UK Gas Security: Current Status and Future Issues

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The Geopolitical Economy of Global Gas Security and Governance: Implications for the UK

1) A two-year research project funded by the UKERC, end date 31st December 2013 (extended to end of March 2014).
2) Involves a team of researchers:

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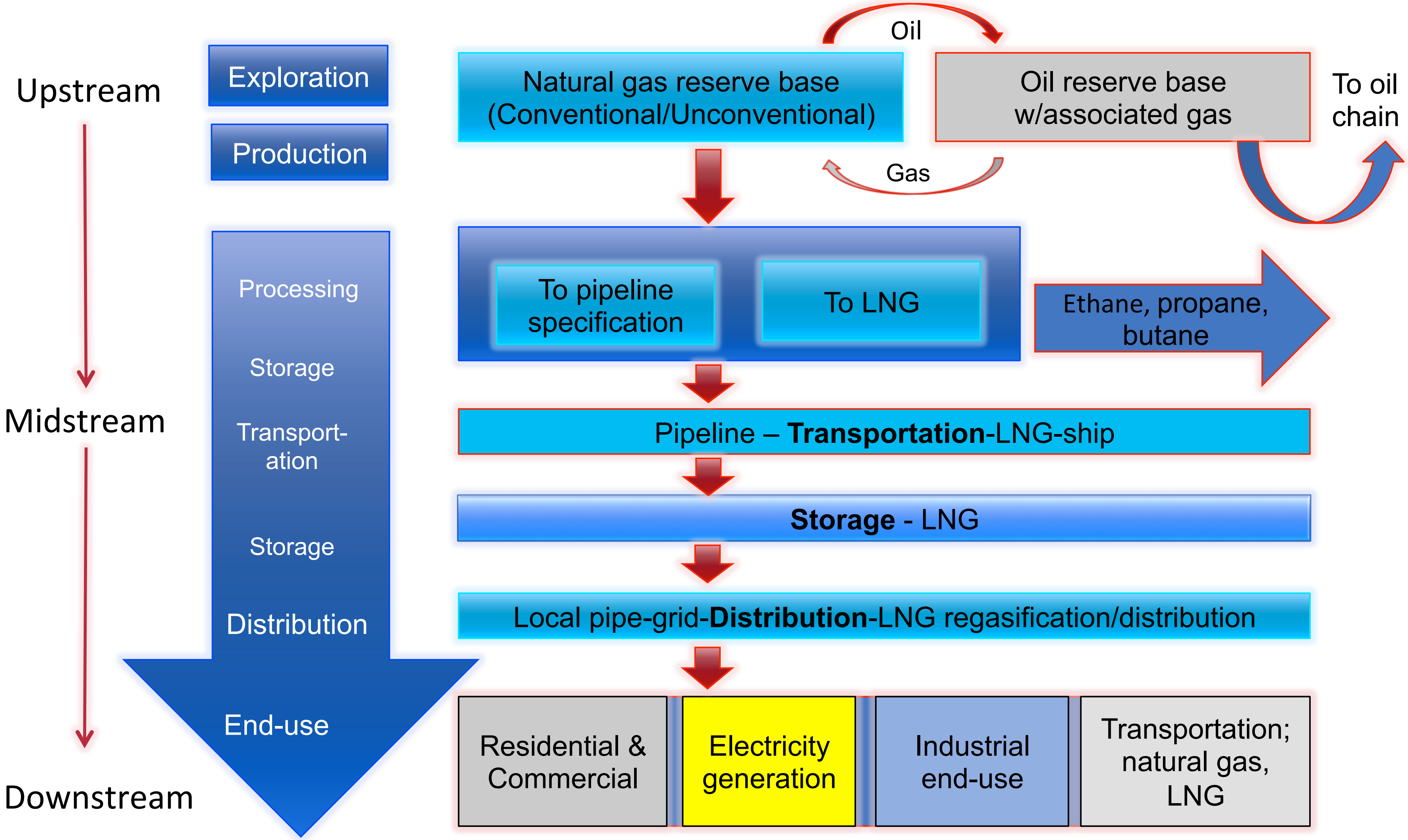
Project research assistant: Joseph Dutton

Consultants: Jim Watson UKERC/Sussex and the Gas Programme at the Oxford Institute for Energy Studies

Why a Supply Chain Approach to Gas Security?

- Provides a necessary antidote to the current failings of the literature on the geopolitics of energy security vis-à-vis natural gas.
- Provides a framework for analysis of the different dimensions of gas security.
- Provides a framework for identifying the actors, relationships and networks that influence global gas security.
- Provides a basis for examining the interactions between global trends and regional (EU) and national (UK) energy policies.

The Natural Gas Supply Chain



Source: based on IGU (2010) *Natural Gas Unlocking the Low Carbon Future*. Oslo: IGU, p. 12.

