Cost Declines—Fueling the Shale Explosion

CSIS

Washington, DC

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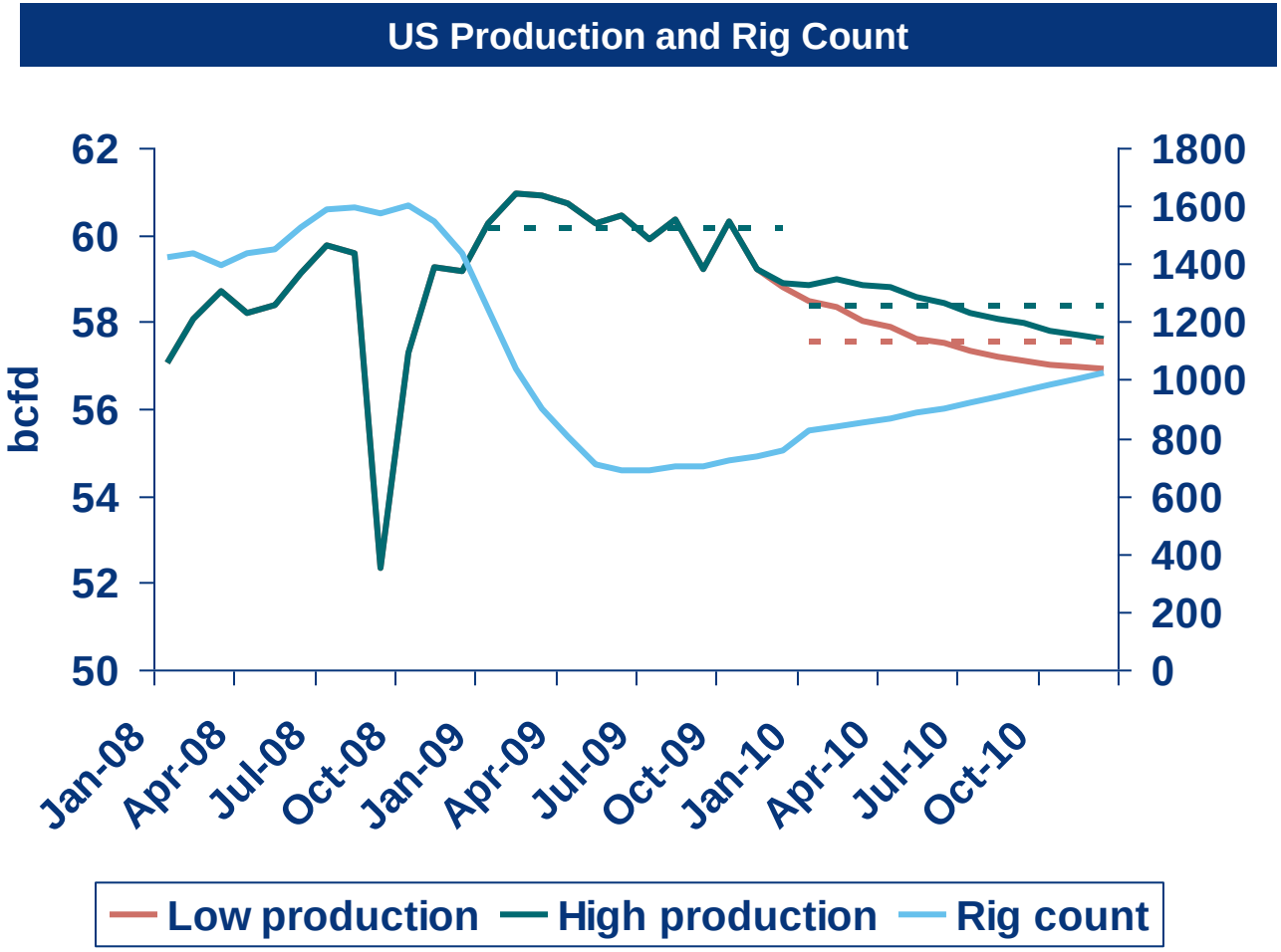
Domestic supply declines have been muted relative to the rig count

