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Asia-Pacific | Europe | North America

Trends in Global Oil and Gas Prices:

Impacts on the Outlook for GTL

May 2014

GTL: Background



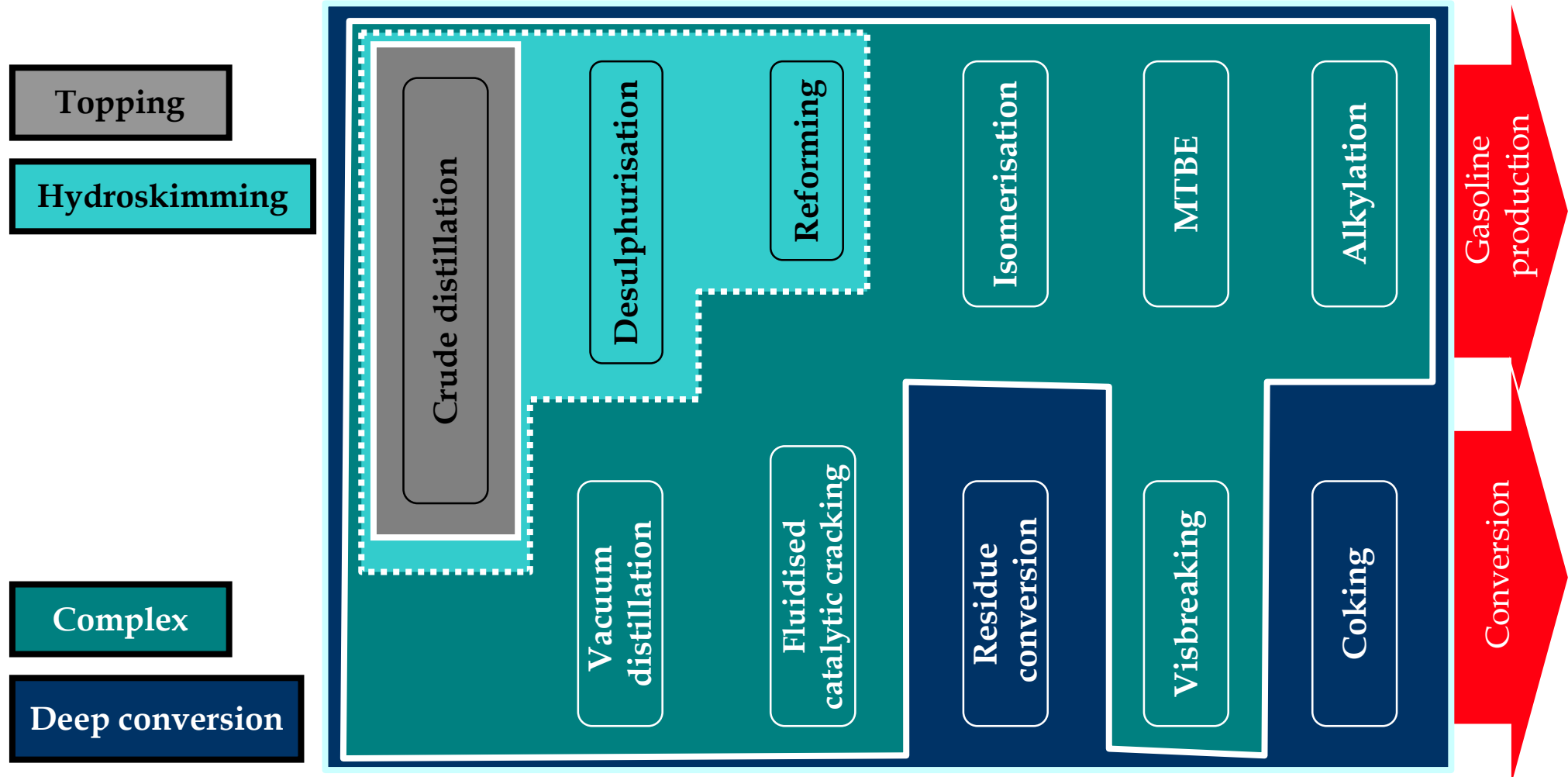
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-
- Gas-to-Liquids sounds great, but
 - It is expensive;
 - Is in effect an arbitrage play between two different feedstock markets;
 - Has been applied occasionally in certain circumstances; but
 - Unconventionals will make GTL harder to justify

Refining: Conversion involves reducing the size of molecules



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GTL: Requires increasing the size of molecules



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- You can't escape the chemistry:



The Majors and Refining: For Most, a Tale of Painful Exit

- The major oil companies have a track record of selling refineries whenever margins are low, usually to:
 - National oil companies
 - Niche refiners; or more recently
 - Trading companies
- These poorly timed sales have transferred significant capital value to the buyers
- Therefore don't expect major oil companies to jump into GTL

Unconventional Gas: What is the Outlook?

