

The Pricing of Internationally Traded Gas: the search for new fundamentals

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IEEJ

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THE PRICING OF INTERNATIONALLY TRADED GAS

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THE OXFORD
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STUDIES

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The Pricing of Internationally Traded Gas, ed. Jonathan Stern (OIES/OUP 2012)

- 1. The Future of Gas – what are the analytical issues related to pricing? Christopher Allsopp and Jonathan Stern**
- 2. The Pricing of Gas in International Trade – an historical survey, Jonathan Stern**
- 3. Natural Gas Pricing in North America, Michelle Foss**
- 4. The Transition to Hub-Based Gas Pricing in Continental Europe, Jonathan Stern and Howard Rogers**
- 5. Domestic Gas Prices in Russia – Towards Export Netback ? Simon Pirani, James Henderson and Katja Yafimava**
- 6. The Pricing of Internationally Traded Gas in MENA and Sub-Saharan Africa, Hakim Darbouche**



The Pricing of Internationally Traded Gas, cont'd

- 7. Pricing of Pipeline Gas and LNG in Latin America, Anouk Honoré and David Ledesma**
- 8. Pricing of Pipeline Gas and LNG in South East Asia, David Ledesma**
- 9. Gas Pricing in India, Anupama Sen**
- 10. Gas Pricing in China, Michael Chen**
- 11. LNG Pricing in Asia, Andy Flower and Jane Liao**
- 12. The Interaction of LNG and Pipeline Gas Prices: does greater connectivity equal globalisation? Howard Rogers**
- 13. The Gas Exporting Countries Forum: global or regional cartelisation? Anouk Honoré and Laura El-Katiri**
- 14. Conclusions: globalisation, cartelisation or a continuation of regional pricing? Jonathan Stern**





THE GAS INDUSTRY HAS BEEN TRADITIONALLY RELUCTANT TO DISCUSS INTERNATIONAL GAS PRICES: WHY IS THIS?

**Lack of transparency has been very
convenient!**



Original Price Logic: fundamentals, and risk sharing in long term gas contracts

ECONOMIC FUNDAMENTALS:

- Cost of development and delivery
- Financing (loan) and cash flow requirements

MARKET FUNDAMENTALS:

- Competing fuels in end use markets
- Ability of customers to switch to other fuels
- Degree of competition from other suppliers

Producer took the price risk (via the base price and indexation); buyer took the market risk (via the take or pay clause)



For international gas trade outside North America “fundamentals” = oil price linkage

RATIONALE FOR EXPORTERS:

- Gas was developed similar to – or along with – oil
- Many gas exporters were also oil exporters

RATIONALE FOR IMPORTERS:

- Gas was replacing oil products and crude oil
- Prices were set below, and indexed to, oil to prevent customers from switching (back)

Common rationale: oil prices were set elsewhere avoiding suspicion of manipulation by exporter or importer



**FOR SEVERAL DECADES
(CERTAINLY UP TO 1990)
THESE WERE SUCCESSFUL,
AND REASONABLY LOGICAL,
ARRANGEMENTS IN MOST
COUNTRIES: WHAT
HAPPENED NEXT?**



In OECD Gas Importing Countries

- **Gas became a much larger part of energy balances than had been expected which meant that instead of replacing oil products, gas began to develop its own market with non-oil fundamentals**
- **Oil prices (especially after 2006) increased much faster and to much higher levels than anybody expected**
- **North America liberalised in the 1980s (Britain in the 1990s), creating competition between suppliers and hub-based pricing**

Serious strains began to appear in Continental Europe post-2008; and in Asia post-2010



In Europe and Asia international gas prices have not reflected market fundamentals for around 20 years

No major concern about this because:

- what matters for the industry is price level not price formation
- Importers could pass through purchase costs to their (captive) customers
- All parties made lots of money – and end users took (most of) the risk

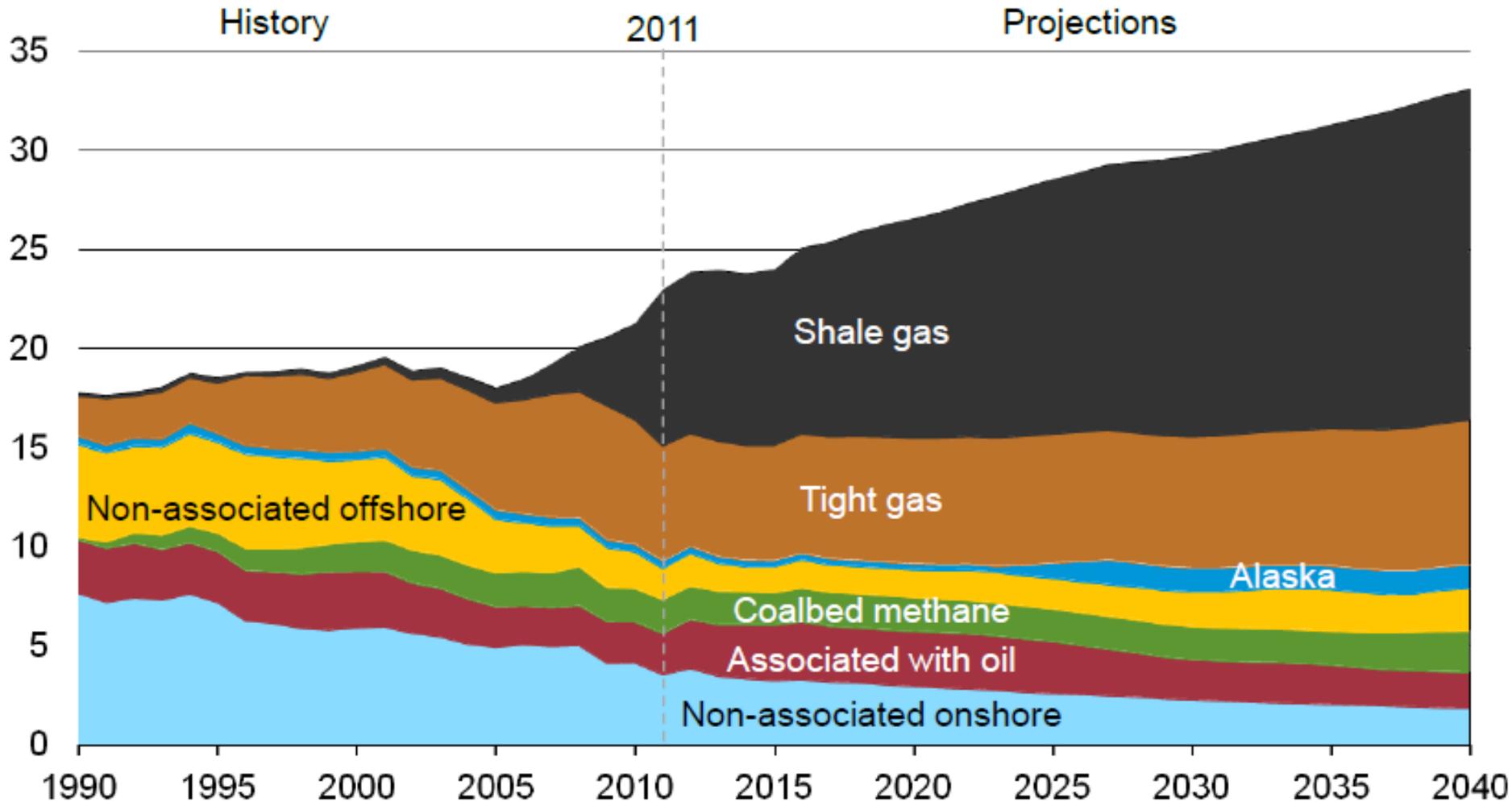
As this highly successful business model begins to fail, price formation becomes the crucial issue



