

Gazprom round table on the European gas markets

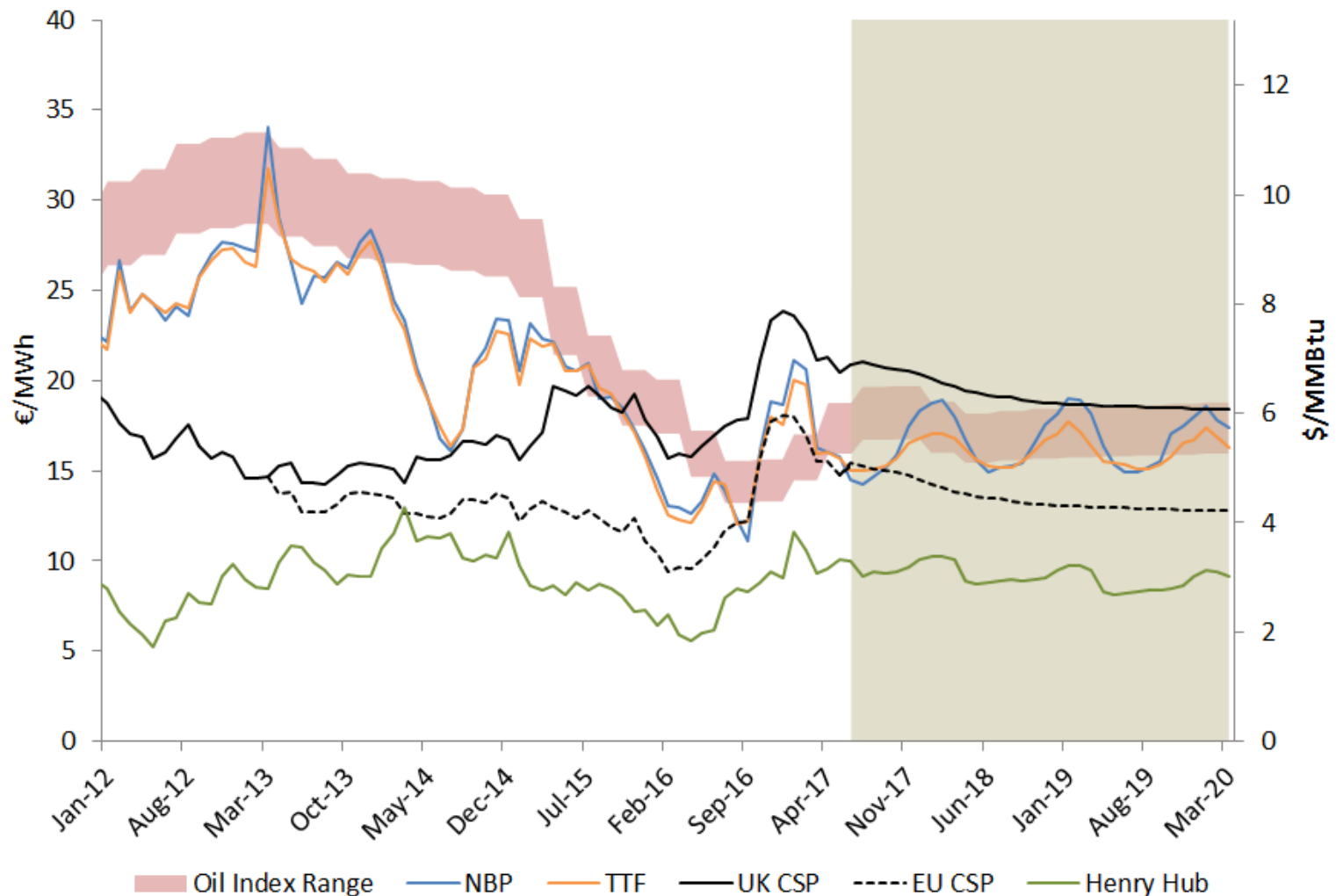
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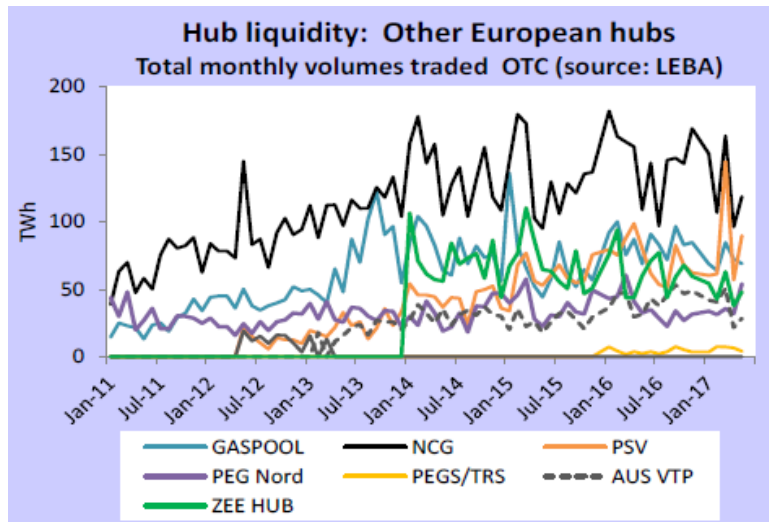
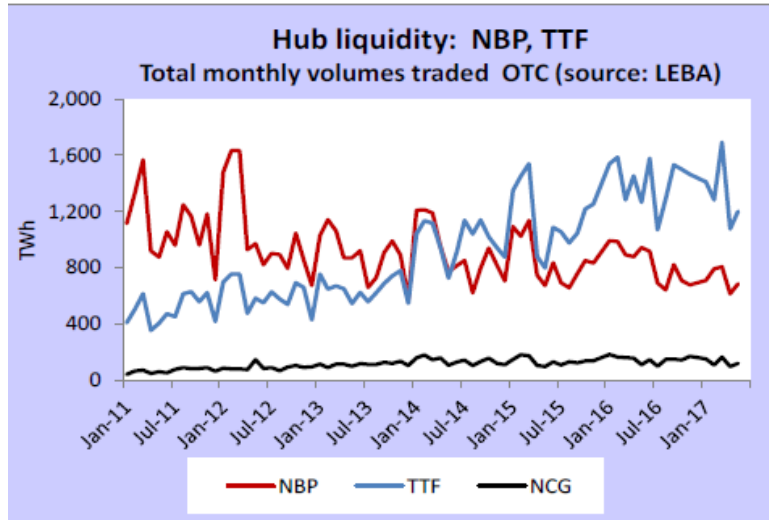
5 July 2017

