



European Gas Market Evolution

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European Gas Markets and Pricing in a Global Context -

- European Gas Demand and Drivers
 - Policy
 - Coal / Carbon pricing
 - Impact of renewables
 - Volatility of demand
 - Industrial and Residential Demand
 - New Demand
- Gas Supply to Europe and the role of LNG
 - Current supply picture
 - Decline in Indigenous sources
 - Competition between LNG and Pipeline Gas to supply Europe
- Impact of market developments on gas prices in Europe
 - Price indexation and levels
 - Contracting



- Gas Demand in Europe

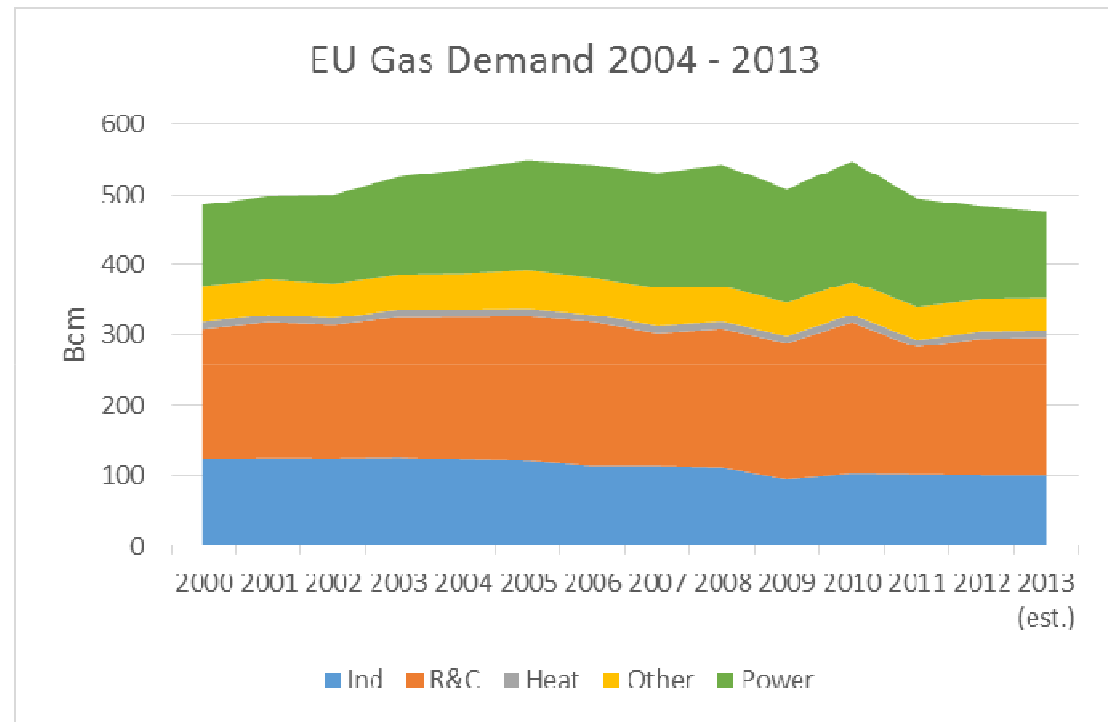


Since 2008 EU gas demand has dropped back to levels last seen in 2000

Demand grew steadily through to 2007 then shrank back by almost 15% on 2008 levels due to a combination of:

- Energy policy uncertainty
- Recession
- Cheap coal
- Renewable Generation Growth

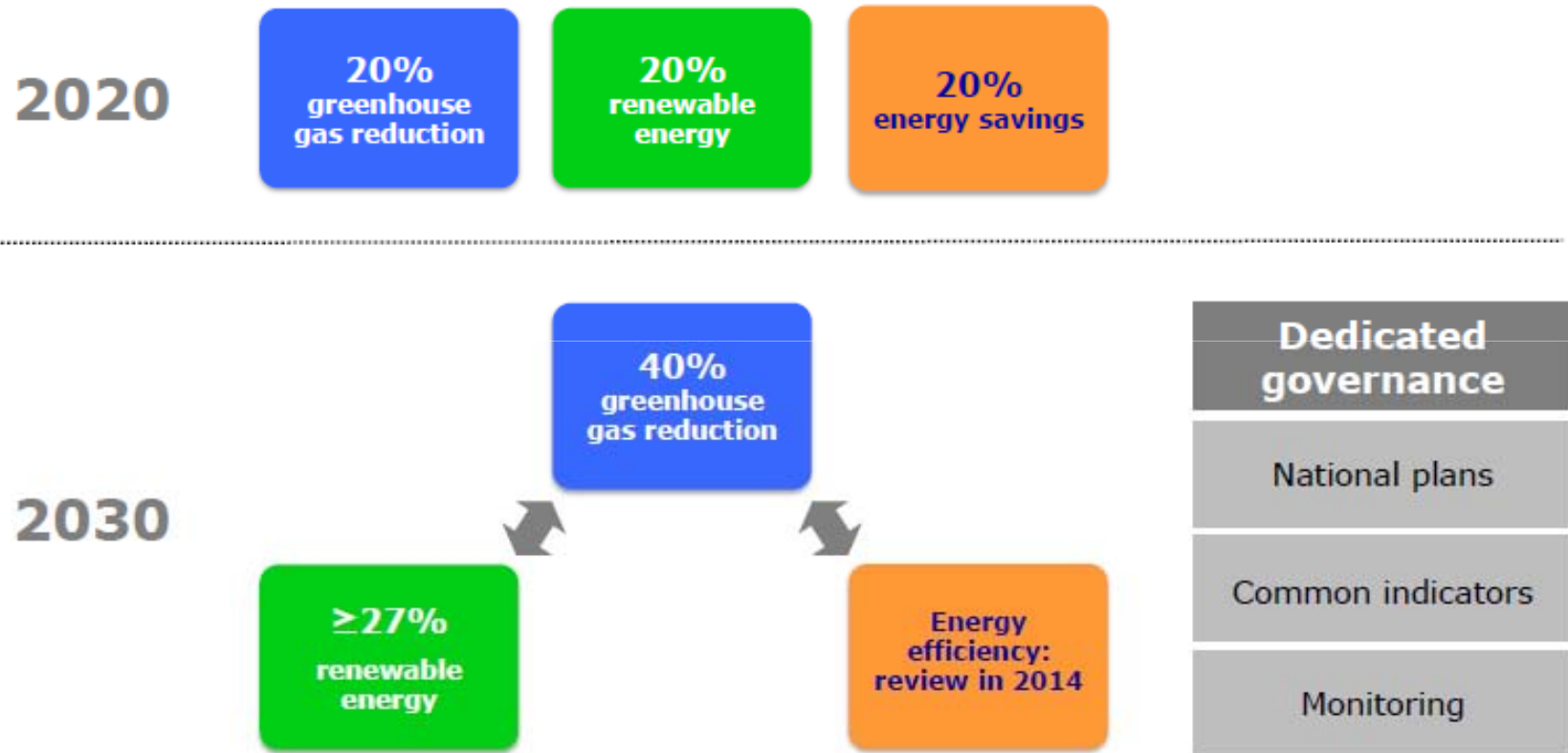
Key questions are why has demand shrunk back so much and will it ever recover?



