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Global Implications of LNG and Unconventional Natural Gas: Price Uncertainties

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Agenda

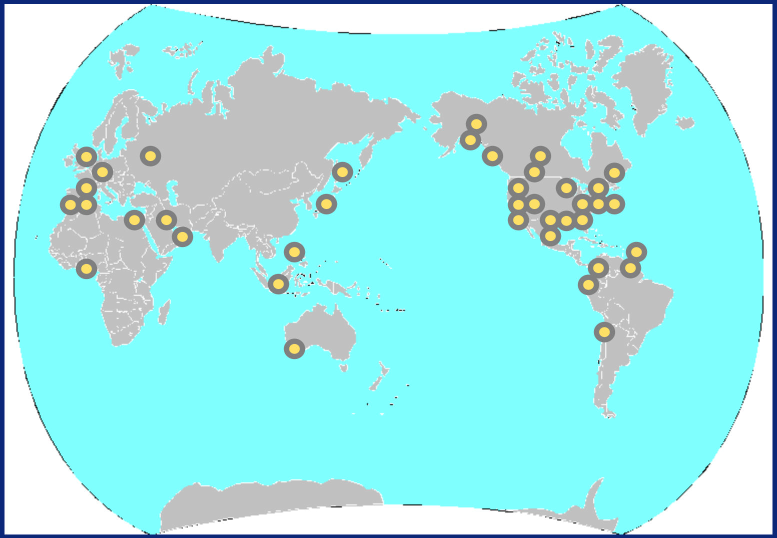
- Introduction
- Gas supply and demand expectations
- Pricing and trade consequences
- Shale gas-LNG-pipeline gas competition
- Looking ahead

BSA – 26 Years of Service to Gas and Energy Industries

Expertise

- Energy economics, rates, price risks, contracting
  - Market research
  - Lender due diligence – power plants, storage, LNG
  - Litigation support/rate cases, 16 jurisdictions
- 500+ assignments since 3/84
- Galway Group leadership in energy, LNG transactions and project management

Major Assignments



Clients: Energy traders, power generators, utilities, banks, governments, universities.

BSA is a Part of the Galway Group of Companies:

Galway Energy Advisors	Commercial advisors and energy consultants
Benjamin Schlesinger and Associates (BSA)	Economic analysts and regulatory consultants
SDG-Galway Energy Strategy Practice	Alliance advising on global strategy and risk management
Galway Capital	SEC registered Broker/Dealer; provides M&A advice and advises on capital raises

