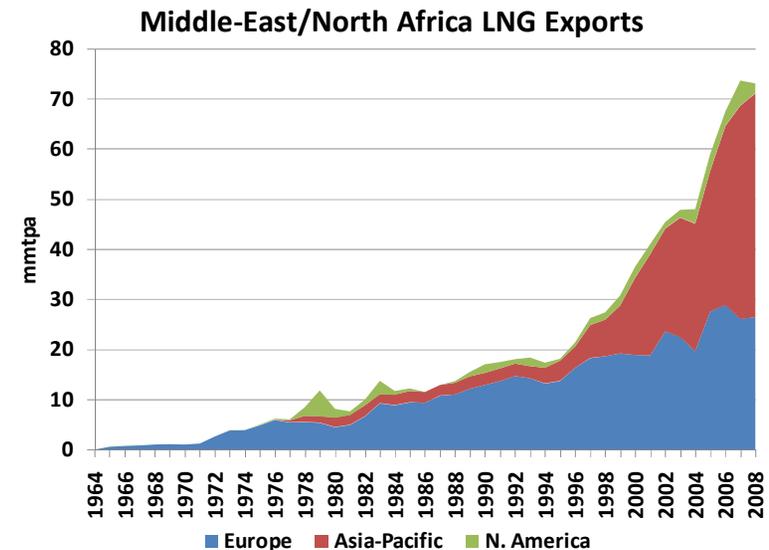
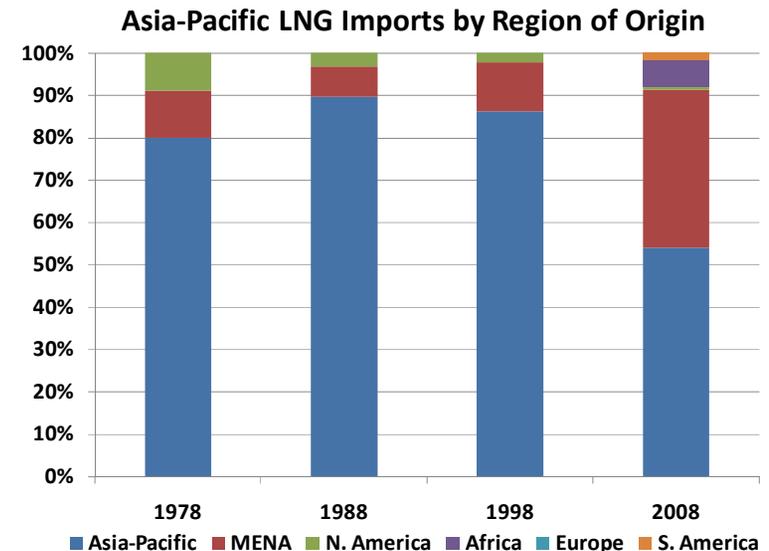
Middle East NGL's Production (mb/d)



Not only does the Middle East supply Asia with feedstock for petrochemicals, but the Gulf's ethane-based petrochemicals industry is also a direct competitor to Asia

Greater Reliance on Gulf LNG Supplies

- Natural gas importing countries of the Asia-Pacific have historically imported LNG from within the Asia-Pacific region
- With declining production from Indonesia, LNG importers (foremost Japan and S. Korea) have sought other sources of supply
- Since the late 1990's, MENA exporters have seen a considerable rise in East Asian demand
- The Gulf states (i.e. UAE, Oman and Qatar) constitute over 60% of MENA LNG supply to Asia-Pacific and over 36% of overall LNG supply to the region
- Japan and S. Korea were among the earliest investors in upstream liquefaction projects in the Gulf



The Asian Price Premium

Market dynamics creates an attractive pricing regime for Gulf suppliers...



Crude Oil

- **The Middle East supplies Asia with close to 12 mmb/d of crude, representing over half of the region's oil demand**
- **Asia's desire for energy security and the Gulf producers' ability to manage Asian inventories creates an unofficial price premium for oil exports into the region versus the Atlantic Basin**
 - Given the distribution of global oil reserves, there is no long-lasting competition that would permanently drive down the Asian premium

LNG

- **LNG exports increased from 15.4 million tons in 2000 to 44 million tons in 2008**
 - This trend will continue as Qatar brings on new supplies
- **Without any real gas-on-gas competition, consumers in Asia are faced with either taking LNG or seeking another fuel**
- **This results in the price of LNG being indexed to alternative fuels such as crude oil or fuel oil/diesel, leading to higher prices compared to Europe or the US which have gas pricing points**

New Areas of Energy Cooperation

- **Several Middle East governments have discussed cooperation on nuclear civil technology with China and Japan:**
 - Japan has held talks with Bahrain and UAE over cooperation on civil nuclear technology
 - In 2008, China and Jordan signed a memorandum of understanding on cooperation in nuclear power
 - Saudi Arabia, Oman and Kuwait have all touted the idea of developing nuclear power with the aid of foreign partners including Japan
- **Environmental concerns over the Gulf's rapid pace of development is slowly creeping into the psyche of the region**
 - Japan is seeking to share its knowledge and experience in promoting energy efficiency with the Gulf States



Strategic Advisors in Global Energy

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- ▶ Buenos Aires
- ▶ **Houston**
- ▶ **Kuala Lumpur**
- ▶ **Lausanne**
- ▶ London
- ▶ Mumbai
- ▶ New York
- ▶ **Paris**
- ▶ Rio de Janeiro
- ▶ **Washington, D.C.**

Main regional offices are shown in blue.

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