



A NEW PHASE OF GAS PRICING IN EUROPE:

*TOWARDS MORE HUB INDEXATION
AND GLOBAL PRICING*

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Nov 16, 2016



S&P Global
Platts

WHAT IS S&P GLOBAL PLATTS?

Platts brings transparency, price discovery and efficiency to global commodity markets

- A leading global provider of energy, petrochemicals, metals and agriculture information and a premier source of benchmark prices for the physical and futures markets
- Publishes thousands of daily price assessments, which are the basis of **1,400+** exchange-traded, cash-settled futures contracts
- Platts' Brent price assessment is the benchmark for **>60%** of the world's crude oil
- Completed eight important acquisitions to extend capabilities since 2011:

Steel & Metals



Sugar & Biofuels Markets



Power & Gas Markets



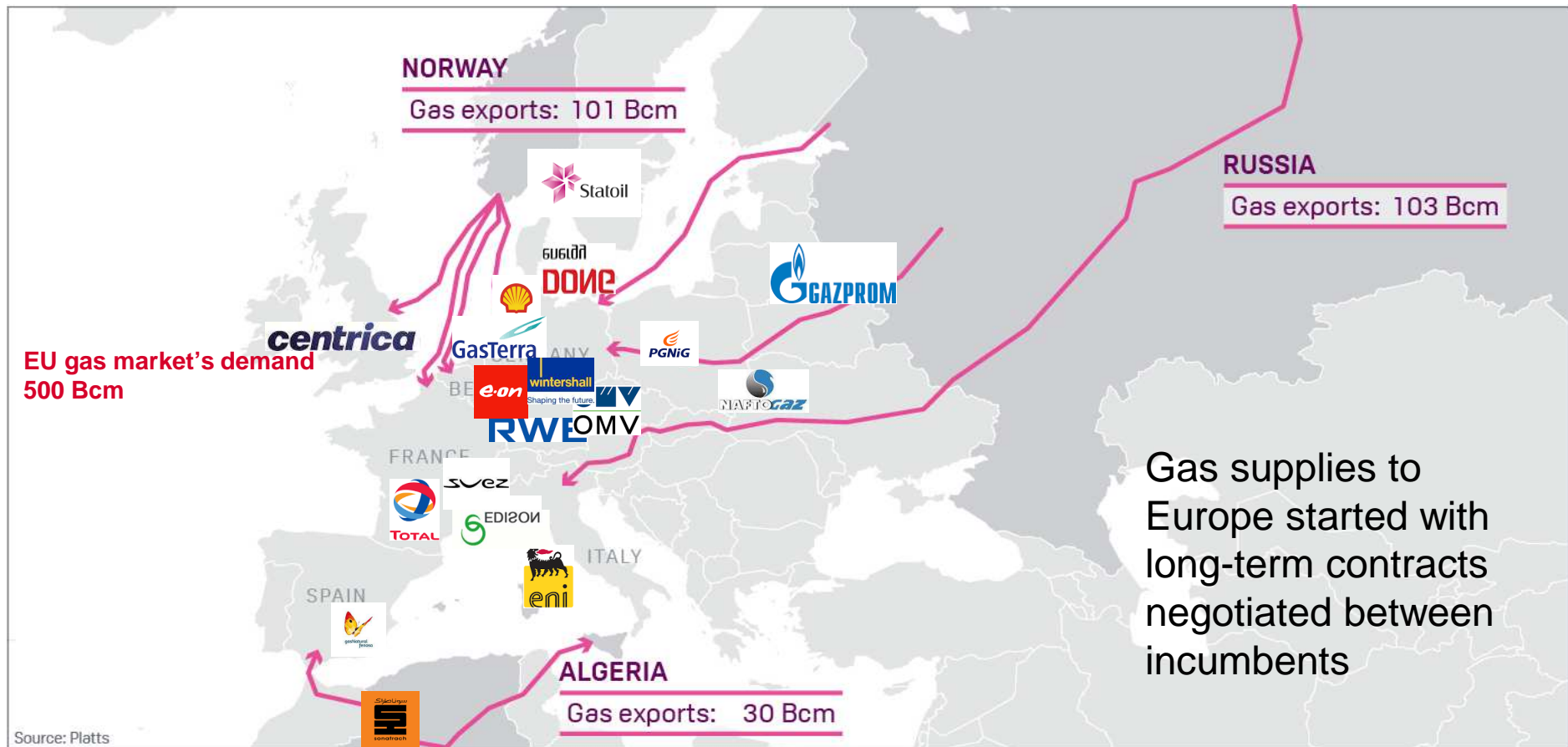
Oil & Shipping Markets



AGENDA

1. The wholesale gas market: from bilateral oligopolies to organised market trading
2. Oil-indexed gas contracts: reason for changes?
3. Pricing the wholesale European gas spot, prompt, forward curve
4. Towards global gas price dynamics and shrinking spread between markets?

HISTORY OF EU GAS SUPPLY: OIL-INDEXED LONG-TERM CONTRACTS



RATIONALE FOR LONG-TERM GAS CONTRACTS

Price and Volumetric risk mitigation

A commercial exchange between Buyers and Sellers where

Buyers mitigate Price Risk & Sellers mitigate Volumetric Risk

Price Risk: From buyer perspective, it removed the price risk, ie that a non-transparent illiquid gas market would have its price manipulated by few producers.

Volumetric Risk: To supports producers' significant upstream and midstream investments, often in order of tens of billion \$

Traditional contract has a Take-or-Pay obligation for the buyer and a price escalation clause for the seller

OIL-INDEXATION: HOW DOES IT WORK?

- In Europe, oil-indexed formulas have a 3-9 months gap with oil prices



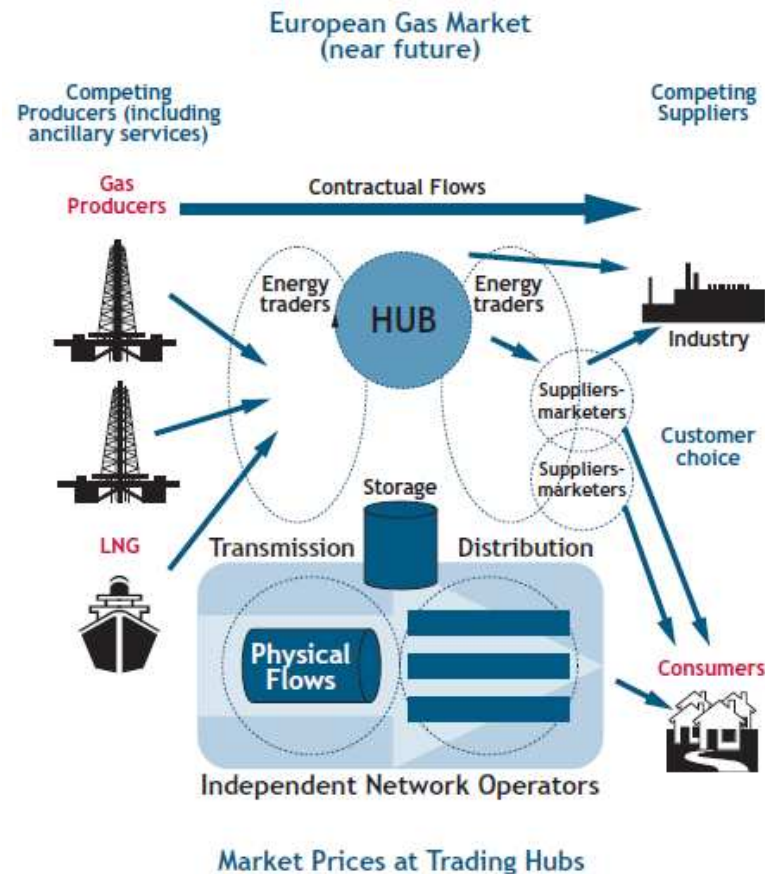
Possible oil products: light heating oil (HEL), heavy heating oil (HSL), gas oil (GO), fuel oil (FO), or Brent

Source: Wingas

Can be classified by three numbers (903, 901, 911, 633, etc.) to indicate:

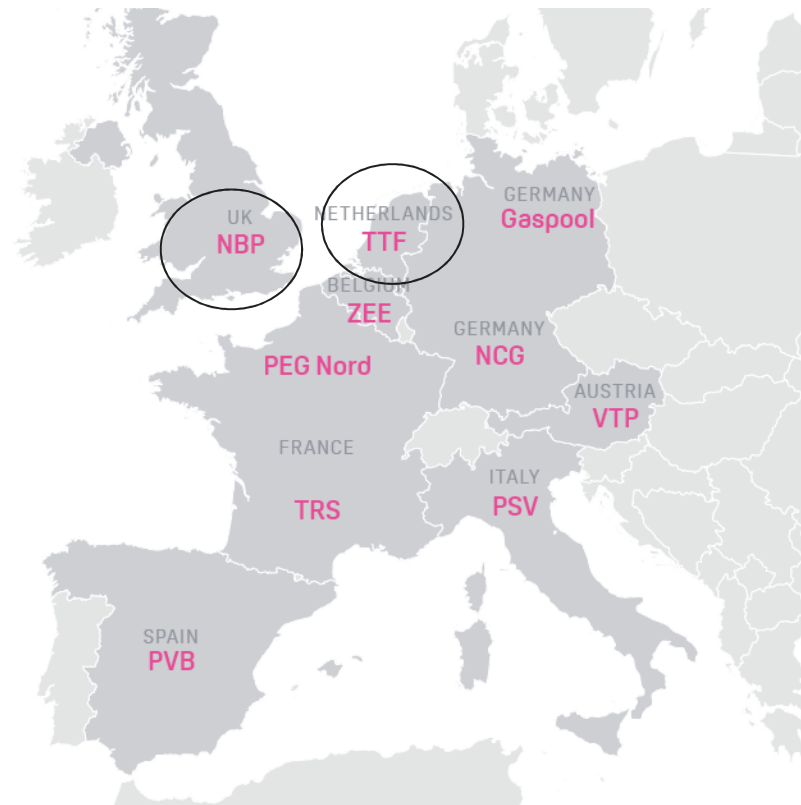
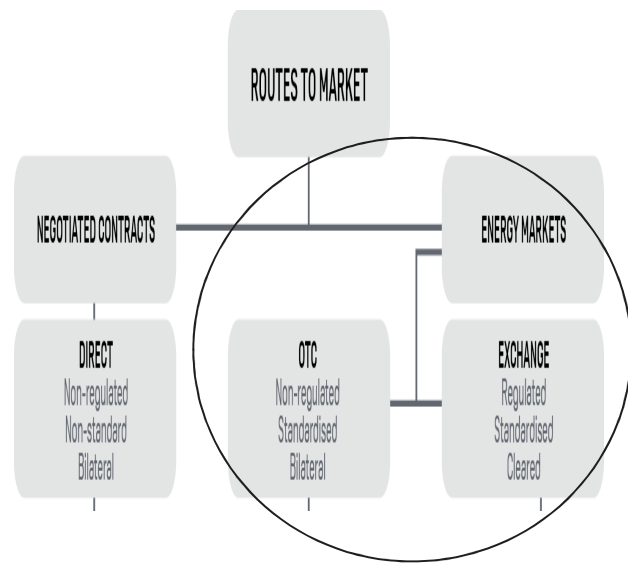
- N. of months for averaging oil price period
- N of month for the lag
- N. of month for the purchase price period

CHANGING MARKET: FROM OLIGOPOLIES TO ORGANISED OPEN MARKET TRADING



- Hub pricing market emerged as a delivery point of gas entering a system, **as opposed to bilateral point-to-point system**
- Liberalized market with prices set by market competition (**so-called gas-on-gas competition**)
- EC as the main driver (Third Energy Package)

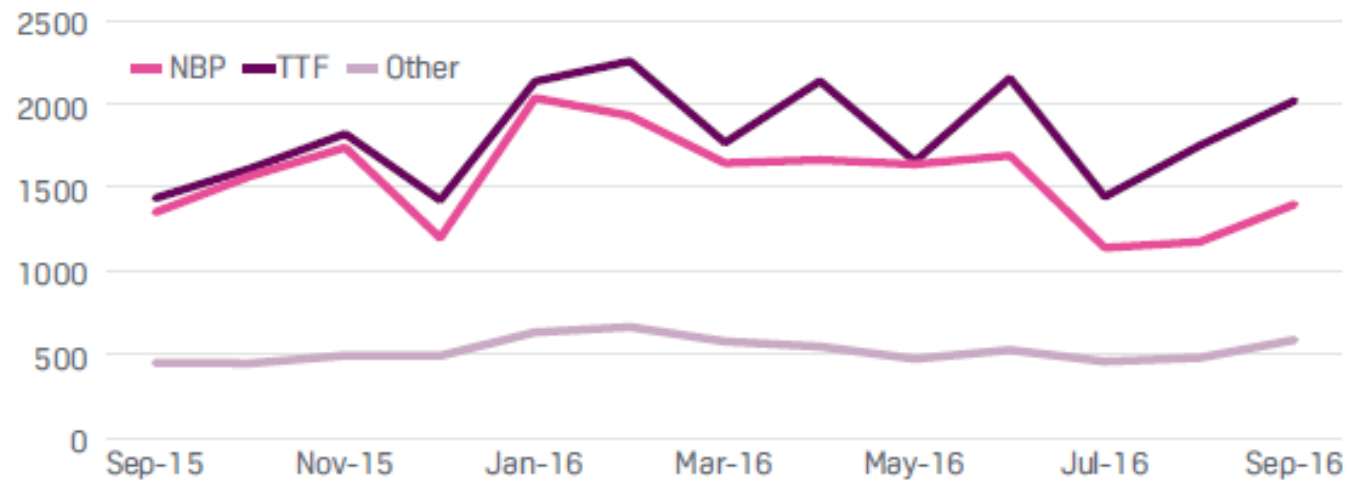
EUROPEAN GAS HUB MAP



Source: Platts

BRITISH NBP AND DUTCH TTF ARE THE MOST LIQUID HUB IN EUROPE

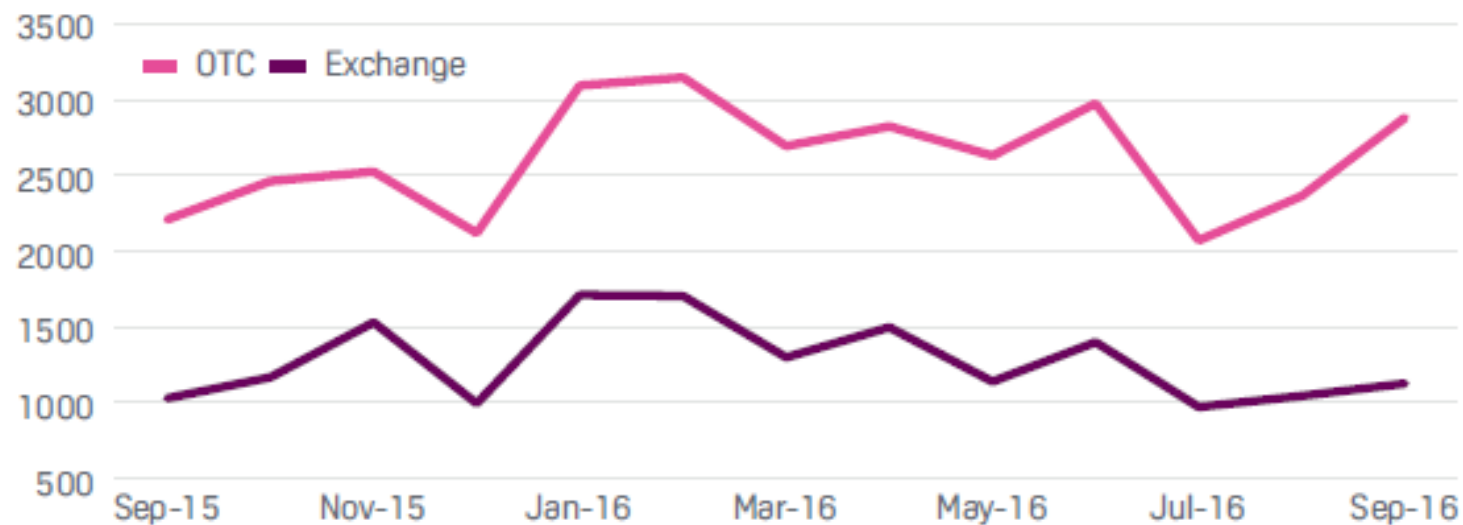
TOTAL TRADED VOLUME: OTC & EXCHANGE (TWh)



Source: Platts analysis of LEBA, ICE, PEGAS, CEGH, GME

OTC MARKET STILL DOMINATES IN EUROPE

TOTAL TRADED VOLUME: OTC V EXCHANGE (TWh)