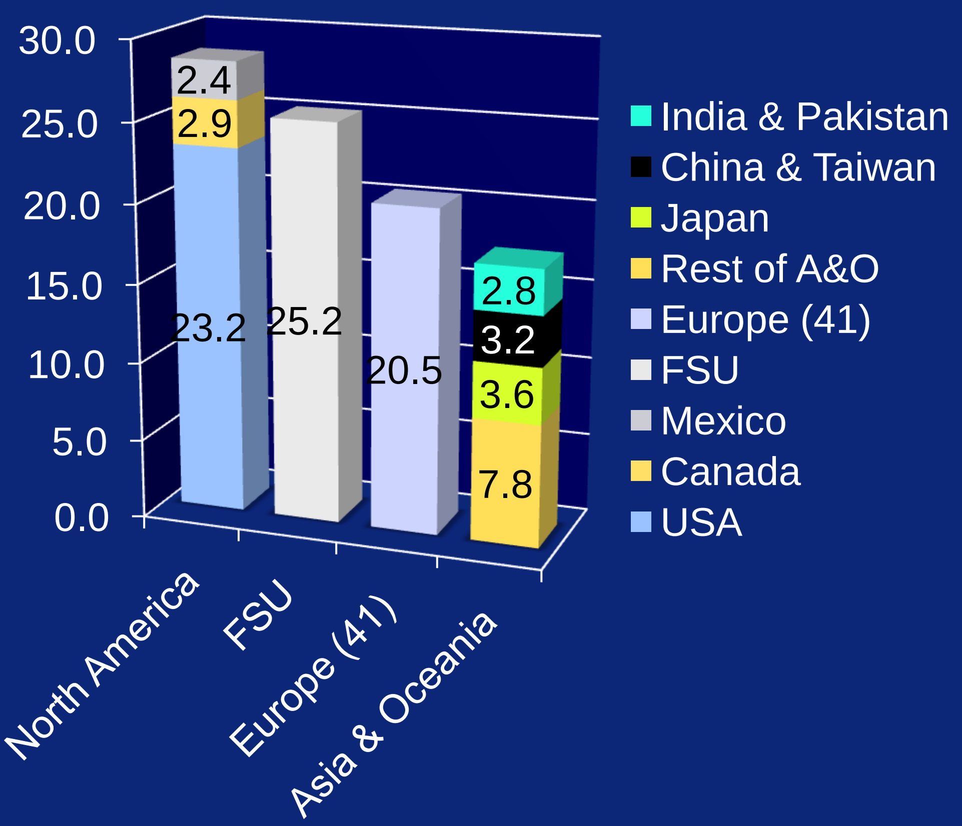
Global Gas Markets

LNG and Pipeline Gas Competition is Emerging Across Four Global Markets

World Gas Markets

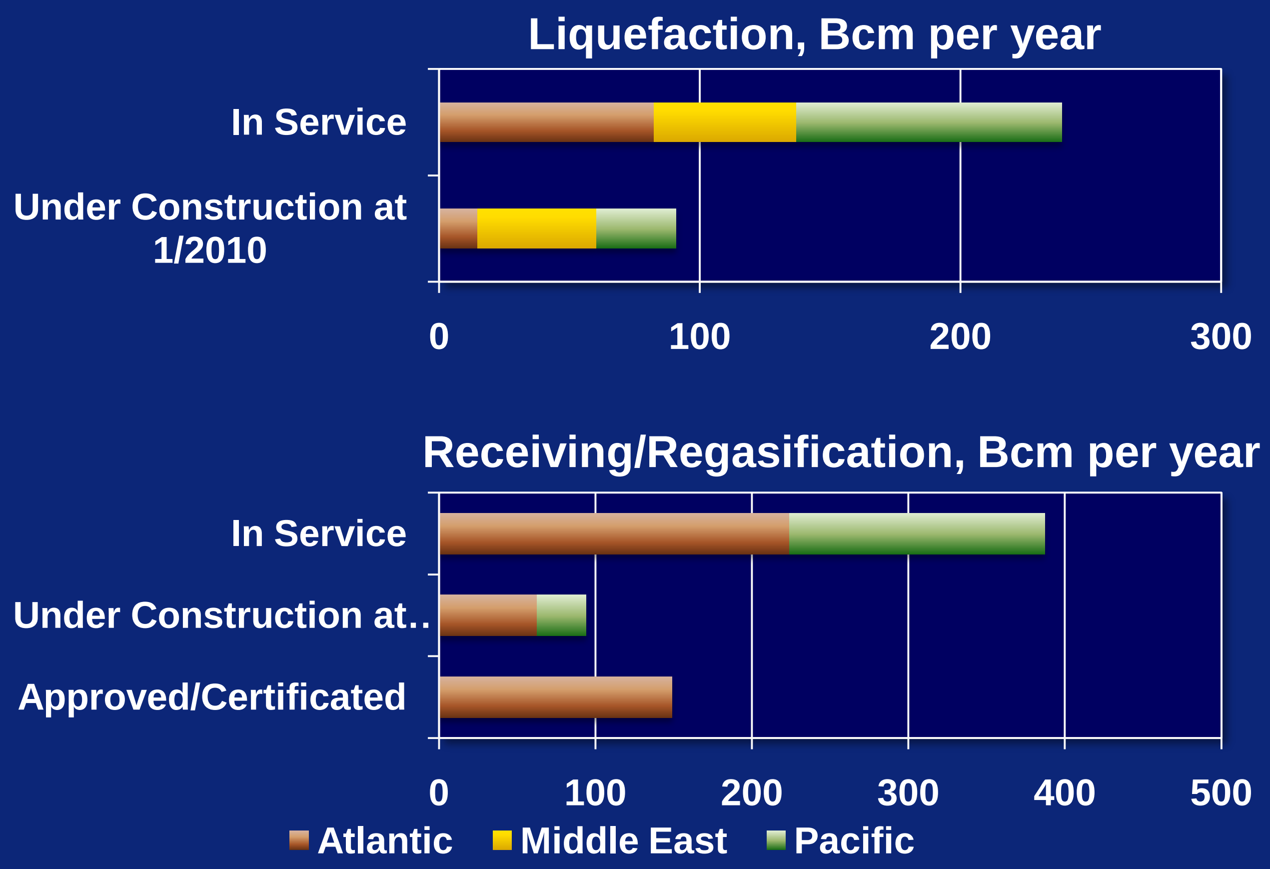
- North America, 28.5 Tcf, now self-sufficient.
- Europe imports from Russia, Algeria, West Africa (also, production in Norway, Netherlands).
- Eurasia (FSU), self-sufficient – most exports to Europe.
- Industrial Asia depends on imported LNG.

Gas Demand in 2008, Tcf



Source: BSA 2009, from EIA.

Global LNG Supplies are Set to Increase by 38% by 2012



Much of this gas was aimed at US markets, where LNG demand will grow more slowly than expected.

Source: Galway BSA 2010, from UNECE LNG Report, Chapter 1 (draft).

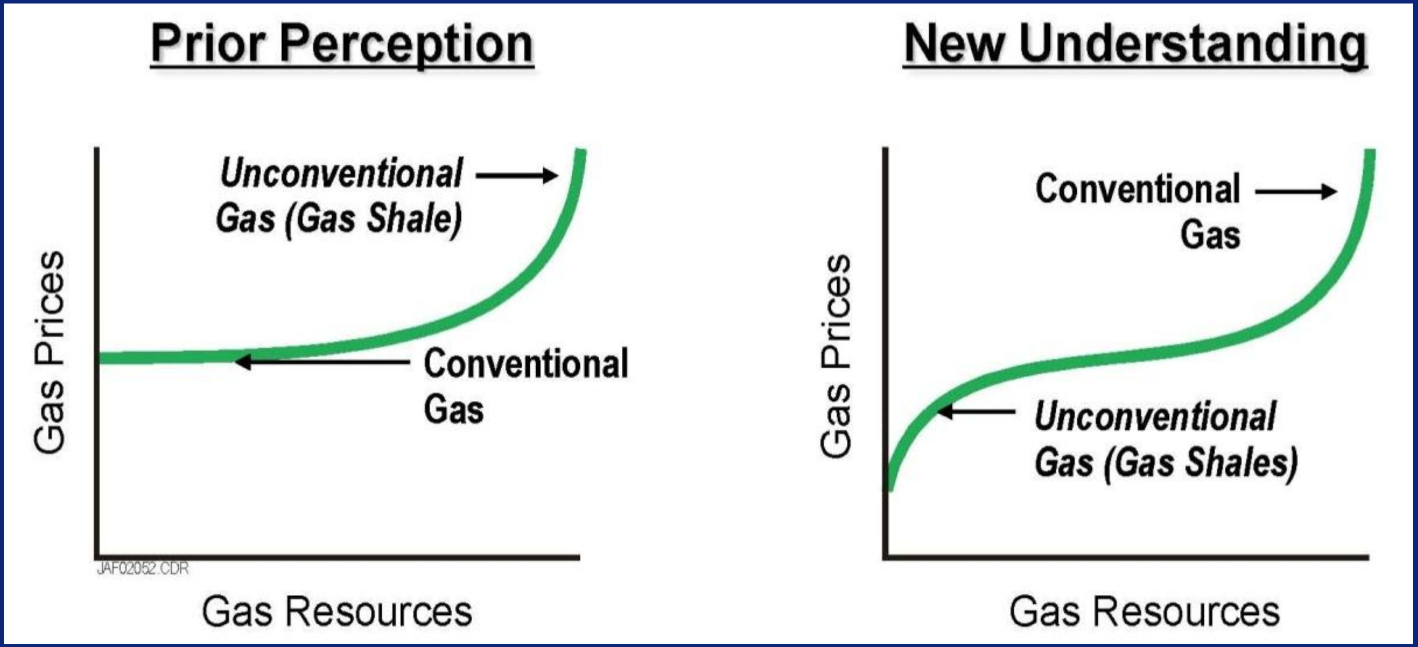
North American Unconventional Gas is Destabilizing World Gas Markets

