

Gas Pricing Principles for European Gas Markets

A View of Gazprom Export

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Fair Price for Gas. Oil-Indexed Gas is Not Overpriced Compared to a Broad Range of Commodities

- The price for major portion of traded commodities has grown 3-4 times during last decade
- In comparison with other commodities, gas prices have been growing slower

	Average prices, ratio to 2001	
	in 2010	in 2011
Motals	20	2.2
	2,5	3,2
	2,4	2,4
Numinium	1 5	2,0
dickol	2,2	2.6
	5,5	5,0
	4,7	3,0 3 7
	2,2	2,1
iviteat	2,2	2,0
Lorn Cattan	2,0	3,0
	2,0	2,8
.000a	2,9	2,8
Drange juice concentrate	1,/	2,0
Chemicals	2,5	3,2
Ammonium nitrate	2,7	3,9
Potassium Chloride	2,8	3,7
Methanol	1,8	2,2
Rubber	2,6	3,2
Dil and oil products	3,1	4,3
Brent	2,9	4,0
Gas oil	3,2	4,5
uel oil	3,0	4,0
Diesel	3,4	4,6
Natural gas:	2,0	2,6
lenry Hub, USA	1,1	1,0
NBP, UK	2,0	2,9
NG, import in Japan	2,6	3,5
BAFA	2,2	2,8
Coal	1,6	2,0

Companies' Costs Exceeded Revenues on a Unit Basis

- In 2011 All-in Costs of Shale Developers were above \$256 per Mcme.
- All-in costs jumped 16% in 2011 over 2010, and are 53% higher than in 2009.
- Unit operating costs have returned to precrash levels.
- Unit F&D costs, however, remain below peak land-rush levels of 2008.
- Commodity inputs like steel, labor, and various contract services are all still increasing for shale gas producers.
- Exxon Mobil CEO Rex Tillerson: "We don't make money. Everything is red".





Before Moving from A to B You Should Understand where You Stand now

- In order for the European hub to produce a sustainable price benchmark they should meet two requirements:
 - Firstly, these prices should be a genuine barometer reflecting total continental supply and demand conditions in Europe and/or at least a large segment of it (for example, of the North-West).
 - Secondly, hub prices should be self-sufficient, fully independent from the oil-indexed prices, not driven by the fundamentals of another market.
- Mainstream European analysts share no doubts as to the readiness of the existing hubs to take over from oil products as price indexes for long-term supply contracts.
 - For example, see J. Stern and H. Rogers, The Transition to Hub-Based Gas Pricing in Continental Europe. Oxford Institute of Energy Studies, NG 49, March 2011, pp.6-7.
 - They insist that there should be "a single mechanism for pricing gas" and hub prices "accurately reflect changing supply and demand conditions".
 - Further, even with all of their imperfections, they argue, European hubs provide the best indicator of a market price which long-term contracts increasingly need to reflect. Hub prices are driven by their own fundamentals and could be higher or lower than the oilindexed prices.
 - According to the mainstream analysts, these two prices are independent from each other and exist nearly in parallel worlds.
- Realities of the existing hybrid gas market in Europe do not match with these mainstream conclusions.

Hub Prices are not an Indication of European Supply and Demand

U.S. Pricing Model



 PH_{US} – hub price in the USA S_{US} – total supply D_{US} – total demand

 $\mathbf{PH}_{US} = \mathbf{F} \left(\mathbf{S}_{US}, \mathbf{D}_{US} \right)$



$PH_{CE} \neq F(S_{CE}, D_{CE})$

 PH_{CE} – hub price in Continental Europe SH_{CE} – total supply = SHI_{CE} + SHEU_{CE} + SLNG_{CE} + SUK_{CE}, where:

SHI_{CF} – sales to hubs by importers

SHEU_{CF} – sales to hubs by end-users (ToP obl.)

SLNG_{CE} – LNG supply to hubs

SUK_{CE} – UK supplies through the Interconnector & BBL

DHI_{CE} – demand by importers for hub gas

DHEU_{CE} – demand by end-users for hub gas

DUK_{CE} – UK deliveries through the Interconnector and BBL

 $PH_{CE} = F\{(SHI_{CE} + SHEU_{CE} + SLNG_{CE} + SUK_{CE}), (DHI_{CE} + DHEU_{CE} + DUK_{CE})\}$

Asymptotic Contract and Spot Price Behavior



Hub Prices are in Fact Derivatives of Oil-indexed **Prices**

GERMANY/AUSTRIA/ITALY/CZECH REPUBLIC

ar curve lead to declining orices and crude oil

Bears tighten grip on TTF as weather and oil limit demand

A softening oil curve, continued warm Despite opening in line with Wednesday mathematical lack of business interest forms. The The Understand line arrest £1 DE

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think that now we're just nearing the usur

That asymptotic relationship explains why hub prices are formally 'delinked' but they are driven by oil indexes. NBP and TTF prices are not only reasonably Oil moves TTF and NCG from bulls to bears aligned to each other but have a strong positive correlation with Gazprom's oil-indexed prices with coefficients of 0.75 and 0.79, respectively. Doesn't this prove that these prices are not free enough but are in

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Day-ahead resists bullish curve Jay aneao resists pumsn curve momentum as crude oil climbs

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Source: ICIS Heren

GERMANY/NETHERLANDS/AUSTRIA

Gains on the TTF prompt and curve at the

Supply disruptions put bulls

in charge; oil lifts far curve

Curve down on weather,

currency and Brent losses

Prompt prices at the Steelswale barrant in

NETHERLANDS

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Reasons for Hub Prices to be Lower than Contract Prices in a Mature Hybrid Pricing Model

- The major reason for the price diversion is the value of flexibility provided by long-term pipeline suppliers.
 - Hubs offer standard lots with no flexibility.
- The second reason why spot prices usually lag behind contract prices is the existence of one-sided balancing on hubs.
 - In the case of a short-term undersupply, it is more convenient to use the existing long-term contract arrangements for securing additional deliveries.
 - In the case of oversupply, selling gas at hubs is a quick-fix.
- The third reason for diversion between hub and long-term contract prices is the availability of flexible LNG that is rerouted from the USA, cheap gas from the UK that arrives to the Continent through the Interconnector, or gas from storage that was acquired at a time when contract prices were lower.

Mechanism for Gas Price Erosion



USA & Continental Europe Pricing Models

Fundamental Differences

1	USA	Hub price is a function of total demand and supply
	Continental Europe	Hub prices are a function of multiple examples of arbitrage
2	USA	One price at a level determined by Henry Hub
	Continental Europe	Multiplicity of prices Company supply managers determine the price of gas portfolio
3	USA	Majority of gas is sold on hubs Majority of LT export contracts incorporate diversion clause
	Continental Europe	Small volumes of physical trade on hubs represent primary sales The remaining volumes of gas traded come from LT contracts for pipeline gas
4	USA	High churn ratios
	Continental Europe	Churn ratio below 4 (low, but sufficient for balancing market)

THANK YOU FOR YOUR ATTENTION!