

The North American and Northeastern US Natural Gas Markets

A Wood Mackenzie Presentation

NECPUC 2012

May 22, 2012

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Near-term North American Gas Markets: Not What They Seem

- › **Current prices are *NO* indicator of long-term value, or cost of natural gas.**
 - The current situation has resulted from a coincidental production high and demand low; both factors will reverse

- › **But – the intense competition between gas and coal will last several years**
 - Rising Gas prices will reflect the shift as gas will *lose* coal displacement demand, indicating less gas to meet displacement demand
 - Limited volatility, as displacement demand elasticity remains strong

- › **Longer Term – gas prices are defined by the marginal cost of production**
 - Not \$4 or even \$5, but...\$5.50 - \$6.00; this is still indicative of a well-supplied commodity market

The next five years...

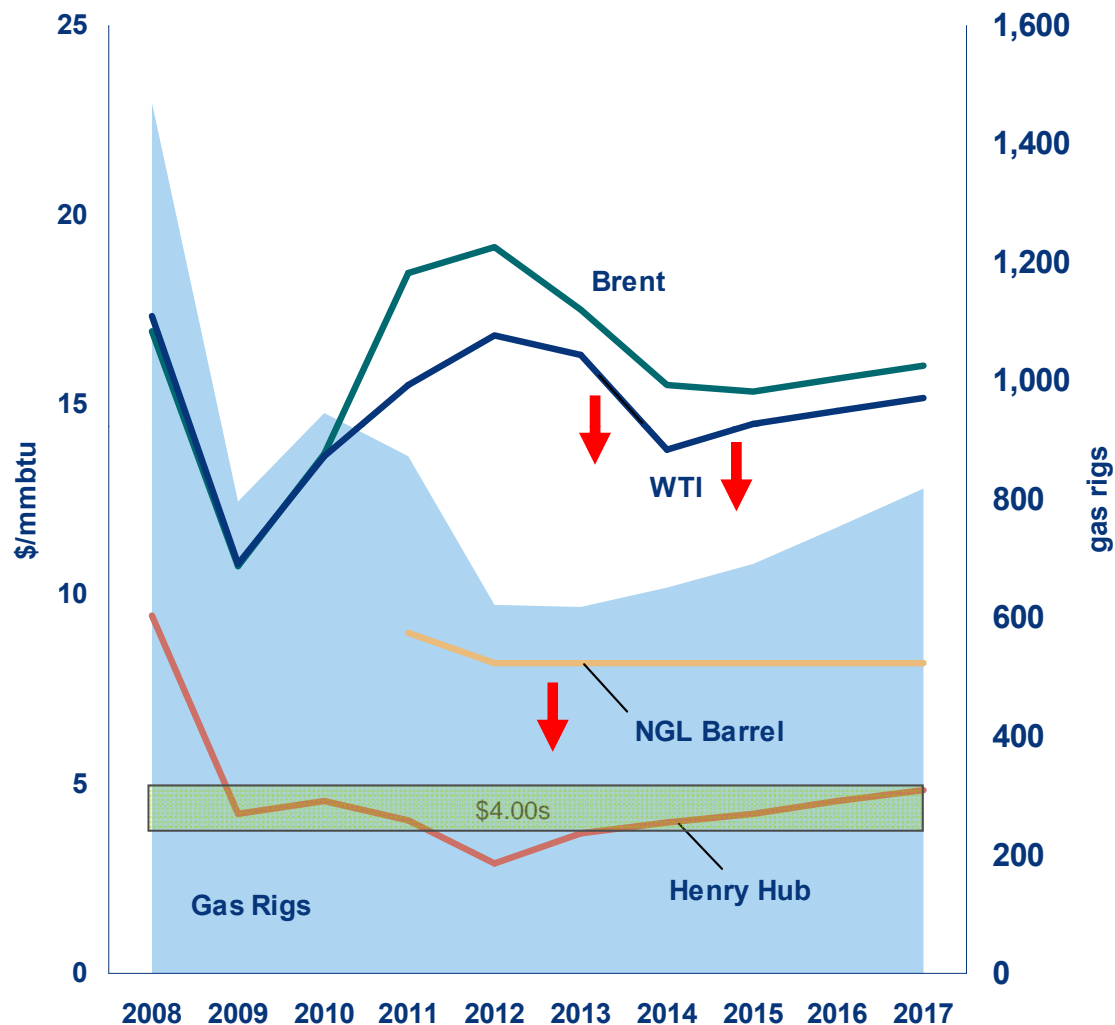
› Intense competition between gas and coal through 2015; <\$5.00/mmbtu price

- Gas supply growth is driven by liquids
- Some recovery in lower-cost dry drilling will occur as prices recover
- Limited alternate markets
- Independents continue to market dry gas assets and focus on liquids
- Gas monetization strategies are considered

› By 2016

- Large scale, long term investments built on low cost gas resource and environmental rules drives up demand
- Prices improve to >\$5.00/mmbtu by 2020
- Drilling in dry gas plays recovers

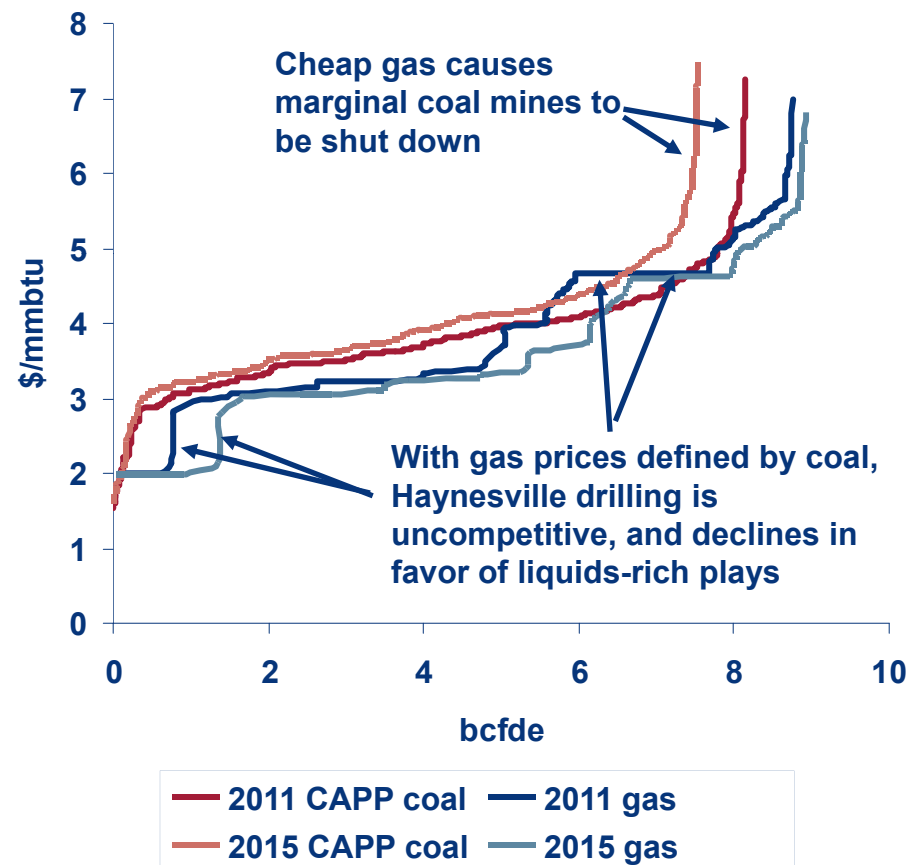
Gas and liquids prices, gas drilling



The next few years will bring broader reconciliation in gas and coal markets

- › CAPP producers have announced production cuts of 26 mst, with more to come
- › Utilities are aggressively pushing back on coal contracts
 - Big Rivers renegotiated its contract with Patriot and Oxford, citing coal quality shortfalls
 - Dynegy using Danskammer bankruptcy to terminate expensive coal contract
 - Xinergy had a customer buy out an expensive coal contract
 - Duke Energy is bidding below cost power into MISO to manage inventories