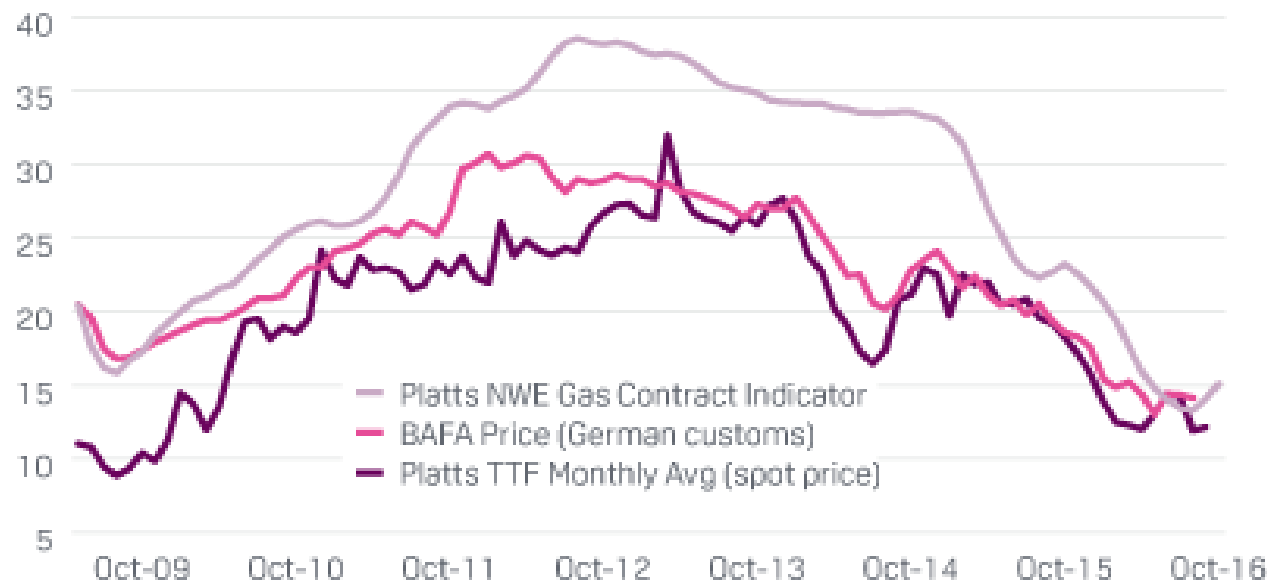


Source: Platts analysis of LEBA, ICE, PEGAS, CEGH, GME

DE-CORRELATION BETWEEN HUB AND OIL INDEXED PRICES

Buyers with oil-linked gas began to make significant losses post-2008 in Europe due to the collapse of hub prices

LONG-TERM VS SHORT-TERM GAS PRICES (Eur/MWh)



Source: Platts, BAFA

TREND: COMPANIES RENEGOTIATE THEIR LONG-TERM CONTRACTS

Claudio Descalzi, ENI CEO said on Long-term contracts:

“The world has changed -- we have hubs, different kinds of price references. It is not easy and we have a lot of renegotiations to keep the price aligned with the market.”

— Platts

TOWARDS MORE HUB INDEXATION IN PRICING LONG-TERM CONTRACTS

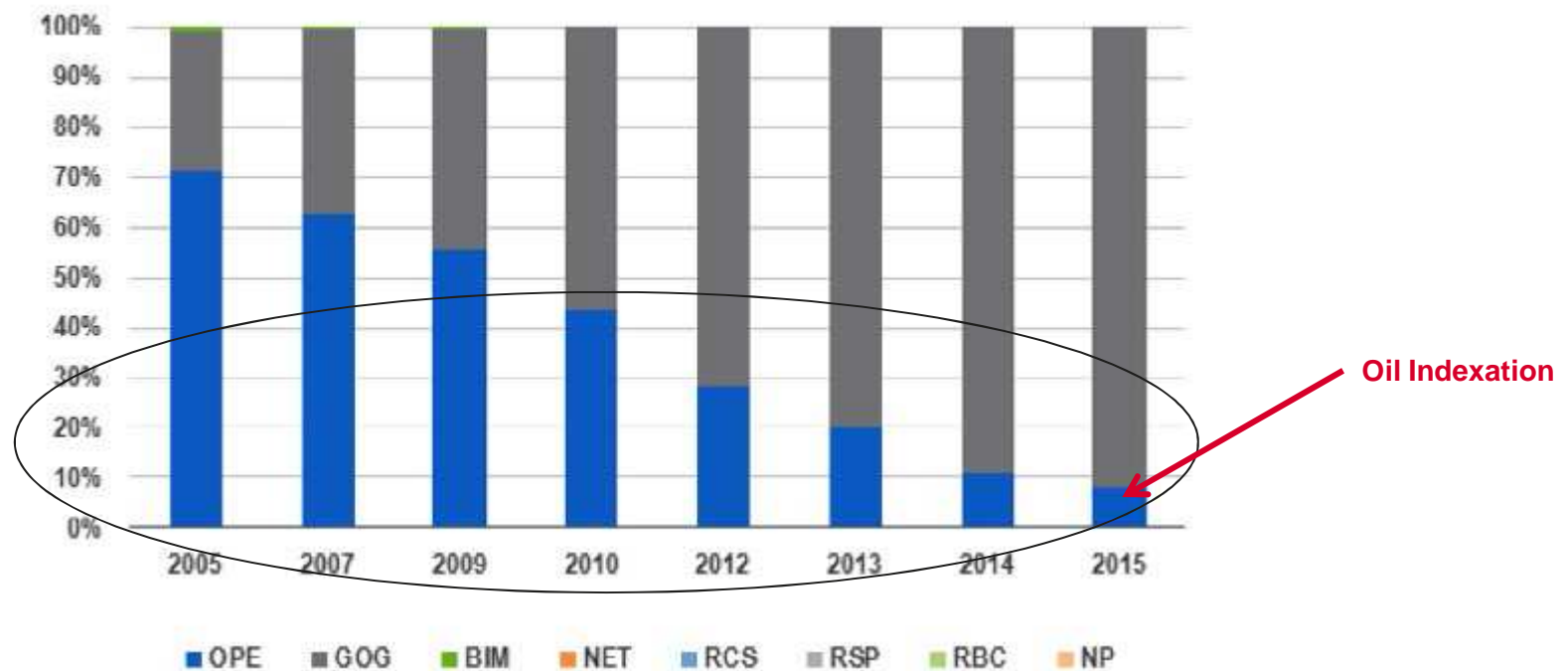
Some examples:

- In 2009, Statoil allows 25% gas spot indexation in majority of contracts for 3 years
- Later Statoil agrees 100% gas spot indexation with Centrica and Wintershall for 10 years
- More recently, Gazprom agreed on a gas price revision based on market price changes in its contracts, with companies including ENI, Engie, RWE, Uniper, GasTerra
- Gazprom has also started some auctions based on market prices since September 2015