- Shale gas giants:
  - Barnett Shale (East Texas)
  - Alabama/Oklahoma (Haynesville, Fayetteville, Woodford)
  - British Columbia (Horn River, Montney)
  - Appalachian/Quebec (Marcellus, Utica)
  - Eagle Ford
- Coal-bed methane
- Tight sands in the Rockies, Texas, elsewhere.

Map from NEB of Canada.

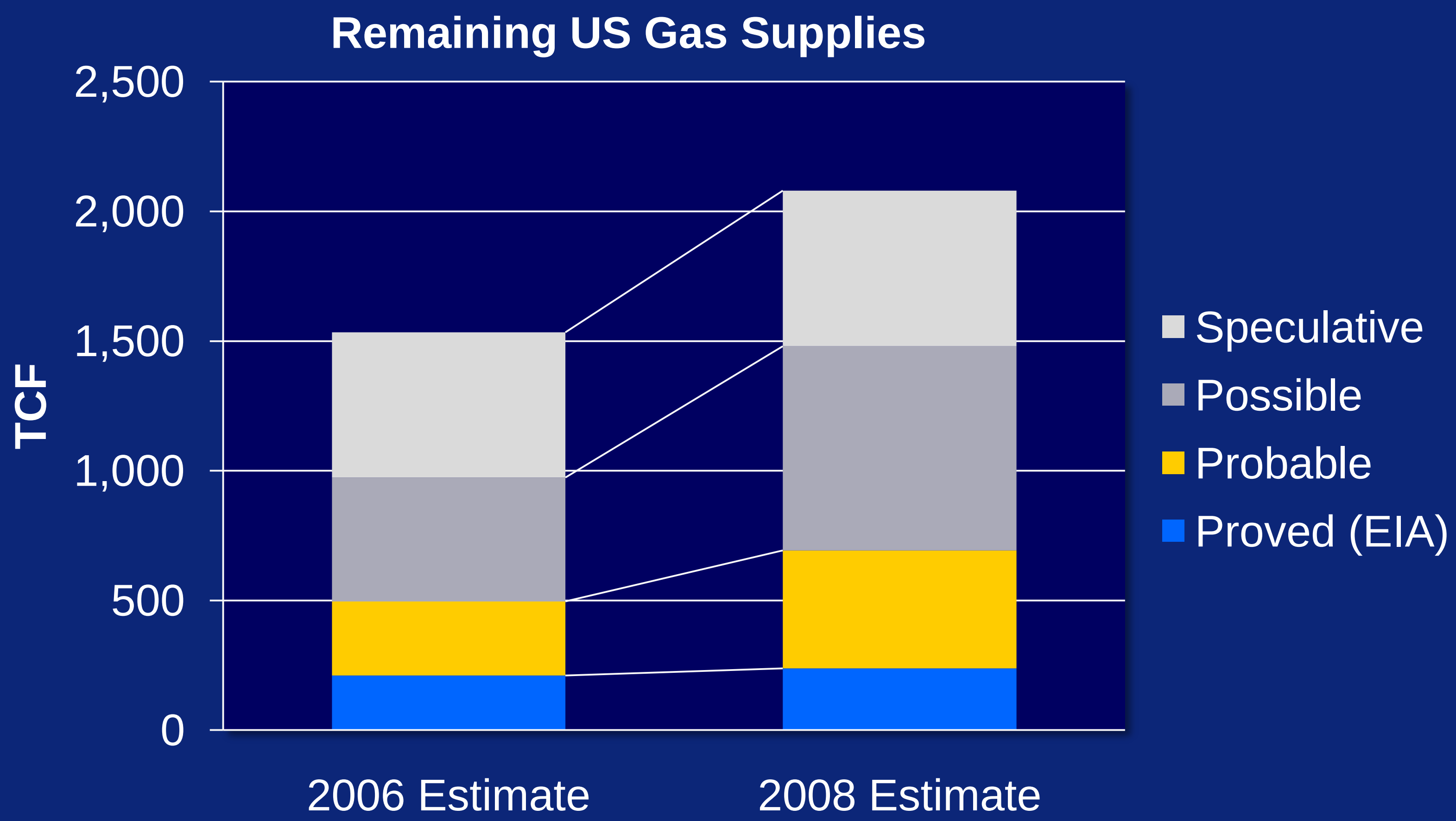
In the US, Shale Gas Has Moved to the Bottom of the Supply Curve

- Until recently, conventional gas was viewed as low-cost, while shale gas was an abundant but high-cost US resource – that perception has now reversed