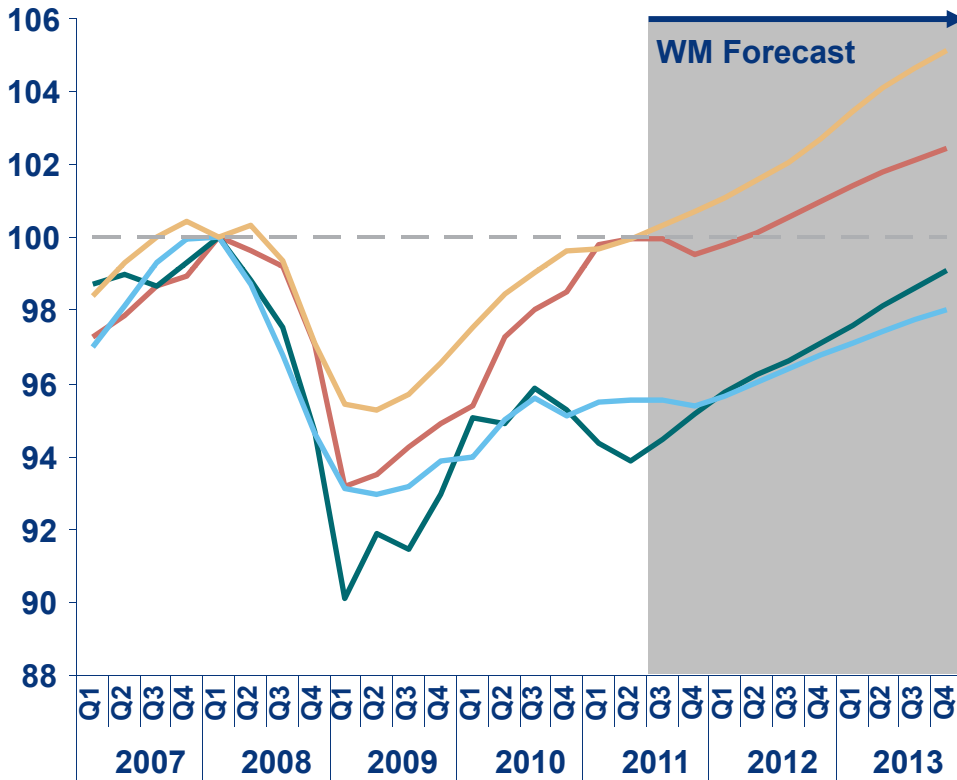
CAPP (adj.) and gas supply curves



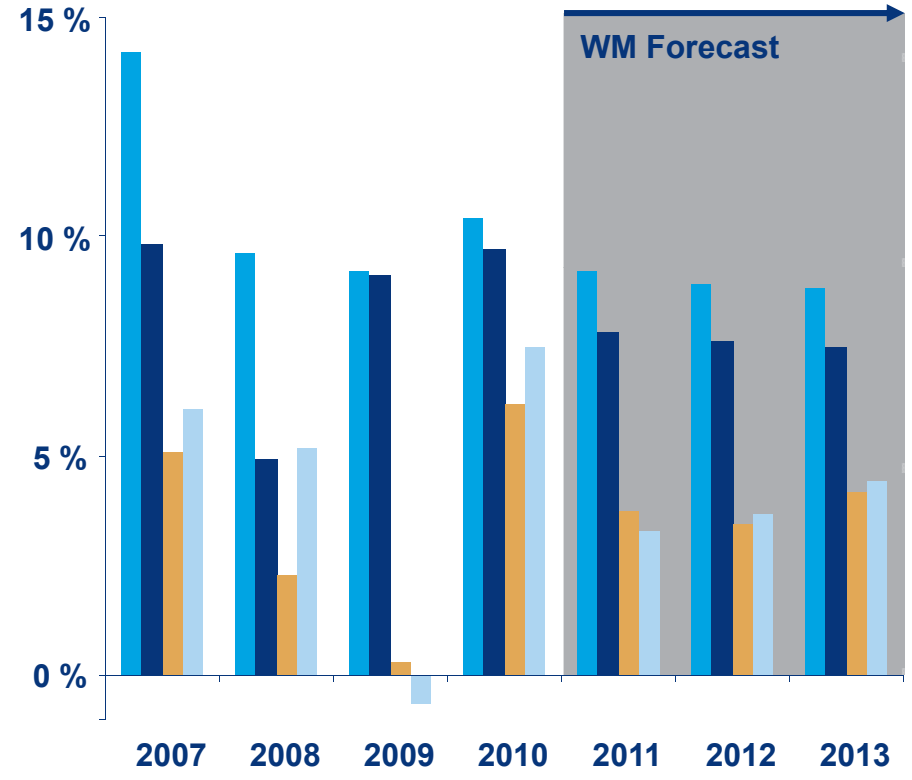
Source: Wood Mackenzie (NA Gas Tool, Coal Market Service)

The US economy is recovering, but not quickly enough for gas and coal producers...

Real GDP Index (Q1 2008 = 100)



Annual Real GDP Growth



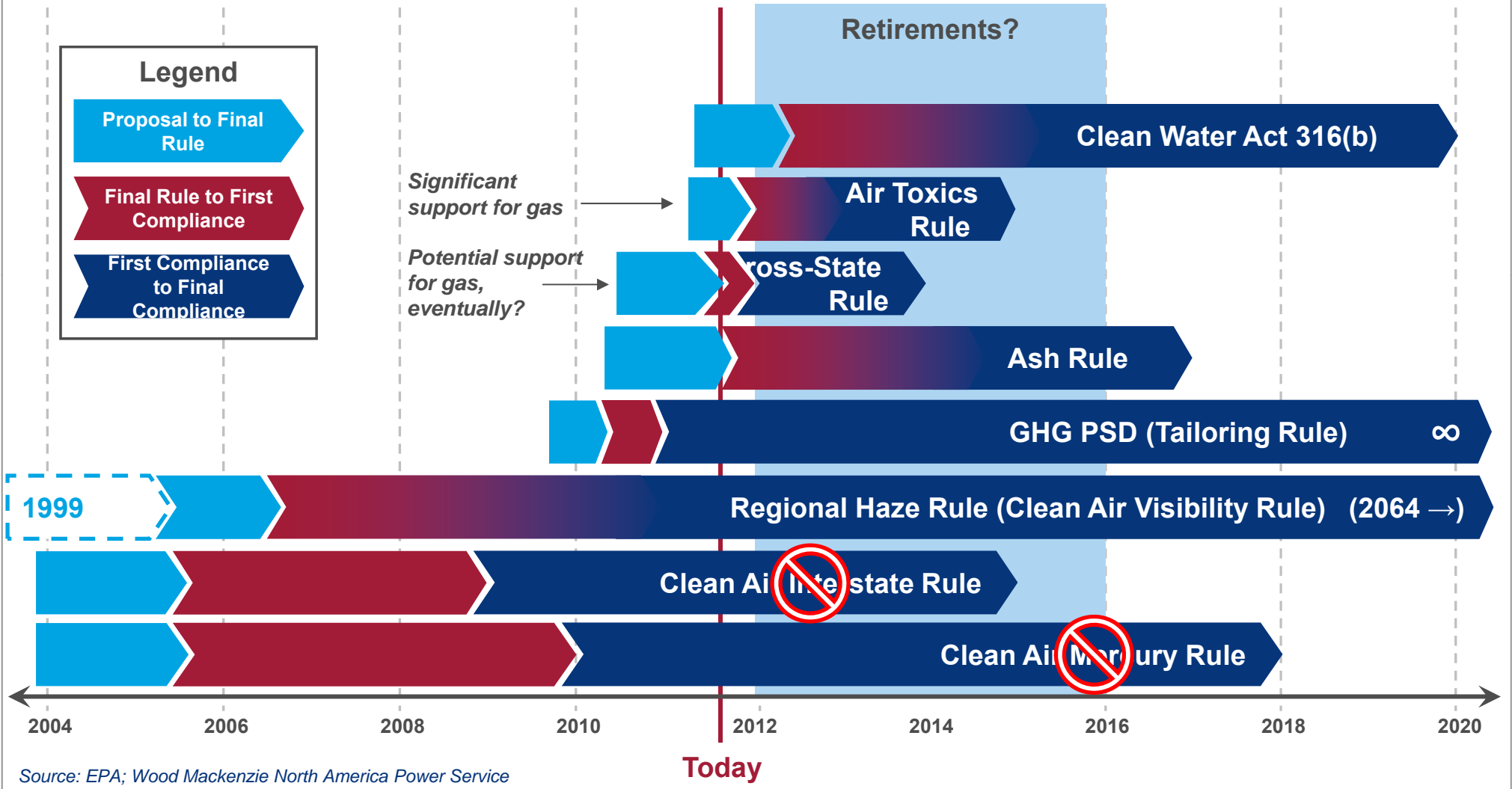
Source: Thomson Reuters Datastream, Wood Mackenzie Forecast

