



Oil & Gas and Insurance

Onshore O&G Outlook – The Engineering Perspective

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Presented by...

- Lorman E. Correa is a Process Engineering Consultant and part of the PT&C|LWG expert alliance. He has 18+ years of experience and provides expert advice on complex Oil & Gas and Refining projects.
- He is also a Lead Process Engineer providing consulting services to world class engineering contractors and oil majors, developing projects in Latin America, Europe and the Middle East.
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Experience with...





AGENDA

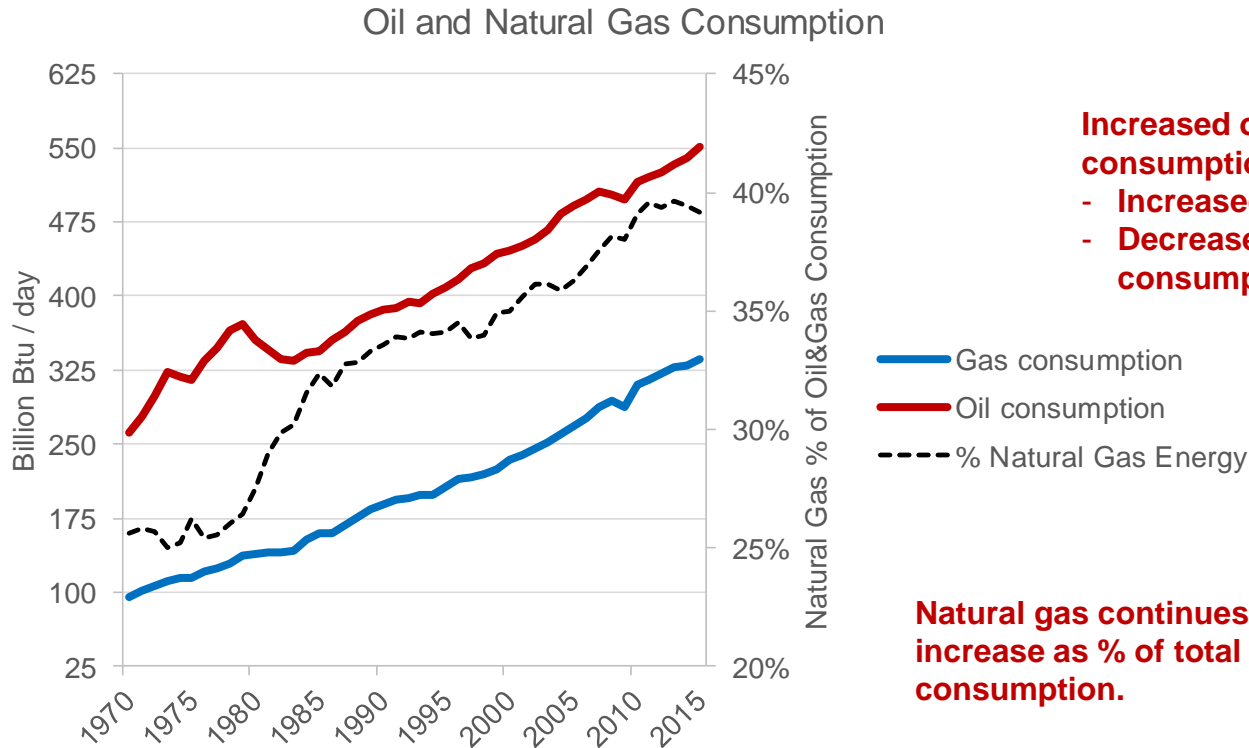
1. Energy Indicators - Oil & Gas:
 - Supply and Demand
 - Refining
2. Shale Oil & Gas Fracking.
3. Engineering Challenges:
 - Technology
 - Legislation



ENERGY INDICATORS OIL AND GAS

Supply and Demand (1)

Oil & Gas



Increased oil and natural gas consumption:

- Increased energy demand.
- Decrease / stagnant coal consumption.

