Growth factors for European gas hubs

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Outline

The role and importance of liquid hubs

- Routes to Market: Bilateral, OTC or Exchange
- LTCs vs. Hub trading
- Oil indexation vs. market pricing

The future pricing of gas

- Moving from Long Term gas Contracts to hub trading
- European gas hubs and their traded products
- Traded gas hubs market indicators

Summary and conclusion

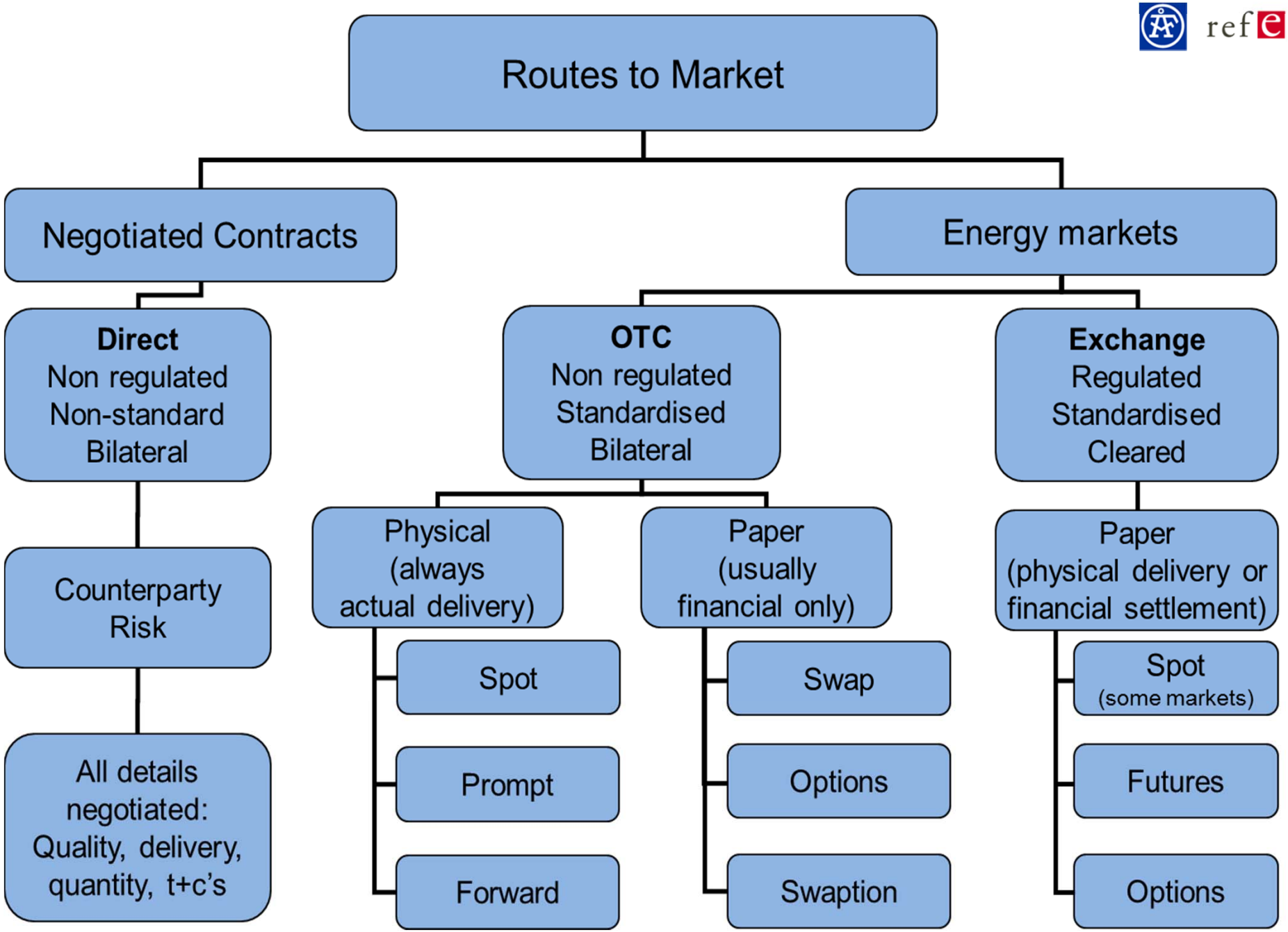
- Will European Gas Hubs provide a true reference point?

The role and importance of liquid hubs

Routes to Market

LTCs vs. Hub trading

Oil indexation vs. market pricing


Routes to Market
Negotiated Contracts
Energy markets
Direct
Non regulated
Non-standard
Bilateral
OTC
Non regulated
Standardised
Bilateral
Exchange
Regulated
Standardised
Cleared
Counterparty Risk
Physical (always actual delivery)
Paper (usually financial only)
Paper (physical delivery or financial settlement)
All details negotiated: Quality, delivery, quantity, t+c's
Spot
Prompt
Forward
Swap
Options
Swaption
Spot (some markets)
Futures
Options

Routes to market: OTC vs Exchange

Over-The-Counter (OTC) trading:

Standardised, bilateral contracts:

- Counter-party credit and performance risk
- Unregulated markets
- Variable transparency
- Favours large and medium sized participants
- From spot and prompt to several years forward
- Mostly physical delivery; sometimes financial
- Delayed cash-flow:
  - payment made after delivery
- Self-traded or through brokers
  - by voice or electronic media

Non-regulated market; Standardised, Bilateral contracts; most popular form of trading in European gas markets

Routes to market: OTC vs Exchange

Exchange trading:

Standardised, cleared financial contracts:

- Financially guaranteed by Clearing House
- Still potential performance risk
- Regulated markets
- Anonymous trading
- From spot and prompt to several years forward
- Financial settlement or physical delivery
- Upfront cash-flow:
  - initial and variation margins from trade date until maturity
- Self-traded or through brokers
  - by voice or electronic media

Regulated market; Standardised, Cleared contracts;
popular form of trading in Britain and increasingly in Holland

Long Term Contracts vs. hub trading

IT'S ALL ABOUT THE VOLUME

Long Term Contracts:

- Irrespective of pricing formulae:
  - Provide security of supply to the buyer
  - Provide security of demand to the seller
  - Allow for relatively easy forward planning

Hub trading:

- Irrespective of pricing formulae of the LTCs:
  - Used to supplement the 'base' LTC volumes in portfolio
  - In Britain and Holland, this can be done up to 5yrs forward
  - Provides ability to 'fine tune' portfolio towards delivery day
  - To buy extra gas when needed
  - To sell excess gas if necessary

SoS and SoD are essential to the long term prospects of the gas industry

Oil indexation vs. market pricing

IT'S ALL ABOUT THE PRICE

Oil indexation:

- Historical due to 'switchability'
- Links the financial with the physical in a 'package'
- Package provides physical optionality to the buyer
- Package provides financial planning for the seller
- **Pricing not reflective** of true gas supply/demand
- Confidential and opaque
- Can apply to contracts of any length
- Preferred by some sellers (Russia & Algeria)
- Major European wholesalers demanding change

Oil indexation is not relevant and untenable; buyers are demanding change

Oil indexation vs. market pricing

IT'S ALL ABOUT THE PRICE

Market pricing:

- Separates the financial from the physical
- Usually 'flat' gas volumes
- Allows for separate financial risk management
- Provides the **'right' gas price** at any given time
- Open and transparent
- Can apply to contracts of any length
- Increasing demand for market pricing
- Seller and buyer can each choose when to hedge
- Seller & buyer can each choose how much to hedge

Market pricing is ultimately a better way of pricing for both seller and buyer

The future pricing of gas

Moving from Long Term gas Contracts to hub trading

The future pricing of gas

Global gas prices have de-coupled

- From as low as $3/mmbtu to around $17/mmbtu
- This situation is untenable in a globalising gas market

Nth America and Britain already have market-pricing

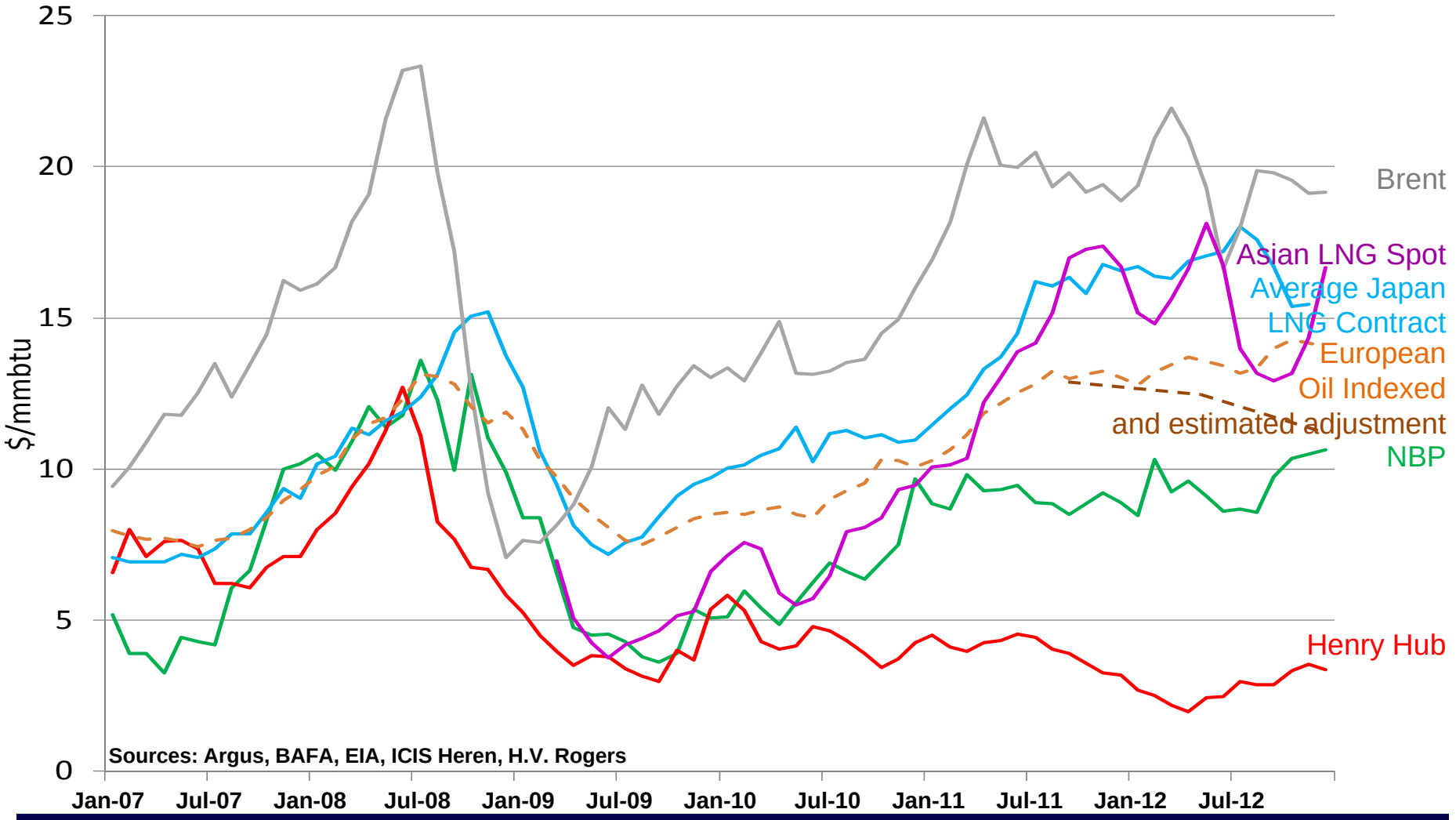
- Still ‘long’ term – reliable and predictable
- Allows for separation of volume and price