Longer Term – Coal, then Cost

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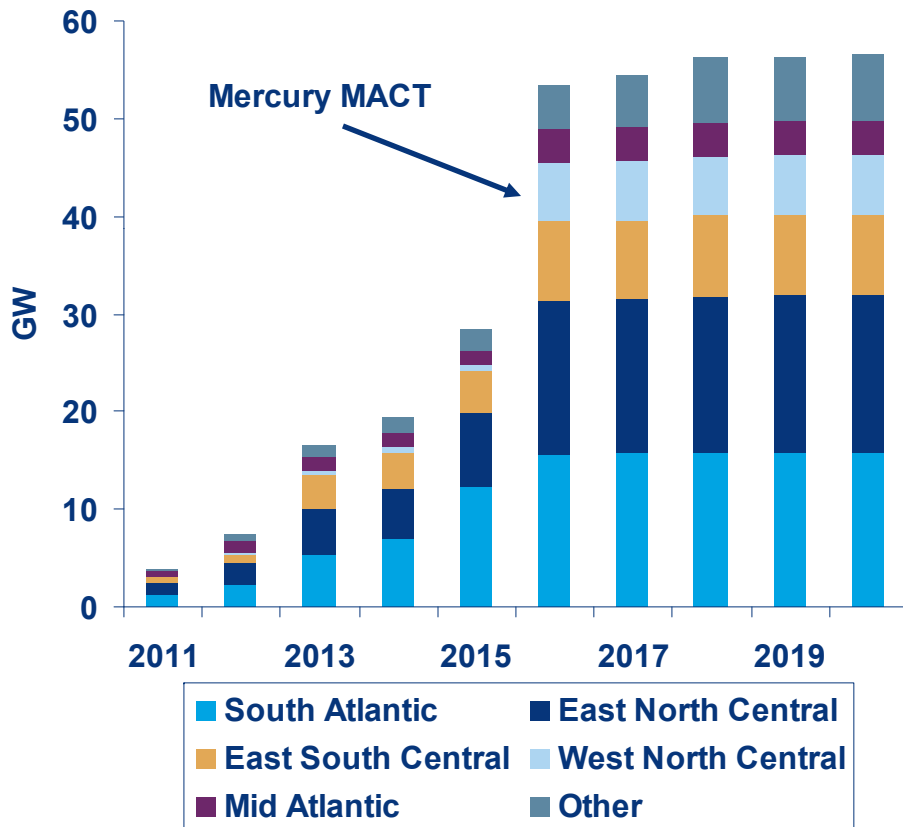


Federal Regulation, Demand Side: Longer term, environmental uncertainties and moderate prices support demand growth



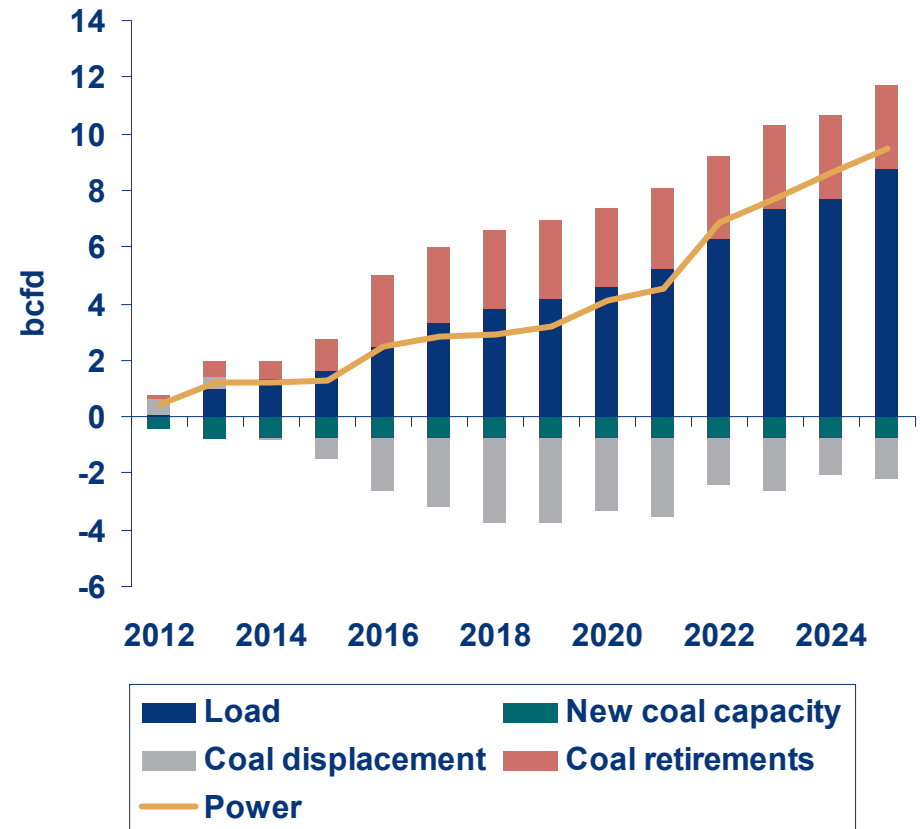
Accelerating coal plant retirements will offset declines in displacement as gas prices rise slightly relative to coal prices

US coal retirements



Source: Wood Mackenzie (NAPS, Coal Markets Service)

US power sector gas demand growth (vs. 2011)

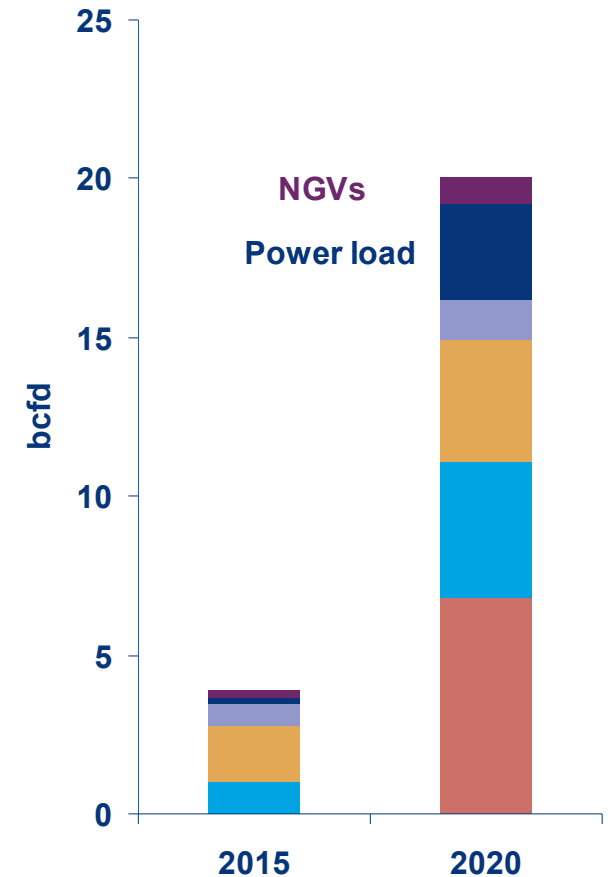
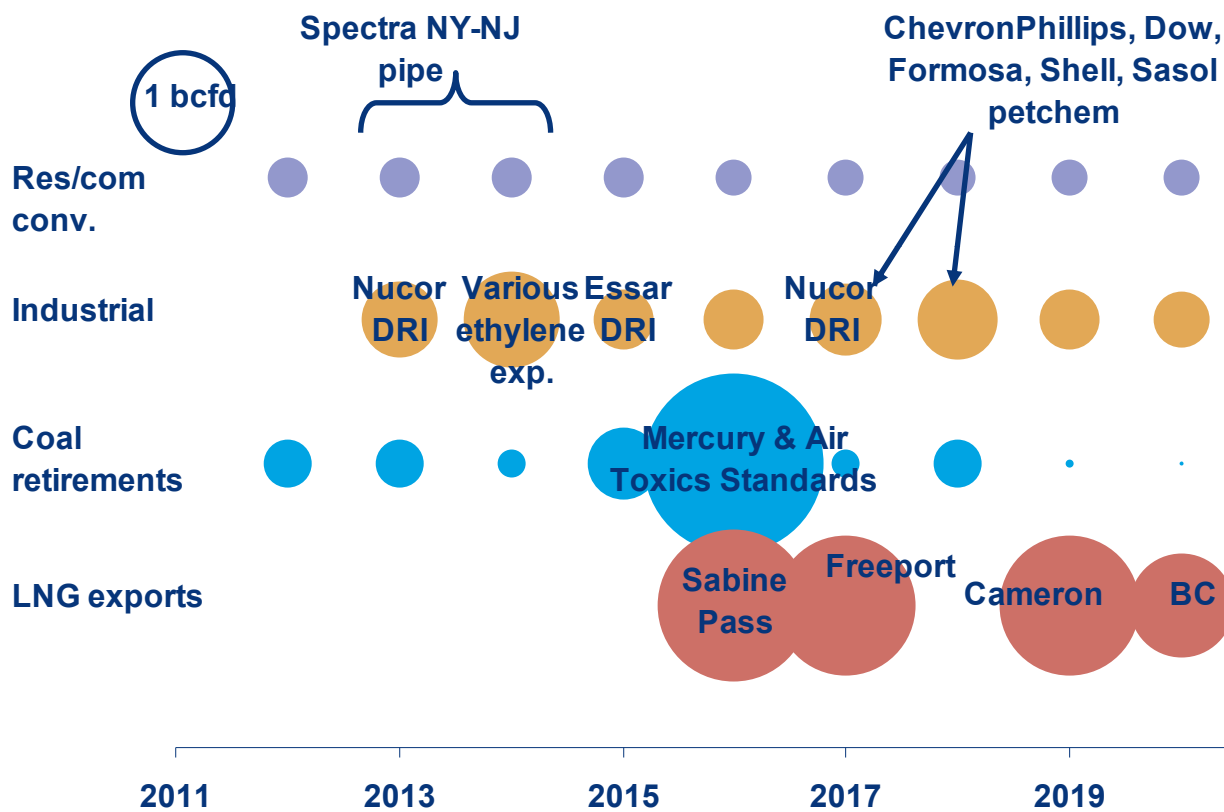