Source: IEA and Gas Strategies Estimates



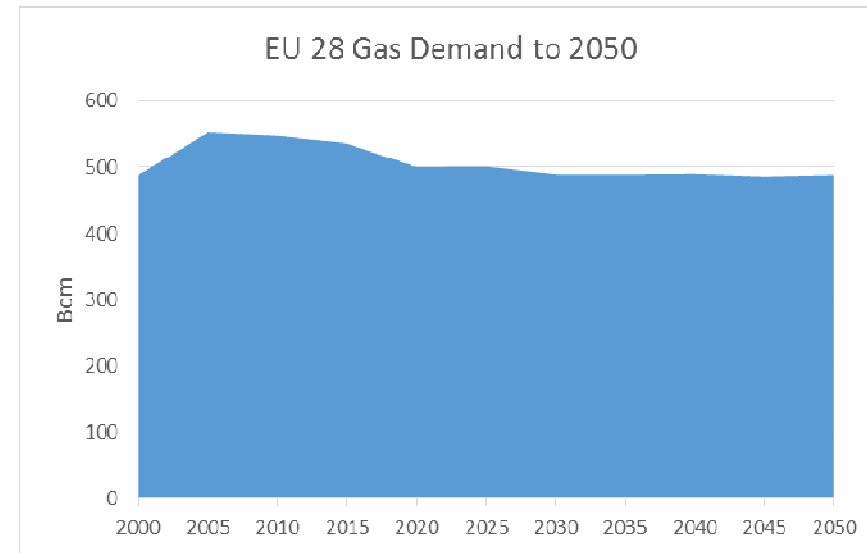
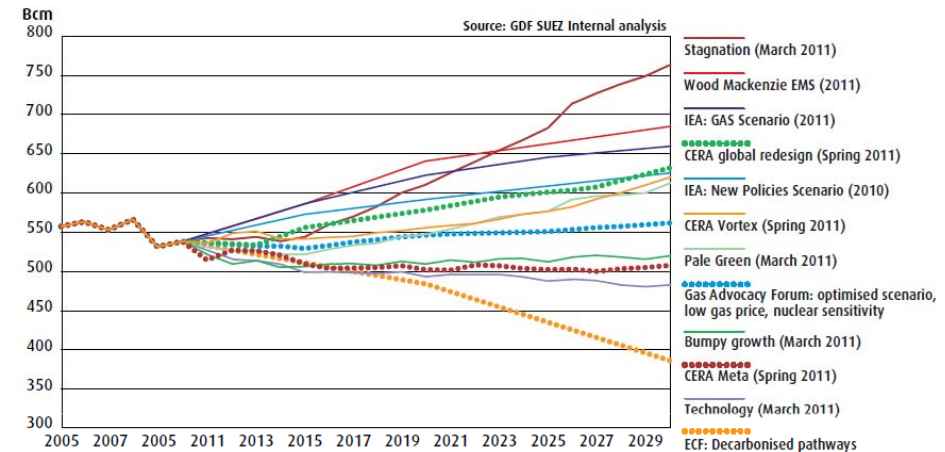
Conflicting EU policy has led to failed EU wide policy – each member state pursuing its own agenda





Forecasters for a long time remained uncertain as to how Europe's gas demand would evolve

- Forecasters saw policy uncertainty leading to wide range of demand outcomes from new “dash for gas” in power generation to rapid demand destruction
- Current consensus view that demand never recovers to pre-crisis levels

