

# *How Horizontal Drilling & Fracturing Technologies Are Changing Natural Gas Markets*

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***Presented to:  
The Energy Council's  
2009 Federal Energy & Environmental Matters Conference***

***March 7, 2009***

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# *Key Points*

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- ❖ **The Energy World has changed. Technology has unlocked unconventional gas resources.**
- ❖ **Natural gas should no longer be viewed as unavailable, unreliable or too expensive.**
- ❖ **Due to unconventional gas production, the US has become supply long, prices are falling and consumers will benefit.**
- ❖ **Burgeoning supplies are overwhelming the nation's pipeline capacity, driving prices even lower.**
- ❖ **The production growth creates an historic opportunity to use gas to quickly and significantly reduce our GHGs and reduce our consumption of oil and other high emission fuels.**

# *Presentation Outline*

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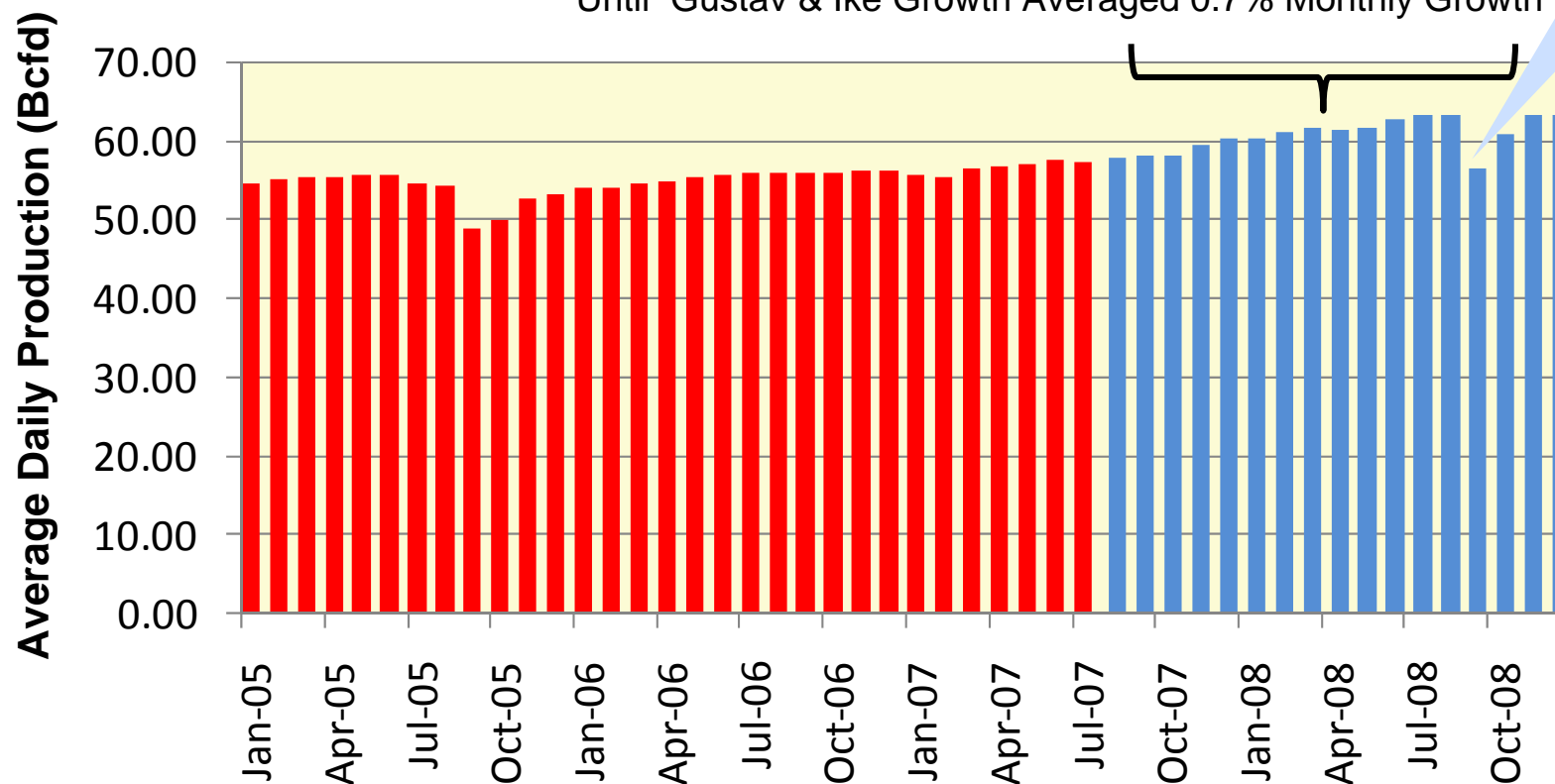
- ❖ **US Supply Explodes: What happened in 2008**
- ❖ **Why It Happened: Impact of technology innovation**
- ❖ **What are the Impacts?**
- ❖ **Recent Activity**
- ❖ **Conclusions and Implications**

# Production Grew In 2008 By 4 Bcfd

08 Production Is Up 7% Over 07

Until Gustav & Ike Growth Averaged 0.7% Monthly Growth

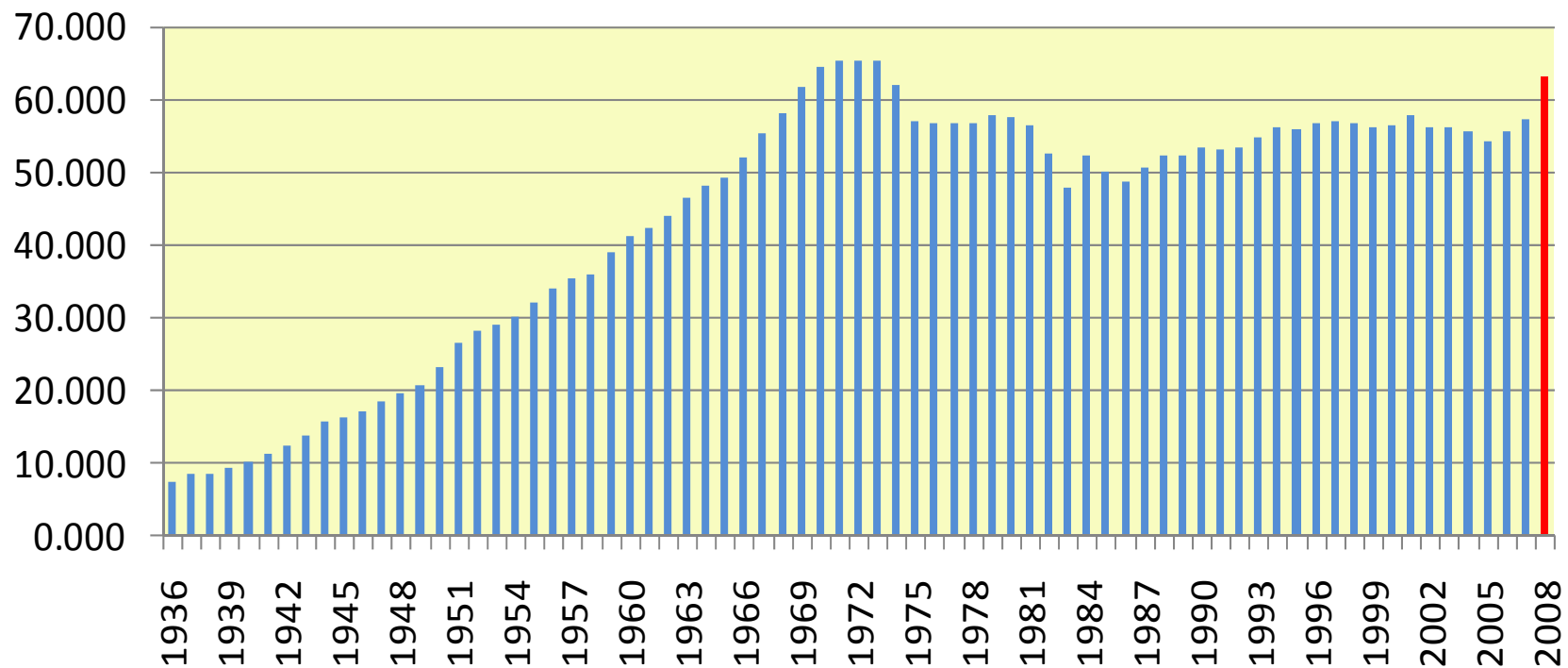
Almost 4.0  
Bcfd lost to  
H'canes



Source: EIA 914 Report  
(Gross Withdrawals)

