North American Natural Gas – A Domestically Available, (relatively) Economic (fossil) Fuel…..Really (trust us this time).

For the Fertilizer Institute and the Fertilizer Industry Roundtable's Fertilizer Outlook and Technology Conference

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consulting
business environment

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- Over 350 professionals including a range of recognised industry leaders
- Unique asset-by-asset supply methodology, proprietary databases & analytical tools
- Depth of industry knowledge allows us to provide commercial, forward looking analysis
- Integrated expertise across Upstream, LNG, Downstream, Coal, Metals, Gas & Power sectors
- We blend analysis with advice to enable better informed decision making by clients
- Clients span all major energy and mining companies, governments and financial organisations

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Over 800 clients across all industry segments, including…

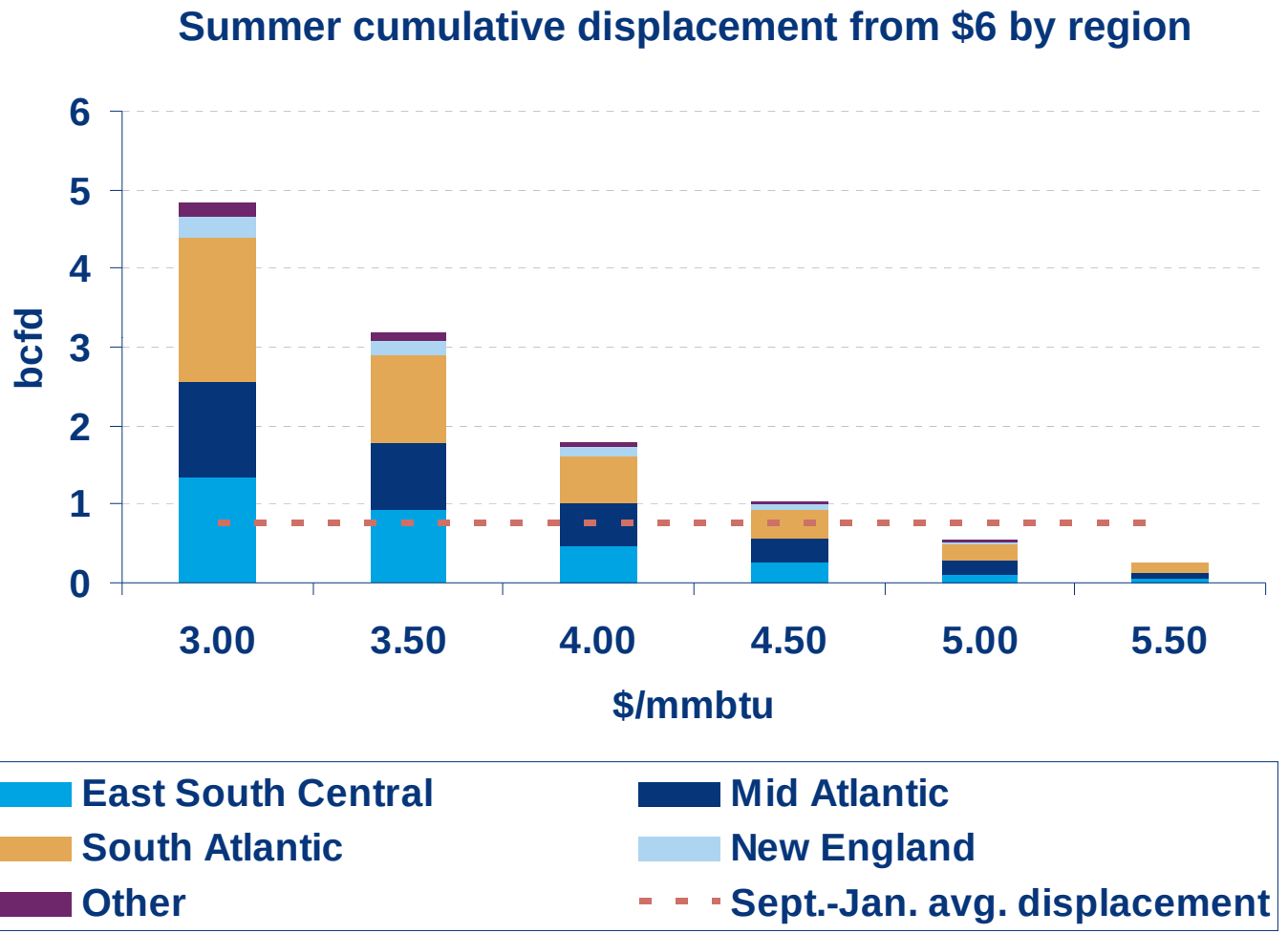
Supermajors	bp, Chevron, Shell, Total
Mid-caps	ConocoPhillips, Repsol, BG plc, Eni, Marathon, StatoilHydro
Independents	Anadarko Petroleum Corporation, Occidental (OXY), Santos, Hess, BHP Billiton
NOCs & Govts	N.I.O.C, CNOOC, Petronas, ONGC, Oljedirektoratet – Ministry of Petroleum and Energy
Utilities	ScottishPower, E.ON, Ruhrgas, Gaz de France, Powergen, Duke Energy
MIning	Exxaro – Powering Possibility, Elk Valley Coal, Peabody, Glencore International AG, Xstrata

What Got us Here?

- **Demand dropped first, and supply has followed only after a long delay**
- **US production has held up, and *potential* continues to climb**
  - Emerging shale resources firming up (Haynesville); other shale resources wait in the wings (BC Horn River, Marcellus)
  - Exploration risk is now a minor uncertainty in terms of future supply availability.
- **Economic growth – and longer term demand - expectations have weakened**
  - Lower GDP expectations reduce overall power generation load growth
  - Industrial demand hit hard by weak economic environment and stronger US dollar
  - Development of coal and renewable capacity continues
- **LNG into North America is set to increase through 2012, despite weaker demand expectations and continued supply growth**
  - LNG supply has outpaced demand, and LNG will be dumped – for a time - into the US
- **Producers have aggressively built new pipe to monetize production, limit basis risk**
  - More than 10 Bcfd from N TX/OK toward the east, even as production growth lags
- **Result: Low Prices until the storage maximum is not longer a market force, with a rebound to the mid $4.00s/MMBtu average next year; wide basis unlikely to return anytime soon**

The Gas Price Floor Depends on Displacing Coal at Levels Higher than Observed Last Fall

- **Scale of current displacement outlook presents some unknowns**
  - Operational constraints
  - Coal plants that are “must-run”

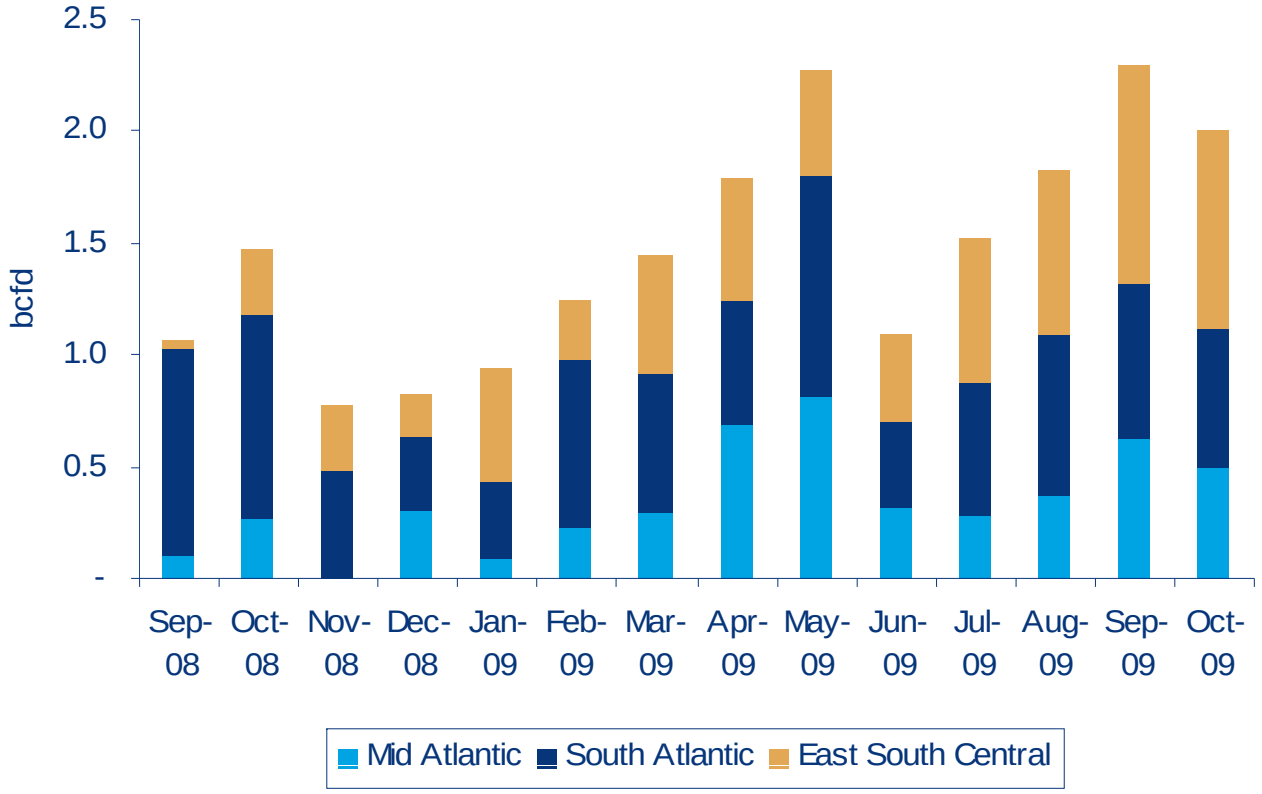


But lower coal prices, and coal operations result in less displacement than a pure all-else-equal analysis would predict. 2 Bcfd displacement demand is expected this fall.

- **Scale of current displacement outlook presents some unknowns**
  - Operational constraints
  - Coal plants that are "must-run"
- **This fall, with lower coal prices, the natgas price required to displace coal has also decreased**

Displacement (Sep 2008 - May 2009);

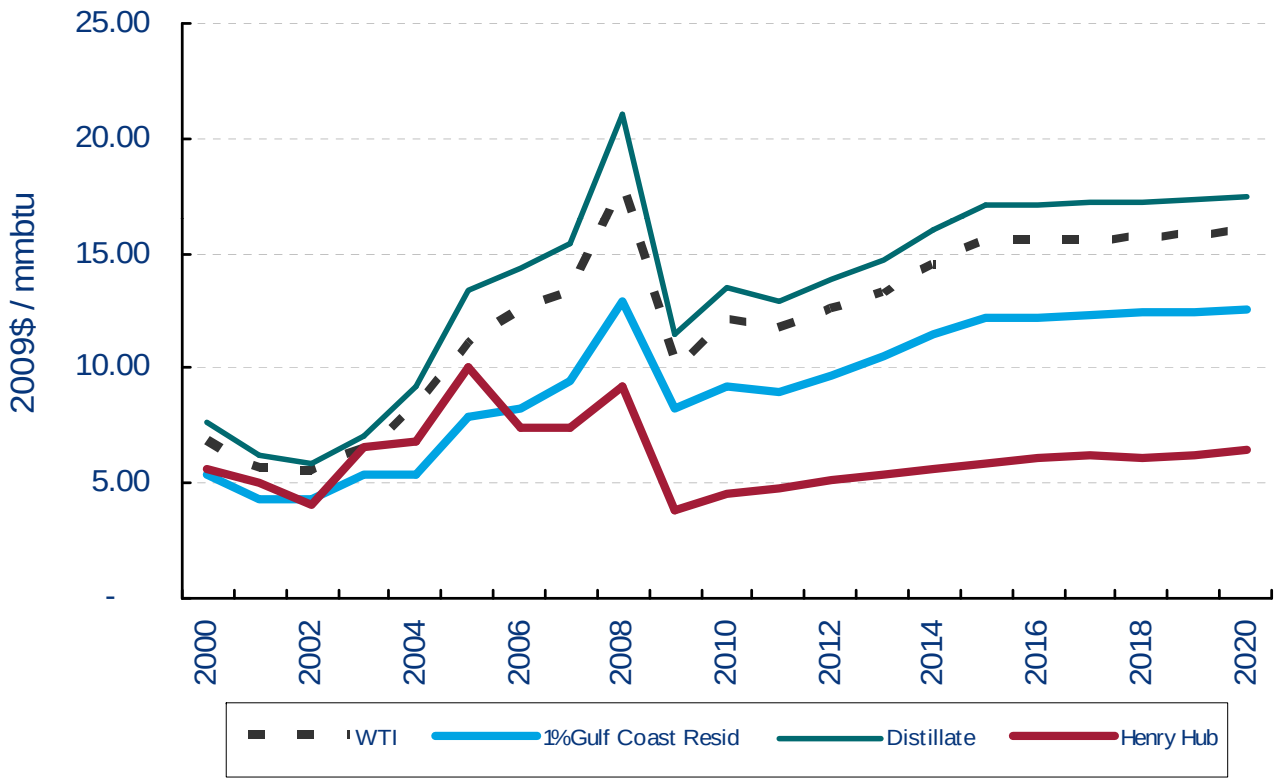
Displacement from $6 by region June – Oct 2009



