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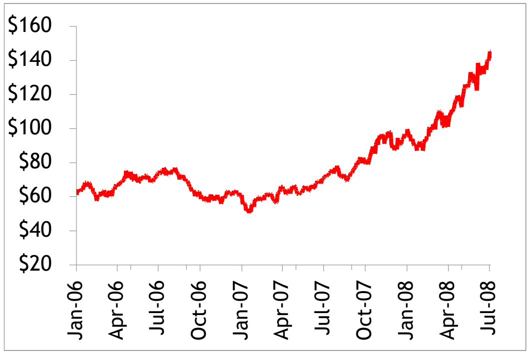
IAEE Houston, November Meeting

Disclosures on page 30

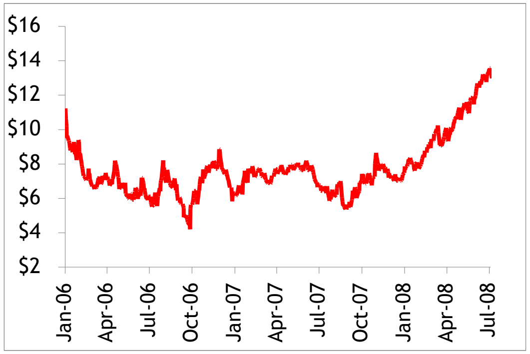
November 12, 2009

Commodities (before peak)

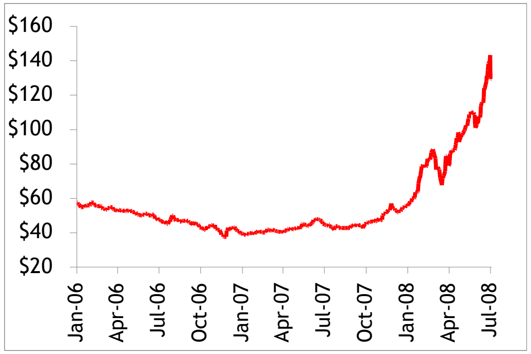
CRUDE OIL



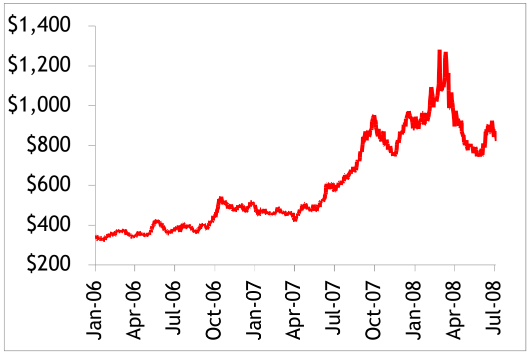
NATURAL GAS



COAL



WHEAT



US DOLLAR

GOLD

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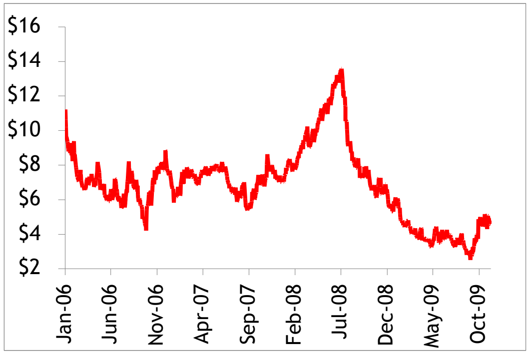
Commodities (to current)

CRUDE OIL

NATURAL GAS



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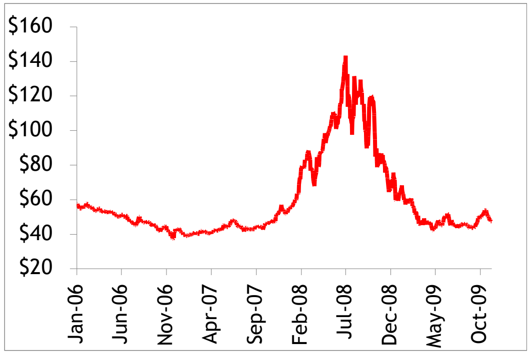
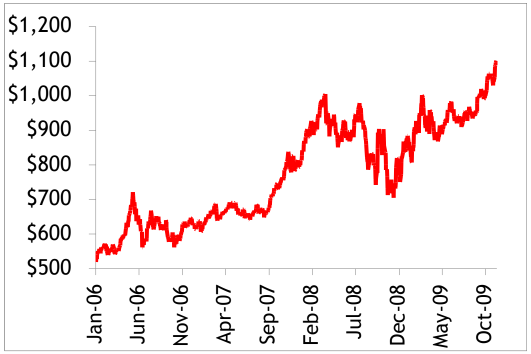


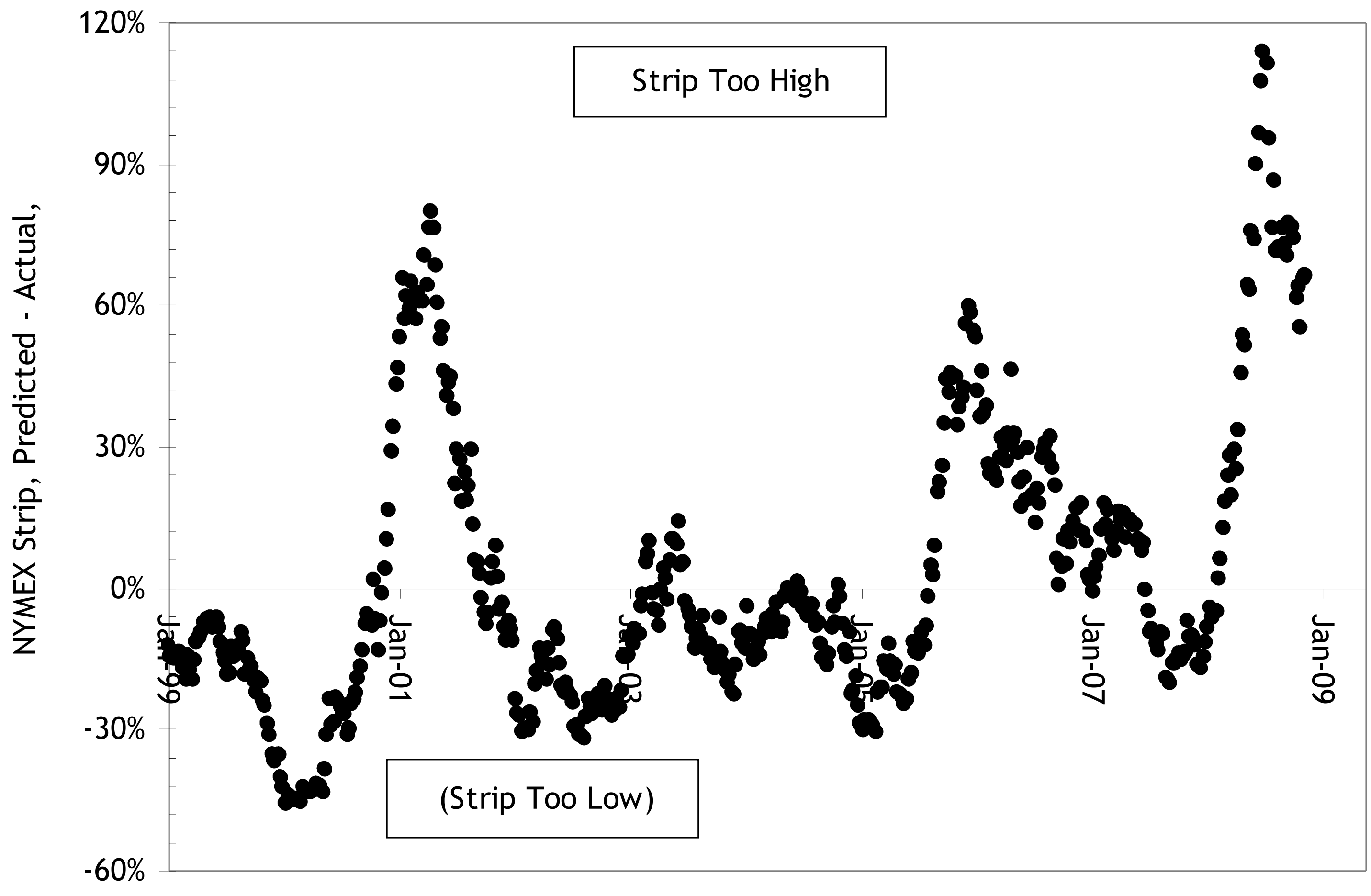
WHEAT

US DOLLAR

GOLD



Futures – Are They Accurate?



