

GAS MARKET DEVELOPMENTS IN THE ASIA PACIFIC REGION

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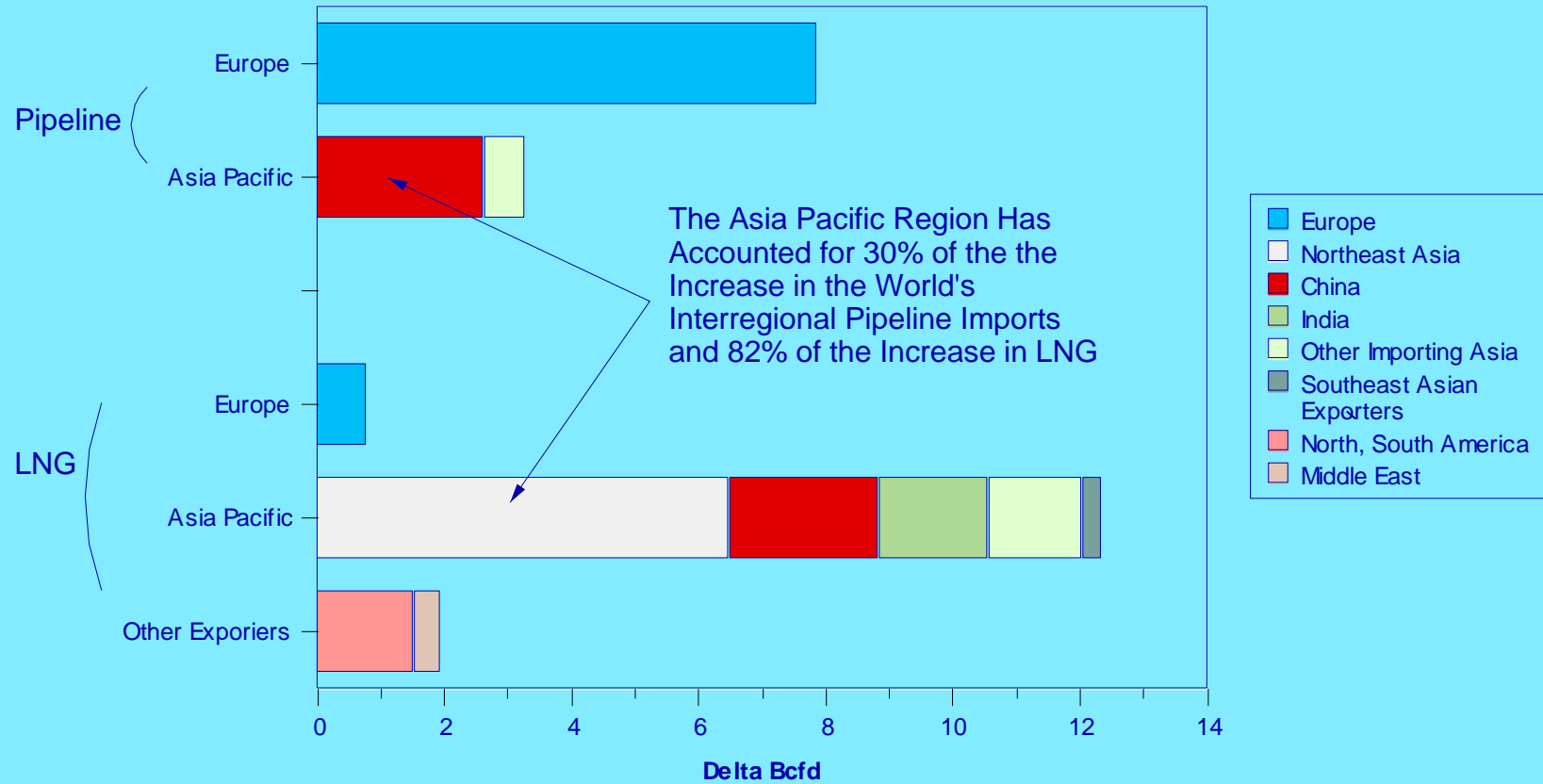
BECAUSE OF THE GEOGRAPHY OF ITS MARKETS AND ITS RESOURCES

- The Asia Pacific Region Has Never Developed the Interconnected Pipeline Grid That Facilitated the Growth of Gas Trade in Europe
- As a Result, 84% of Asia's Trade is in the Form of LNG, Whereas Europe's is 84% Pipeline
- Asia Has Also Inherited LNG's Oil-Linked Contract Pricing Structure, Which Together with Asia's Unique Pricing Formula, Has Left the Region With Higher Import Prices Than Most of the Rest of the World
- Thus Gas Has Only an 11% Market Share of Primary Energy While in Europe Its Share is 24%

NEVERTHELESS, THE ASIA PACIFIC REGION IS WHERE THE ACTION HAS BEEN IN WORLD GAS TRADE

- Over the Past Decade, World Gas Demand Has Increased by 29% or 72.6 Bcfd
- Interregional Trade in Natural Gas Has Accounted for 36% of That Demand Growth or 26.4 Bcfd
- And the Asia Pacific Region Has Accounted for 67% of The Increased Trade
- Northeast Asian LNG Alone Contributed 25% of This Growth; Increases in Chinese Pipeline and LNG Added Another 19%