S&P Global
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European gas prices take direction from different price anchors at different points in time

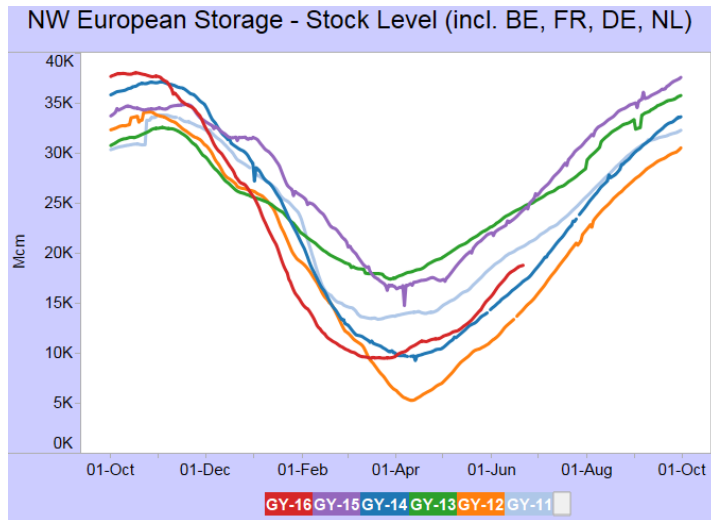


TTF has overtaken NBP as most liquid hub in NW Europe; elsewhere, traded volumes remain low but NCG and PSV are gaining

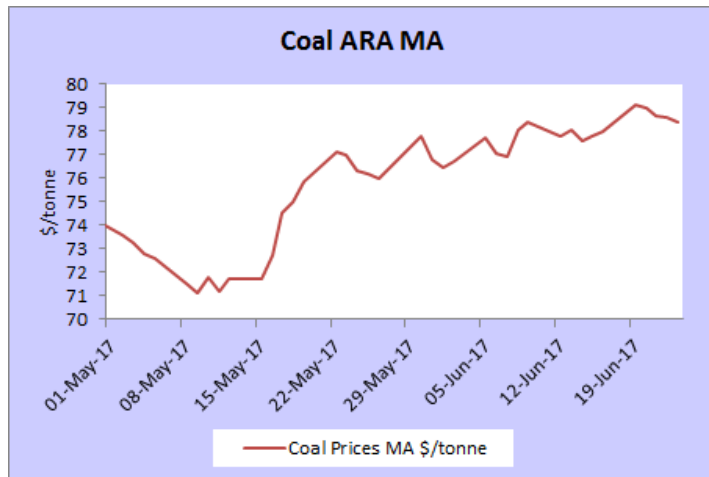
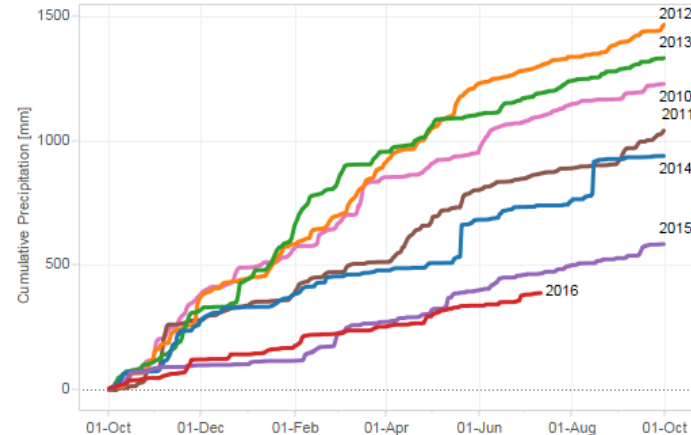