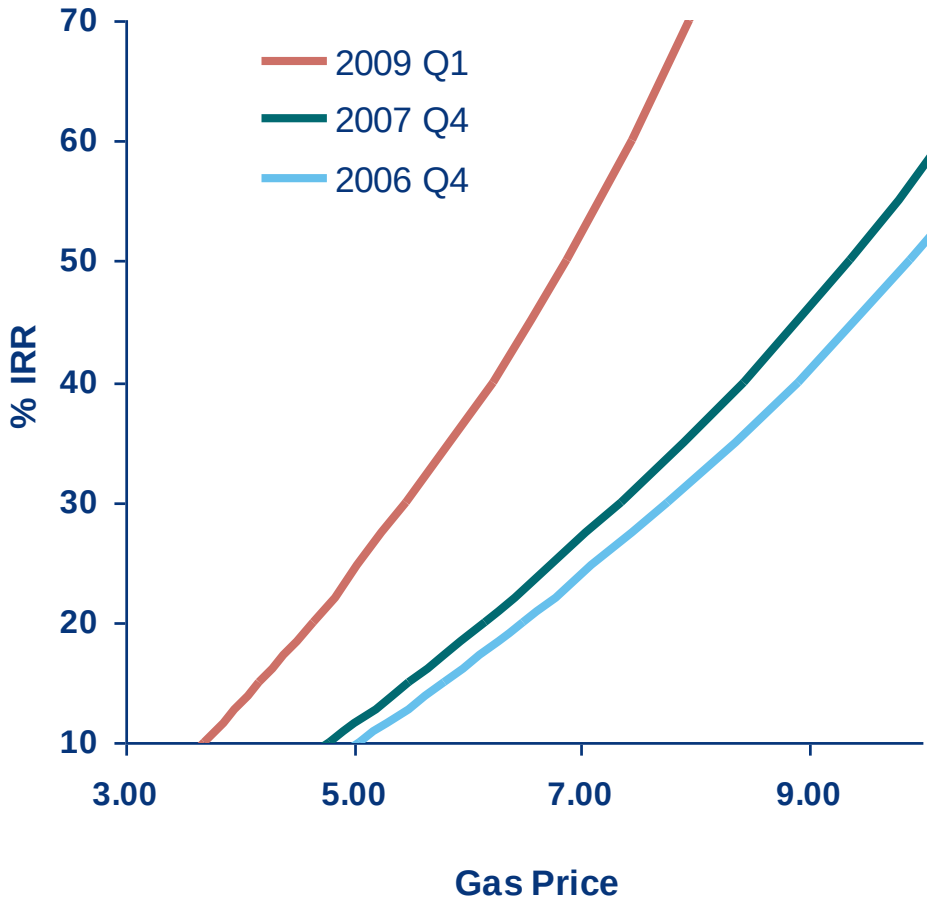
- Super productive new plays support supply
- Producers high-grade prospects across the board
- Rig count now recovering—even with NYMEX at $6.00/mmbtu
- Producers are hedging into a 2010 strip, as prices are sufficient to secure attractive margins