NORTH AMERICA

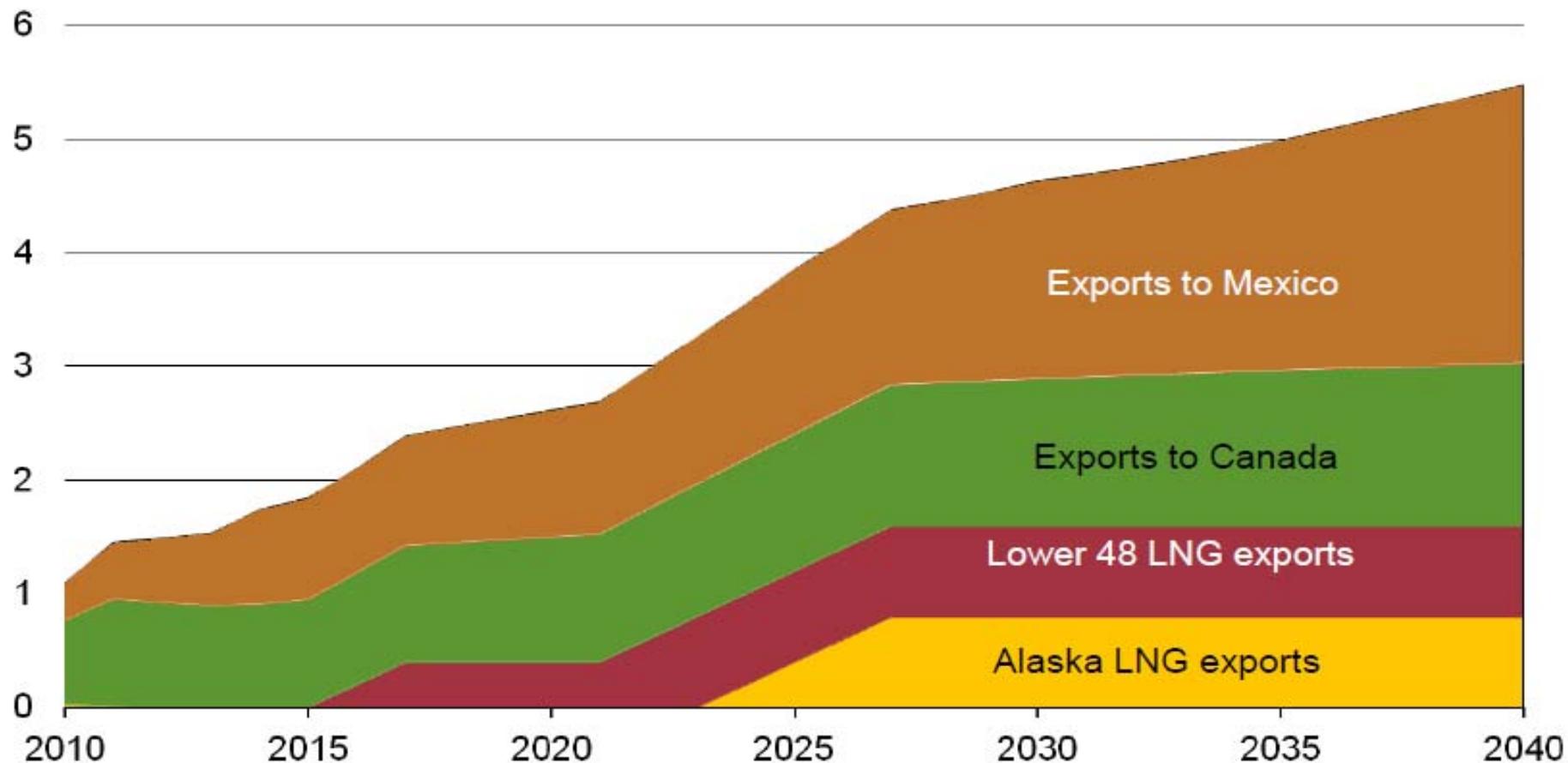
US Gas Production Projection to 2040

U.S. dry natural gas production
trillion cubic feet