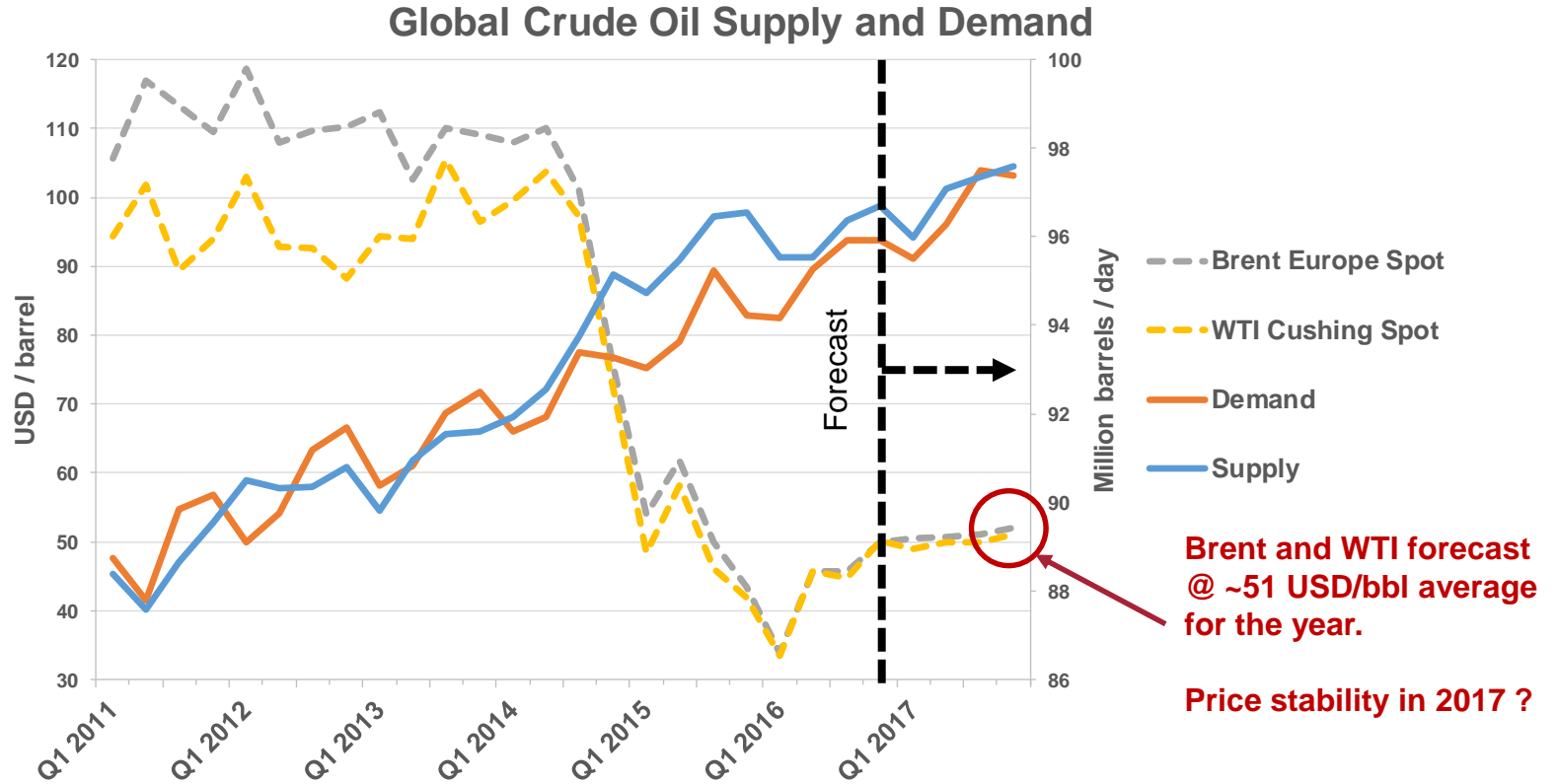
— Gas consumption
— Oil consumption
- - - % Natural Gas Energy

Natural gas continues to increase as % of total HC consumption.

Based on information presented in the 2016 BP Statistical Review of World Energy.

