

# Gas Outlook for Europe and Global LNG

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Ofgem Energy Markets Outlook Seminar

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# An age of 'unprecedented uncertainty'...??

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- It is widely accepted that under normal conditions there is plentiful gas to supply worldwide demand and we have the capacity to satisfy UK and the rest of Europe
- However there is a great deal of uncertainty around:
  - Demand
  - Decline in indigenous production
  - Supply from Norway
  - Supplies from Russia
  - Flexibility of LNG supplies
  - Storage requirements
  - Liquidity of European markets
  - Security of Supply

# Uncertainties

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2. Decline in indigenous production
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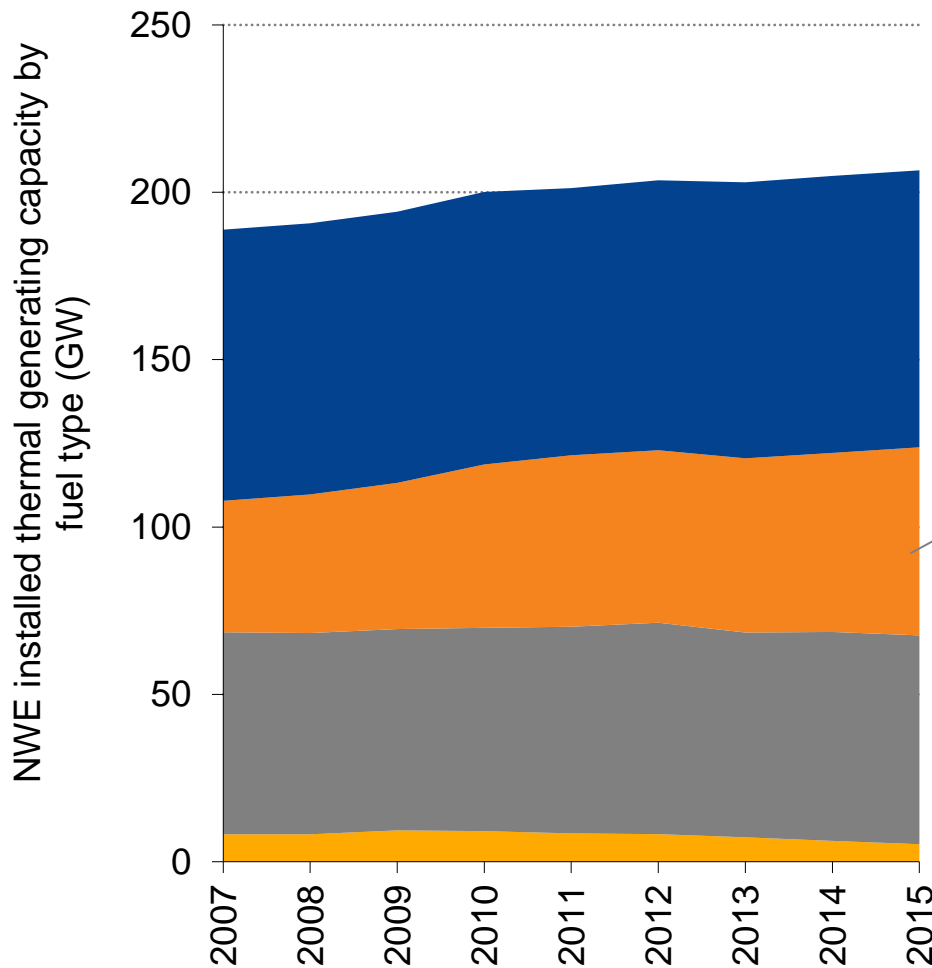
# Uncertainty of GB gas demand

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- The first statistically cold winter in 14 years saw GB system demand spike at 468mcm/day
- If it was a 1-in-5 winter then there is 20% chance of it being worse this year!
- Our analysis of a 1-in-20 winter shows demand would be about 13% (all in the winter) and the peak day at over 480mcm/day

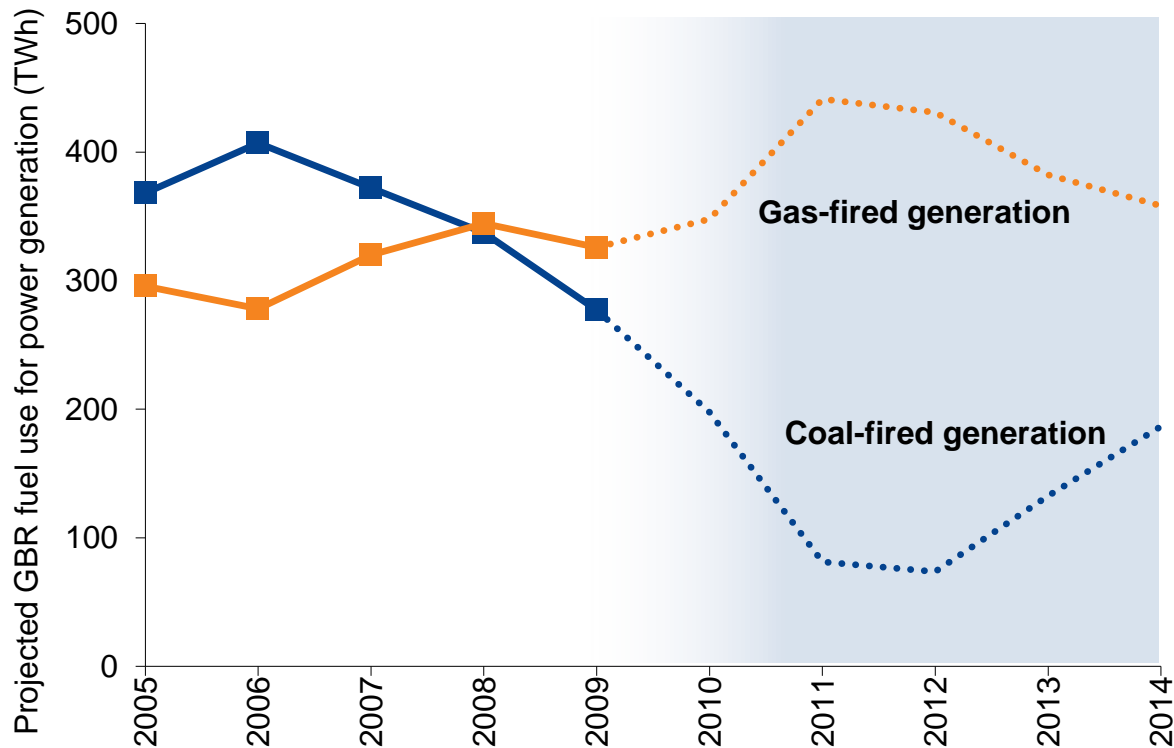


# The gas-fired generation fleet across NW Europe continues to grow...



- A 20% increase in CCGT capacity in the next few years will drive gas demand growth across NW Europe
- Relative price of gas and coal could affect annual gas demand from power generation by +/-30%