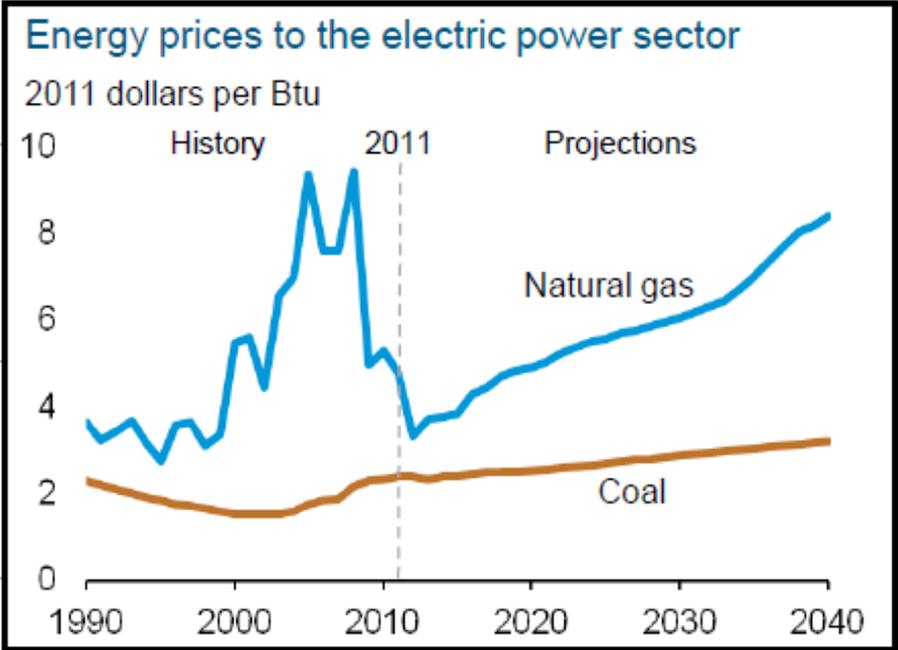
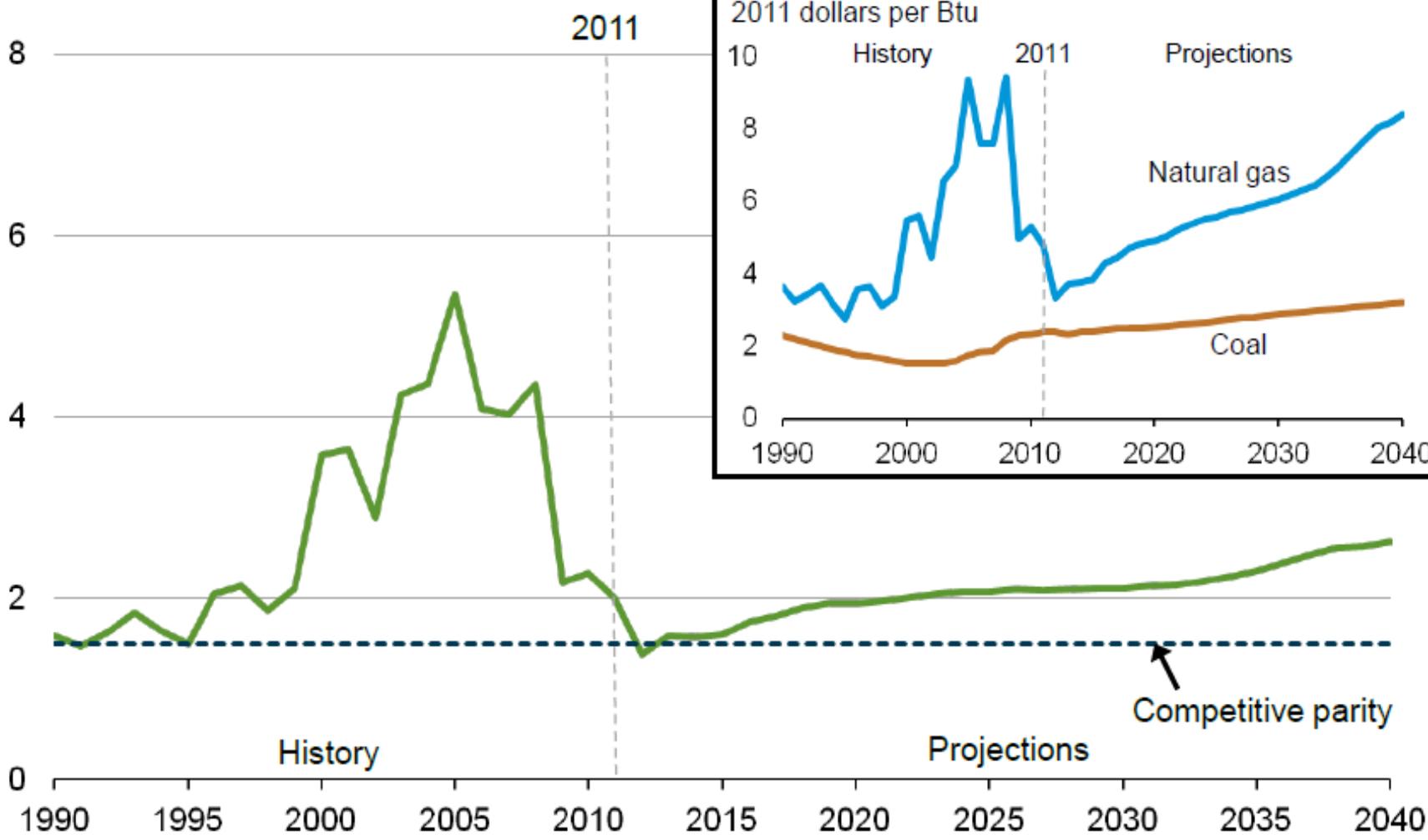
Total natural gas exports nearly quadruple by 2040 in the *AEO2013* Reference case