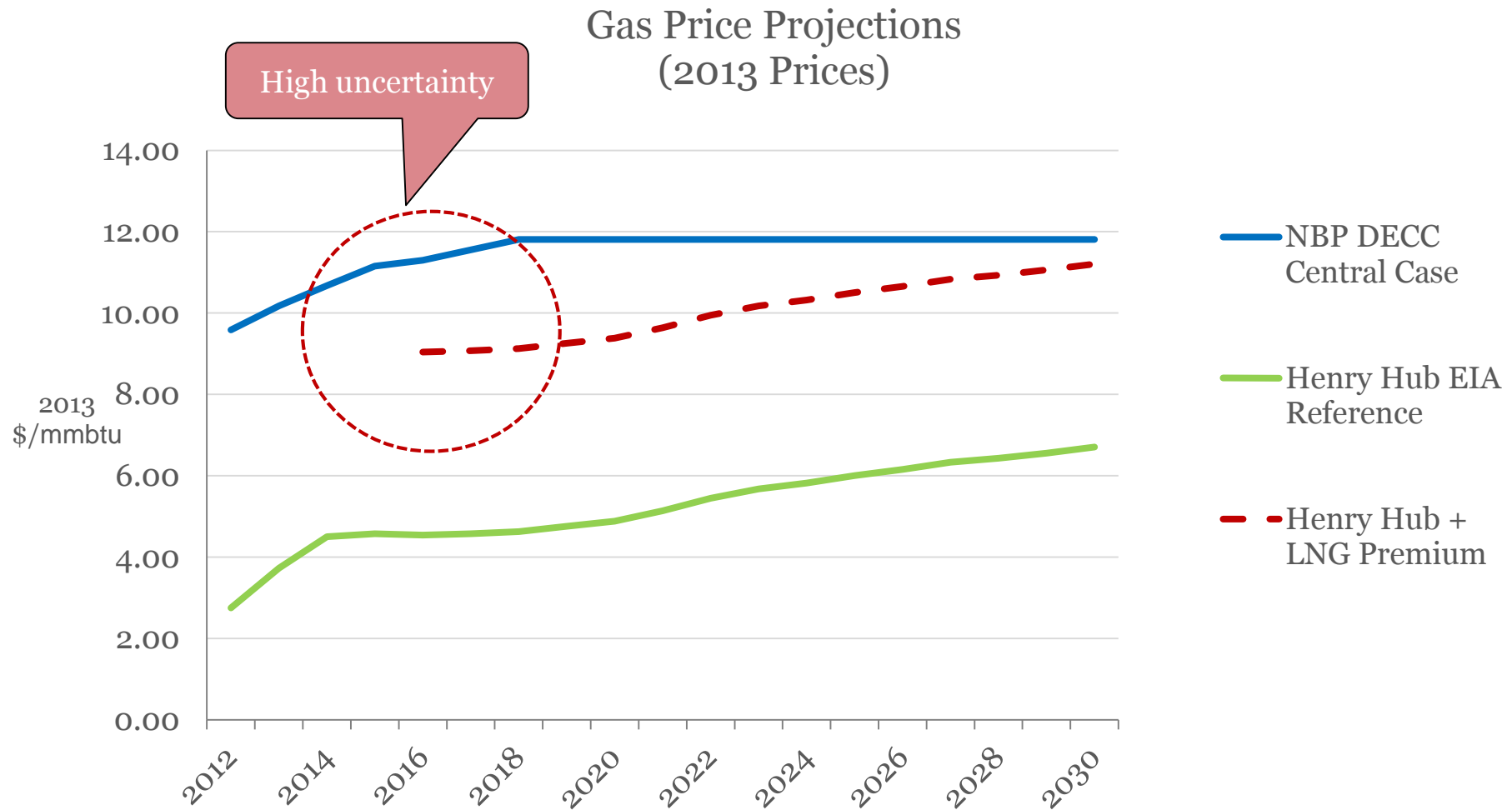
- We recently prepared a review of the global outlook for unconventional hydrocarbons and the likely impact on UK gas prices. Key results were:

Scenario	Key events	Impact on UK gas prices (real)
Base	<ul style="list-style-type: none">• No significant unconventional production in Europe• LNG exports from North America• China becomes a major unconventional producer• Surplus LNG is available	Prices decline until 2020, then increase linked to the cost of LNG imports from NA
Optimistic	<ul style="list-style-type: none">• As above, except:• Significant shale gas in the UK and Central	>1% real decrease in gas prices
Pessimistic	<ul style="list-style-type: none">• No significant unconventional production in Europe• No significant LNG exports from North America• China remains a major buyer of LNG	1% real increase in gas prices

US LNG exports: Will set the minimum price support level in Europe



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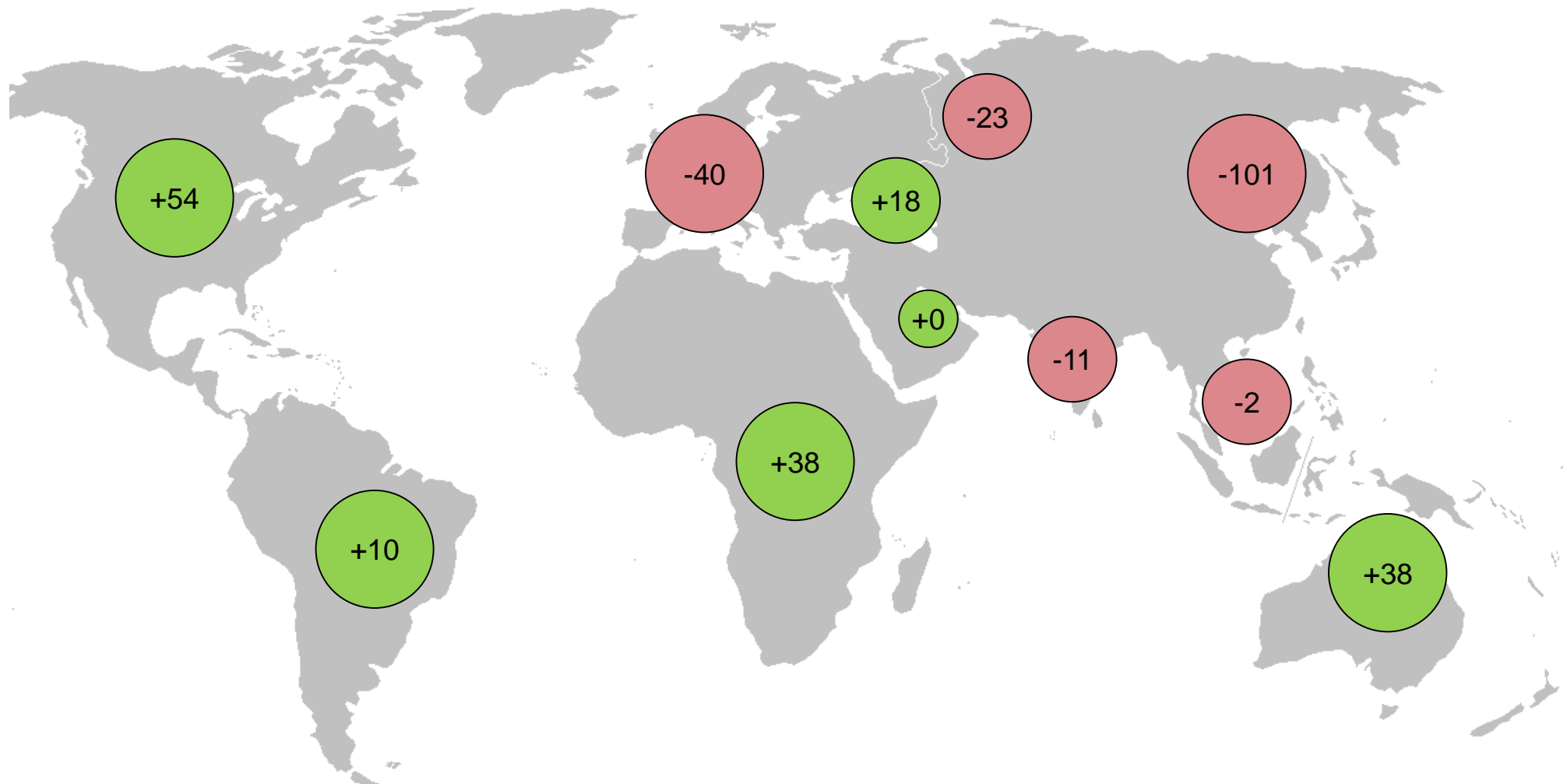