Continental Europe is changing fast

- End user demand for ‘fairer’ prices is forcing change
- Marginal demand can already be bought on the markets
- Buyers can see the ‘true’ value in publicly quoted hub prices

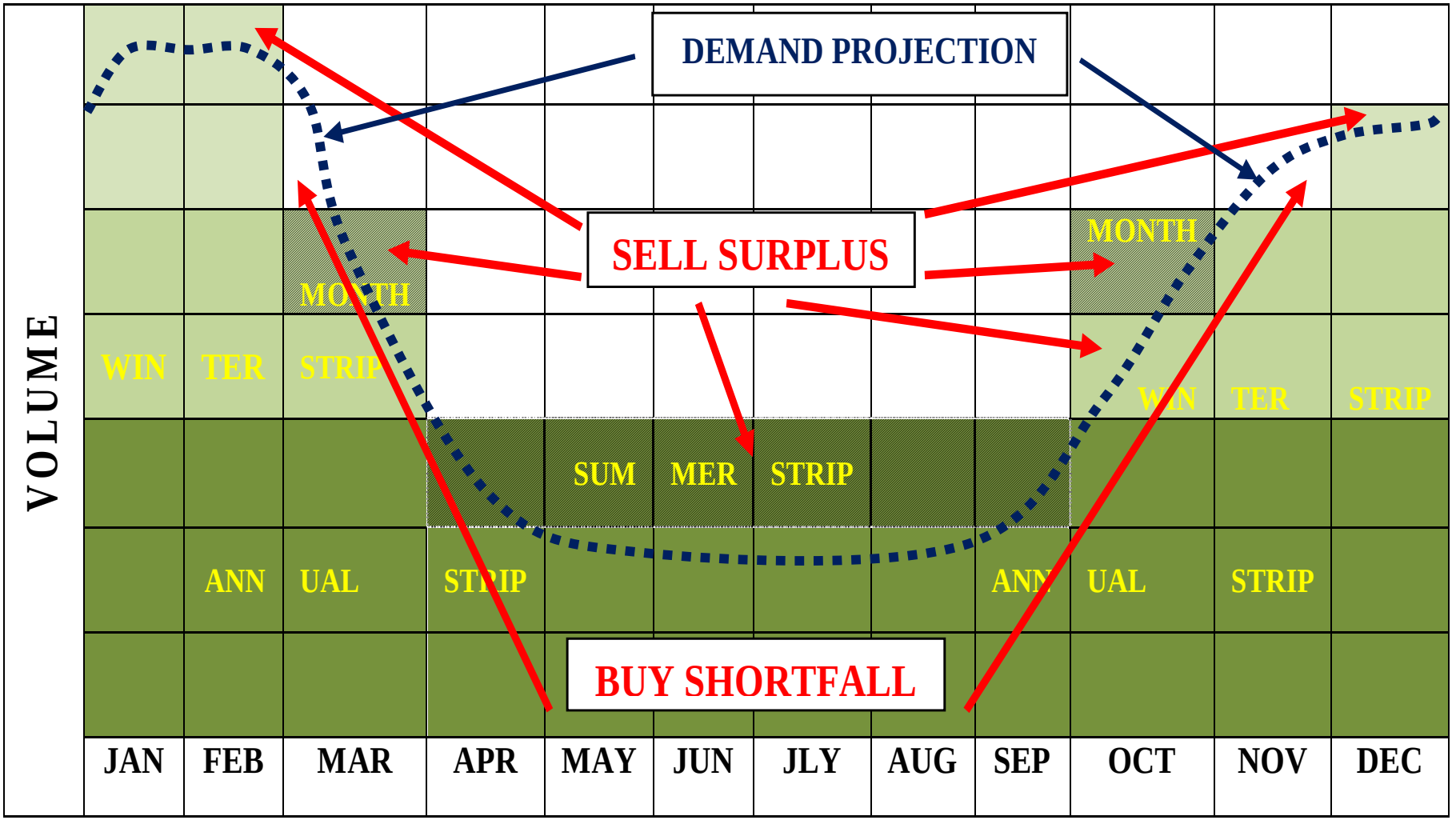
Europe should see market pricing reach 50% by 2013

Global gas and Brent prices: January 2007 – December 2012



Global gas prices have de-coupled across the various trading areas: from c.$3/mmbtu to c.$17/mmbtu…!