- TTF has increased in liquidity while NBP has declined
 - Since Jan-14, higher volumes traded OTC on TTF compared with NBP
 - TTF traded volumes now ~1.75 times higher than on NBP
 - Same trend seen on Exchange-traded volumes
- Liquidity has also grown on most other continental hubs since Jan-11
 - NCG, Gaspool, Aus VTP, PSV have all seen liquidity growth
 - Volumes still far below NBP and TTF
 - PSV experienced significant traded volume growth over last four years:
 - Implementation of a market based balancing system in 2013
- Both NBP and ZEE have declined in liquidity
 - Both are traded in ppth
 - GBP has become much more volatile since Brexit vote of June 2016 – market players preferring to trade/hedge in a currency which is less volatile?
- NBP losing connection to continental supply
 - Loss of Rough, reduction in BBL long term capacity bookings, IUK long term booked capacity dropping in Oct-18
 - Could also be seeing US producers starting to hedge US LNG volumes destined for Europe at TTF – most liquid hub and EUR denominated

Current prices supported by low NWE stocks, low hydro and bullish coal prices



Cumulative precipitation (Italy)



Bullish Factors

- North West Europe (NWE) stocks low; increased injection rates during first half of June
- Low hydro levels in Italy, France, Spain
- Bullish coal prices supporting the NW European coal switching price

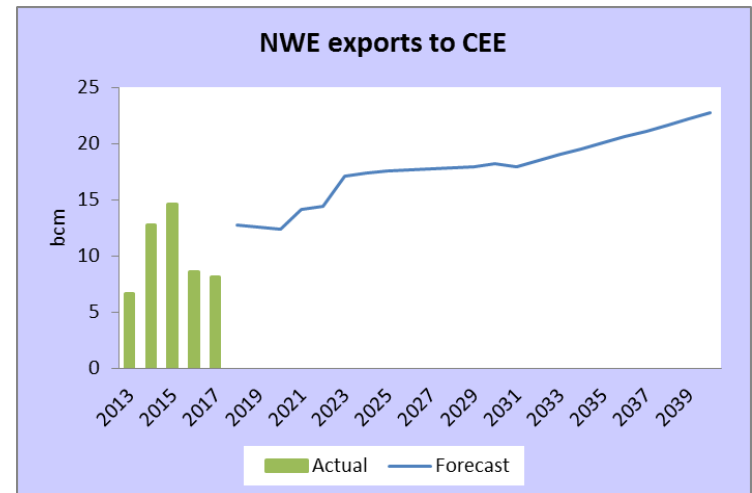
Bearish Factors

- Strong NCS supply, low maintenance for S-17
- Strong LNG sendouts; deliveries increasing in NWE since start of S-17 especially in the south (Spain, Italy) as they remain premium markets

Slightly reduced CEE imports from Russia and increased exports to Ukraine require increased imports from NWE

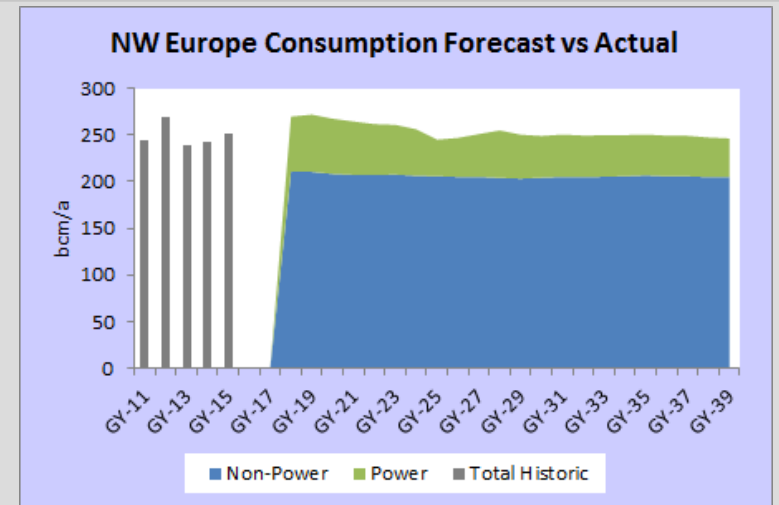
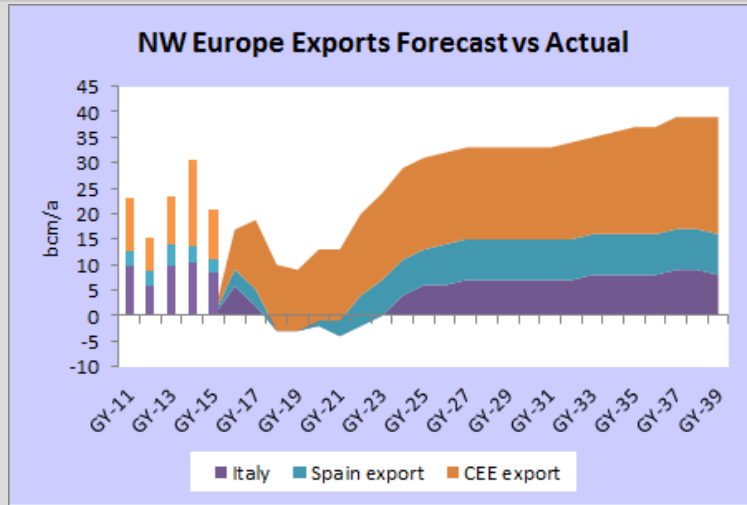