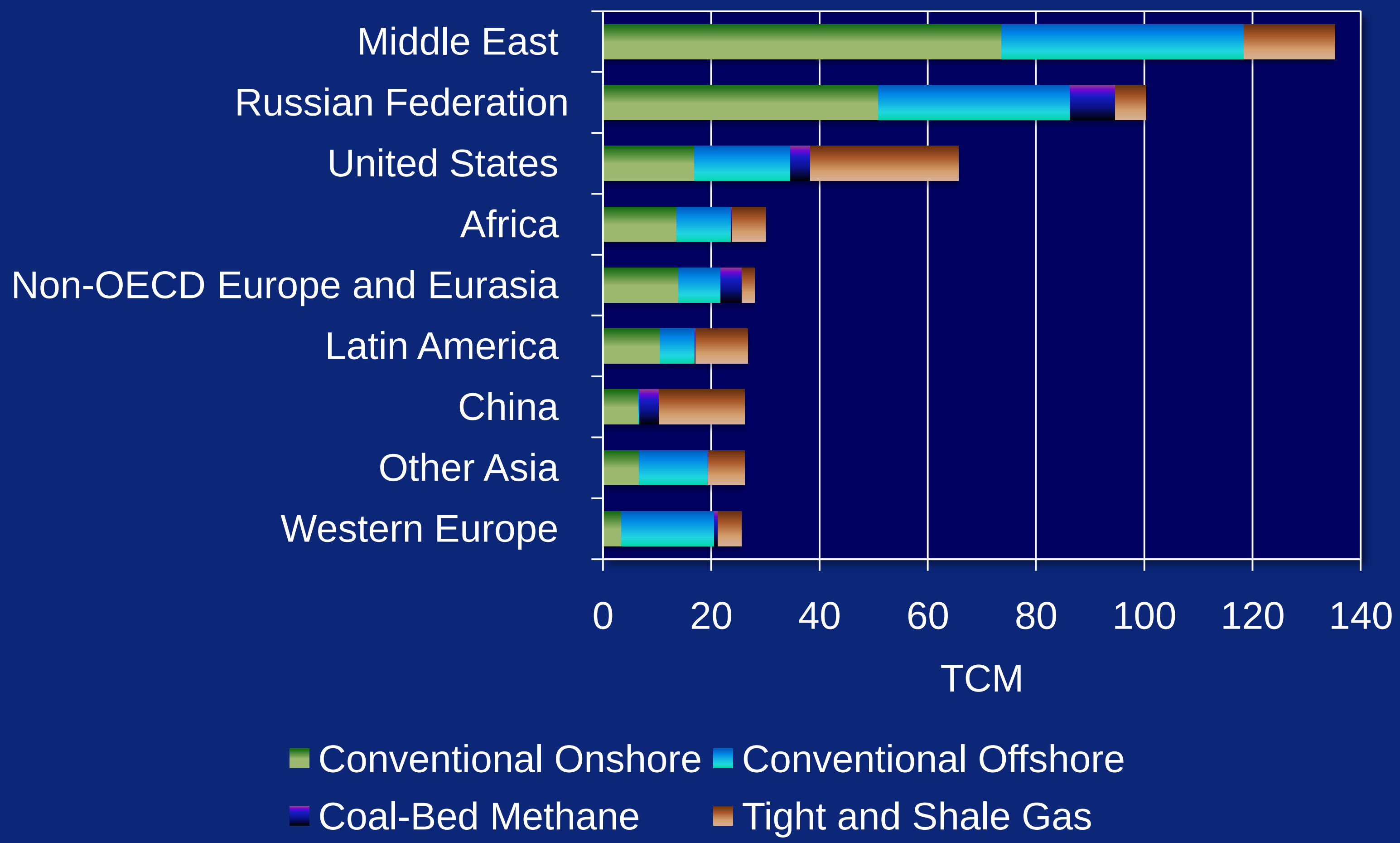
Source: Vello Kuuskraa, Advanced Resources, International, before NCAC-USAEE/CSIS Shale Conference, March 9, 2010, Washington, DC.

Most of North America's Shale Gas Bounty is Still Being Proved Up



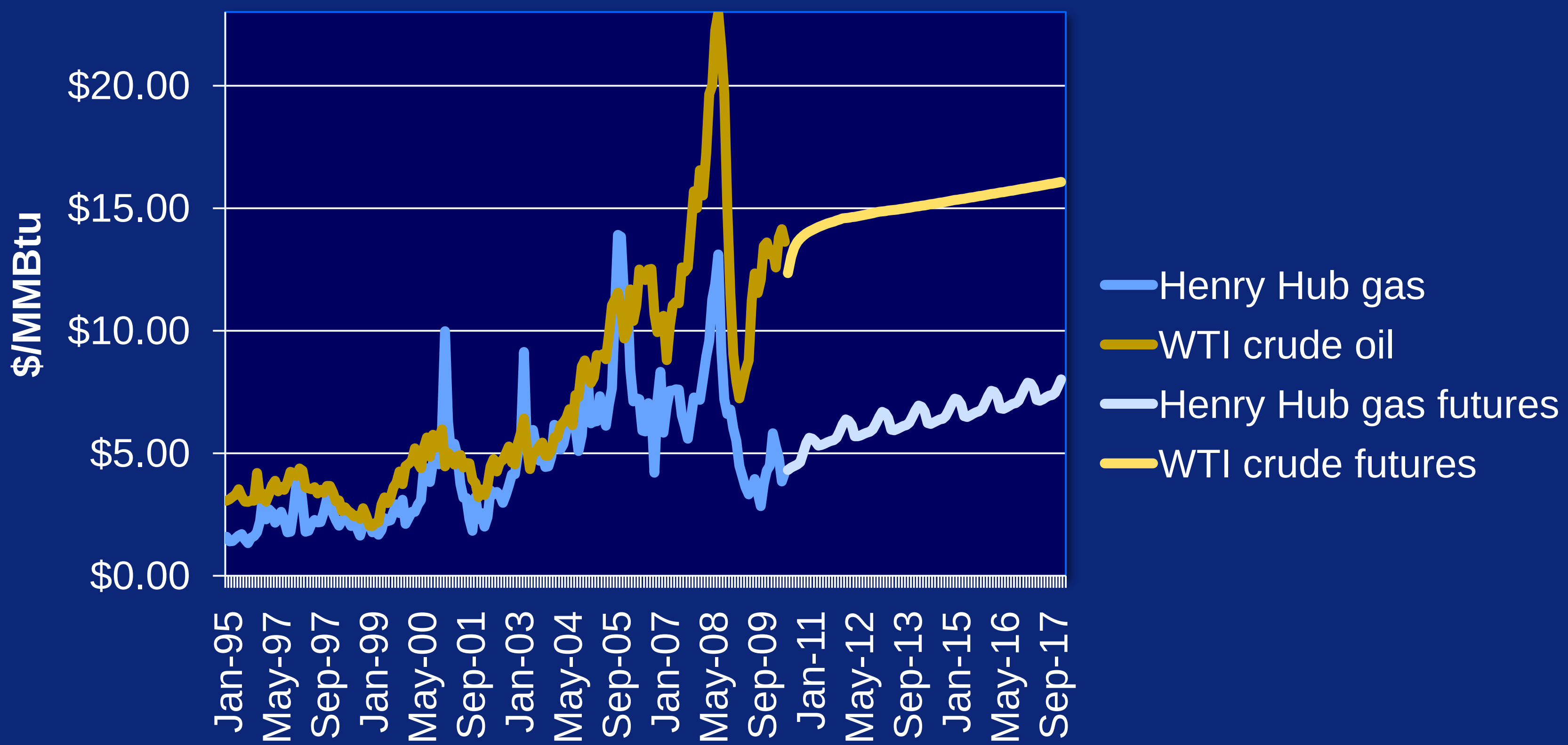
Source: Potential Gas Committee, Colorado School of Mines, 2009.