THE INCREASE IN INTERREGIONAL GAS TRADE OVER THE PAST DECADE

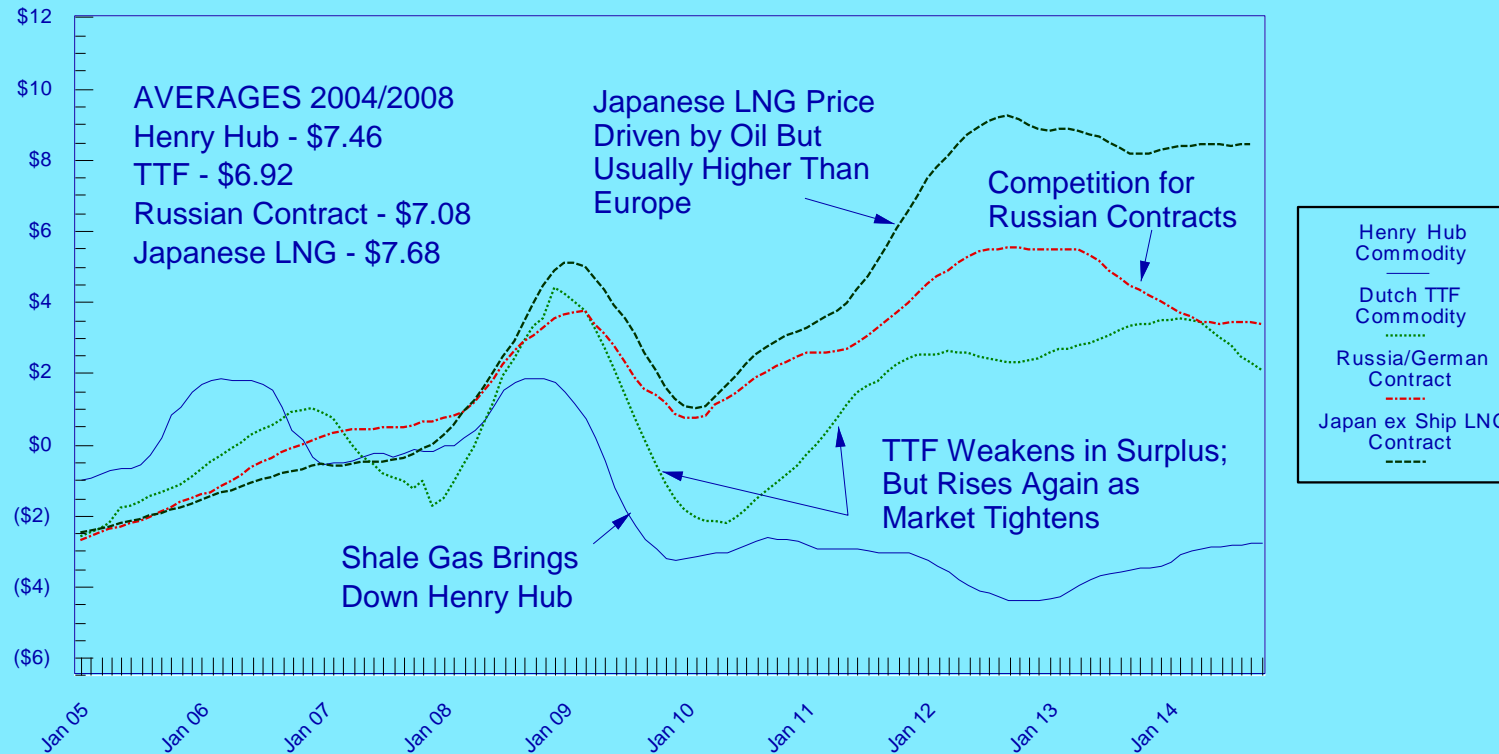


BUT THE MARKET IS CHANGING, RAISING QUESTIONS AS TO WHAT THE FUTURE HOLDS FOR GAS IN THE REGION AND FOR WORLD LNG DEMAND

- Foremost Among These is the Issue of Asian Pricing
- And Since High LNG Prices Have Both Acted as a Brake on the Region's Economic Growth and Have Been Used to Justify Supply From High-Cost Sources, Such as Australia, The Resolution of the Pricing Issue Will Influence Not Only Asia, But the Outlook for LNG, as Well
- The 2009/2010 Gas Market Surplus Set Off Regional Price Competition and Forced a Possibly Permanent Restructuring of the International Gas Pricing System
- As a Result of the Surplus, International Gas Prices Are Experiencing Unprecedented Divergence

THE EMERGENCE OF REGIONAL PRICE DIVERGENCE FOLLOWING THE GAS MARKET SURPLUS OF 2009/2010 (12 MONTH MOVING AVERAGES) THE DEPARTURE OF REGIONAL GAS PRICES FROM THEIR AVERAGES FROM 2004 THROUGH 2008

Price Relative to 2004/2008 Average



- The High Asian Prices (the "Asian Premium") are a Product of Oil-linked Contracts, Keyed to the Japanese Customs Cleared Price of Crude Oil (JCC) or the "Japanese Crude Cocktail "
- Those Prices Have Been Reinforced by a Tight Asian Market as a Result of Rapid Growth in Chinese Demand and the Effect of the Post Fukushima Nuclear Shutdown in Japan
- It is Possible to Estimate the Size of the Asian Premium by Envisioning What a Theoretical Competitive Commodity Market Might Look Like
- In Such a Market, European Equilibrium Prices Should Not Be Able to Rise Above U.S. Prices Plus Transportation to Europe; And Middle East Sellers, Seeking the Highest Netback, Would Arbitrage Asian Prices Against European Prices

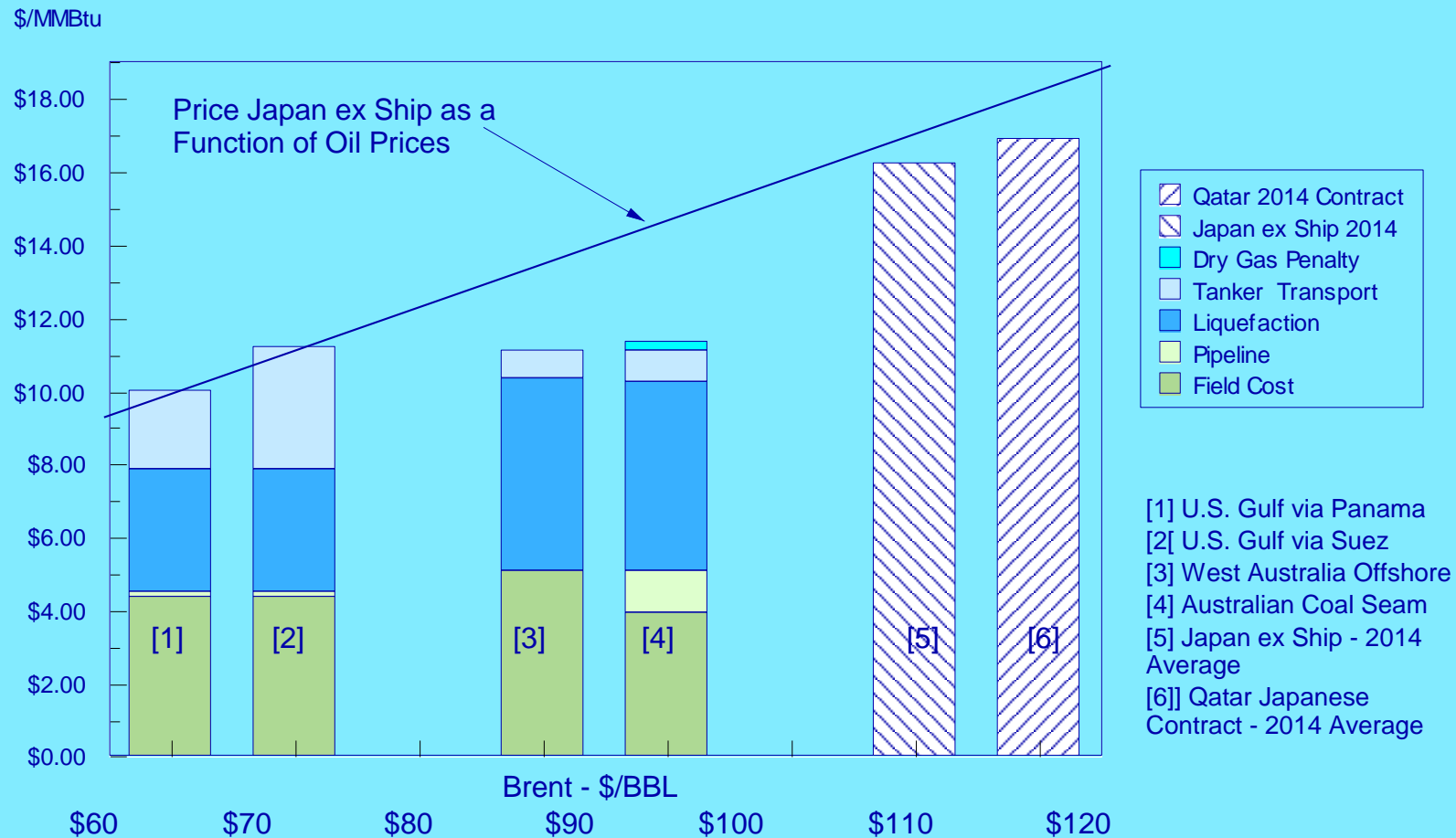
HYPOTHETICAL WORLD LNG PRICE STRUCTURE [1] ASSUMING MARKETS ARE IN EQUILIBRIUM WITH U.S. 2013 COMMODITY PRICES, TRANSPORT COSTS TO EUROPE SET EUROPEAN PRICES AND EUROPEAN NETBACKS FROM EUROPE TO QATAR SET ASIAN PRICES