Source: Wood Mackenzie (NAGS, NAPS, Coal Markets Service)

Demand-side investments are underway—but generally will take several years to materialize

Annual gas demand growth

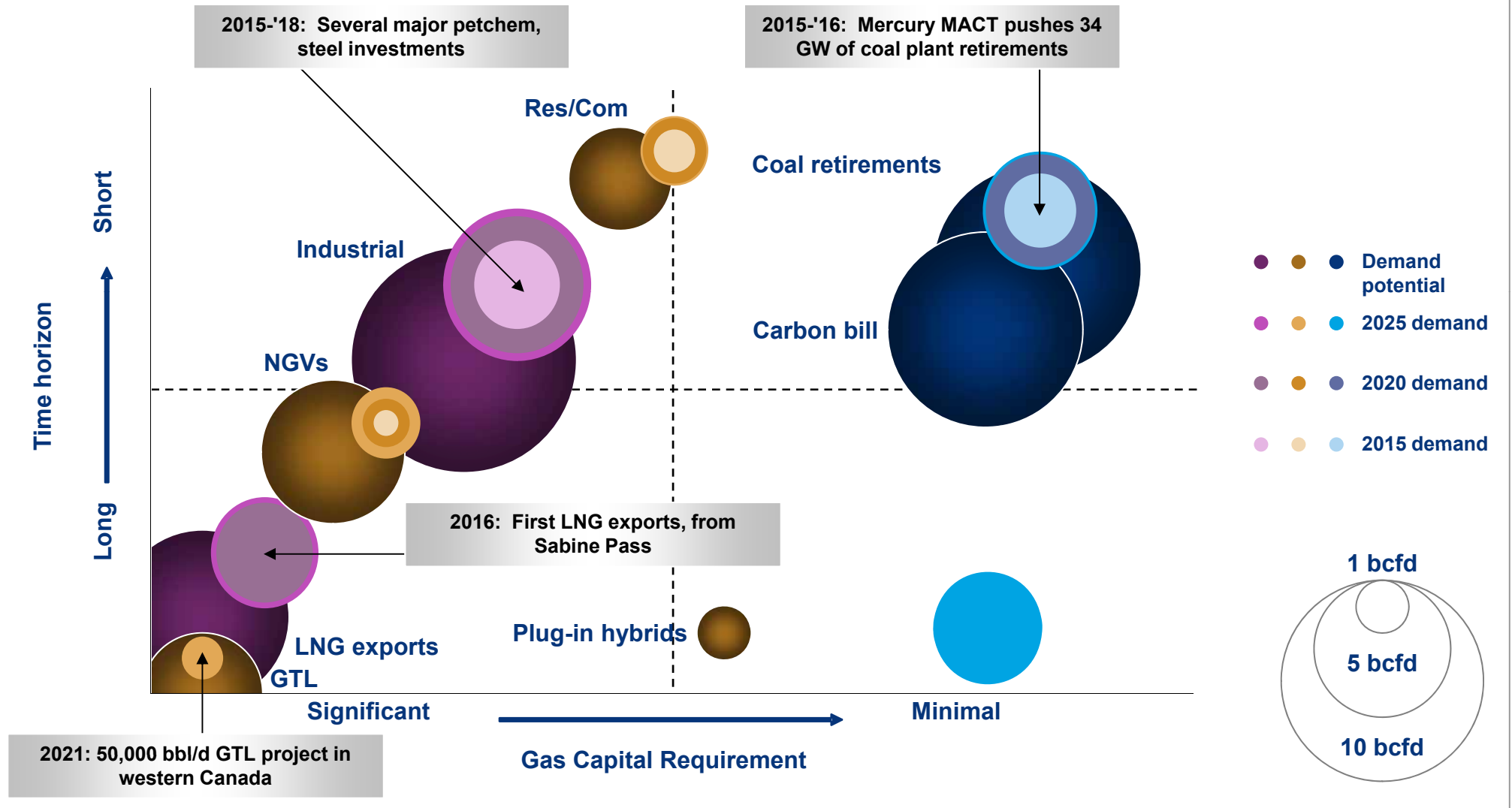
Cumul. demand growth (vs. 2010)



Source: Wood Mackenzie North America Gas Service

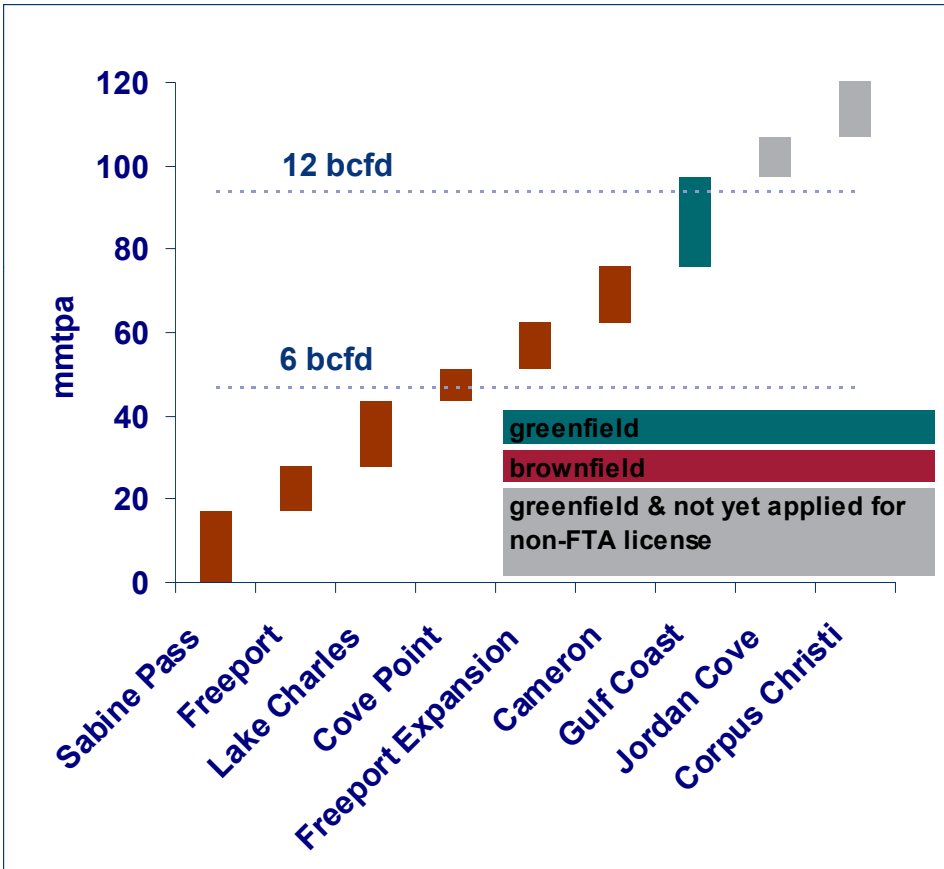
Source: Wood Mackenzie North America Gas Service

What additional demand-side opportunities are available with forecast gas prices?