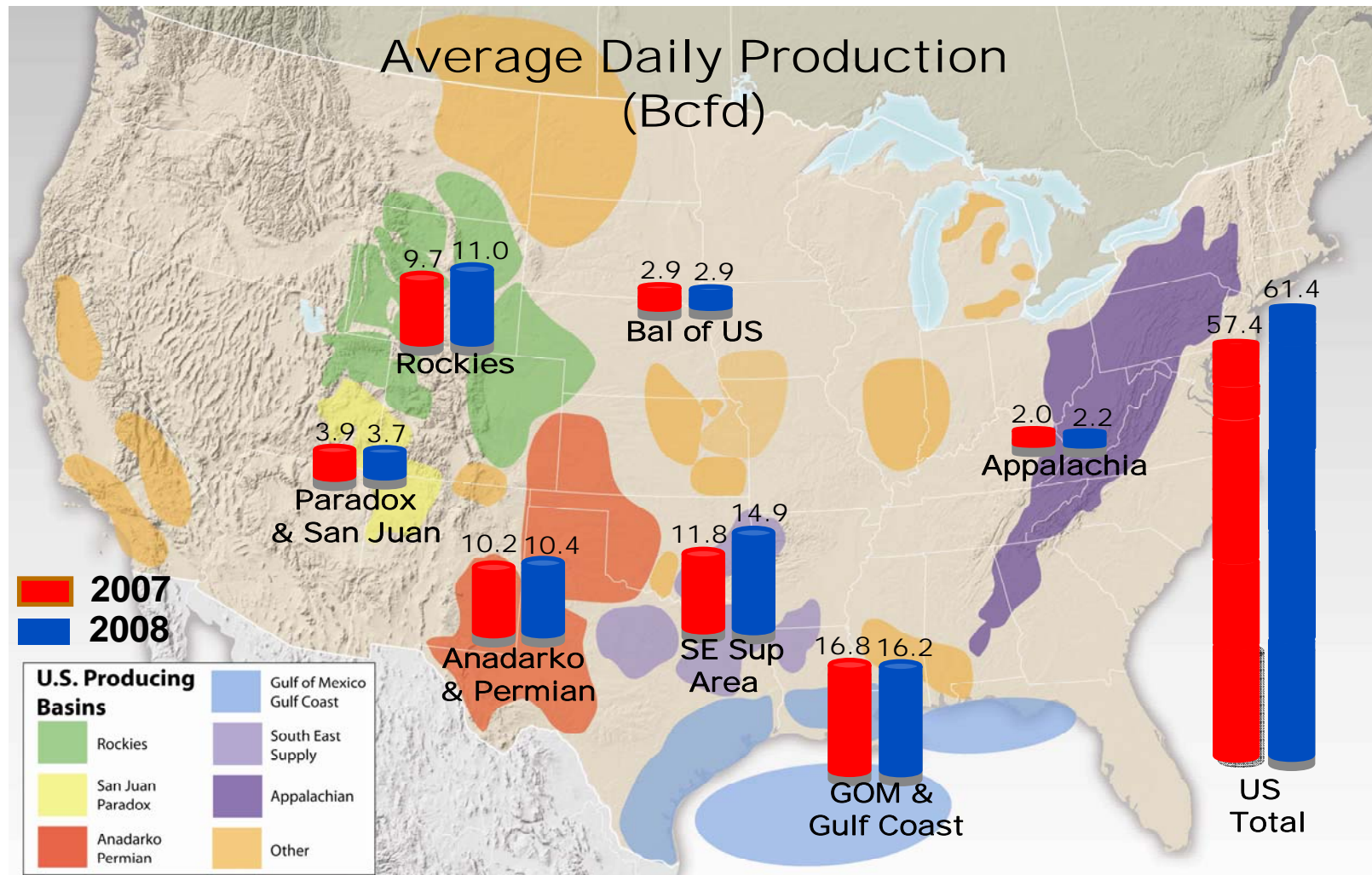
# *Production Is Nearing Historic Highs*