- Assume all long term contracts between Gazprom and Central and Eastern Europe¹ (CEE) buyers, except PGNiG (Poland), are extended upon expiry
- PGNiG contract due to expire in 2022, after which time Russian exports to Poland are expected at half the volume, with a combination of contractual and short term offtakes. Exports to CEE from Russia forecasted to drop from 40bcm to 35bcm in 2023
- Assume modest growth in Ukraine demand but no Russian imports
- Ukraine demand met by modest domestic production growth and increased CEE exports, mainly from Slovakia at Budince
- Growth in CEE domestic demand coupled with decline in domestic production and slight reduction in Russian imports leads to greater need for imports from NWE

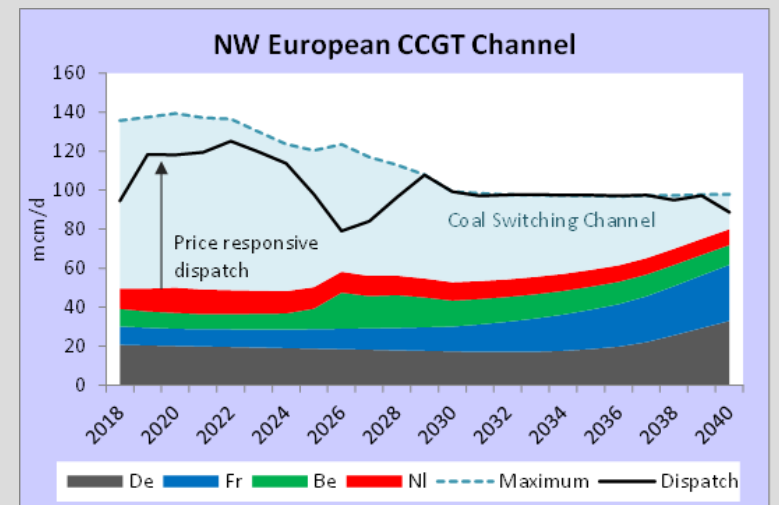
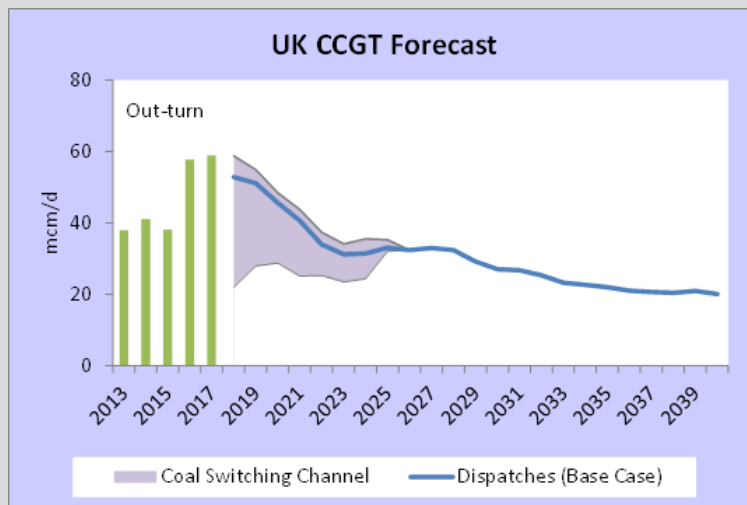


We forecast stable demand in NW Europe...risks prevail for CCGT, LDZ and export demand