# Power sector gas demand in GB is set to increase through to 2012

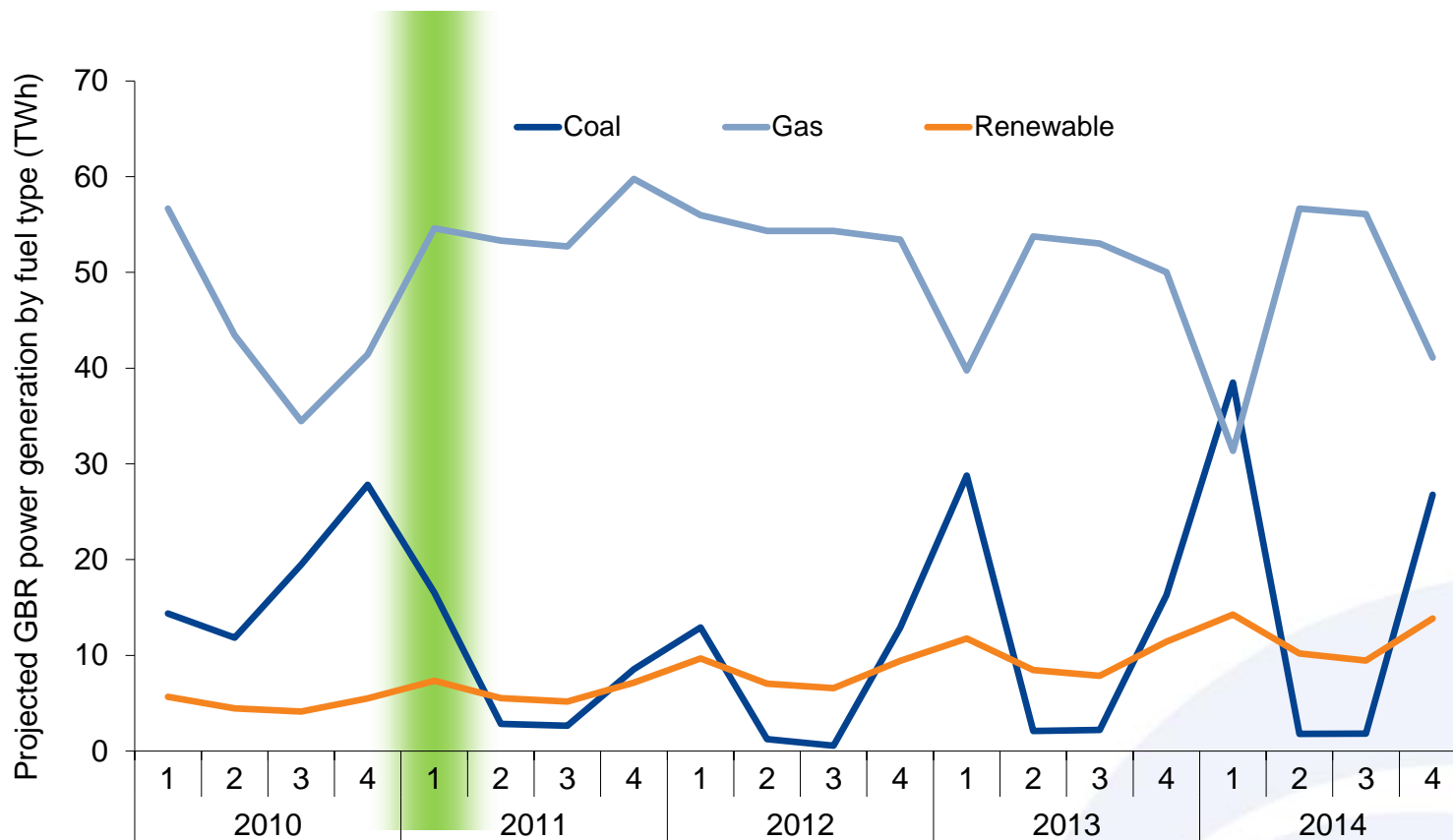


- 3GW of new CCGT capacity is expected to come online during the course of 2011, increasing gas demand.
- We expect low short-term gas prices relative to coal to result in fuel switching in favour of gas

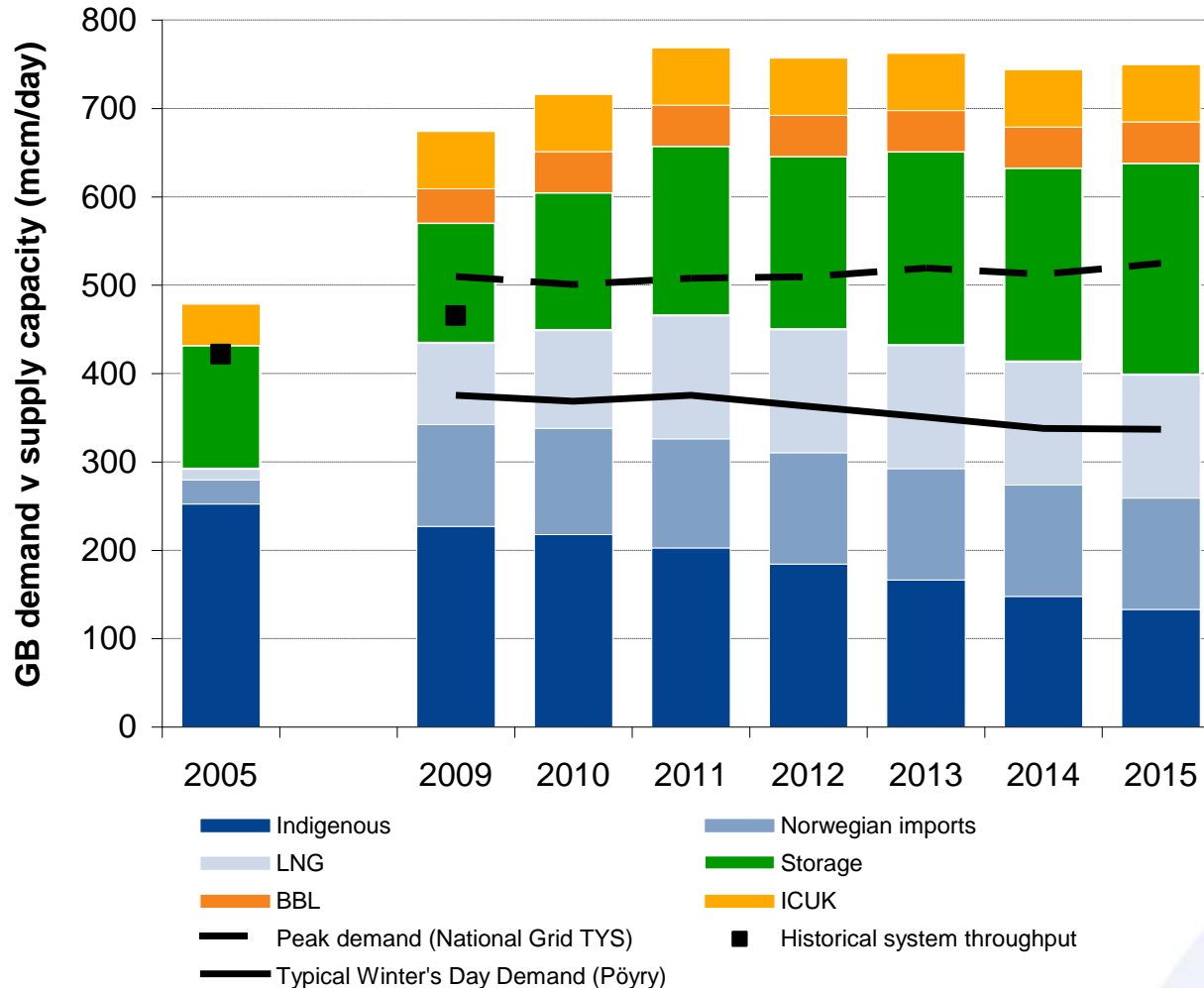
- Higher heating demand may affect gas prices, reducing its competitiveness against coal and dampen demand from power generation sector

# Through winter 2010/11, gas demand for power generation could remain at summer levels

The 'usual' winter upswing in coal demand may be less pronounced over winter 2010/11, as an oversupply in the market reduces gas prices, keeping CCGTs competitive with coal-fired generators



# Plentiful capacity to bring gas to GB



- Import capacity has more than offset the loss from indigenous production
- By 2011 supply capacity will be 50% more than peak demand
- Will the gas turn up?