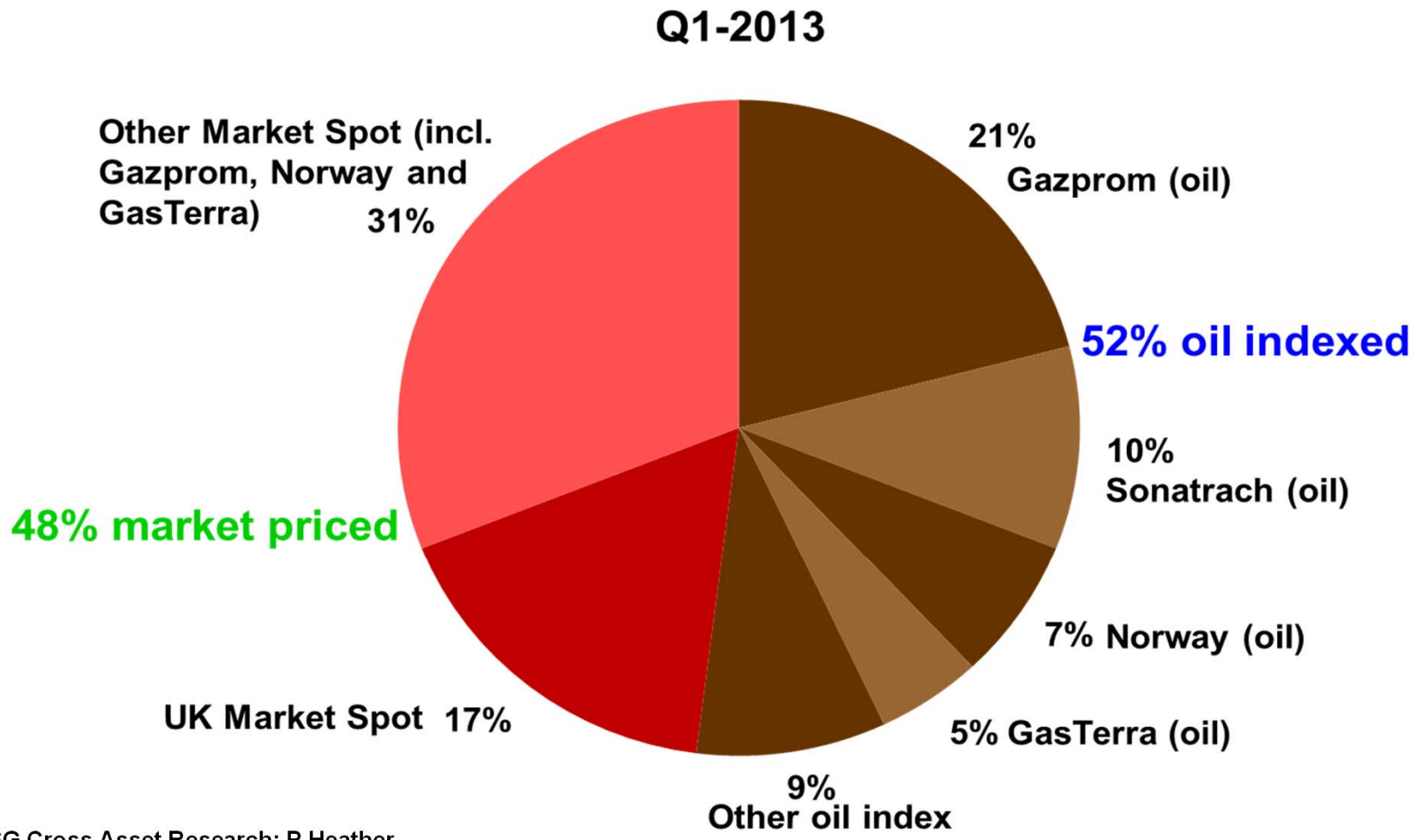
New approach to trading: buyers



Source: P. Heather

Hubs provide the mechanism needed to take gas trading to market pricing; Buyers recognise that liquid markets help them manage their businesses

Estimated split of European Gas Supply: 2013



Source: SG Cross Asset Research; P.Heather

Oil indexation is no longer relevant; the logic for gas-to-gas 'market pricing' is apparent and its share is expected to top 50% in 2013

Conclusions Contractual Structure

- Continental European gas LTCs are in **turmoil** and must be **re-engineered** soon; historical precedents in North America and Britain were both **difficult**
- European gas markets **are** changing and this is a **consumer led** change but will require robust and reliable **'marker' prices**

Negotiation and now **arbitration**

are favouring market pricing

- A credible 'marker' hub must have **good liquidity** from spot to several years forward
- It must be fully **transparent**, fully **open** and **accessible** to a wide range of participants