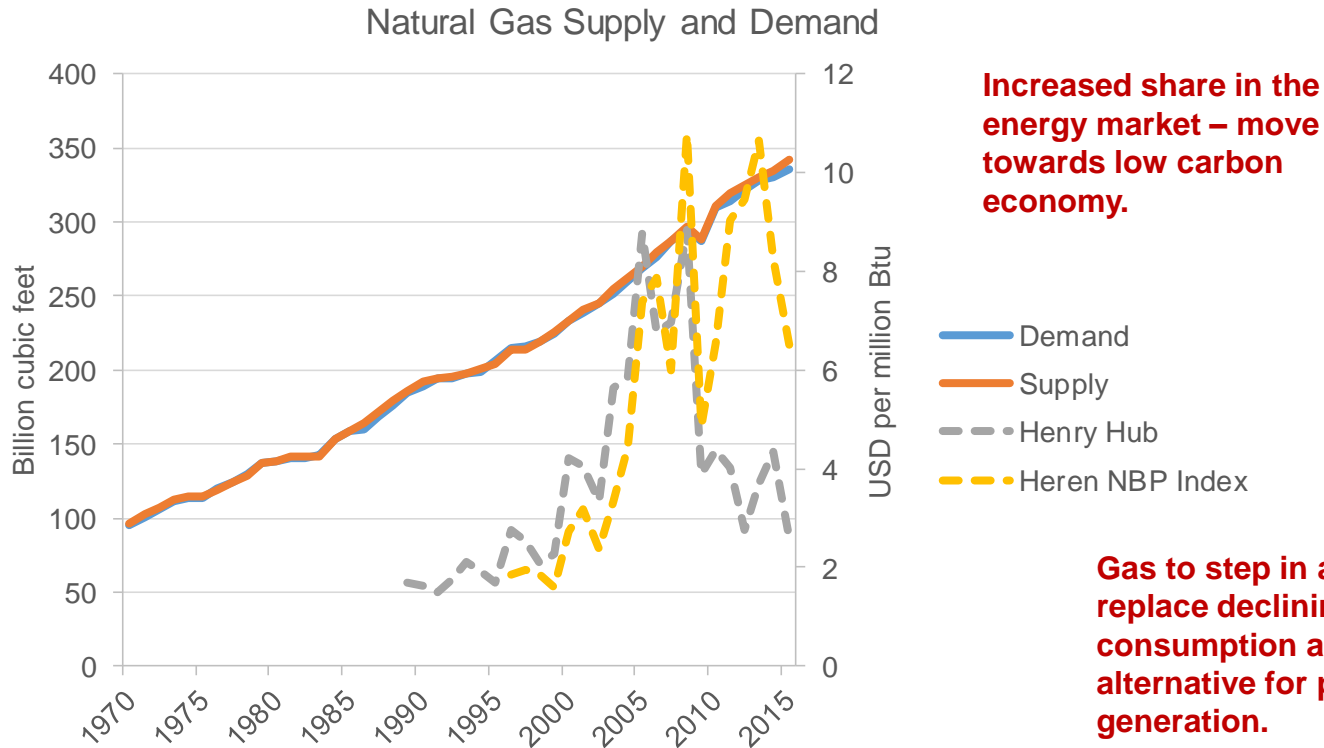
Supply and Demand (2)