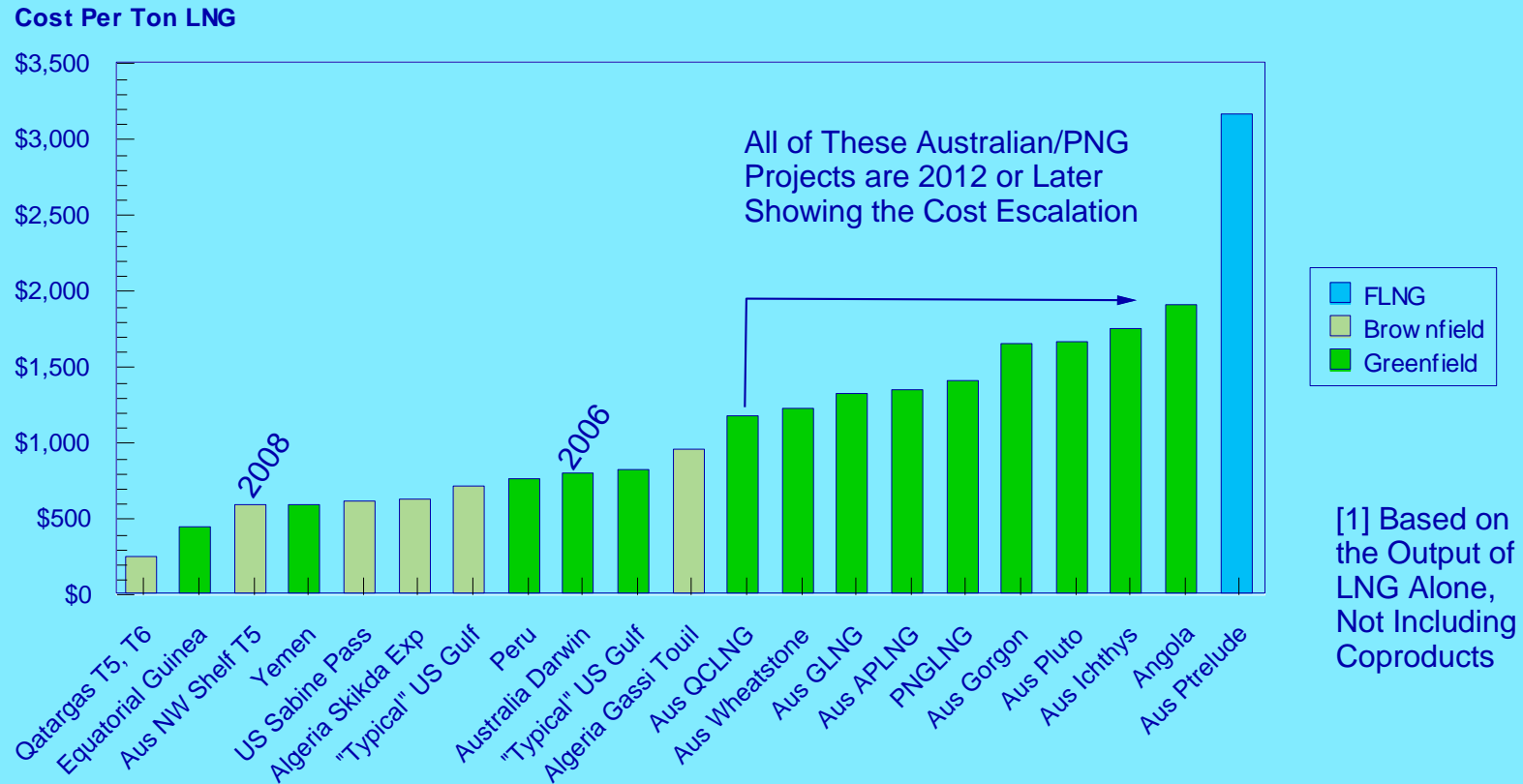
THE ASIAN PREMIUM IS COMING UNDER ATTACK FROM TWO SOURCES

- First, the Somewhat Surprising Decline in World Oil Prices Will Drag Down Contract Prices Without any Change in Existing Formulas
- And Second, the Chronic Tight Asian Markets That Have Supported the High Prices Now Seem to be Weakening in the Face of Surplus Supply, Thus Creating the Potential for Price Competition
- The Following Slide Illustrates the Effect on Prices from an Oil Price Decline; It Does Not Take Into Account Formula Time Lags or the Effect of the Few Remaining "S" Curves, Primarily in Australia, That May Moderate the Effect
- And the Australian Economic Illustrations are Averages; New Projects May be Much More at Risk

THE EFFECT OF DECLINING OIL PRICES ON THE OIL-LINKED JAPANESE LNG PRICE SHOWING EFFECTS ON SELECTIVE SUPPLY SOURCES (CURRENT PRICE LEVELS, ASSUMING U.S. PROJECTS AND PANAMA CANAL IN OPERATION)