"That's mathematics, son. You can argue with me, but you can't argue with figures." **Foghorn Leghorn**

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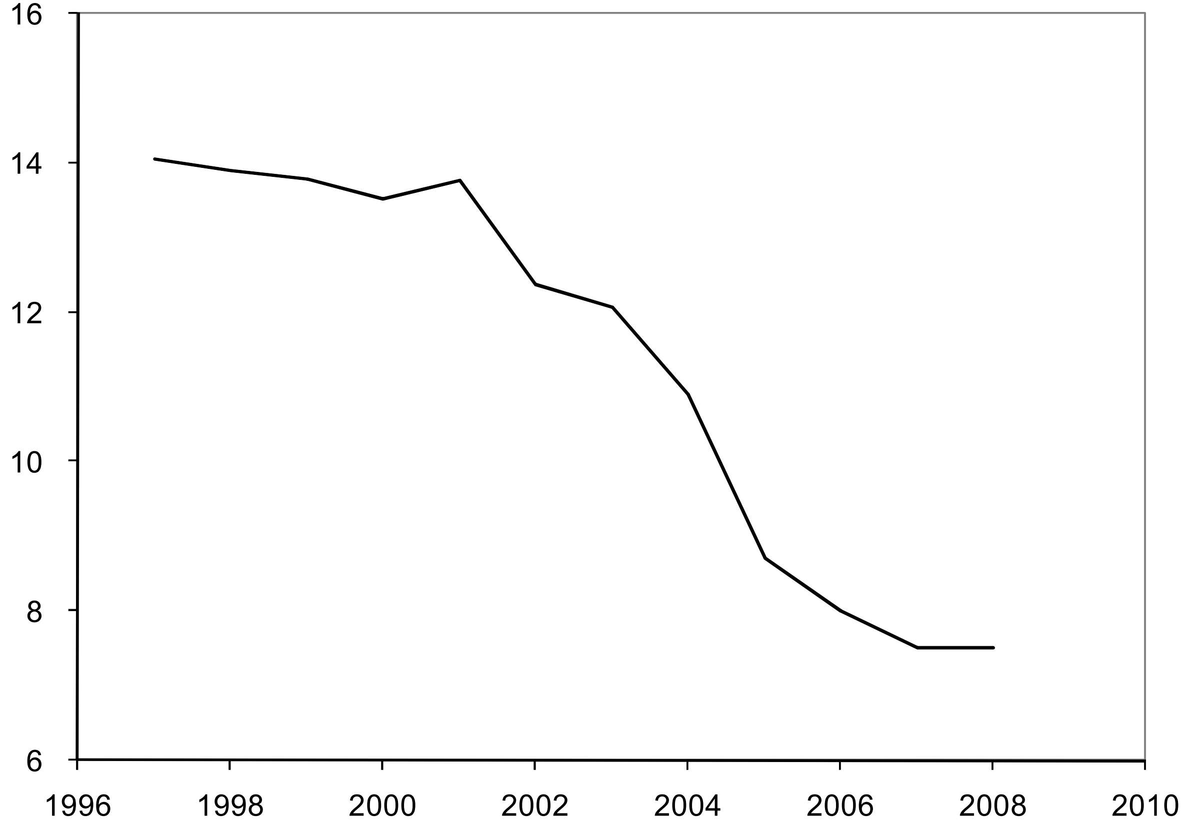
Shalemania

- Long Term – ample gas supply
  - Need fewer rigs in fewer places
  - Shales will grow
  - Everywhere else declines
- Near Term – declines kicking in
  - Current rig count unsustainable…too low
  - 2010 – activity pick-up…but service pricing?
- Crude oil
  - The Rod Tidwell of energy "You're loving me now!"
  - Lots of desire to "get oily"…but harder to accomplish

Why Shale? Meet GOM Production



“I can hardly remember how I built my bankroll, but I can't stop thinking about the way I lost it."   *Mike….Rounders*

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US Major Producing Basins

32 separate production regions…including the 6 major shale plays

"According to the map we've only gone 4 inches."
Harry…Dumb and Dumber

Source: TPH Estimates

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TPH Natural Gas Wellhead Supply Model

Data Gathering

- Define basin area
- Pull historical production data from HPDI
- Review data and analyze vintage performance

Model Development

- Construct base & new well models
- Develop theoretical type curves
- Tie rig count to new production

Calibration

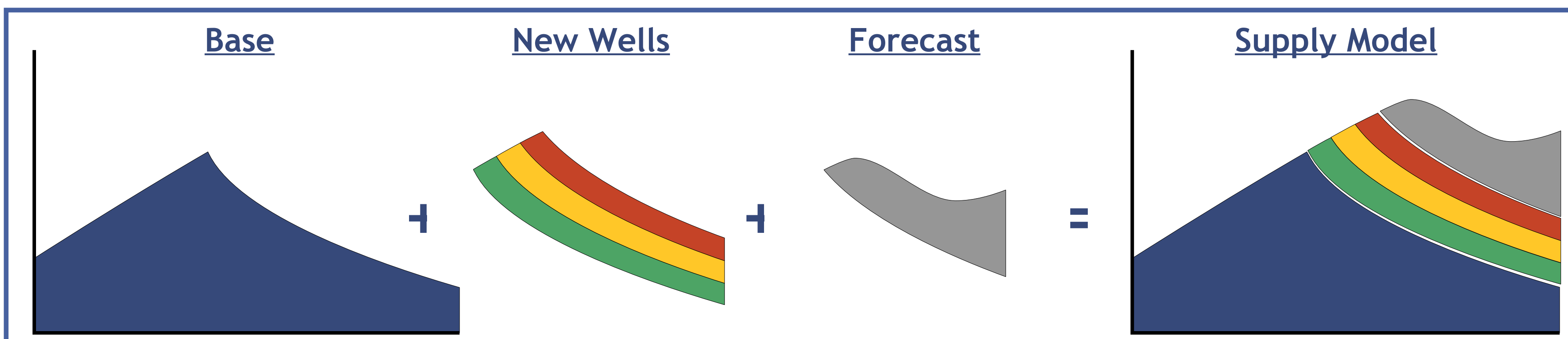
- Match new well type curve model to actual performance of wells completed in 2008
- History match the base wedge model to actual basin production

Assembling the Parts

- Aggregate base and new well models
- Check total history match

Forecasting

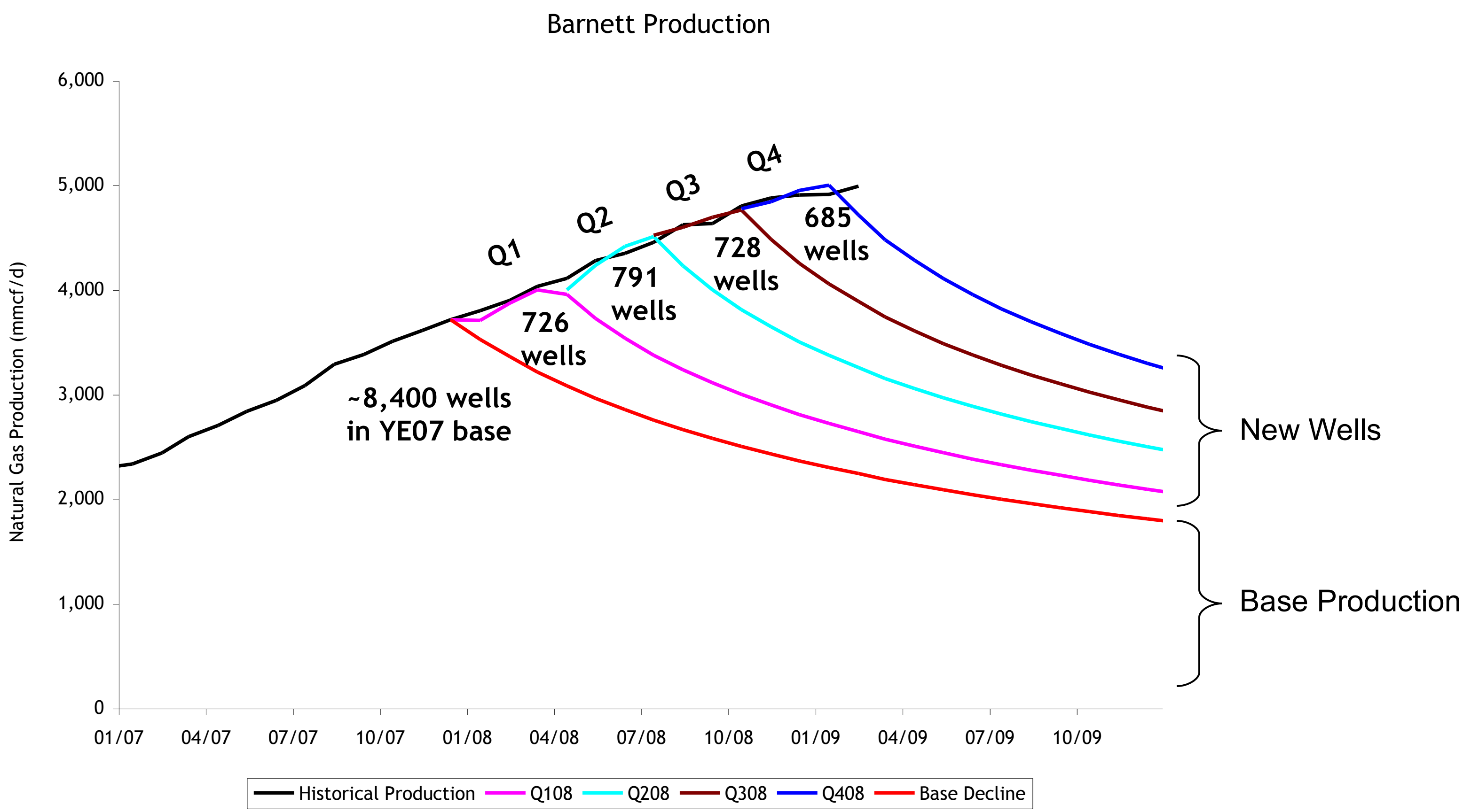
- Combine rig count projection with forward type curve and base decline models
- Run sensitivities



Step I: Developing the Basin Type Curve

Barnett Shale

- Base production (12/07) includes ~8,400 wells with total production of 3.7 bcf/d
- 2008 activity: 185 rigs drilled 2,930 new wells, increasing production by 32% or 1.2 bcf/d



Source: Rig Count = Rig Data, Production History = HPDI and EIA, Forecast = TPH Estimates
Note: Wellhead production is wet gas