Oil



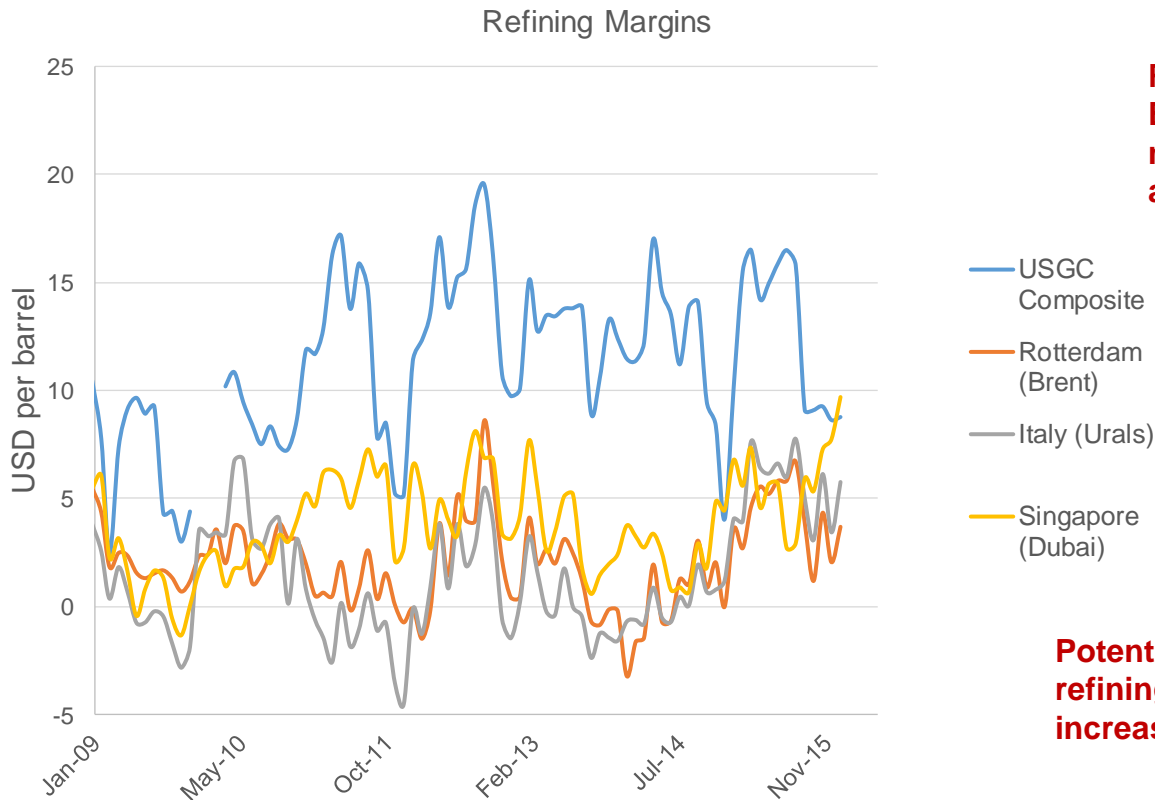
Data obtained from the U.S. Energy Information Administration.

Supply and Demand (3) Gas



Based on information presented in the 2016
BP Statistical Review of World Energy.

Refining (1) Margins



Refinery margins in Europe recovered from negative trends in 2013 and 2014.

Potential for new refining projects to increase efficiency.

Data from Oil & Gas Journal Energy Database
Source: The Pace Consultants Inc.

Refining (2)