Gas: Understanding supply/demand trends



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Changes in gas balance by region, 2011-2020, bcm / year



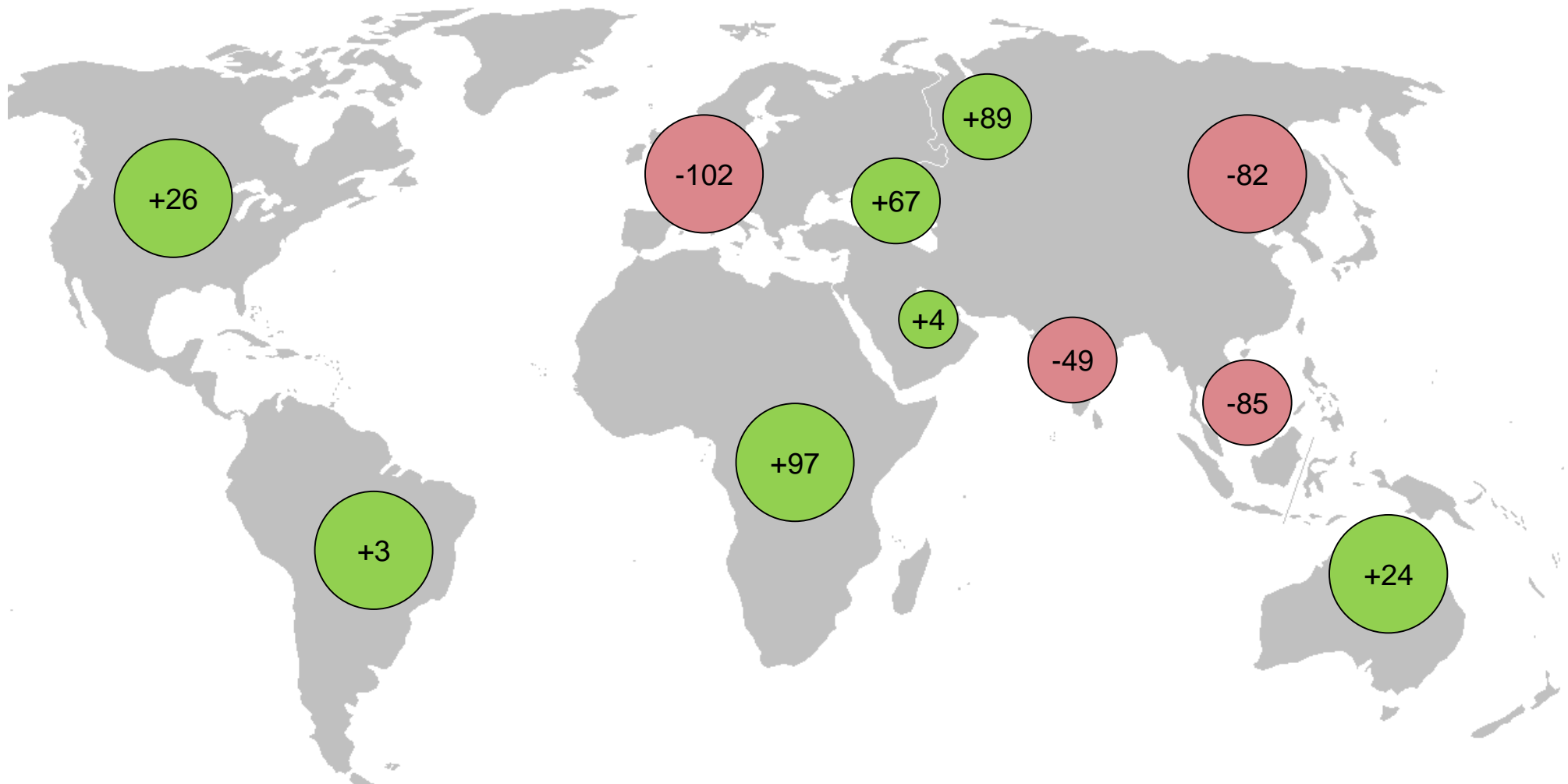
Source: IEA World Energy Outlook 2103

Gas: Understanding supply/demand trends



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Changes in gas balance by region, 2020-2035, bcm / year