Even so, the Natgas Rebound is Unlikely to be a Strong as Many Producers Hope, and Oil and US Gas are on – Divergent Paths

- **Avg. price WTI:**
  - 2010-15: *$76.97*
  - 2016-20*: $91.90*
  - 2020-25*: $96.10*
- ***However, oil is getting more difficult to find; supply pressure for oil builds beyond 2015.***
- ***Plentiful exploration risk, and reservoir performance risk in this oil outlook – in contrast to US gas.***
- ***Avg price Henry Hub:***
  - *2009: $3.81*
  - *2010: $4.85*
  - *2010 - 2015: $5.21*
  - *2015 – 2020: $6.28*
- ***Avg Btu Diff. WTI - Henry:***
  - *1997 – 2008: $2.39*
  - *2009 – 2020: $8.39*

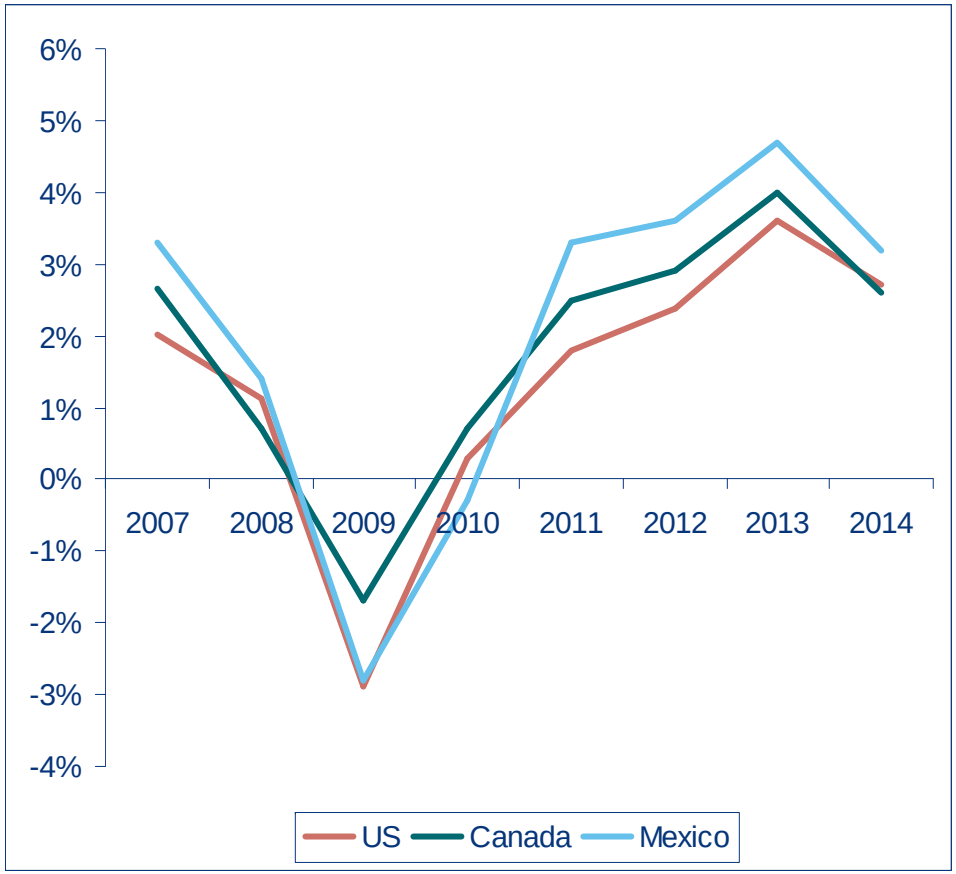
Oil and Gas Commodity Price Forecasts ($2009)



Economic expectations offer little support for natural gas demand…

- **Short-term (through 2010) outlook remains very bleak**
  - Deleveraging has begun but nowhere near complete yet
  - Exports weak given lack of global demand
  - Consumers are not yet spending freely
  - Fiscal stimulus packages not sizable enough to outweigh demand contraction
- **Annual growth does not exceed 3% until 2013**
- **Gas demand challenged by weak industrial outlook and low power loads**

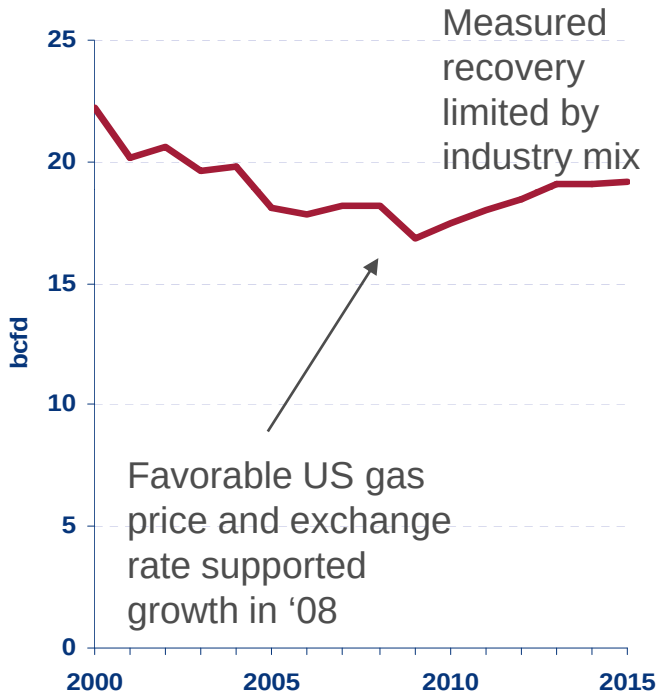
North American GDP growth expectations



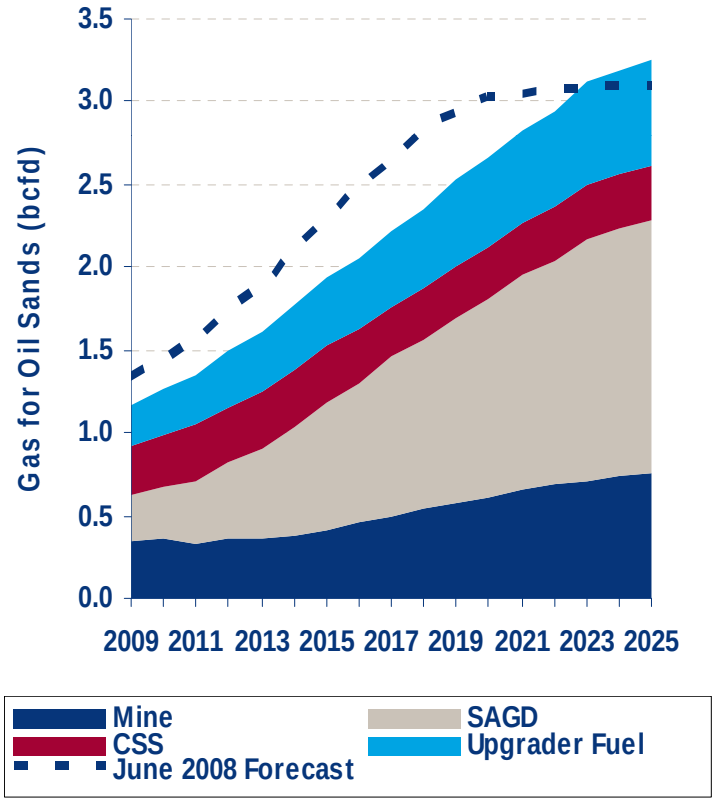
Despite the Lower Price for Natural Gas, Industrial Demand Is Currently Handcuffed by the Economy

- Energy cost advantages versus other markets aren't enough to offset weak economic conditions in the near-term
- Recovery should take hold—given lower prices—in 2011 and 2102
- Longer term, lower prices aren't likely enough to support US manufacturing or increase capacity for gas-intensive industry like fertilizer or petchem to levels seen pre-2005

US Industrial Gas Demand

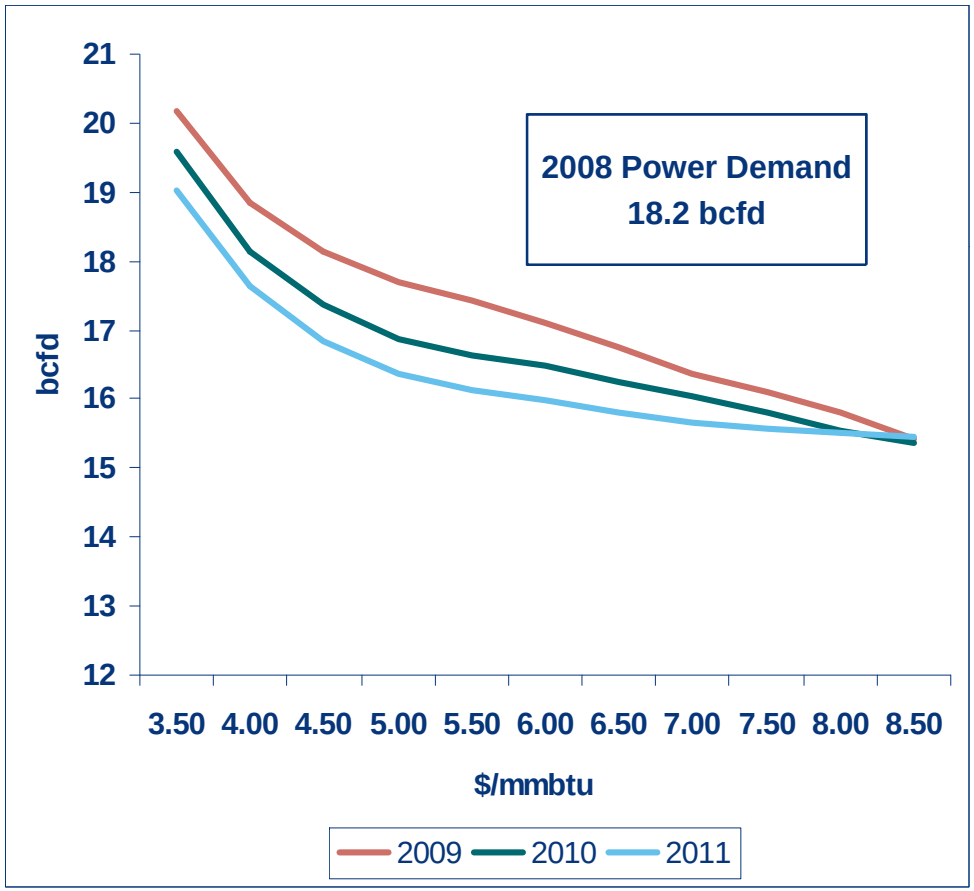


Canadian Oil Sands Projects Have Come Under Pressure



Power demand trends are negative even when the economy recovers…

Assuming a constant power price, power demand for gas declines between 2009 and 2011, for a given gas price below $8/mmbtu