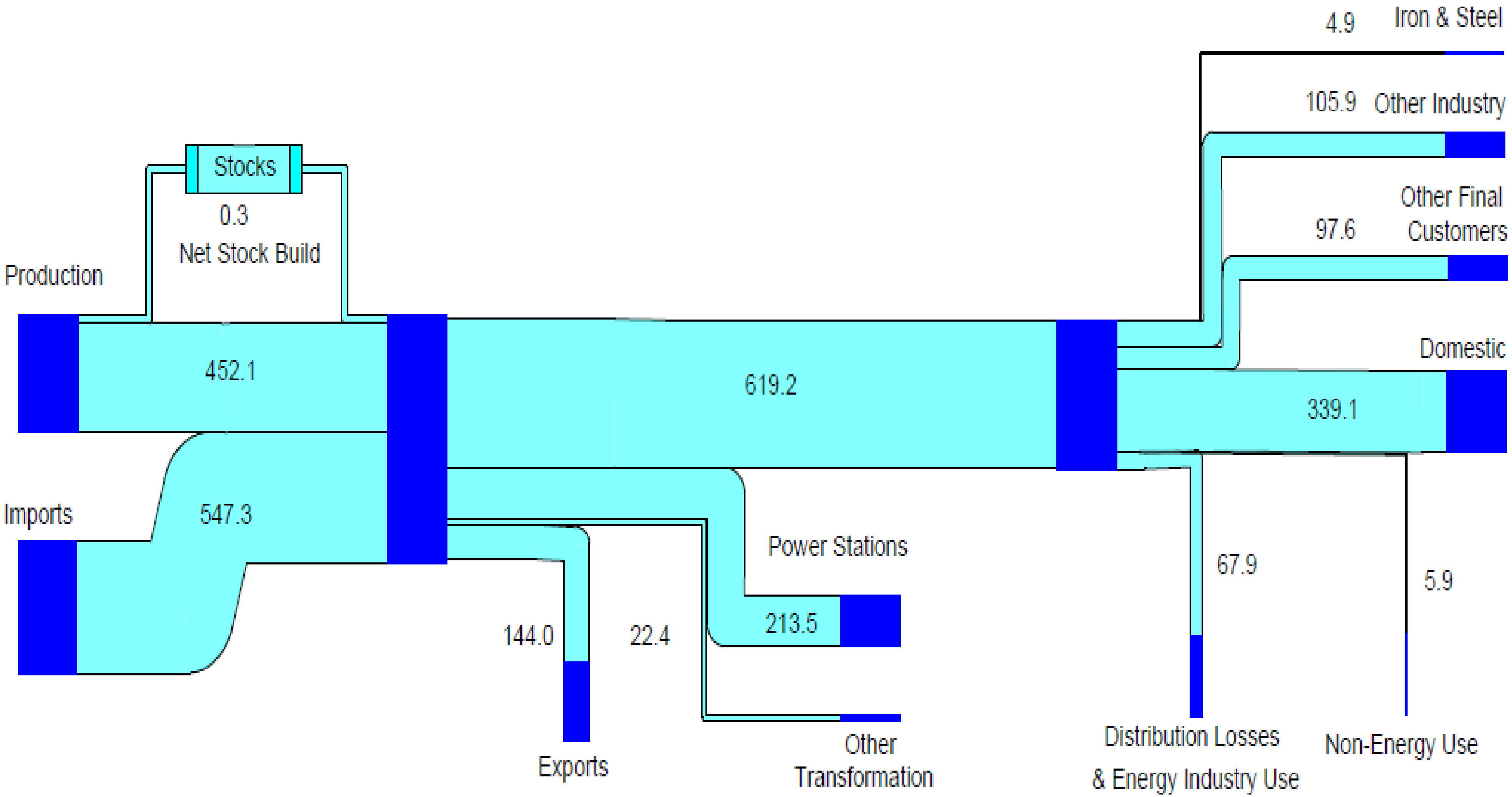
A Supply Chain Approach to Gas Security

	Geopolitics	Dimensions	Issues
UPSTREAM	**Security of Supply**	• Resource Base • Investment • Technology	• Nature of proven reserves • Access to reserves for investors • Access to investment to develop proven reserves • Availability with existing technology and prevailing price • Technical reliability of production
MIDSTREAM	**Security of Transport (Transit)**	• Processing • Transportation • Storage	• Processing of associated gases • Pipeline network • Compressor stations • Liquefaction facilities • LNG Shipping • Regasification facilities • Interconnectors
DOWNSTREAM	**Security of Demand**	• Power • Industrial use • Domestic use • Transport	• Role of gas in the energy mix • Price formation • Price competitiveness • Contract structure • Energy policy • Carbon tax • Carbon Capture & Storage