Improvement in Shale Development Economics

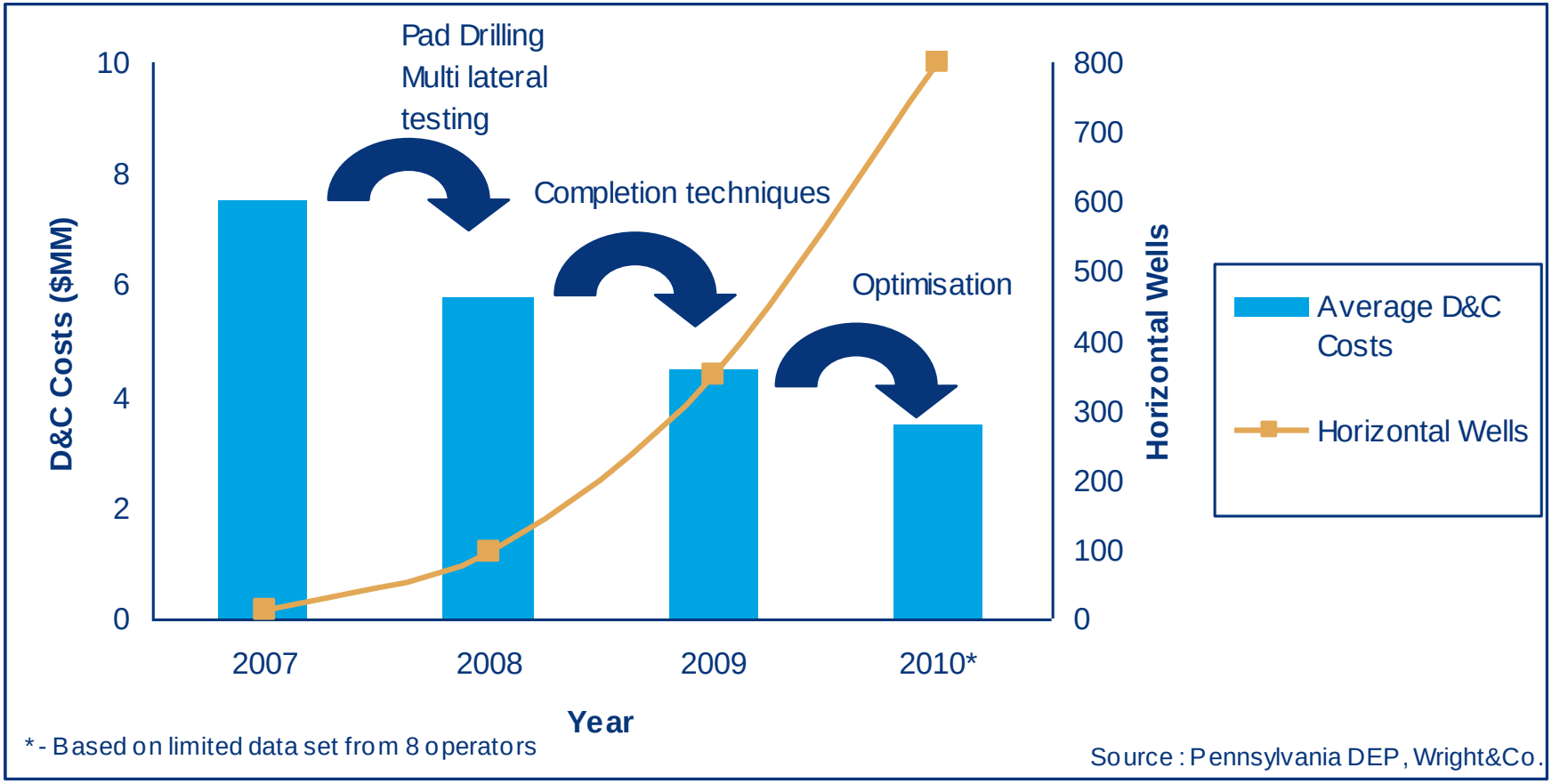
- **No two shale gas plays are identical**
- **Dominant acreage holders drill several thousand wells over the life of the play**
  - Continuous technological feedback
- **Southwestern Energy a great example for cost reduction**
  - Experimented with and adopted longer laterals
  - IP rates increased by two and half times over the course of two years
  - Reduced drilling time from 30 days to 14 days by using pad drilling.
- **Further room for reduction in emerging shales from pad drilling**