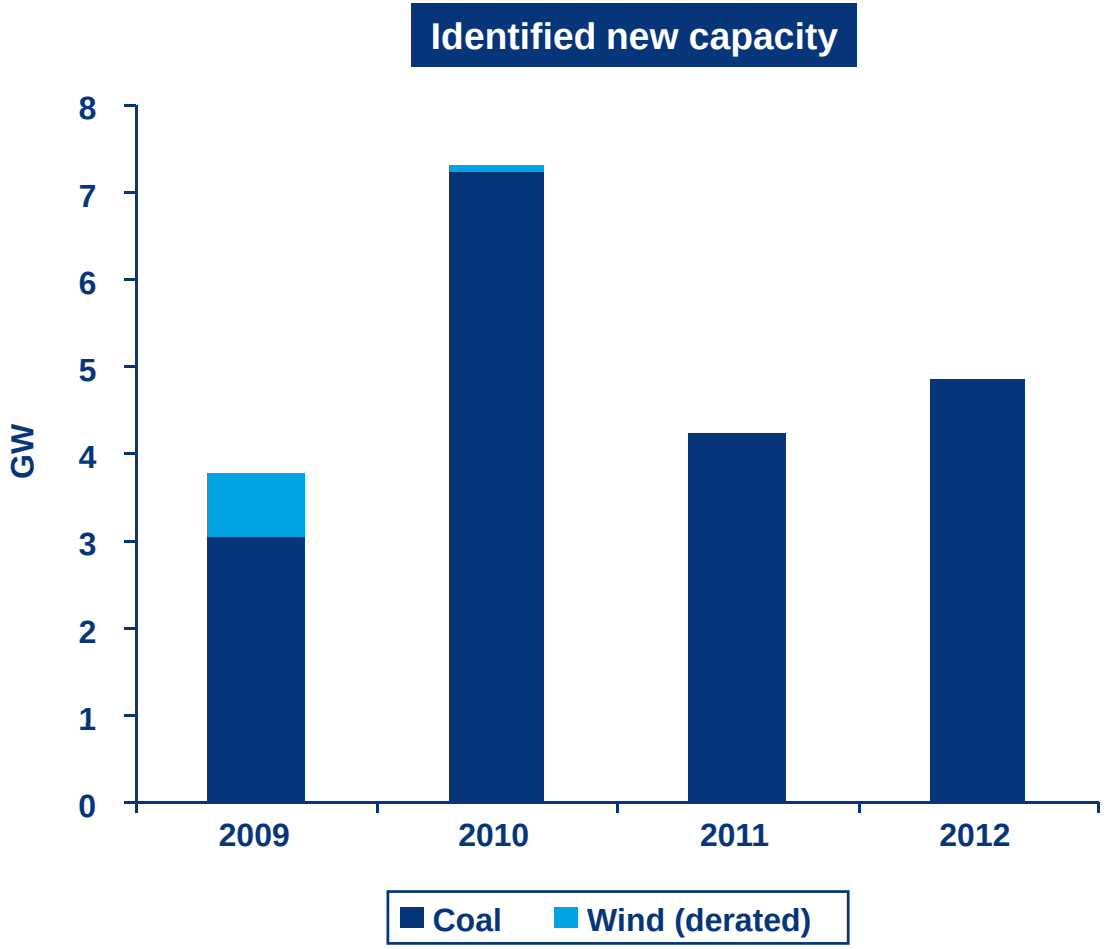


US GDP Growth		US gas demand for power (bcfd) at different prices		
		$4	$5	$6
2009	(2.9%)	18.7	17.6	17.1
2010	0.3%	18.1	16.8	16.4
2011	1.8%	17.9	16.7	16.3

Source: Wood Mackenzie

…as 19.4 GW of coal-fired generation is planned to come online by the end of 2012

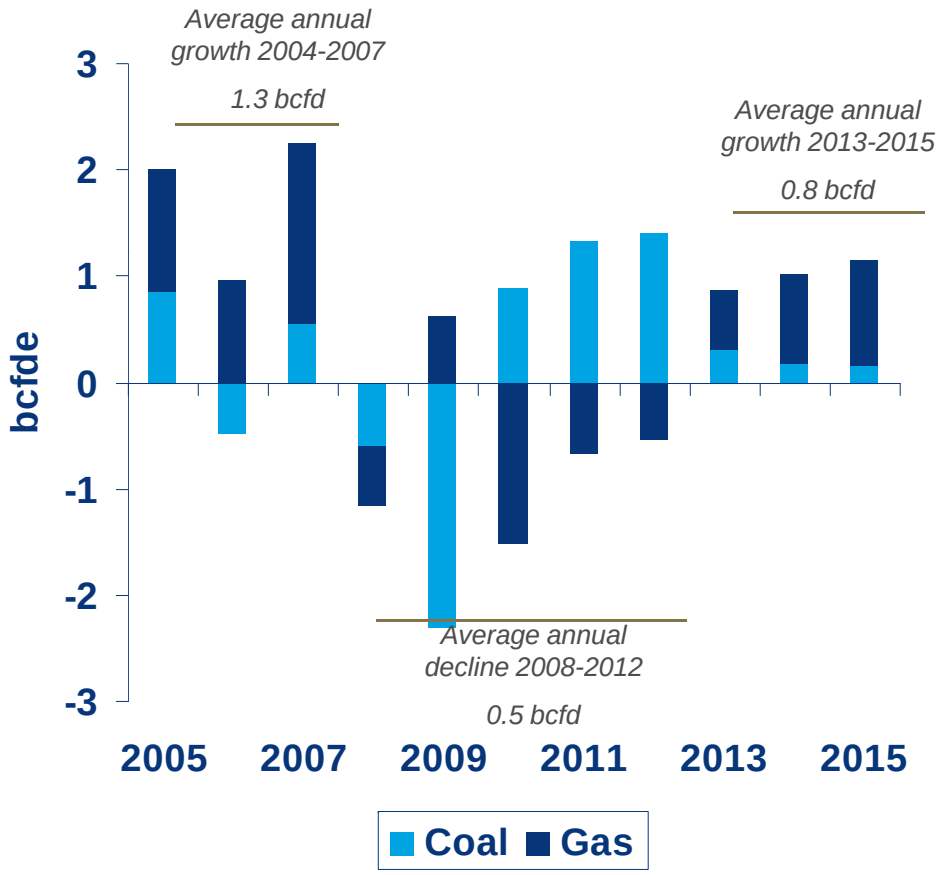
- All of this capacity is in construction, site prep, or testing
  - "Steel in the ground"
- This new Coal Capacity is highly efficient, baseload capacity that will push marginal gas-fired units off the supply stack and other gas plants toward the margin



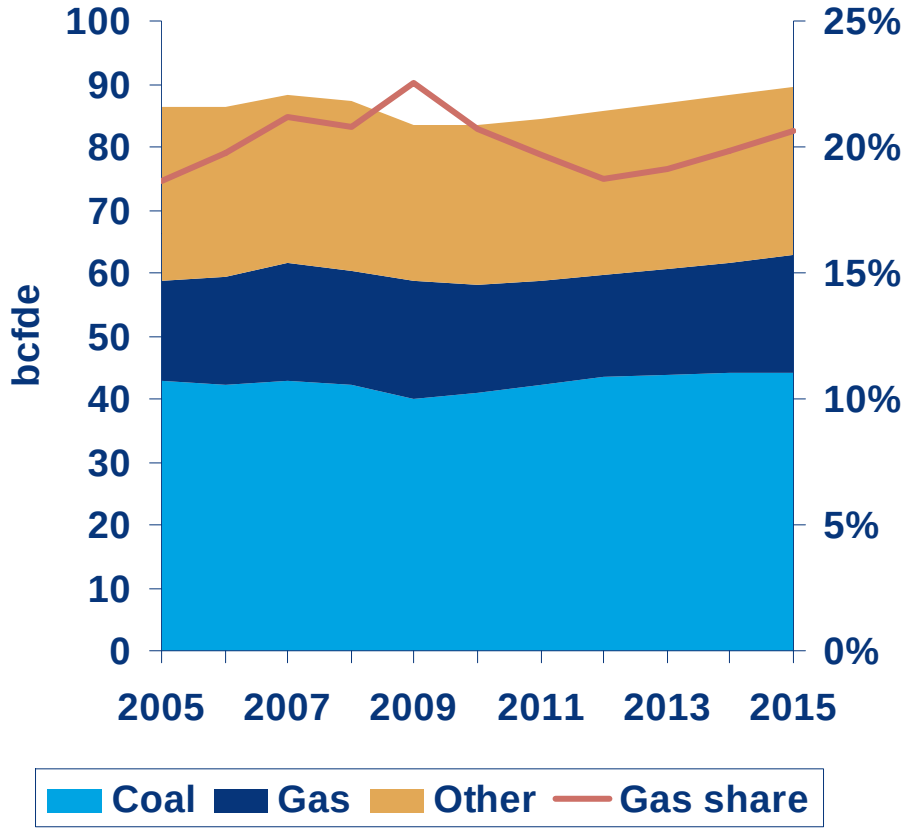
Source: Wood Mackenzie

Not Until 2013 does gas demand growth from the US power sector accelerate

Gas and Coal Demand Growth

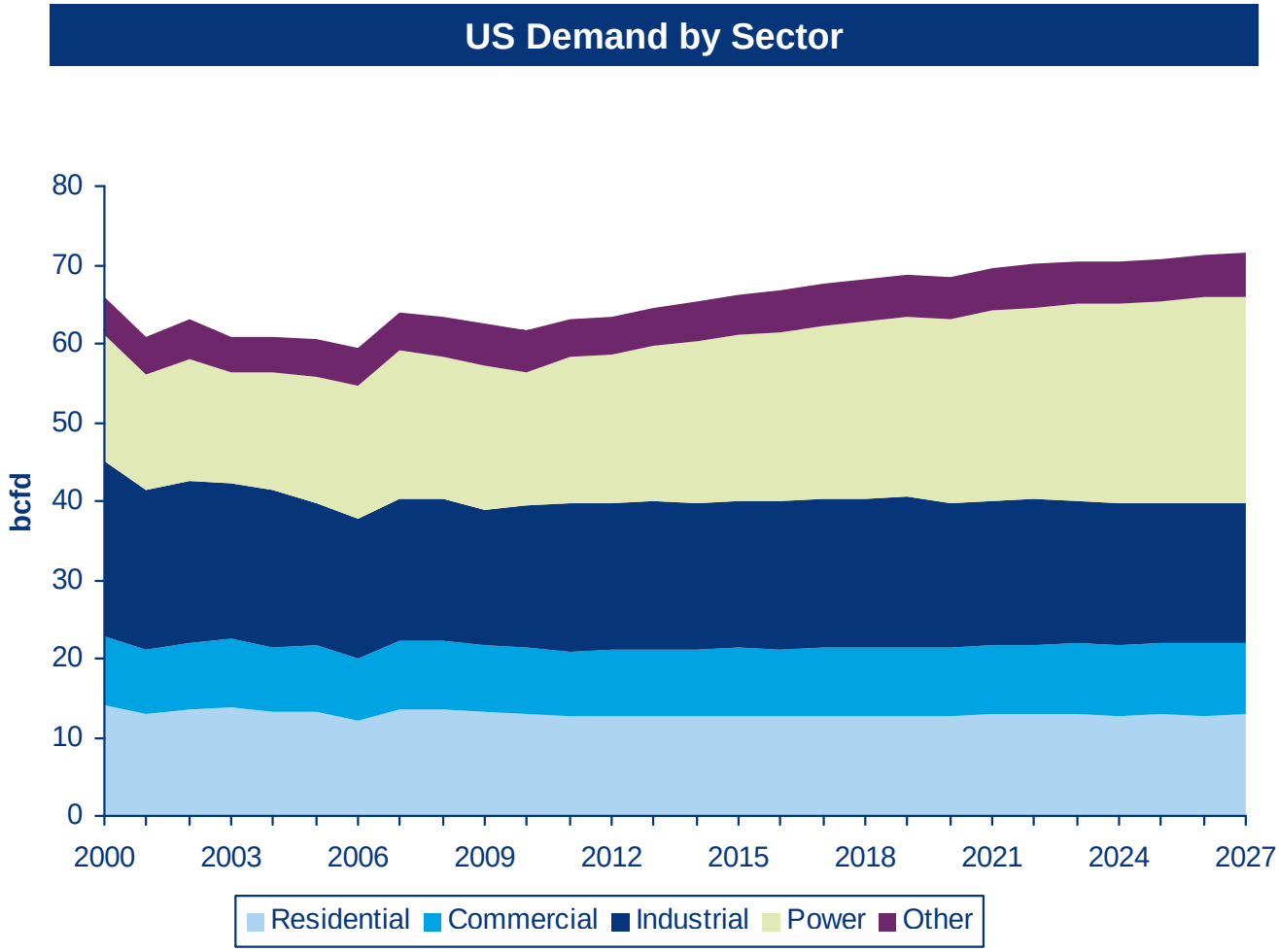


Gas's Share of Generation Starts to Recover in 2013



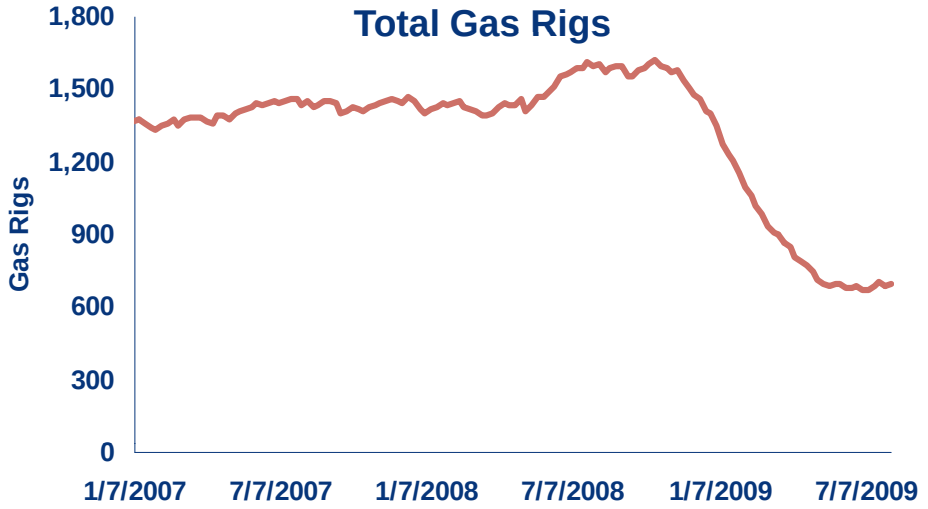
The Result: Overall Gas Does Not Resume "Normal" Growth Patterns for 2-3 Years