**Lower 48 Gross Withdrawals  
(Bcfd)**

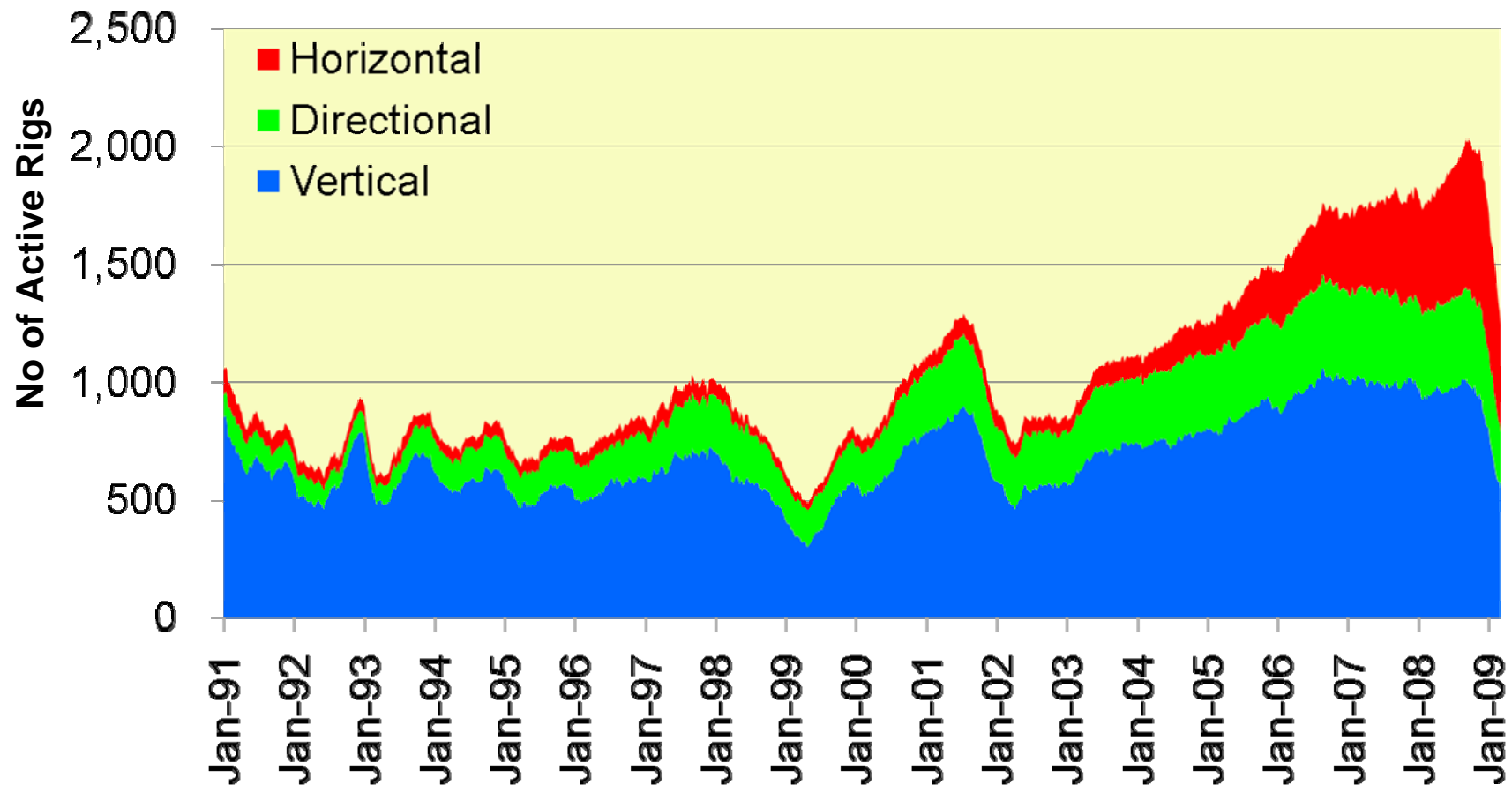


Source: EIA, BENTEK

# *Growth Was Greatest In The Non-Conventional Supply Regions*

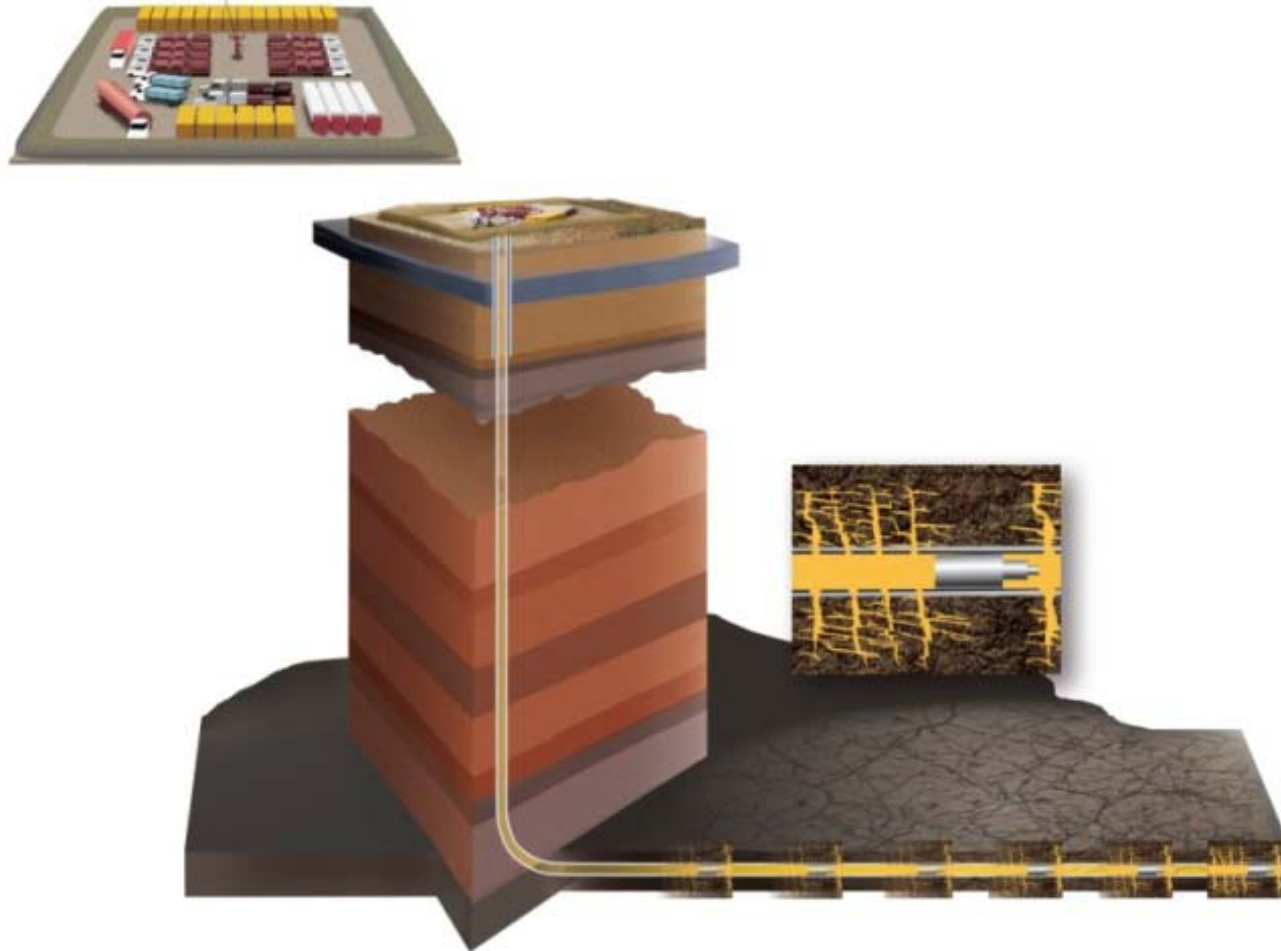


# *Drilling Reflects The Shift To Unconventional Production*



# *Innovative Fracing Technology Is Driving The Growth*

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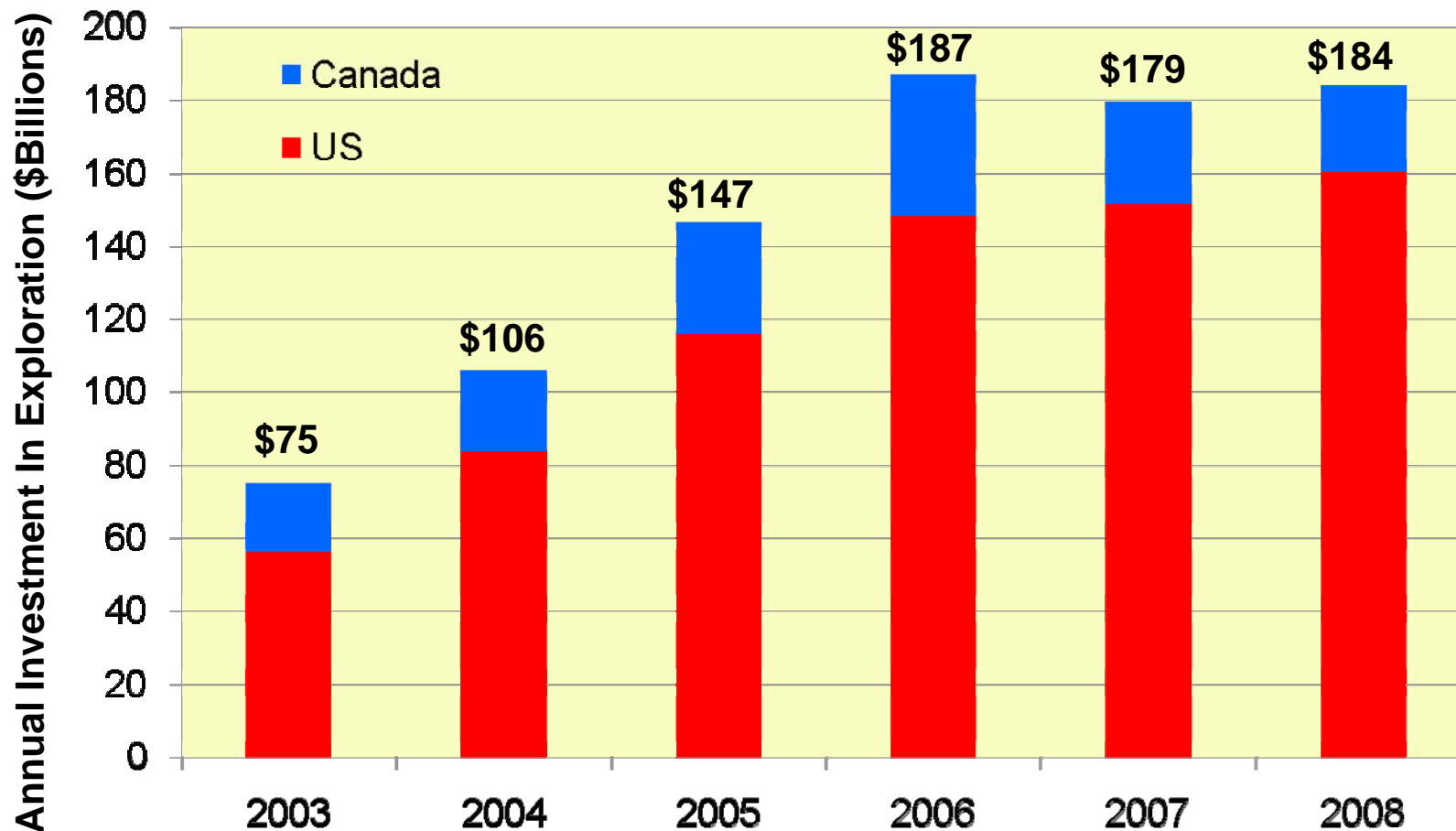