Improving Economics for Southwestern Energy

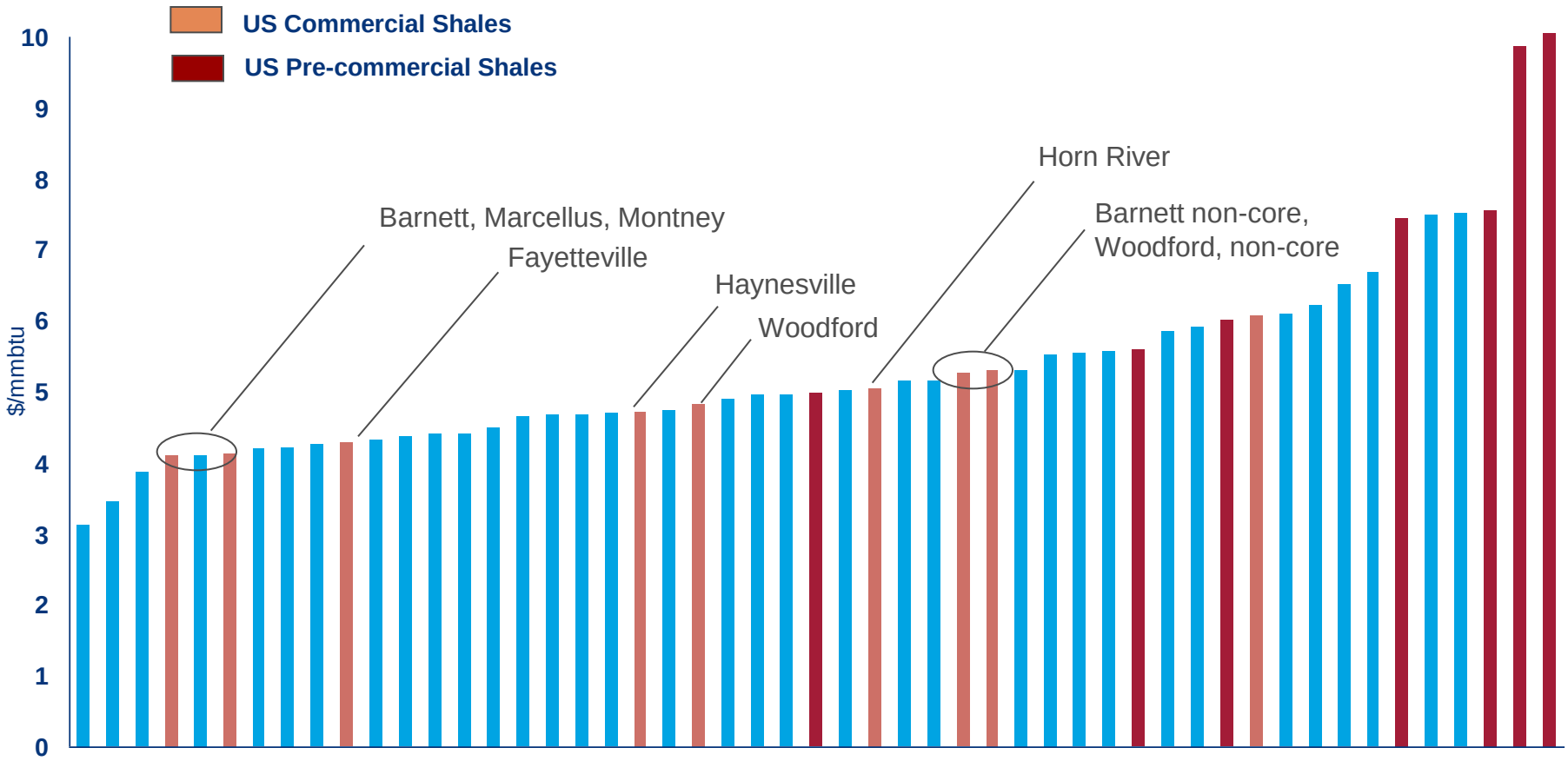


Horizontal pad drilling enables operators to minimize down-time between wells using skid-mounted rigs