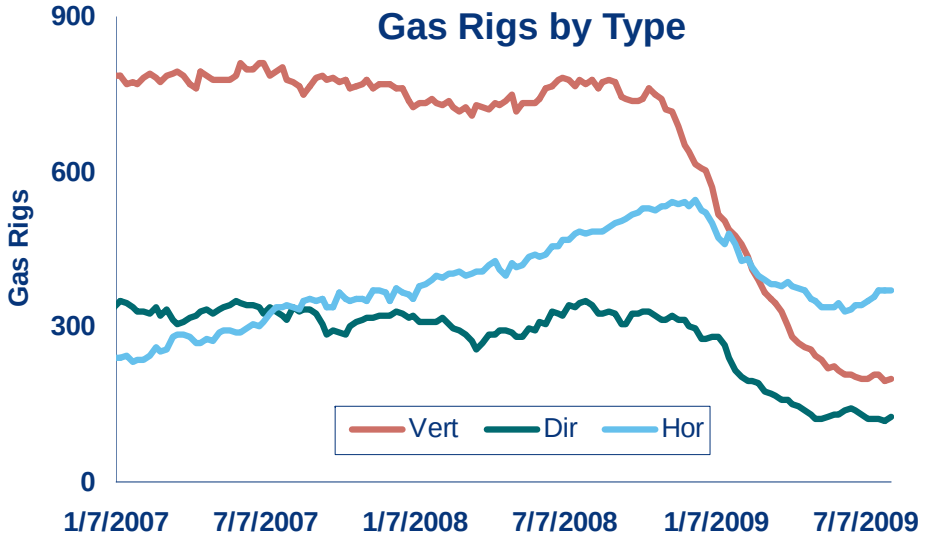
- Over the next few years weak GDP holds down power and industrial demand
- As the economy recovers, gas demand growth resumes
- Long-term, development of renewable and nuclear power capacity hold down gas' growth pace in the power sector
- Industrial, residential and commercial demand hold steady through the extended study period



Supply is – finally – beginning to decline

- Supply growth through first half of 2009 despite strong drilling cuts
- Majority of the rigs that came off early were vertical low horse power rigs
- 90-120 day lag between observed rig counts and production response
  - Lag includes time to drill, complete and tie-in wells
- In areas with capacity constraints including Barnett and Fayetteville, wells drilled last year tied-in through the first quarter
- GoM supply growth through the early part of the year from hurricane recovery

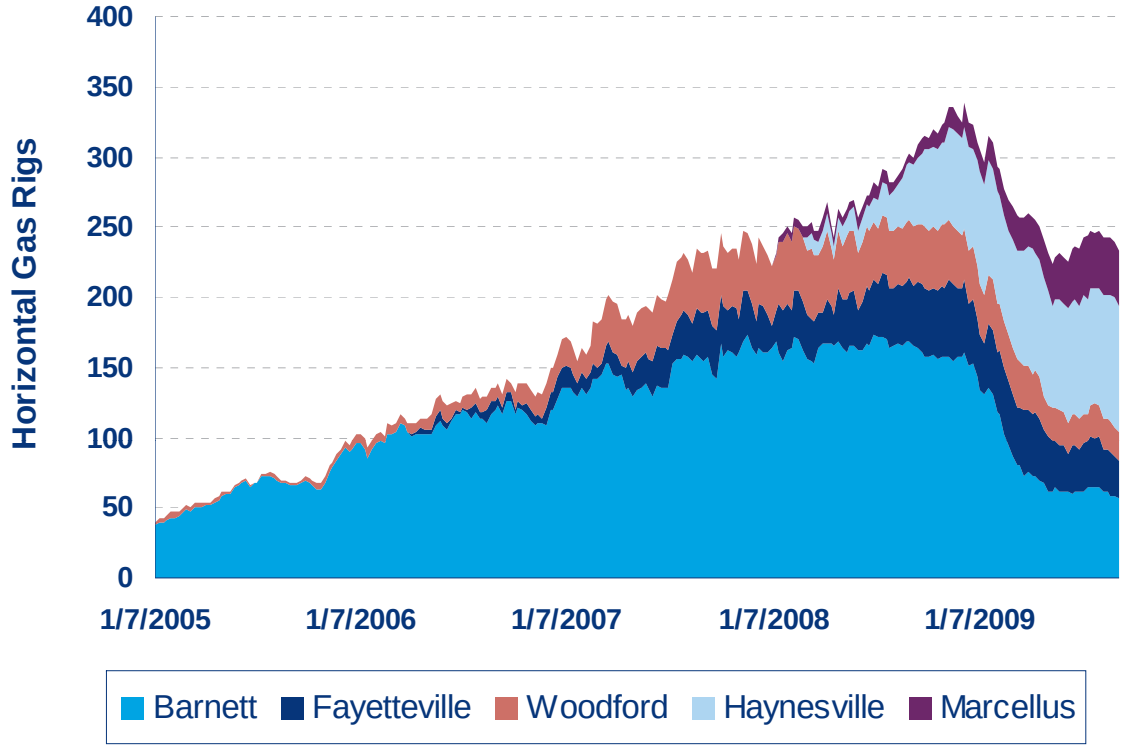




Source: Smith Bits and Wood Mackenzie

Even as shale rig counts are showing signs of life

- Shale drilling peaked in mid-December 2008 despite rig layoffs in other areas
- Drastic rig reductions in Barnett and Woodford plays
- In the emerging shales, operators have spent heavily acquiring acreage which needs to be held by production

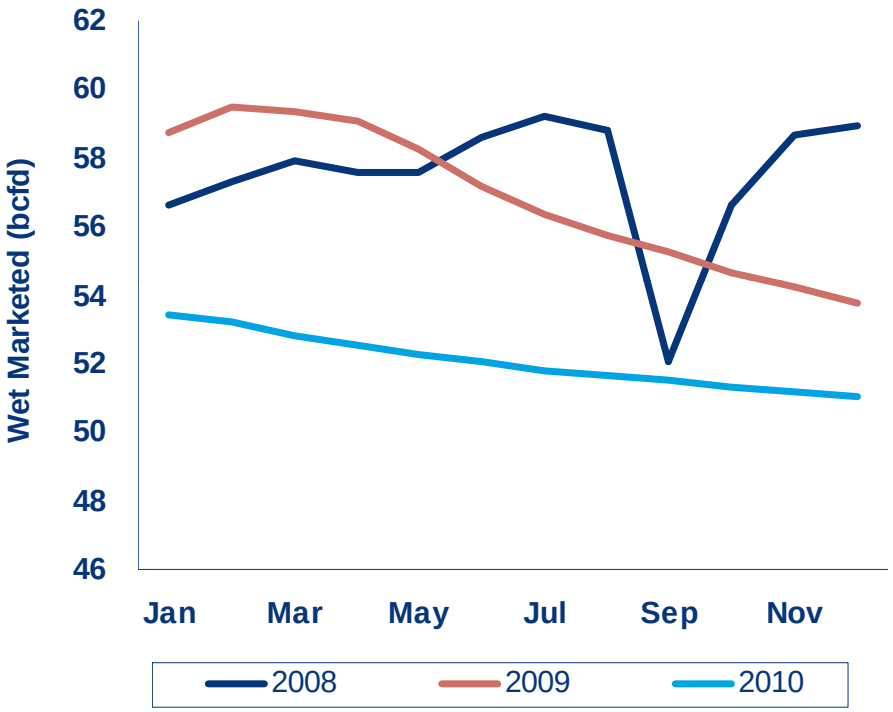


Source: Smith Bits and Wood Mackenzie

- Haynesville
  - Chesapeake, with joint-venture partner Plains, is continuing its pre-recession drilling program. Petrohawk has allocated 70% of its 2009 budgets toward Haynesville
- Marcellus
  - Range is deploying six fit-for-purpose rigs in 2009. Chesapeake-Statoil JV expected to increase its rig count to 20 by the end of the year.

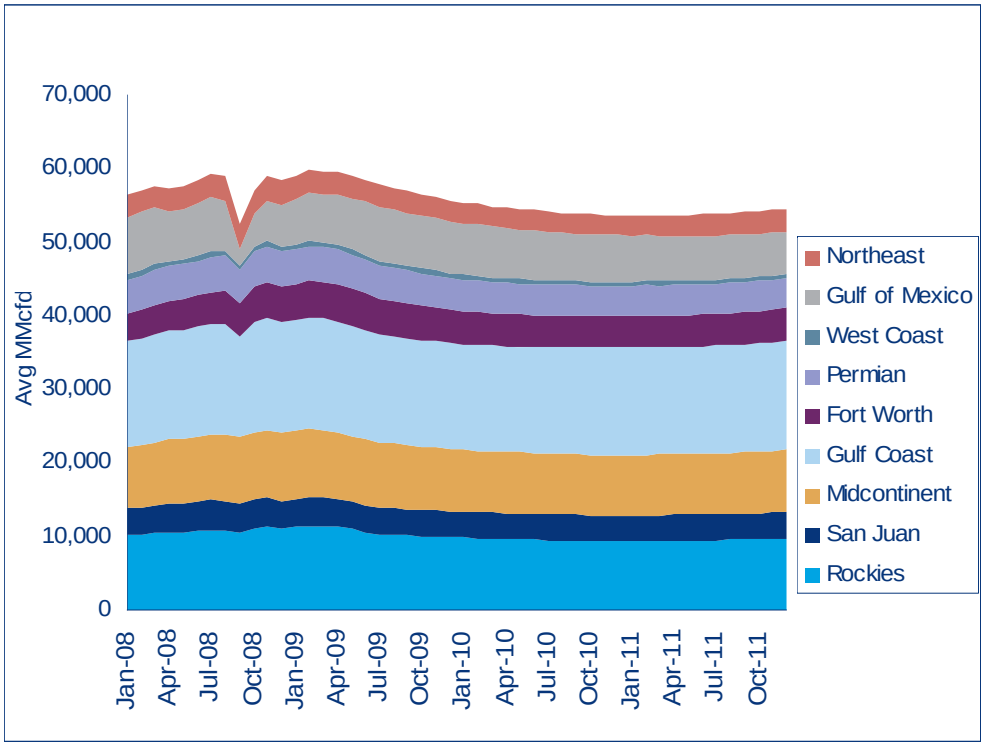
Shale production techniques and rig efficiencies have prevented a steep decline in Supply

US L48 Expected Production Levels



Source: Wood Mackenzie

US L48 Wet Marketed Production By Region

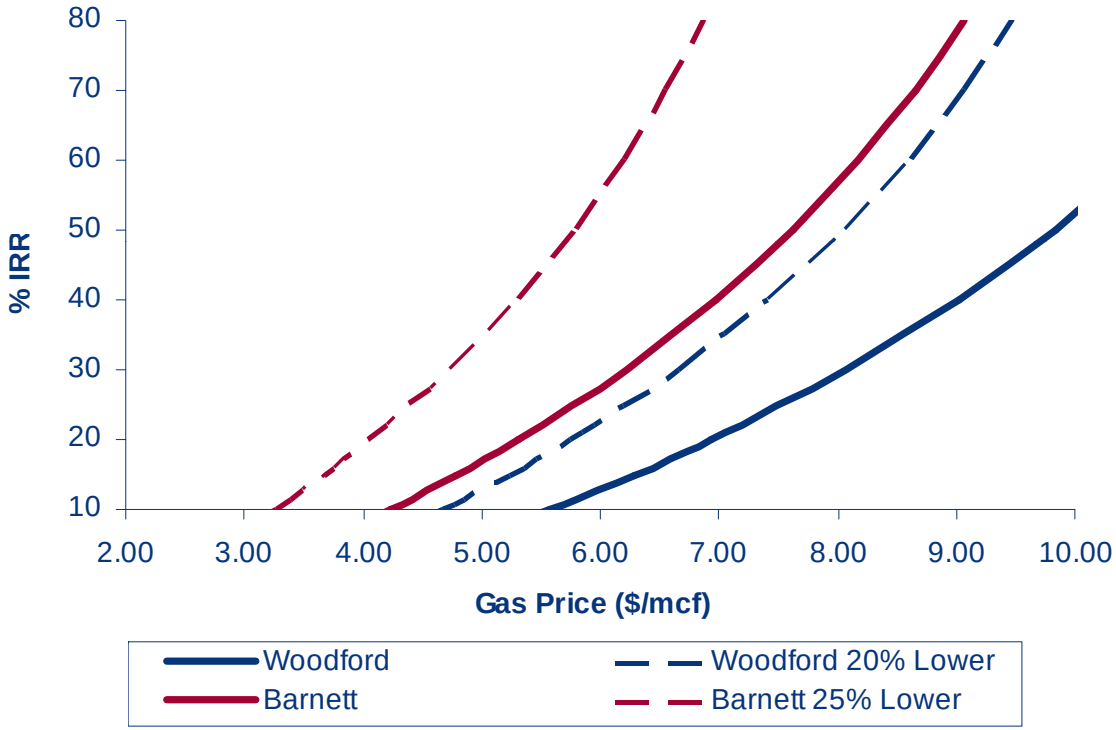


Source: Wood Mackenzie

- Annual yoy production remains flat in 2009 despite the strong drilling cuts
- 3.6 bcfd annual drop expected in 2010
- Monthly peak (early 2009) compared to early 2011 trough is approximately 6 Bcfd decline