Today's p50 World Gas Holders Present a Different List From "Proved" Reserves



Sources: UNECE LNG Report, Chapter 1 (draft); EIA, Journal of Petroleum Technology 6/2006, Potential Gas Committee 2009, BSA 2010..

Global Gas Contract Prices, Largely Tied to Oil, are Under Pressure From Spot Prices



A large, persistent gap has opened between European/ Asian gas contract prices vs. US/Euro spot gas prices.

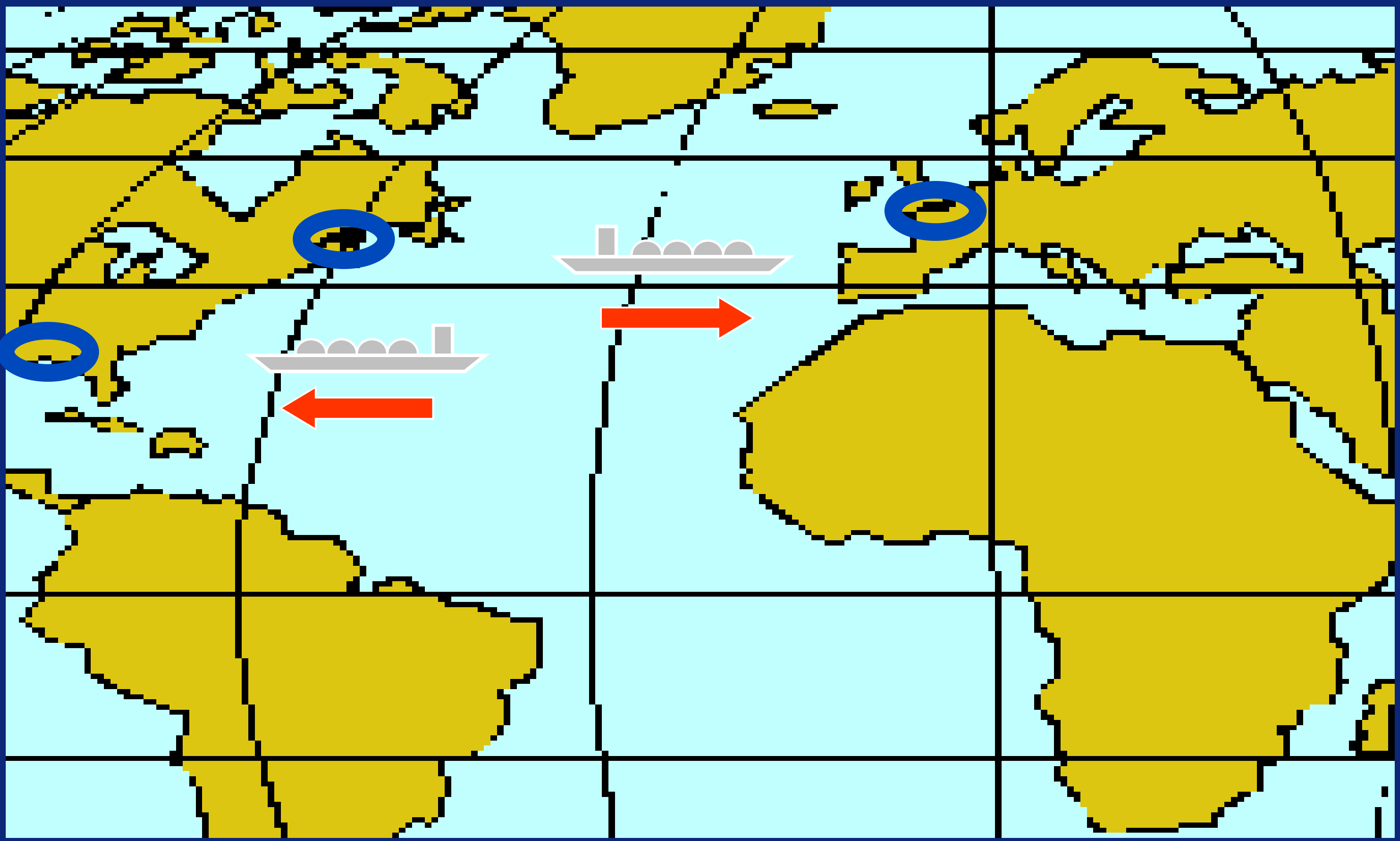
Source: BSA 2010, from NYMEX,close at 14-May-10.