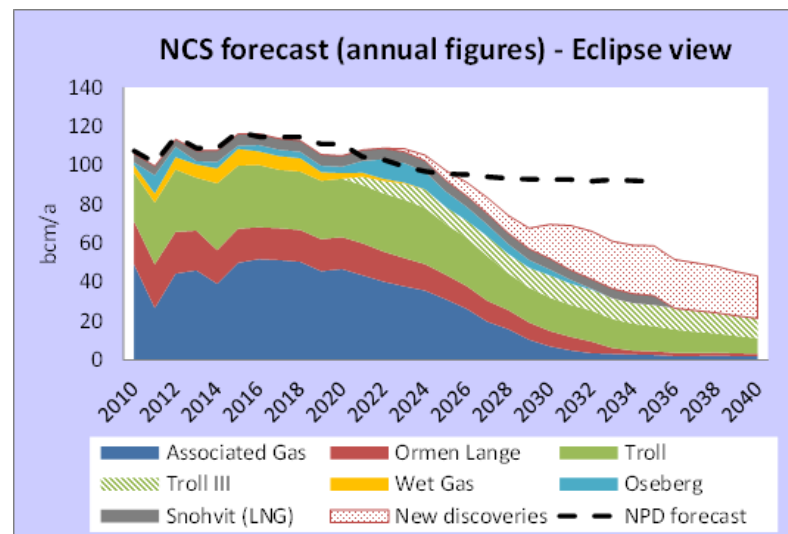
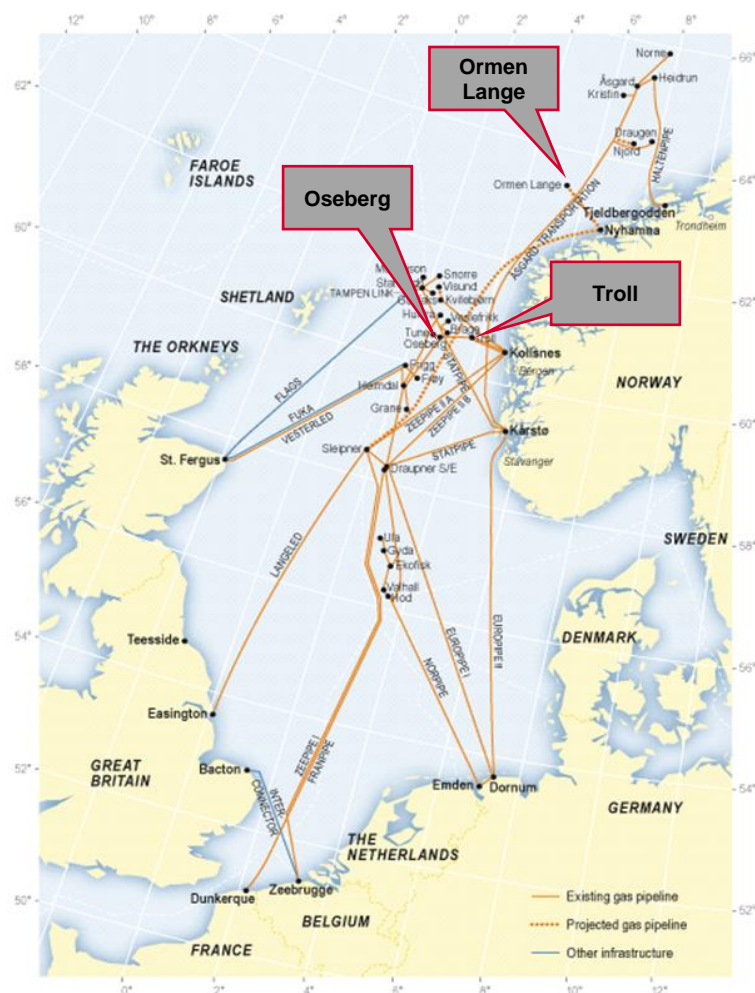
Total Demand and Exports



CCGT Demand Potential

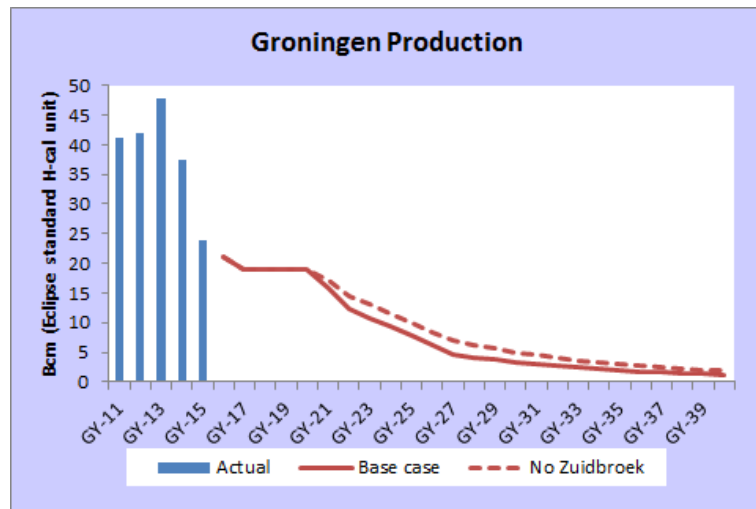


Despite new discoveries, we forecast total NCS production to decline rapidly from the mid 2020s