Source: *Hydraulic Fracturing Factsheet*, prepared by  
Chesapeake Energy, February 2009

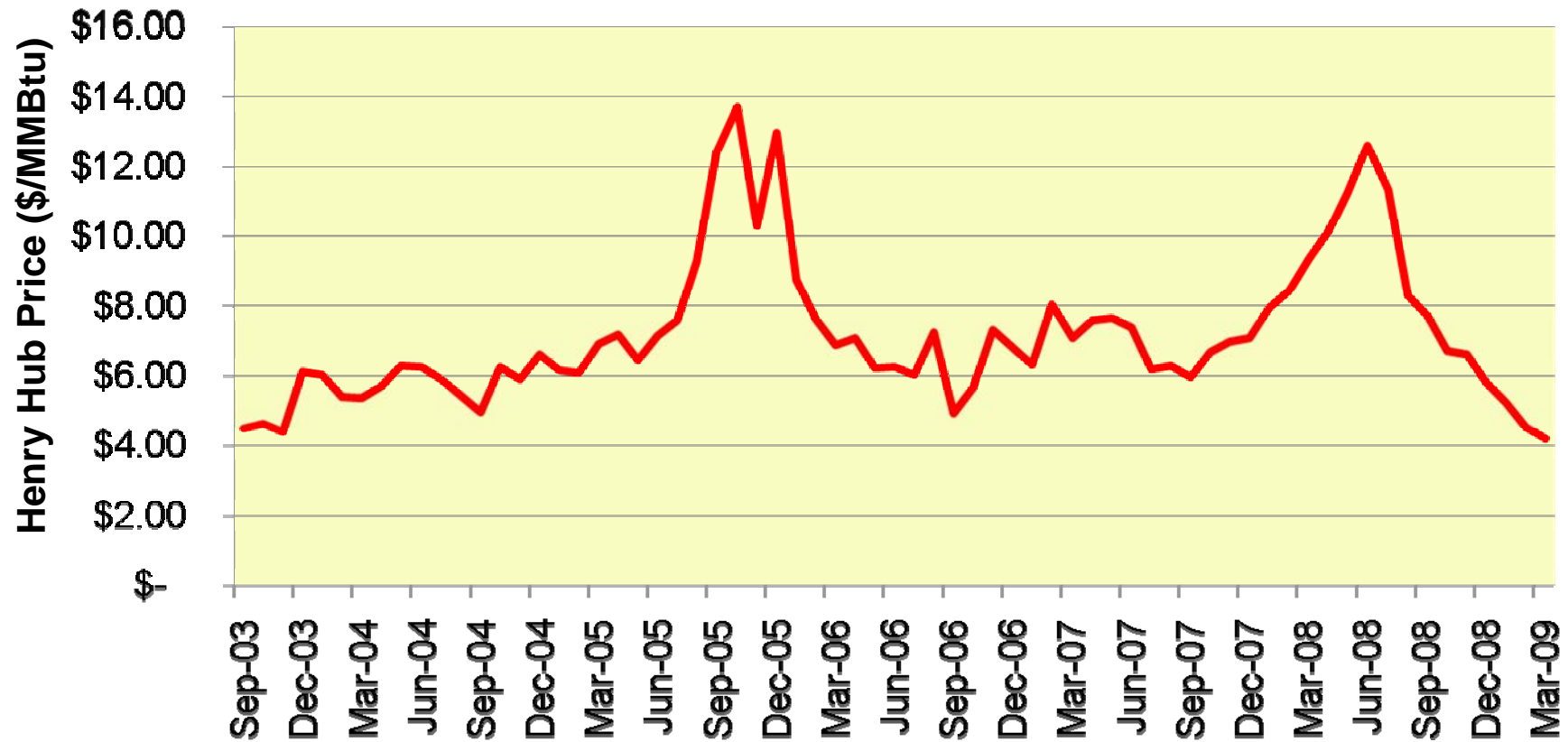


# *Producers Have Invested Nearly \$1 Trillion On Exploration Since 03*

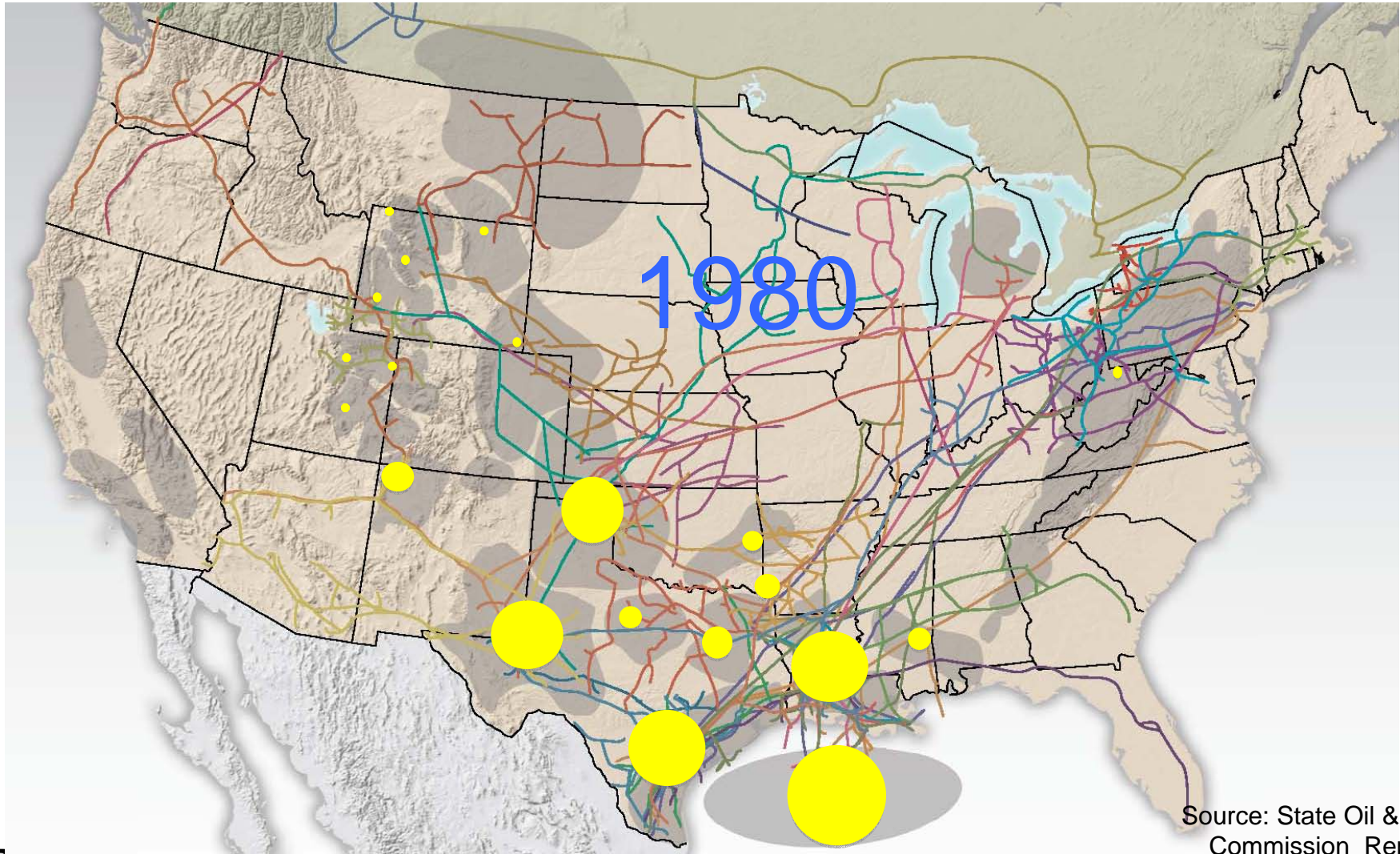
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# *Natural Gas Prices Are Falling Precipitously*