European Gas Trading Hubs Have Emerged Along Lines of US Spot Markets

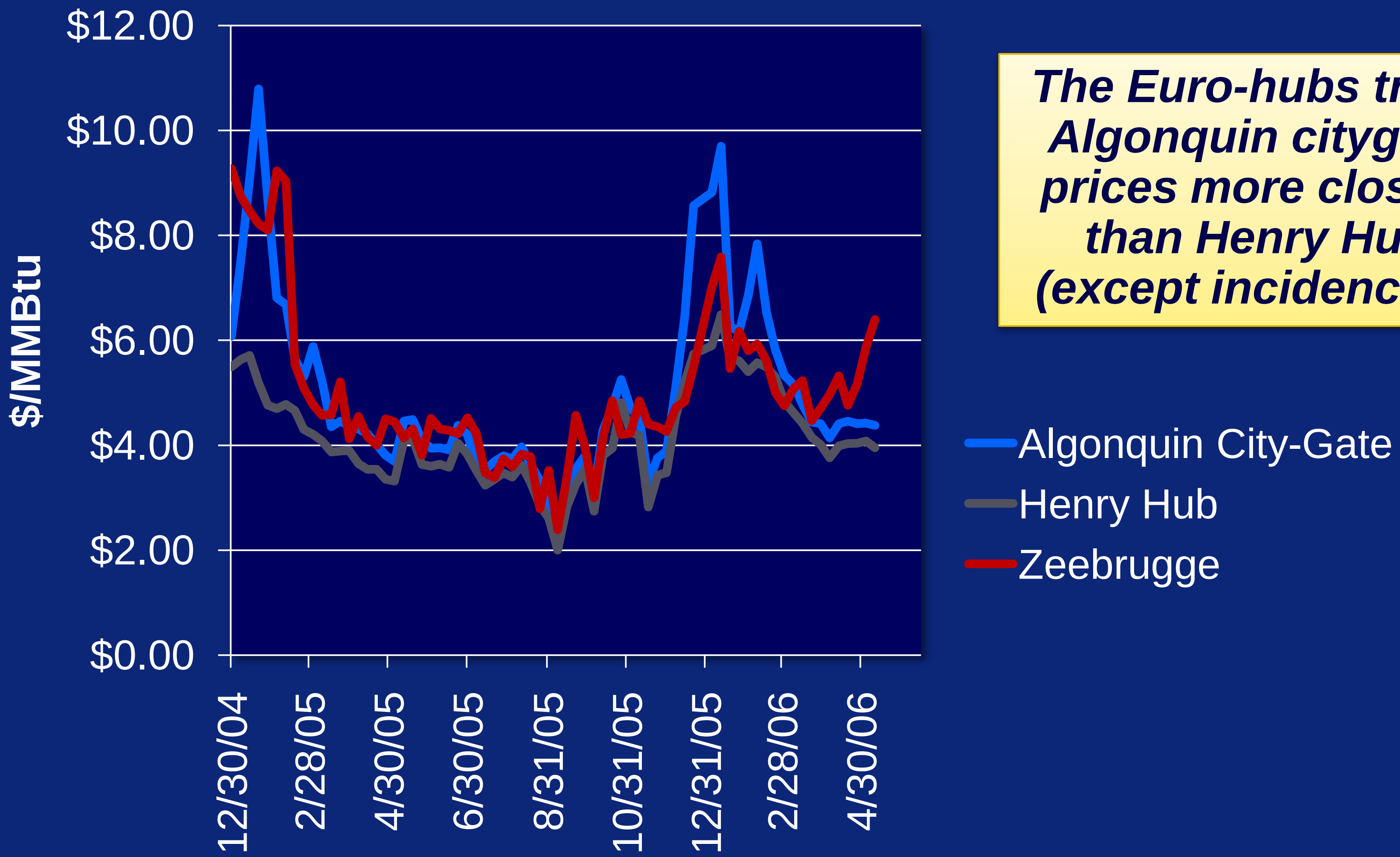
- EU has strongly promoted open access since 1989
- Gas hubs in NW Europe:
  - NBP/UK market
  - Zeebrugge/Zeehub
  - TTF in Holland
  - German hub (EON).
- Euro-hubs compete with contract gas on the margin
- 2010-12: Gazprom will price 15% of contract volumes at the Euro-hub

Source: BSA 2010, map from World Gas Intelligence.