A COMPARISON OF THE CAPITAL COST PER TON OF LNG [1] FOR VARIOUS LNG PLANTS SHOWING THE HIGH AUSTRALIAN COSTS FOR PROJECTS STARTING UP AFTER 2012



IT IS NOW BECOMING APPARENT THAT THE LNG MARKET MAY BE OVERSUPPLIED IN THE NEAR FUTURE

- There May be Too Little Demand Growth to Accomodate Both an Expected Surge in LNG Supply and the Many Projects With Proposed Startup Dates
- A Surge in Capacity From Australia and the Startup of U.S. Gulf Coast Exports is Reminiscent of the Surge From Qatar in 2008 to 2011, Which Sharply Weakened Prices
- And it Comes at a Time When Chinese Pipeline Commitments (Most Recently to Russia) and the Restart of Japanese Nukes Threatens to Limit Those Countries Appetites for LNG at Recent Growth Rates
- But the Surge is Larger and it Will Not be Cushioned by Displacement of Russian Pipeline Exports to Europe as Was the Earlier Surge; and the Nukes are Coming Back

INCREMENTAL GROWTH OF LNG DEMAND FROM A 2013 BASE COMPARED WITH SCHEDULED FIRM, PROBABLE, AND SCHEDULED POSSIBLE CAPACITY FROM THE JENSEN DATABASE(CAPACITIES AT 85% CAPACITY FACTOR)

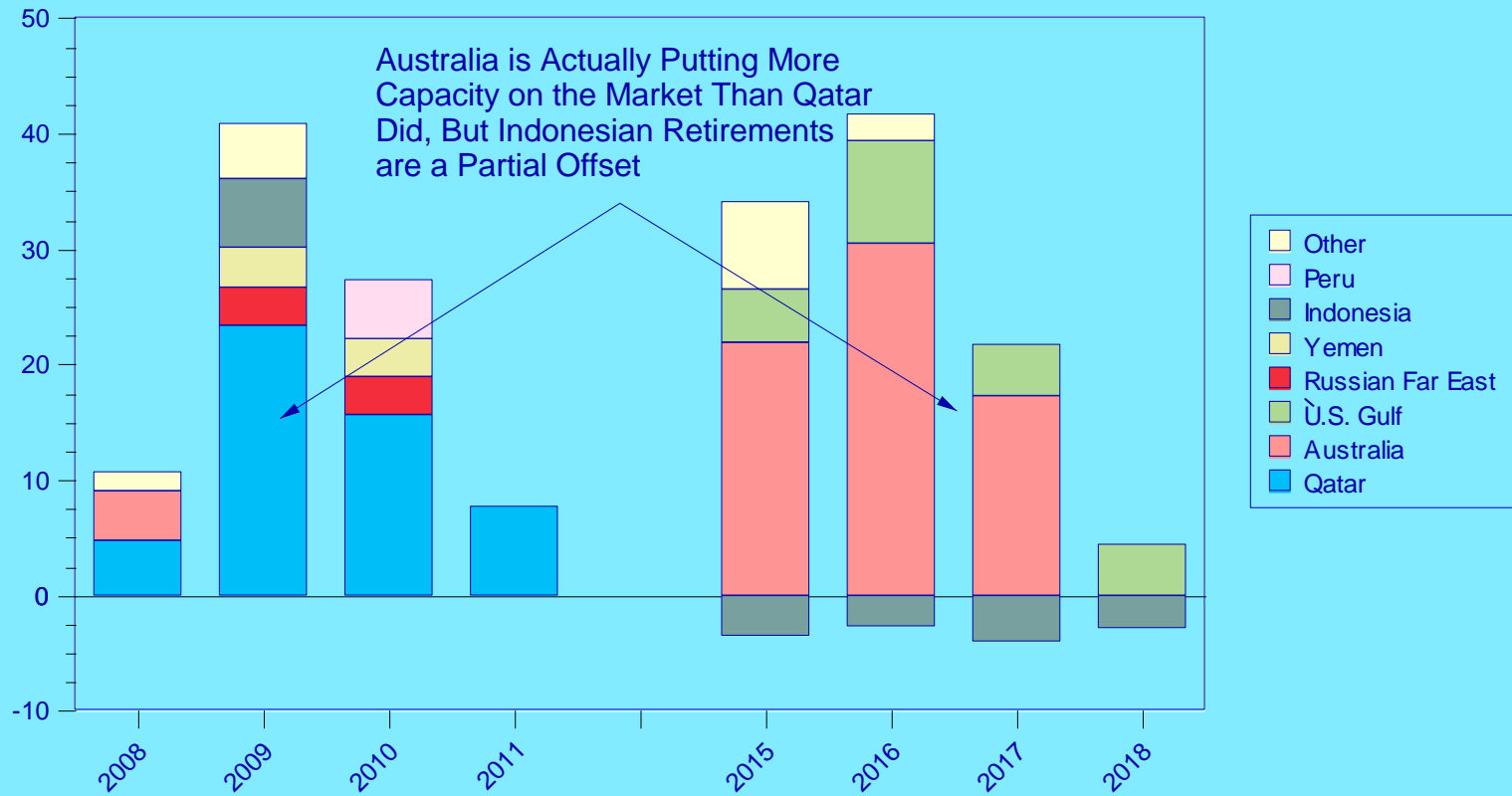
MMT Incremental Increase Over 2013 (Capacity @ 85% CF)