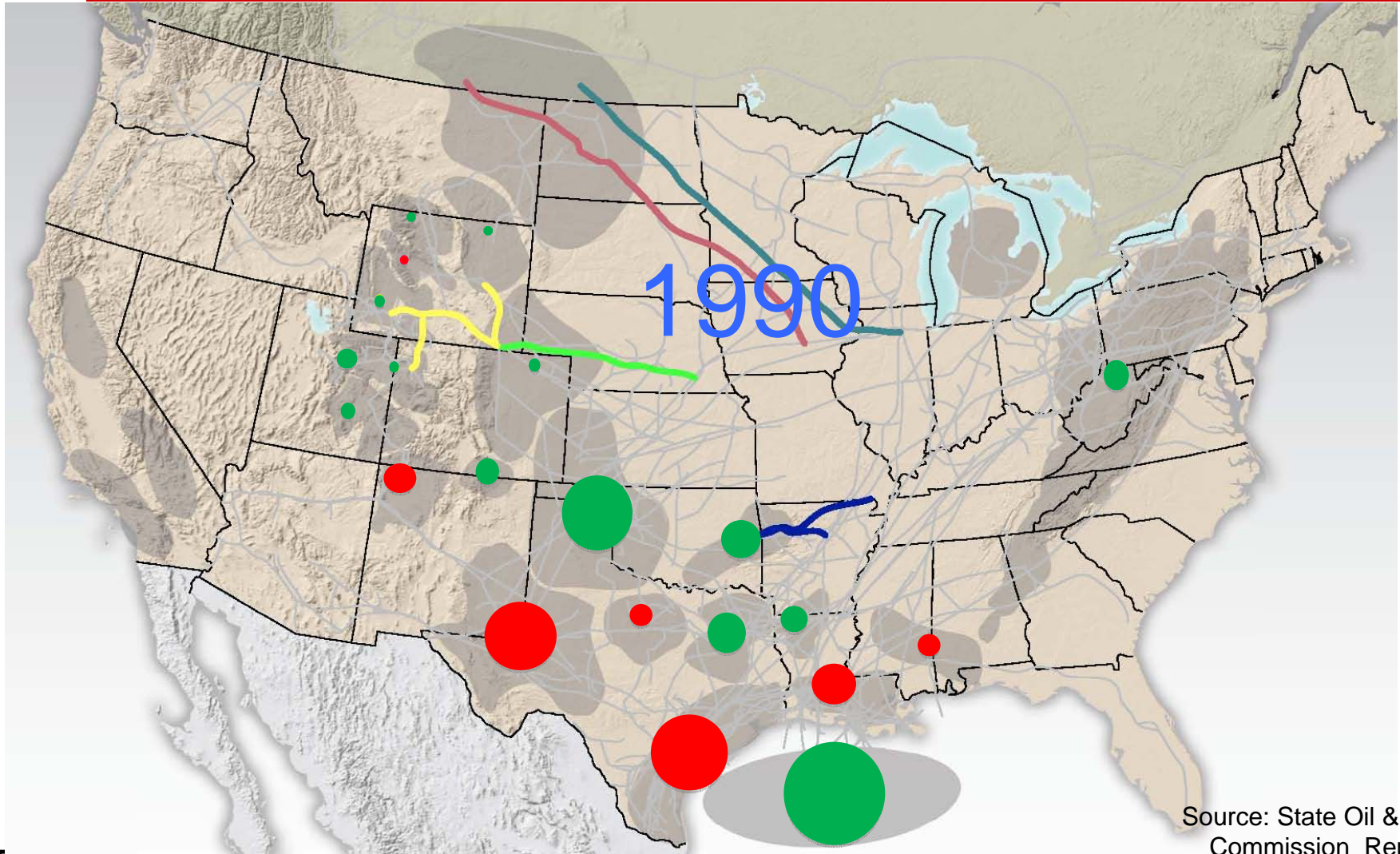
# *The Geography of Production Is Changing*