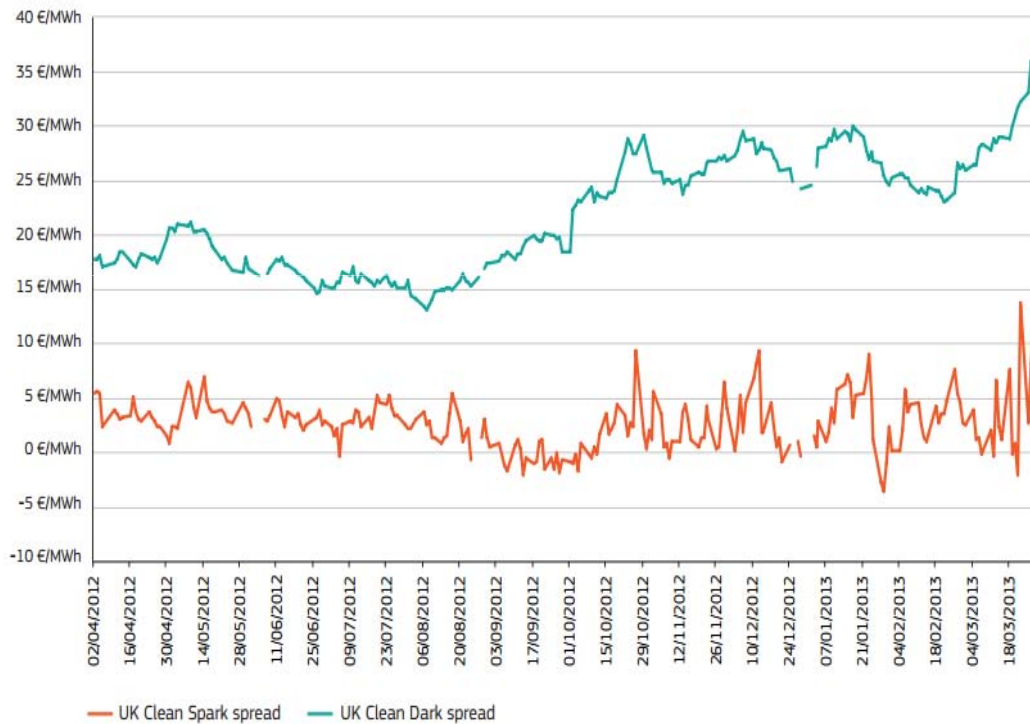


Source: EU Energy, Transport and GHG Emissions, Trends To 2050, Reference Scenario 2013



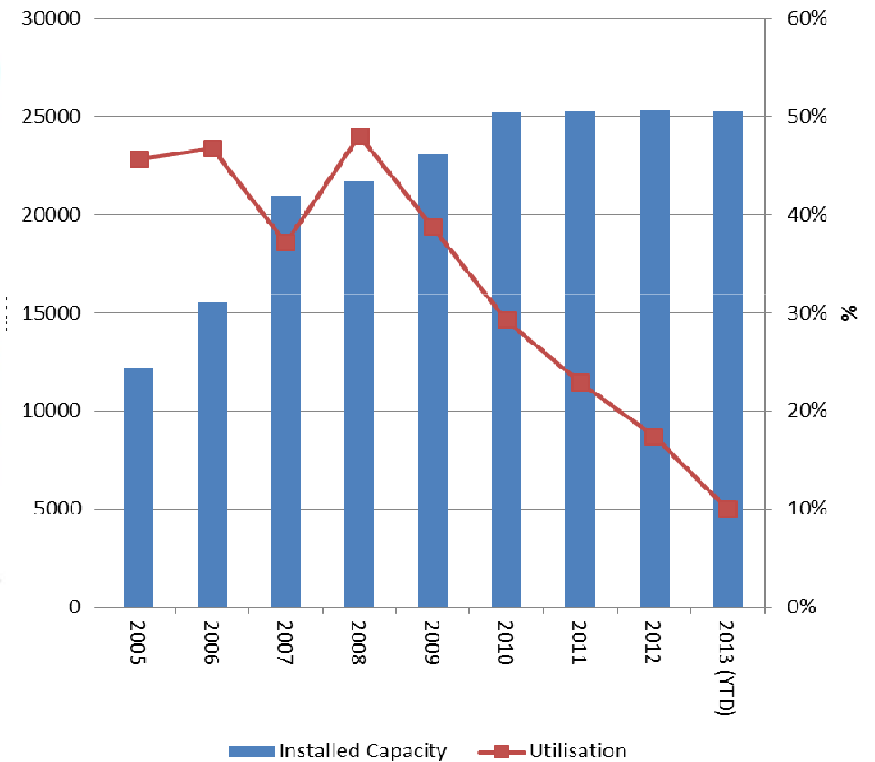
Cheap coal combined with low CO2 prices has continued to suppress demand in Power Sector