Cost efficiency trend in the Marcellus Shale

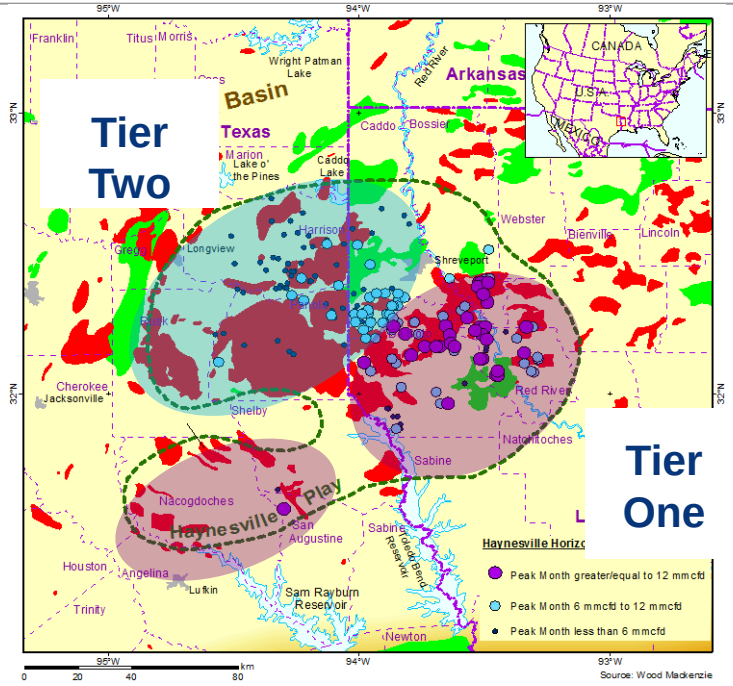


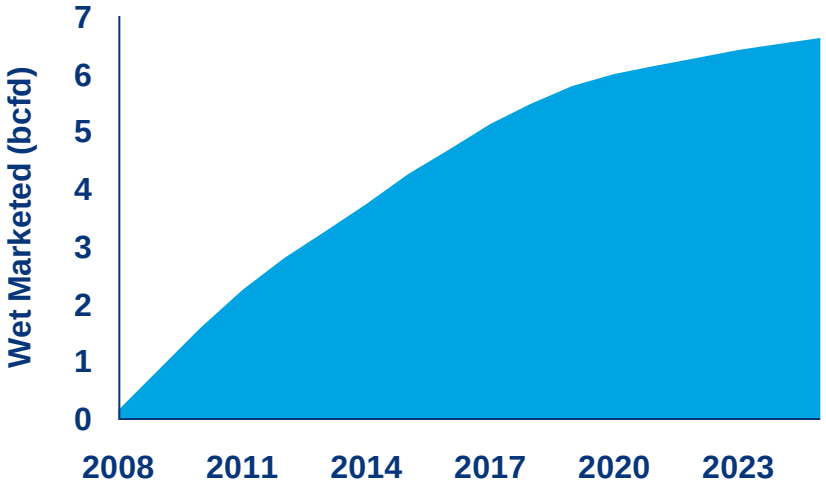
Unconventional Gas Economics: Big Seven Shale Plays Are No Longer Marginal



Haynesville Shale

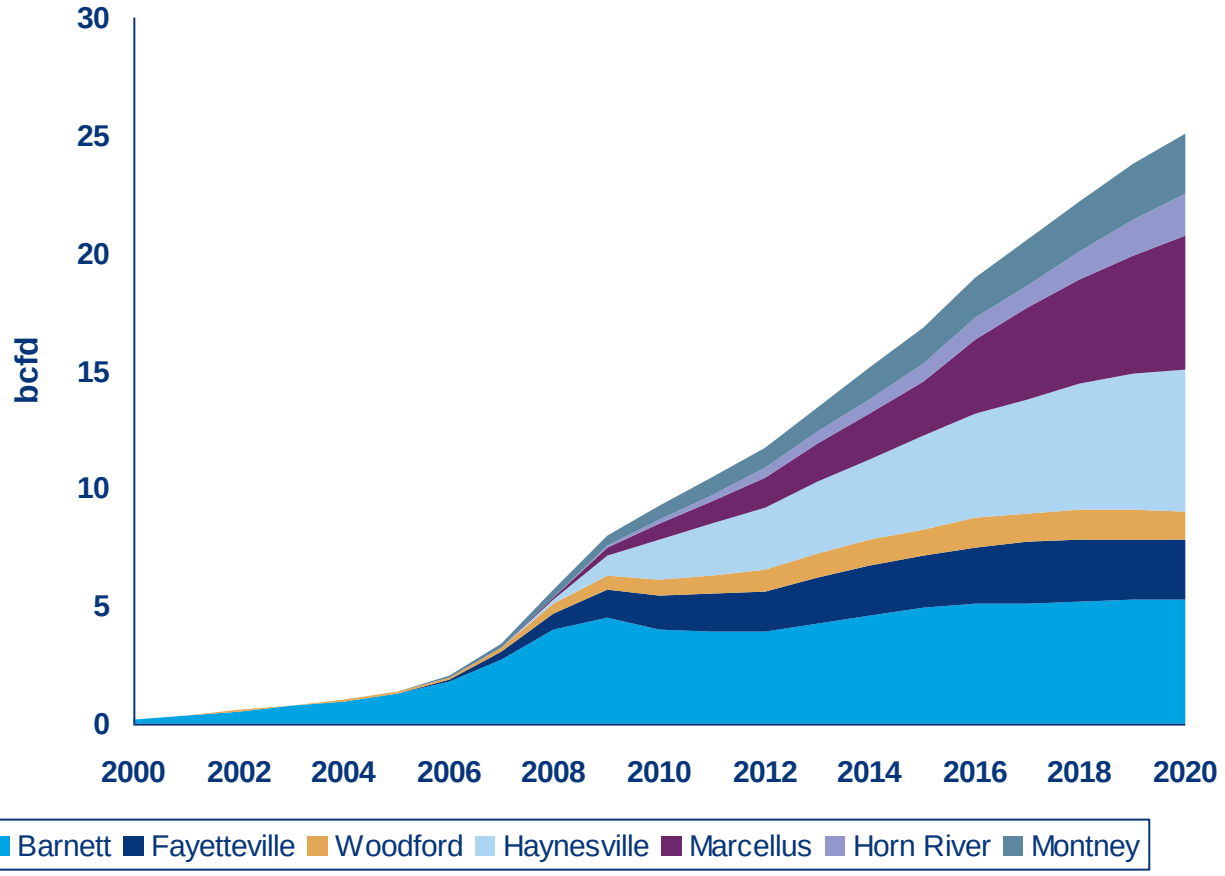
- **Average well performance is strongest in Northwest Louisiana**
- **Cost reduction from decrease in drilling times**
  - Improved bit design
  - Enhanced downhole equipment service life
- **Further cost reduction expected from pad drilling**
- **Upside**
  - Further improvement in well performance. Average EUR of 6.5 bcf considered
  - Better wells in Tier II area
- **Downside**
  - Early fracture closure due to proppant embedment