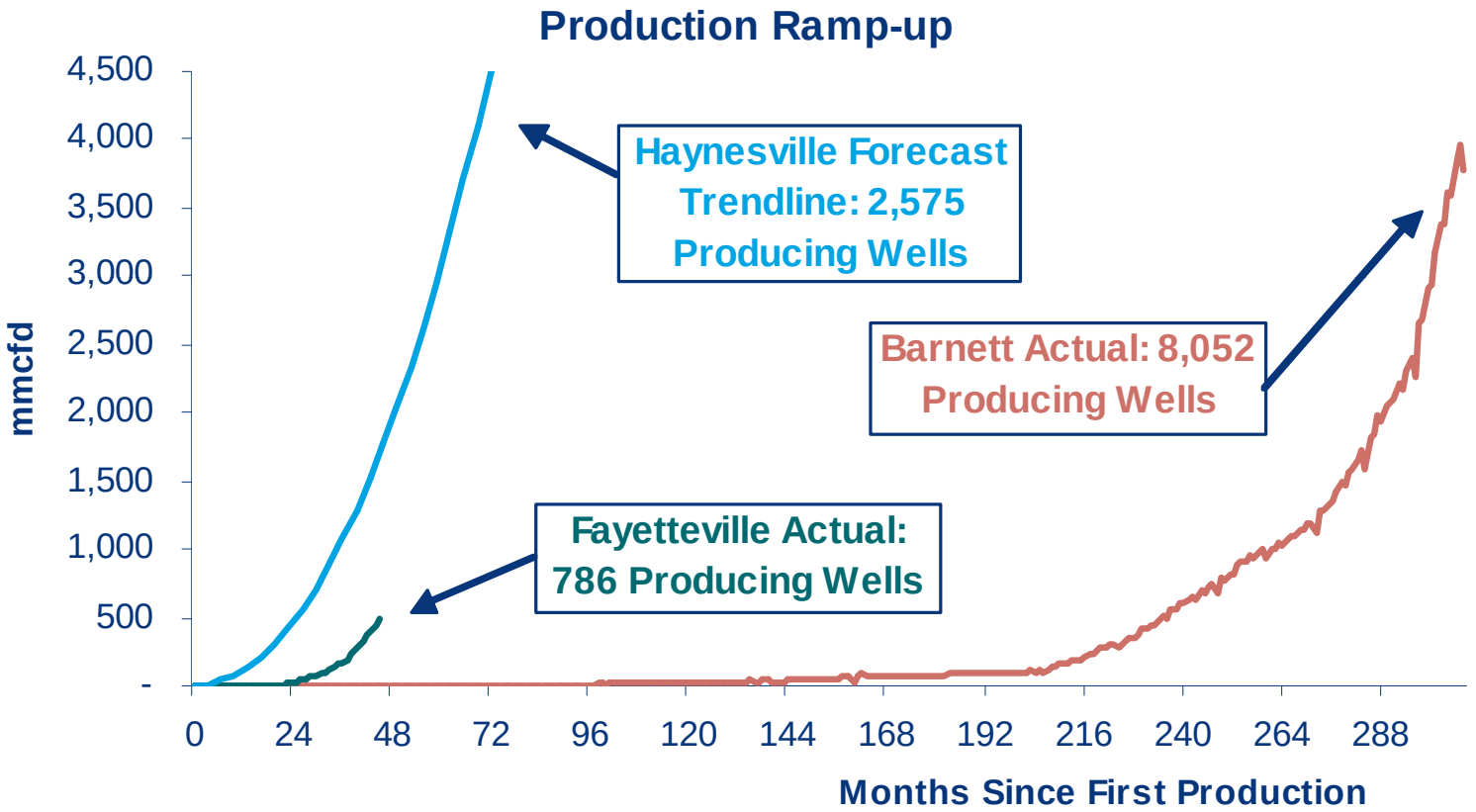
… but producers' costs have room to fall further too

- **Cost environment in 2009 to be more favorable for the E&Ps – costs expected to be 20-40% lower**
- **Cost declines not as steep in emerging shale plays. Barnett has seen significant cost reductions**
  - Rig rates 20-55% lower
  - Tubular costs down by up to 50%
  - Stimulation costs down by 30%
  - Lower fuel and chemical costs due to lower oil prices
- **Lower well costs translate to lower breakevens**
  - 10% reduction in well costs reduce breakeven costs by approximately 8% for Barnett and Woodford



Source: Modified from Wood Mackenzie Upstream Service

And production can ramp up faster: Experience results in faster growth for new plays

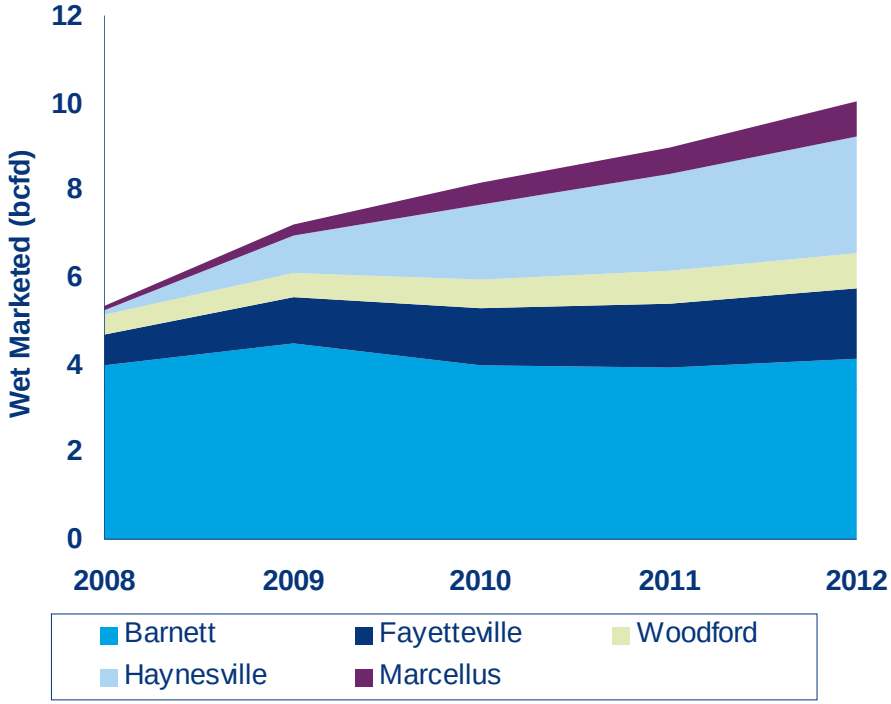


Source: Wood Mackenzie, State Production Data

Haynesville Time Zero is 1Q 2008; Fayetteville Time Zero is 2004; Barnett Time Zero is 1982

And for the most part, emerging shales have survived production cuts

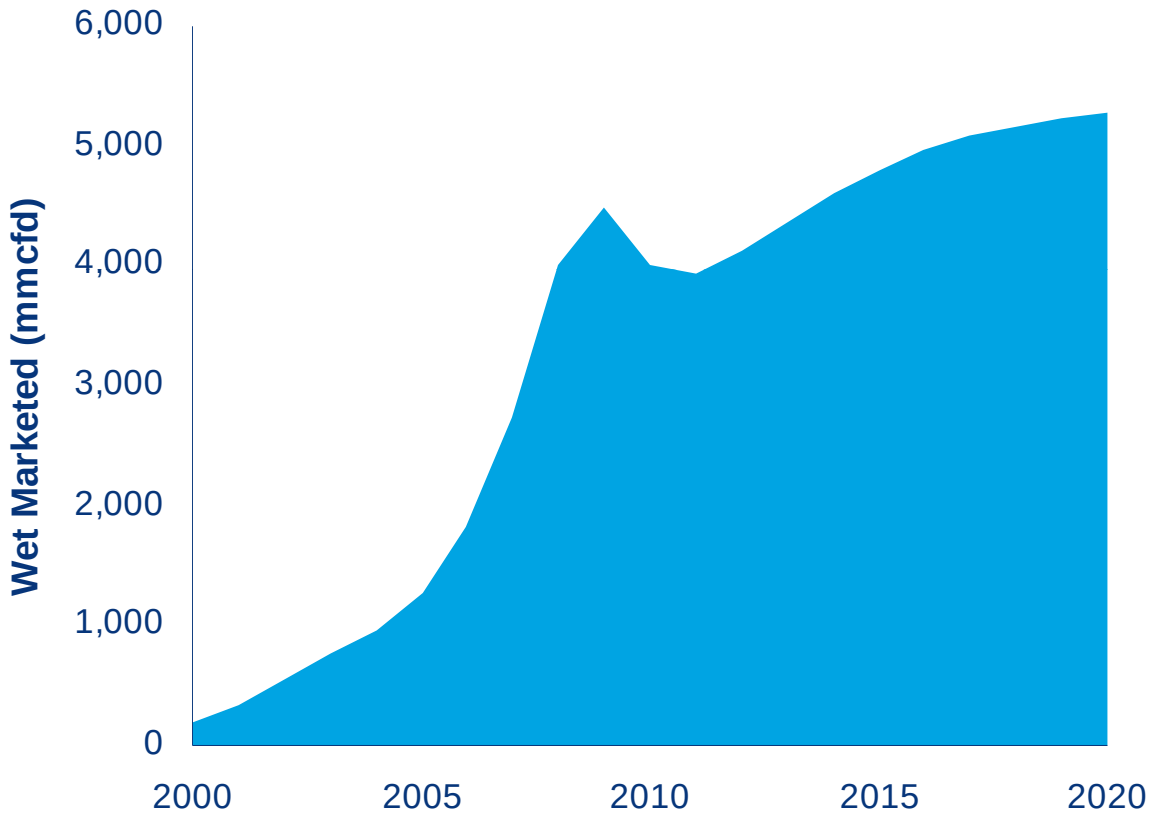
- **Operators have made significant investments in acquiring acreage**
  - Drilling expected to be robust to hold acreage
- **Haynesville**
  - Petrohawk and Chesapeake to maintain activity at previously planned levels
- **Horn River Shale**
  - Operators committing capital to further test and develop the play. Industry to drill 30-35 wells in the play
- **Marcellus**
  - Range and several others stepping up activity. Range deploying six fit-for-purpose rigs. Chesapeake planning to reach 20 rigs in the play by end of 2009
- **Fayetteville**
  - Southwestern drilling same number of wells as in 2008. Chesapeake expected to maintain 20 rigs in the play – nearly double early 2008 levels



Source: Wood Mackenzie NAGS & Upstream Service

Barnett

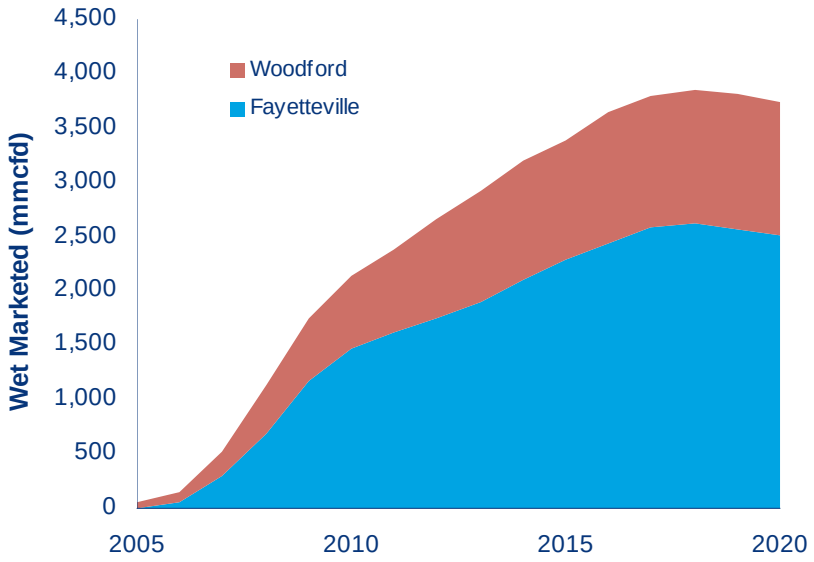
- **Wellhead production averaged 4.35 bcfd in 2008**
- **Rig counts down 61% from 2008 peak**
- **Large independents that have driven growth have announced aggressive spending reductions**
- **Well performance still improving**
- **Future of Barnett**
  - Tighter spacing in the core - majority of expansion in Core area will be in increasingly urban setting
  - Limited expansion to the West. Large drop in activity from pre-recession levels expected
  - Re-fracturing of existing vertical wells