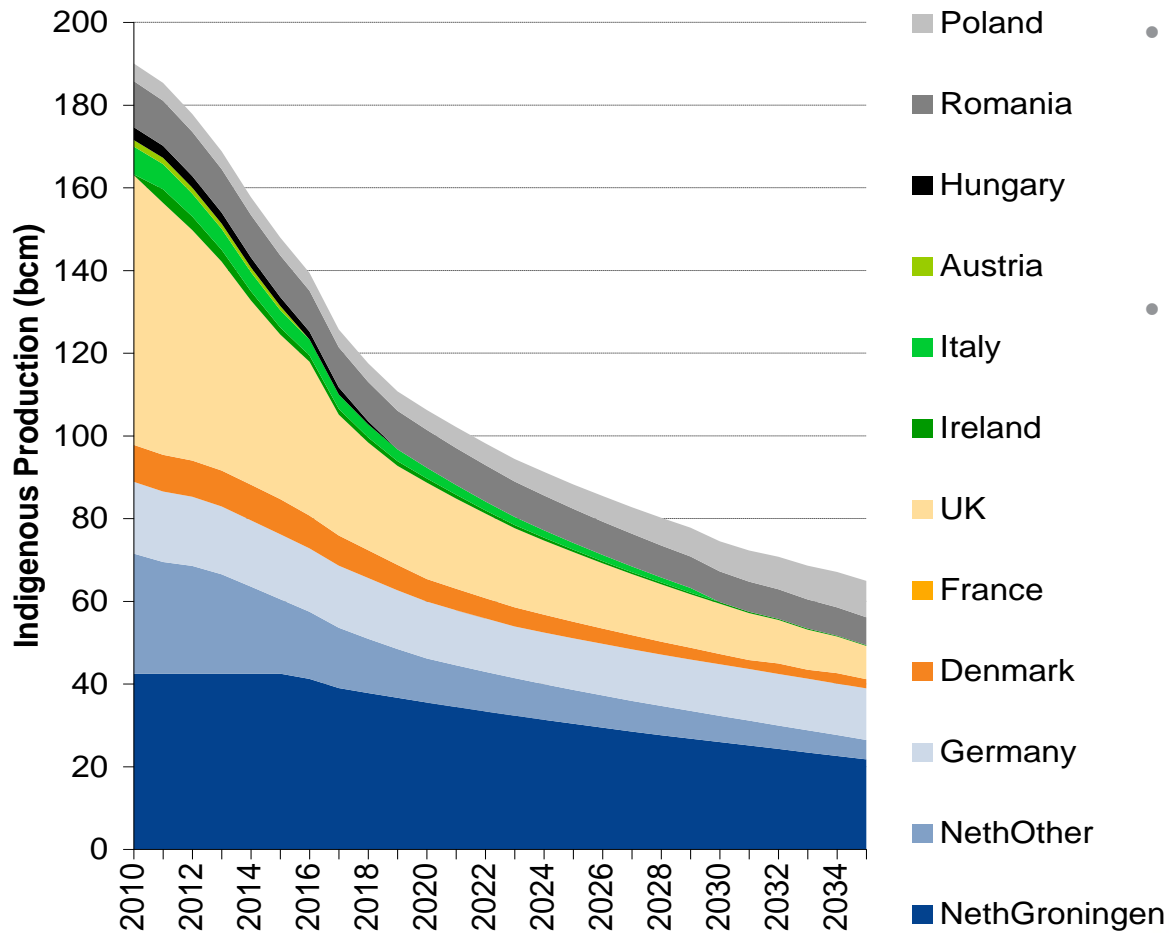


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# Declining production across Europe



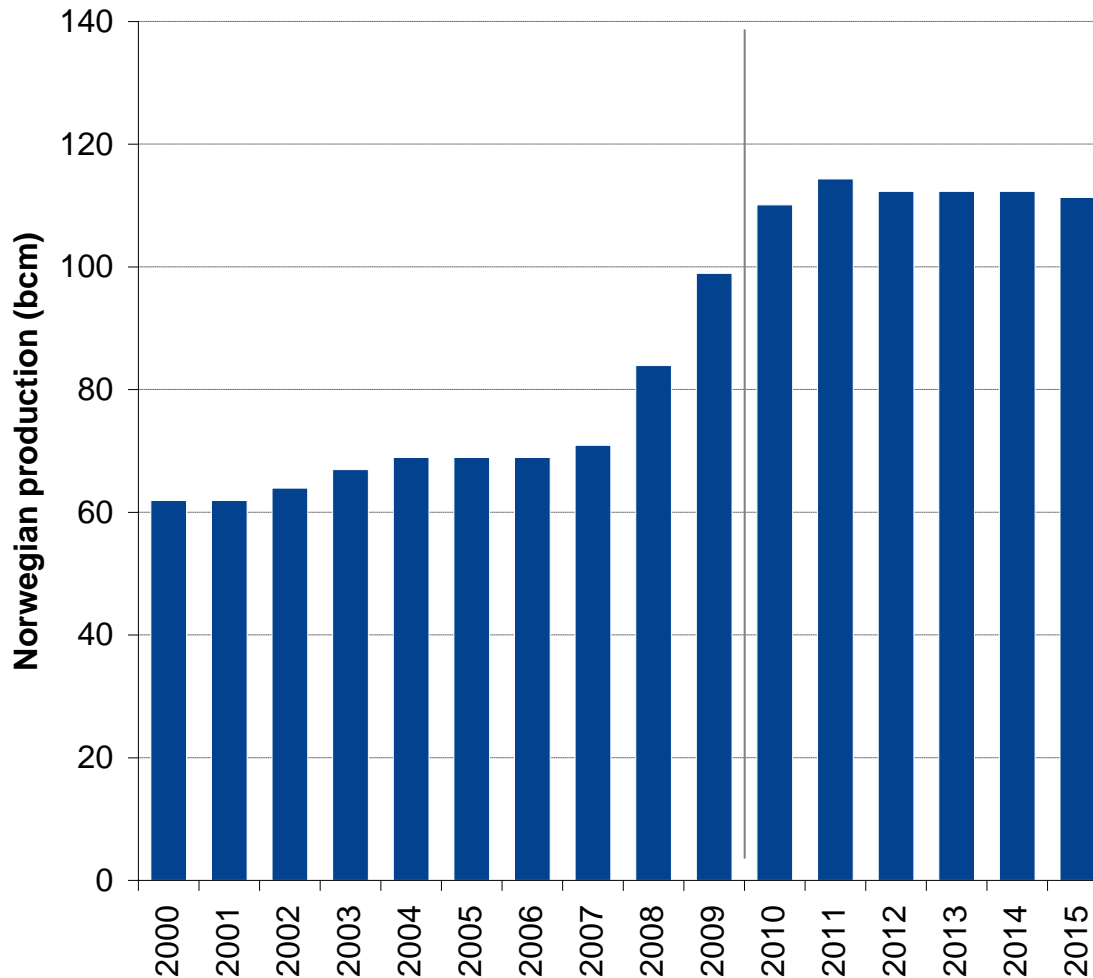
- Significant decline in indigenous production across Europe in the next 10 years
- Increased imports of pipeline gas from Norway and Russia plus LNG

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# Norwegian supplies increasing



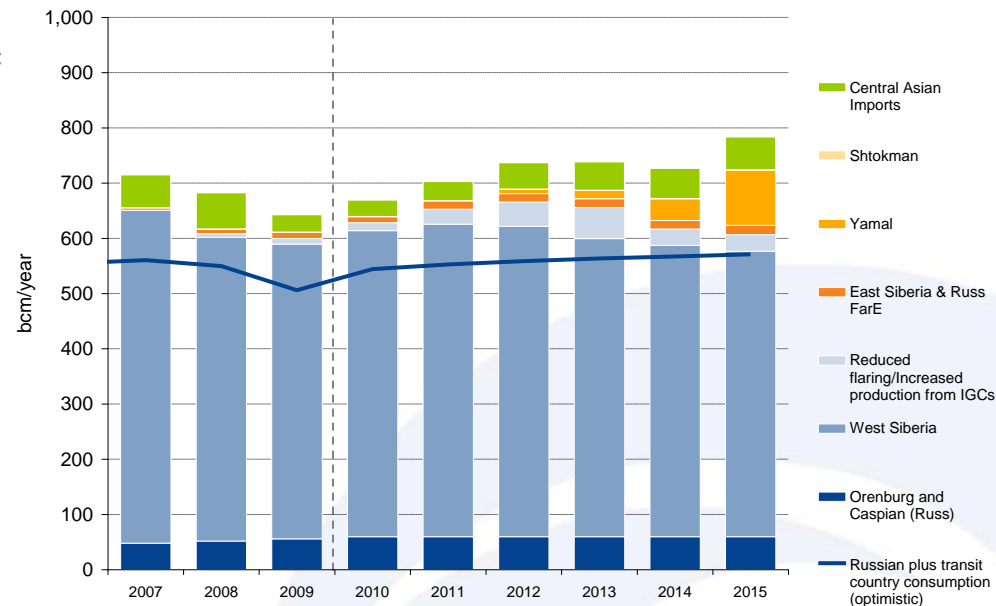
- Recent growth in production in Norway set to stabilise and decline slowly from about 2014
- Temporary outages seen this year are equally likely to occur in future
- Gassco network can be used to arbitrage between the different markets and transfer flexibility without using interconnectors

# Russian investment in pipelines will continue...



- Nord Stream has received all necessary permits.
- The 1,220 km underwater section under the Baltic Sea began construction in April.
- The 27.5bcm/year pipeline is due for completion in late 2011.
- No new field has been allocated to it, suggesting that the gas will be mostly diverted from existing pipelines.
- First gas from Yamal's Bovanenkovo field is not expected until late 2012.