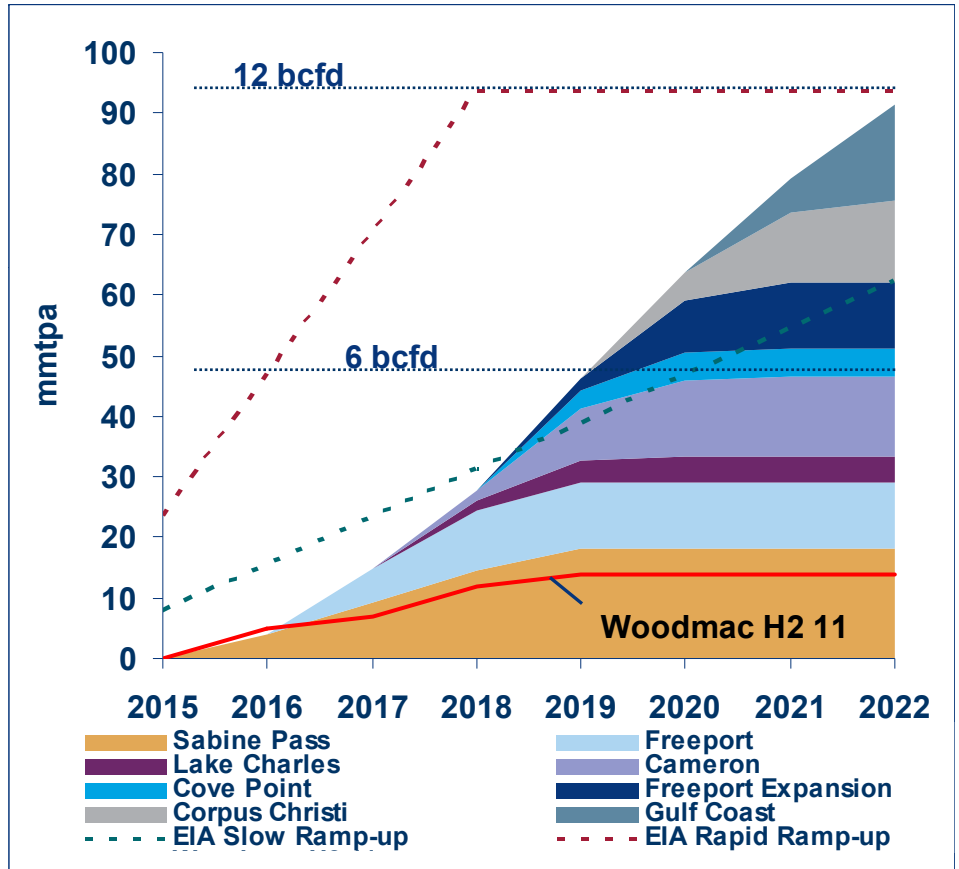


There is no real consensus (yet) on the likely volume and ramp-up of US LNG exports

Order of filing Of Non-FTA Applications



WM View of Possible US LNG Export Capacity and Flows (H2 '11) with EIA Report Overlay



Source: DOE Filings, EIA, Wood Mackenzie Estimates

The current Wood Mackenzie View...4 NA Export Facilities; a 6-year Ramp-up to 6.8 Bcfd

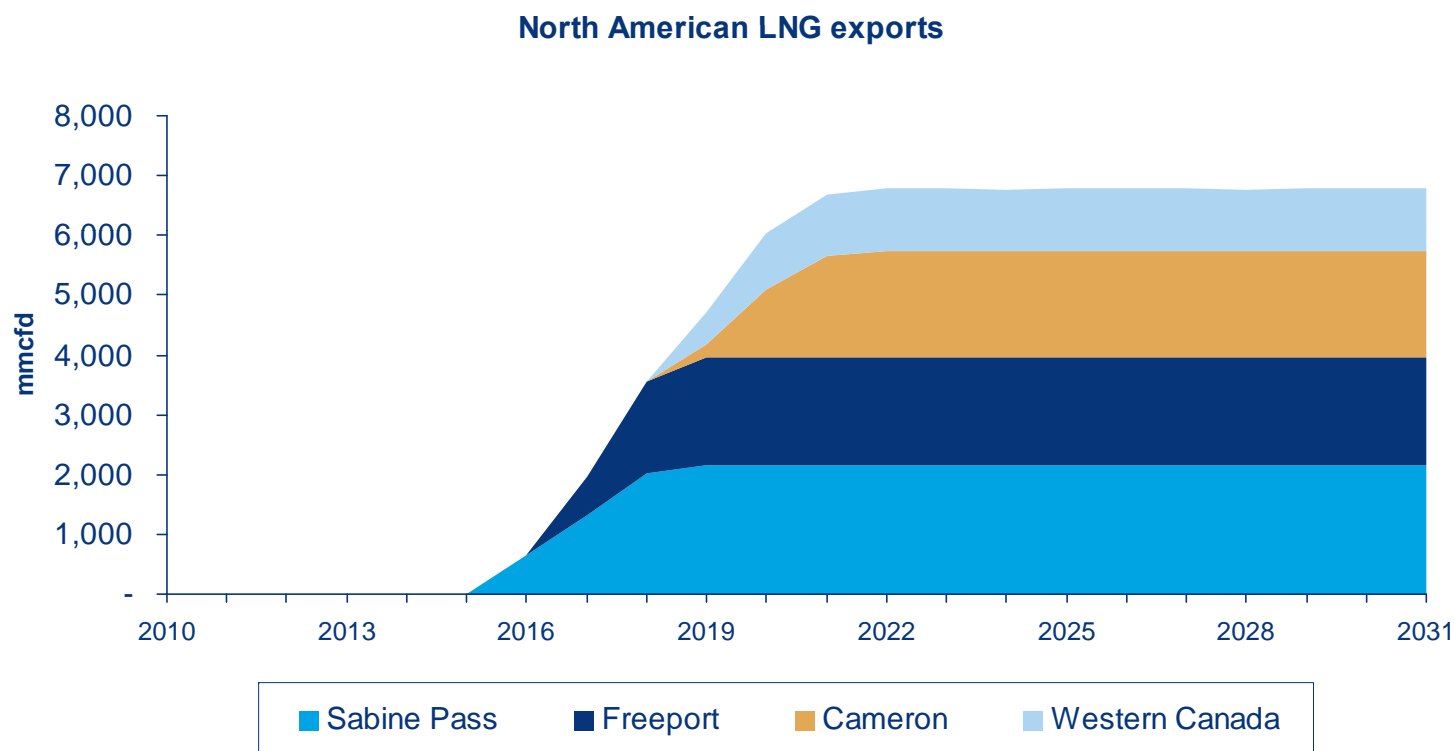
› Reflects political and market constraints

- US approvals – to a point; so long as gas is inexpensive
- Longer term, increased Asian supply options
- Our view is closest to EIA's "Slow Ramp" view

› Impact on gas prices are likely to be limited (<\$1.00)

› Canadian and Alaska LNG exports provide another "wild-card"

WM Current View of N AM LNG Export Flows



Source: Wood Mackenzie Estimates

Will Oil and Natural Gas Ever Get Together Again in North America? Unlikely

› Average price WTI Crude Oil:

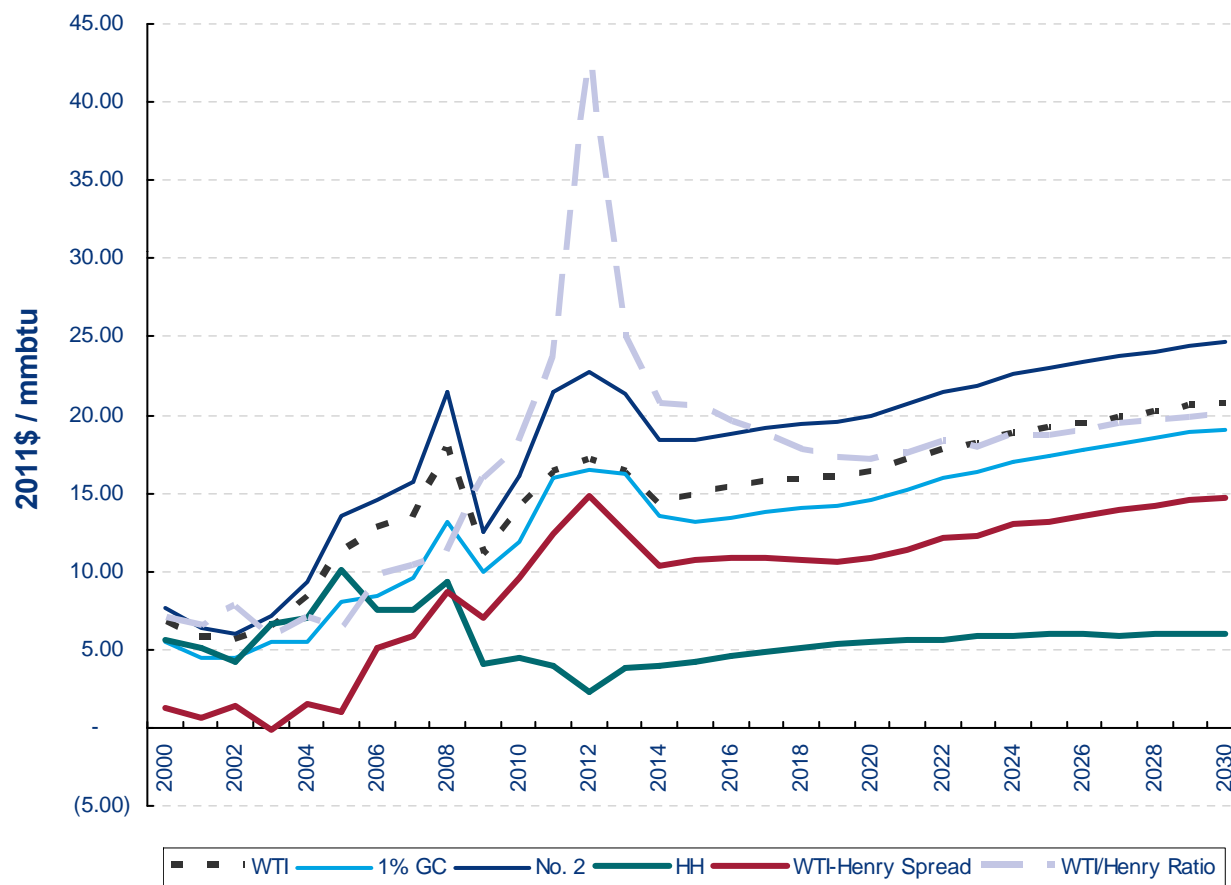
- 2011-15: \$92.11
- 2016-20: \$97.60

› Plentiful exploration and reservoir performance risk in this oil outlook longer term, in contrast to US gas.

› Avg Henry Hub (real):

- 2012: \$2.68
- 2013-15: \$4.01
- 2016-20: \$5.10
- 2021-30: \$5.88

Oil and Gas Commodity Price Forecasts



Average WTI Oil to Henry Hub Gas Differential

	\$2011/mmbtu
2000-2010	3.82
2012	14.83
2013-2020	11.36
2021-2030	13.27

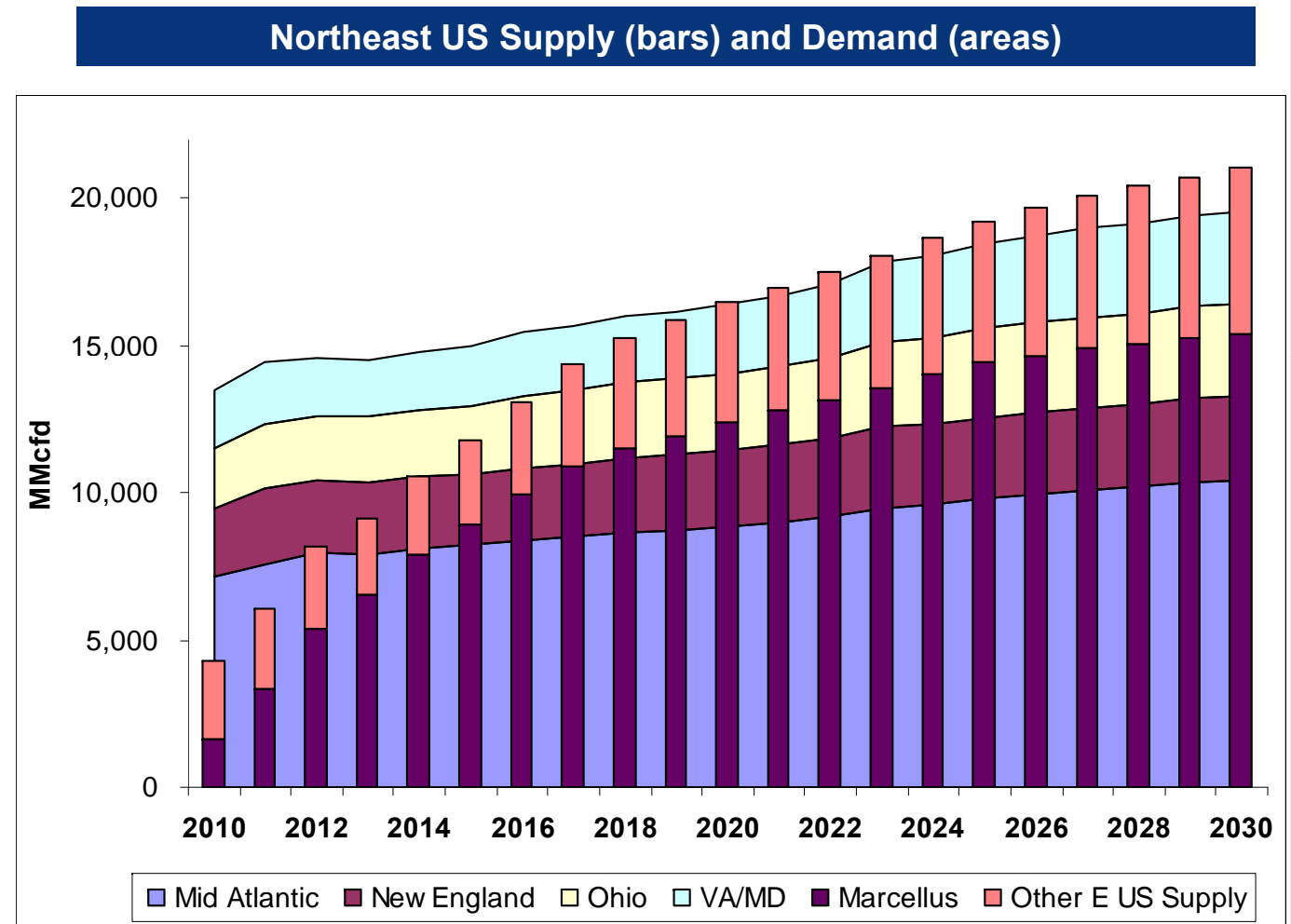
The Northeastern US – Major Shifts in Store