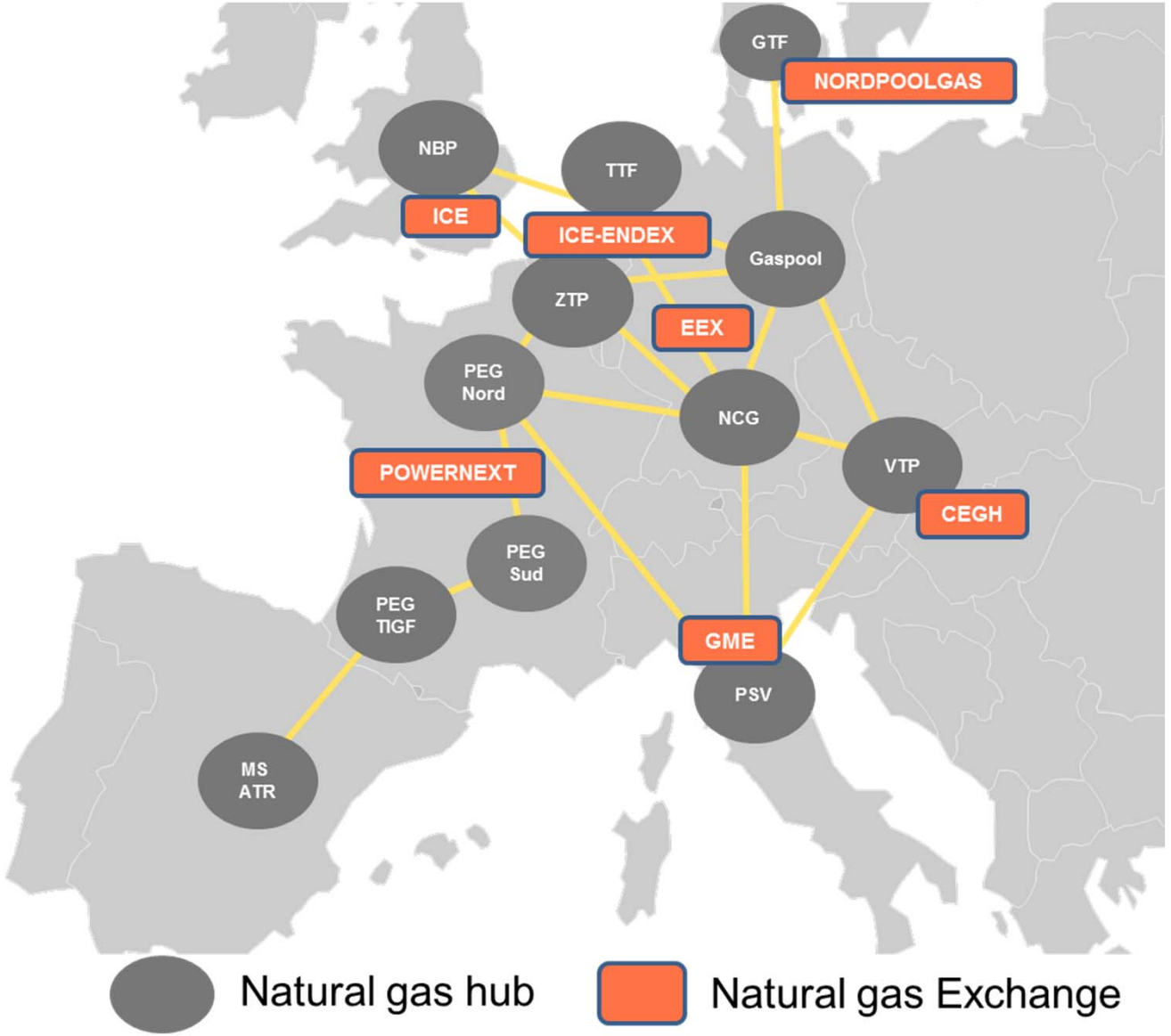
How long the transition will take is uncertain but competition will mean that gas-to-gas pricing will prevail