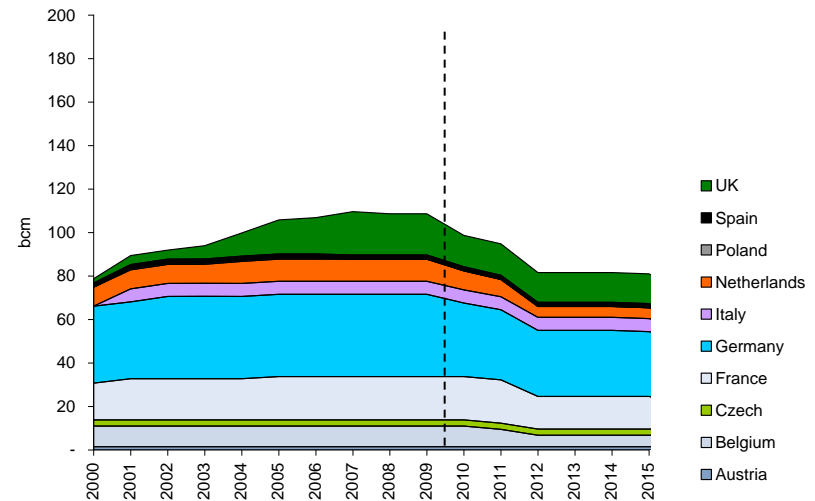
- Gazprom's capex has increased to \$24.3 billion in 2010-11, up from \$15.1 billion in 2009
- Pipelines will remain the biggest item in the investment programme, as it has to build over 4,137 km of pipelines before Yamal gas reaches Europe.



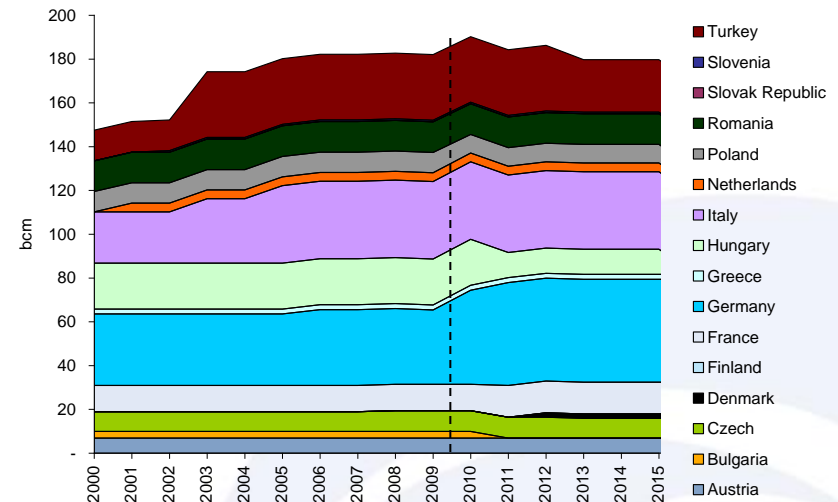
# Contractual obligations – long-term take-or-pay contracts

- A number of the long-term take-or-pay contracts with Norway will be expiring in the next few years, leaving more 'uncontracted' or spot gas.
- Recent Norwegian supplies to GB have been uncontracted or with NBP gas indexation, so producers are getting used to taking price risk.
- Potential for trading at Continental hubs will increase and Norwegians will use the Gassco network to arbitrage between the different markets without using interconnectors
- Gazprom has come under pressure to re-negotiate its contracts – reducing take-or-pay levels to including a gas spot market component in the oil-indexed formulae.
- Concessions on an individual basis and only until 2012, based on the assumption that the oversupply will by then disappear.
- In longer term Gazprom will seek to preserve ToP and oil-indexation clauses in European contracts, some of which have been signed until 2035-37.

Long-term contracts from Norway



Long-term contracts from Russia



Source: Cedigaz

# Russian-Ukrainian disputes in 2010-11 will be mitigated by...

## The Ukrainian angle:

- The need for internal political consolidation led to the signing of the Kharkiv Accords with Russia in April 2010, which Kiev will want to enforce in the coming winter
- The nature of the deal that links gas to the lease of the Black Sea ports in the Crimea means bilateral relations will remain opaque, even though Ukraine has signed on to Energy Charter and European Energy Community

## The Russia angle:

- The new government of Ukraine is more palatable to the Kremlin than the previous 'Orange Revolution' leadership
- Fall in European demand means Russia will be more reluctant to lose CIS customers, including Ukraine, where imports of Russian gas could fall to less than 30bcm in 2010 from over 70bcm in the early 2000s

## The EU angle:

- Measures undertaken in the aftermath of the past crises have improved the regulatory framework, allowing gas in Europe to move more freely
- The construction of new interconnectors (e.g. Hungary-Romania) has increased west-east gas trade
- New LNG re-gasification terminals in Italy, France and UK plus better access to LNG terminal in Greece
- New storage has been added for security of supply considerations



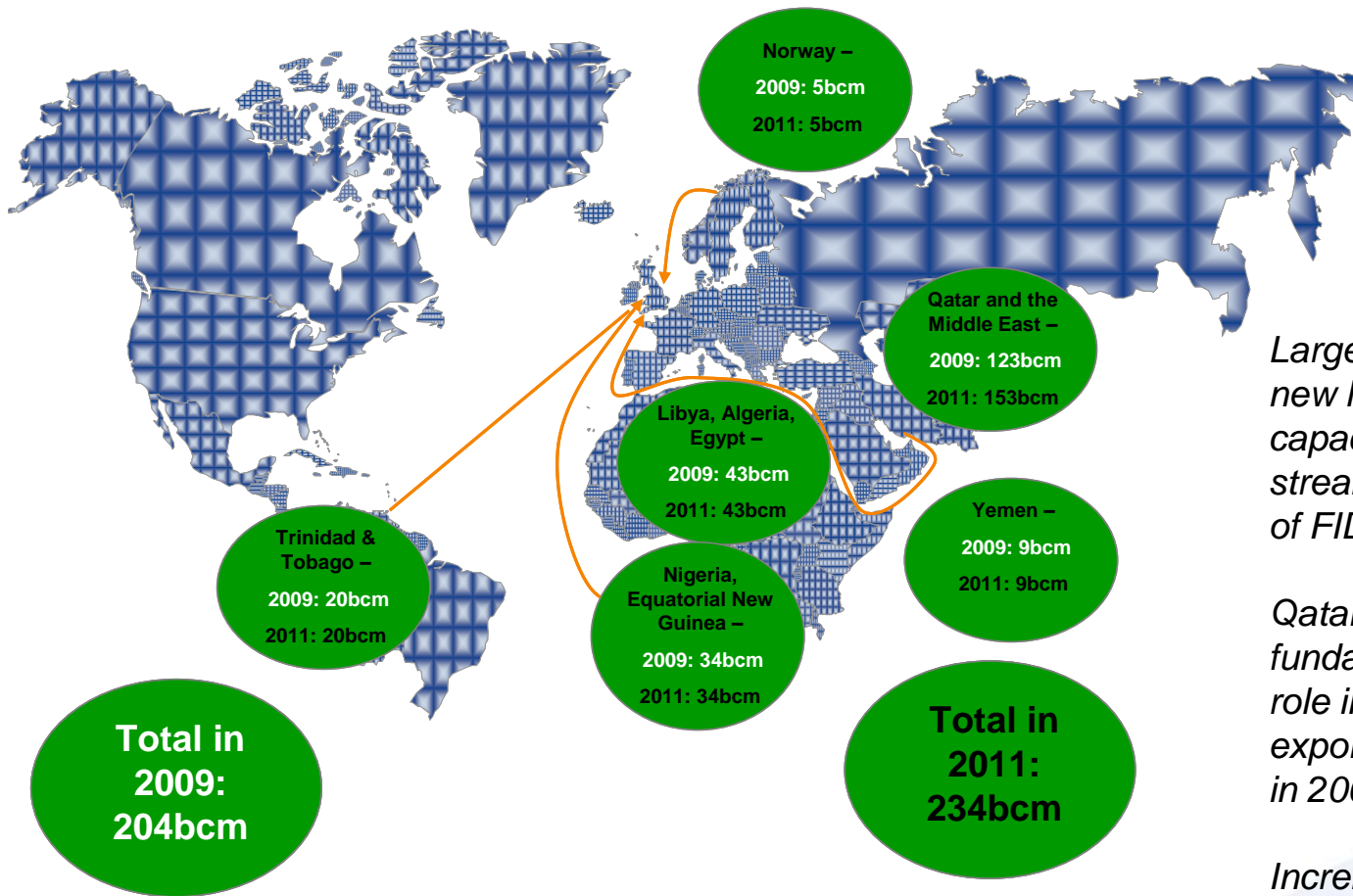
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# Steady increase in Atlantic basin LNG liquefaction capacity