U.S. natural gas exports
trillion cubic feet



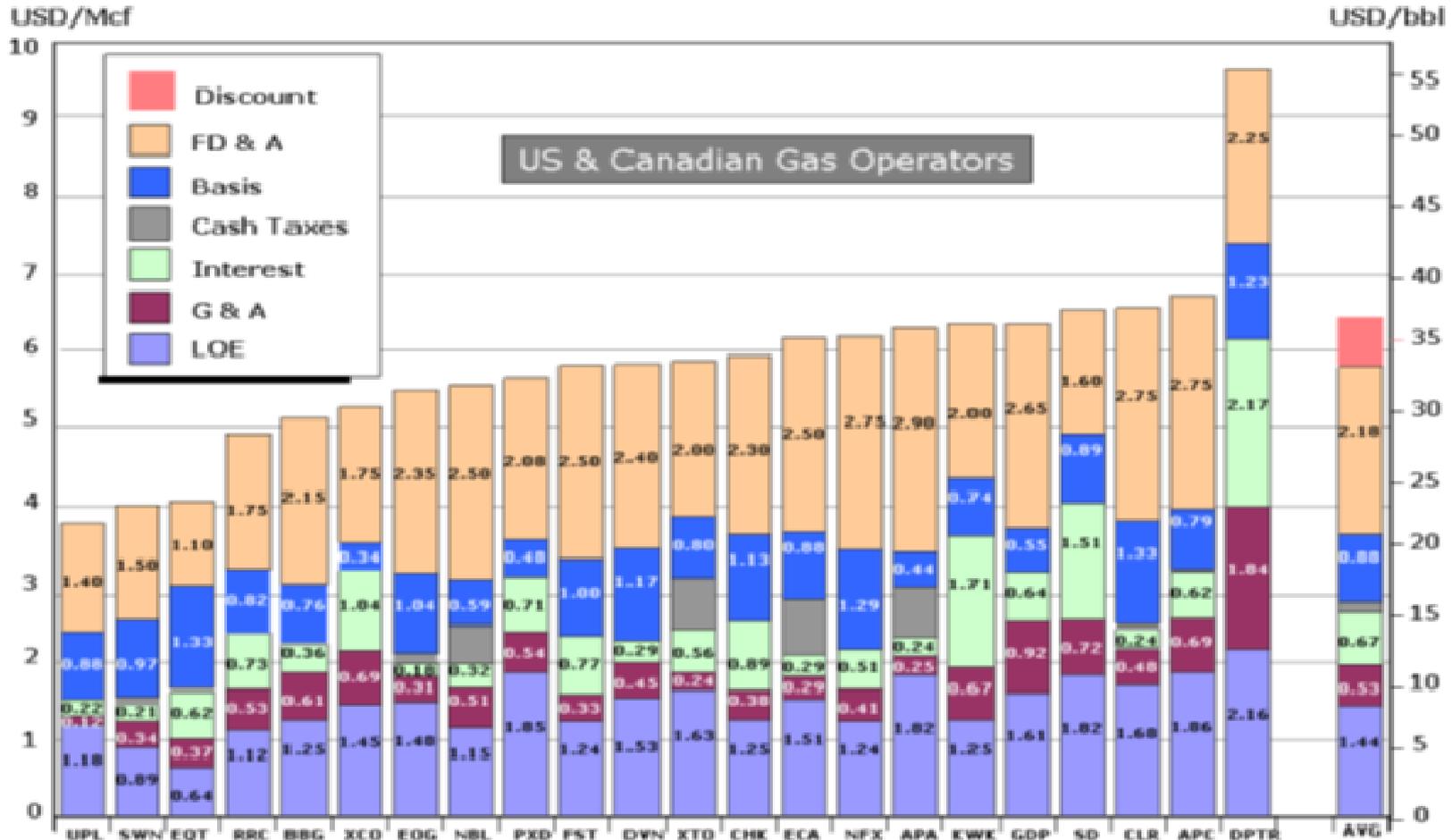
US Gas Prices to 2040: in absolute terms and relative to coal

ratio of natural gas price to steam coal price



Source: EIA, Annual Energy Outlook 2013 Early Release

Break-Even Henry Hub Price For North American Gas Operators



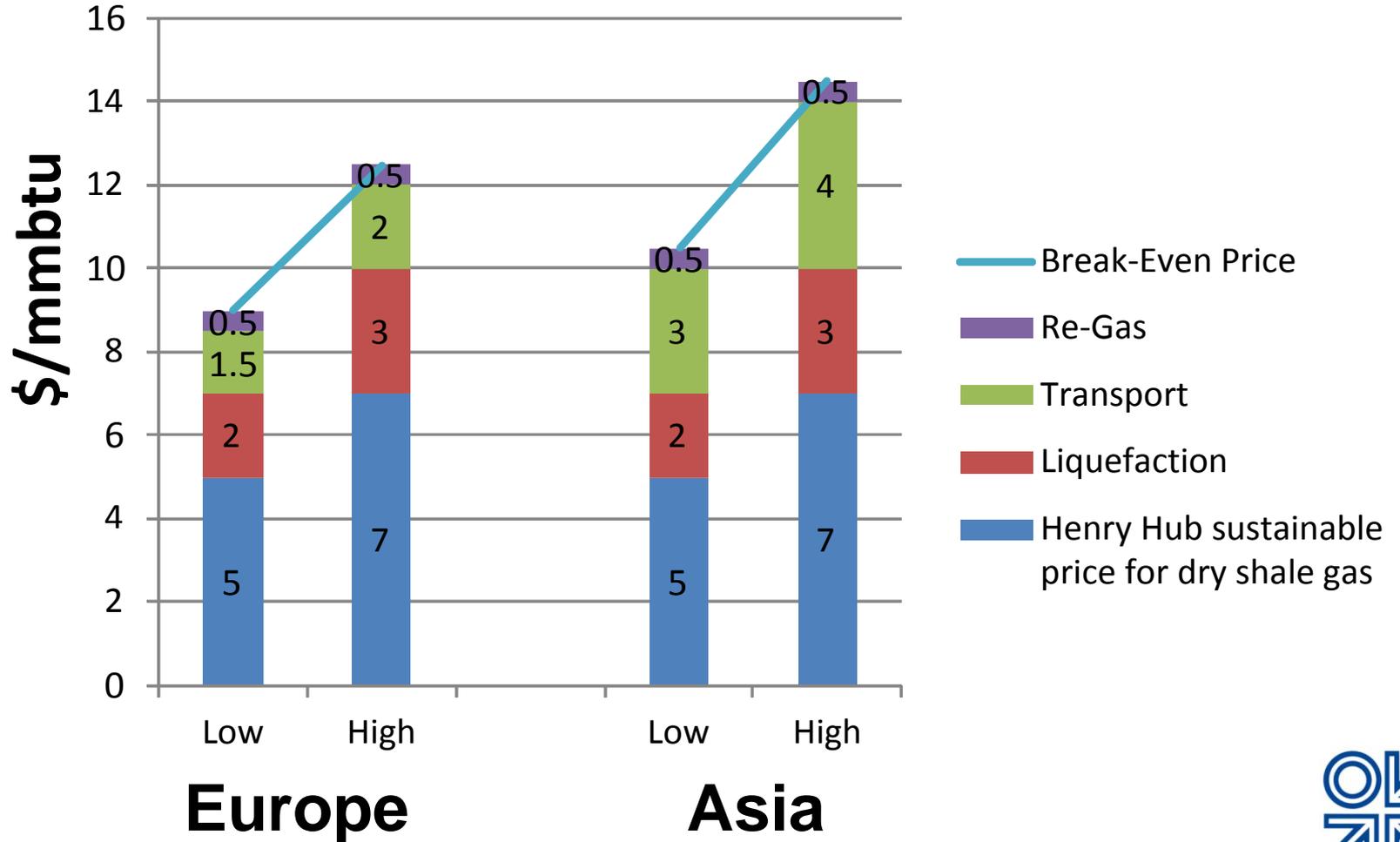


North America – Continued Isolation or Key Global LNG Supply Source ?