A TALE OF TWO SURGES

NEW CAPACITY SUPPLIED IN THE 2008/2011 SURGE AND THAT POTENTIALLY TO BE SUPPLIED DURING 2015/2019

Capacity Added - MMT LNG



NORTHEAST ASIA AND CHINA HAVE BEEN THE DRIVING FORCES IN THE ASIA PACIFIC GAS TRADE

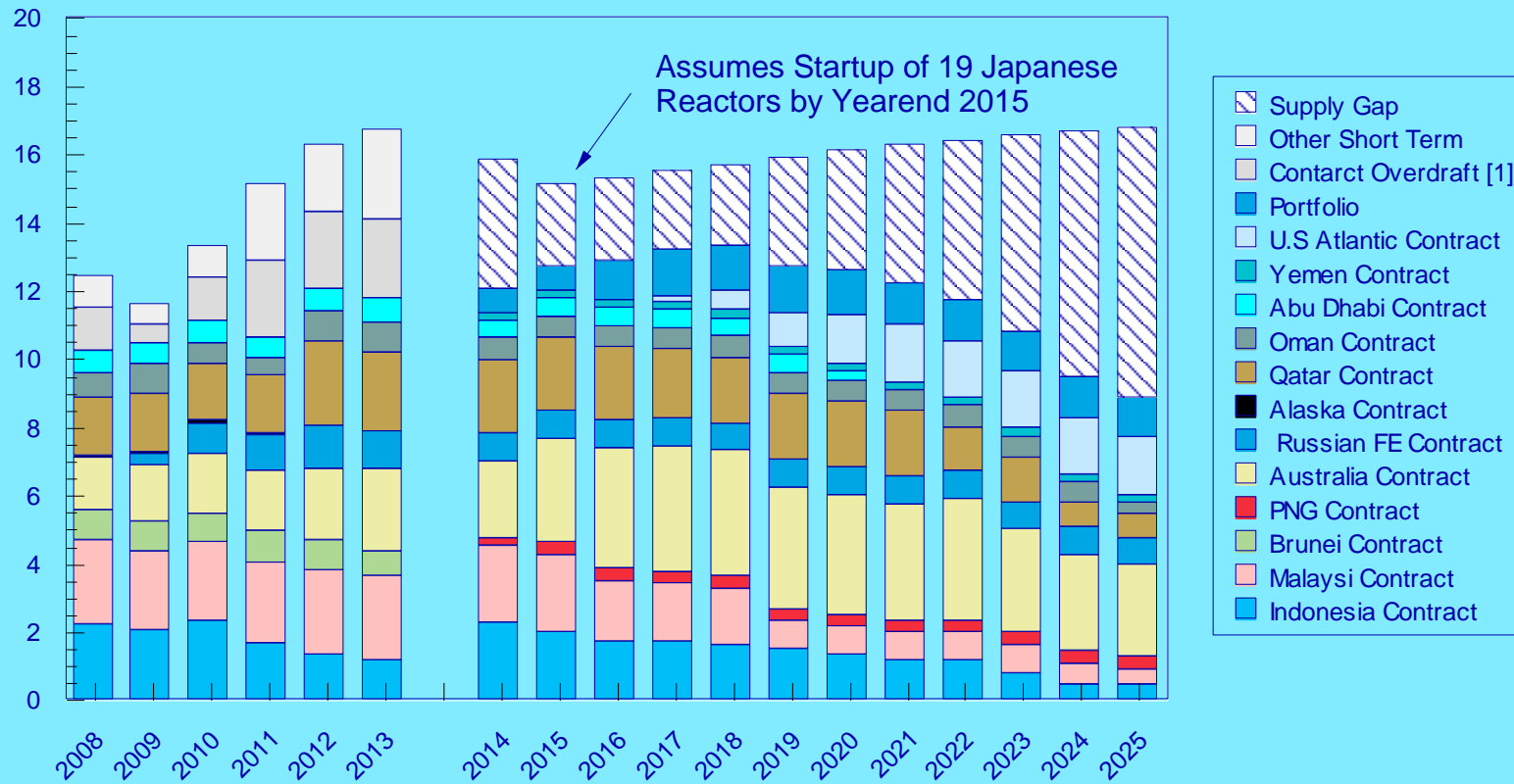
- But Both Regions are Experiencing Changes in Their Appetites for More LNG, Potentially Putting Pressure on the Traditional Asian Oil-linked LNG Pricing Formula
- The Indian Subcontinent Will be a Growing Market, But if the Long-Discussed Iran-Pakistan-India Pipeline Ever Gets Done, It Would Put a Crimp in LNG Demand
- Other Asian Importers, Such as Taiwan, Singapore and Thailand, Though Relatively Small, Will Also Contribute to LNG Demand Growth
- And Island LNG Exporters, Such as Indonesia and Malaysia, are Beginning to Import LNG as They Try to Serve Their Scattered Markets

HALF OF ALL THE WORLD'S SHORT-TERM LNG TRADE IN 2013 WAS DESTINED FOR NORTHEAST ASIA

- Much of This Went to Japan, Where Electric Utilities with Shut Down Nuclear Capacity Were Reluctant to Make Long-Term Commitments for Replacement Gas Supply
- But the Nukes are Being Turned Back on and New Supply From Australia and Papua New Guinea Will Shrink the Uncommitted Gas Market
- If the IEEJ Target of 19 Restarts by the End of 2015 is Achieved, Gas Demand Would Decline Significantly
- The Best Prospect for New Commitments for This Market Will Occur Towards the End of the Decade as Contract Expirations, Particularly From Indonesia and Malaysia, Begin to Kick In

PROJECTED NORTHEAST ASIAN NATURAL GAS IMPORTS AND THEIR POTENTIAL CONTRACT COVERAGE (CAPACITIES @ 85%) BCFD

Commitments in Bcfd



[1] Deliveries in Excess of Contract Quantity by Contract Suppliers

GIVEN THE MANY UNCERTAINTIES IN THE CHINESE ENERGY ECONOMY,

- It Has Been Difficult for the Chinese, Let Alone Western Observers, to Project Future Chinese Gas Imports
- What is Apparent is That China Has Been Developing a Portfolio of Gas Supply Options That Enhance the Country's Ability to Negotiate the Best Possible Supply Deals; That Alone Adds to the Uncertainty as to How it Will be Supplied
- If China Proceeds to Utilize the Contract Commitments That it Had Previously Signed in Russia, Turkmenistan, Kazakhstan and Uzbekistan, They Potentially Take a Substantial Share of China's Import Growth to 2025
- And Some of the Potential LNG Market Has Already Been Contracted For