OIL-INDEXED CONTRACTS HAVE DECREASED

Russia & Algeria still use oil-indexation; Norway mainly hub-indexed

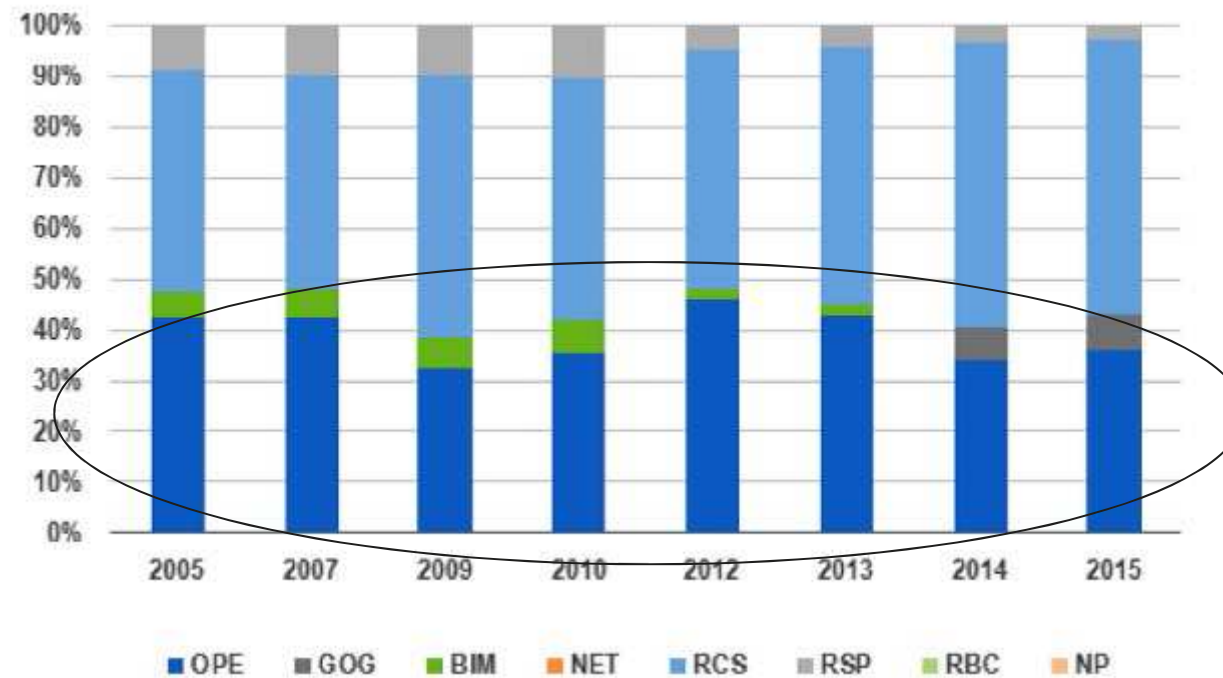
Europe Price Formation 2005 to 2015



Source: IGU

BUT NOT SO MUCH IN SOUTH-EAST EUROPE

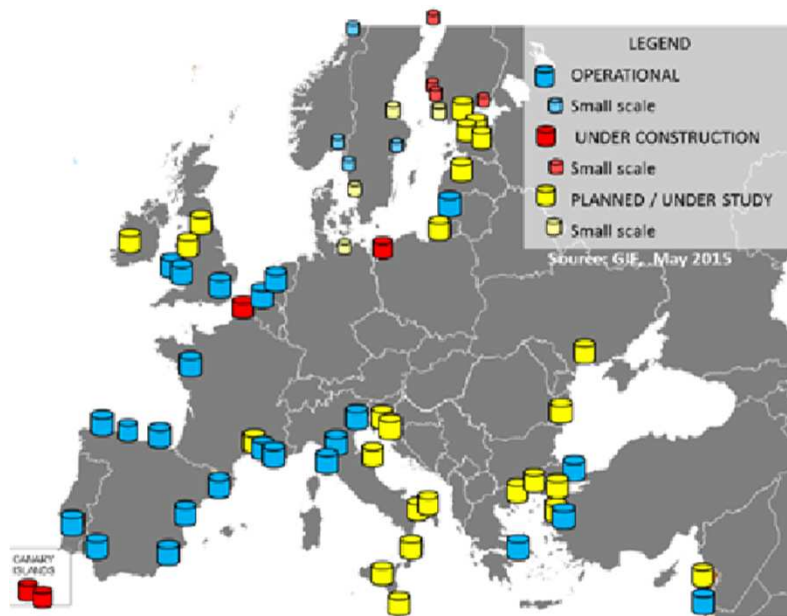
Supply in South-East Europe still highly dependant on Russian gas



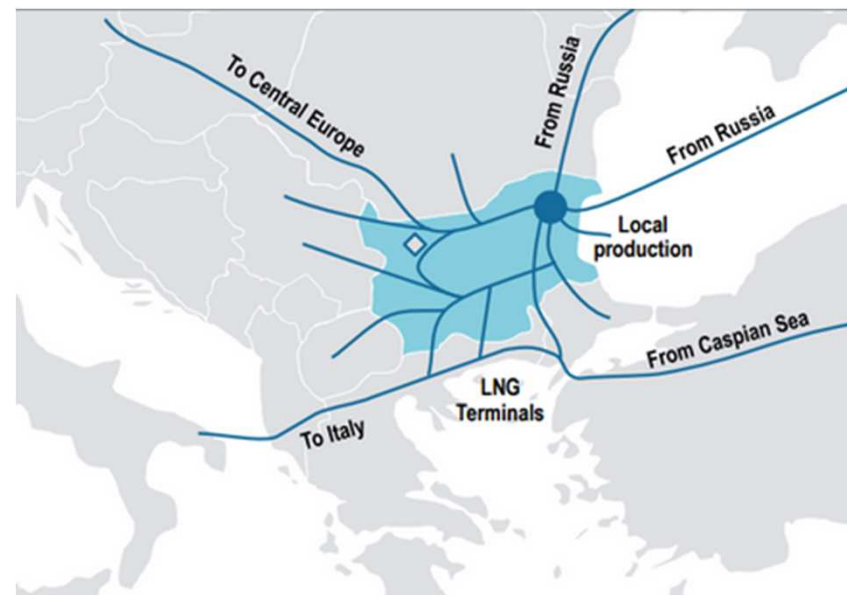
Source: IGU

TREND: DIVERSIFICATION OF SUPPLY (AND CONTRACTS) IN THE SOUTH EAST REGION

Improved connection, with Projects of Common Interest (PCI) supporting new LNG terminals and pipeline reverse flow infrastructure projects



Source: GLE, 2015



Source: European Commission

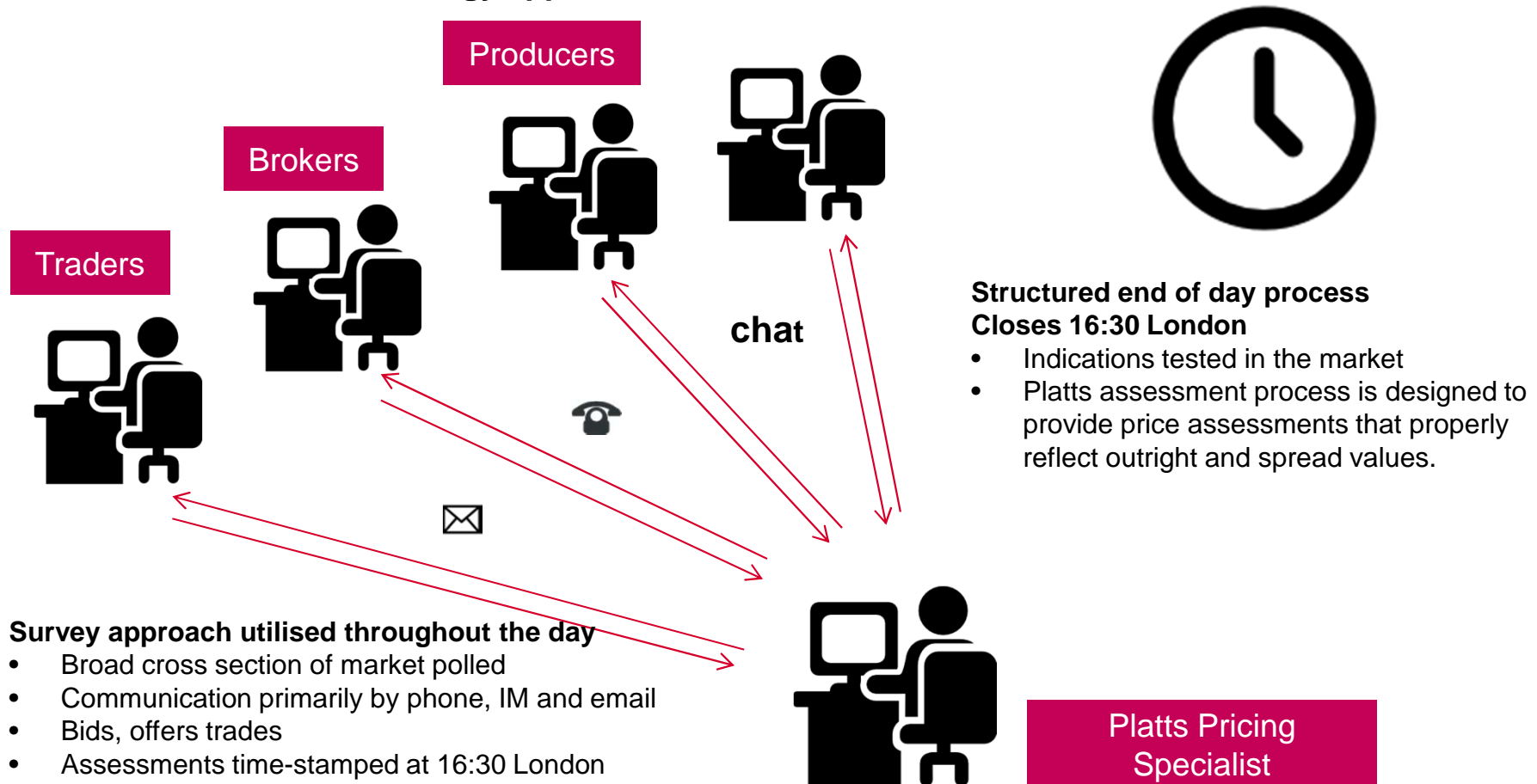
LNG increases flexibility/optionality for buyers