- North American LNG export projects currently being pursued (but not yet approved) total 235 bcma. This is >70% of 2012 global LNG trade!
- US Federal opposition to US LNG exports seems unlikely. Canada expected to progress independently.
- Much depends on future HH prices
- Timing (2015+) coincides with Australia and East Africa LNG 'wave'.

50-100 Bcm/year of North America LNG Exports could profoundly impact global balances.

Break-even Costs for North American LNG Exports in Europe & Asia at \$5-7HH





EUROPE: THE MOVE TO HUB-BASED PRICING

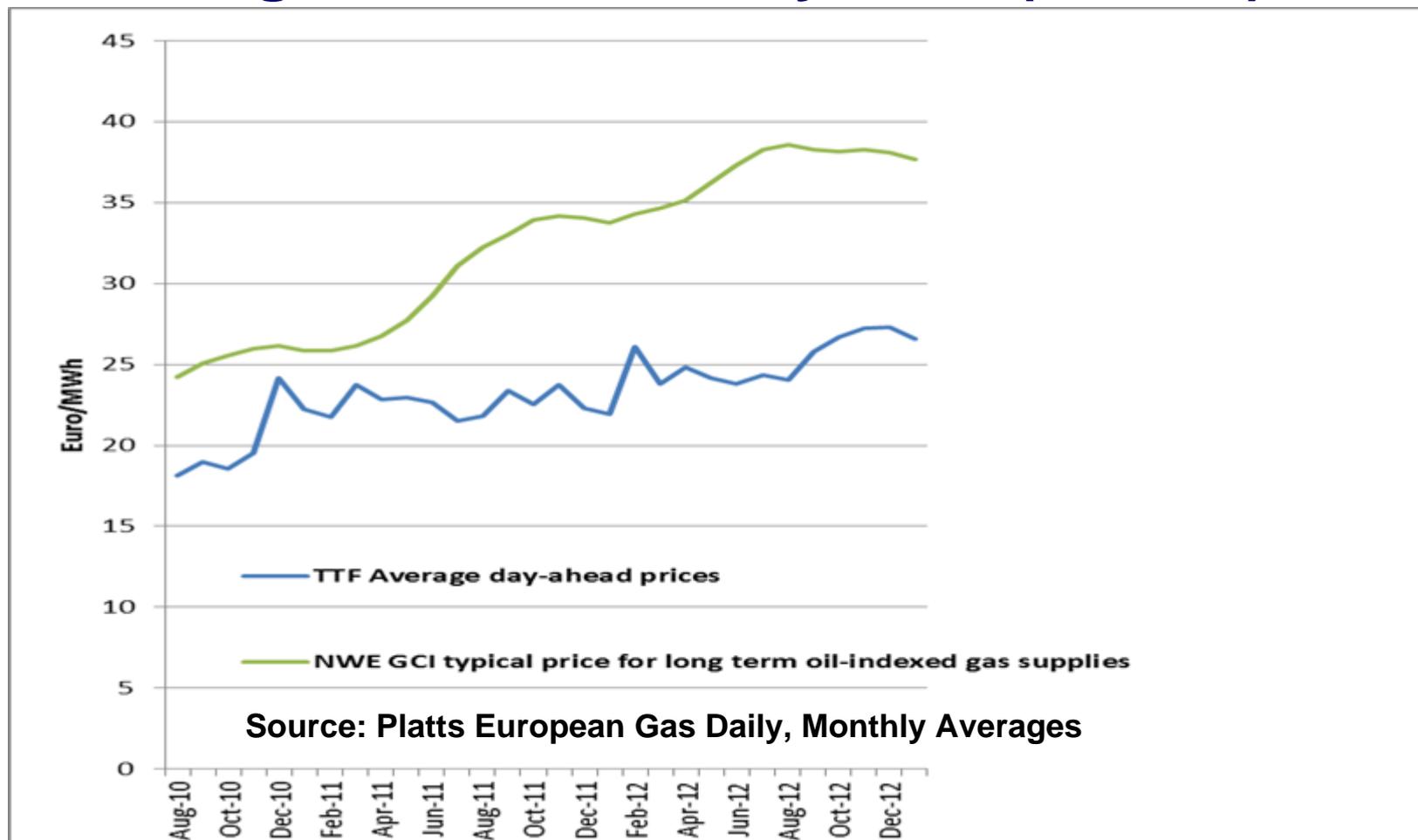


Inability to adjust long term contract prices to supply/demand fundamentals

- As fundamentals changed, contracts did not (or could not) adapt
- For a long time this “did not matter” but in Europe the situation changed post 2008 because of recession, liberalisation and competition, LNG supply surplus, hub pricing and the huge increase in oil prices..
- Oil-linked long term contract prices became increasingly uncompetitive and..
- Led to European utilities, exposed to competition, losing significant amounts of money for the first time

Systems change when Big Players lose Big Money!