Spot Clean Spark Spreads and Spot Clean Dark Spreads in the UK



Source: EC Market observatory Q1 2013

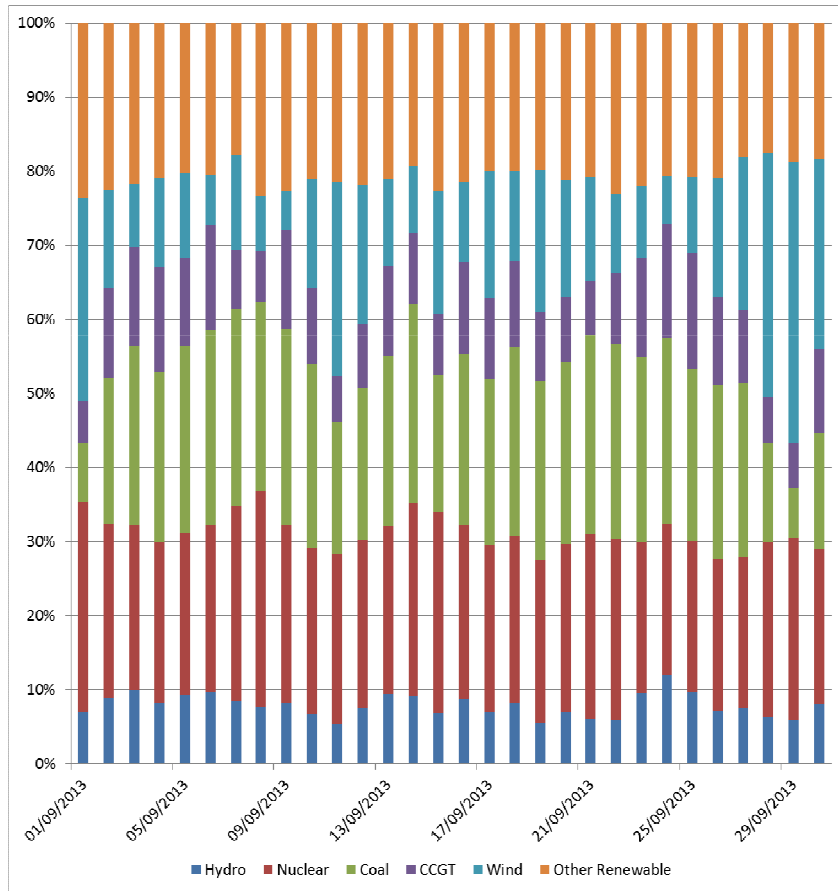
CCGT Utilisation in Spain 2005 – 2013





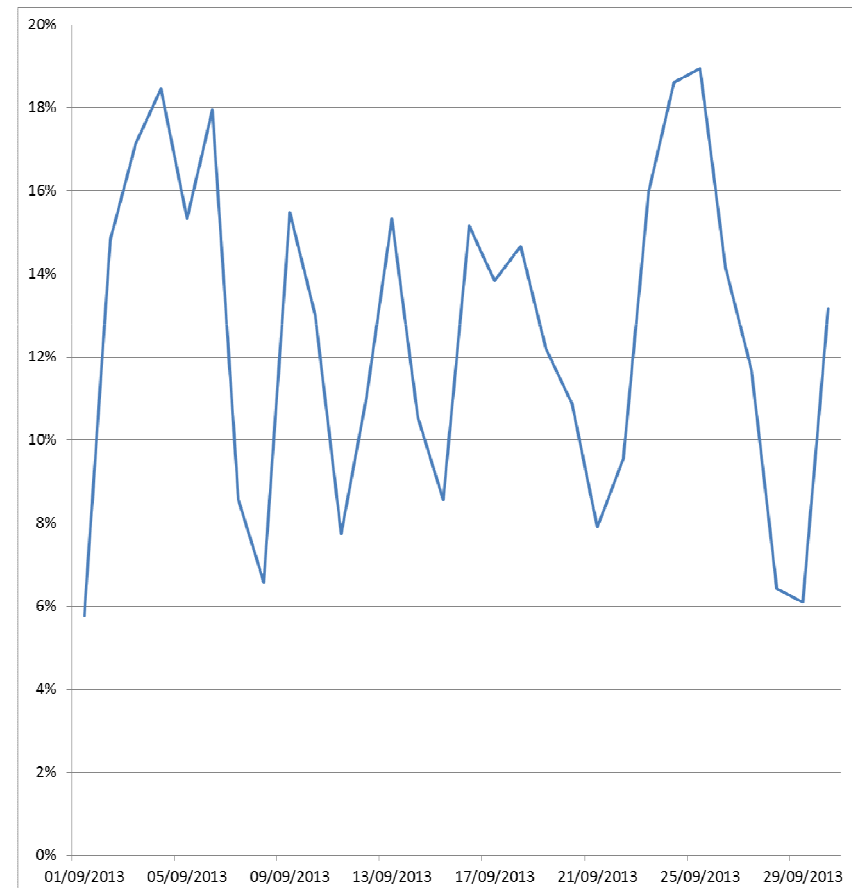
The increase in the availability of renewable power is also creating far greater volatility for gas fired generation

Generation by Source Spain September 2013



Source: Red Electrica de Espana

CCGT Utilisation in Spain through September 2013



Source: REE



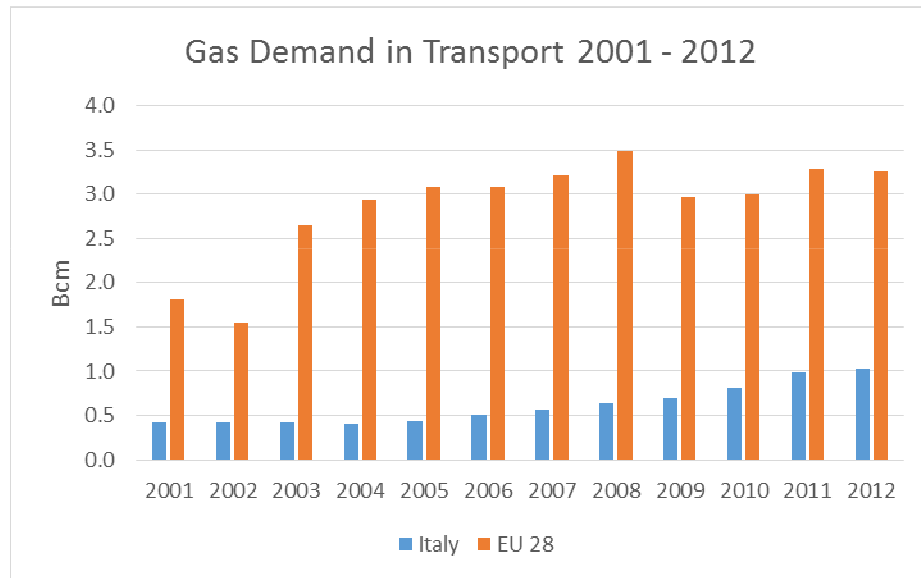
Residential and Industrial demand across the EU is in decline or stagnating