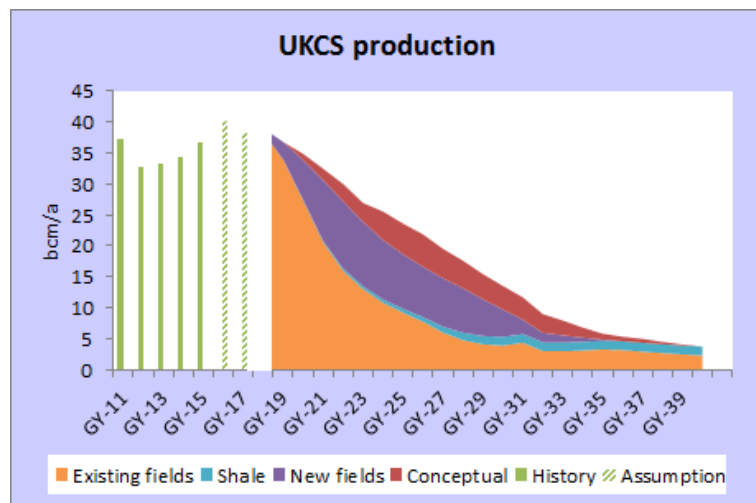
- **Total NCS** production and pipeline exports have recently hit record highs with **117.2 bcm** produced in 2015
- Our assumption for **Troll** is that Phase III starts in 2021 (FID expected 2018) lifting its production by ~10 bcma
- For **Ormen Lange**, we see production flat at current levels (16.4 bcma) until 2020 with production decline halted by the installation of compressors planned during the course of 2017
- For **Oseberg**, we forecast the field will run out of oil by 2021 when it will start blowing down all gas and we assume peak production of 10bcm reached in 2022/23, then quickly declining
- Assume **new discoveries** (notional gas) peak at **25.5 bcma** in 2035:
 - Based upon a probability-adjusted interpretation of NPD reporting
 - Assume Barents Sea production starts from 2030

Indigenous production in the Netherlands and on the UKCS is in terminal decline



Key drivers Dutch production:

- Groningen's permit level has been reduced to 21.6bcm (L-cal) in GY-17, a 10% reduction from its GY-16 permit level of 24bcm (L-cal)
- Further downside risk on permit due to potential seismic activity
- Expected decline in L-gas demand in France, Belgium and Germany to limit need for Groningen production
- H-gas to L-gas conversion further limit requirement for L-gas production



Key drivers UKCS production:

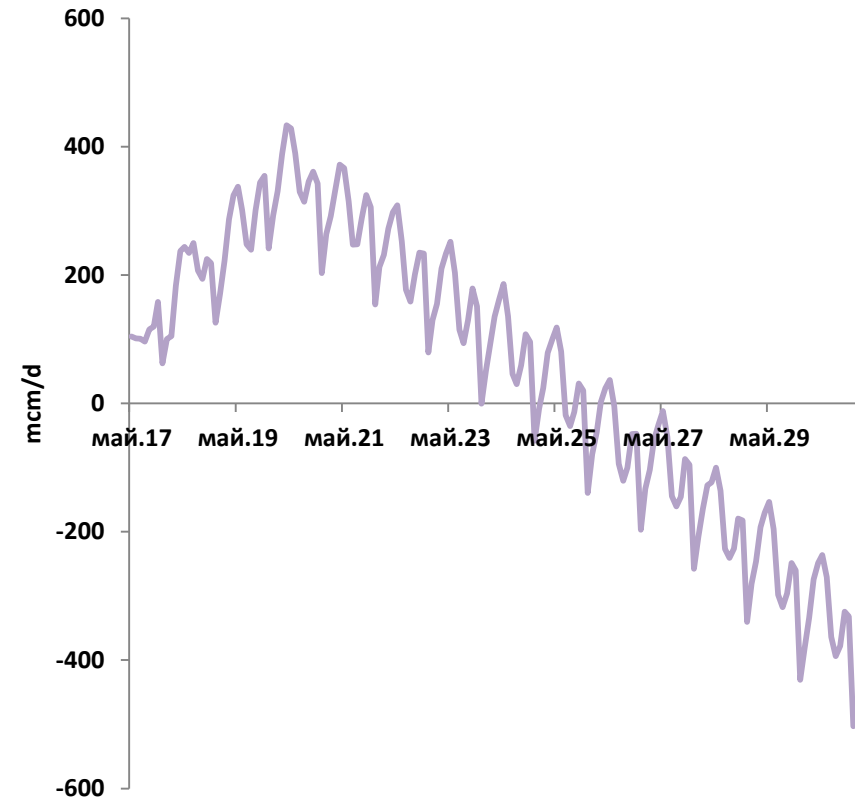
- New production (Cygnus, Laggan and Tormore, Stella, Clair Ridge, Blythe) is offsetting decline and shut in and decommissioning of older fields
- Peak production of 40.3bcm expected for GY-16
- New fields will not be able to replace declining existing production from GY-17 onwards
- Shale volumes expected marginal

We expect the global LNG market to go through a period of oversupply until 2026...

Our view of the LNG global surplus quantifies the LNG balance offsetting supply with demand outside of Europe

- Supply:
 - We see supply growth of ~50% by the end of 2020, from 380 bcm to 570 bcm
- Demand:
 - **Decline** in 'traditional' high demand countries such as **Japan** (return nuclear plant) and **S. Korea** (buildout of new coal and nuclear capacity) offsetting LNG demand from CCGTs
 - **Declining** in **Central** and **South America** with pipeline imports from US and development of domestic production (associated gas from oil, shale)
 - **Growing** in rest of **Asia**, led by China and the Indian sub-continent
 - **Developments** in the **Mediterranean** (Zohr, Leviathan etc.) changing the gas balance in the region – reduction of imports in Jordan and Israel and return of Egyptian exports

LNG Global Surplus¹ (mcm/d)

