PatrickHeatherConsultancy

Market gas pricing: the role of hub trading

International experience on gas trading development

School of Management SKOLKOVO Energy Lectorium

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Good evening! Добрый вечер!

Patrick Heather Consultancy Limited

Patrick Heather

- In the commodity markets since 1981:
 - as broker, trader, manager
- Most of career in energy markets:
 - oil, oil products, gas and power
- Joined PowerGen in 1996: established gas trading capabilities
 - On several industry committees: inc. NBP'97 & standardised spark spd
 - Established Within-Day market by trading on-the-day flat gas at the NBP, the first ever such deal
 - Established Other trading firsts: IPE gas futures, 10yr flat gas NBP trade, standardised spark spread, NBP financial swap and others
 - In 2000, set-up PowerGen's electricity trading desk
- In 2002, recruited to BG Group as Trading Manager
 - Set-up their trading capability from scratch
 - Introduced the concept of 'portfolio optimisation' to a company that had been very much focused on operational issues

Patrick Heather

- Since 2004, Patrick has been an independent consultant
 - Advising and giving presentations to many organisations:
 - from the European Commission, regulators and governments, to the APX and ICE futures exchanges, to financial institutions and to various producer, mid-stream and end user companies
 - in Australia, Austria, Brazil, Britain, China, Estonia, France, Greece, Holland, India, Italy, Japan, Norway, the Philippines, Poland, Russia, Sweden and Turkey
 - Acting as Expert/Expert Witness:
 - Enron, Austrian utility, UK investment bank, Gas Supplier (SEE), Gas Marketer (NWE), Gas Marketer (SWE), Gas Supplier (NWE)
 - Lecturing at various seminars/universities/schools:
 - Florence School of Regulation, Warwick University, Bocconi School of Management, University of Tartu, Eurasia Energy Summer School
- Nov 06-Dec 09: Commercial Advisor to South Hook Gas
- Senior Fellow of the Oxford Institute for Energy Studies

Patrick Heather Consultancy Limited

- An Energy Markets consultancy, specialising in the European utility sector, covering gas, electricity, emissions and coal and, in the energy forwards and futures markets.
- Advising on trading, risk-management and portfolio optimisation issues but also on providing marketing and business advice.
- Giving presentations on the utility/traded markets and related topics.
- Providing practical knowledge and experience in trading, managing trading operations, setting up trading desks, contract negotiation and Client representation.
- Providing Expert Opinion in gas contract litigation and other energy trading related cases.
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Oxford Institute for Energy Studies

Patrick Heather is a Senior Research Fellow at the OIES, focusing on the gas markets, in Britain, Continental Europe and Asia.

His published works are available on the Institute's website:

"The Evolution and Functioning of the Traded Gas Market in Britain" http://www.oxfordenergy.org/wpcms/wp-content/uploads/2010/11/NG44-TheEvolutionandFunctioningOfTheTradedGasMarketInBritain-PatrickHeather-2010.pdf

"Lessons from the February 2012 European gas 'crisis'" http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/04/Lessonsfrom-the-February-2012-gas-crisis.pdf

"Continental European Gas Hubs: are they fit for purpose?" http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/06/NG-63.pdf

"The evolution of European traded gas hubs" http://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/12/NG-104.pdf

"European traded gas hubs: an updated analysis on liquidity, maturity and barriers to market integration" https://www.oxfordenergy.org/wpcms/wpcontent/uploads/2017/05/European-traded-gas-hubs-an-updatedanalysis-on-liquidity-maturity-and-barriers-to-market-integration-OIES-Energy-Insight.pdf

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Outline

What makes a successful traded gas hub

- What is a gas hub?
- The path to maturity
- Which are the successful hubs globally?

How do traded gas hubs help the gas markets to evolve?

- Encourage competitive markets
- Allow for easy physical and financial contract management
- The importance of exchanges in mature markets

Russia's vision for a European/international gas index

Summary and Conclusion

What makes a successful traded gas hub

What is a gas hub?

Gas hubs: basic definitions

Actual geographical location:

• Terminal, flange, processing plant, compressor station, etc.

Virtual location:

- Often but not always, within a country's gas grid network.
- This is often referred to as Entry/Exit zone or Market Area.

Balancing Hubs:

 Used by Shippers to balance their portfolios near to maturity and at delivery and by the TSO to physically balance the gas grid, usually on a daily basis.