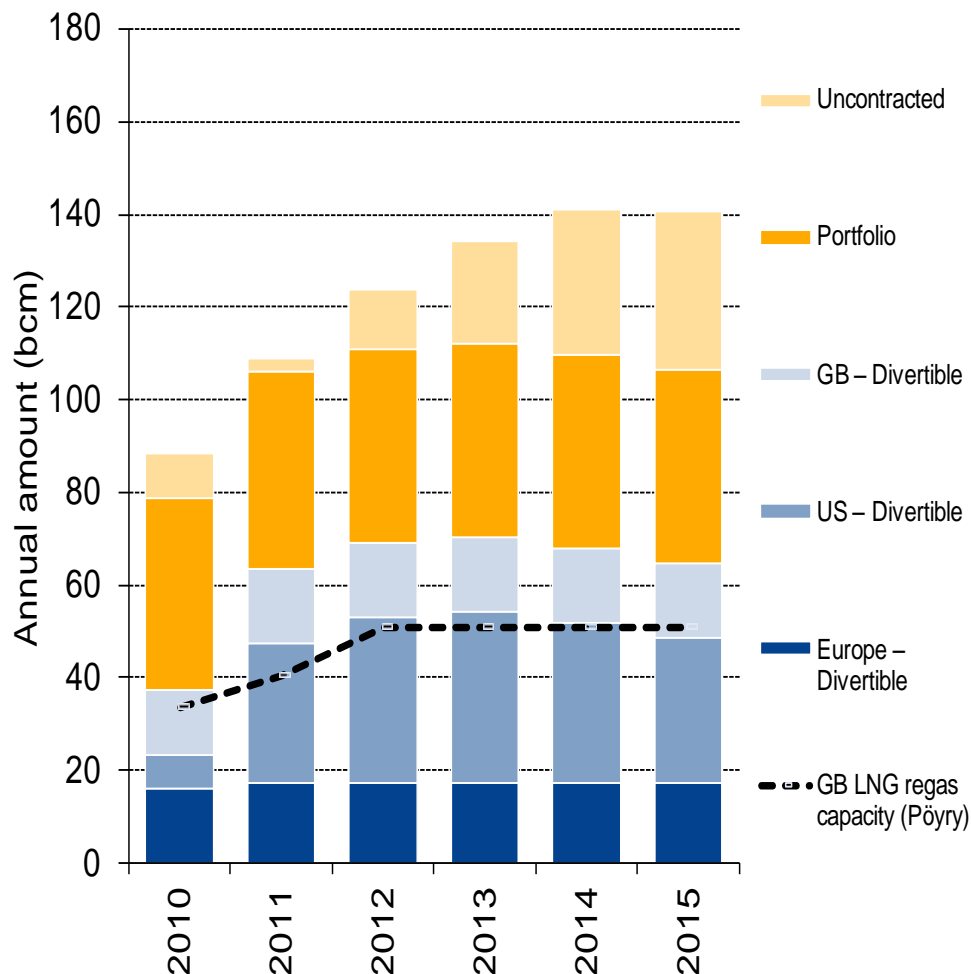
*Large volumes of new liquefaction capacity have come on stream in 2010 – the result of FIDs taken in 2006-07*

*Qatar has played a fundamental role in LNG expansion, with exports rising from 71bcm in 2009 to 102bcm in 2010.*

*Incremental expansion will continue, with the world's total liquefaction capacity by 2013 increasing by 50% on the 2009 level*

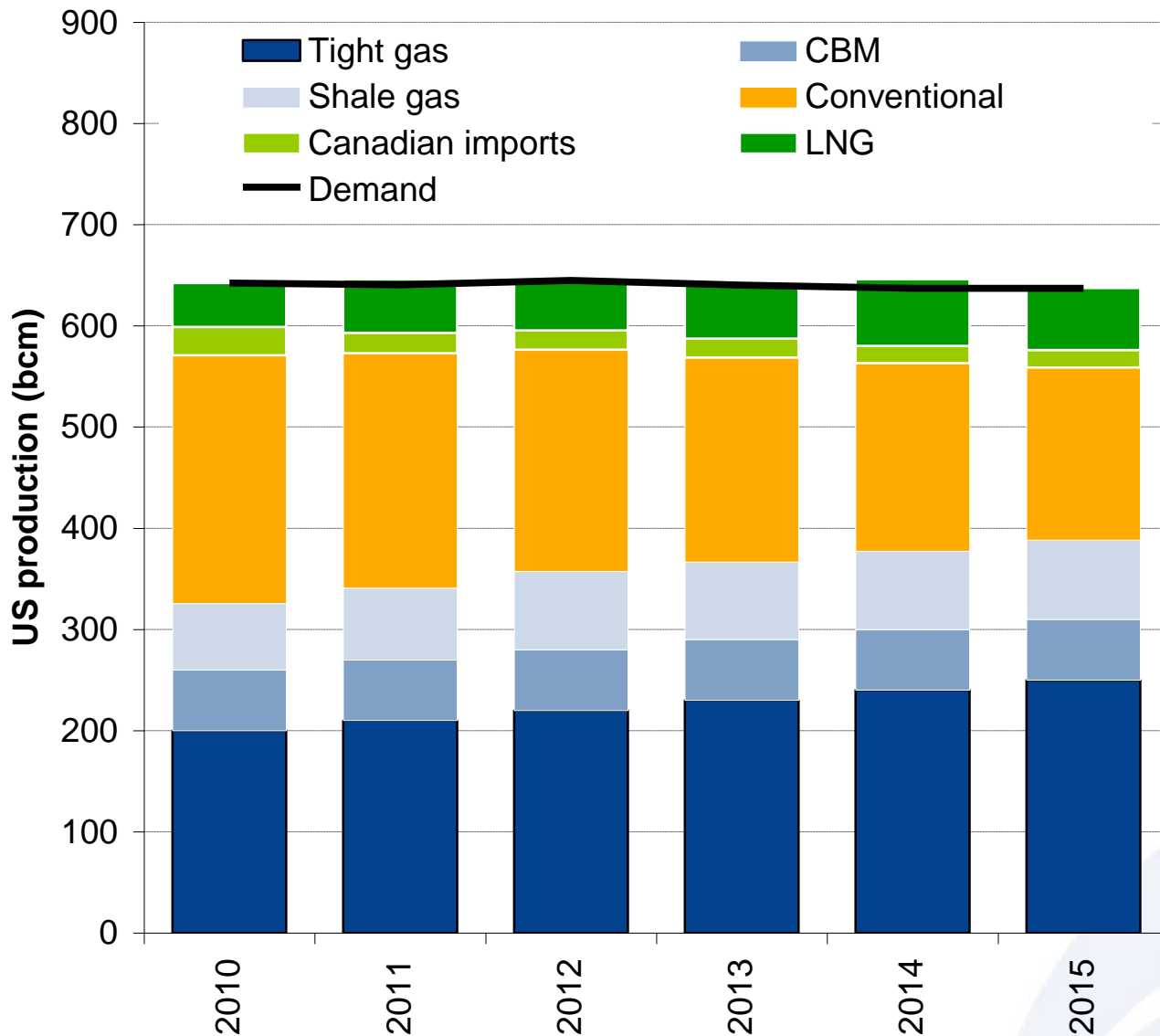
# Growth in flexible LNG provides more opportunities for spot cargoes

*Forecast of LNG production and contractual commitments vs. GB re-gasification capacity*



- Uncontracted, portfolio and divertible LNG is considered to be flexible and not tied to a destination
- Flexible LNG will increase to represent approximately 50% of all LNG produced by 2020
- The ratio of global regasification capacity to liquefaction capacity is approximately 1.8 : 1.0 providing a wide opportunity to take spot cargoes
- LNG will have increasing capability to move flexibility from one market to another.