Planned / Ongoing Projects in Europe

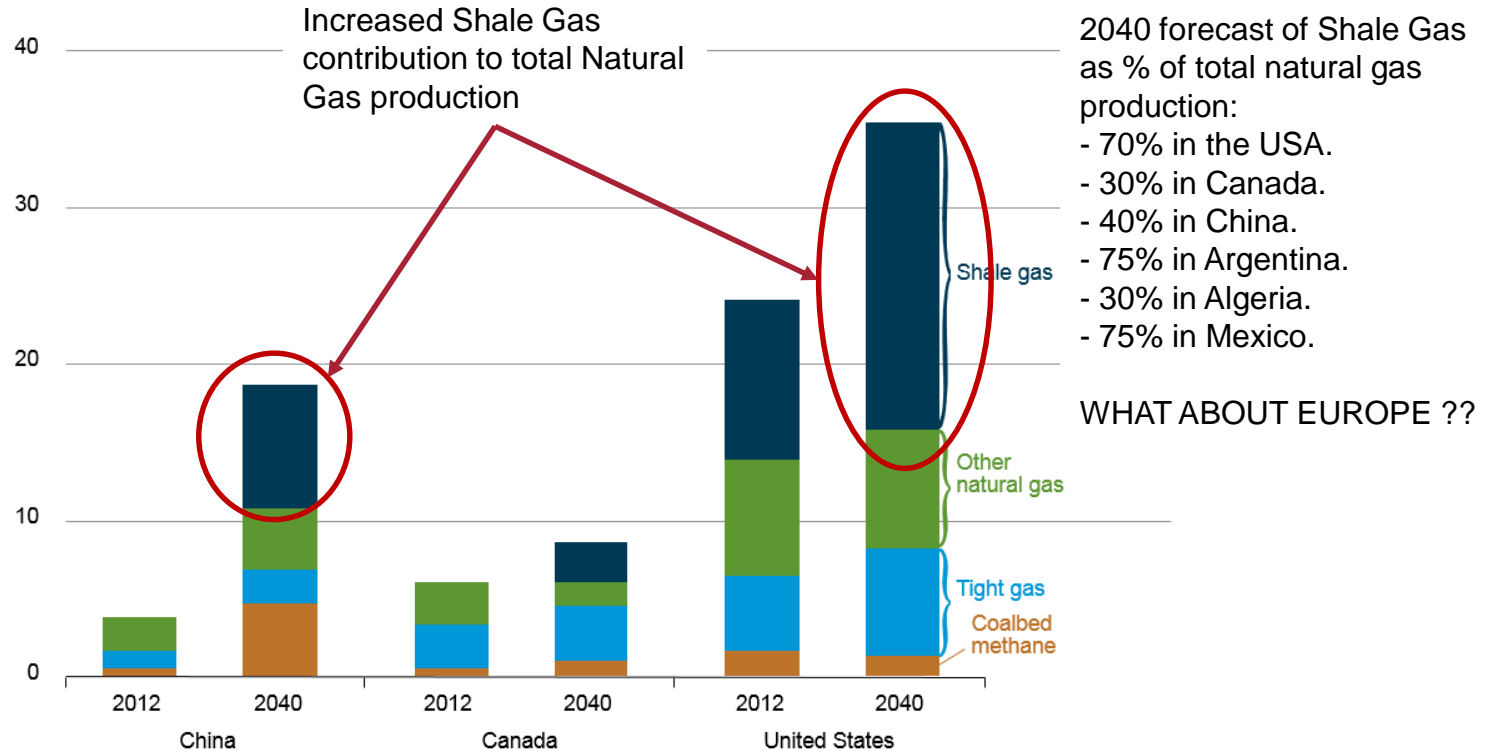
Refinery	Country	Company	CAPEX (MMUSD)	Scope
Donges	France	Total	450	Low sulphur fuels
La Mède	France	Total	250	Overhaul and biorefining
Lindsey	UK	Total	-	Capacity reduction
Rotterdam	Netherlands	ExxonMobil	-	Hydrocracker expansion
Naantali	Finland	Neste Corp.	70	Utilities enhancement and integration with the Porvoo refinery
Gibraltar-San Roque	Spain	CEPSA	-	Improved gas turbine technology to improve efficiency
Cressier	Switzerland	Varo Energy	55	Adaptation to 5% ethanol gasoline
Antwerp	Belgium	ExxonMobil	1,000	New delayed coker



SHALE OIL & GAS FRACKING

Shale Oil & Gas Fracking (1)

World trends



Data obtained from the U.S. Energy Information Administration.

Shale Oil & Gas Fracking (2)