Trading Hubs:

 Used by Shippers to risk manage their portfolios, often up to 3 or more years in advance.

These definitions describe their location and their function

Gas hubs: 4 categories

Trading Hubs:

- Reached a certain level of maturity and are already being used for the financial risk management
- Based on virtual trading points
- Only two NWE gas hubs in this category, **NBP** and **TTF**.

Transit Hubs:

- Actual transit locations, or physical points, at which market participants can choose to trade gas
- Primary role to facilitate the transit of large quantities of gas for onward transportation
- Two NWE gas hubs in this category, **ZEE** and **CEGH**.
- North American hubs are all actually physical locations, rather than virtual hubs
- Henry Hub has also become a traded hub, the North American benchmark.

These categories describe their development and maturity

Gas hubs: 4 categories

Transition Hubs:

- Based on a virtual trading point but have not yet reached a mature level
- Being used as 'balancing markets' for shippers
- May not develop sufficiently to become more than just national markets
- These would include the French, German and Italian hubs.

Potential Hubs:

 Emerging 'hubs' in Asia, although for the most part they are only pricing initiatives, rather than actual hubs, physical or virtual, at this stage.

These categories describe their development and maturity

What makes a successful traded gas hub

The path to maturity

What constitutes a 'good' hub?



Source: Heather (2015)

The 'Path to Maturity' starts with Third Party Access and, over a period of time, develops to provide first OTC then financial products, ending with Indices used as reference prices in physical contracts

3 Main Indicators

There are 3 main indicators that reveal the level of liberalisation and market development of traded gas hubs

The 3 main indicators are:

The **political will** to create the necessary framework The **cultural attitudes** to trading and change Which in turn then dictate the level of **commercial acceptance** in order to allow the market to organically grow

These 3 main indicators are the basis of creating successful traded gas markets out of the 'old world' monopolistic era

These metrics are somewhat subjective but are essential to allowing a traded gas market to develop

Hub-Based Gas Market



THE 'NEW WORLD' HUB-BASED GAS MARKET: all producers bring their gas supplies to the hub market, usually the gas grid situated in the demand area; all buyers make their purchases from the hub, including exports (whether national or international) from the hub to another; re-trading takes place

Traded Hubs

- 'Real' traded hubs have:
 - Good liquidity, good volumes, often high volatility
 - Often a benchmark
 - Are a true market place, reflective of supply/demand
 - Not just a physical transfer point but also attracting 'speculative' trading
- 'Real' traded gas hubs are:
 - Henry Hub: the first traded gas hub and the North American benchmark
 - NBP: the first traded gas hub in Europe and *the* British and NWE Sterling benchmark
 - TTF: has developed to be the Continental Leader and *the* European Euro benchmark

The change in gas price formation that has necessitated a robust and reliable marker price to be able to risk manage gas portfolios

What makes a successful traded gas hub

Which are the successful hubs globally?

North American gas regions, markets and hubs

Seven regions serve 33 Market Centers/Hubs Traders 'wheel' gas shipments from hub to hub Henry Hub in Louisiana is the Benchmark Hub

NYMEX HH futures contract: the most traded gas contract in the world



US was the first market to liberalise but it has a 'complicated' structure

N. American gas is being market priced

Market pricing clearly dominates the North American market:

- Fully liquid trading markets in the USA and Canada
- Wholesale price in Mexico being referenced to prices in the USA

North America has almost total market pricing; a very small amount (<1%) of NoPrice in Mexico for gas used in refinery process and enhanced oil recovery.

European gas regions, markets and hubs

ICE NBP and ICE-Endex TTF futures contracts: the most traded in Europe



Only two mature, Benchmark gas trading hubs in Europe: NBP and TTF

European gas is being market priced

• Britain now has 100% market pricing

Britain has had market pricing for many years; price formation on the Continent is changing, at a different pace North-West vs. South-East

- Continental Europe is now c.34% oil indexation [plus 5% regulated pricing]
- Continental Europe is now c.61% market priced
- Increasing volume of spot priced gas
- Eastern and Southern Europe resisting change

How long the transition to fully liberalised, commercial, hub-priced gas markets will take to complete is uncertain: it will take time and it will be costly but competition will mean that gas-to-gas pricing will ultimately prevail