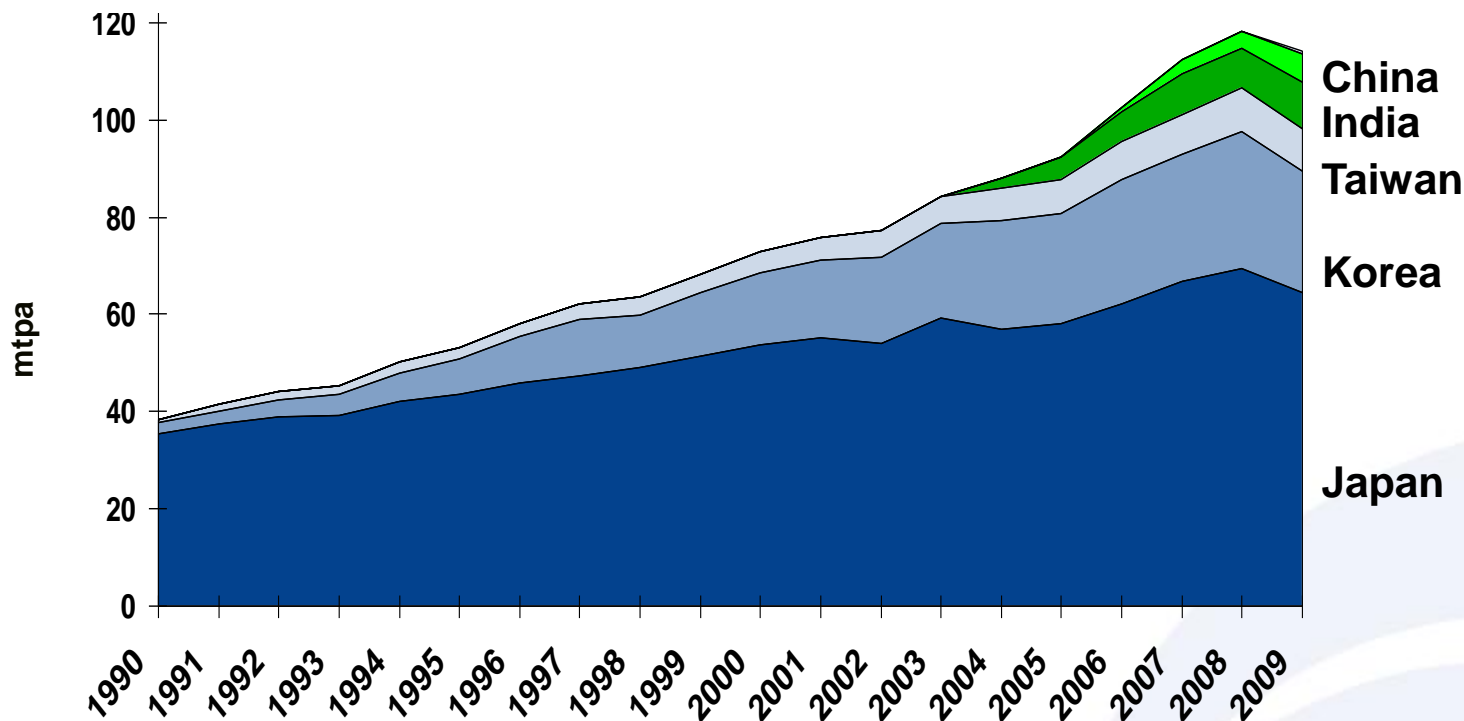
# US production and imports



- Production of all three types of conventional gas has been on the rise
- Shale has received most attention due to technological breakthroughs and the resultant rapid pace of development.
- This trend will continue in 2011, freeing more LNG for the European market.
- Demand recovery will be met through increased indigenous production and possibly higher pipeline imports from Canada in later years.

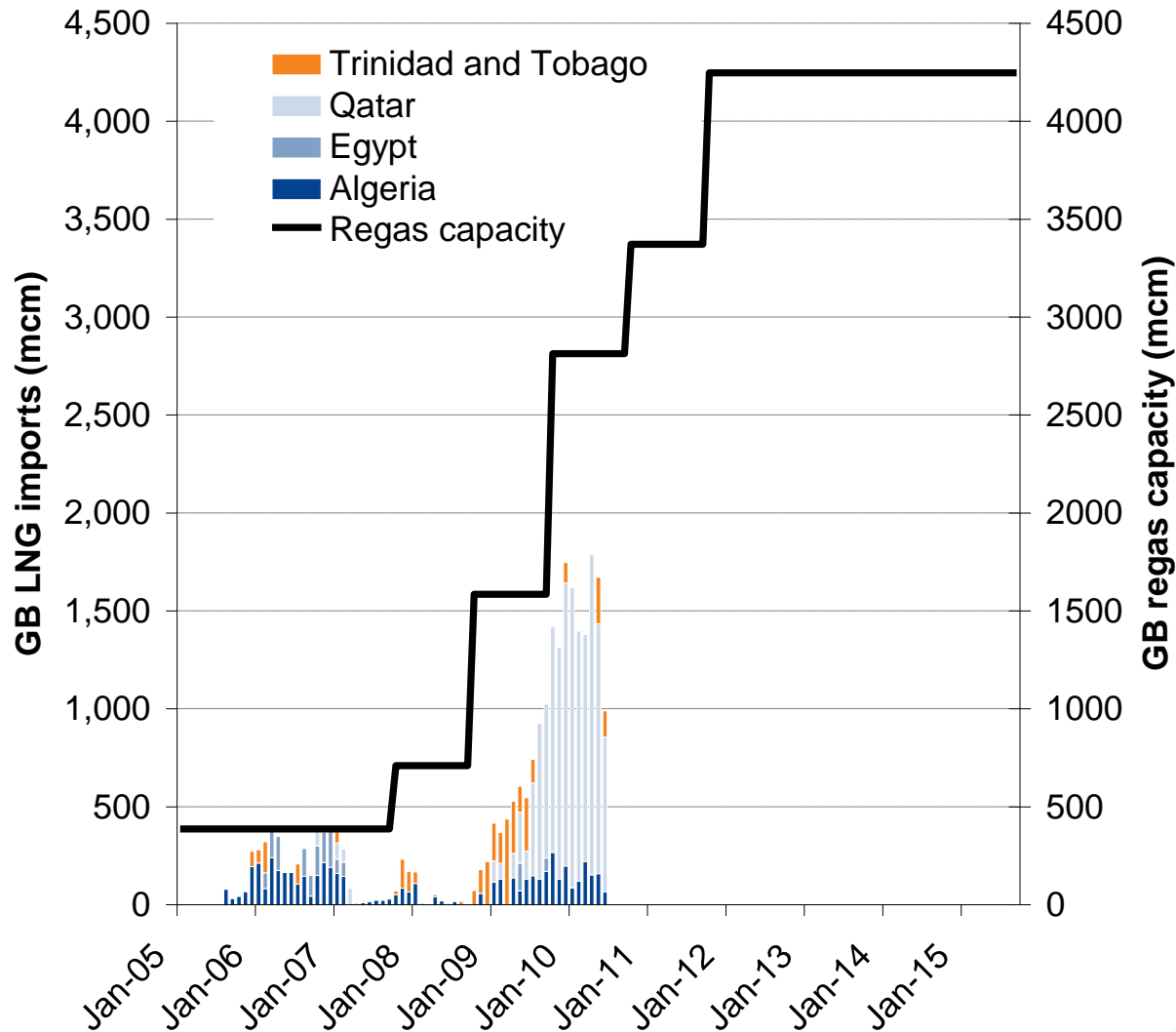
# Far East Demand

- There has been a significant growth in LNG Demand, up to recession
- China and India are talked about as key markets, but demand is relatively small compared to Europe at the moment and demand growth will also be satisfied by pipeline supplies from Russia and Kazakhstan
- New LNG supplies from Australia will satisfy demand growth and declining Pacific supplies and release Middle East LNG into Atlantic market