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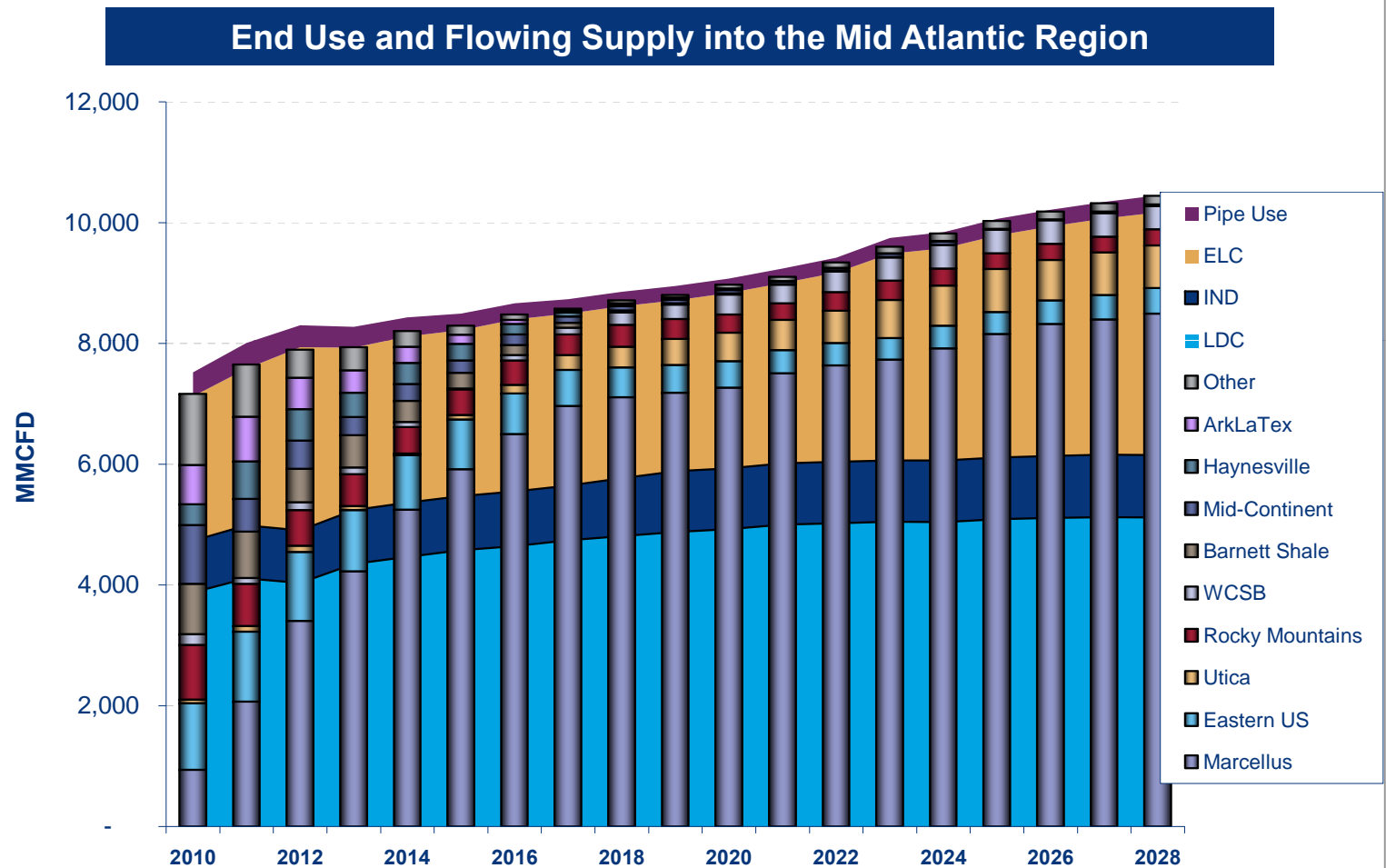
Northeast US Supply and Demand – No Need for Massive Backhauls(?)

- Many analyses showing long-distance backhauls ignore the size of the Ohio and VA/MD markets.
- Or, they may overstate potential regional production.
- While production grows by ~17 Bcfd, demand grows by 6 Bcfd.
- The need for backhauls does arise after 2020, and reaches ~ 1.5 Bcfd.
- The Southeast proves the most attractive market for these excess supplies.



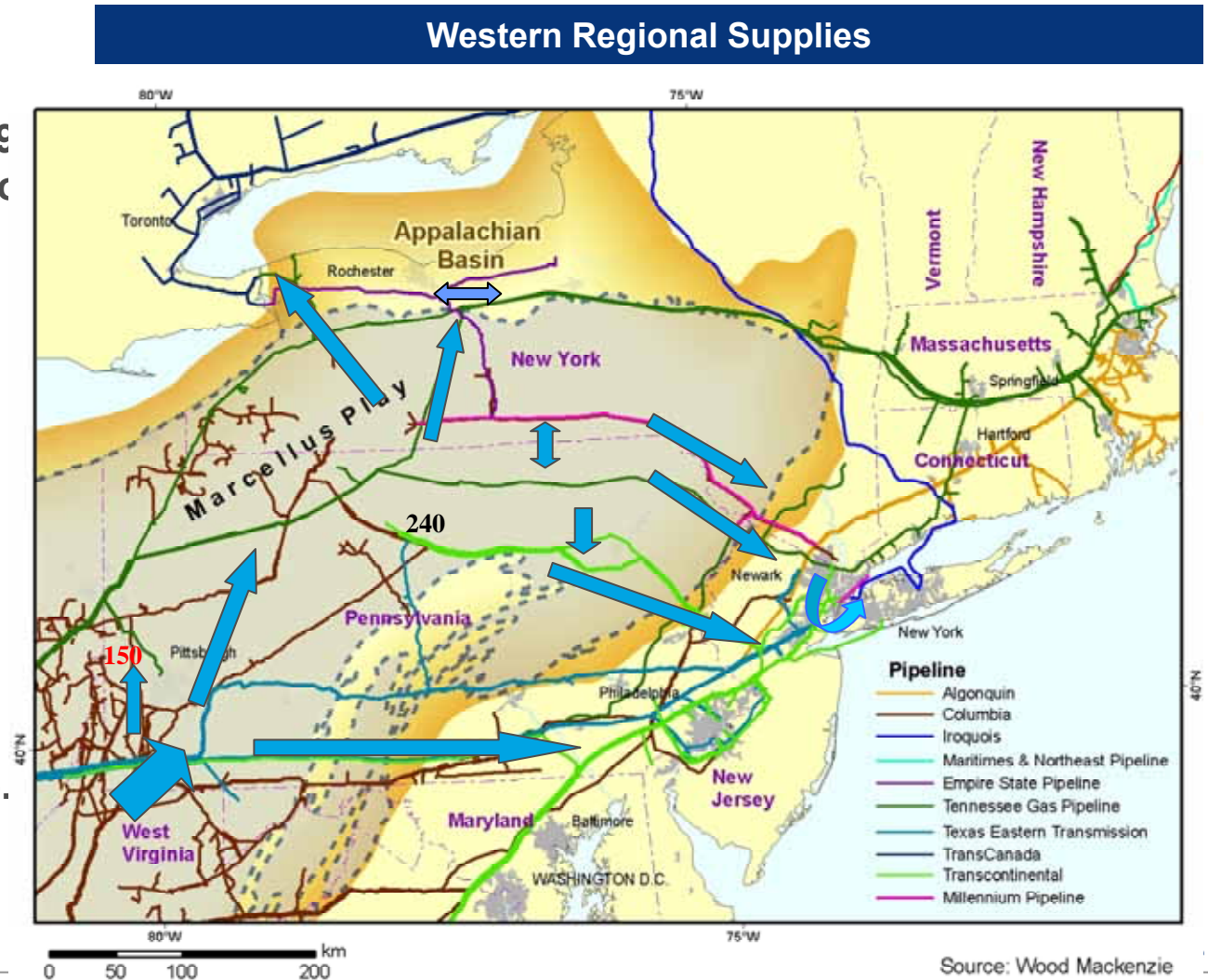
The Result – The Marcellus and Other Regional Supplies Physically Back Everything Else Out

- Demand = areas (Res/com, Ind, Elec)
- Supply = bars
- The Marcellus exceeds 80% of Mid Atlantic end use demand by 2017, and maintains an 80-85% share thereafter.
- The remnant is from the Utica, other eastern supplies (Appalachia), the WCSB, and some residual Rockies volume.



Marcellus-driven Pipeline Capacity Additions: Reflecting the SW and NE Play Area Developments 2012 and 2013

- › In addition to 2.9 Bcfd of gathering and pipe completions in 2011, 2012 will see another 2.9 Bcfd of gathering, and 2.3 Bcfd of pipeline capacity.
- › These completions will enable another supply increase late 2012.
- › 2013: 1.9 Bcfd of pipe completions.
- › Few completions truly access new markets; most allow for displacement of long-hauls.
- › Additional displacement is available, especially on Transco.



Wood Mackenzie – Who we are...

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Who is Wood Mackenzie?

Wood Mackenzie is a leading content, analytics and consulting business operating in the global energy and metals industries.

It is a knowledge-based business headquartered in Edinburgh with global reach and a trusted world-class brand synonymous with quality.