- There is little prospect of significant increases in gas consumption in the industry and R&C sectors because:
 - Markets are mature
 - Energy intensity of industry is in decline
 - There is low or negative population growth
 - Policy continues to drive energy efficiency improvements
- Gas consumption in the industry sector in Europe's six biggest markets fell from 94 Bcm in 2000 to 90 Bcm in 2005 and to 69 Bcm in 2012 (a decline of 1% per year)
- Gas Consumption in the Residential and Commercial sector has remained fairly stable but increased pressure on energy efficiency is likely to put downward pressure on consumption in the sector in the long term



Demand drivers for future – some limited recovery of power, transportation fuel and potentially LNG bunkering

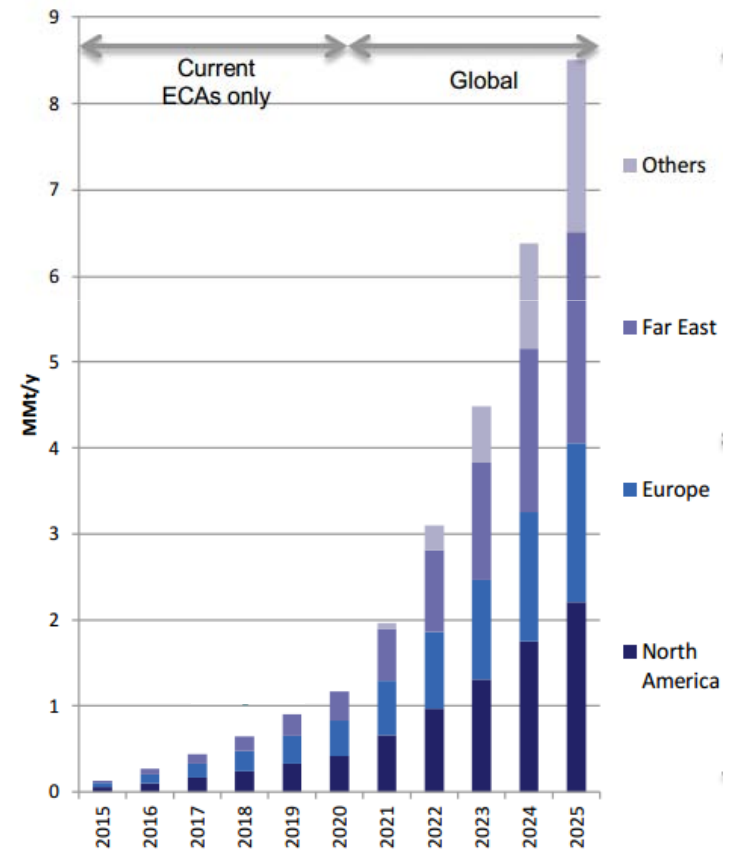
Gas demand growth in the transportation industry in Italy



Over 75% of Natural Gas Vehicles in the EU are owned by Italy and although gas demand in this sector is still low it is growing quickly.

Source: IEA and NGVA Europe

Estimated demand for LNG as a marine fuel



Source: Gas Technology Institute, LNG 17 presentation



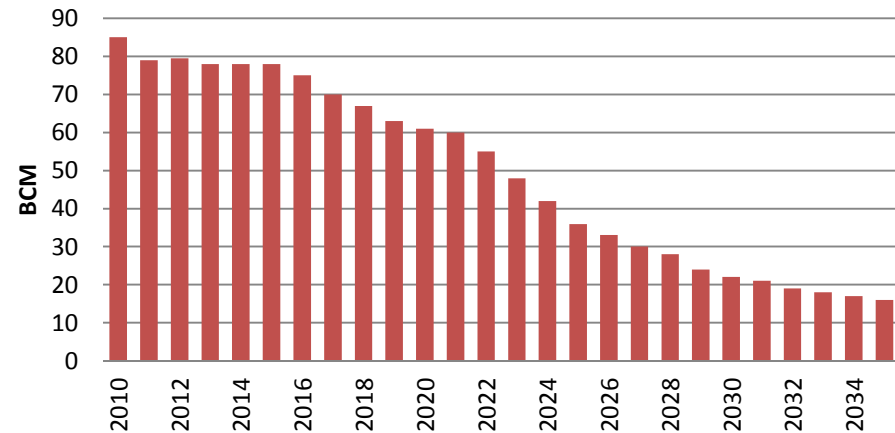
– Gas Supply in Europe



Supply side more certain – we are losing significant volume of indigenous supply

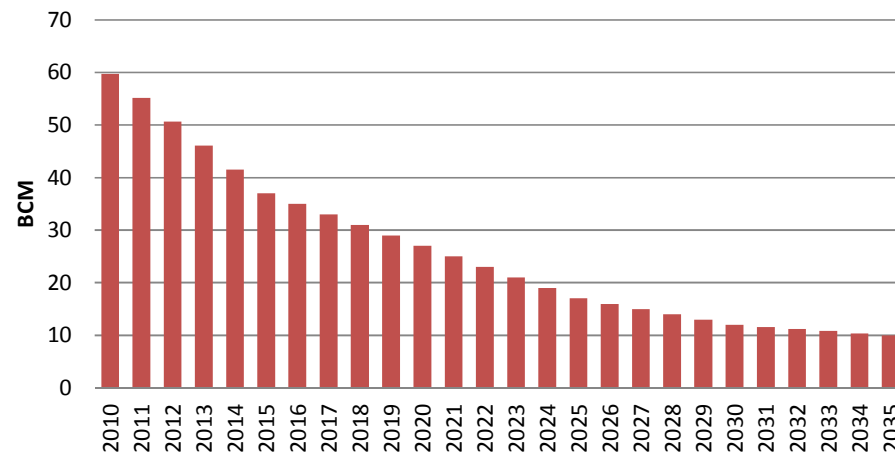
- Netherlands will move from position of major exporter to importer to meet domestic demand by 2030
- UK has moved from a position of self sufficiency in gas in 2000 to a position in 2020 where it will be importing 75% of its requirement
- Total of 100 Bcm of indigenous production lost by 2030