Source: A. Flower

# GB LNG re-gasification capacity



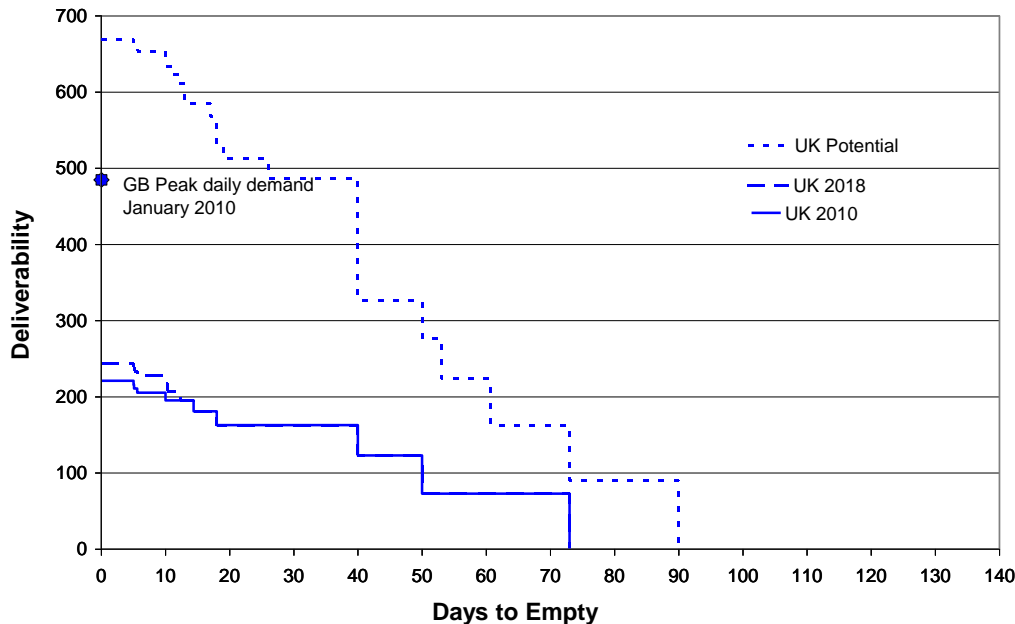
- GB is well placed to benefit from the increase in the volume of uncontracted LNG given its excess re-gas capacity
- Expansion in liquefaction capacity and developments in the US gas industry meant that more LNG came to GB in 2009/10 than at any time in the past
- Higher demand in Far East and outages meant UK could have imported more given the prices this summer

# Uncertainties

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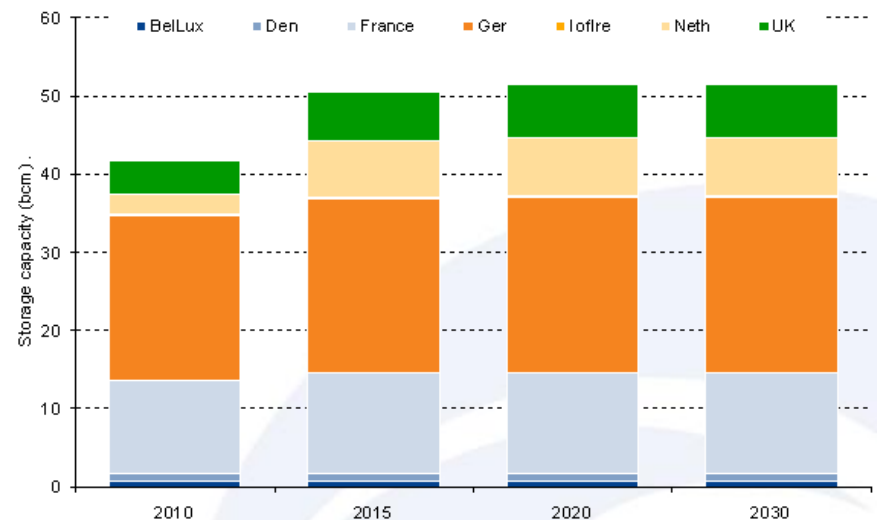
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# Potential growth in gas storage in the UK and NW Europe



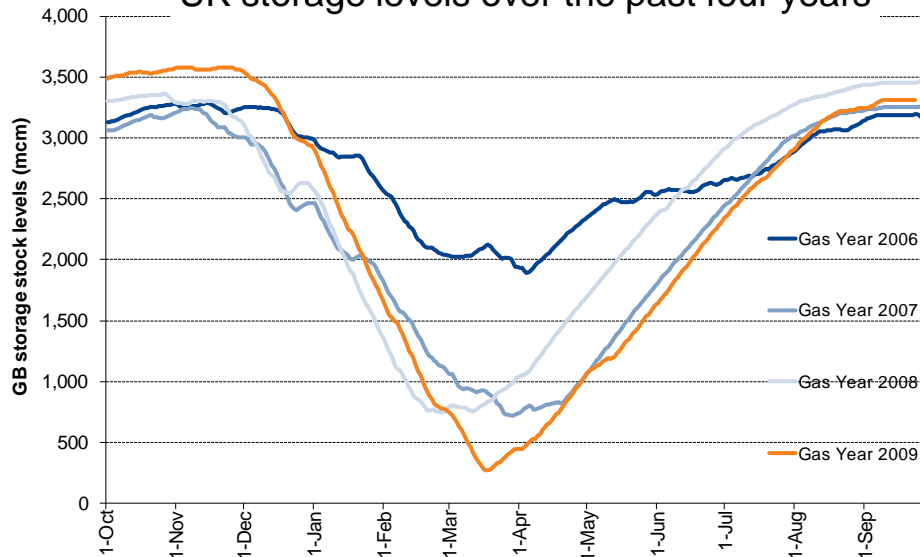
- Growth in the UK is initially in high deliverability
- But depleted field storage is also planned for long-range flexibility and security of supply
- Shorter range storage can give greater coverage through cycling

- Storage facilities are also planned in NW Europe, particularly in Germany (+10bcm)
- Most growth in German storage is in high deliverability caverns for short-term flexibility
- New storage capacity will be added, even under the more conservative projections

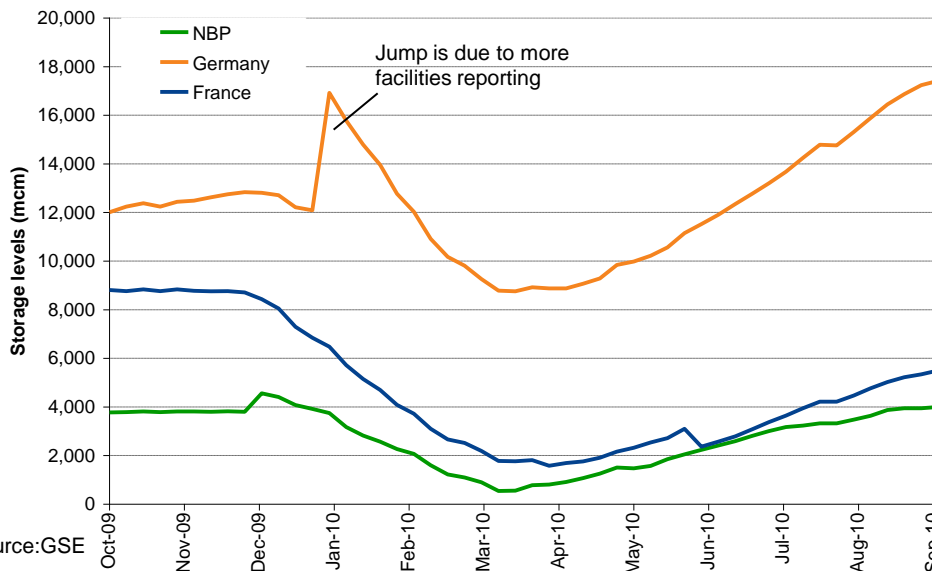


# UK vs. European storage stocks

UK storage levels over the past four years



Source: National Grid



Source: GSE

- In 2010, levels of gas in UK storage reached record lows and the re-filling process continued at maximum rate right through August.
- To reach the level of 'fullness' achieved last year, storage injections will need to continue through October (which was the case in 2007/08 gas year).
- Storage in Europe is far greater than in UK
- The amount left in store in Germany at end of winter was twice as much as in UK at start of winter
- Improving interoperability through 3rd Package will also assist in the transfer of flexibility from one market to another