TTF (Hub) and Oil-Linked Contract Gas Prices, August 2010-January 2013 (€/MWh)



2012, hub prices averaged 30% below oil-linked contract prices



Hubs and Exchanges Have Developed Rapidly Since 2010

OXFORD INSTITUTE FOR ENERGY STUDIES Natural Gas Research Programme

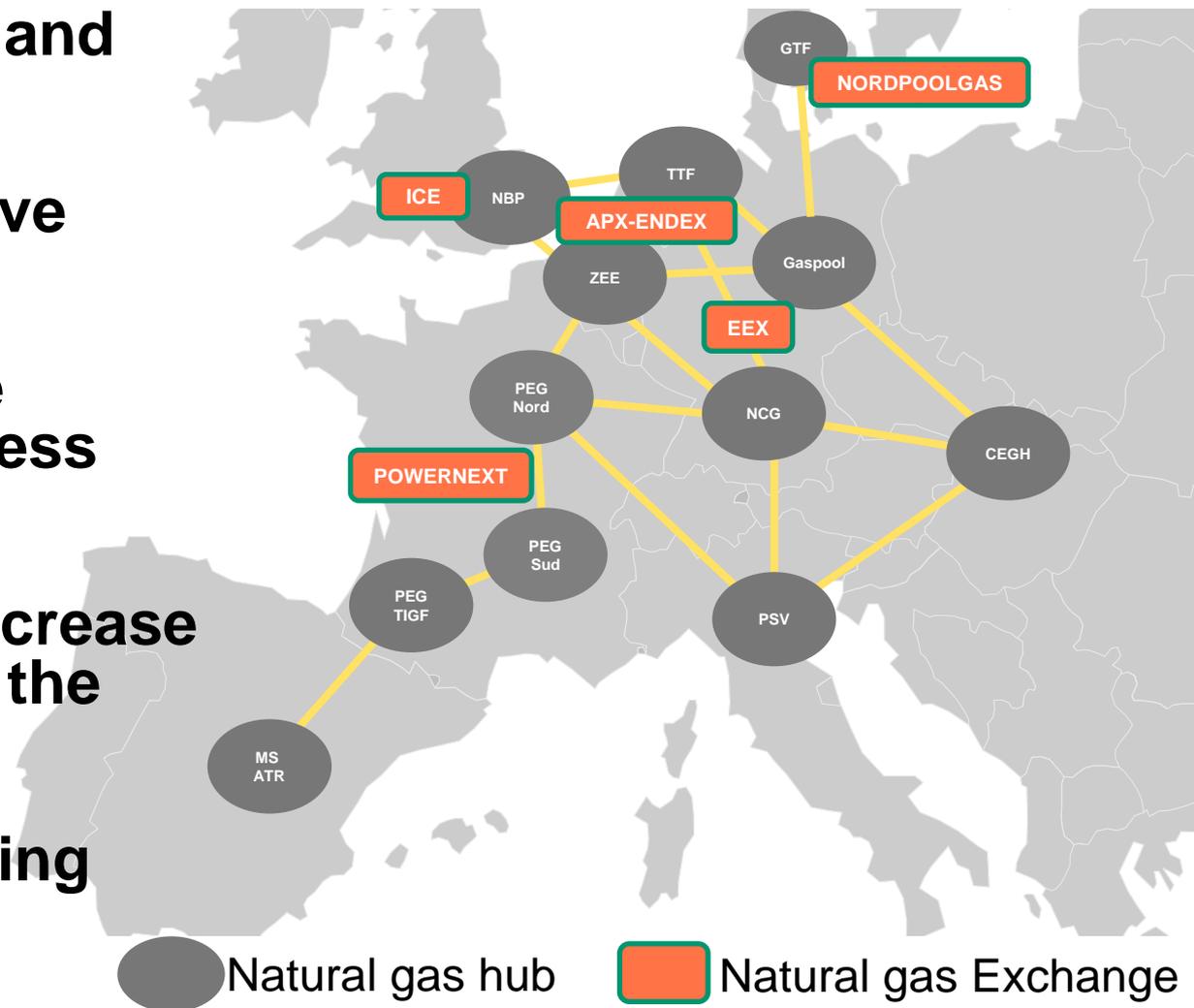
Especially German and Dutch markets

Traded volumes have continued to grow

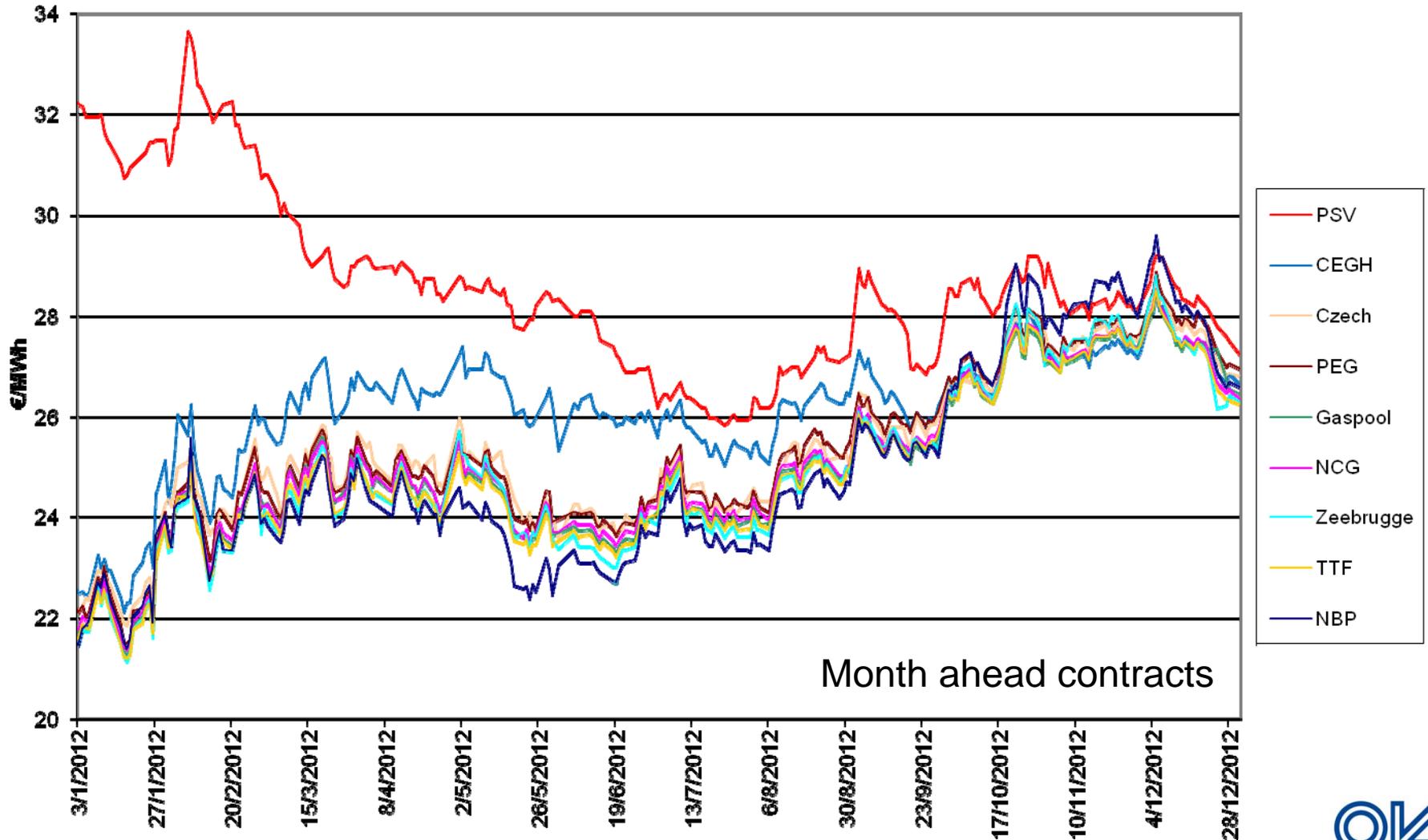
Gas Exchanges are creating new business

EU and regulators pushing plans to increase competitiveness in the gas market

Hubs are still evolving



European Gas Hub Correlations 2012: prices are converging, no sign of manipulation



EUROPEAN SUPPLY: ON THE VERGE OF BEING MOSTLY SPOT-INDEXED?

Estimated split of European gas supply in 2011

58% still oil-indexed

Other Spot (incl. of
Gazprom, Norway
and GasTerra)
25%

Gazprom (oil)
23%

Sonatrach (oil)
10%

Norway (oil)
9%

GasTerra (oil)
7%

Other oil index
9%

UK Market Spot
17%

**E.ON, PGNiG
and RWE
arbitrations,
Statoil
renegotiations
and growth in
demand could
reduce oil
indexation to
below 50%**



Source: SG Cross Asset Research



Potential Market Power of Gazprom

- In a globally connected system comprising North America, Europe, Russia & CIS and the Asian LNG – importing countries; Gazprom:
 - is the only supplier able to supply volumes significantly above current levels at short notice, and this headroom is growing.
 - has 700 staff engaged in M&T activities on European hubs and LNG.
 - could influence European Hub prices through supply ‘management’.

**But LNG may complicate Gazprom’s position,
Russia may be faced with a ‘price-volume’
dilemma**



JCC-BASED LNG IMPORTING COUNTRIES



Why has the oil price linkage been maintained in Asian LNG contracts?

- Oil price linkage was introduced in the 1970s when oil was the main competing fuel to natural gas in Japanese power generation
- The cost pass-through mechanism allows Japanese utilities to adjust their gas and power tariffs to end users by the same percentage as the country's average LNG procurement cost movements, regardless of an individual buyer's actual purchase costs
- Projects “need oil linked prices” to support new LNG supply

**But, post-Fukushima, a new mood/new fundamentals;
Japanese utilities begin to make substantial losses**



What is the main problem related to pricing: is it price level or price formation?

- Is the problem that prices are too high?
If so the problem is price level
- Or is the problem that prices no longer have any market logic? If so the problem is price formation

Reducing the price level is a short term solution, but in the longer term only a change in price formation will solve the current problem



If the problem is the price level – what could be done?

- **Reduce the base price**
- **Reduce the slope**
- **Adjust the “kink points” of the S-curve**