The Case of the UK

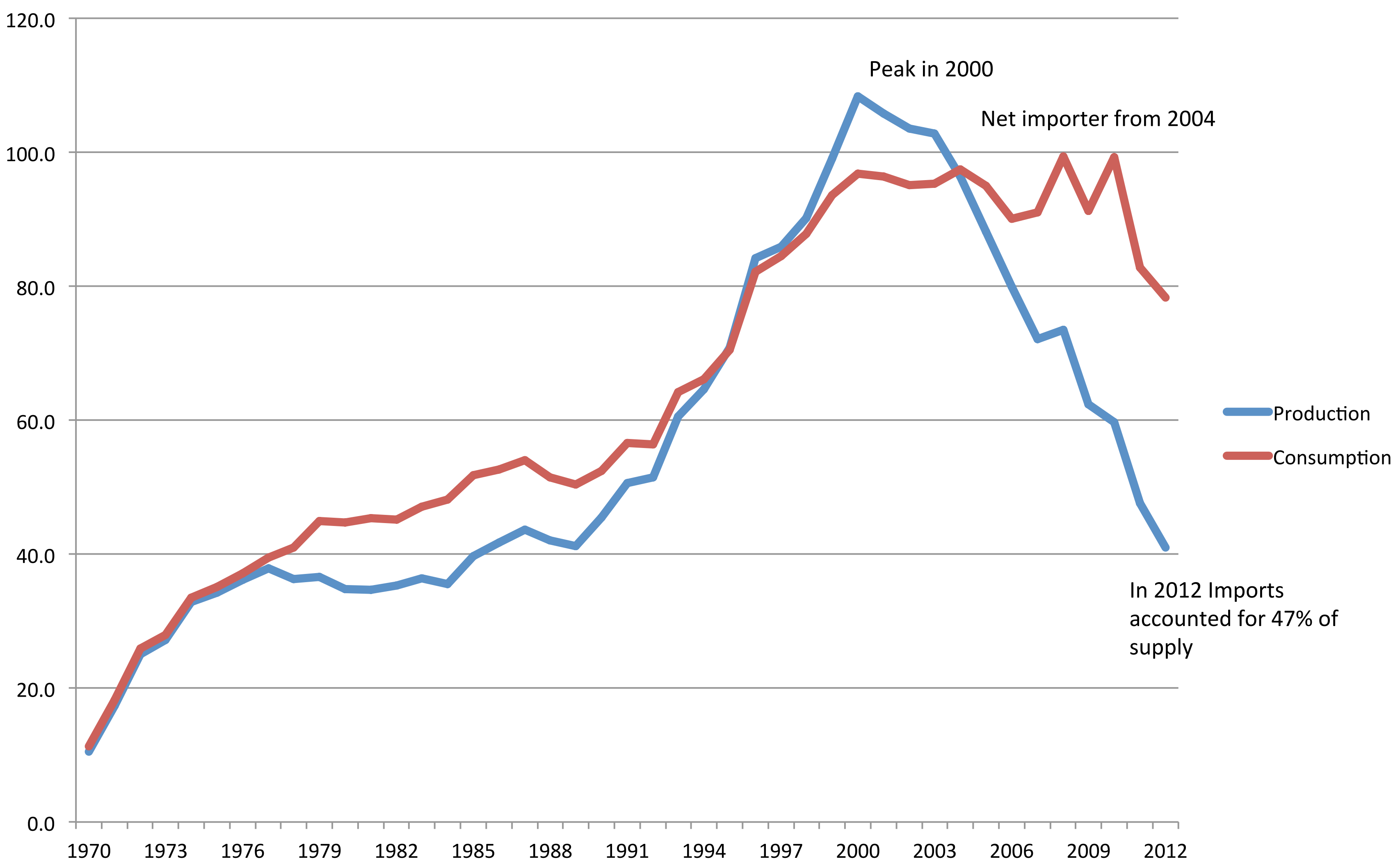
- Growing Import dependence
- The Globalization of UK gas security
- Growing uncertainty
- A Supply Chain Approach to UK Gas Security

Natural Gas Flowchart 2012 (TWh)



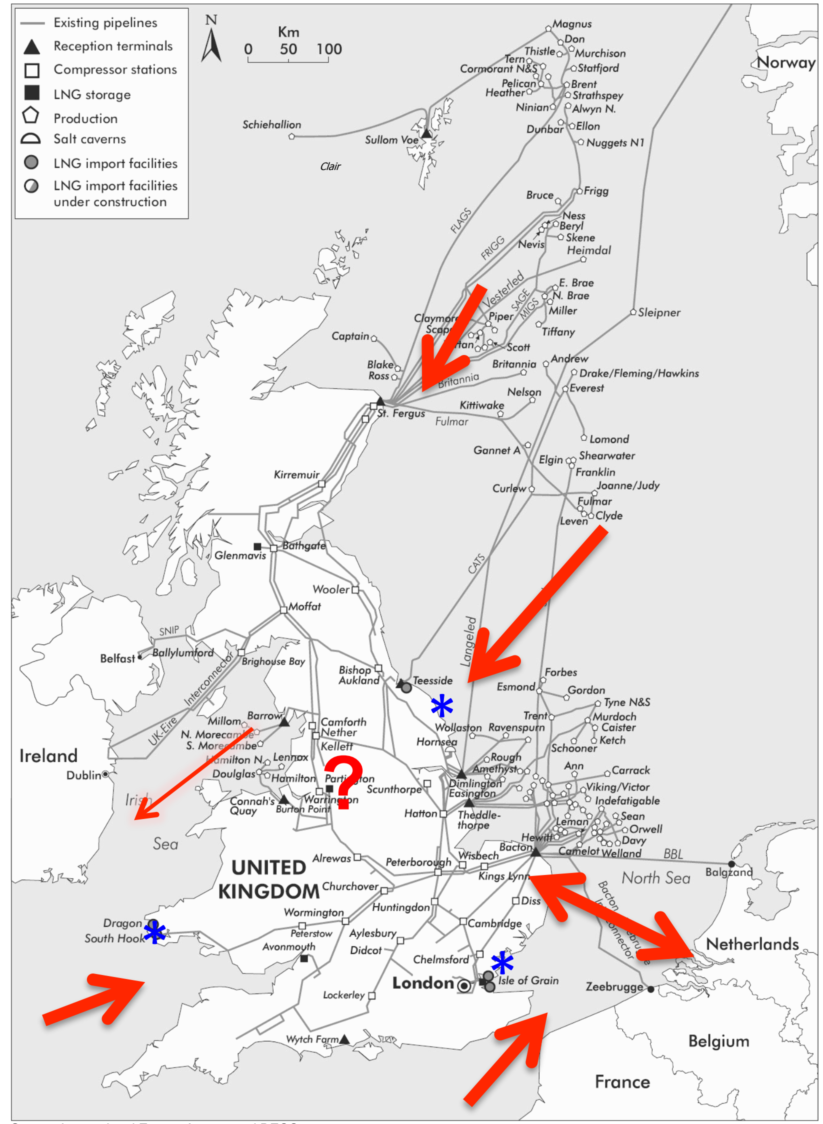
Source: DECC (2013) DUKES

UK Natural Gas Production and Consumption: 1970-2012 (BCM)