Source: State Oil & Gas  
Commission Reports

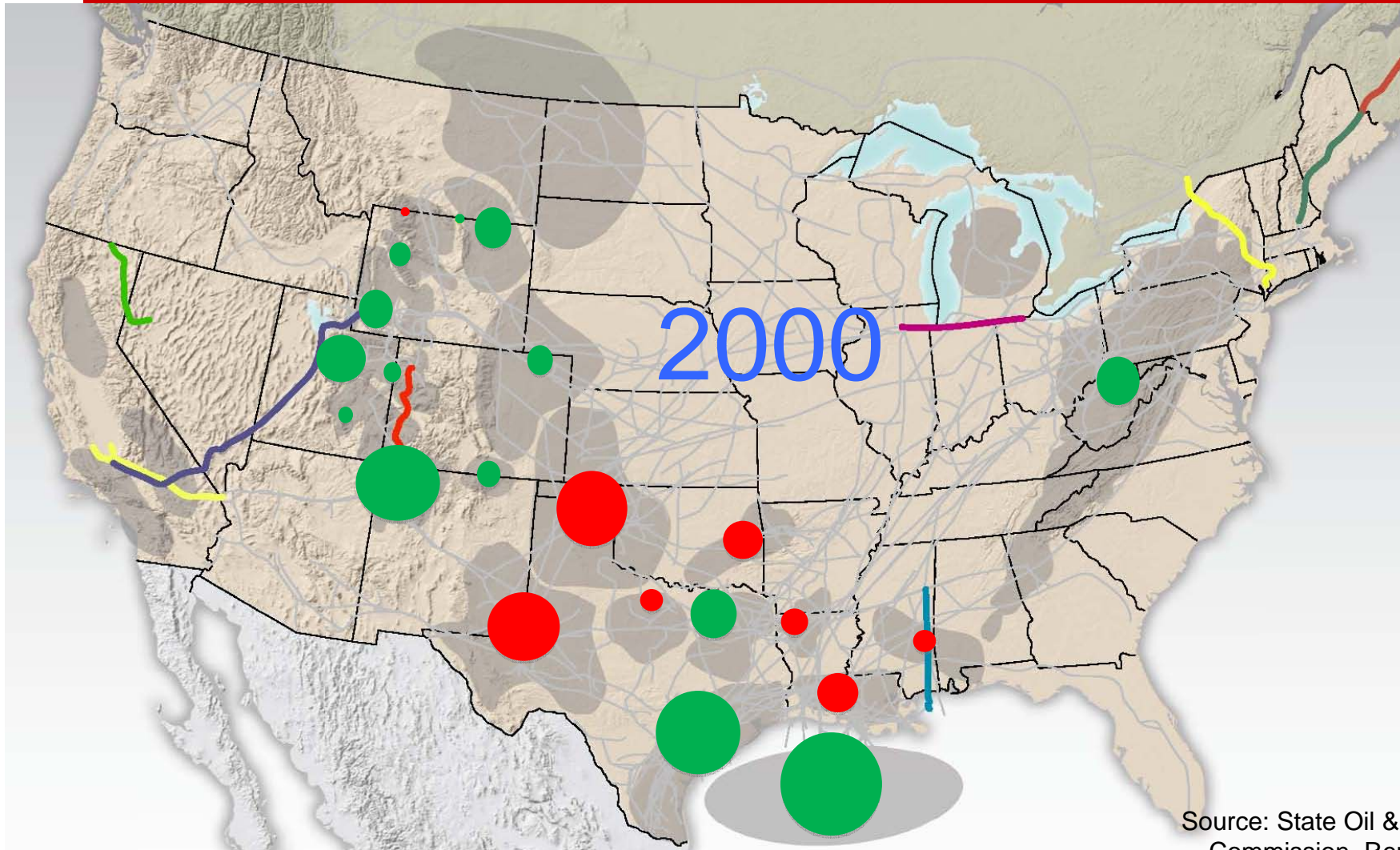


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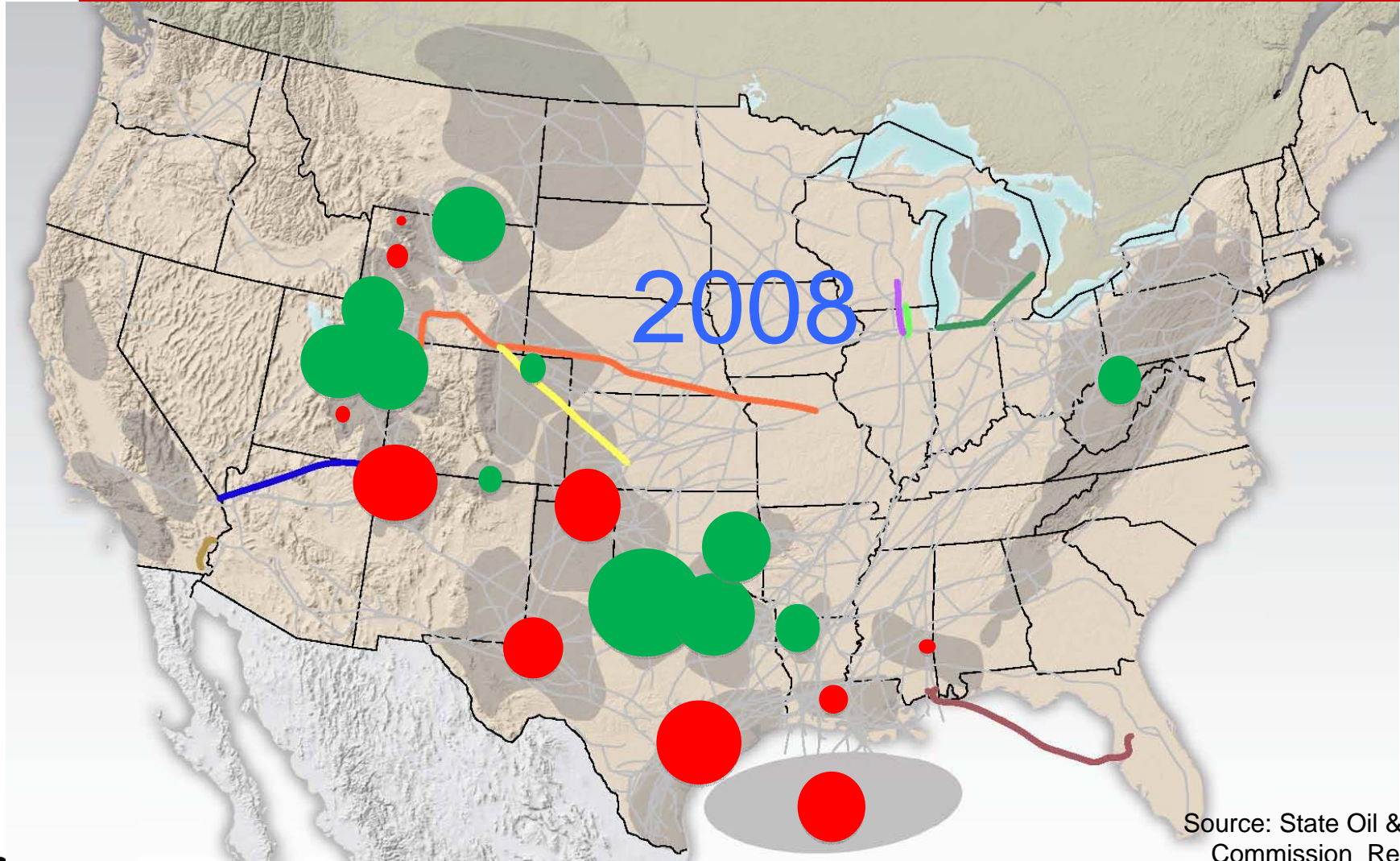
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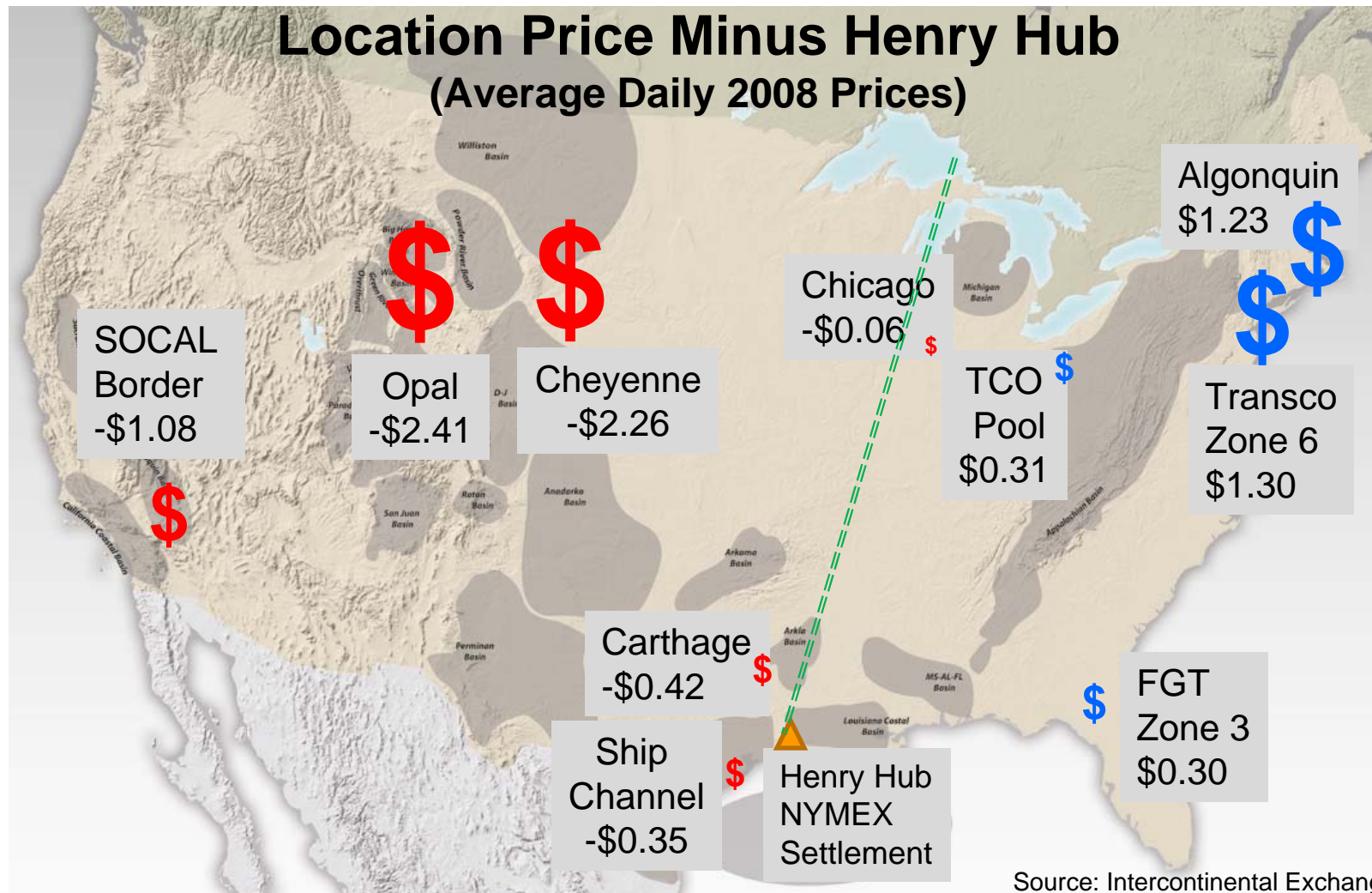