Pricing gas contracts at S&P Global Platts

Various contracts, various drivers

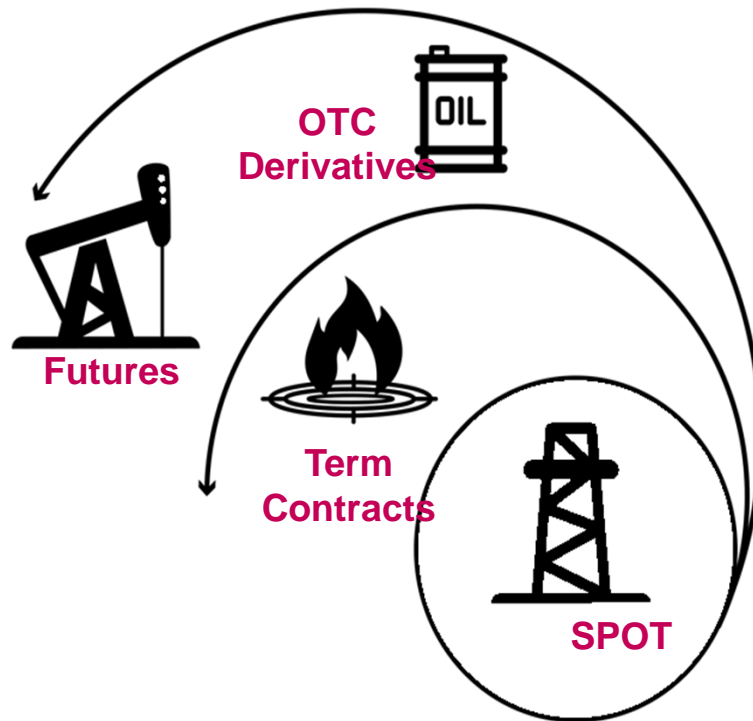
MARKET CONSULTED THROUGHOUT THE DAY TO ASSESS CONTRACTS

S&P Global Platts' methodology approach



SPOT, PROMPT, FORWARD CONTRACTS ALSO ASSESSED ACCORDING TO SPECIFIC DRIVERS

Focus, Impact & Relevance



Fundamentals Data:

- Fundamentals analysis – imports/exports, maintenances
- Weather forecast change
- Storage levels, injections, withdrawals
- Balancing system
- Cross-commodity analysis (LNG, power, oil, coal, etc.)
- Forex
- Contract utilization analysis (long-term contracts)

Down the curve

EXAMPLE OF DUTCH TTF PRICE ASSESSMENT

PLATTS DUTCH TTF ASSESSMENTS (Hi-cal gas)

October 27, 2016	p/th	Eur/MWh	Change D-1 (Eur/MWh)	\$/MMBtu
Day ahead	45.461	17.300	+0.050	5.535
Weekend	45.329	17.250	+0.175	5.519
Working week+1	46.118	17.550	+0.200	5.615
November	45.658	17.375	+0.275	5.559
December	46.183	17.575	+0.300	5.623
Q1 2017	46.315	17.625	+0.300	5.639
Q2 2017	43.424	16.525	+0.225	5.287
Q3 2017	42.636	16.225	+0.225	5.191
Q4 2017	46.052	17.525	+0.225	5.607
Q1 2018	47.432	18.050	+0.225	5.775
Q2 2018	44.212	16.825	+0.250	5.383
Summer 17	43.030	16.375	+0.225	5.239
Winter 17	46.709	17.775	+0.225	5.687
Summer 18	43.884	16.700	+0.250	5.343
Winter 18	47.300	18.000	+0.250	5.759
Summer 19	43.556	16.575	+0.150	5.303
Winter 19	46.775	17.800	+0.150	5.695
Gas year 2017	45.329	17.250	+0.250	5.519
Cal 2017	44.607	16.975	+0.275	5.431
Cal 2018	45.395	17.275	+0.225	5.527
Cal 2019	45.264	17.225	+0.175	5.511

Spot

Prompt

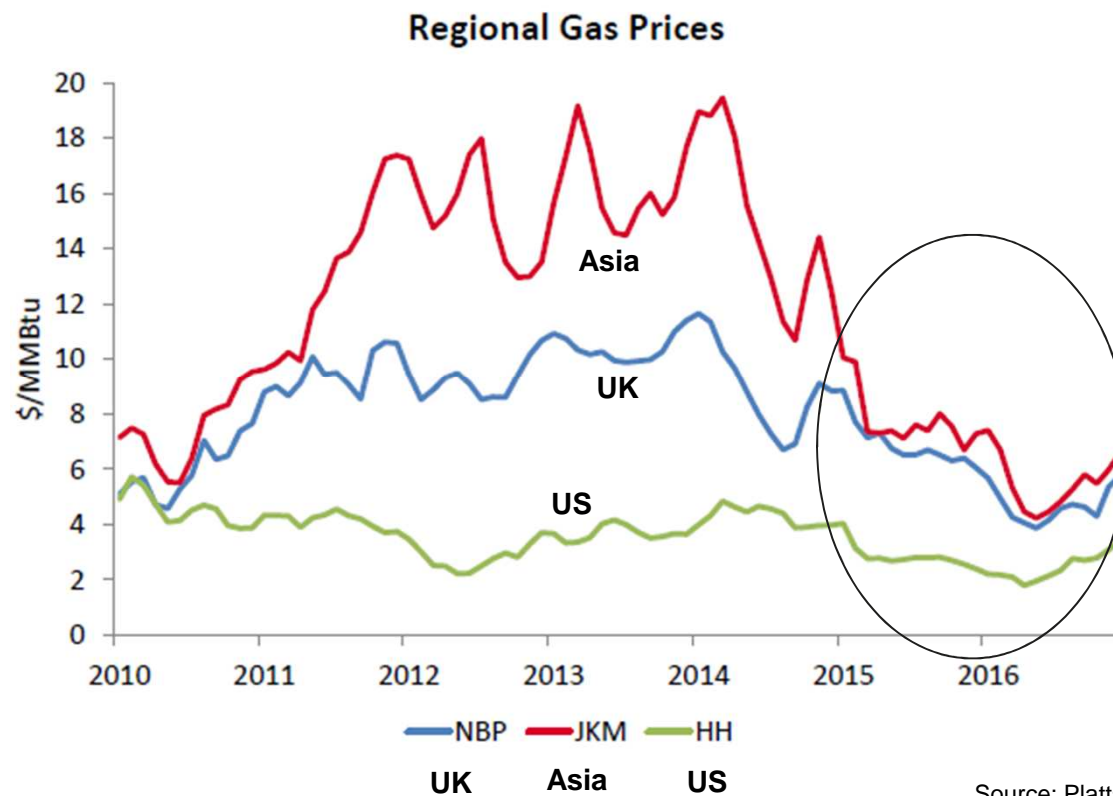
Curve

➤ Less liquid hubs trade at spread with TTF (locational spread)

➤ Time spread is also used (Month-ahead vs quarter ahead vs season ahead, etc.)

Towards more global gas price convergence worldwide?

GLOBAL GAS PRICES CONVERGENCE



Source: Platts Analytics Eclipse, Bentek

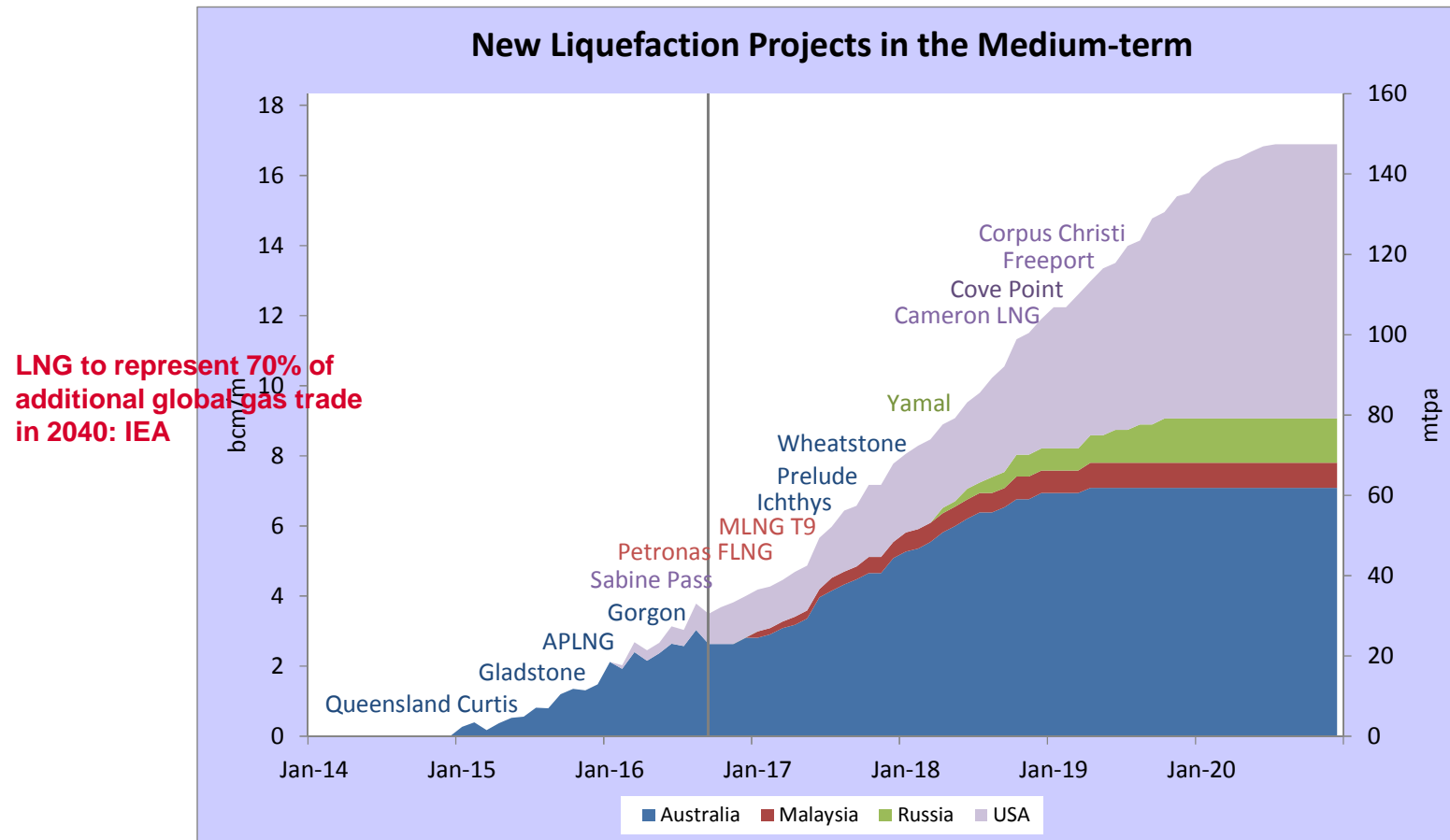
DATED BRENT CRUDE OIL PRICES FELL OVER 60% SINCE JAN 2013