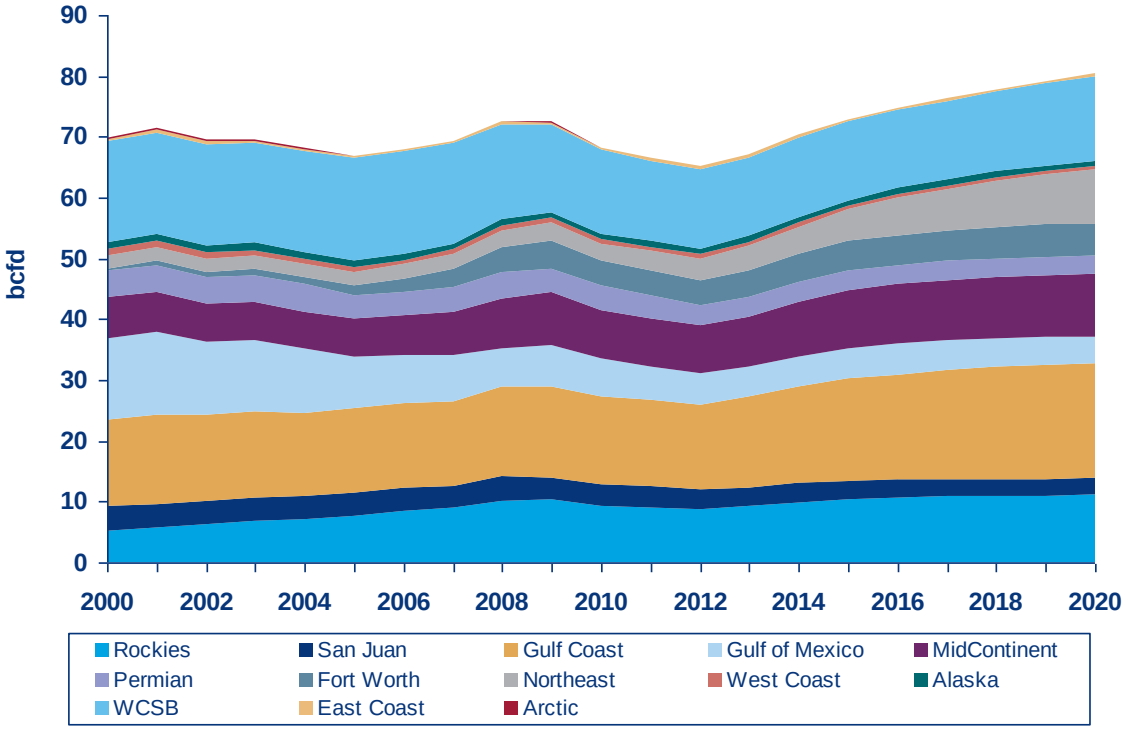
Shale gas production set to grow steeply now…

- Haynesville already a significant supply source
- Marcellus production temporarily constrained by infrastructure and regulatory environment
- Horn River costs improving, producers already moving to multi-well pads