Source: BP 2013

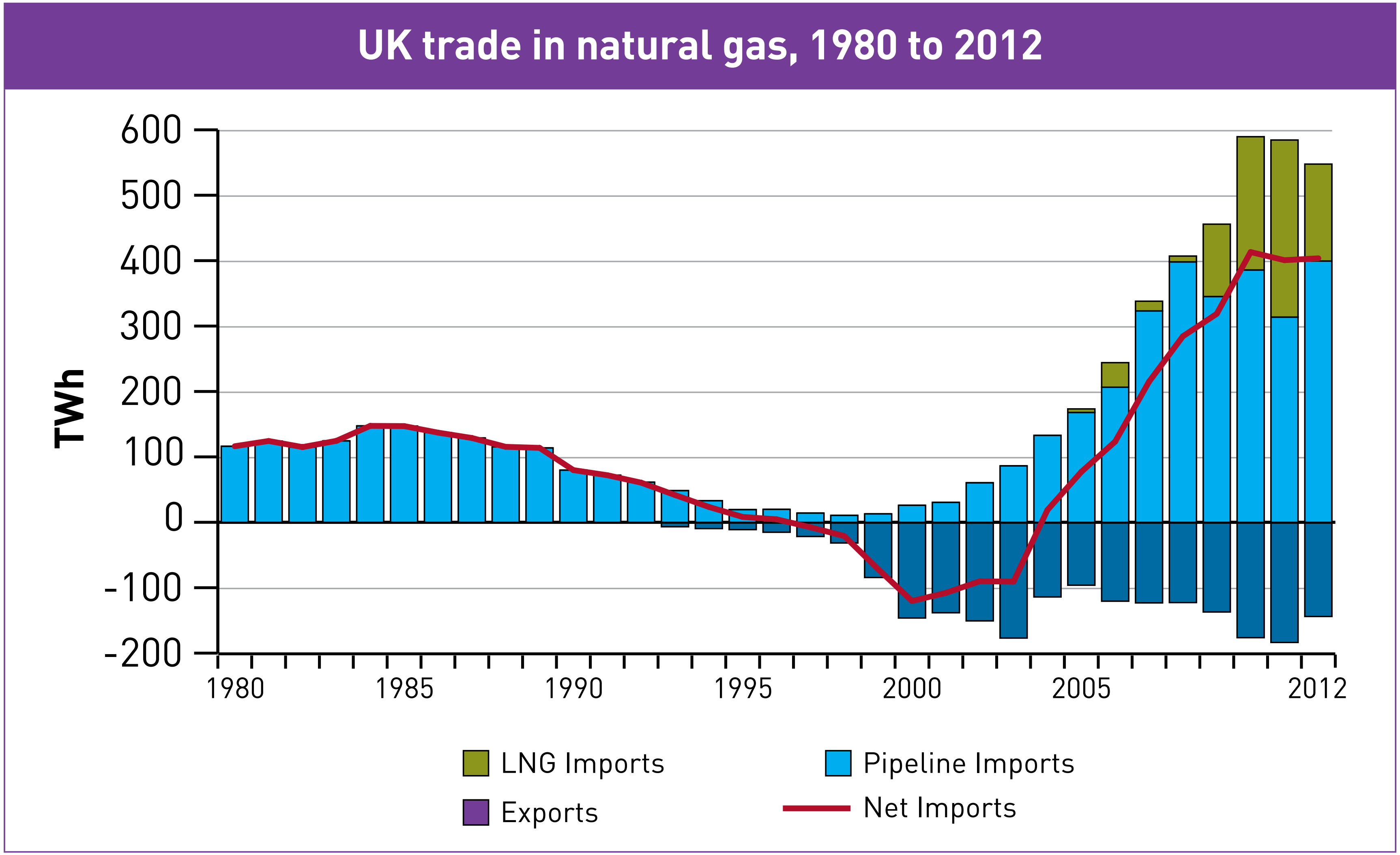
THE UK'S CONTEMPORARY GAS BALANCE



Source: International Energy Agency and DECC

VECTORS

1. UK Continental Shelf
2. Norwegian Continental Shelf
3. Interconnectors (IUK & BBL)
4. Liquefied Natural Gas
5. Exports to Ireland
6. Domestic gas storage
7. Domestic unconventional gas?