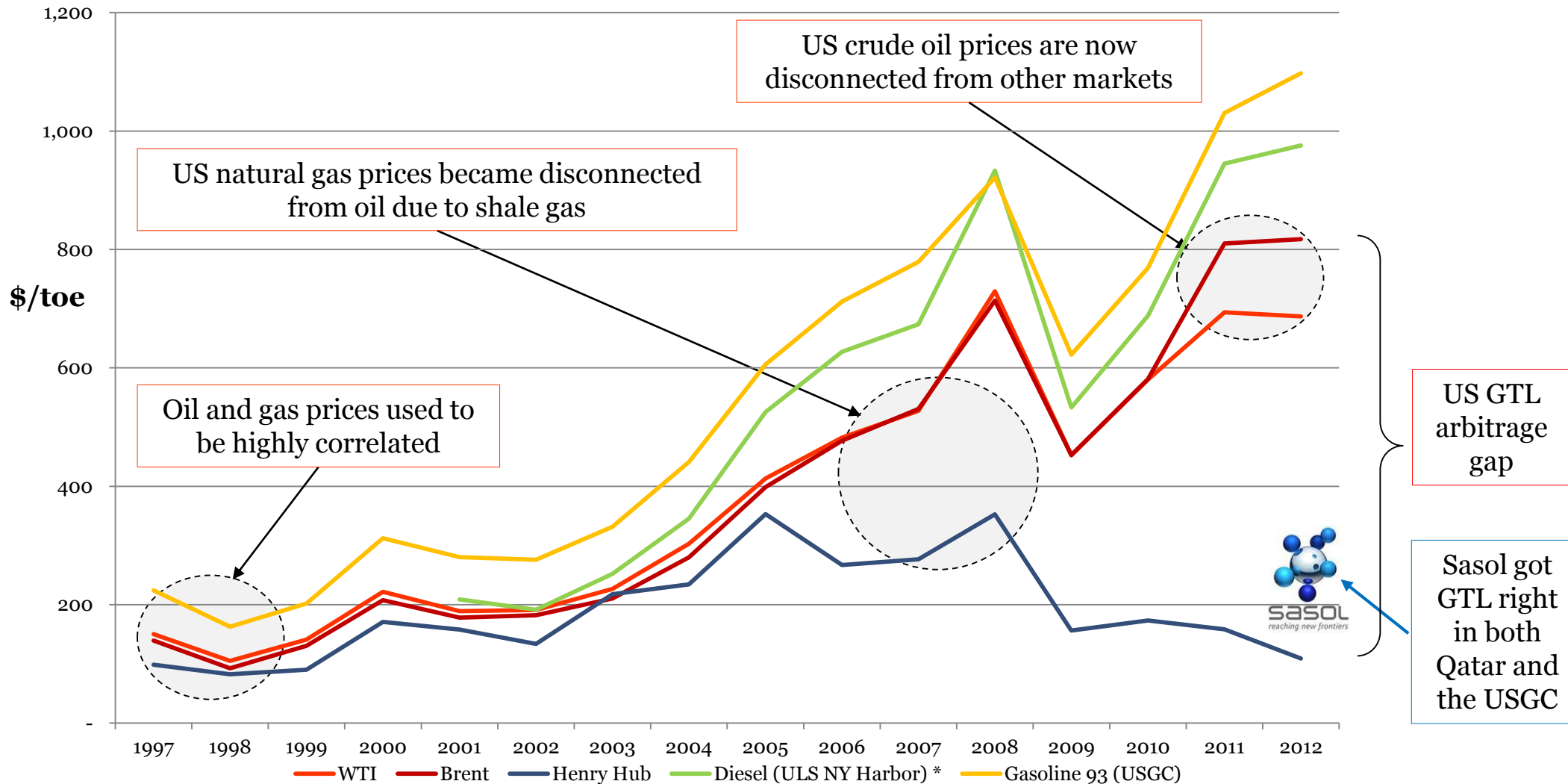


Source: IEA World Energy Outlook 2103

GTL: Uses F-T to Arbitrage Between Gas and Oil Markets



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Source: CEG analysis

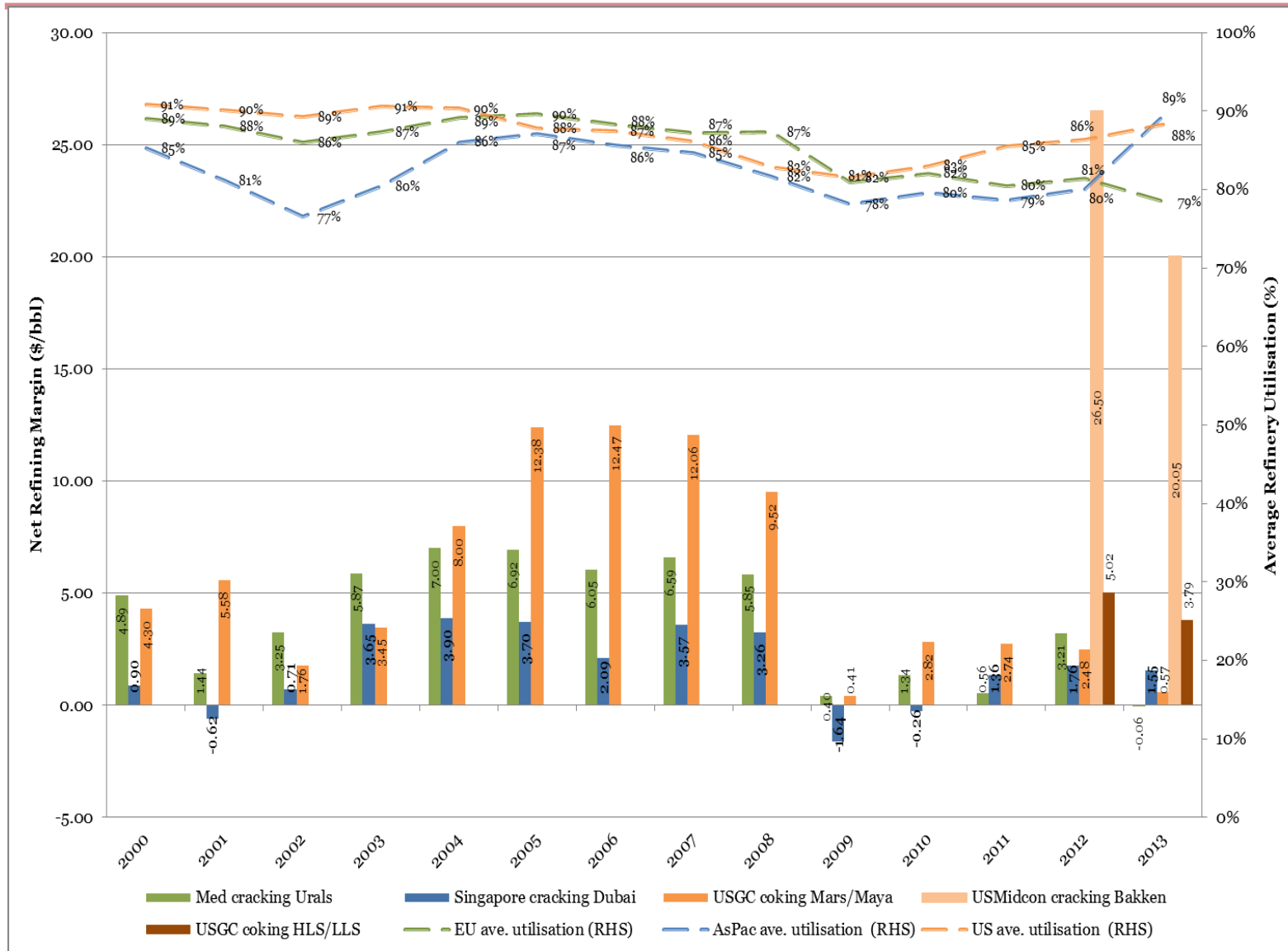
* 2001-2005 estimated

Large Scale GTL: Some Numbers



Location	Configuration	GTL capacity (bbls / day)	Bitumen capacity (bbls / day)	Ethylene production (mtpa)	Capex (\$ billion)	Cost (\$ / bbl capacity)
Shell Pearl Qatar	Large scale GTL	140,000	-	-	20	\$140,000
Sasol USGC	• Large scale GTL	96,000	-	-	11 – 14	\$114,000 - 145,000
	• Ethane cracking	-	-	1.5	5 - 7	n/a
Sasol Oryx Qatar	Large scale GTL	35,000	-	-	1.2 – 1.5	\$35,000 - \$44,000
Kitimat, British Columbia	Oil sands: proposed deep conversion refinery	-	395,000	-	13	\$33,000
Alberta	Oil sands: deep conversion, partial oxidation and ethylene production	-	300,000	1.0	10	\$33,000

Unconventionals: The Impact on US Refining Margins



- The ban on oil exports from the US has caused a surge in refining margins
- It is US-specific phenomena
- High shale oil production elsewhere would have much different effects
- It would shrink the gas / oil arbitrage gap, upon which large scale GTL depends

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