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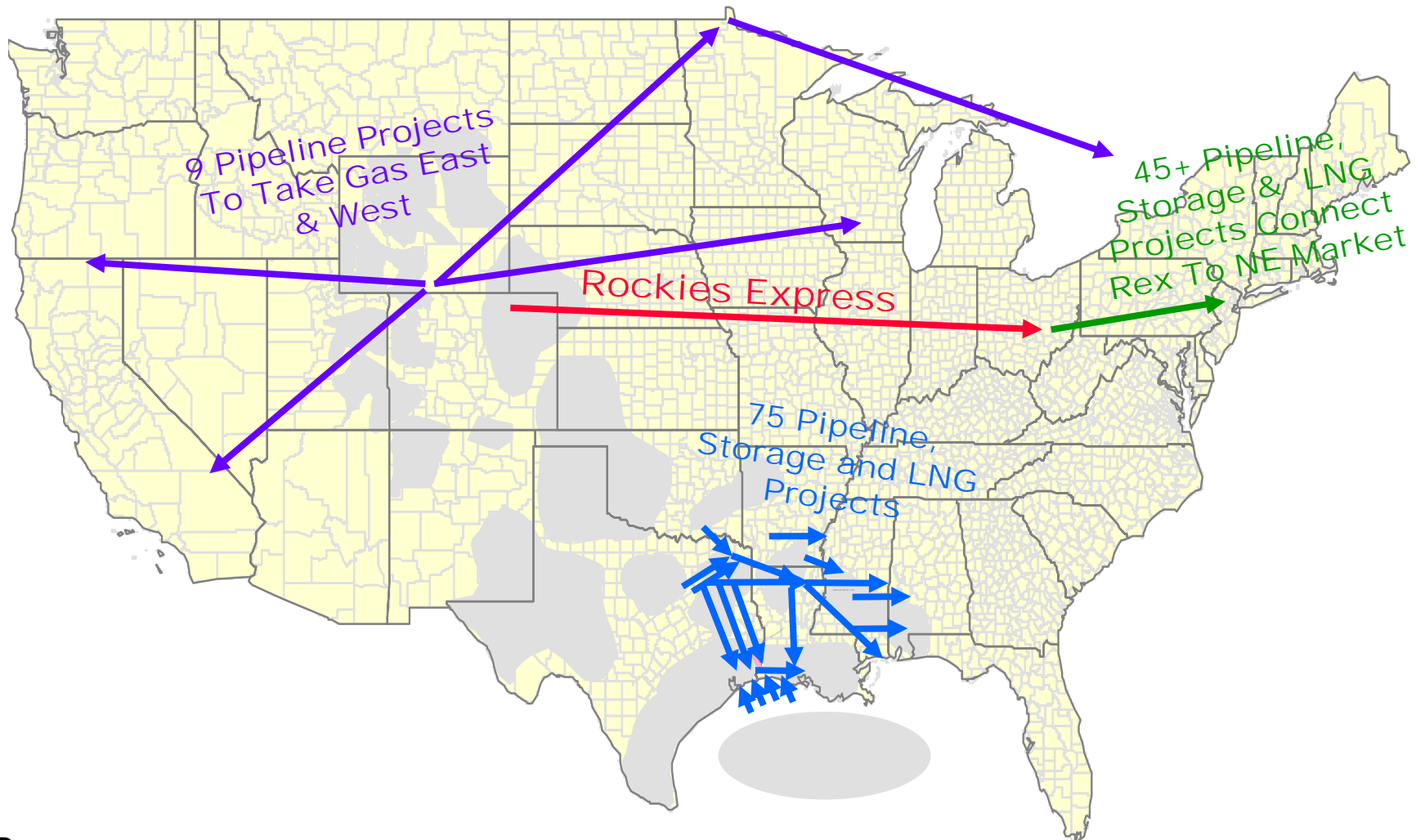