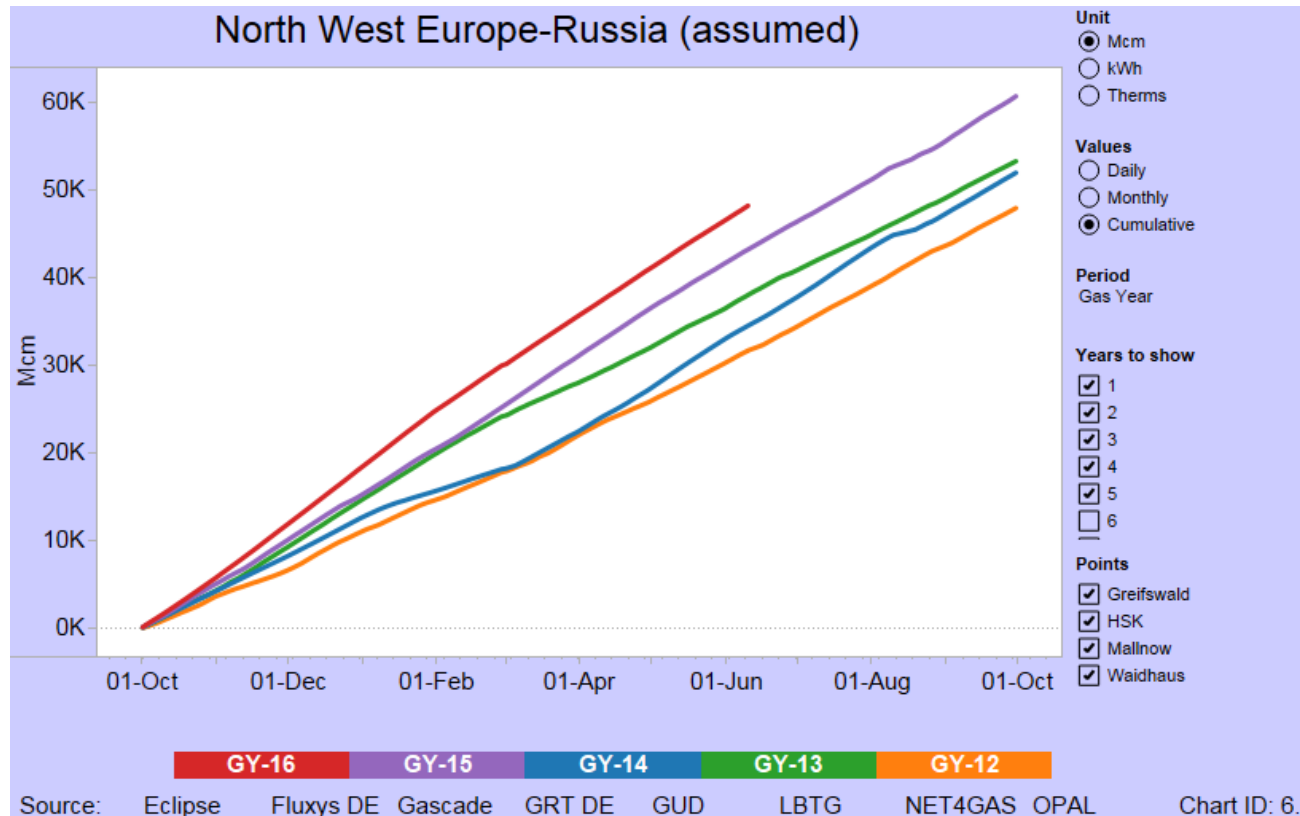


...but there are significant uncertainties to this view

Key risks/uncertainties to our view

- Timing of start up of the new LNG supply:
 - Many projects are technically highly complex, in difficult locations, using new technology (e.g. FLNG)
 - Australia most at risk, US projects simpler and less to go wrong (i.e. already tested storage tanks, jetties, power supply etc..)
- Power generation in Asia:
 - Policy in regulated markets – will they react to low gas / LNG prices?
 - Nuclear power sentiment?
 - Carbon policies
- Buildout of import infrastructure in developing demand centres:
 - e.g. Pakistan FSRU's
 - Pipeline infrastructure bringing gas from coastal areas to demand areas)
- How will supply react to low price environment:
 - Shut ins in the US, East Australia (small volumes), old LNG projects?
 - Diversion LNG feedgas to domestic markets?