Atlantic LNG is Bouncing Between Euro-hubs and the US East and Gulf Coasts



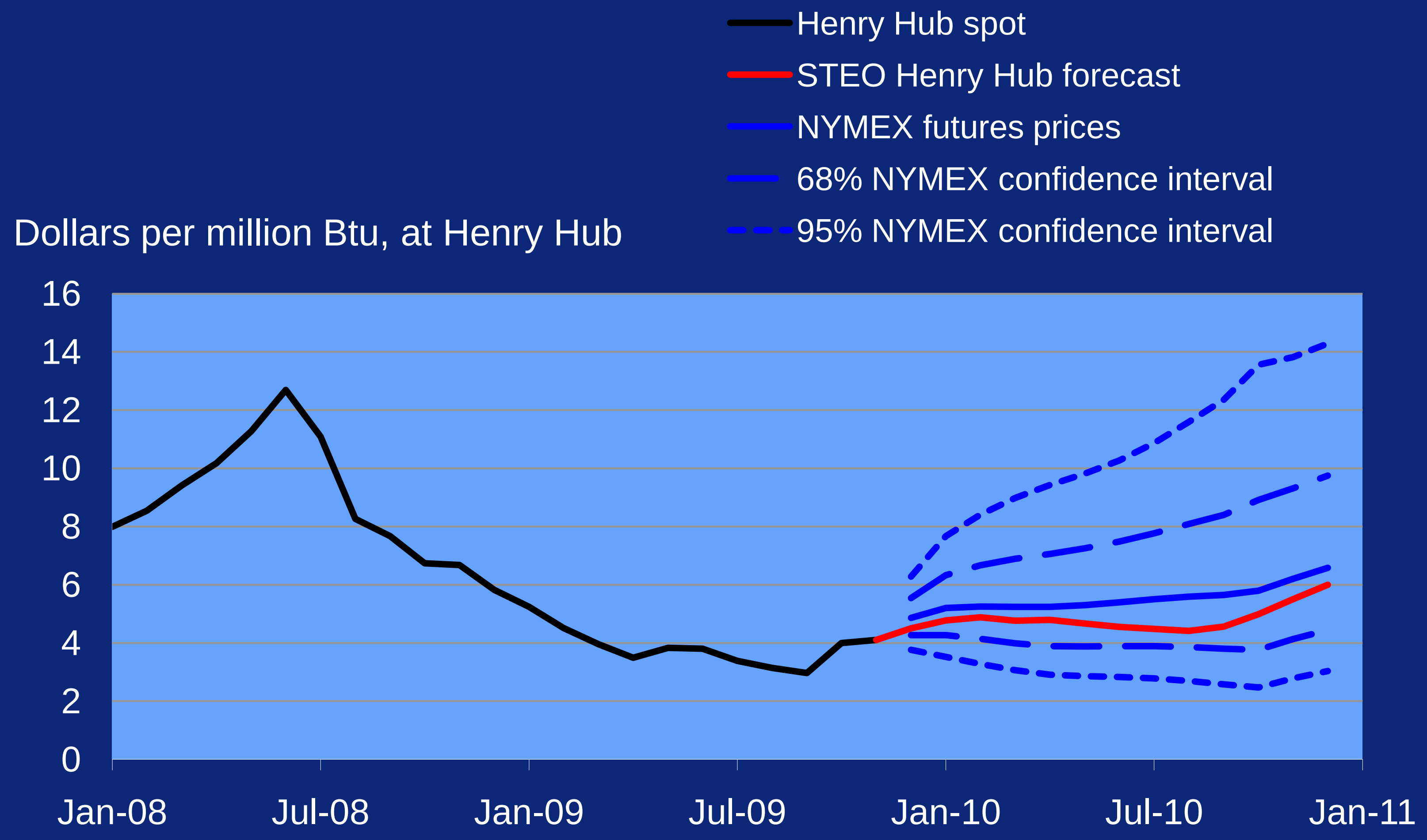
Spot Gas Competition Impacts Markets Within and Beyond The Atlantic



The Euro-hubs track Algonquin citygate prices more closely than Henry Hub (except incidences).

Source: BSA 2010, World Gas Intelligence.

The Direction For Natural Gas Spot Prices Remains Highly Uncertain



Source: EIA Administrator Richard Newell, November 20, 2009, before NCAC-USAEE, Washington, DC.

Implications, Commercial Risks…

- Uncertainty remains large – gas prices will be driven by such fundamentals as world economic growth, shale extraction technology, global LNG, carbon policy
- A contract crisis is brewing in Western Europe
  – It is likely that European gas contracts are better structured than the old US contracts to withstand the coming shale-and-LNG-driven spot price onslaught
  – Movements in Asian markets may take place as well, probably led by China’s LNG importers
- Demand deficit – even with economic recovery, major legislation and capex in renewables may ultimately curb world gas demand growth, further pressuring world gas prices and supply agreements
- Corporate assumptions and contracts may need to be revisited

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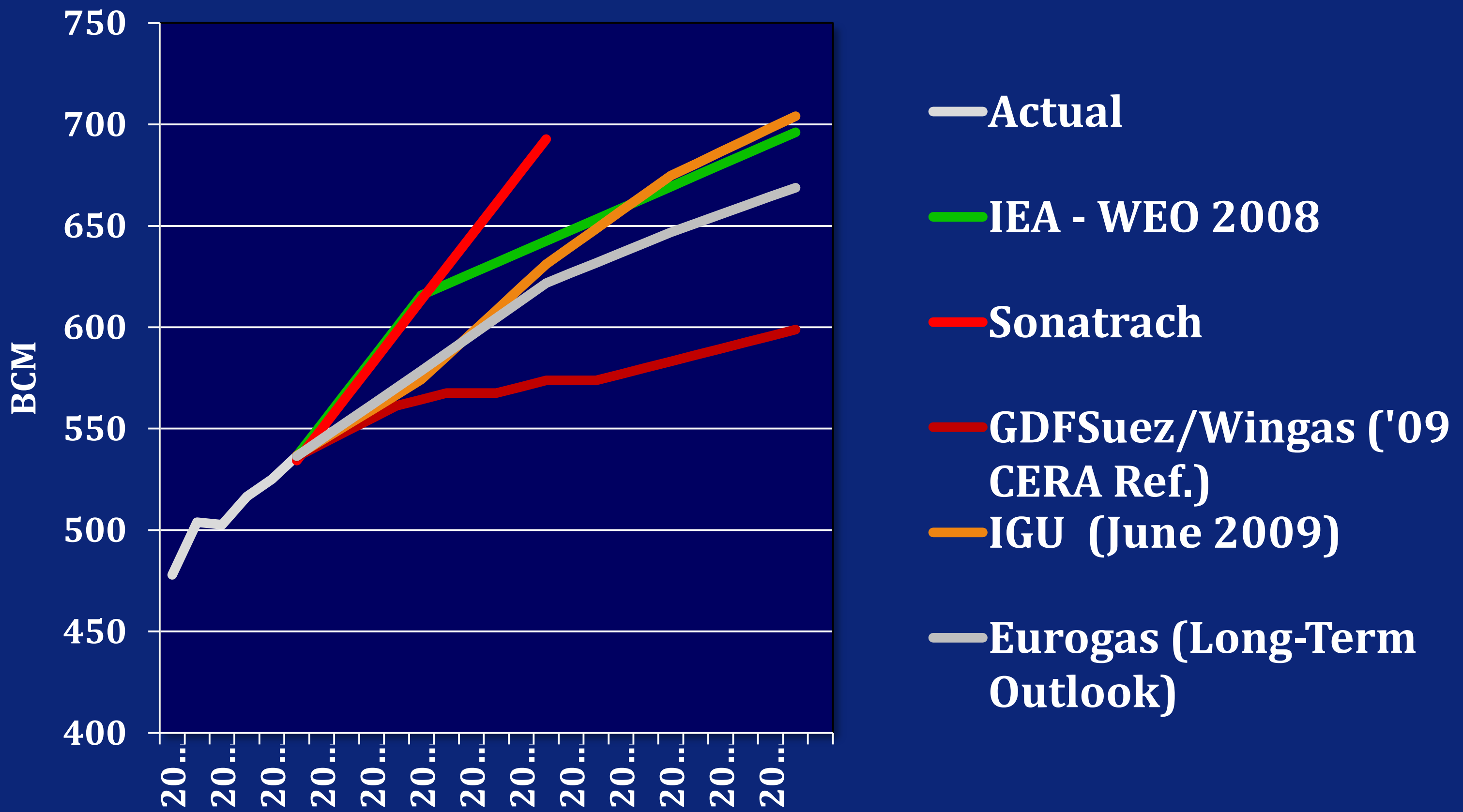
Questions?