At a glance

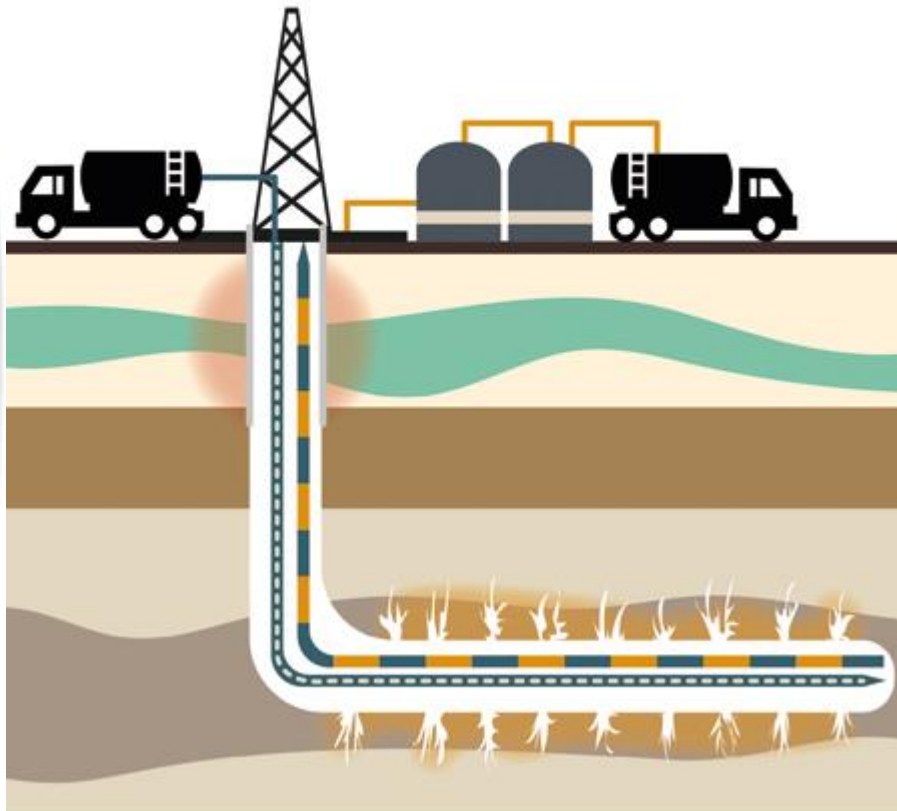


Image obtained from <http://www.businesspeople.it>

- Knowledge about the existence of shales is old. Made viable with recent development of high precision horizontal drilling.
- Hydraulic fracturing “Fracking” selected technology to exploit shale reserves.
- Shale exploration and production in the U.S. started around 1949. 100,000+ wells drilled to date.
- Shale depths of up to 8,000 ft.
- Minimum shale thickness of 35 to 90 metres to the productive.
- Recovery factor around 20% of OGIP (Original Gas In Place).

Shale Oil & Gas Fracking (3)

Potential environmental risks

Contamination of aquifers through incorrect cementation of the well.

Gas seeping through the fractures reaching aquifers ??

~50% of water containing chemicals and other contaminants which is used in the fracturing process is recovered at the surface (flowback). Potential for contamination of surface water if run off occurs.

Water returned to the surface may contain naturally occurring radioactive elements such as radium and radon.

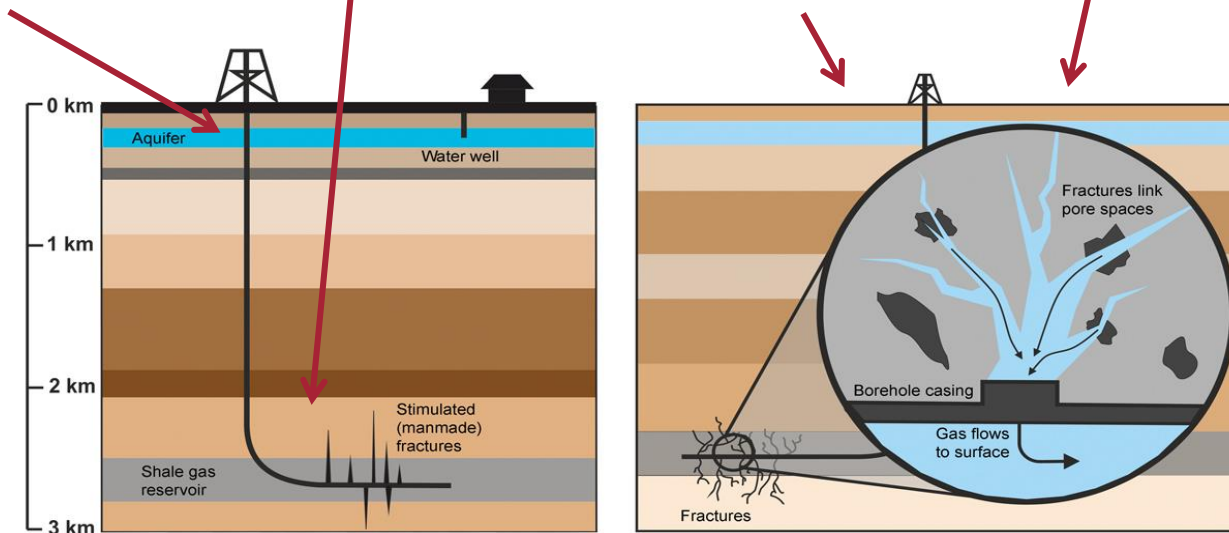


Image obtained from <http://www.rsc.org>

Shale Oil & Gas Fracking (4)

The UK Shales

Midland Valley of Scotland

Shale gas: 80.3 tcf (P50)

Shale oil: 6.0 billion barrels (P50)

Bowland Shale

Shale gas: 1,329 tcf (P50)

Shale oil: not significant.