(\$/barrel)



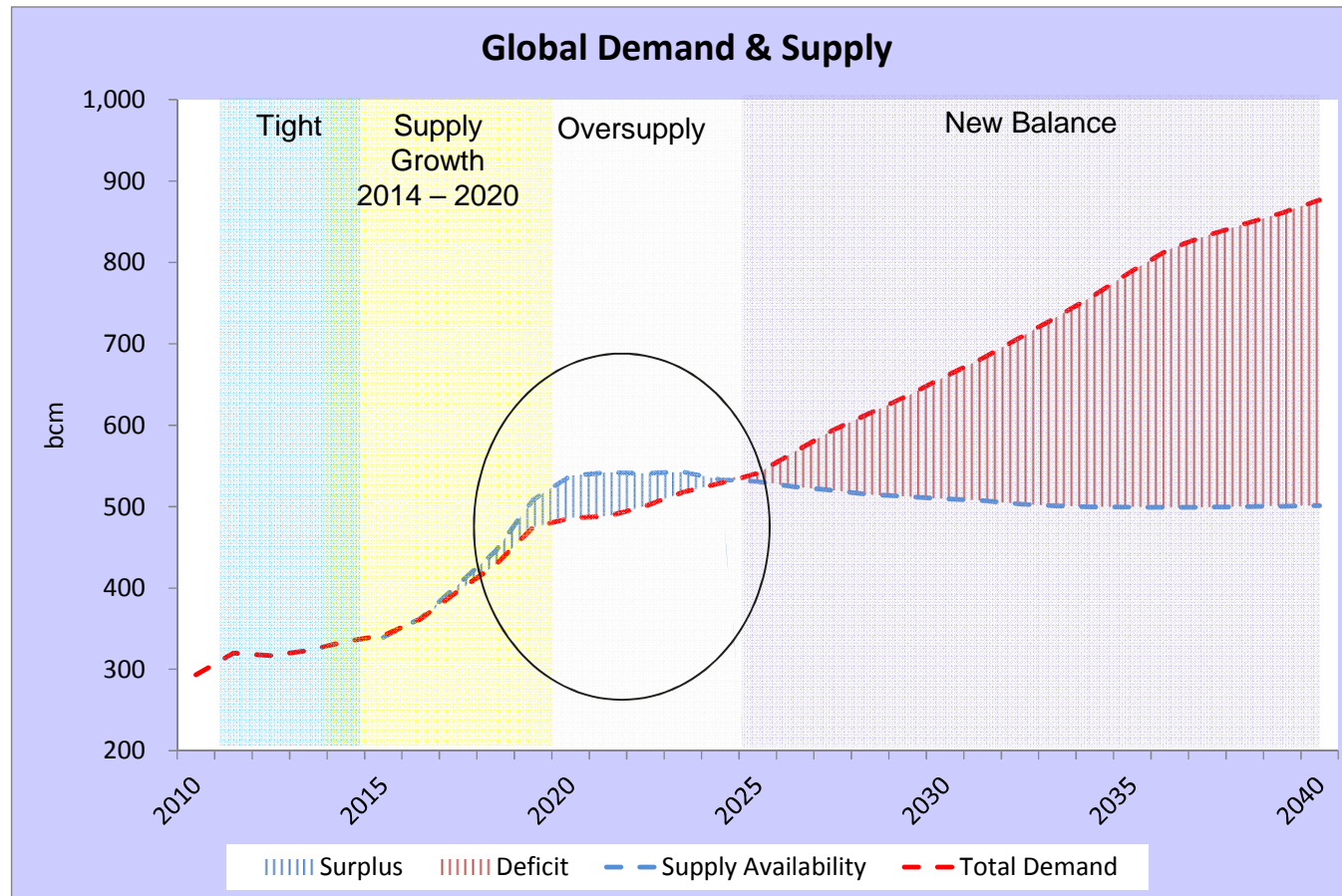
Source: Platts

NEW LNG CAPACITY, LNG GLUT PERSPECTIVE



Source: Platts Analytics' Eclipse

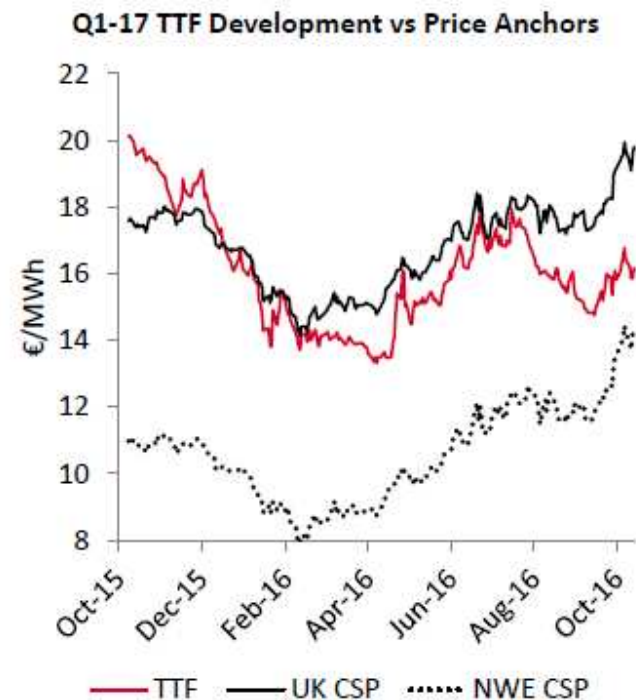
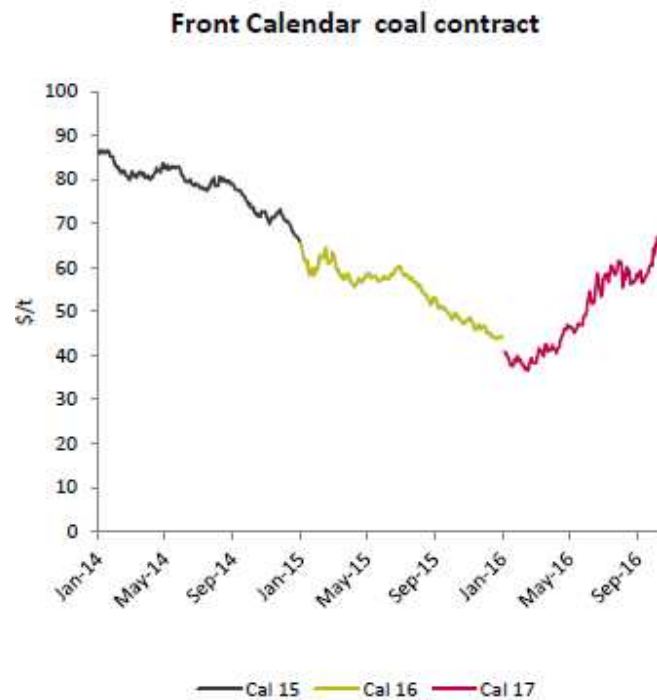
GLOBAL OVERSUPPLY PICTURE BETWEEN NOW AND 2025