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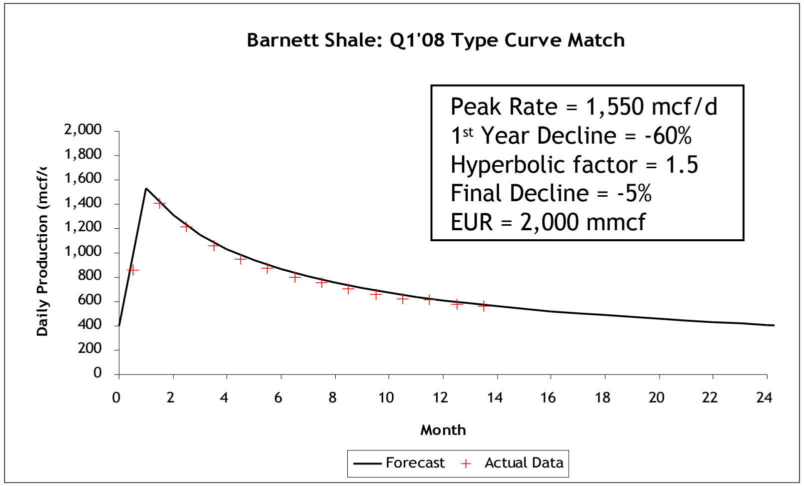
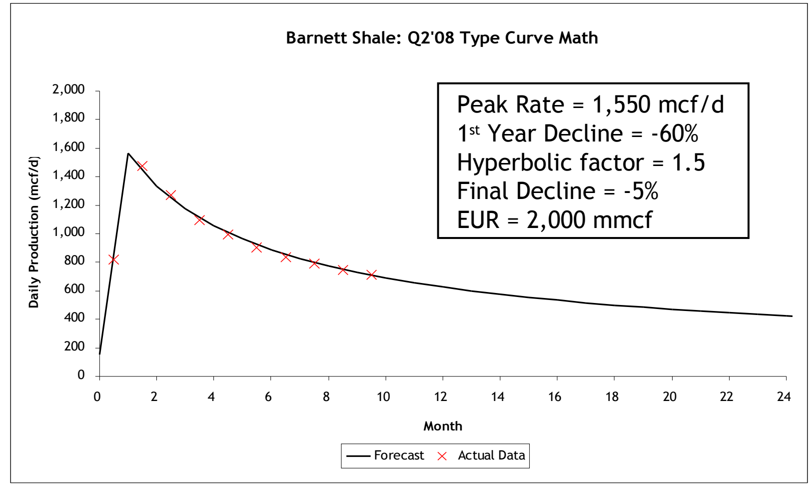
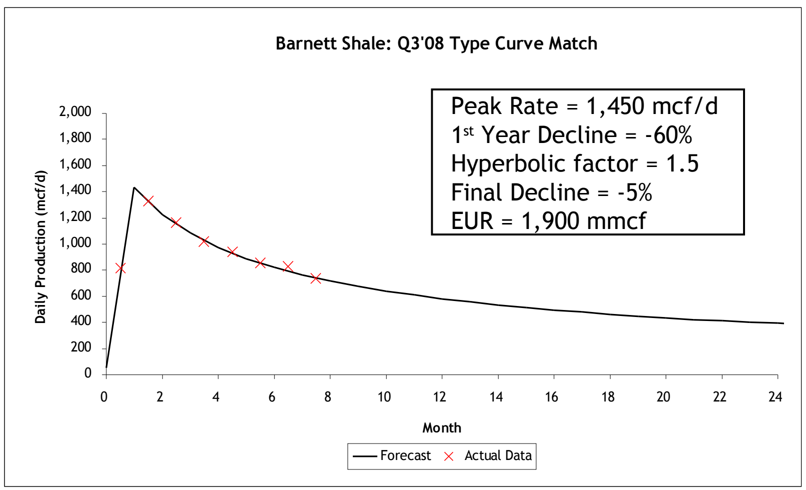
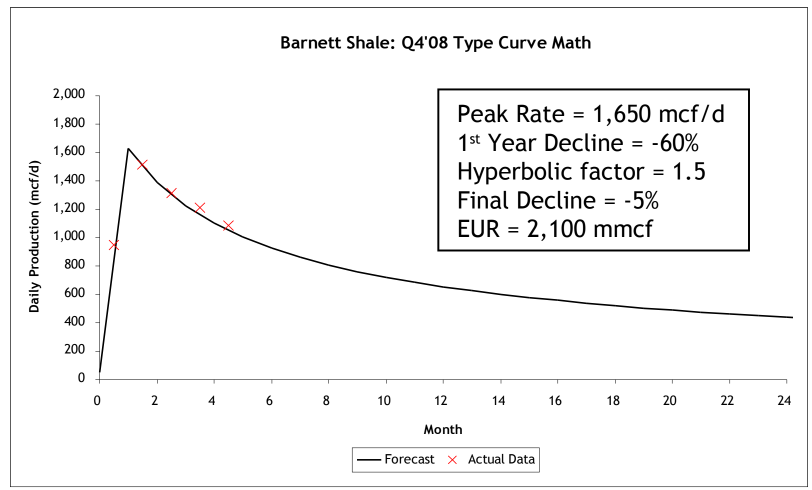
Step II: Quarterly Type Curve History Match









Variation in production characteristics from quarter to quarter is small

Source: Rig Count = Rig Data, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas

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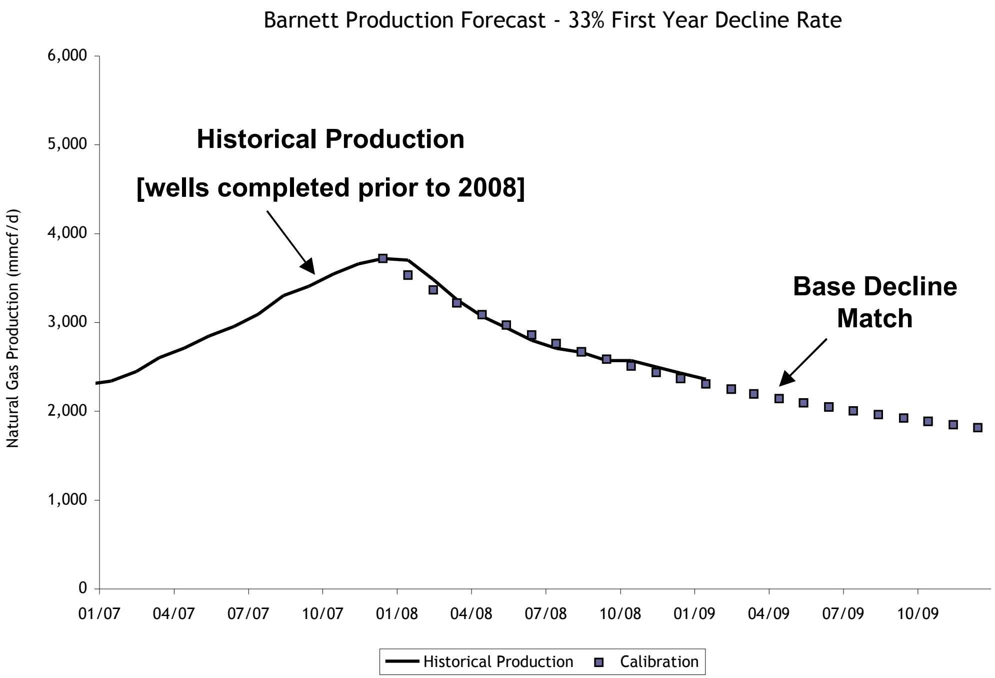
Step III: Understanding Base Decline

Biggest factor in calibrating the Barnett is the base production decline



- All wells completed prior to '08 used to calculate base decline
- Calibration requires balancing hyperbolic factor, curve fit of base production, and performance of new wells completed
- Assume: Hyperbolic factor for base production is the same as '08 new well groups. An important and realistic constraint for a 'pure' play region
- Regression modeling suggests a -33% base decline rate

Source: Rig Count = Rig Data, Production History = HPDI and EIA, Forecast = TPH Estimates
Note: Wellhead production is wet gas

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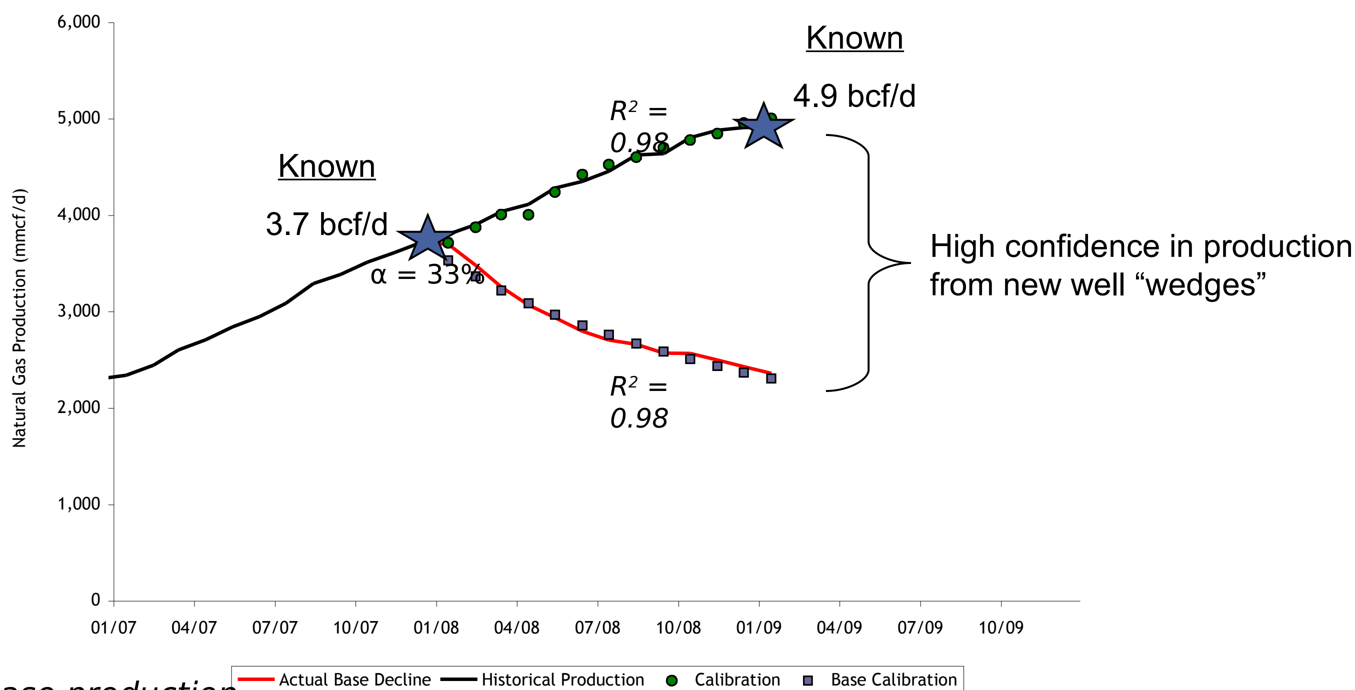
Step IV: Calibrating Base Decline