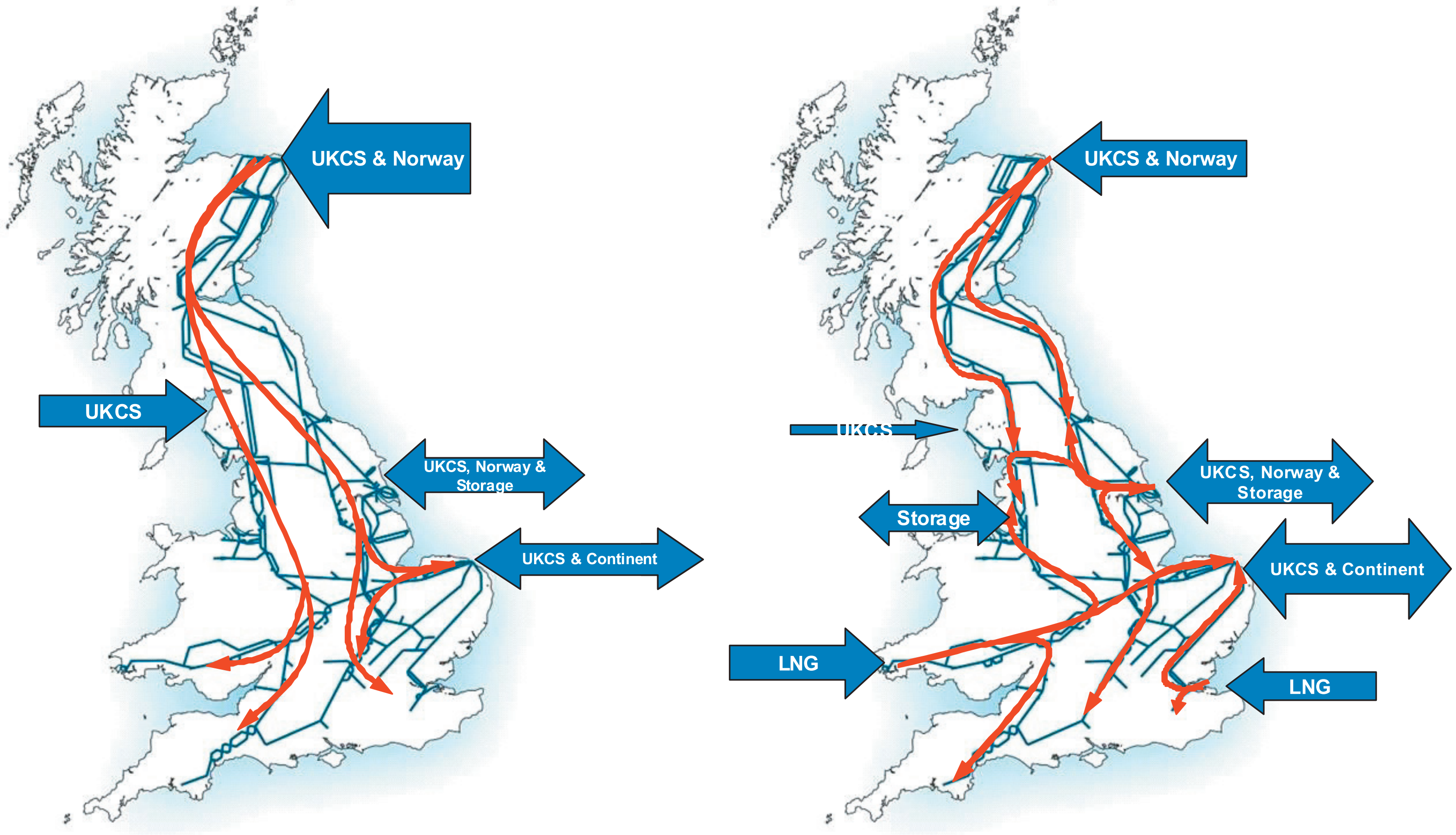


Source: DECC (2013)