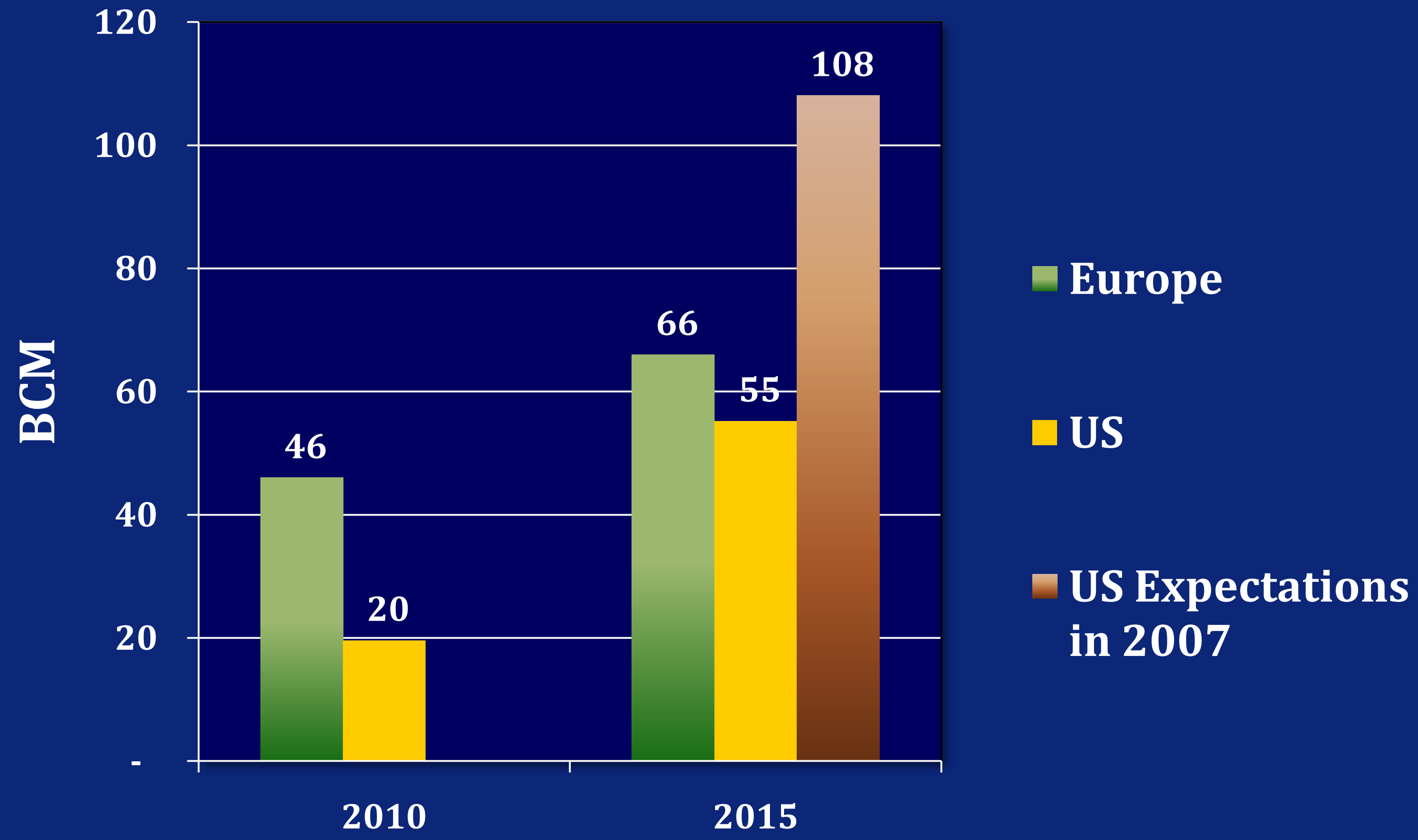
Changing "The Great Game"

European Gas Demand is Set to Continue Growing, With New Gas-fired Power Plants



Sources as stated; Galway BSA 2010, chart from UNECE LNG Report, Chapter 1 (draft).

LNG Import Expectations for North America Have Changed Widely



Source: Galway BSA 2010, from UNECE LNG Report, Chapter 1 (draft); BSA report to the American Gas Foundation, 2008.