Barnett Shale

- Known data points: 12/07 production (start = 3.7 bcf/d) and 12/08 production (exit = 4.9 bcf/d)
- Layer in 2008 growth using 2,930 wells drilled and type curves
- Given the 1.5 b-factor, solve for implied base decline rate…in this case -33% for the Barnett



α = decline in base production

Source: Rig Count = Rig Data, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas

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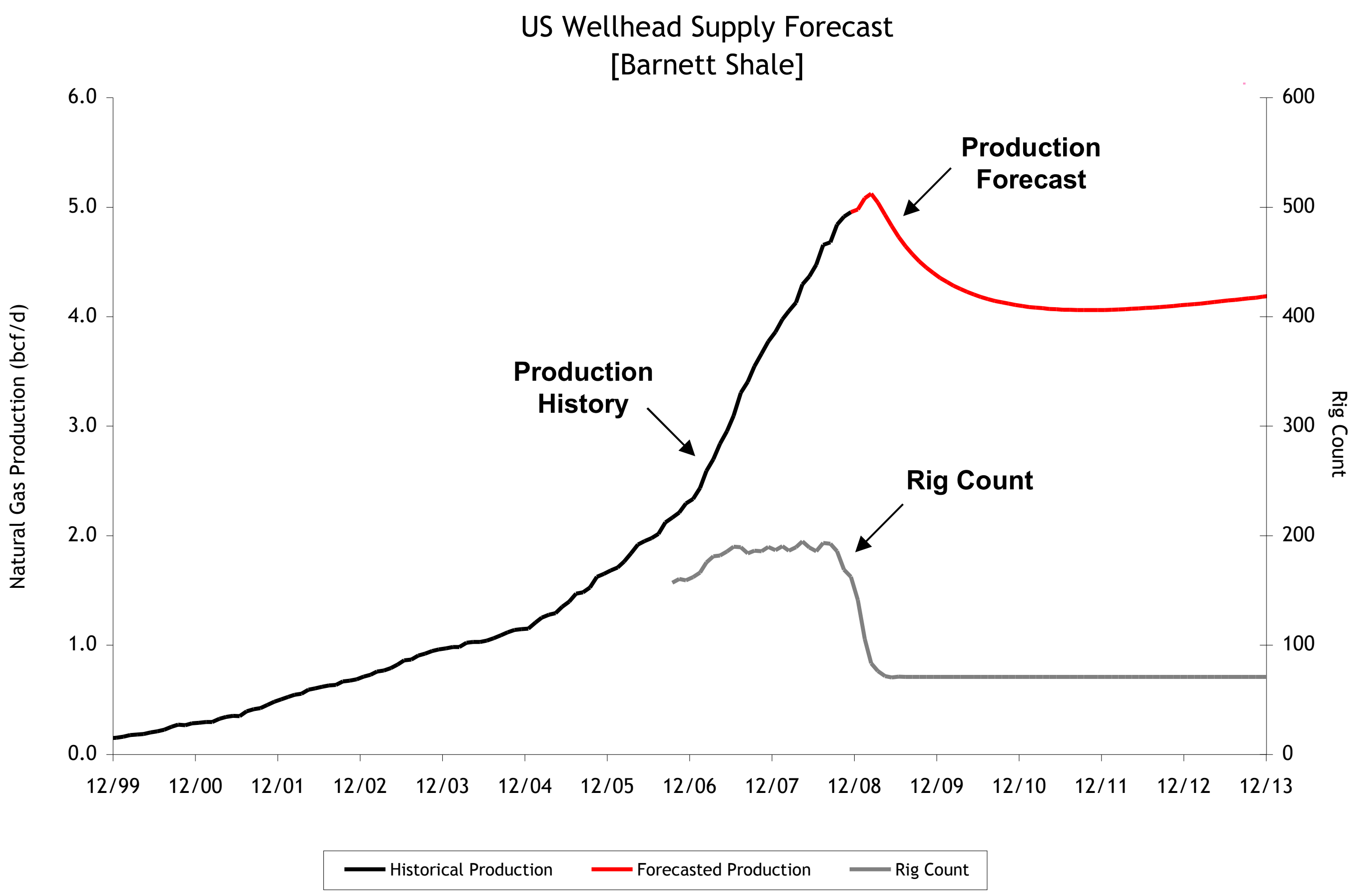
Barnett Scenario – Holding Rig Count Flat

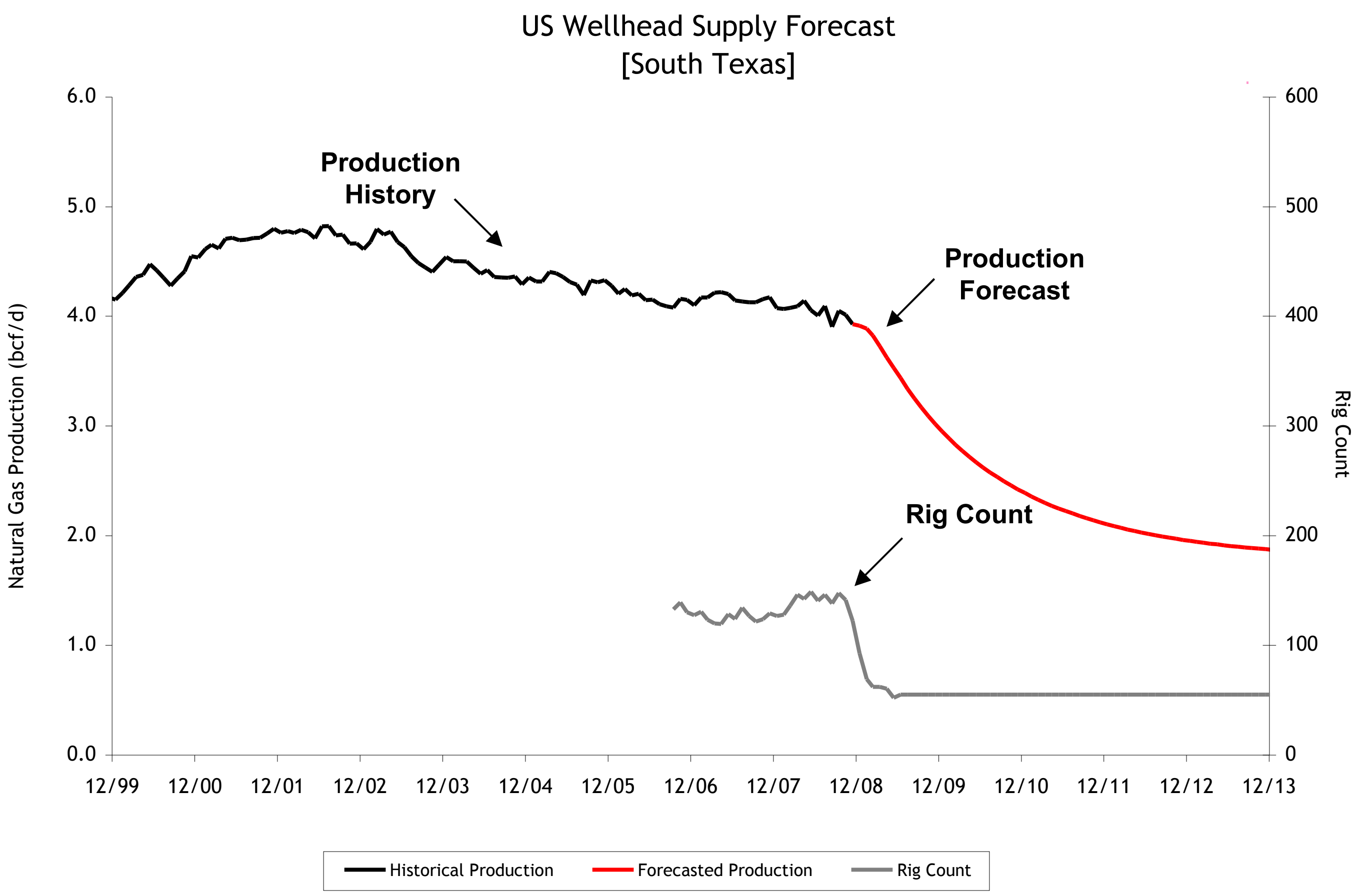


- '09 exit rate down 0.6 bcf/d y/y
- Production bottoms mid-2011 at 4.0 bcf/d and stays *relatively* flat through 2013 as drilling balances field declines

Source: Rig Count = Rig Data, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas.

South Texas Scenario – Holding Rig Count Flat



- Declines already occurring in this basin
- ‘09 exit rate down 0.9 bcf/d y/y
- ‘10 exit rate down 0.6 bcf/d y/y
- This a mature basin!

You don't need to be thinking immortality -- you need to be thinking hit the 7 iron! Romeo Posar: Tin Cup

Source: Rig Count = Rig Data, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas

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What Does it Mean?