Source: Platts Analytics' Eclipse

THE GROWING IMPORTANCE OF COAL IN GLOBAL GAS DYNAMICS

Higher coal prices support power, clean spark spreads, gas demand

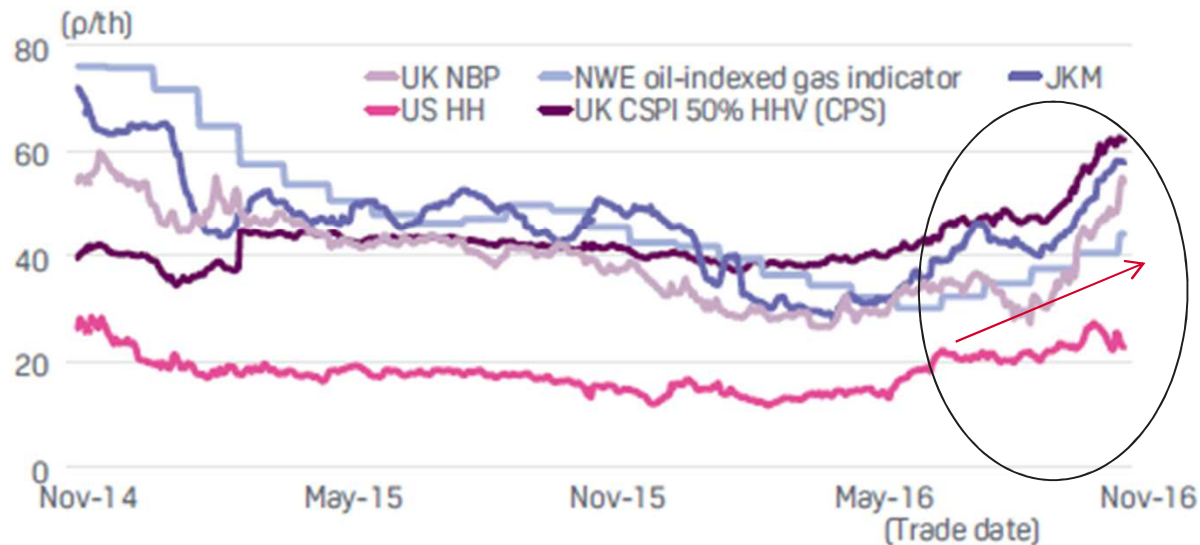


Note: CSP = Carbon Support price

Source: Platts Analytics' Eclipse

THE GROWING IMPORTANCE OF COAL IN GLOBAL GAS DYNAMICS

KEY PRICE ANCHORS – MONTH AHEAD



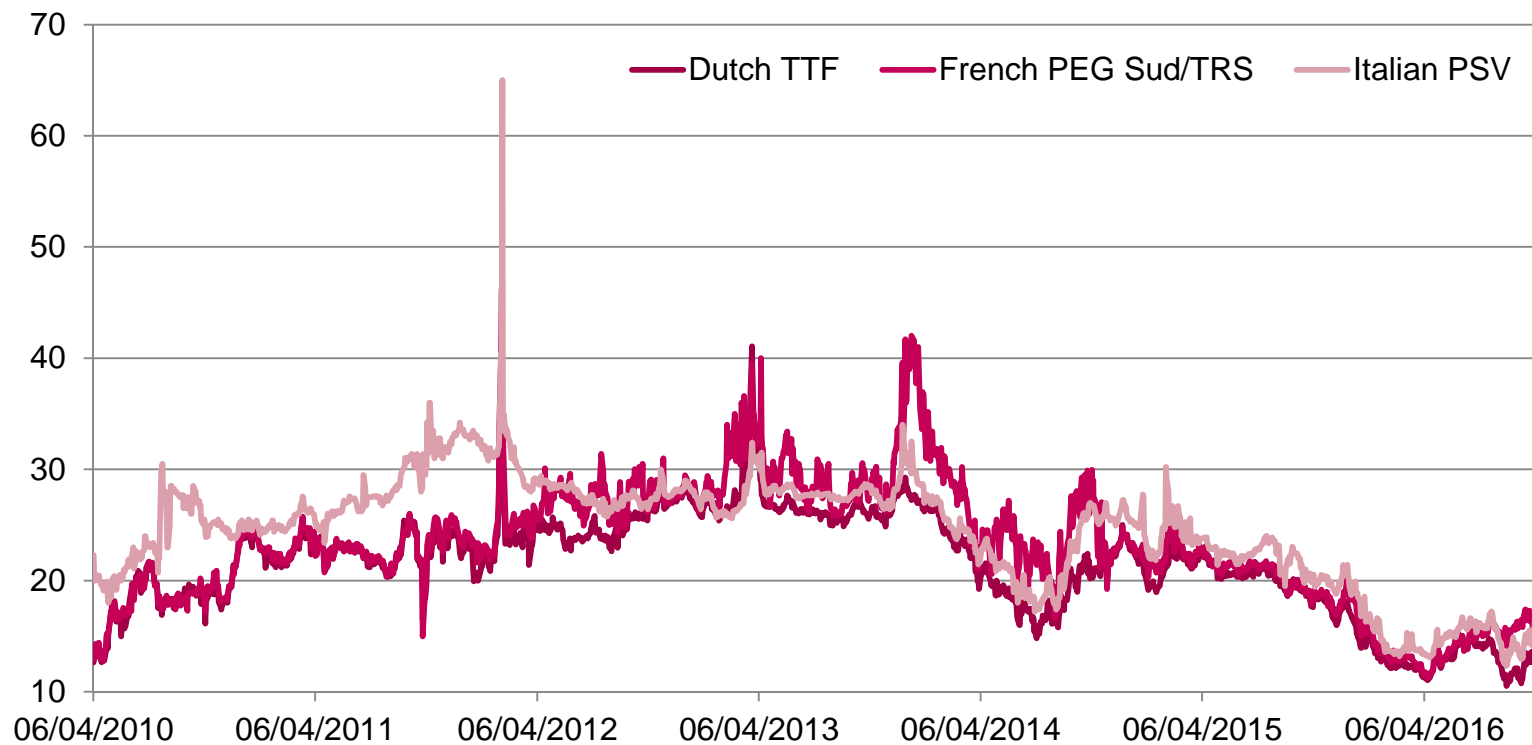
Note: CSPI = Coal Switching Price Index

Source: Platts

Focus on Europe: price convergence or price correlation?

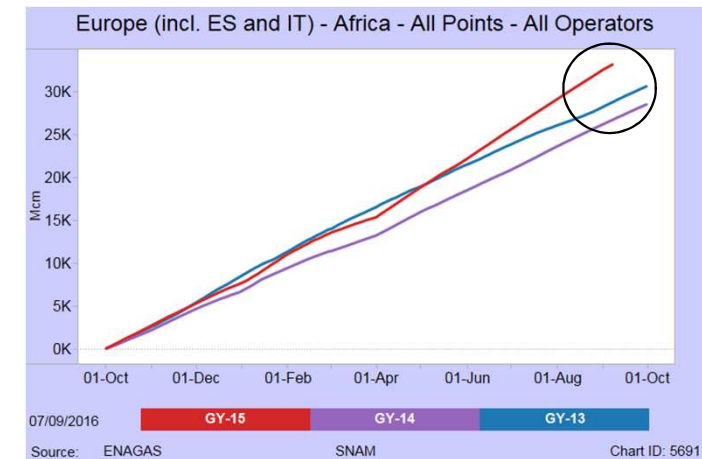
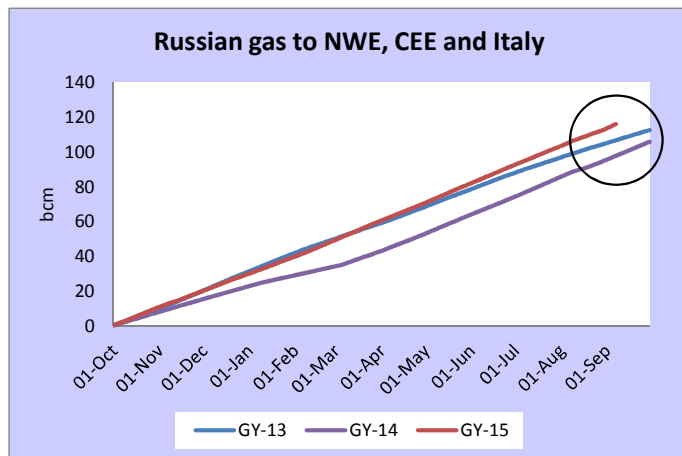
EU GAS SPOT FALLING--CONVERGENCE

European key prices anchors- Day-ahead (Eur/MWh)