Potential Asian gas markets and hubs

Chinese contenders, by virtue of serving the largest demand area in the region, do have potential but there are many issues to resolve to enable free competitive wholesale trading in gas



Singapore currently seems best suited as regional natural gas trading hub: unbundled gas and power infrastructure; wholesale gas pricing; open access SLNG terminal; well placed geographically to serve all Asia-Pacific

Asia/A-P gas predominantly oil priced

Traded gas markets in this region are in their infancy:

- Uncertain which market/s might develop as a credible benchmark on which to price contracts
- Multiple pricing areas might develop:
 China, Japan, South Korea, Singapore
- A number of gas indices now being reported

Current JCC based indexation is no longer appropriate; buyers would prefer market pricing but, due to dominance of LNG as source of supply with little or no pipeline alternatives, it is not clear how the transition will take place

Asia/A-P market indices

Index	Japan/METI	JKMTM	RIM Japan	ANAE	EAX	SLInG
Publisher	METI	Platts	RIM Intelligence	Argus Media	ICIS	SGX & EMC
Start of Stats	Mar. 2014	Feb. 2009	Feb. 2016	2012	Jan. 2014	Sept. 2014
Ship (Cargo) Size	Any	2.9–3.7 Bcf	2.9 Bcf tankers & partial cargoes	2.9–3.3 Bcf & partial cargoes normalized	0.6–5.6 Bcf & partial volumes	2.9–3.7 Bcf
Index Coverage Area	LNG delivered to Japan	Spot physical cargoes delivered into Japan and South Korea	Japan, South Korea, Taiwan and China	Japan, South Korea, Taiwan, China	Physical cargoes to Japan, South Korea, Taiwan & China	Vessels on the water with potential to deliver to Singapore
Assessment Type	Census sent from METI to market players	Daily phone or electronic survey of market players	Trading info from OTC market; Price assessment from JOE LNG market deals & bids/offers	Daily phone or electronic survey of market participants	Daily phone or electronic survey of bids, offers (first-hand or observed)	Survey of select market participants
Assessment Frequency	Monthly price assessments	Daily, with market close prices	Assessed & published daily	Assessed & published daily	Assessed & published daily	Half-monthly assessments, published twice weekly
Sale or delivery	DES contracted and arrival	DES	DES	DES	DES	FOB

Source: EIA "Perspectives on the Development of LNG Market Hubs in the Asia Pacific Region" (2016)

There are also several initiatives to develop LNG trading platforms, in China and South East Asia, including the Singapore based OTC matching platform, known as GLX

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JKM is gaining in popularity

JKM[™] - Exchange cleared Swaps (ICE+CME)



Source: Platts (from Platts, ICE and CME data)

Q1-Q3 2017 Cleared JKM[™] swaps nearly triple whole of 2016

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Churn rates

Probably the most important factor in determining a gas hub's commercial success. Churn rates are an excellent measure of a hub's real liquidity and success and are a parameter used in most commodity and also financial

markets

Commodity markets are deemed to have reached maturity when the churn is in excess of 10 times

Financial players will usually only trade in markets with a churn in excess of 12

Representative churn rates 2015/16 (trading/consumption)						
Country	Hub	Churn				
Jnited States	All USA	c.61-90				
Netherlands	TTF	57				
Britain	NBP	22				
Austria	VTP	5.7				
Belgium	ZEE+ZTP	4.1				
Germany	NCG+GPL	3.3				
Rest of Europe	FR,IT,CZ,ES	0.1-1.3				
Asia	No hubs yet; Lim	; Limited spot trading				

There are three successful, mature, benchmark hubs today: Henry Hub, NBP and TTF; no other hub is even near to the 10x criterion for mature markets

How do traded gas hubs help the gas markets to evolve?

Encourage competitive markets

Mature gas markets: their function

- Open and Transparent markets:
 - Foster trading, competition and, ultimately, the 'best' or 'right' price at any given time
 - Attract many participants of different types who bring liquidity
- Liquid markets allow for the ability to:
 - Physically adjust portfolio volumes over time
 - Financially risk manage gas portfolios
- Mature gas markets can help provide:
 - Security of supply and security of demand
 - Providing a market place for the buying and selling of, usually, marginal quantities of physical gas

Most of all, mature, open, transparent and liquid markets provide secure Risk Management tools

How do traded gas hubs help the gas markets to evolve?