Future pricing of gas

European gas hubs and their traded products

Traded gas hubs market indicators

European gas hubs and Exchanges

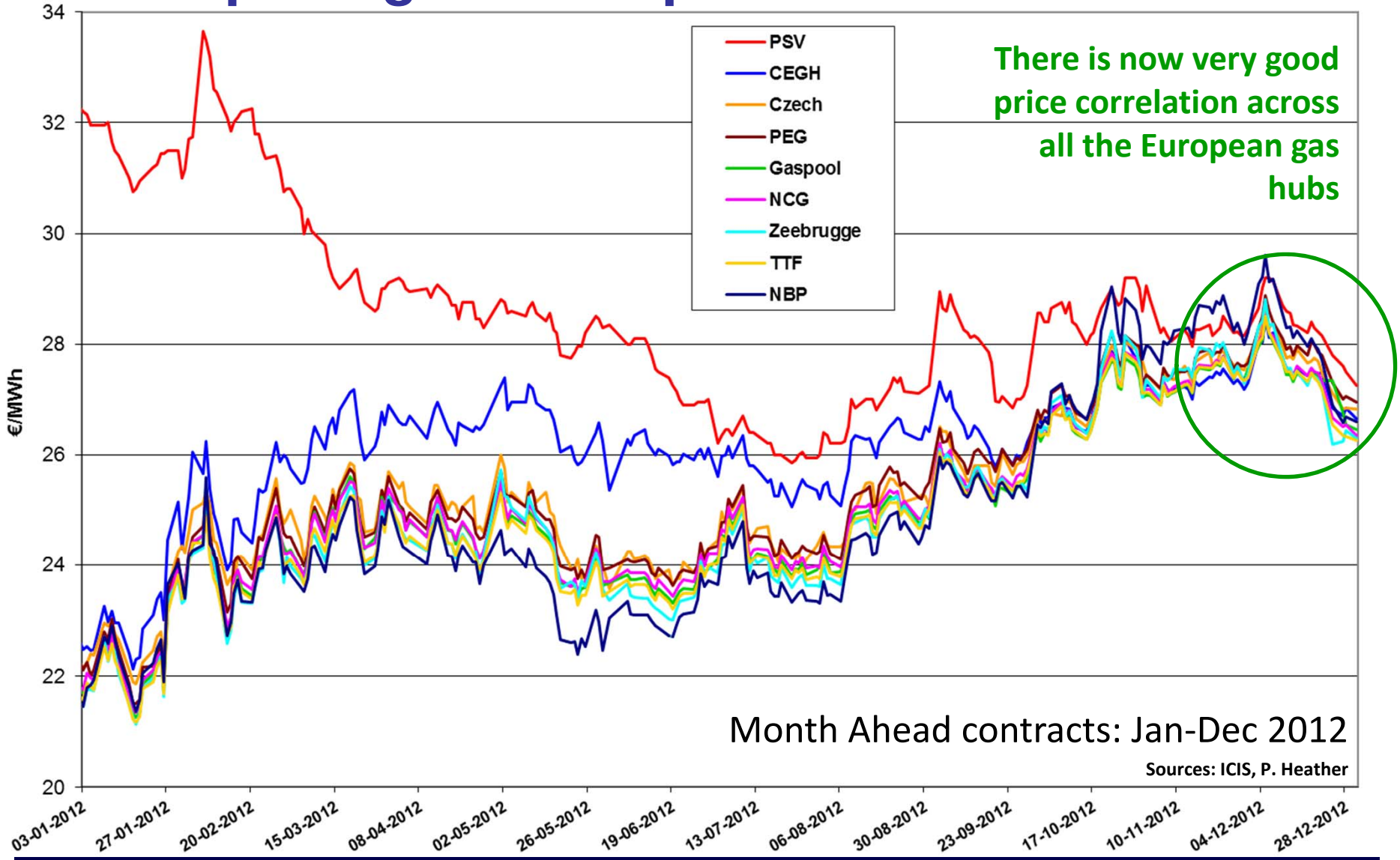


European gas hubs: traded products

	OTC + CLEARING	WD	DA	BOW W/E WDNW BOM	MA MONTHS	QUARTERS	SEASONS	GAY YEAR	CAL YEAR	EXCHANGE	BALANCING TRADES	SPOT	FUTURES MONTHS	FUTURES QUARTERS	FUTURES SEASONS	FUTURES YEARS
BRITAIN NBP	Y+Y	Y	Y	Y	Y	Y	Y	Y (<3)	Y	Y	Y	Y	Y (83)	Y (13)	Y (14)	Y (6)
HOLLAND TTF	Y+Y	Y	Y	Y	Y	Y	Y	Y	Y (<5)	Y	N	Y	Y (6)	Y (4)	Y (6)	Y (6)
GERMANY NCG	Y+Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y (5)	Y (4)	Y (4)	Y (3)
GERMANY GASPOOL	Y+N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y (5)	Y (4)	Y (4)	Y (3)
BELGIUM ZEE + ZTP	Y+N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
FRANCE PEG NORD	Y+Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y (3)	Y (3)	Y (3)	Y (1)
FRANCE PEGS SUD + TIGF	Y+N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N
AUSTRIA CEGH VTP	Y+N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y (WD 2013)	Y (3 FRONT MTHS)	N	N	N
ITALY PSV	Y+N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y (1)	N	Y (1)	Y (1)
KEY:	Y=AVAILABLE		N=NOT AVAILABLE		(-)=ADDITIONAL INFORMATION		GREEN=HIGH VOLUME		AMBER=MEDIUM VOLUME		BLUE=LOW VOLUME		RED=NO VOLUME			

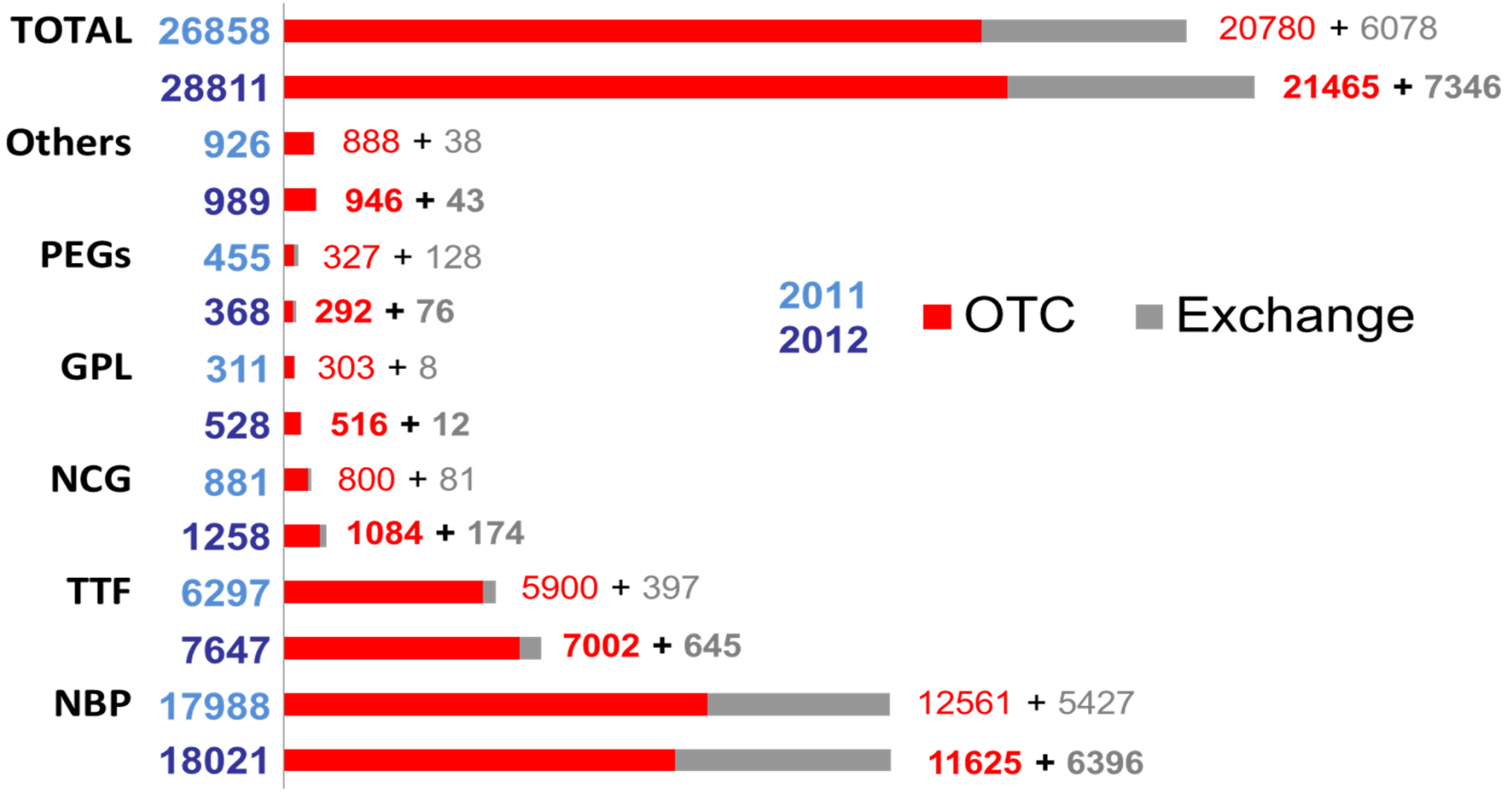
Sources: ICE ; ICE-Endex ; EEX ; Powernext ; CEGH ; GME; P. Heather