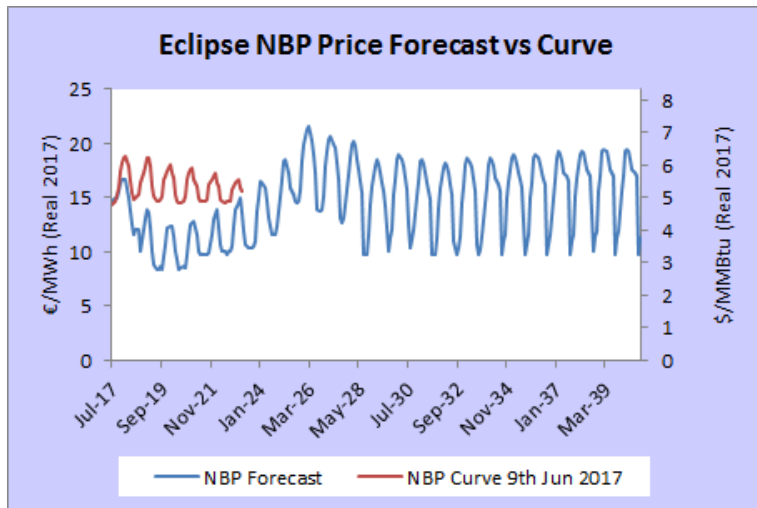
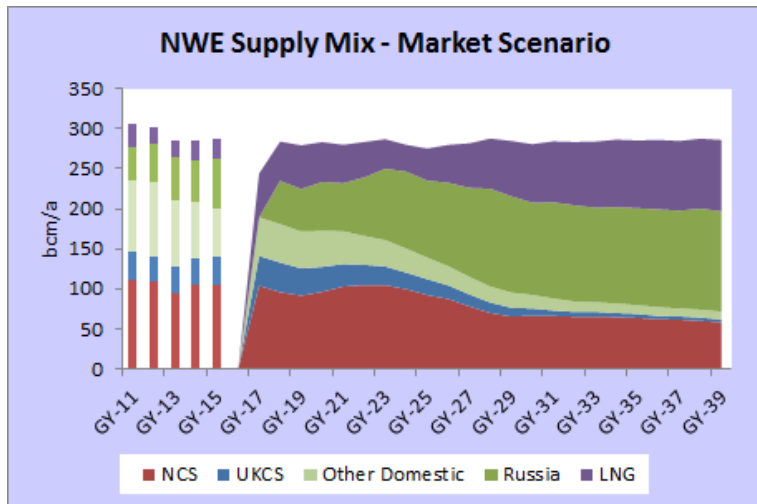
Russian gas to NW Europe on a steady growth path with further upside expected



Our view:

- Russian production upside of +100bcm/a under current infrastructure
- Nord Stream 2 to mainly serve NWE and CEE markets, TurkStream volumes destined for Turkey and SE/CEE
- SRMC of Russian gas to NWE below US LNG based on current Henry Hub prices
- Price structure for NWE importers to be market-based for majority of volume

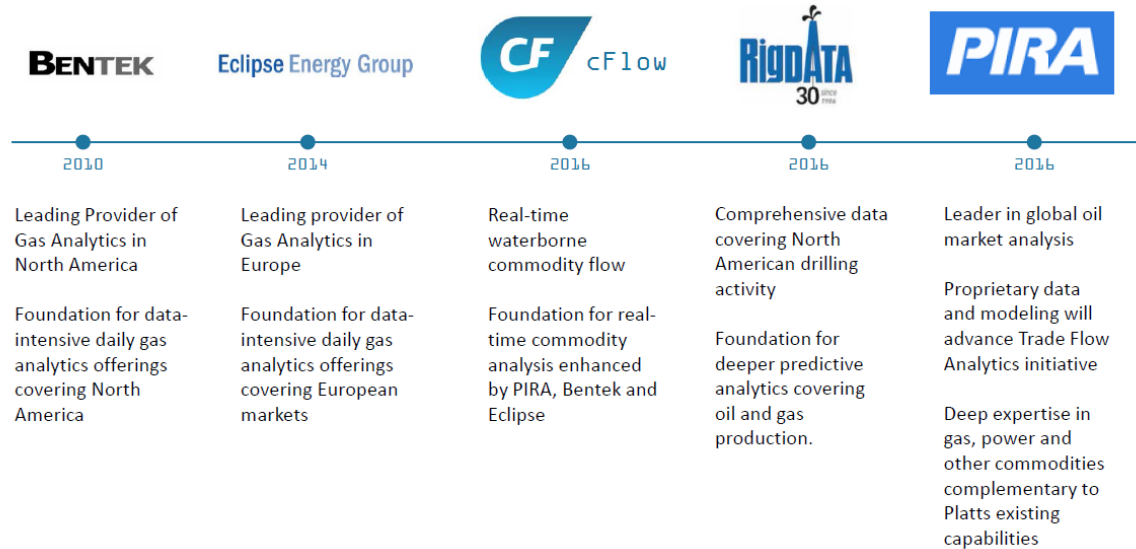
We forecast NW European gas markets to develop in three distinct phases



- Oversupply period (to GY-23)
 - robust indigenous supply in NW Europe
 - global oversupply of LNG
 - Russian imports start to pick up
 - significant UK and continental coal to gas switching provides sink
 - price forecast bearish to market forward curve
- Transition period (to GY-26)
 - indigenous production in decline
 - LNG balance moving from over- to under-supplied
 - continued increase in Russian imports
 - market tighter – return of more seasonality
 - price forecast rising in real terms triggering new supply sources
- New balance period (from GY-27)
 - indigenous production stabilizing at lower levels, compensated by LNG and Russian imports
 - NW Europe hub prices highly exposed to US gas prices

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Thank you!

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