Netherlands Gas Production Forecast 2010 - 2035



Source: Natural Resources and Geothermal Energy in the Netherlands, Annual Review 2012. (TNO)

UK Gas Production Forecast 2010 - 2035



Source: National Grid and Gas Strategies Estimates



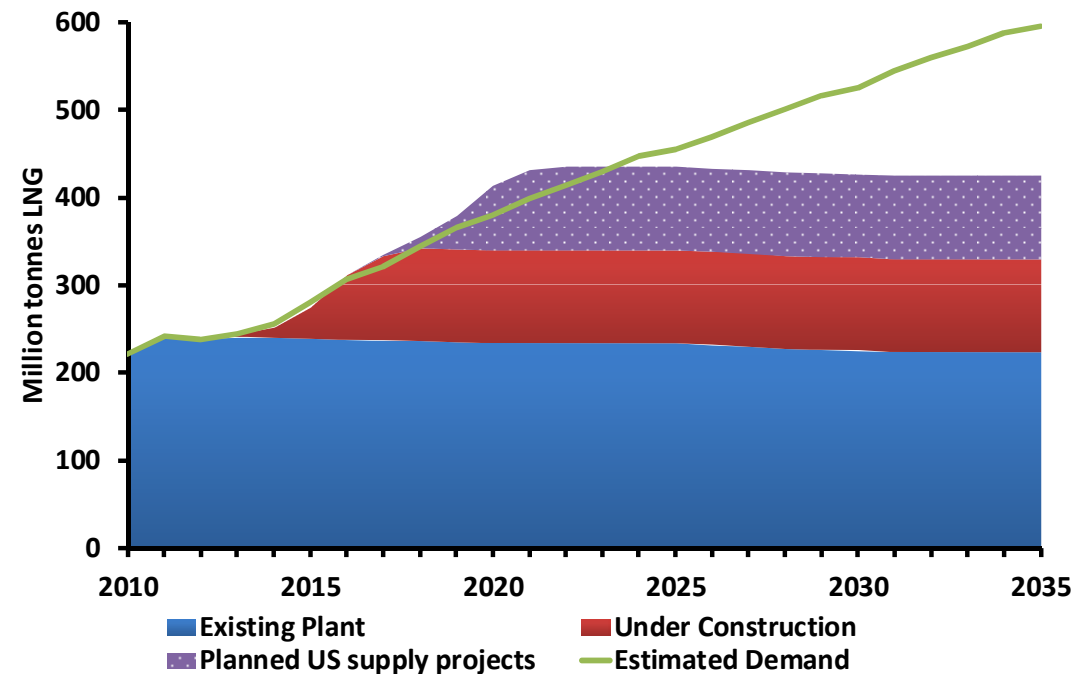
New supply routes are being established to replace declining supply





Post 2017 new LNG supply comes to market offering significant opportunity to Europe

- There are over 40 credible planned LNG projects which could take FID in coming years
- In the US alone, there are plans to convert 95 mtpa of existing regas facilities into export plants.
- Australia, Russia, Canada and East Africa have significant planned capacity



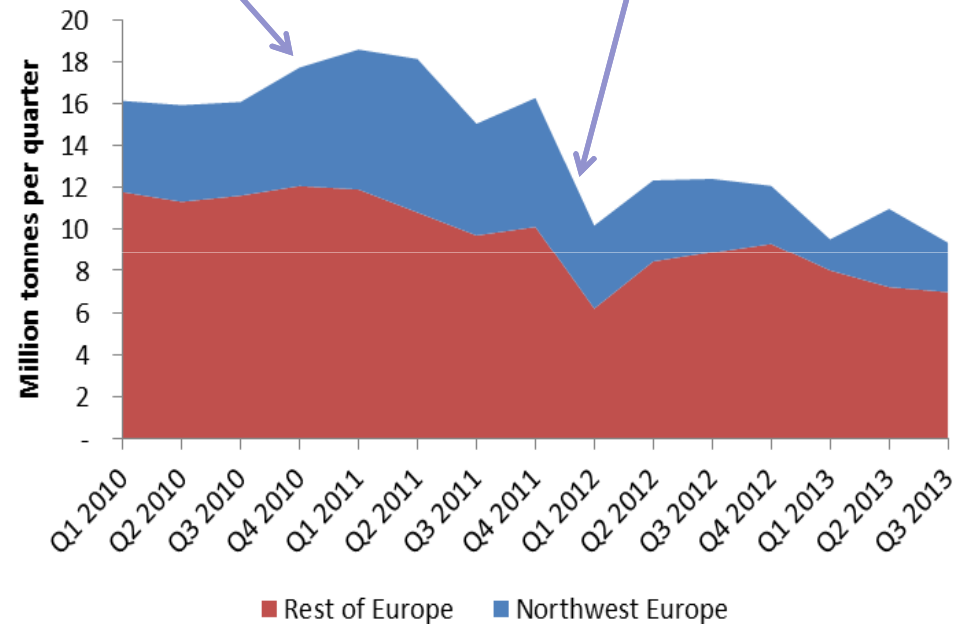


Although LNG supply has reduced in recent years the capacity remains

- European LNG imports increasingly respond to supply/demand changes and recent decrease is not likely to be structural
- Next 'wave of exports' is from North America – Europe will be a key market despite price differential to Asia
- > 100 mtpa of US LNG capacity has found long-term offtakers or is sponsored by aggregators – even if only 50 mtpa takes FID, will not all go to Asia