What does this achieve: it reduces the level of the price, but maintains the JCC mechanism. But if oil prices continue to rise then constant adjustment is required



If the problem is price formation – what could be the alternatives?

FIRST: reassess the market for gas, what fuels (energies) compete with natural gas

SECOND: decide which contractual mechanism would best reflect market conditions:

- **Interfuel competition: a mix of oil products/coal/power base price/index**
- **A spot gas index eg JKM or similar and related to this...**
- **A hub price: physical, virtual, located in Asia**

The basic problem is that JCC no longer reflects gas market conditions in Japan and has not done so for many years (like in Europe)



Price Formation Option 1: interfuel competition pricing

ADVANTAGES:

- Reflect current energy market conditions which can be monitored over time
- Should never get substantially out of line with competing fuels
- Same as traditional Continental European mechanism so experience is valid

DISADVANTAGES:

- Competitive fuels difficult to agree with sellers
- May be only a transitional stage to spot/hub prices

Power companies and city gas utilities would have different price mechanisms – each company would have its own price mechanism



Price Formation Option 2: Spot Pricing (eg JKM)

Spot LNG Price Index:

- **Advantage:** reflects current Asian LNG supply/ demand balance
- **Disadvantages:**
 - too few cargoes (at least currently) on which to base long term contracts
 - May reflect global, rather than Asian, market dynamics



Option 3: Henry Hub-based pricing

ADVANTAGES:

- Established hub price mechanism, no suspicion of manipulation by Asian stakeholders
- Currently lower price than JCC

DISADVANTAGES:

- risky if HH prices rise significantly above \$6/Mmbtu (and oil price falls)
- No Asian market fundamentals

Henry Hub/NBP pricing risks being a short term device to reduce price level, not a long term solution to the price formation problem



Price Formation Option 4: Pricing at an Asian Hub

ADVANTAGES:

- Provides on-going price reference which can evolve from physical trade into a hedging/risk management reference with a range of durations
- Can be a physical or virtual location

PROBLEMS: needs many (all?) market players to agree on:

- location – each country wants its own hub
- liquidity acceptable as price reference
- rules – trading/financial regulation



Possible locations for Pacific hubs 1

- **SINGAPORE:** demand/storage is relatively small with limited potential for growth, but will play a useful “transitional role”
- **SHANGHAI:**
 - China will become the biggest gas market in Asia by 2020 and the biggest LNG importer some time in the 2020s
 - Good mix of domestic (conventional and unconventional) and imported (LNG and pipeline) gas BUT..
 - Market dynamics are different to other countries
 - Overly dominated by 3 state-owned companies?