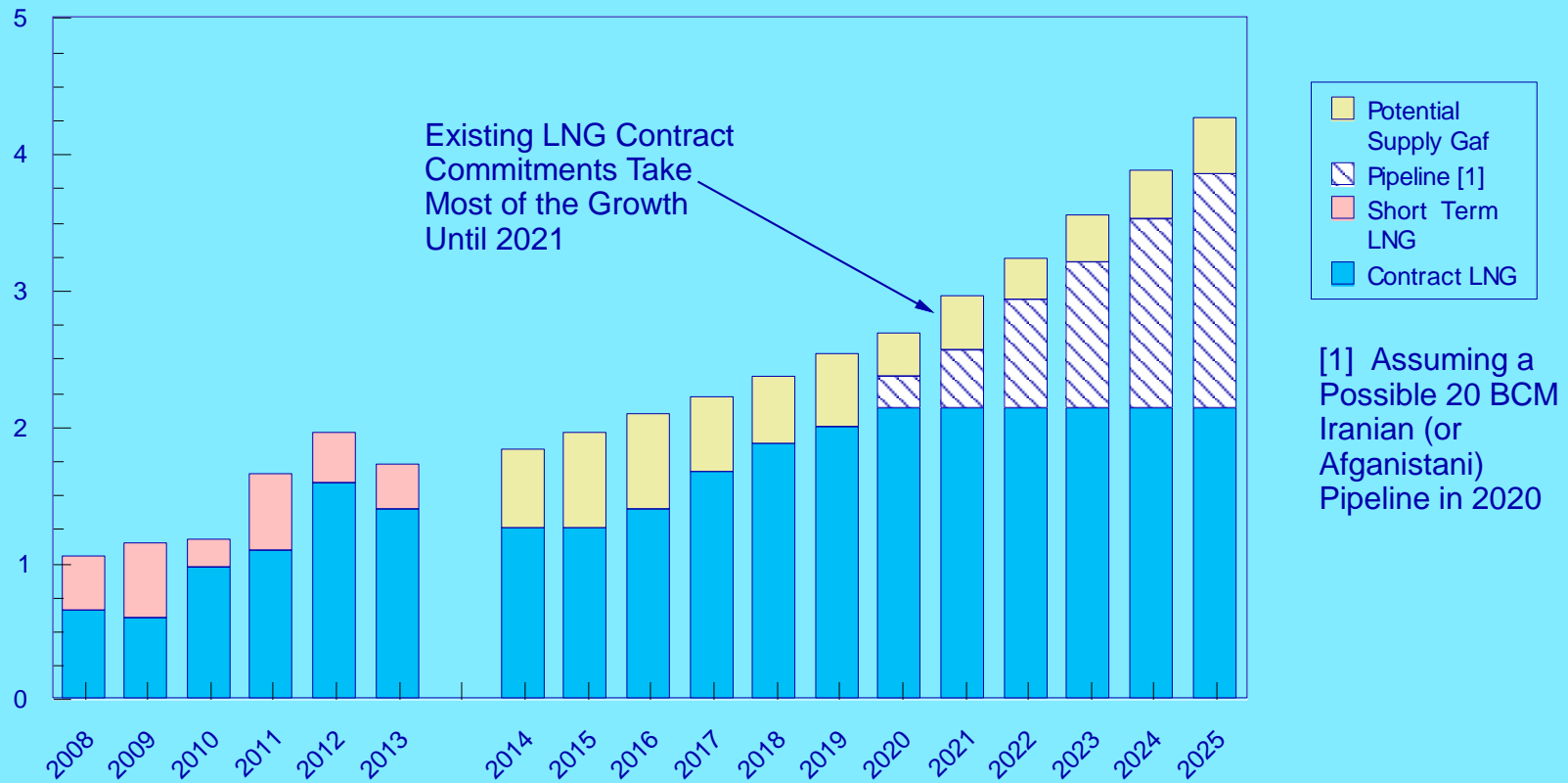
- Then in the November APEC Summit in Beijing, Xi and Putin Announced the Signing of an Agreement for a West Siberian Pipeline, Potentially Further Squeezing the Market for LNG
- And Then the Following Day, Xi and Obama Announced a Climate Agreement That Would Cap Chinese Carbon Emissions, Presumably Increasing the Demand for Gas
- So Much for Projecting Chinese LNG Demand With Any Certainty
- But Trade Press Reports Suggest That the Russian Deals Undercut LNG Prices, Giving the Chinese an Excellent Bargaining Position in Future LNG Price Negotiations

INDIA BECAME A GROWING LNG IMPORT MARKET IN 2004

- But it Has Had Problems
- Regulatory Issues and the Difficulty of Finding Credit-Worthy Buyers Have Slowed What Once Was Viewed as an Attractive Market
- And the Fact That Many of the LNG Supply Options are "Basis Backhauls" Has Made it Difficult to Line Up Competitively-Priced Supply
- And Over it All Hangs the Spector of the Long-Negotiated Iran-Pakistan-India Pipeline and Now a Resurfacing of the Turkmenistan-Afghanistan-Pakistan-India (TAPI) Line
- If Either of These Lines Actually Goes Forward, it Would Put a Crimp in Future LNG Demand

PROJECTED INDIAN NATURAL GAS IMPORTS AND THEIR POTENTIAL CONTRACT COVERAGE (LNG CAPACITIES @ 85%, PIPELINE @ 90%) BCFD

Commitments in Bcfd



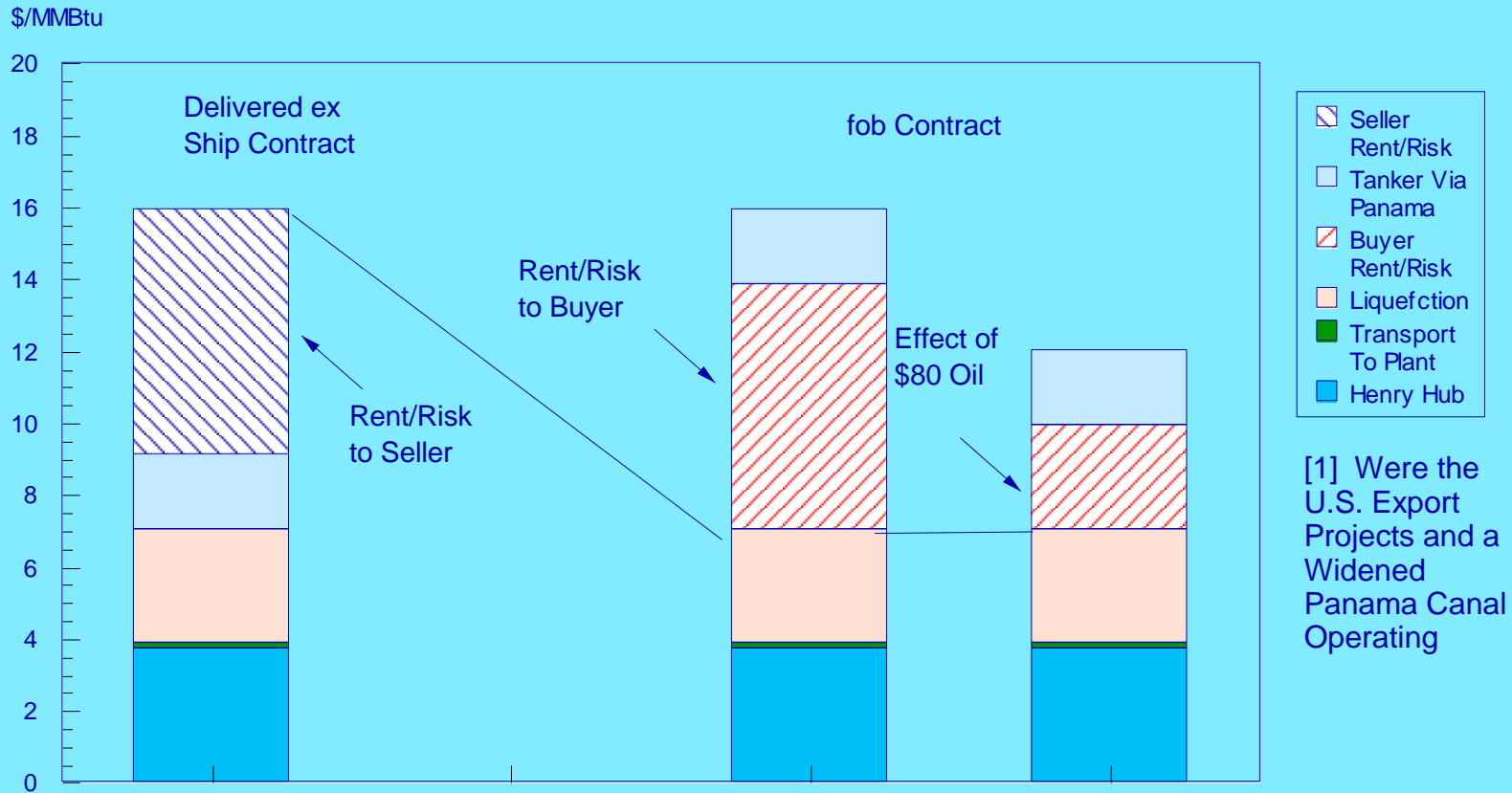
THE OUTLOOK FOR ASIAN LNG PRICES PLAYS AN IMPORTANT ROLE IN THE U.S. LNG EXPORTS DEBATE