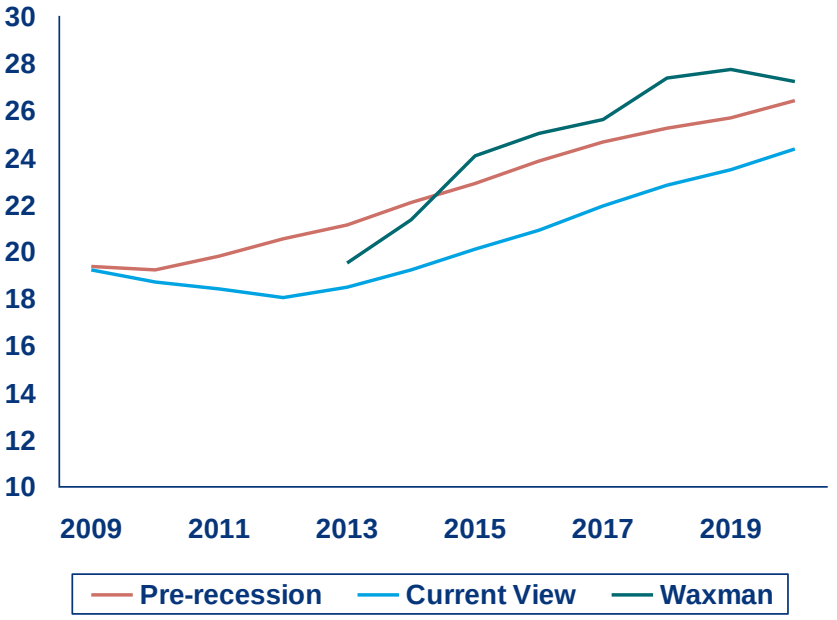


…with strong growth in North American supply, eventually

US and Canadian Production



US Gas Demand from the Power Sector



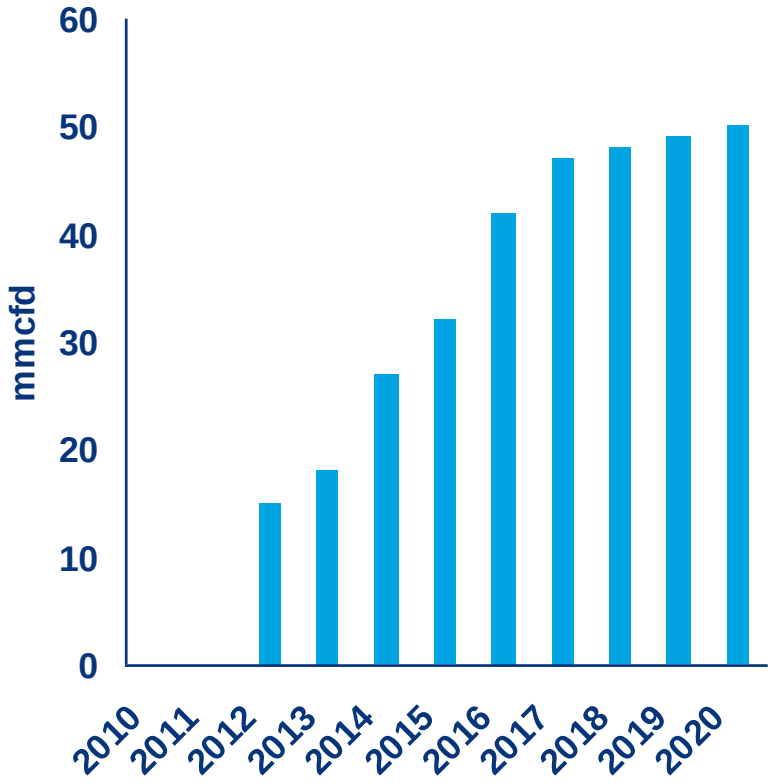
Source: Wood Mackenzie NAGS and Upstream Service

Vertical drilling and conventional supplies, plus higher cost unconventionals contribute to the rebound