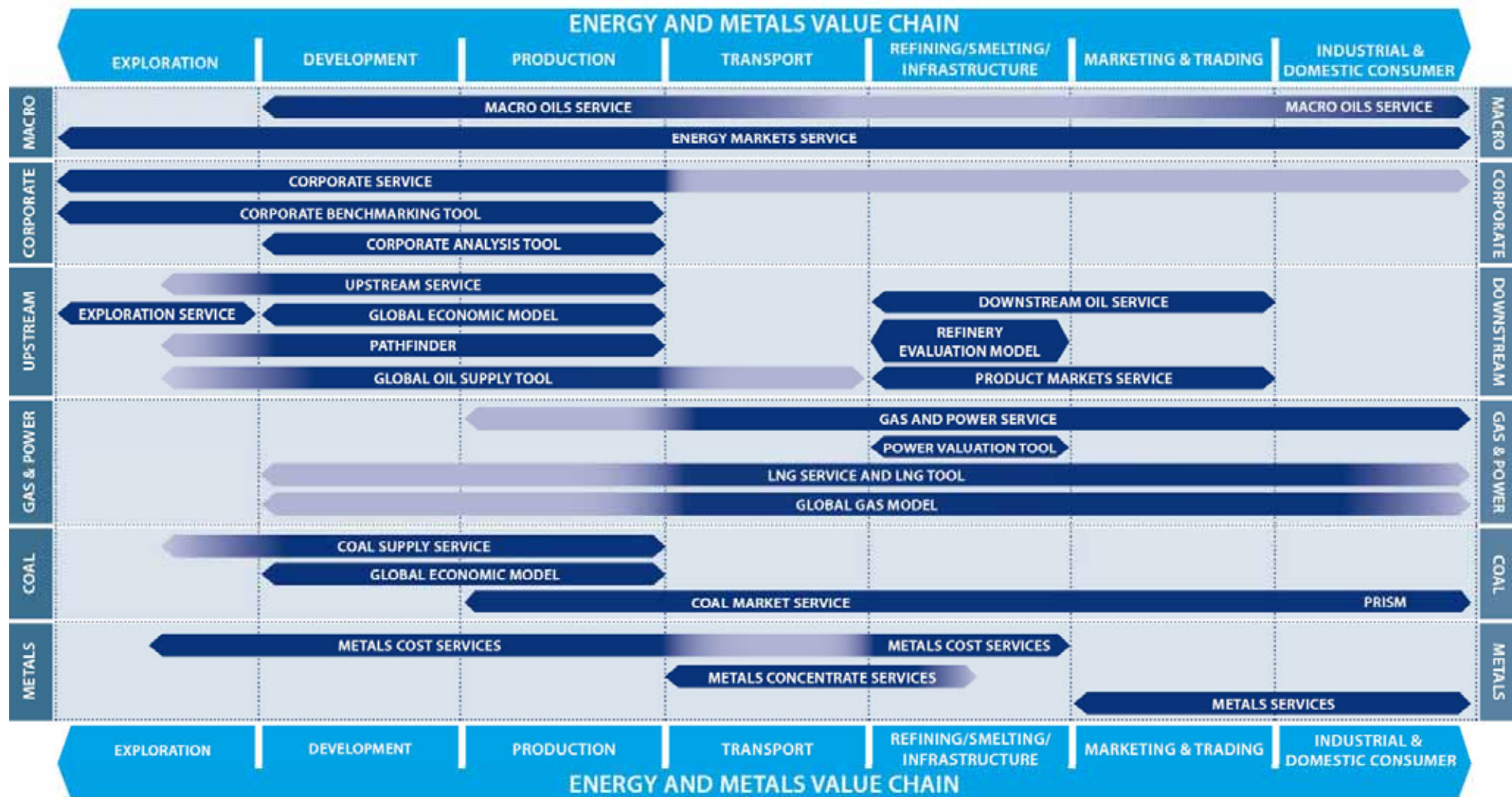
The company is a premier supplier of 'must have' research and knowledge-based consulting to clients in every major company in the energy and metals industries, as well as leading financial services organisations, governments and government agencies across the globe.

History & Key Milestones

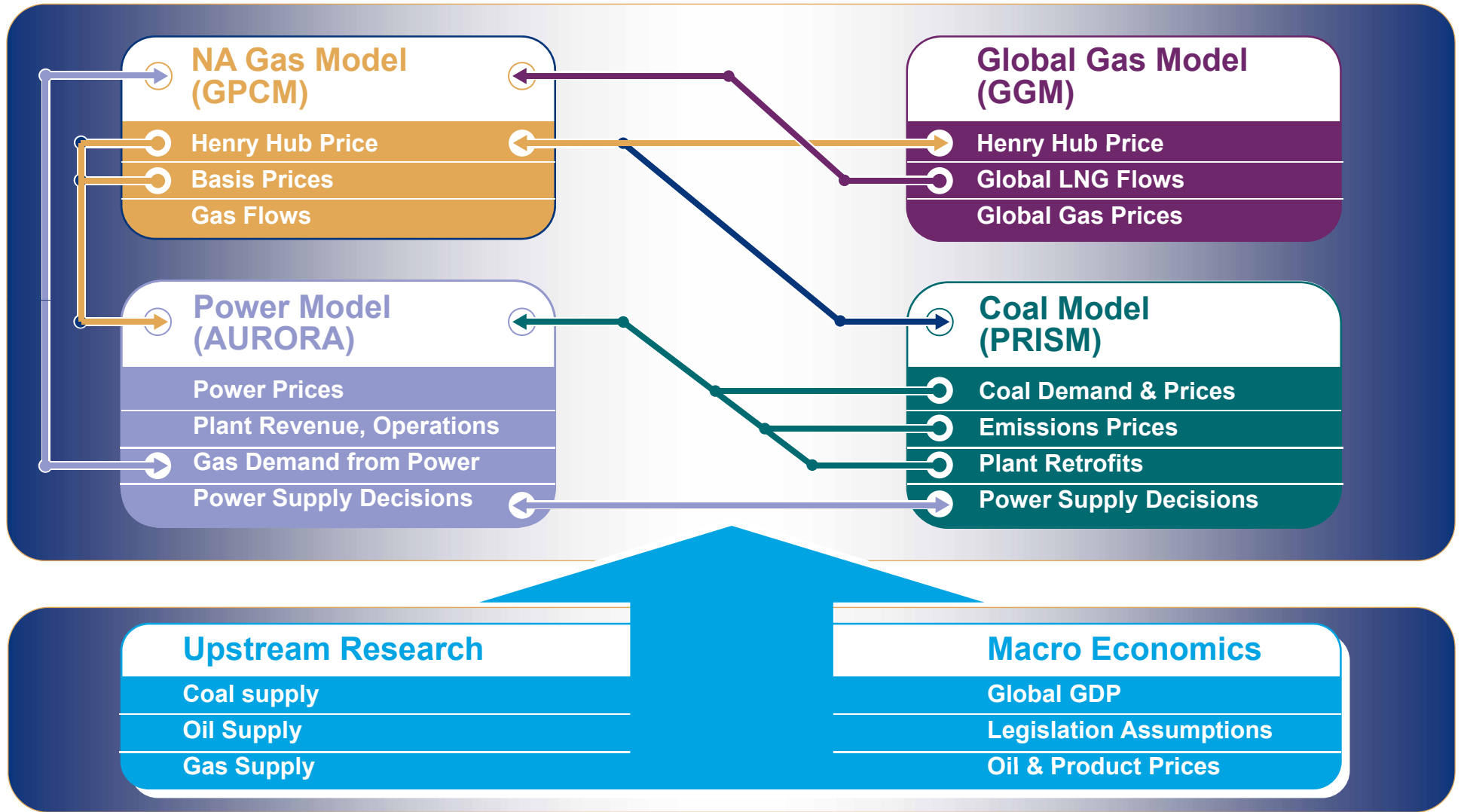
Competitive Advantage Built Over 30 Years

- › 1844: Wood Mackenzie founded as Edinburgh-based stockbroking firm
- › 1970s: Wood Mackenzie developed into a top-rated institutional broker, with particular emphasis on high quality research and recognised in financial centres across UK, Europe and US
- › 1973: North Sea Service, Wood Mackenzie's first industry research offering, was launched
- › 1980s: Commenced provision of consulting services
- › 1981: Entered Life Sciences market
- › 1986: Wood Mackenzie purchased by Hill Samuel, the UK merchant bank, with successive ownership by NatWest and Bankers Trust
- › 1999: Bankers Trust (including Wood Mackenzie) purchased by Deutsche Bank
- › 2001: Buy-out from Deutsche Bank by management, employees and Bank of Scotland
- › 2005: Refinancing deal, involving Candover (a leading European private equity house)
- › 2007: Secondary investment by Candover, Creation of coal team by acquisitions of Hill & Associates and Barlow Jonker and divestment of Life Sciences division
- › 2008: Acquisition of Brook Hunt

Research Coverage Across The Value Chain



Integrated Wood Mackenzie models and methodology



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