Re-orientation of domestic gas flows

Mid 90's to mid 00's

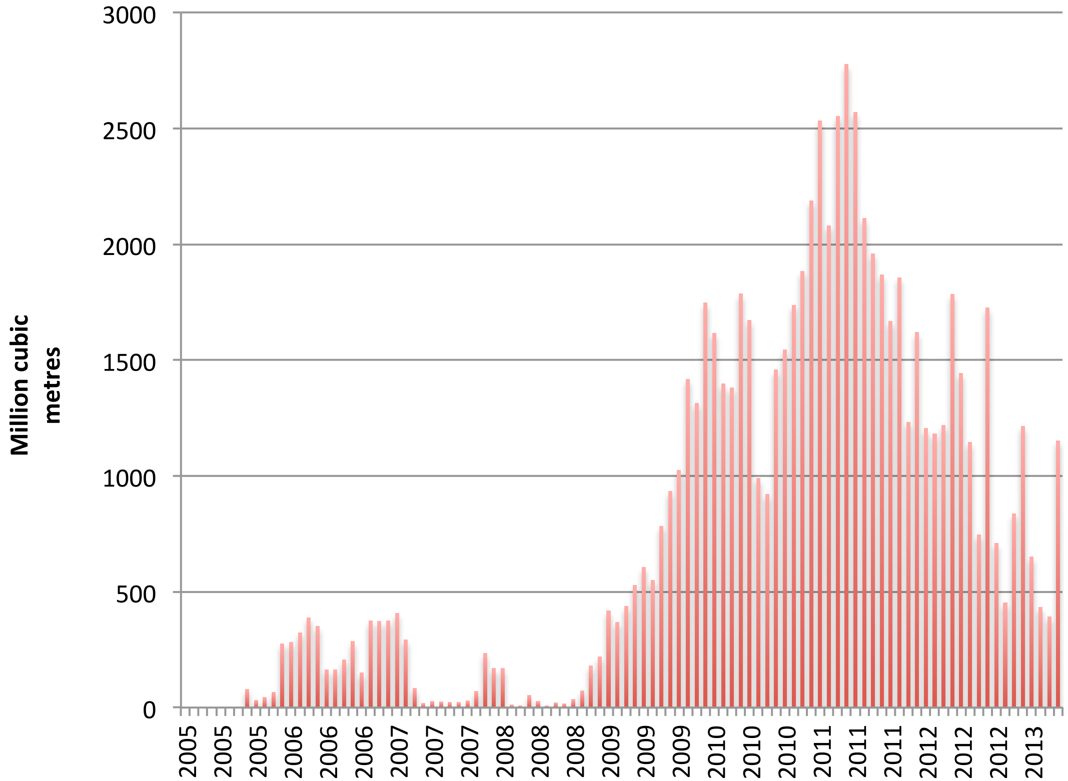
Mid 00's to 2013

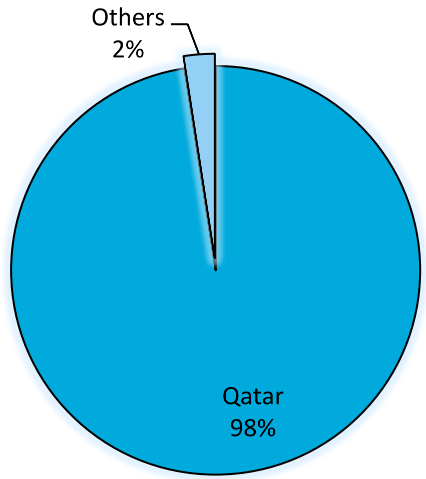


Note numerous proposed storage projects are not shown

Source: National Grid 2013

UK LNG Imports



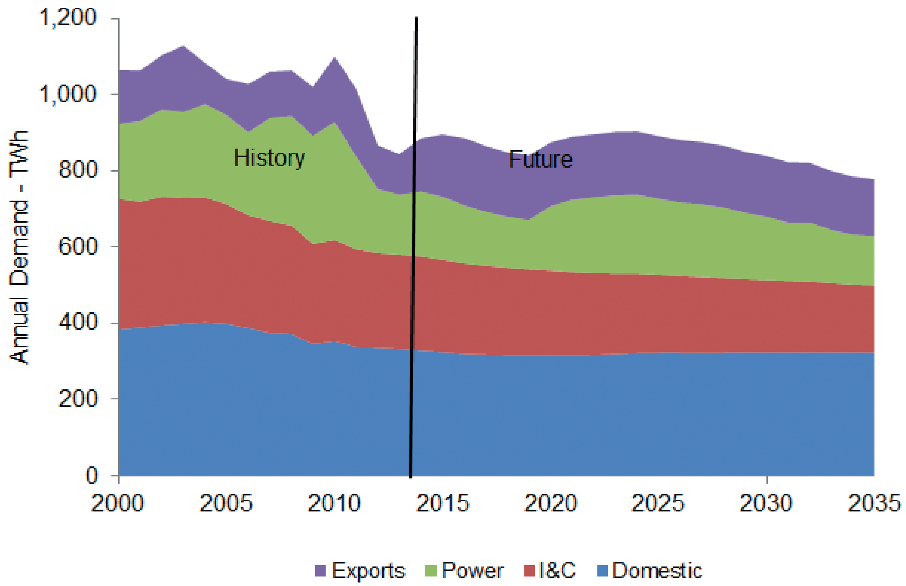


Others
Algeria,
Egypt,
Nigeria,
Norway,

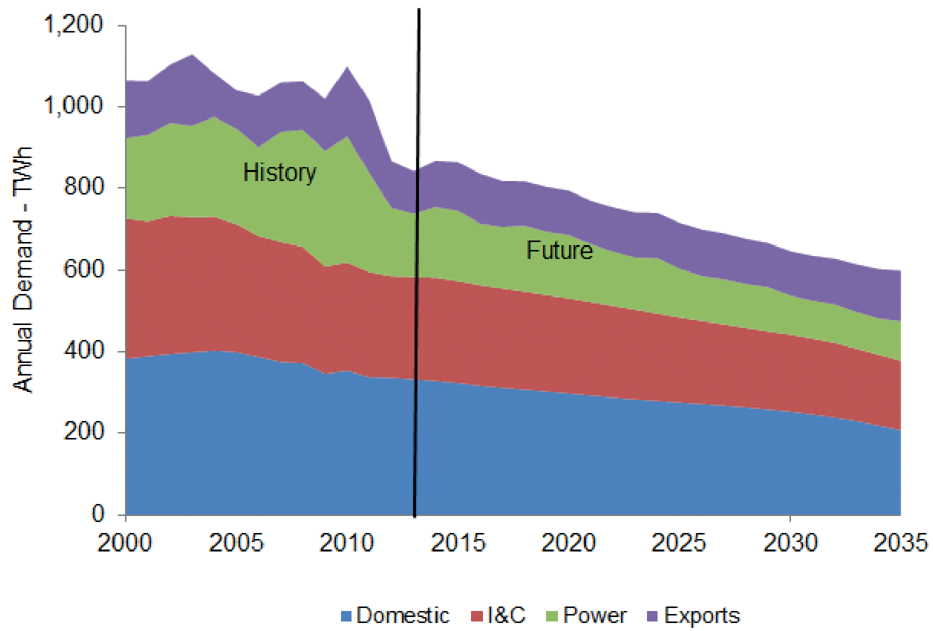
LNG = 46.8% Of UK Gas Imports in 2011 and 27.6% UK Gas Imports in 2012

LNG Facility	Ownership	Capacity	2012 %
Dragon LNG (Milford Haven)	BG Group: 50% Petronas: 50%	6bcm	1.2%
South Hook (Milford Haven)	Qatar Petroleum Intl.: 67.5% ExxonMobil: 24.15% Total: 8.35%	21bcm	73.4%
Isle of Grain (Essex)	National Grid (Sonatrach, GDF-Suez, Centrica, E.ON Ruhrgas, and Iberdrola)	20.3bcm	25.4%