Allow for easy physical and financial contract management

New approach to trading: Optimisation

Changing attitudes in energy trading:

- -Large wholesale companies are no longer simple 'intermediaries' between producers and end-users
- -They can no longer 'pass on' gas on a 'cost plus' basis
- -They are now energy trading companies with complex gas (and power, and coal) portfolios



-They now need liquid markets to financially hedge their exposures -They also buy and sell balancing volumes

Buyers recognise that liquid markets help them manage their businesses

Source: Heather (2012)

How do traded gas hubs help the gas markets to evolve?

The importance of exchanges in mature markets

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Gas exchanges: their role and function

- Price Discovery & Transparency
 - The ability to know the price of gas now and in the future (up to six years ahead on ICE NBP and five years for ICE-Endex TTF)
 - Publicly and easily accessible
- Supply/Pricing flexibility
 - The ability to separate price function from supply function
- Physical balancing
 - Providing a market place for the buying and selling of, usually, marginal quantities of physical gas
- Risk Management
 - Providing a facility for managing price risk through a secure and regulated market – hedging and trading

Exchanges are complementary to the OTC markets and assist in the development of traded gas hubs in a secure, regulated environment

Russia's vision for a European/international gas index

Major differences Russia / UK-NL / Nth America

- Size of country (GB,NL)
- Size of Infrastructure (GB,NL)
- Volume of Gas Transported
- Dominance of the 'Physical' in Russia
- Separation of the 'Physical' from the 'Financial' in the three mature markets
- Emerging Trading in Russia
- Established Trading in the three mature markets

Major similarities Russia / UK-NL / Nth America

- Own Production
- Size of country (NA)
- Size of Infrastructure (NA)
- Delivered through 'Entry Points'
- Demand far away from Supply

There are a number of differences and similarities between Russia and the three Benchmark gas markets in the world; indeed, it could be said that Russia is a different case altogether, somewhere between the 'large' North American market and the 'small' British and Dutch ones

What is important to know & understand

- The 'Big' Picture NOT the Detail
- Why GB/NL/NA have Successful Trading
- Physical is NOT Financial
- There is Transportation...

...and there is Trading

 How to Adapt the trading models from GB/NL and Nth America to Russia's Needs

Necessary prerequisites and Russia

For a viable index:

- Need a liquid hub
- Active OTC and Exchange contracts/trading

Current situation:

- Political willingness is apparent
- Regulator keen to see progress
- Independents keen to participate
- However, incumbent is resistant!
- Traded volumes are increasing
- Changes needed to help develop the gas market:
 - Review 'type/location' of traded hub/s
 - Review Gazprom export monopoly?
 - Attract foreign companies to buy gas in Russia and export?

Some way off from the prerequisites; decisive political actions needed now to encourage further development of the traded gas market



Spimex gas contracts

For a viable index:

- Needs to be representative of true supply/demand
- Needs to attract wide variety of participants

Current situation:

- 3 Contracts/delivery points: all in Siberia
- Trades include bundled (Gazprom) transportation
- Sellers: 67% Gazprom 33% IOCs
- Buyers: >40% Gazprom subsidiaries
- No re-trading allowed: sales only
- Traded volumes are increasing

Changes needed to help develop the gas market:

- Concentrate liquidity in one contract, preferably in demand area
- This would attract more independent buyers
- Allow re-trading to attract non physical players

Could the Spimex contracts provide a benchmark index? In their current form, probably not





SPIMEX

St. Petersburg International Mercantile Exchange

Summary and conclusion

Summary and Conclusion

US gas markets started liberalisation in the 1980's but took nearly 20 years to become a 'regulated competitive market', only truly liberalised at the wholesale level

Britain's gas markets liberalised in the mid-1990's and reached 'maturity' within 10 years, albeit at a high cost

European gas markets really started in the mid-2000's but are far from being fully liberalised across all countries

Asian gas markets have just started in the mid-2010's to move away from oil indexation towards market pricing

Henry Hub is the benchmark for Nth American gas and some LNG supplies NBP is the £ benchmark for gas in British Isles and some LNG supplies TTF is the € benchmark for North West European gas supplies Further down the line another European hub is feasible and there will almost certainly be at least one Asian hub However, it must be remembered how long the process of change takes!

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Thank you! Спасибо!

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