# Uncertainties

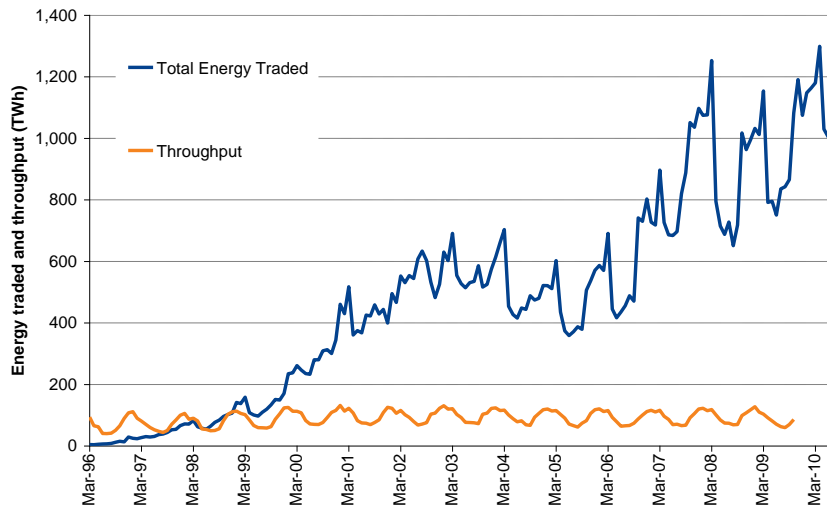
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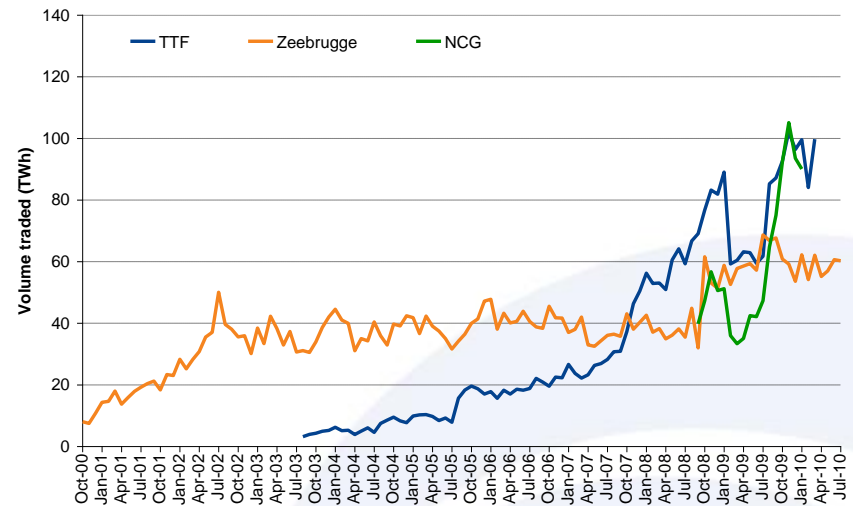
# Trading liquidity

- Trading has grown in Continental hubs, but is at best 10% of NBP trading
- Increasing uncontracted and flexible supplies will help to increase trading across European hubs
- Improving interoperability through 3<sup>rd</sup> Package will also assist in the trading of gas between hubs
- NBP will remain as the main reference price for NW Europe

## NBP



## Continental Hubs



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# Security of Supply

- Pöyry's studies for DECC concluded that there would have to be very extreme circumstances for any security of supply concerns for GB, particularly once Nordstream is completed
- Worldwide prices would be affected in such circumstances and NBP may see spikes if there is a very large and sustained supply outage



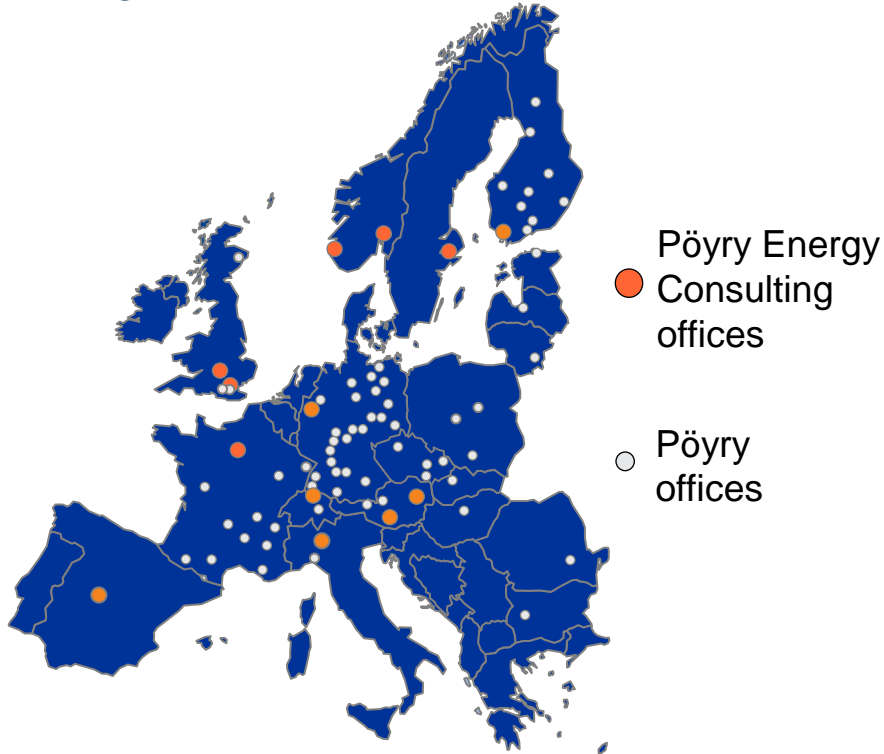
# Conclusions

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- Demand:
  - In the short term, demand from power generation will stimulate demand recovery, while demand from other sectors will either decline or remain stable
  - We expect that lower short-term gas prices relative to coal will result in fuel switching in favour of gas
- Supply:
  - The global gas market is oversupplied and will remain so in the next few years as a result of Qatar's LNG expansion and US unconventional gas developments
  - In this context, Russian under-investment in the upstream has not created shortages in Europe, while its construction of Nord Stream will strengthen European security of supply
  - Improved political relations between Russia and Ukraine mitigate the likelihood of supply interruptions in winter 2010/11
- Gas trading:
  - Increasing amounts of uncontracted and flexible gas and LNG will provide impetus to gas trading across Europe
  - The abundance of gas globally should exercise downward pressure on prices

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Strategy



Business Operation



Valuation &  
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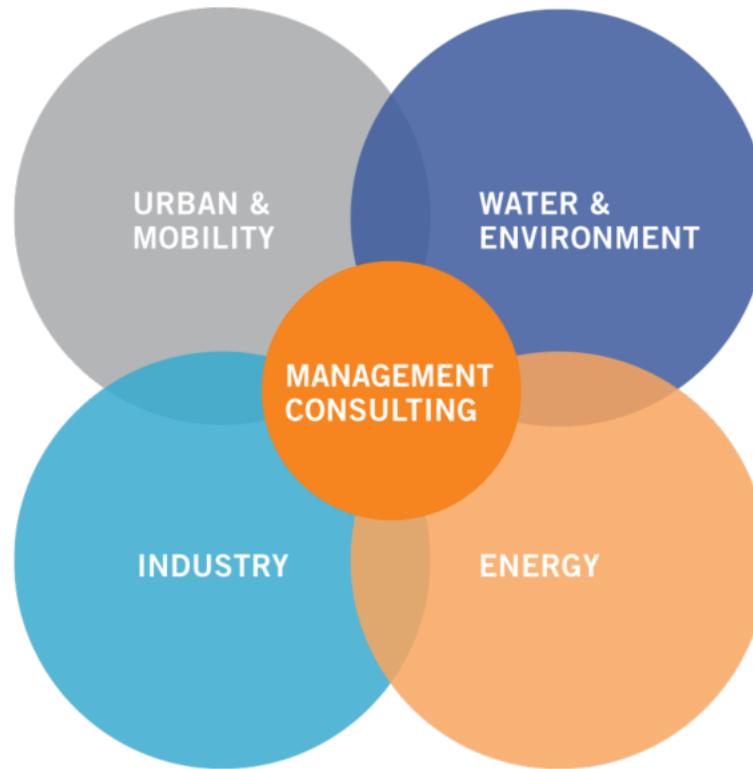
Sustainability

# Wide range of deep expertise

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