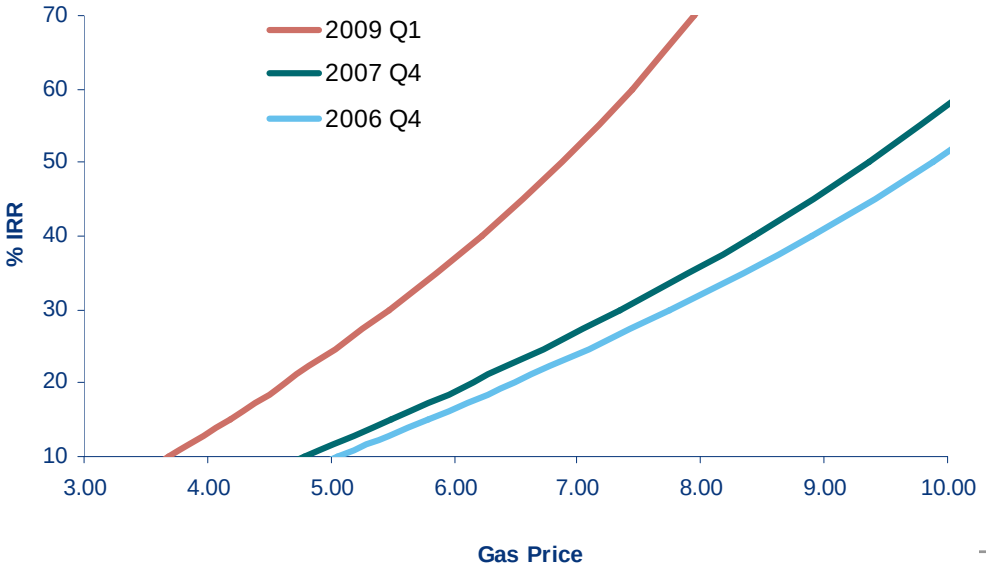
Source: Wood Mackenzie NAGS and Upstream Service

Arkoma Shale Plays

- **Fayetteville**
  - Pioneered by Southwestern. Major operators include Chesapeake/BP, XTO and Petrohawk
  - Well performance steadily improving. Average IPs for Southwestern's wells increased by over 50% from 2007
  - Operators moving to pad drilling
  - Capital commitment despite the downturn
- **Woodford/Caney**
  - Pad drilling has significantly reduced well costs for Newfield
  - Newfield expects 40 acre ultimate well spacing for reserve optimization

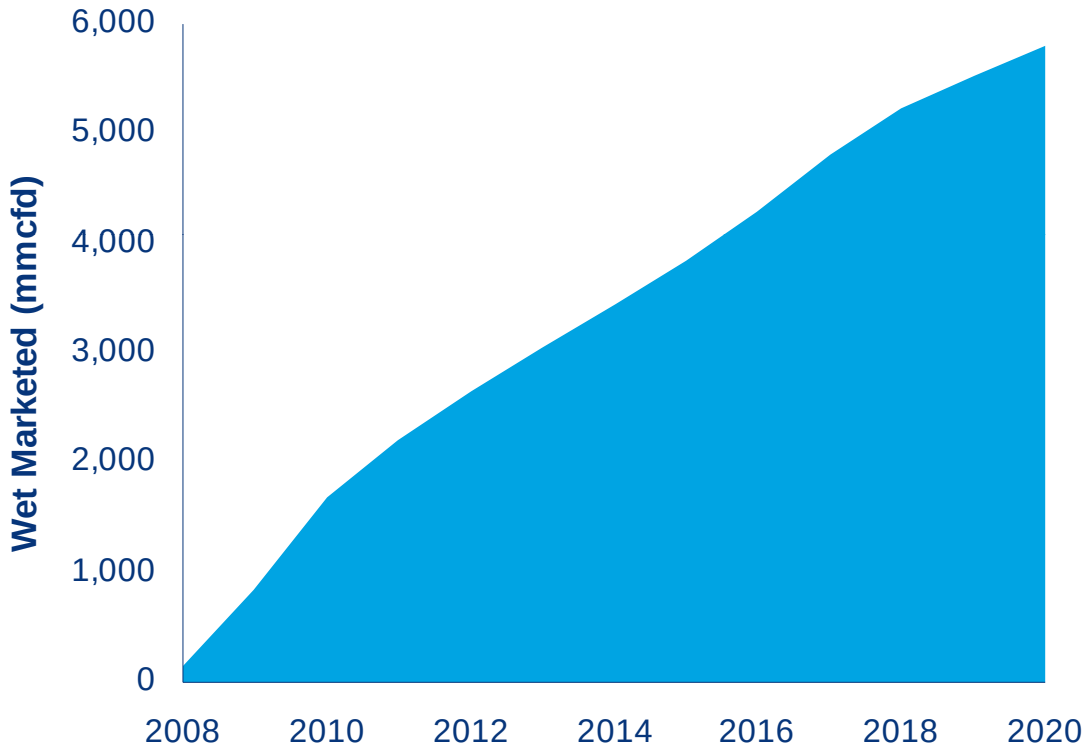


Improvement in Fayetteville Economics for Southwestern Energy



Haynesville Shale

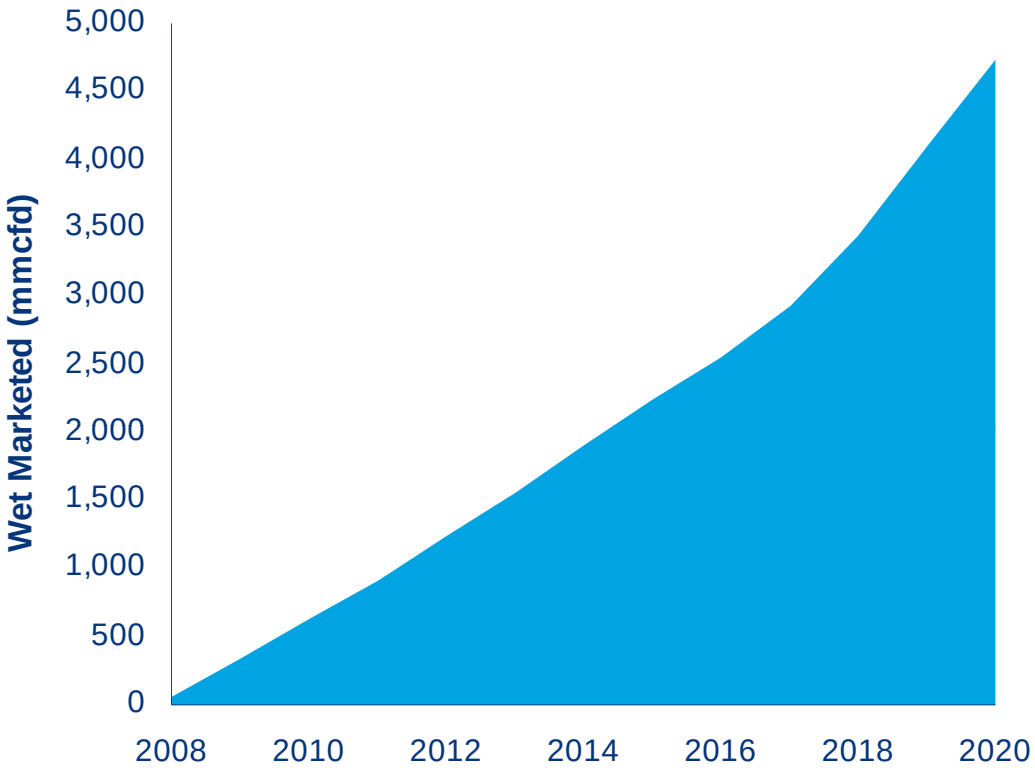
- Haynesville described as one of the biggest plays in the region
- Core area preliminarily designated as 3.5 million acres in Caddo, De Soto, and Bossier parishes in NW Louisiana
- Over 90 horizontal rigs active in the region
- Wells being drilled on 640-acre spacing to hold leases. Downspacing likely to 80 and 60 acres.
- Current unrisked net resource potential over 130 tcf - **operator announced only**
- Optimism supported by strong well results - initial production rates of 8-28 mmcfd
- Horizontal wells expected to recover 4.5-8.5 bcfe



Source: Wood Mackenzie NAGS and Upstream Service

Marcellus Shale

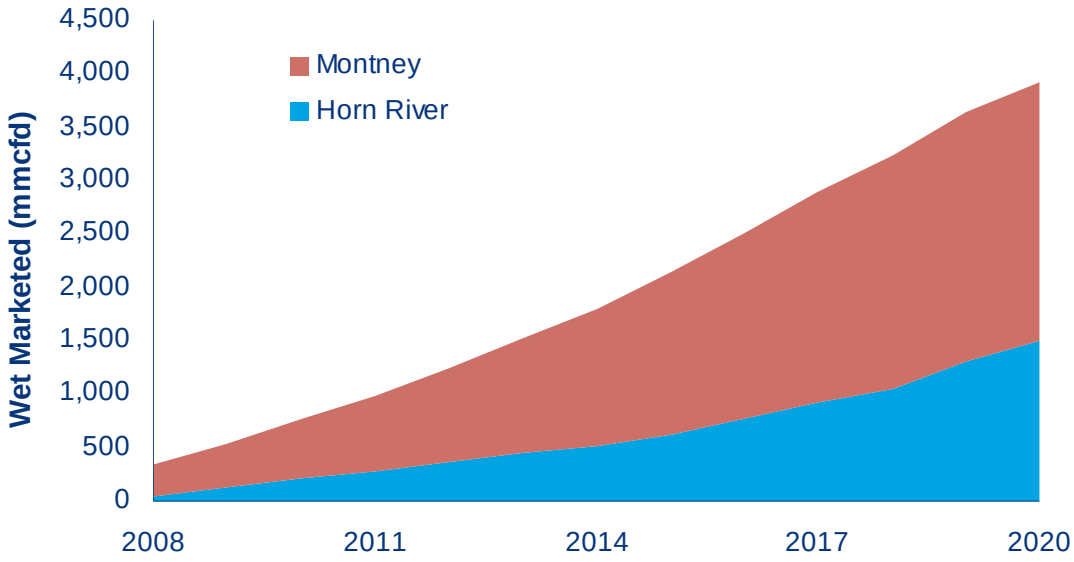
- Large volumes of gas in place – recent studies estimate up to 300 tcf recoverable
- Well performance improving. Range has reported consistent IP rates over 5 mmcfd
- Horizontal wells expected to cost US$ 3.0-4.0 million
- Marcellus economics among the best due to better lease terms and premium prices
- Operators making progress with well permitting and water issues
- Initial development concentrated in the Southwestern portion of the play along PA-WV border
    - Infrastructure in NE PA is challenging