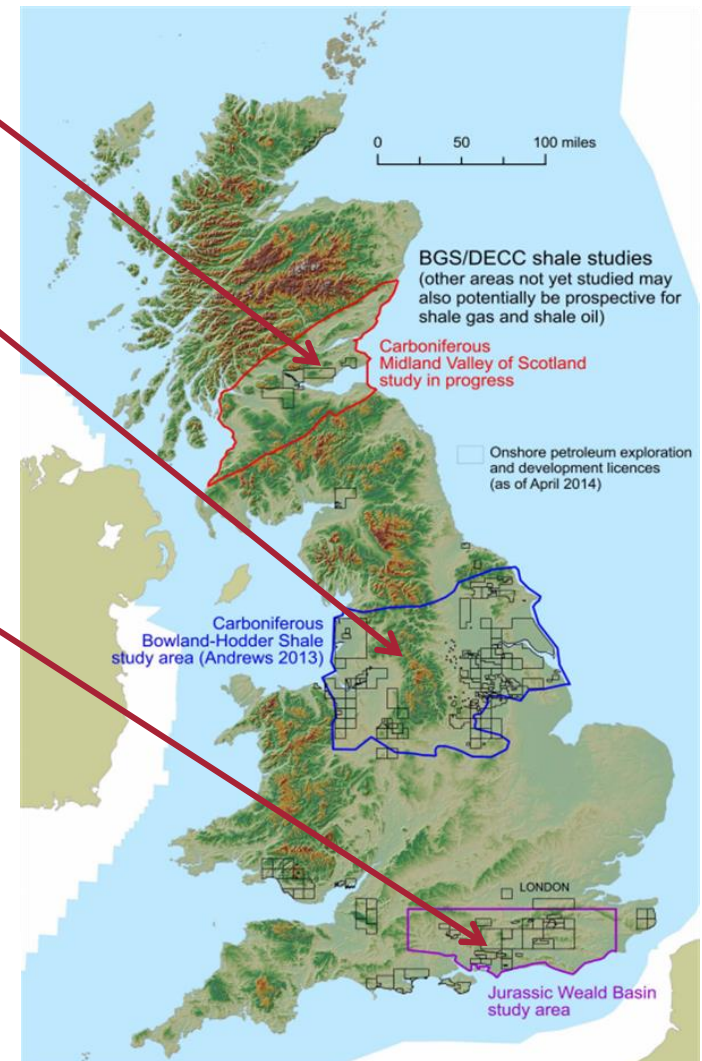
Jurassic Shale of the Weald Basin

Shale gas: not significant.

Shale oil: 1.1 billion barrels (P50)

The Bowland Shale could meet the UK natural gas demand for the next 50 years. (Based on 2.2% yearly consumption increase, and 20% OGIP @ P50)

Data on reserves obtained from <http://www.bgs.ac.uk>
Image BGS/DECC, The Jurassic shales of the Weald Basin.





ENGINEERING CHALLENGES

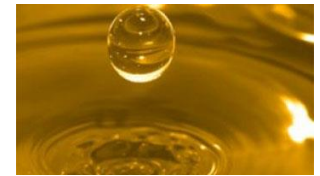
Engineering Challenges(1)

Technology

Shale gas vs coal - CO₂ emissions over project lifecycle



Impact of Russia moving to ULSD



Move towards low carbon economy



Impact of low prices on asset integrity.



Unstable energy market and talent development



Engineering Challenges(2)

Legislation

- UK - Regulation of unconventional onshore oil and gas.
- EU regulations - move to low carbon economy and view on shale oil and gas exploration and production.
- View on recent trends/consultations in the UK (London in particular) regarding restrictions / tariffs on the use of diesel vehicles.



THANK YOU

QUESTIONS?

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