European gas hubs price correlation



Physical connectivity and commercial trading bring price correlation; but spreads are emerging due to pipeline contracts and storage factors

European Hub volumes: OTC vs. Exchange



Sources: LEBA/Tankard; ICE ; ICE-Endex ; EEX ; Powernext ; CEGH ; GME; P. Heather

On average, across the European hubs, 7.3% increase year/year, but wide variations from hub to hub: PEGs -19% to NBP ~Flat to GPL +70%

Volume, 'tradability' and 'churn'

Two important measures of a hub's commercial success:

The churn ratio

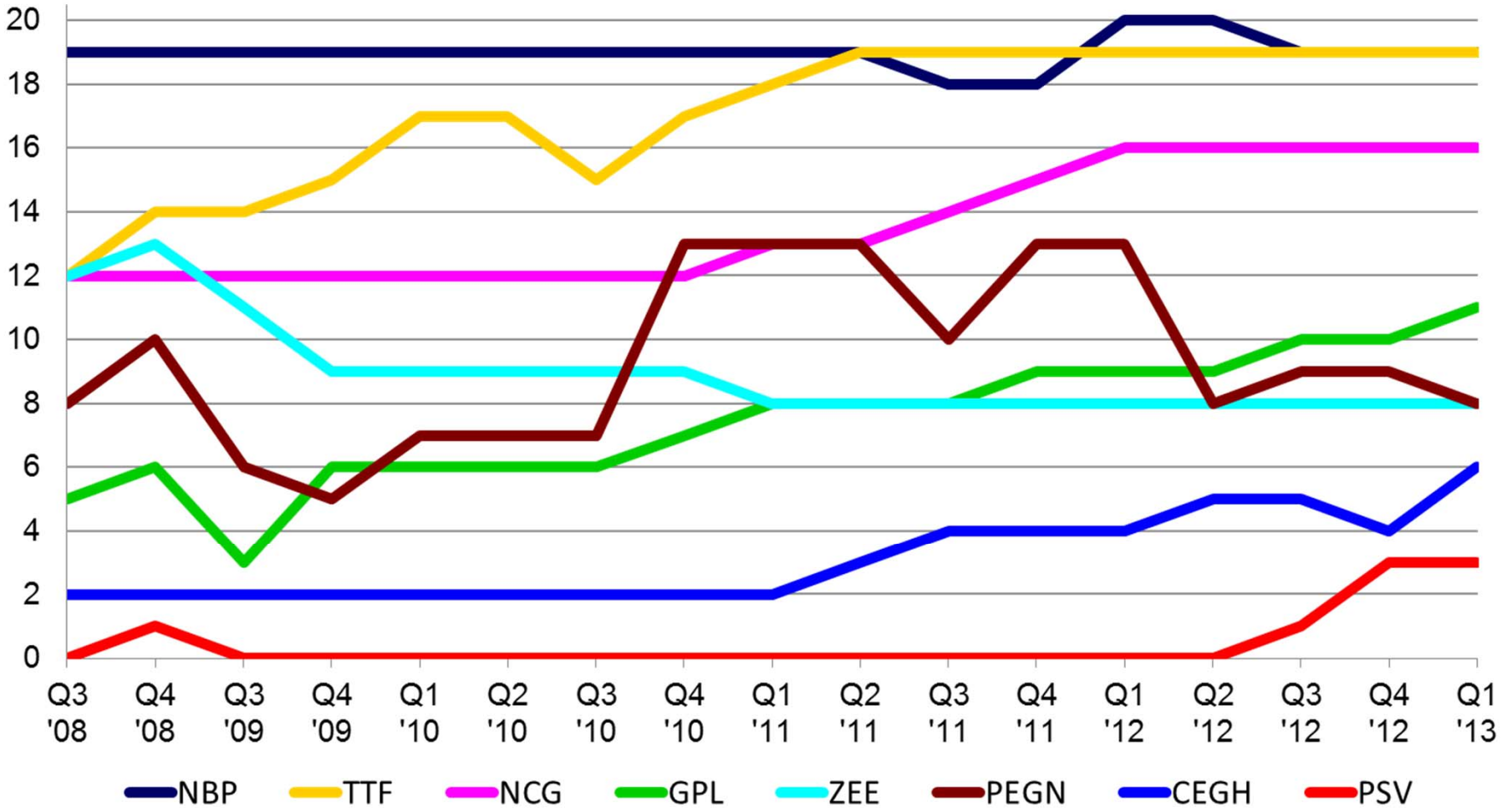
- The multiple of traded volume to actual physical NTS throughput
- A measure of the number of times a 'parcel' of gas is traded and re-traded between its initial sale by the producer and final purchase by the consumer
- Markets are deemed to have reached maturity when the churn is in excess of 10 times