Source: Wood Mackenzie NAGS and Upstream Service

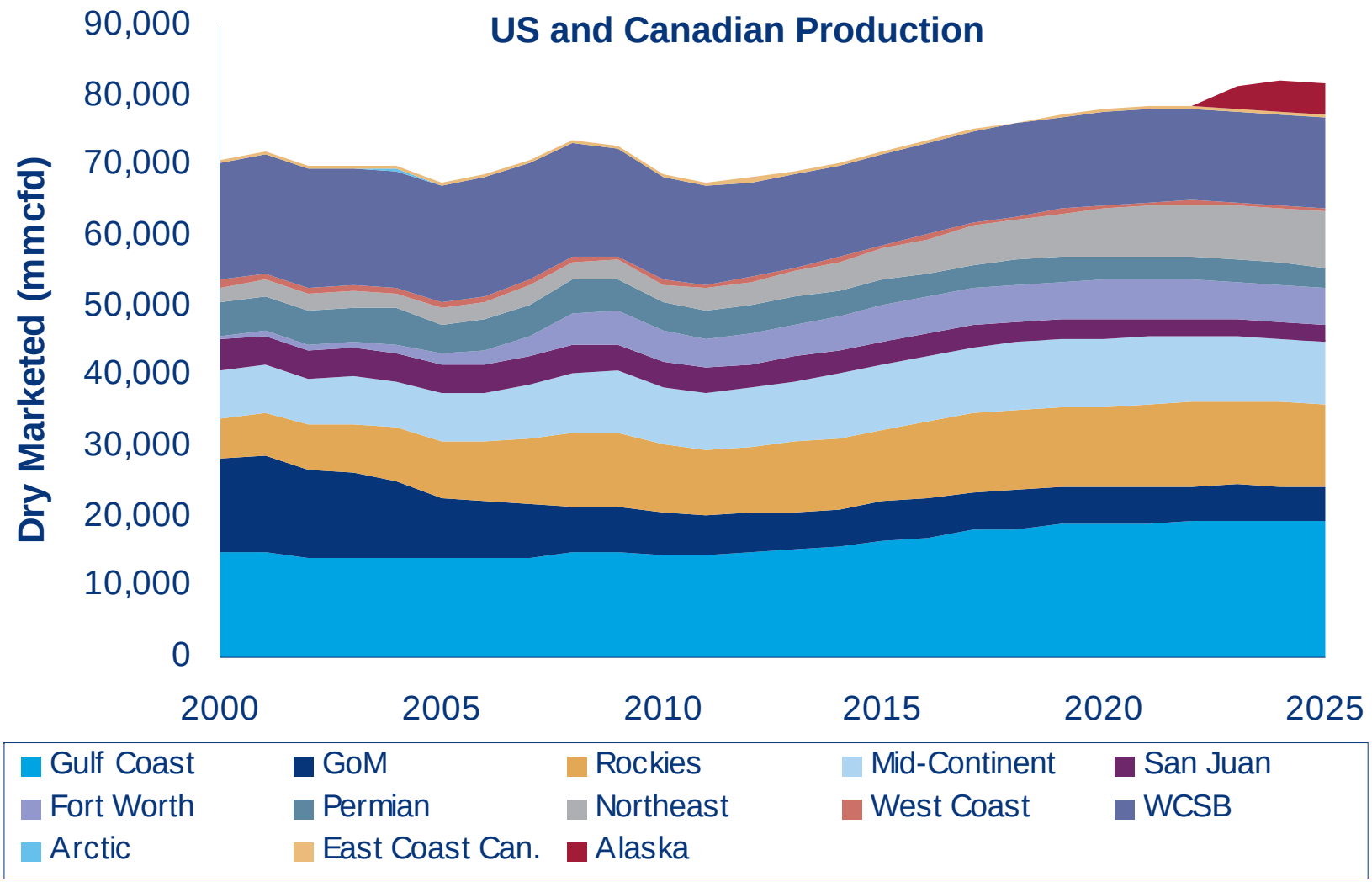
WCSB - Horn River Shales and Montney

- **Horn River**
  - Over 500 tcf of gas-in-place. Operator announced recoverable gas resources of up to 36 tcf
  - Long laterals with large fracture stimulations leads to high well costs. Costs however decreasing rapidly
  - Limited infrastructure
- **Montney**
  - Originally developed with vertical wells. Multi-stage fracture stimulated horizontal wells very successful
  - GIP estimates vary – estimated volumes are 150 tcf
  - Bulk of activity concentrated on the BC portion of the play
  - Operators actively targeting the play



Source: Wood Mackenzie NAGS and Upstream Service

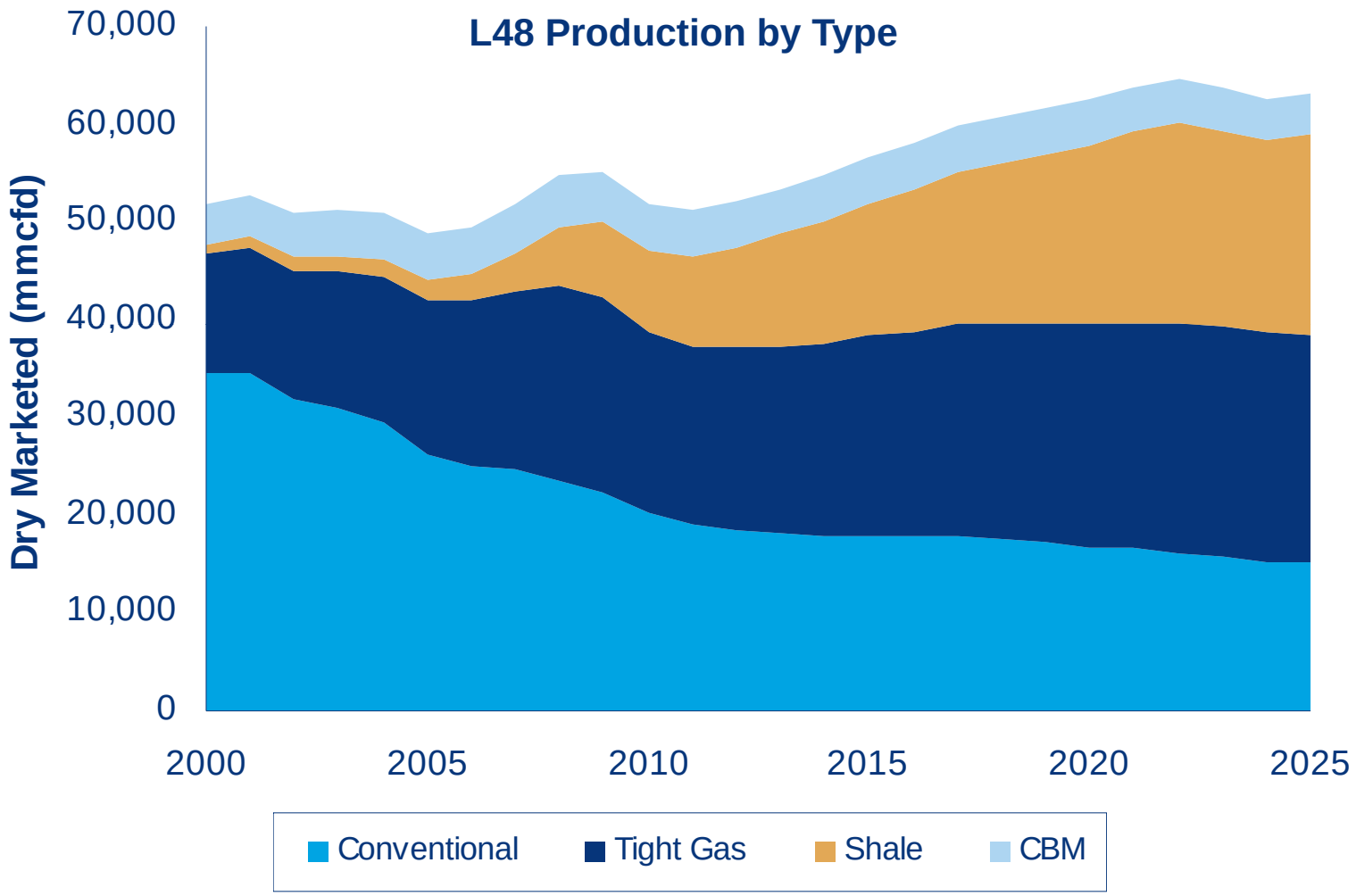
Longer Term: Potential for Strong Growth in Domestic Supply



Source: Wood Mackenzie NAGS and Upstream Service

Source: Wood Mackenzie North American Gas Service

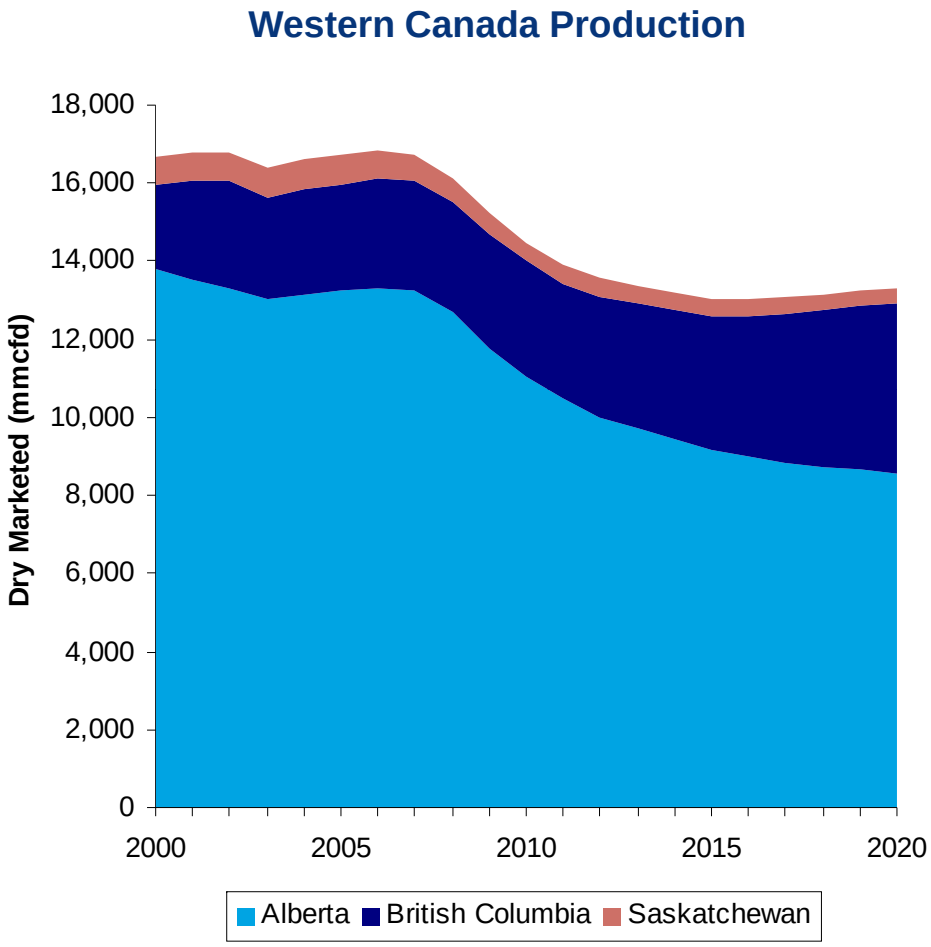
Shale Gas Growth Represents a Paradigm Shift in Supply



Source: Wood Mackenzie NAGS and Upstream Service

Unconventional Production Growth from British Columbia

- **Strong declines through 2011, reflecting the economic trends**
- **No strong catalyst to reignite Albertan drilling**
  - The new royalty framework has changed investment climate as evidenced by land sale results
  - Transitional royalty terms have not impacted drilling levels
- **Montney and Horn River plays expected to support production growth in British Columbia**
  - Strong drilling activity in Montney despite the downturn

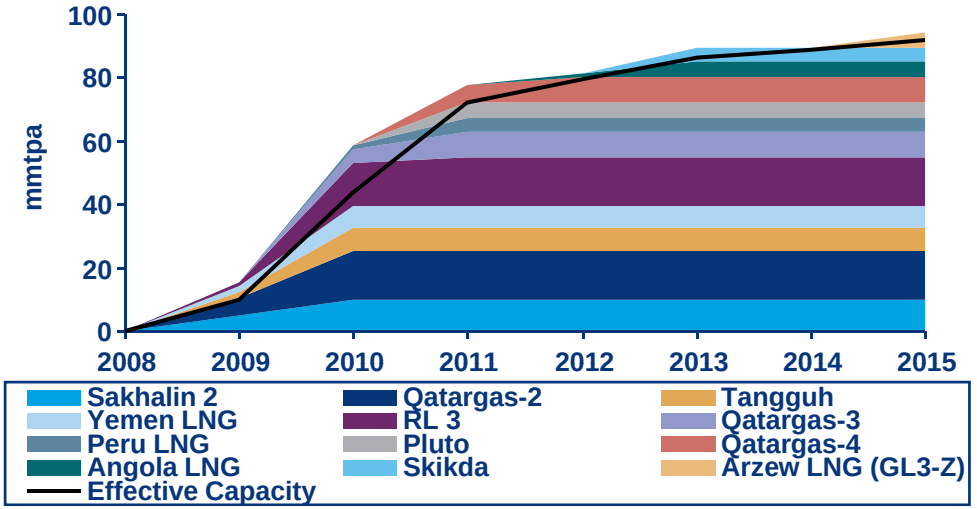


Source: Wood Mackenzie NAGS and Upstream Service

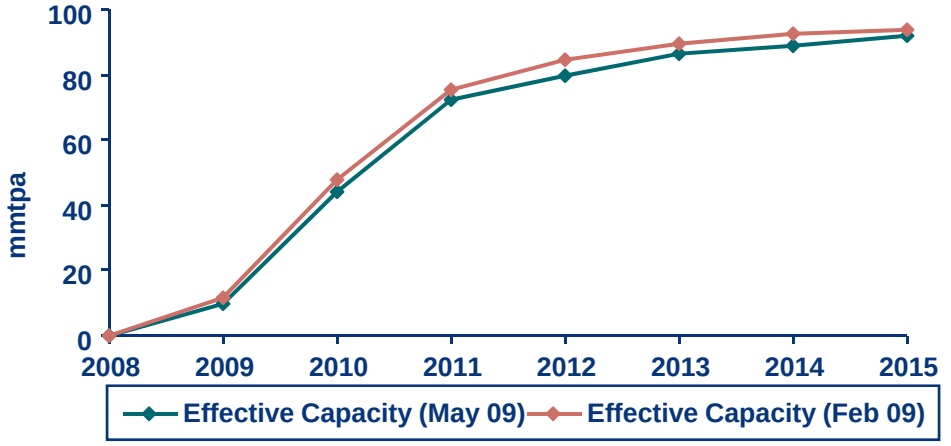
Internationally, over the next few years 90 mmtpa of new LNG capacity will have come on-stream since Q1 2009