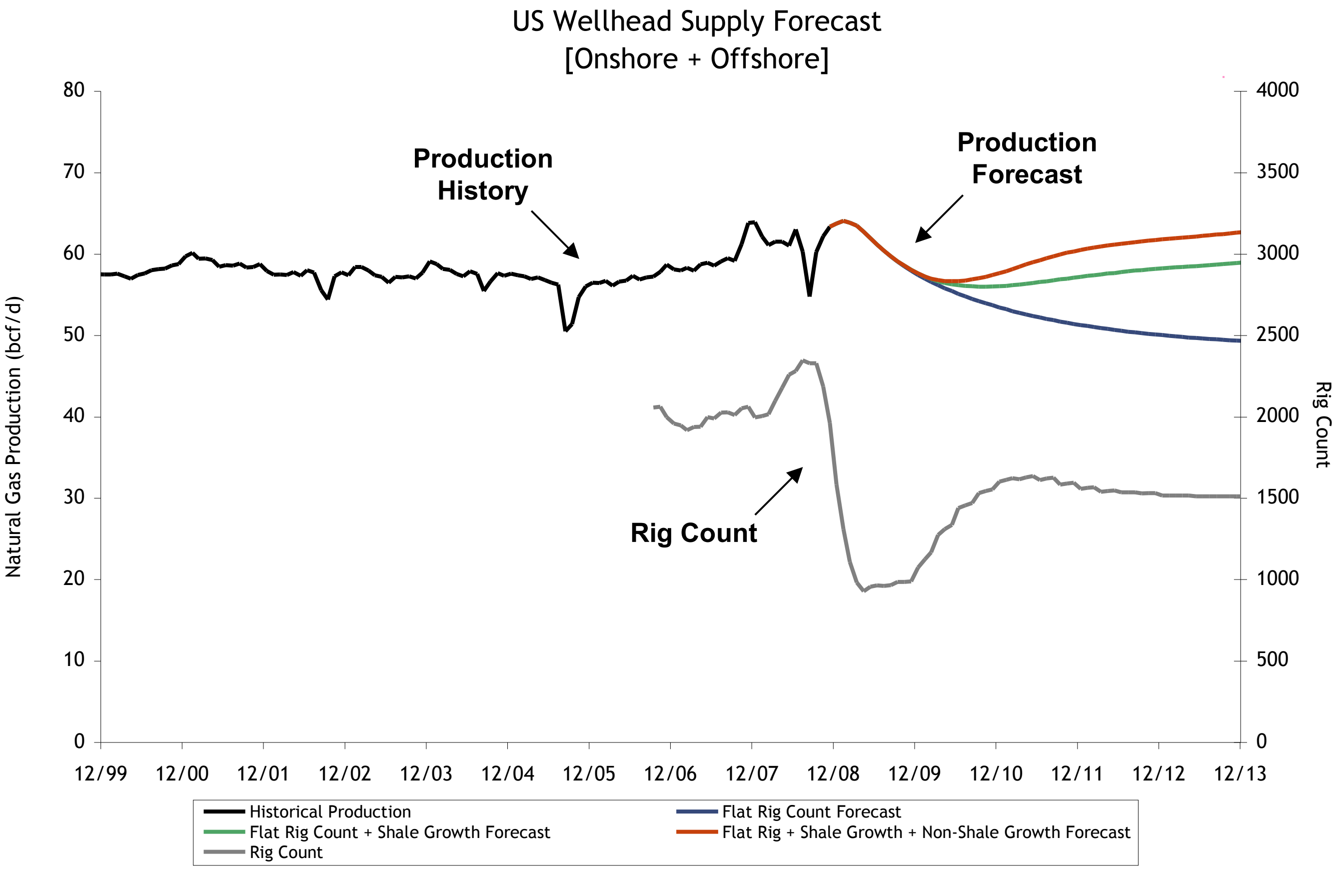
Current

- Rig count unsustainably low
  - 2010 production declines 10%...2011 an additional 5%
  - Gas Prices need to rise to entice more drilling
- Gas Production is falling…now!

Longer Term

- Fewer rigs in fewer places
  - 1500 total rigs in 2011…compared to 2350 peak in 2008
  - Marginal cost of supply matters…$6.5/mcf medium/long term
- Asset values (service and E&P) will reflect growth and non-growth areas (i.e, GOM analogy)

Step 3 – Add Non-Shales (Our Base Case)



- ~1,500 total rigs long term
- 2010 rig count build (peaking at 1,640 rigs)
- Pullback (~120 rigs) in 2011 as market is oversupplied
- Shift to unconventional (shale) drilling is key

Only ~1,500 rigs needed to balance market longer term…shales and non-shales

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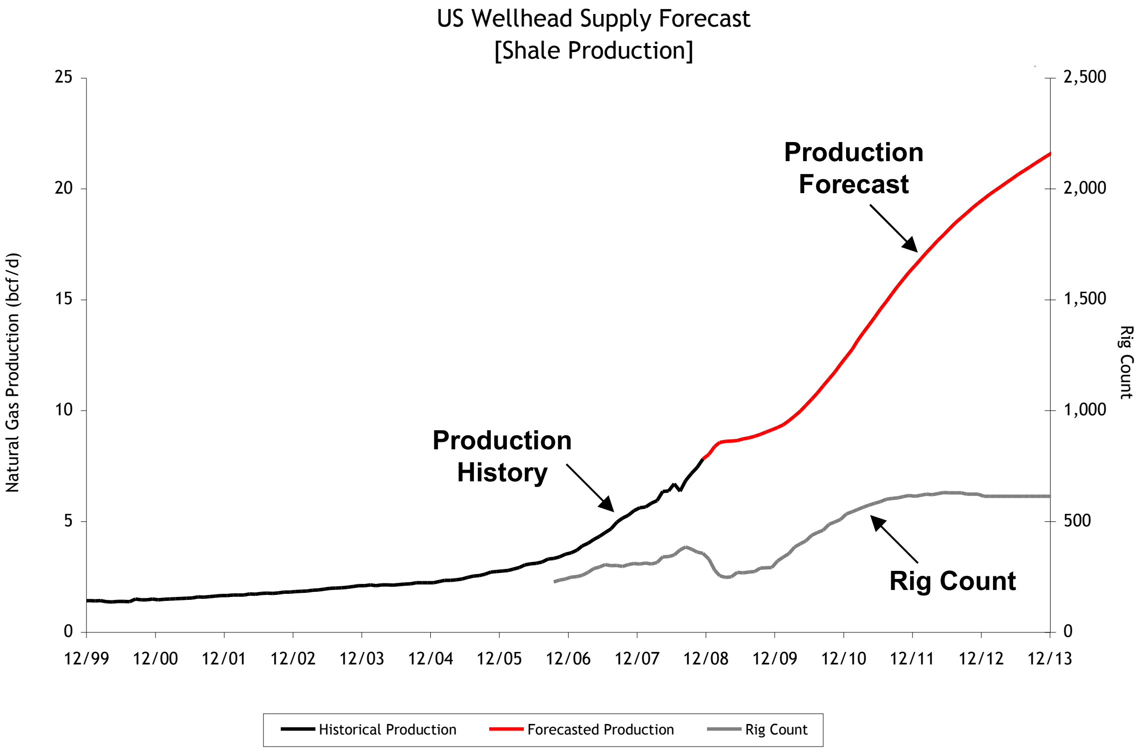
Shales – Fueling The Engine Of Growth



- **Shale gas 12/08**
  - Production = **8 bcf/d** (12% of US)
  - Rig Count = **357 rigs** (18% of US)
- **Shale gas 12/13**
  - Production = **22 bcf/d** (35% of US)
  - Rig Count = **614 rigs** (41% of US)

	Daily Gas Volumes, bcf/d		
Shale Basin	**12/08a**	**7/09e**	**12/13e**
Barnett	5.0	4.7	5.5
Woodford	0.9	0.9	1.5
Fayetteville	1.3	1.5	2.8
Haynesville	0.2	1.0	6.3
Marcellus	0.0	0.2	4.4
Eagle Ford	0.0	0.0	0.7
Antrim	0.4	0.4	0.3
Total	**7.8**	**8.7**	**21.5**

The only thing better than one crawfish dinner is five crawfish dinners. Coach Red Beaulieu – The Waterboy