- The Typical Japanese Pricing Clause is Based on a Simple Formula That is Linked to the Japanese Customs Cleared Price for Crude Oil - JCC or the "Japanese Crude Cocktail"
- "It is in the Form of:
$$P=C+S*JCC$$
- Where P is the Price in \$/MMBtu, C is a Constant Expressed in \$/MMBtu and S is the "Slope", a Dimensionless Number Multiplied by the Oil Price
- Discounting is Most Often Done by Changing the Slope; But its Simplicity Limits the Contract Options for Competitive Discounting and, Once Negotiated, the Only Thing That Changes is the Oil Price

- Northwest Europe Has Benefitted from the Price Competition That Was Unleashed by the LNG Surge in 2009/2010
- There LNG Arbitrage Together With North Sea Commodity Competition Exported Weak North American Prices to the Continent Through the Open Access EU Pipeline System and Undermined Oil-Linkage
- No Similar Price Competition Has Been Possible in Asia Because There Is No Access to Commodity Gas; This Has Been a Powerful Driving Force Behind the Asian Interest in U.S. Exports Since it Gives Asia a Source of Gas-to-Gas Competitive Commodity Supply Similar to That Which Has Already Benefitted Europe

- The Most Common Type of LNG Contract is the Delivered ex Ship (DES) Contract in Which the Seller Delivers to the Buyer's Receipt Terminal; The Price Clause is Based on Destination Market Conditions
- Less Common is the fob Contract in Which the Delivery is Made at the Outlet of the Liquefaction Plant; But the Pricing is Commonly Based on Destination Pricing and Adjusted for Tanker Transportation
- All of the U.S. Export Contracts so Far are Also fob Contracts, But They are Unique in That Their Pricing Clauses are Based on Origin Pricing - Keyed to the North American Commodity Price at Henry Hub
- Thus Unlike Traditional Clauses, the Economic Rent - and the Price Risk - Go to the Buyer, Not the Seller
- That is Their Appeal to Oil-Linked Contract Buyers

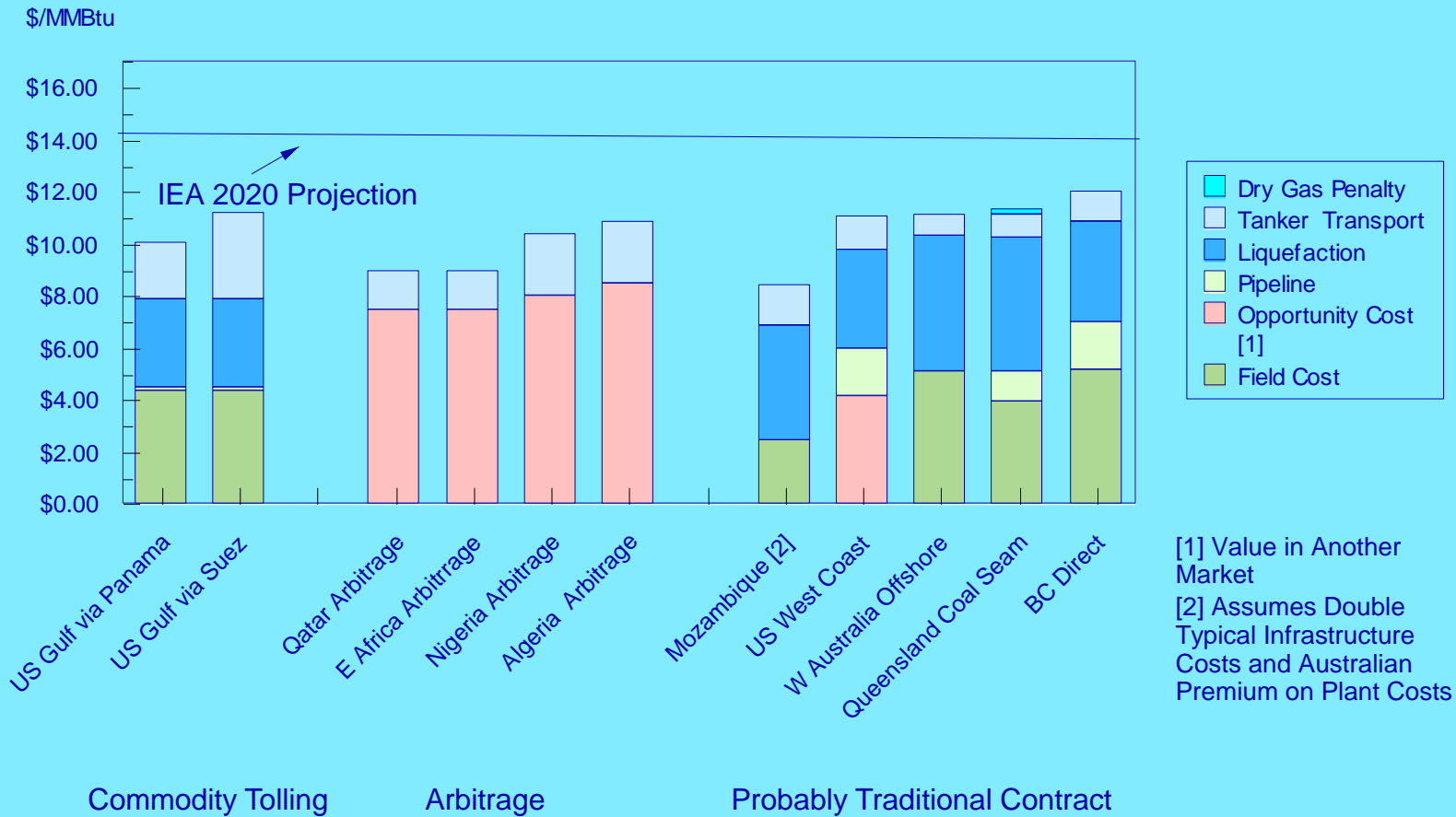
WHO GETS THE RENT AND TAKES THE RISK BETWEEN THE 2013 JAPANESE PRICE AND THE HENRY HUB PRICE [1] AND SHOWING THE RISK OF \$80 OIL TO THE BUYER