Qatari output increasing

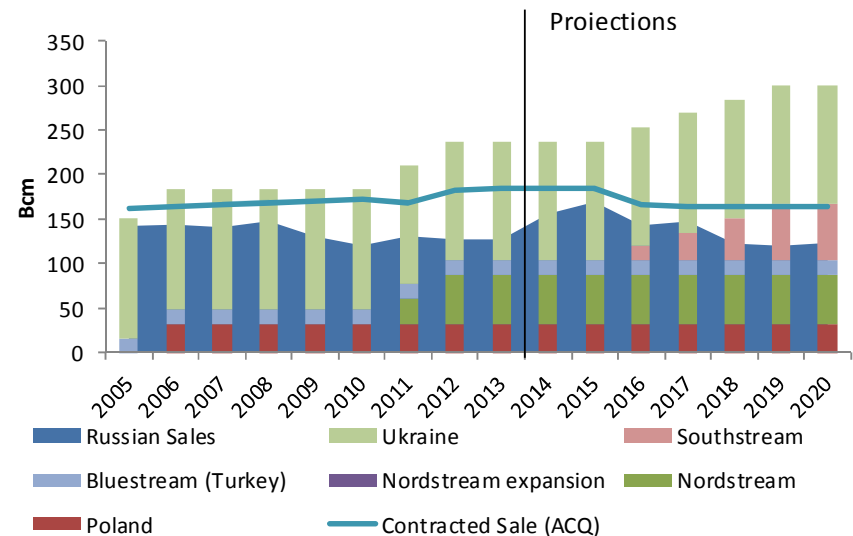
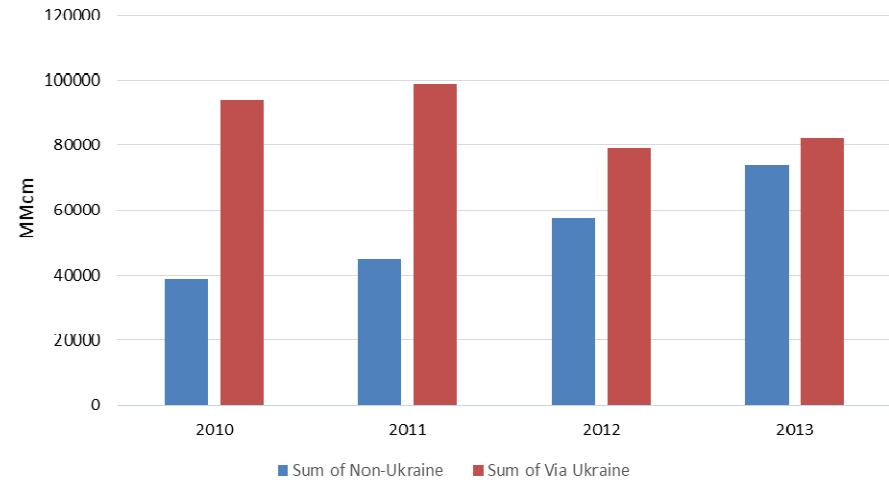
Fukushima effect and weak European demand due to recession





Russian gas will remain critical to European supply - but which way will it come and how much?

- Nord Stream already affecting Ukraine volumes in 2013
- Deliveries to Europe and Turkey not using Ukraine transit – 47% of total Russian supply versus 29% in 2010
- Impact will be larger when South Stream in place
- Potential for full Ukraine by-pass if South Stream built at full capacity



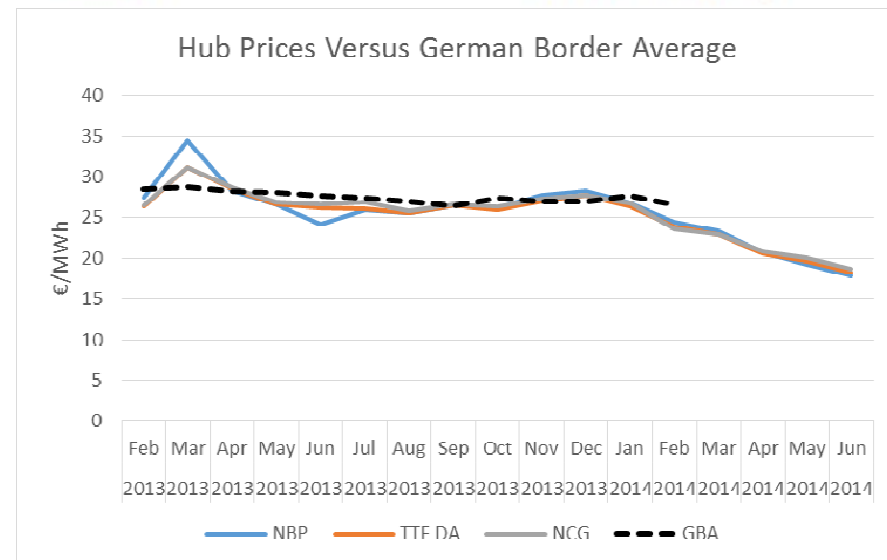
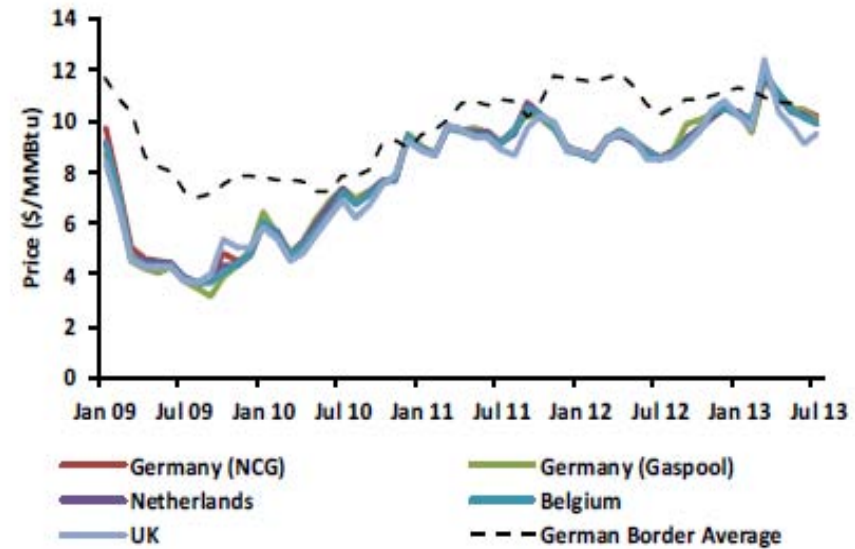