Possible locations for Pacific hubs 2

- **JAPAN: physical “Tokyo hub” or virtual “Hub Japan”?**
 - logical location in Asia’s biggest LNG market
 - would require universal endorsement by importers and government (regulator/s)
- **Korea: a large enough market for a hub but not enough market players (similar problem in Taiwan)?**

The future could see a number of different hubs, or the gradual emergence of a single Asian hub; but this will depend on what market players want (or what their commercial problems will force them to develop)



Price Transition in New LNG Contracts

- Buyers need to think hard about which system best reflects market fundamentals and allow for future price transition in Asia
- One possibility is netback market pricing but anticipating future evolution to hub pricing
- Price review clauses have to be much more specific than in previous contracts

Agreeing to prices in new contracts which are above market levels because producers “need high prices” is not a sustainable strategy and does not provide security



Price Transition in Existing LNG Contracts with JCC

- How to get sellers to agree to change
- Sellers have based project economics on oil-linked prices; may face losses on new projects
- Contractual/legal problems: is renegotiation and international arbitration desirable, possible, necessary?

This is the most difficult problem facing buyers and will become acute as new projects arrive later this decade



The Future of LNG Pricing in JCC Countries

- Prices have to reflect end-user market conditions OR...
- Market conditions via hub pricing

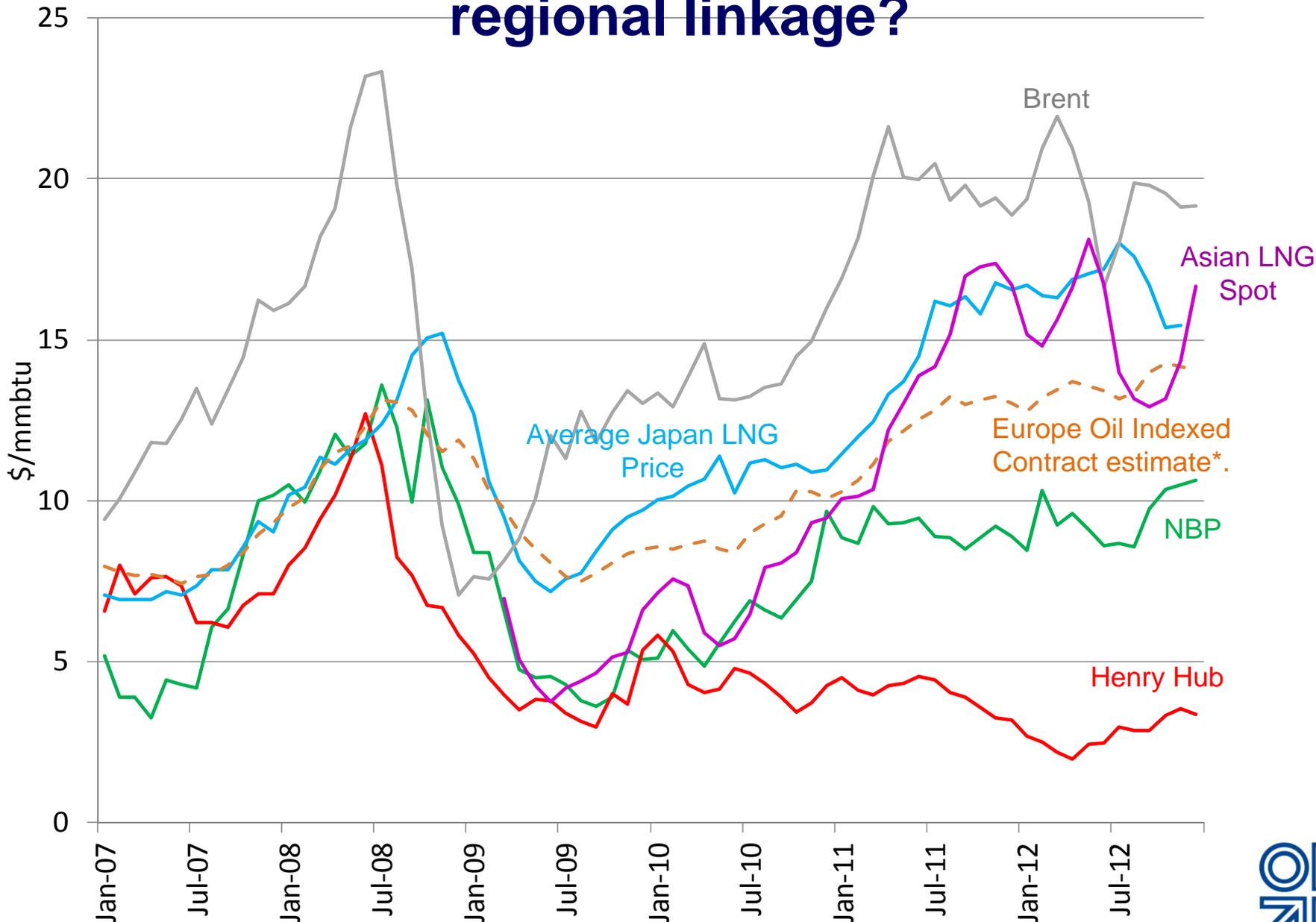
BUT...

- This will not happen quickly even for new contacts
- For existing contracts changes will be especially painful (but will eventually happen)

Linking to Henry Hub and NBP is a transitional phase which confuses price formation with price level

CONCLUSIONS: INTERNATIONAL GAS PRICING – THE SEARCH FOR NEW FUNDAMENTALS

Globalisation of Gas Pricing, or increasing regional linkage?



Future Gas Price and Contract Dynamics

- A contractual link to oil prices is no longer logical BUT...
- this does not mean that oil prices are no longer relevant to gas price formation only that specific contractual linkage is no longer appropriate
- Hub-based prices will not automatically and always be lower than oil-linked prices
- Hub-prices do not mean the end of long term contracts

The analytical challenge is to work out the components of, and influences on, hub price formation: national/regional/global gas supply and demand; prices of other fuels – oil, coal, electricity, carbon

Gas Pricing: the search for new fundamentals

Only spot/hub-based pricing can react quickly enough to rapidly changing supply and demand fundamentals but transition to hub-based pricing will be painful:

- The 1980s and 90s were difficult in North America and UK
- Problems in Continental Europe with renegotiation of long term contract prices from oil to hub-based (and arbitrations)
- Problems in Asia as JCC-linked LNG with oil prices >\$100/bbl becomes untenable

Analysis needs to focus on price formation not price level; the trend is towards hub-based pricing



THANK YOU

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