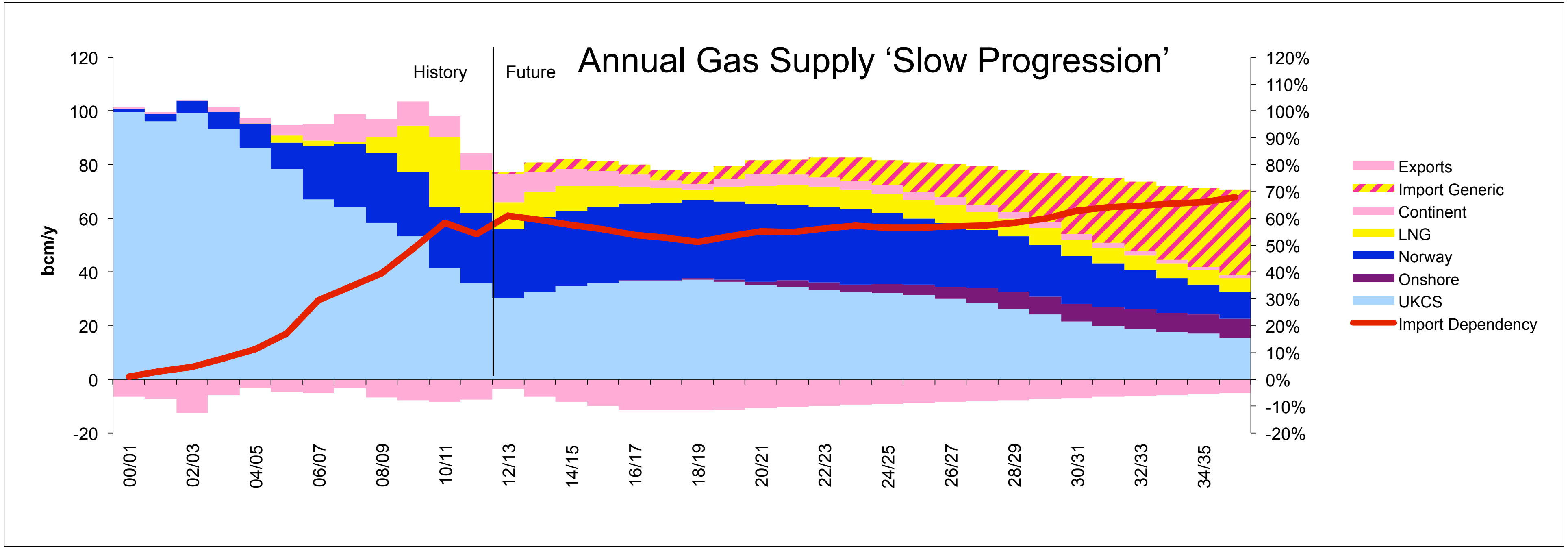
National Grid's Annual Gas Demand Scenarios 2013

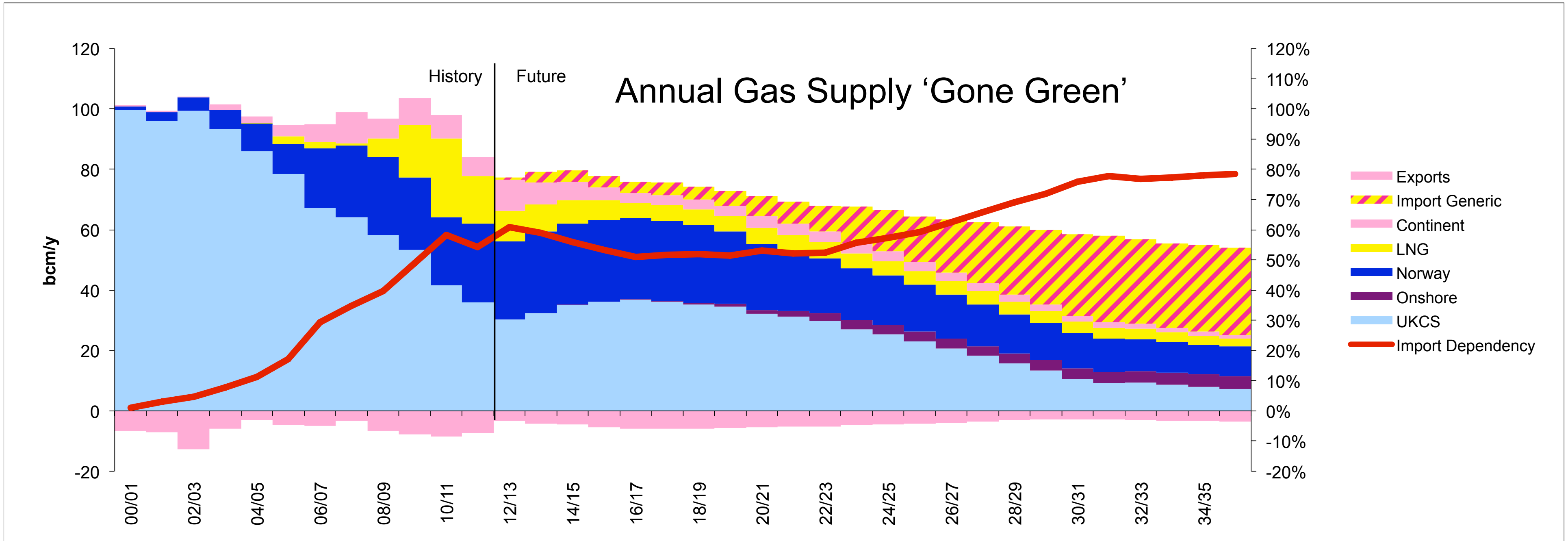


Our Slow Progression scenario has a fairly flat view of annual demand over the scenario period. There is a further decrease in demand from 2012 due to a slower economy. Total demand then remains broadly flat, until the mid 2020s when total demand starts to decrease predominantly due to the changes in power generation demand.



In the Gone Green scenario, there is a continual reduction in annual gas demand throughout the scenario period. This is due to a combined influence of further efficiency savings, a transition to alternative sources of energy in our Gone Green scenario, and power generation being maintained as marginal plant for electricity balancing and reserve.