- **In Qatar, the first mega-train is on-stream with a further five expected to follow by the end of 2011**
  - Sakhalin-2 and Tangguh have started to export LNG and we expect Yemen and at least one more mega-train in Qatar to follow by year-end
- **However, there will undoubtedly be issues as the trains ramp-up and our expectation of the LNG volumes that will actually be produced from this new capacity is somewhat lower than the nameplate capacity ('effective capacity')**
- **We also continue to see delays to start-ups (e.g. Yemen and Skikda) which is further impacting the expected near-term production from the trains**
  - Compare Feb-09 forecast with our latest view
- **Important to note that all of this capacity will eventually come on-line and will have a big impact on the market in the near term**

Forecast Supply Additions from Capacity Currently Under Construction



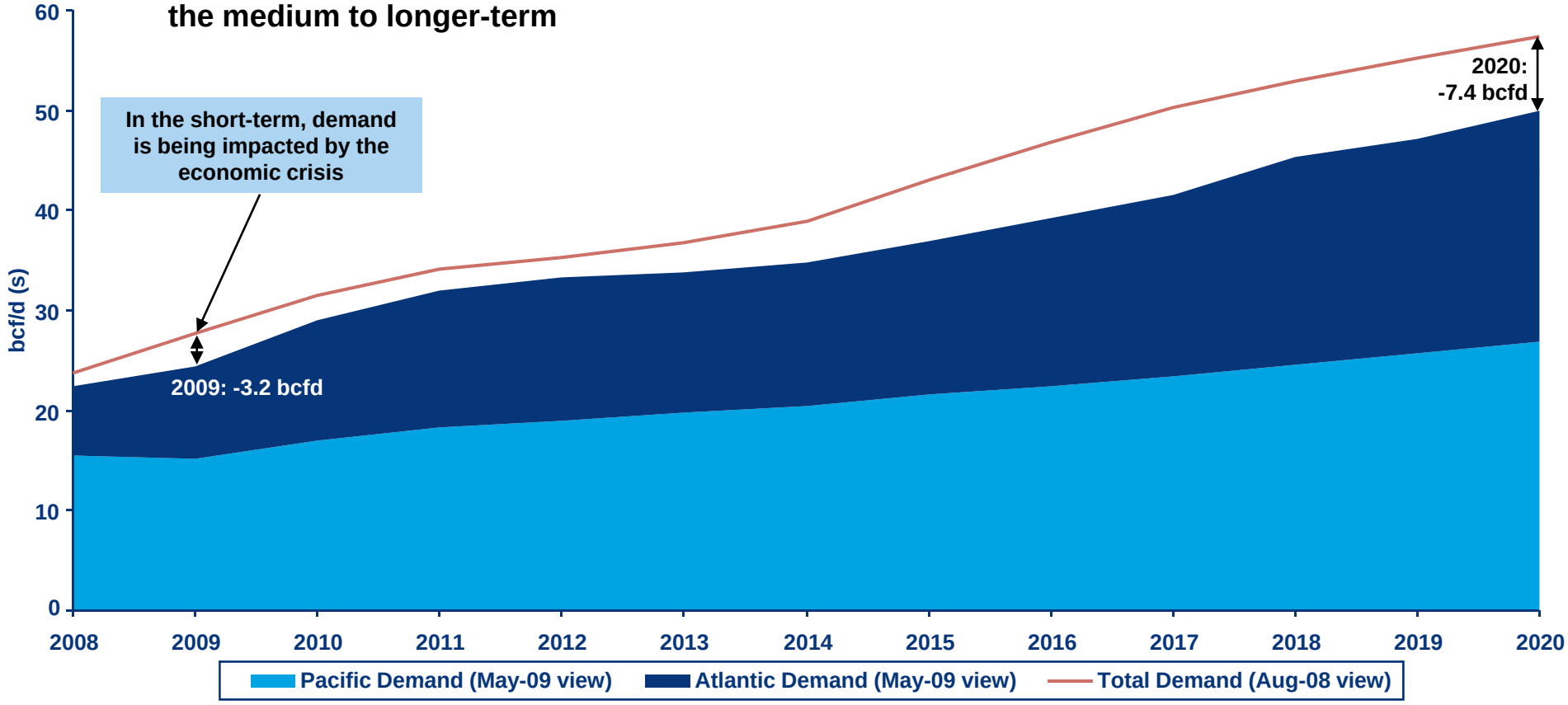
Forecast Production from Capacity Currently Under Construction (Latest View)



Note: 1 mmtpa of LNG = 0.13 bcfd of gas. Source: Wood Mackenzie LNG Tool

At the same time, global LNG demand is coming under serious pressure…

- North America had been key to forecast Atlantic Basin LNG demand growth, but the upside in indigenous unconventional gas production has dramatically reduced LNG requirements
- The economic crisis (and associated loss of demand) is expected to create a 'demand lag' in the medium to longer-term

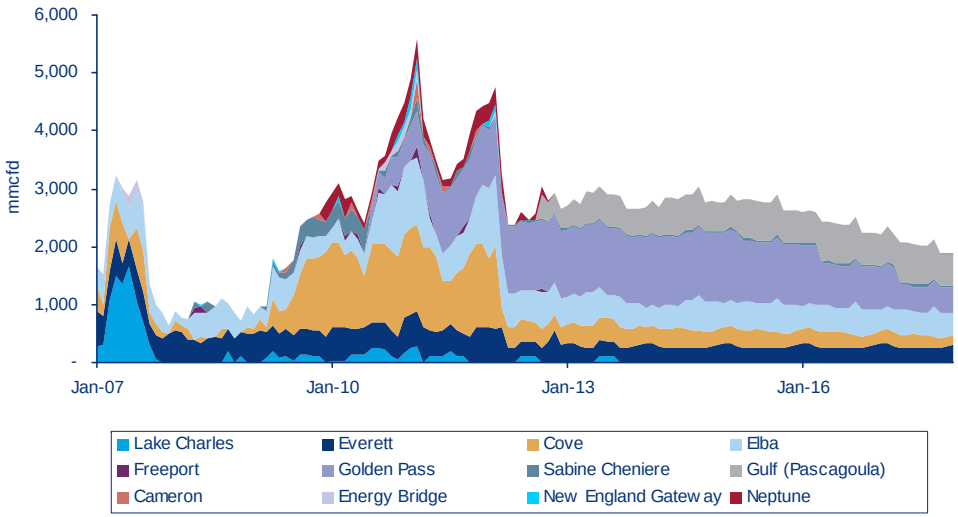


LNG trade in 2008, LNG demand 2009-20

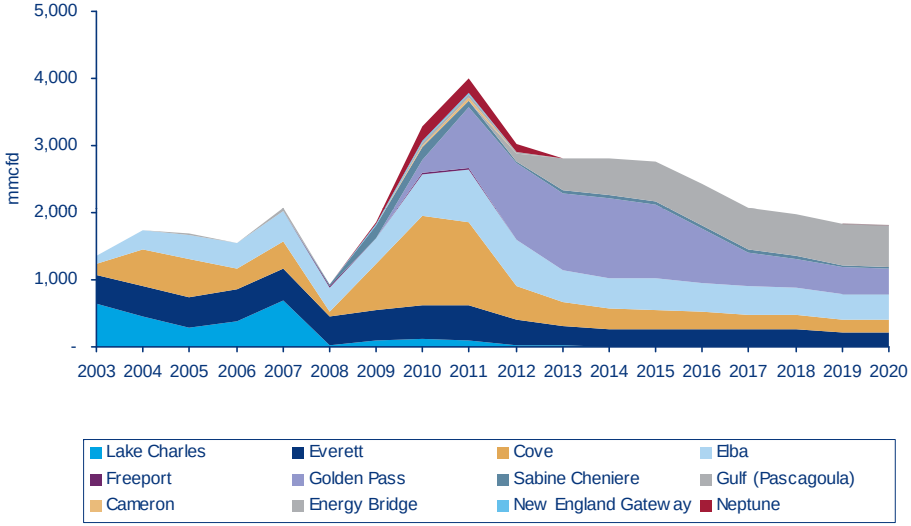
Source: Wood Mackenzie LNG Tool

Net result: US LNG imports are expected to rise through 2012 before declining steadily

Monthly LNG Volumes into the US



Annual Average LNG Volumes into the US

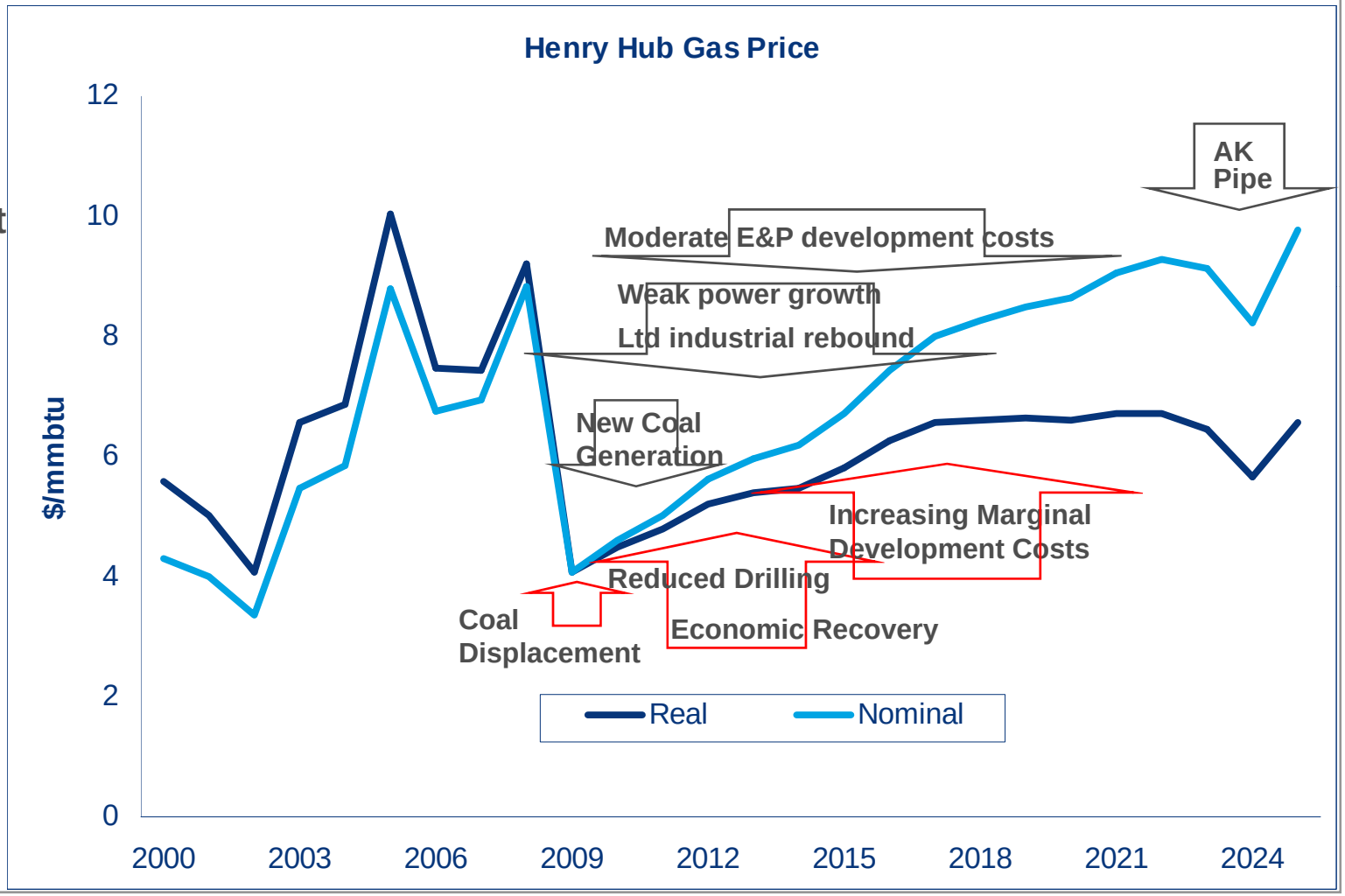


- LNG imports rise by 1.5 – 2.0 Bcfd next year, helping to offset supply declines
- Imports hit a peak of 4-5 Bcfd in 2011-2012 before beginning a long-term decline.
- Gulf Coast imports will increase the most, along with Cove Point (MD).

Source: Wood Mackenzie North American Gas Service

Bottom Line – Annual gas prices longer term will fluctuate between $5.00 - $6.50 (2009$), trending higher, depending on the cost of US development.

- BUT – It could be another 2 years before prices are sustained within that range
- Woodmac Nov-Mar: $4.85
- NYMEX (Wed): $5.84
- 2011: low $4.00s at Henry, with static demand and more rigs active.
- Don't you wish you could buy the Woodmac forward curve?



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