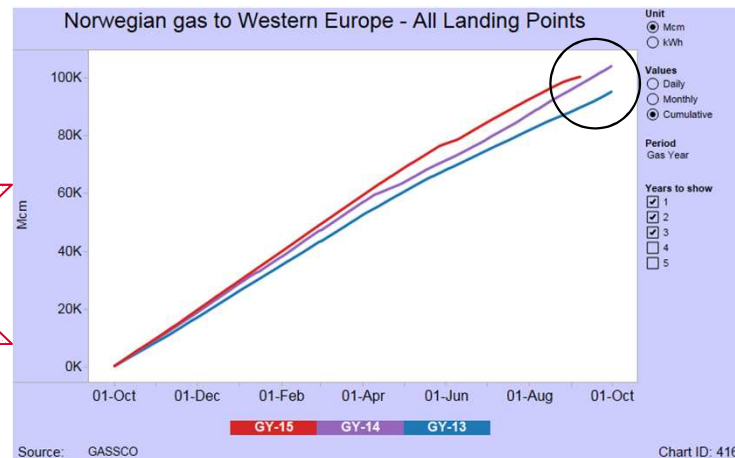
Source: Platts

HIGH SUPPLIES FROM RUSSIA, ALGERIA AND NORWAY INTO EUROPE



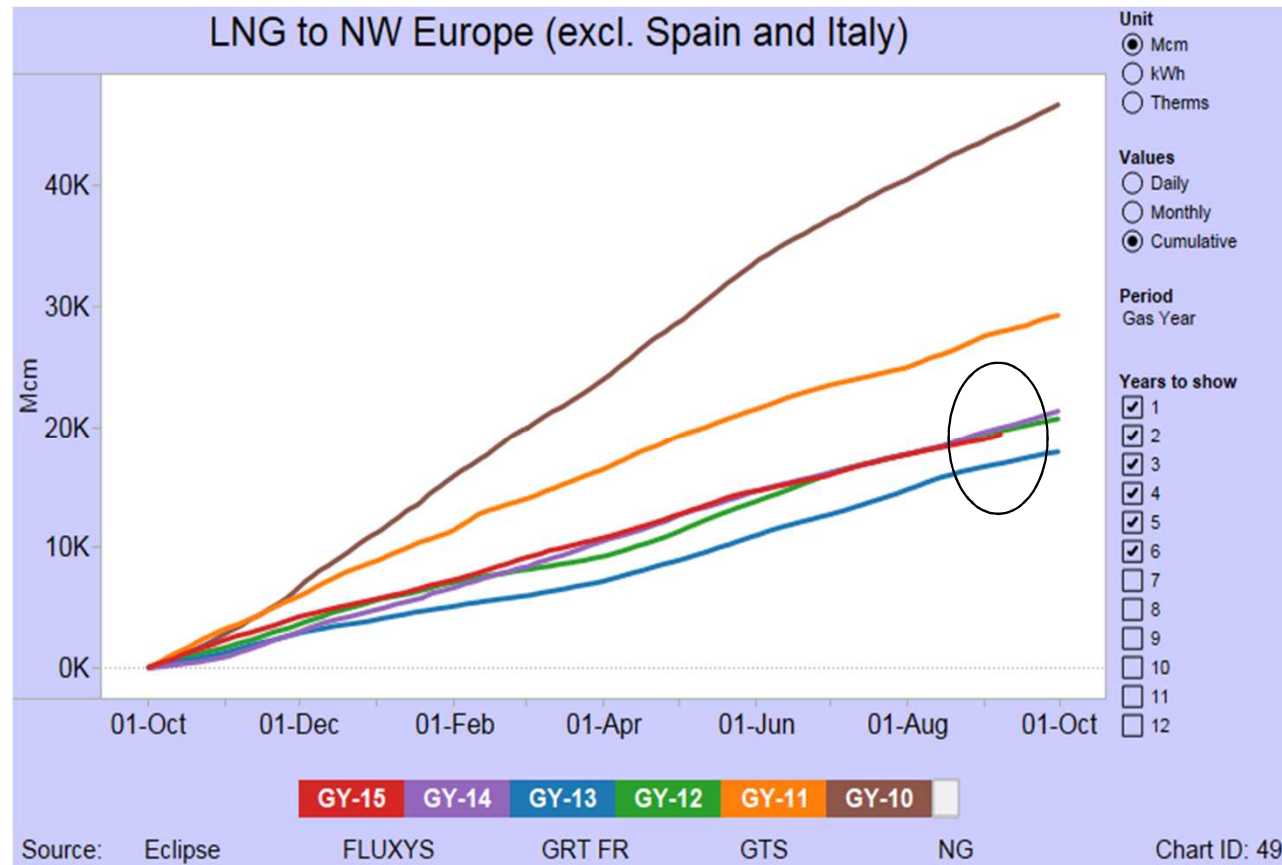
Algeria + Libya

and storage levels are high



Platts Analytics' Eclipse Data

EUROPE HAS SIGNIFICANT CAPACITY TO ABSORB LNG



GY-10: 47bcm



GY-11: 29bcm



GY-12: 21bcm



GY-13: 18bcm



GY-14: 21bcm

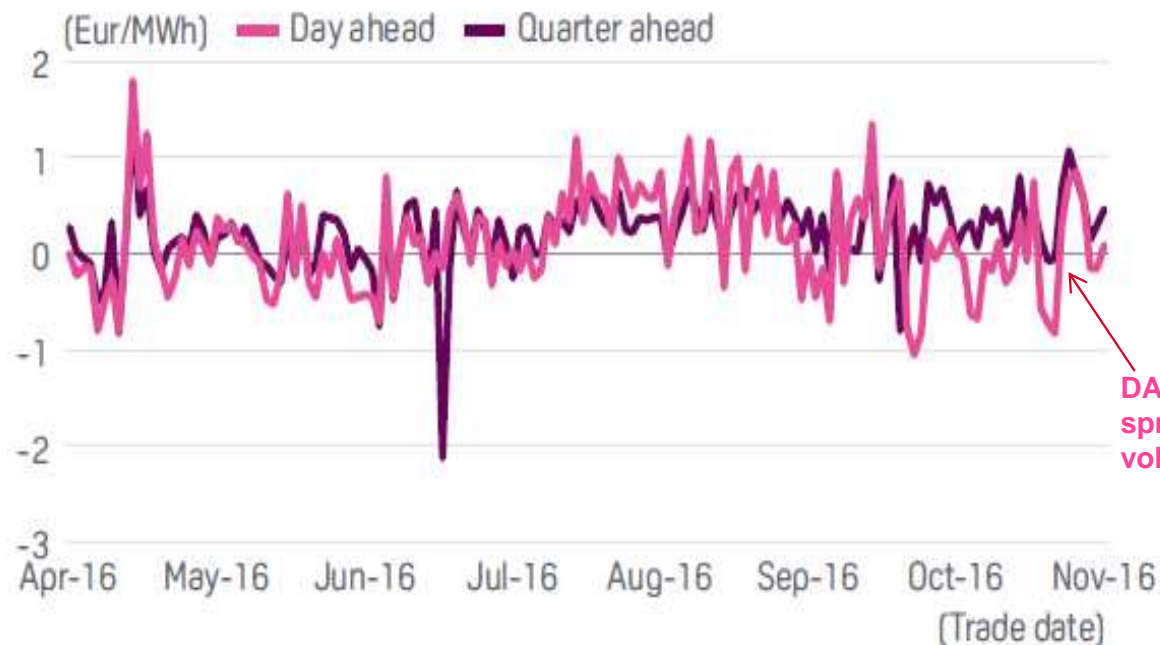


GY-15: 21bcm

Source: Platts Analytics' Eclipse

TREND: FURTHER SHIFT TOWARDS SPOT TRADING?

PEG NORD-TTF LOCATION SPREADS



➤ Expected flows of LNG imports into Europe could bring a more pronounced spot/prompt gas price volatility

➤ Arbitrage opportunity with volatile spot prices associated with flexible products

Source: Platts

CONCLUSIONS

- **Gas price formation changing in Europe**
 - More hub-indexation, renegotiation of long-term contracts, LNG option, flexibility
- **LNG supply set to increase 50% in the 2015 to 2020 period**
 - Platts Analytics forecast 7 Bcm of additional LNG supply to Europe this winter
- **US LNG export adding flexibility**
 - Can be turned off if market price falls below marginal cost of delivery
- **Traditional demand is stalling or increasing only slightly**
 - From 2020 to 2025, with short supply expected from 2025 onward
- **Leading to downward pressure on gas prices**
 - Supported by fall in oil price, pipeline supply
- **Lower prices incentivising demand?**
 - New emerging demand, coal to gas switching
- **Increasing “globalization” of gas prices**
 - Dynamics in one market impacting price formation in other markets