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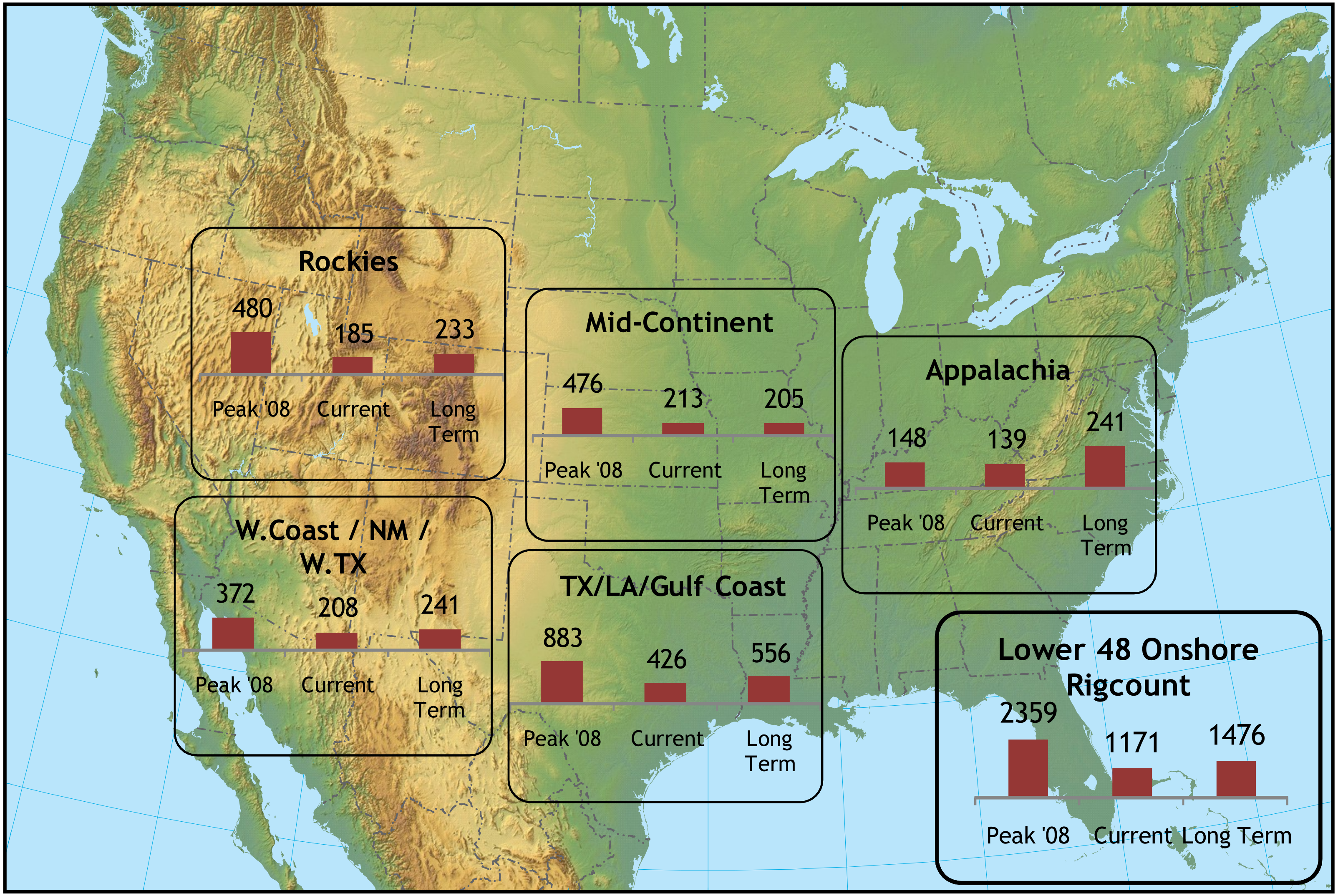
The US Recovery Will Not Look The Same



Source: RigData, TPH

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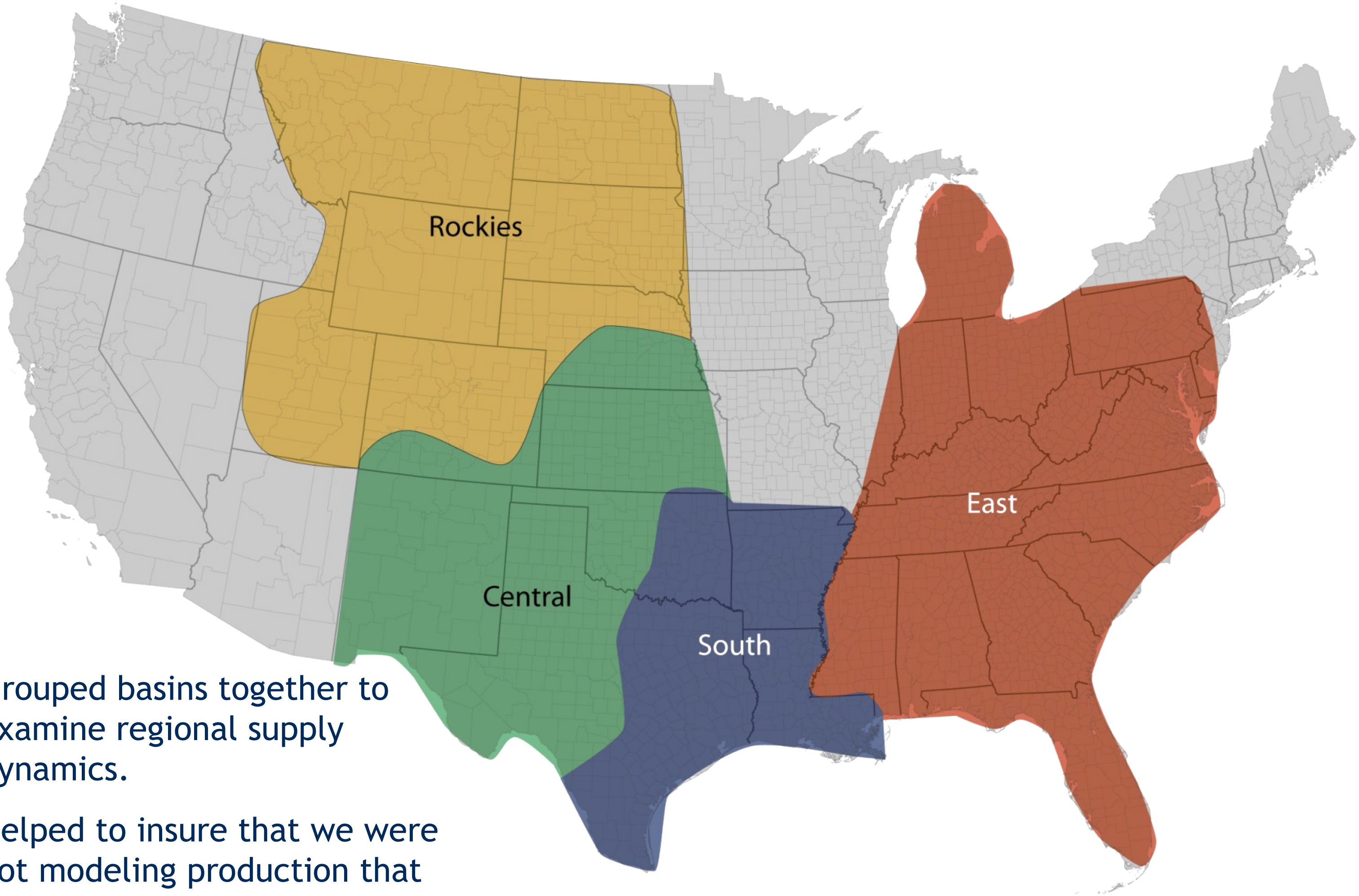
Regional Production

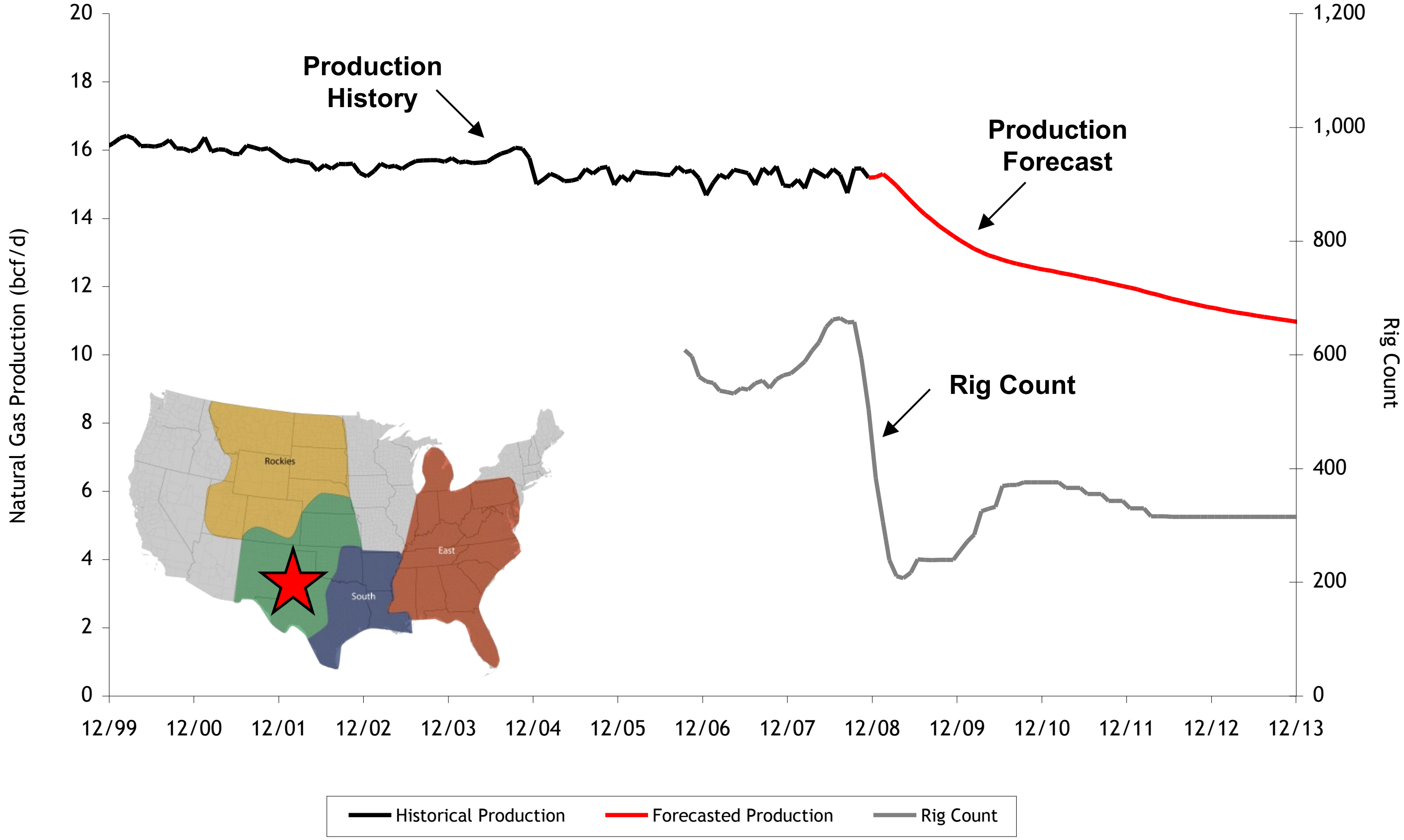


Grouped basins together to examine regional supply dynamics.