- Impact of market developments on gas future and prices



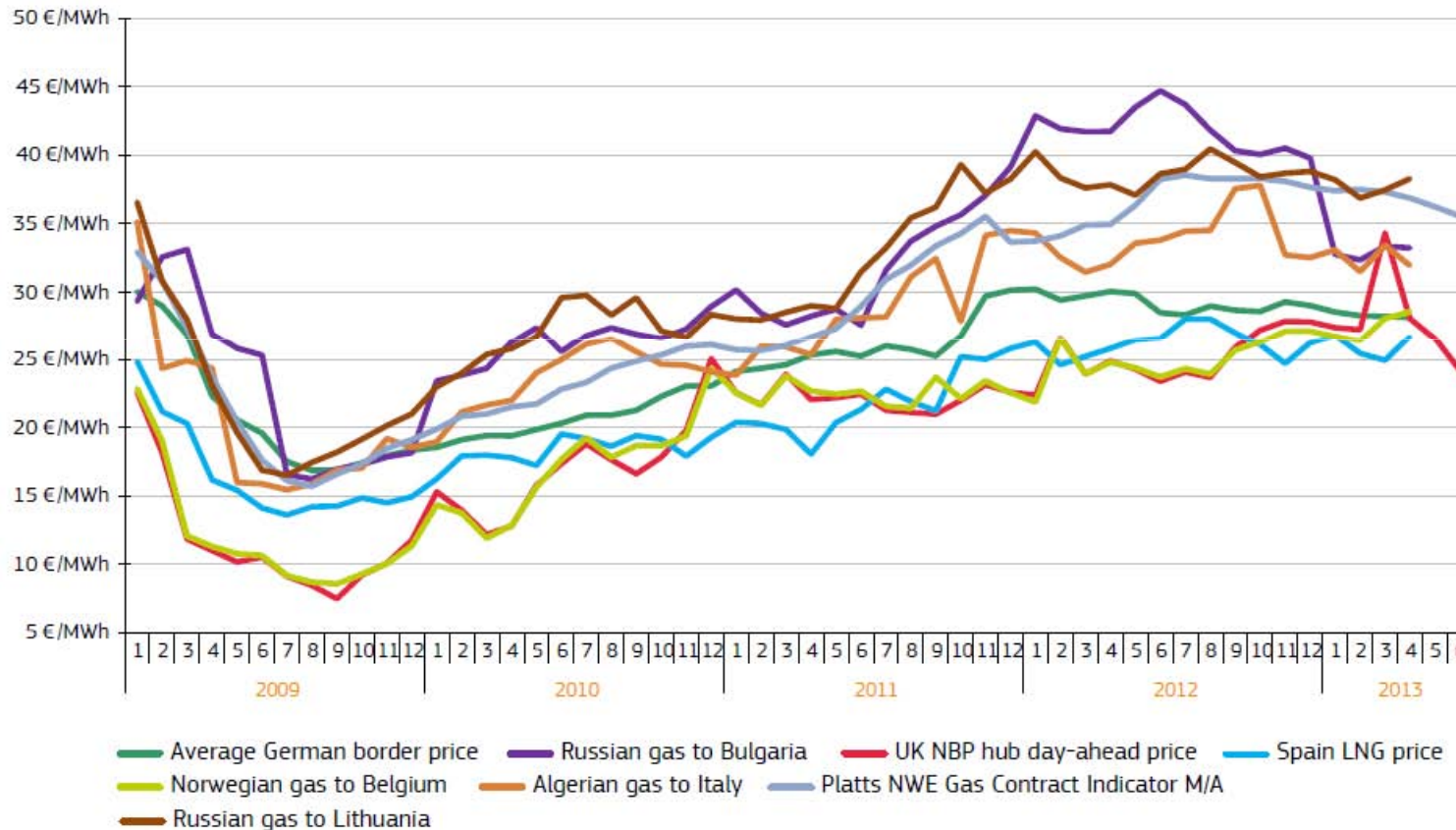
Recent European Gas Price Evolution in major markets

- Historically hub prices and average border prices have followed different paths
- Currently pricing in North West Europe hub and border prices locked together





Despite convergence of prices in North West Europe – Gas Prices vary across the region



Source: Quarterly Report on European Gas Markets, European Observatory Q2 2013



Hub Pricing Evolution likely to continue as infrastructure and new supply connects markets





Impact of market evolution

- Demand is down and likely to remain flat
- Competition between LNG and Pipeline imports to Europe toward the end of the decade likely create downward pressure on European prices
- Prices will increasingly be set on a hub basis across the continent as buyers seek to offset risk in end user markets
- Prices likely to converge slowly across the continent as market becomes increasingly interconnected and supply more diverse
- More flexible contracting may be needed to meet the demands of a more flexible market
- Increased global LNG capacity and greater destination flexibility (particularly from US supply) could lead to increased correlation of price in the Atlantic Basin (Europe and North America)