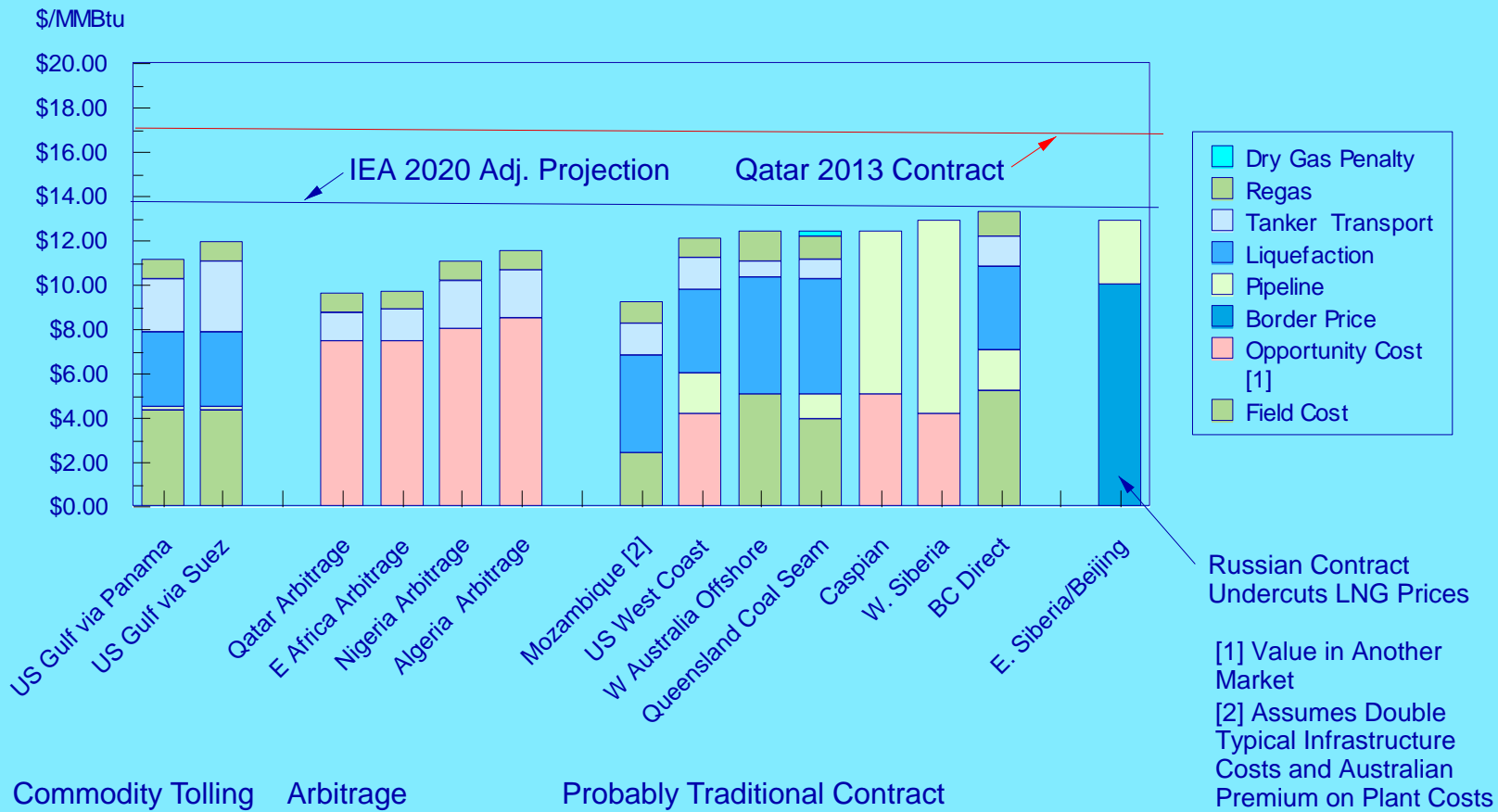
**BECAUSE ASIAN LNG COMPETITORS "SHADE"
CONTRACT PRICES ONLY SLIGHTLY, LNG
PRICING IS VERY SLOW TO RESPOND,
EVEN IN VERY WEAK MARKETS**

- That is the Essence of Northeast Asia's Problem in Dealing With the Asian Premium
- In Theory, Destination-Flexible Supplies Should be Able to Undermine the Price Structure by Arbitraging Much Cheaper Atlantic Basin Prices
- But the Potential Arbitragers Often Have a Stake in High Asian Prices and So That Does Not Work Quickly Either
- The Chinese Have an Advantage Since They Can Play Off Pipeline Supply Against LNG; An Earlier Turkmen Contract Helped, But the New East Siberian Contract Should Have a Significant Effect

ILLUSTRATIVE COSTS OF DELIVERING NATURAL GAS TO JAPAN IN 2020 ASSUMING CURRENT COSTS AND PROJECTED 2020 PRICES (IEA WEO 2013 FOR JAPAN AND EUROPE, EIA AEO 2014 FOR U.S.)



ILLUSTRATIVE COSTS OF DELIVERING NATURAL GAS TO SHANGHAI IN 2020 ASSUMING CURRENT COSTS AND PROJECTED 2020 PRICES (IEA WEO 2013 FOR JAPAN AND EUROPE, EIA AEO 2014 FOR U.S.)



IN CONCLUSION

- The Asia Pacific Region Has Been at the Center of Some of the Major Trends That Have Been Driving International Gas Trade Over the Past Decade
- It Has Been A Major Contributor to LNG Demand Growth
- But its Oil-Linked Prices, Forced up by High Oil Prices and Reinforced by Tight Asian Market Conditions, Has Both Been a Brake on Regional Economies and a Justification for Costly New LNG Projects
- That is Now About to Change; Oil Prices are Coming Down and the Tight Gas Market Appears to be Entering a Period of Surplus and Potential Price Competition
- The Resolution Will Affect Not Only Asia But LNG Trade, as Well