The 'Tradability Index'

- A measure of narrow bid/offer spreads across the trading curve, indicating good liquidity
- A figure calculated by Icis-Heren and reflects the ease with which a market can be traded
- A reflection of market confidence and good participation

NBP is a high volume, high liquidity, safe and easy market to trade

ICIS Tradability Index
Q3-2008 to Q1-2013



Sources: ICIS European Gas Hub Report, Q1-2013; P. Heather

TTF has joined NBP at the top; ZEE and PEGN are struggling; CEGH is showing promise; PSV is barely off the ground

Selected Hub churn rates: 2011 vs. 2012

Volumes in TWh	Σ OTC (less cleared)	Σ Exch. futures	Σ Exch. spot	Σ Traded	Net traded Physical	Re-trading ratio	Σ NET Physical	Net market churn	Σ GROSS Physical	Gross market churn
NBP 2011	12,561.15	5,289.10	137.63	17,987.88	523.95	**34**	893.78	**20.1**	1047.89	**17.17**
NBP 2012	11,624.71	6,258.35	137.36	18,020.42	481.81	**37**	881.89	**20.4**	981.64	**18.35**
Δ Britain	**-7.5%**	**+18.3%**	**-0.2%**	**+0.2%**					**-6.3%**	
TTF 2011	5,900.25	380.82	15.88	6,296.95	317.15	**20**	453.89	**13.9**	961.07	**6.55**
TTF 2012	7,001.57	621.62	23.44	7,646.63	323.82	**24**	422.14	**18.1**	981.27	**7.79**
Δ Holland	**+18.7%**	**+63.2%**	**+47.6%**	**+21.4%**					**+2.1%**	
ZEE 2011	628	NONE	0.24	628	114.77	**5**	214.44	**2.9**	459.09	**1.38**
ZEE+ZTP/ L 2012	691	NONE	1.71	693	107.76	**6**	220.71	**3.1**	431.05	**1.61**
Δ Belgium	**+42.8%**	**N/A**	**+612.5%**	**+43.1%**					**-6.1%**	
NCG+GPL 2011	1,043.08	69.24	18.90	1,131.22	212.21	**5**	863.28	**1.3**	1,061.06	**1.07**
NCG+GPL 2012	1,600.00	160.53	25.82	1,786.35	213.04	**8**	868.81	**2.1**	1,065.12	**1.68**
Δ Germany	**+53.4%**	**+31.8%**	**+36.6%**	**+57.9%**					**+0.4%**	
PEGs 2011	327.39	101.25	26.89	455.53	110.27	**4**	485.21	**0.9**	551.37	**0.83**
PEGs 2012	291.86	41.52	34.56	367.94	101.88	**4**	470.18	**0.8**	509.41	**0.72**
Δ France	**-95.0%**	**-59.0%**	**+28.5%**	**-19.2%**					**-7.6%**	
'Net traded' (as % of total gross physical): Britain @ 50%; Holland @ 33%; Belgium @ 25%; Germany and France @ 20%										

Sources: LEBA/Tankard; Eurostat; Energy-Flows (TSO data); ICE ; ICE-Endex ; EEX ; Powernext ; CEGH ; GME; P. Heather

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

Summary and Conclusion

Will European gas hubs provide a true reference point?

Summary and Conclusion

Will Continental European Gas Hubs provide a meaningful market price?

- –The past 10 years have seen much change in the European traded gas markets
- –**All of Britain's gas supplies are market priced**
- –**Continental Europe has lagged behind but is now changing fast**

In 10 years' time, as many hubs as now but…

- –Difference between **liquid traded** hubs
  - Used for risk management
- –And **balancing physical** hubs
  - Used to adjust the physical portfolios of shippers

NBP will probably remain the benchmark for gas in British Isles and for LNG coming into Channel ports
TTF is fast becoming the benchmark for North West European gas supplies and CEGH has promise as a CEE marker

Summary and Conclusion

Much has happened in the development of the European gas hubs and there are still some hurdles to overcome…

Liquidity and transparency are key but assessment needs defined measures and criteria:

–Reliable and transparent data sources

–Reliable OTC & futures volumes and indices

–Comparative churn rates across all markets

Physical connectivity is also key to realise the EU's aim for regional Market Areas:

– But is very costly

– Market Coupling may be a viable alternative

But, yes, Continental European Gas Hubs will provide a true reference point!

Thank you!

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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 and standardised spark spread
  - 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 different organisations:
    - from a trading software house to a large bank, from the ICE to various producer and end user companies
  - Advised companies and governments:
    - in Austria, Brazil, Britain, France, Greece, Holland, Italy, Norway, the Philippines, Poland, Russia, Sweden and Turkey
- Nov 2006-Dec 2009, Commercial Advisor to South Hook Gas
- Senior Research 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

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Oxford Institute for Energy Studies

- Patrick Heather is a Senior Research Fellow at the OIES, focusing on the gas and power markets, in Britain and Continental Europe.
- With the emergence of LNG as an increasing part of the gas supply mix into NWE, this is now part of his work.
- He specialises in the commercial aspects of the markets, focusing on trading issues. Currently, he is working on the transition of the long term contracts of gas from Russia, Norway and Holland into mainland Europe from being priced with an oil formula to being priced against gas.
- 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/Lessons-from-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
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