Key Marginal Supply Sources

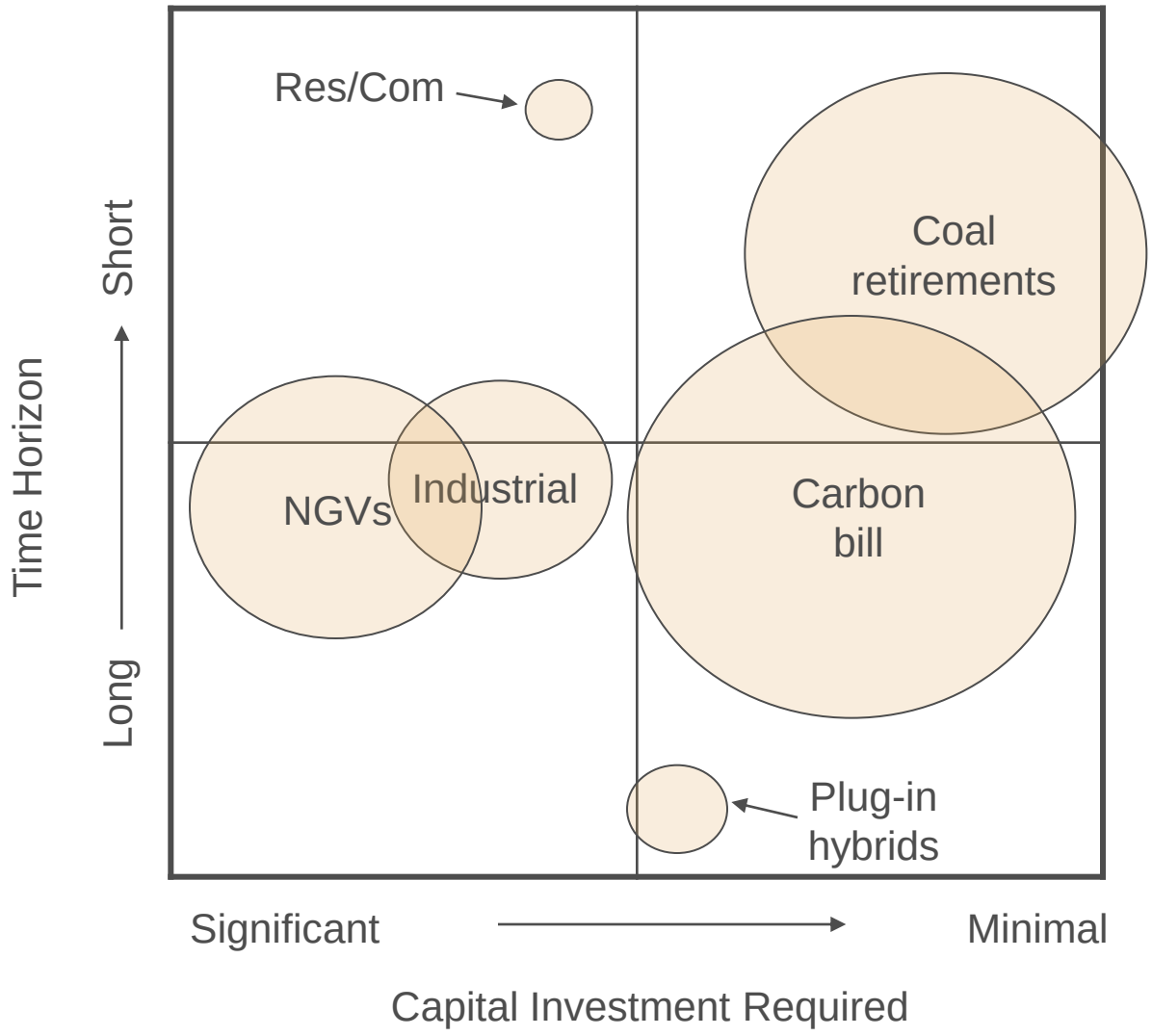
		10 breakeven	15 breakeven	10 new drill	10 producing
Gulf Coast	FTW Barnett SW SHG	4.7	6.6	22.5	733.5
Gulf Coast	ALT Bossier TGS	4.8	6.6	-	39.0
Gulf Coast	GFC Austin Chalk TGS	4.8	6.7	1.2	125.8
Mid-Continent	AKM Woodford SHG Non-core	4.9	6.7	-	65.0
Rockies	PIC Mesaverde TGS	5.3	7.4	-	1,107.0
Gulf Coast	ALT Travis Peak TGS	5.7	7.9	-	622.0

Annual New Drill Volumes—Barnett Southwest



What does shale success mean for long-term gas market size?

Circle size reflects demand potential



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