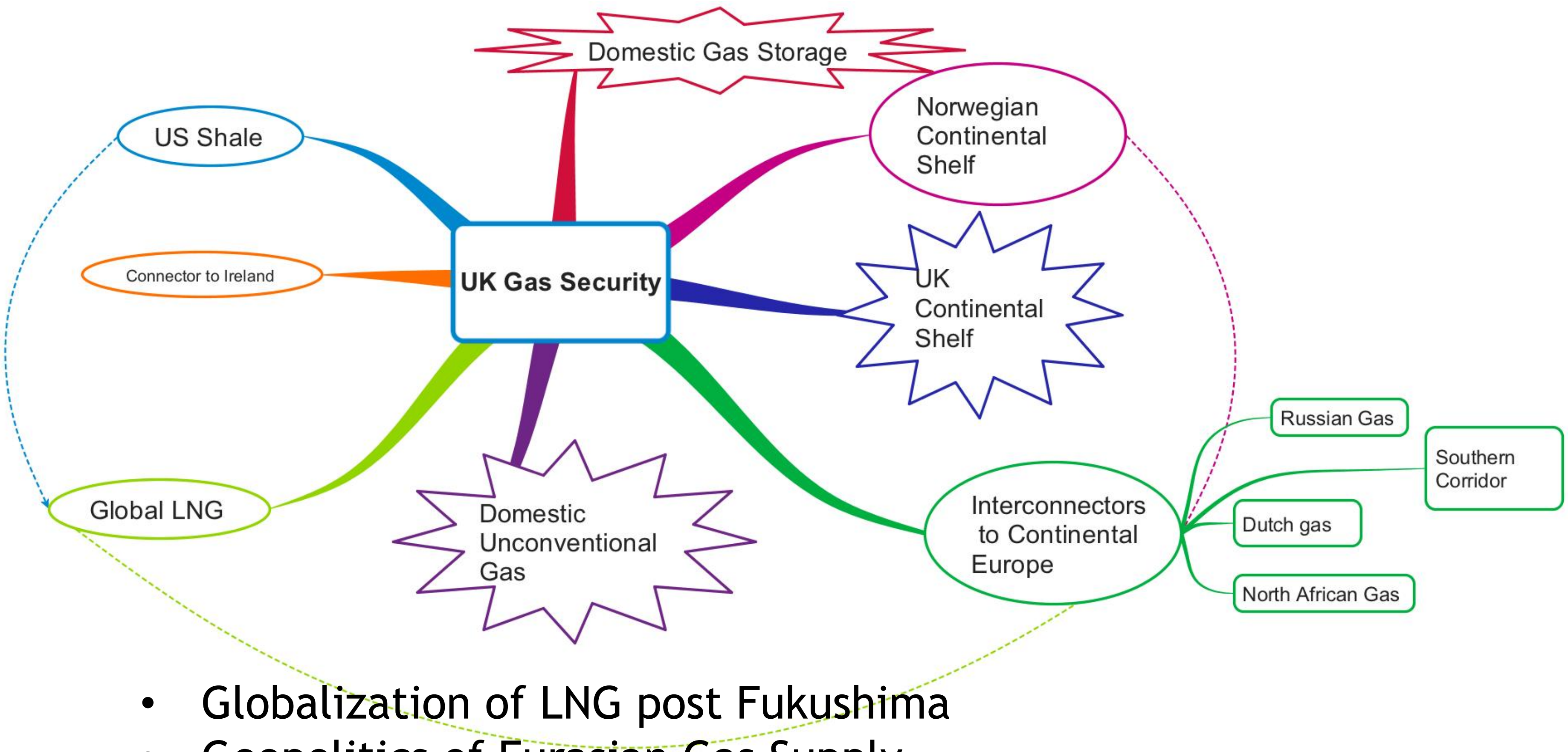


Source: National Grid 2013

A Supply Chain Approach to UK Gas Security

	Geopolitics	Dimensions	Issues
UPSTREAM	Security of Supply	• Resource Base • Technology • Investment	• Production from UKCS • Production from Norwegian CS • Production from Russia/N. Africa • Upstream of LNG supply chain & access to LNG cargoes • Domestic unconventional gas production (biogas & shale)
MIDSTREAM	Security of Transport (Transit)	• Processing • Transportation • Storage	• LNG Regasification facilities • Interconnection (domestic and external) • Processing & storage • Re-orientation of the NTS • Role of NBP as a liquid market/hub
DOWNSTREAM	Security of Demand	• Power generation • Industrial use • Domestic use	• Role of gas in UK energy strategy • Price Competitiveness • Contract Structures • Gas-to-Gas market/hub evolution • Gas intermittency • Carbon floor price and ETS • Carbon Capture & Storage

Globalizing UK Gas Security of Supply



- Globalization of LNG post Fukushima
- Geopolitics of Eurasian Gas Supply
- The Future of Norwegian Gas Production
- The Consequences of the US Shale Gas Revolution
- Prospects for Shale Gas in the UK and Europe

Conclusions

- There is a tendency to focus on the issue of *physical security of supply*—the UK has a diverse gas supply system—but it is increasingly exposed to risks in global gas markets and *price security of supply* is the more likely concern.
- Most supply disruptions have been technical failures in the upstream and midstream, but mitigation measures—interconnection and storage—can reduce these risks, but who pays?
- The greatest source of insecurity and uncertainty relates to 'security of demand' and this is impacting on investment in the power generation sector.
- How much gas, for how long requires an whole systems approach.

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