Helped to insure that we were not modeling production that could not be physically delivered.

Note: South Region includes GOM

Regional Breakdown: Central Region



- Minimal production growth in '08 while rig count increased 12%
- Significant 2010 volume declines (-1.6 bcf/d annual average)
- Cana Woodford / Granite Wash horizontal plays = Wild Cards…but unlikely to arrest regional decline

Source: Rig Count = Rig Data Onshore/Baker Hughes Offshore, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas. Rig count is total rig count gas/oil and onshore/offshore, as applicable.

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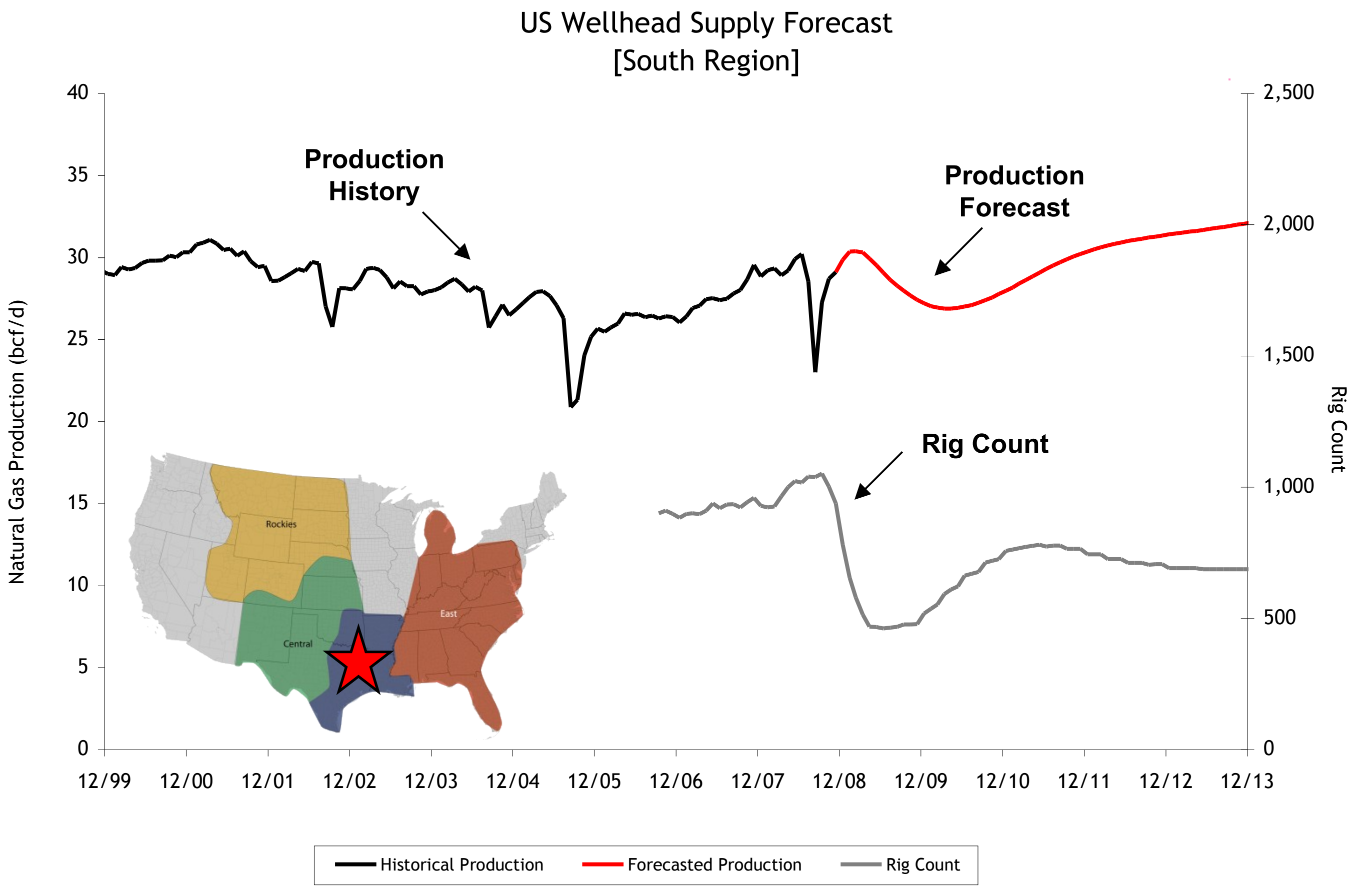
Regional Breakdown: South Region

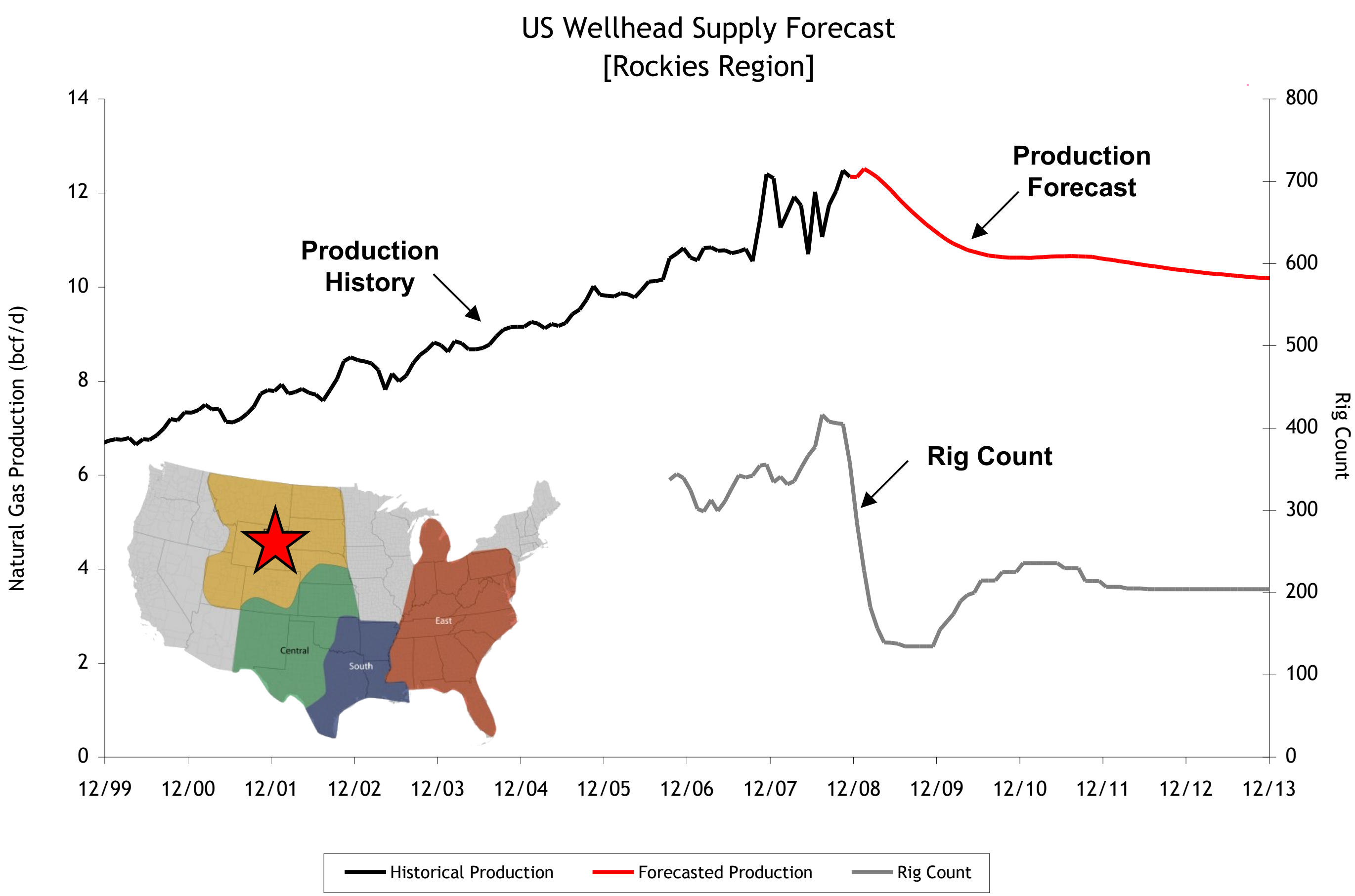


- South region includes rollup of:
  - Shales: Barnett, Fayetteville, Haynesville, Woodford, Eagle Ford
  - Legacy: South Texas, East Texas, Arkoma North Louisiana, Gulf Coast
  - Offshore: GOM Shelf and Deepwater
- Historically, peak production ~30 bcf/d. We forecast region growing to 32 bcf/d by 2013

Source: Rig Count = Rig Data Onshore/Baker Hughes Offshore, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas. Rig count is total rig count gas/oil and onshore/offshore, as applicable.

Regional Breakdown: Rockies Region



- Production has grown significantly since 1999 (~6 bcf/d)
- 2008 rig count (+13%) outpaced production growth (+8%)
- No need to ramp activity from 2010-2013
- 2% per year long-term decline

Source: Rig Count = Rig Data Onshore/Baker Hughes Offshore, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas. Rig count is total rig count gas/oil and onshore/offshore, as applicable.

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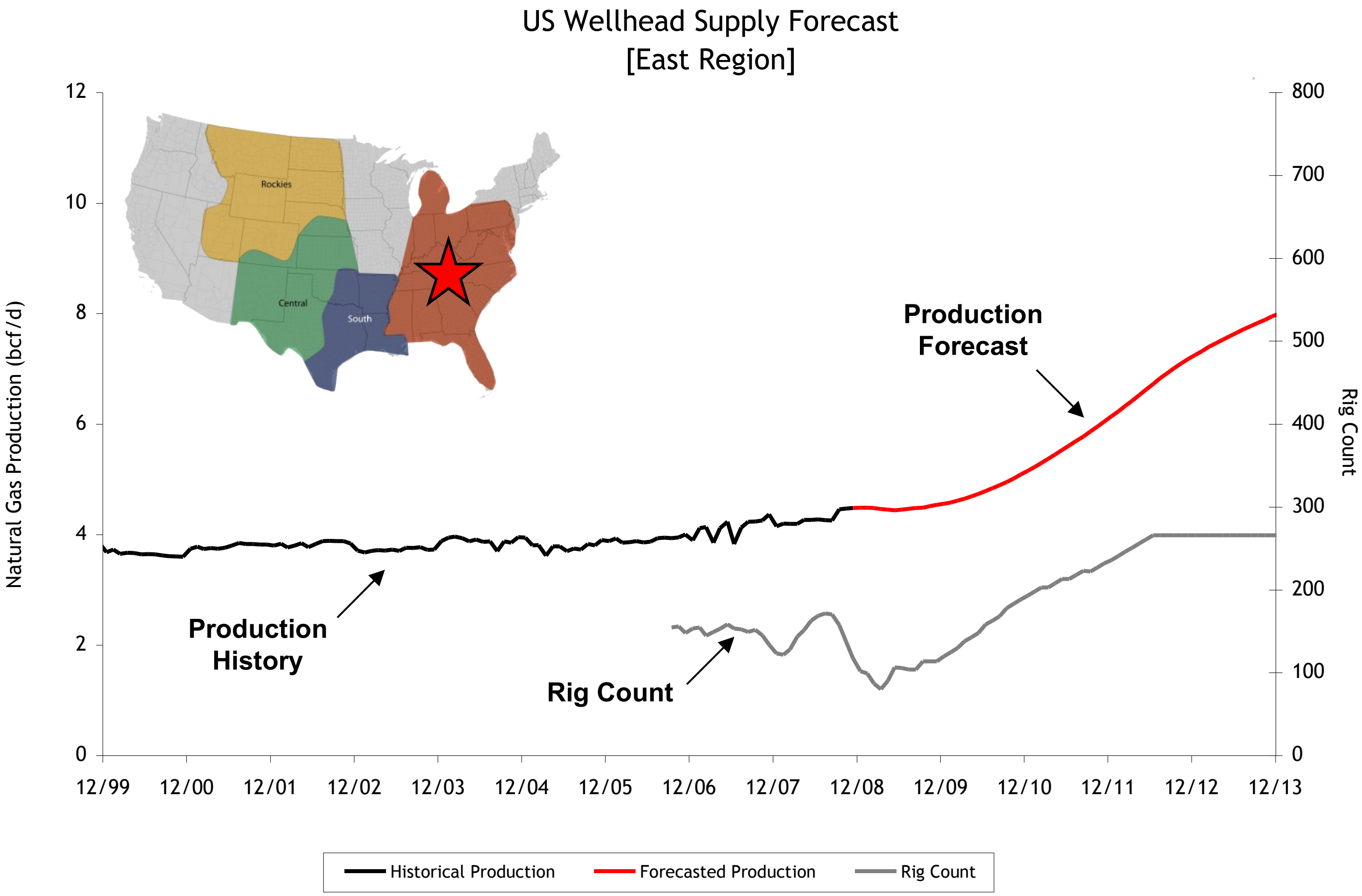
Regional Breakdown: East Region

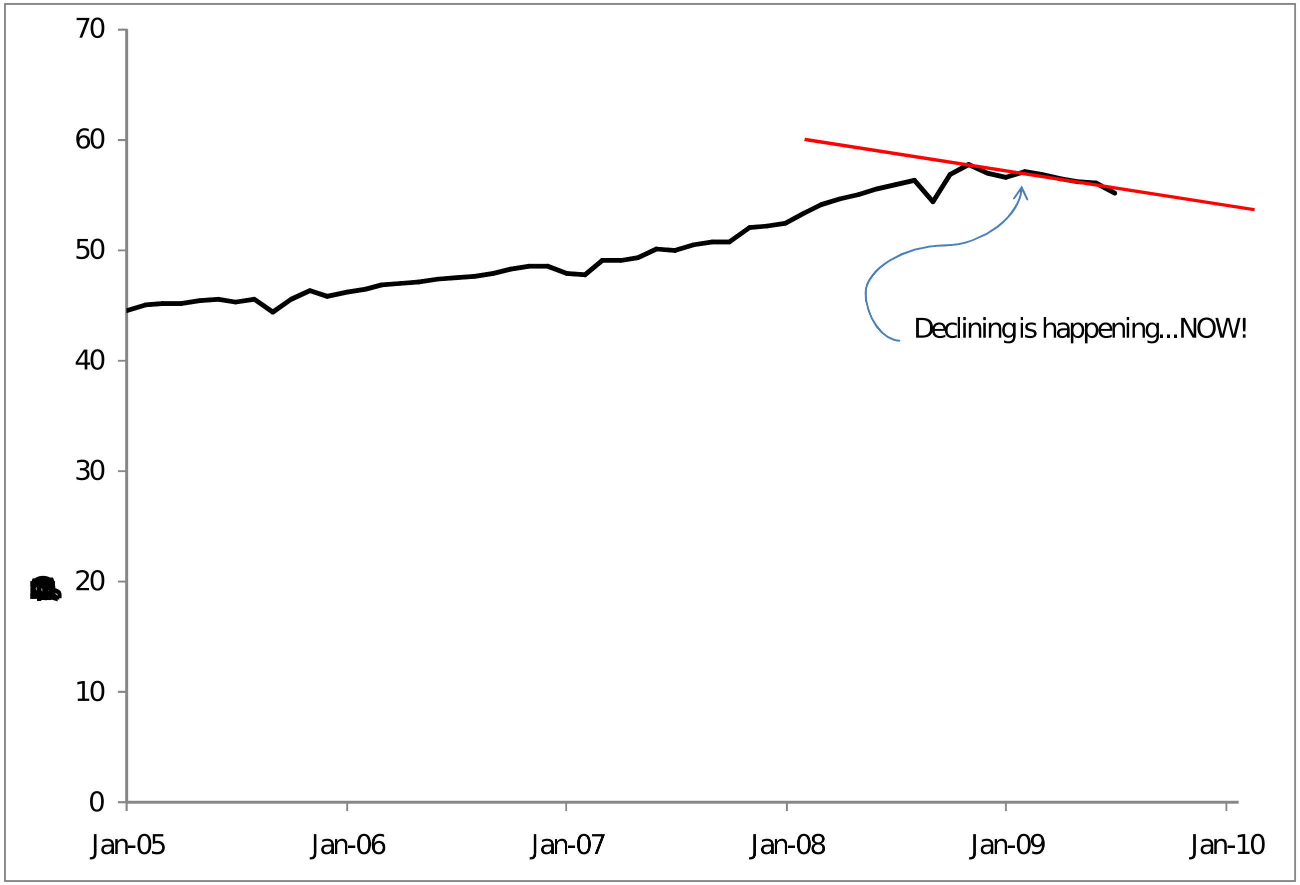


- East region includes rollup of Marcellus, Appalachia conventional
- Marcellus ramp from ~0.2 bcf/d to 4.4 bcf/d by 2013
- 3 bcf/day of East Region supply growth more than offsets Rockies 1.6bcf/day decline

Source: Rig Count = Rig Data Onshore/Baker Hughes Offshore, Production History = HPDI and EIA, Forecast = TPH Estimates

Note: Wellhead production is wet gas. Rig count is total rig count gas/oil and onshore/offshore, as applicable.

Onshore Production – Is Declining



Revenge Of the Nerds!

- Horizontal Drilling
  - Proper Azimuth
  - Optimum Length
- Completion – Hydraulic Fracture…**can't boilerplate**
  - Multiple Stages, Simultaneous Fracturing
  - Slickwater vs. Gelled Fracs
  - Regionally Specific
  - Surfactant, **100 mesh, proppant transport** etc.
- Well Spacing - w**ill drive ultimate recovery**
  - Depends on Completions and Reservoir
  - Fracture Mapping with Micro-seismic helps
- Reservoir Modeling difficult
  - Natural fracture spacing/orientation
  - Isotherm, gas-in-place, free gas porosity

"No one will really be free until nerd persecution ends."

Gilbert – Revenge of the Nerds

Wild Cards

- Shale Performance
- Officer and a Gentleman
  - “I got nowhere else to go”
- Gas Macro Variables
  - LNG
  - Renewables
  - Canada Imports
  - Demand
- High-Grading/Well efficiency
- Shut-Ins/Uncompleted Wells
- Infrastructure Build-Out

Natural Gas

- Ample gas supply in almost any demand scenario – long term
  - Shale gas
- 1 bcf/day net demand growth assumed
- Shale, Shale and more Shale
- Fewer rigs required (~1500)
- Lower equilibrium natural gas price
  - $7.50/ mcf in 2010 – lower rig count matters
  - $6.50/mcf in 2011 +
- Implications for all energy subsectors/stocks

North American Natural Gas Implications

- Expect “Have’s” and “Have Not’s” to emerge
- Shale, Shale and more Shale
- 2010 = strong; 2011= outlook dims
- Shale envy = consolidation
- Good trade; Mediocre Investment
- Focus on Being/Owning a “Have”

Don’t Believe $7.5/mcf gas in 2010?

Anything is Possible…Scoreboard!
Texas A&M 52…Texas Tech 30

Yeeeeesssssssssssssss! Napoleon Dynamite

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