Source: State Oil & Gas  
Commission Reports

# Pipeline Constraints Create Price Anomalies

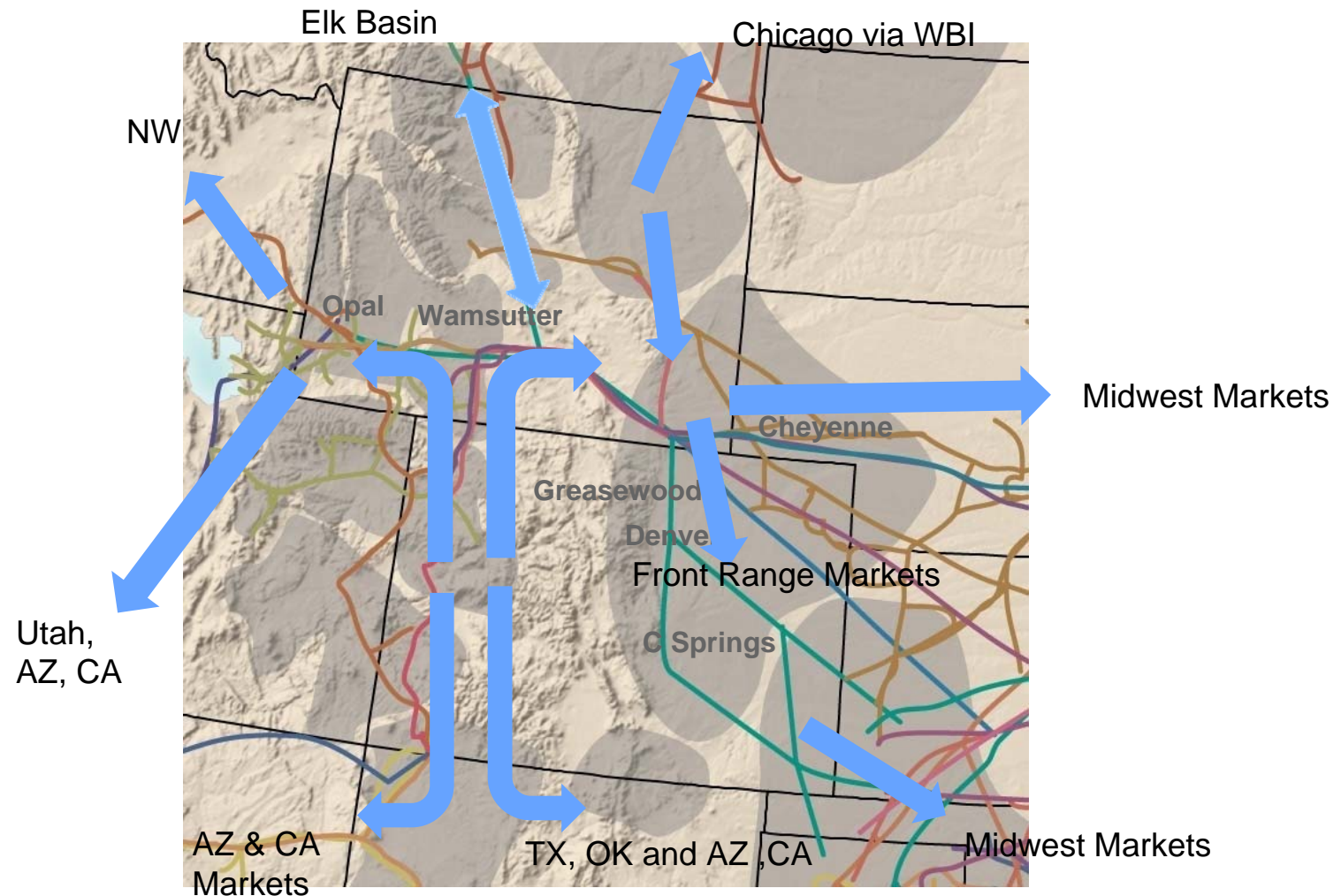


# *Billions Are Being Invested To Connect New Production*

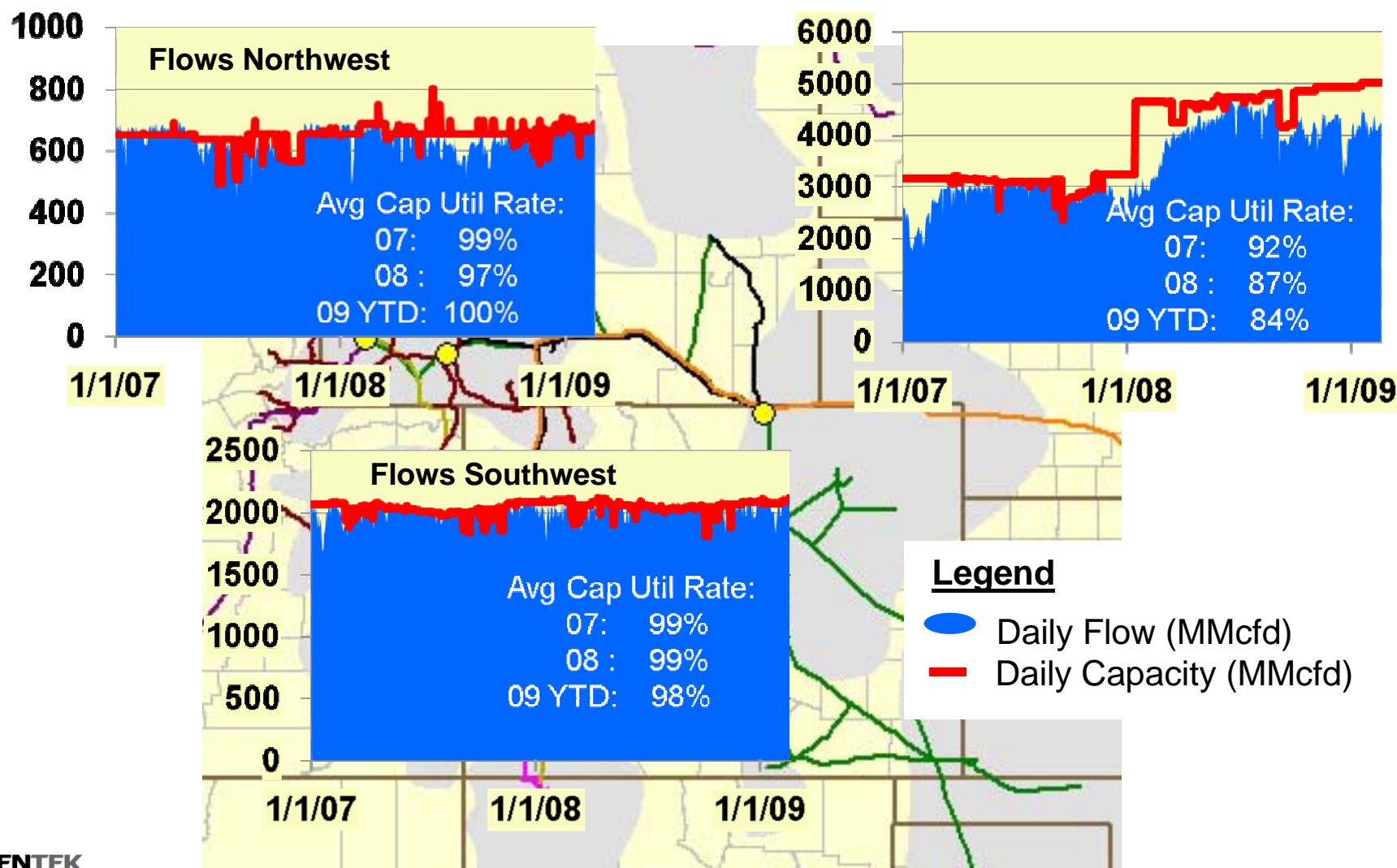




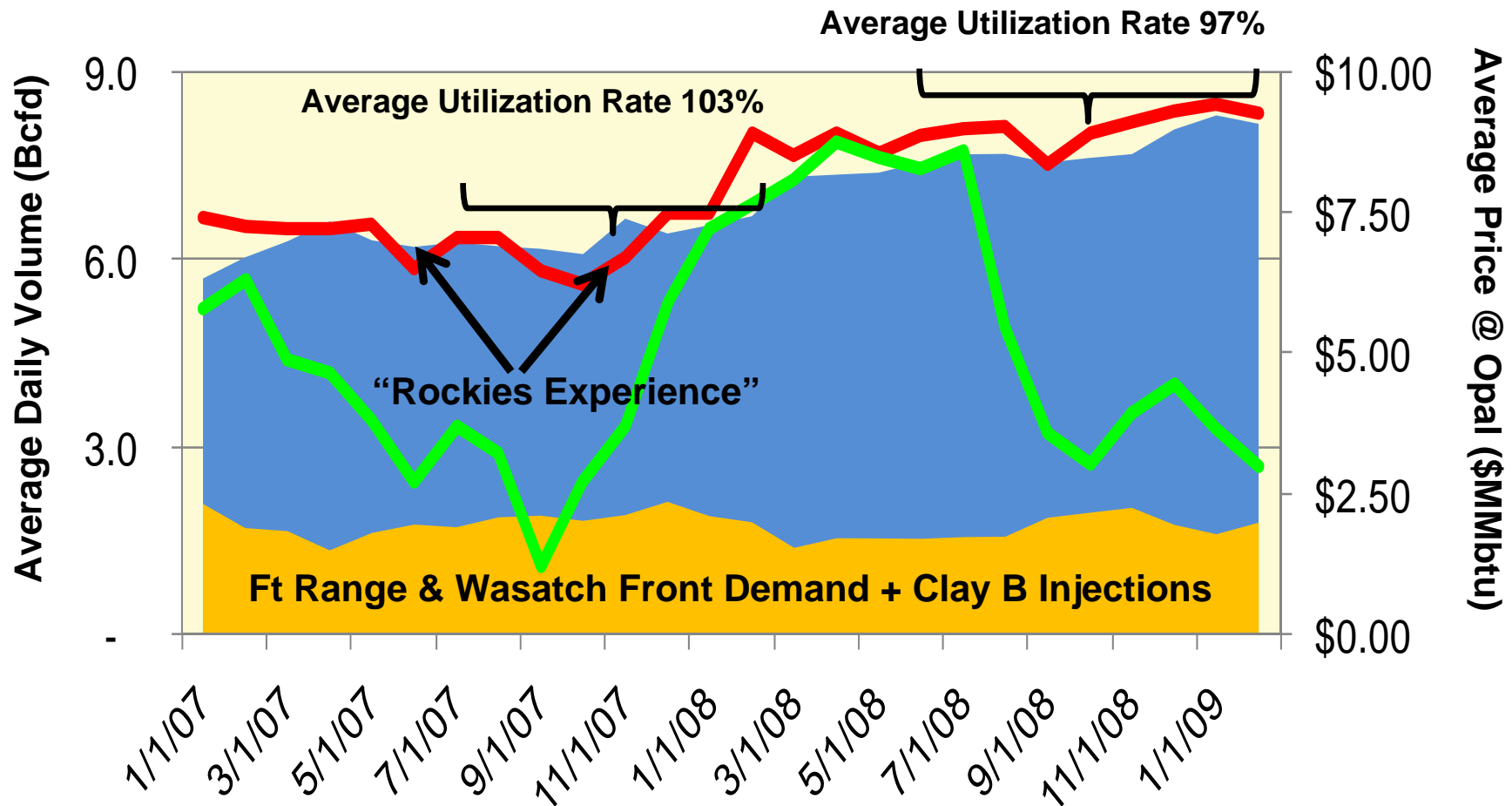
# *Rockies Gas Is Mostly For Export*



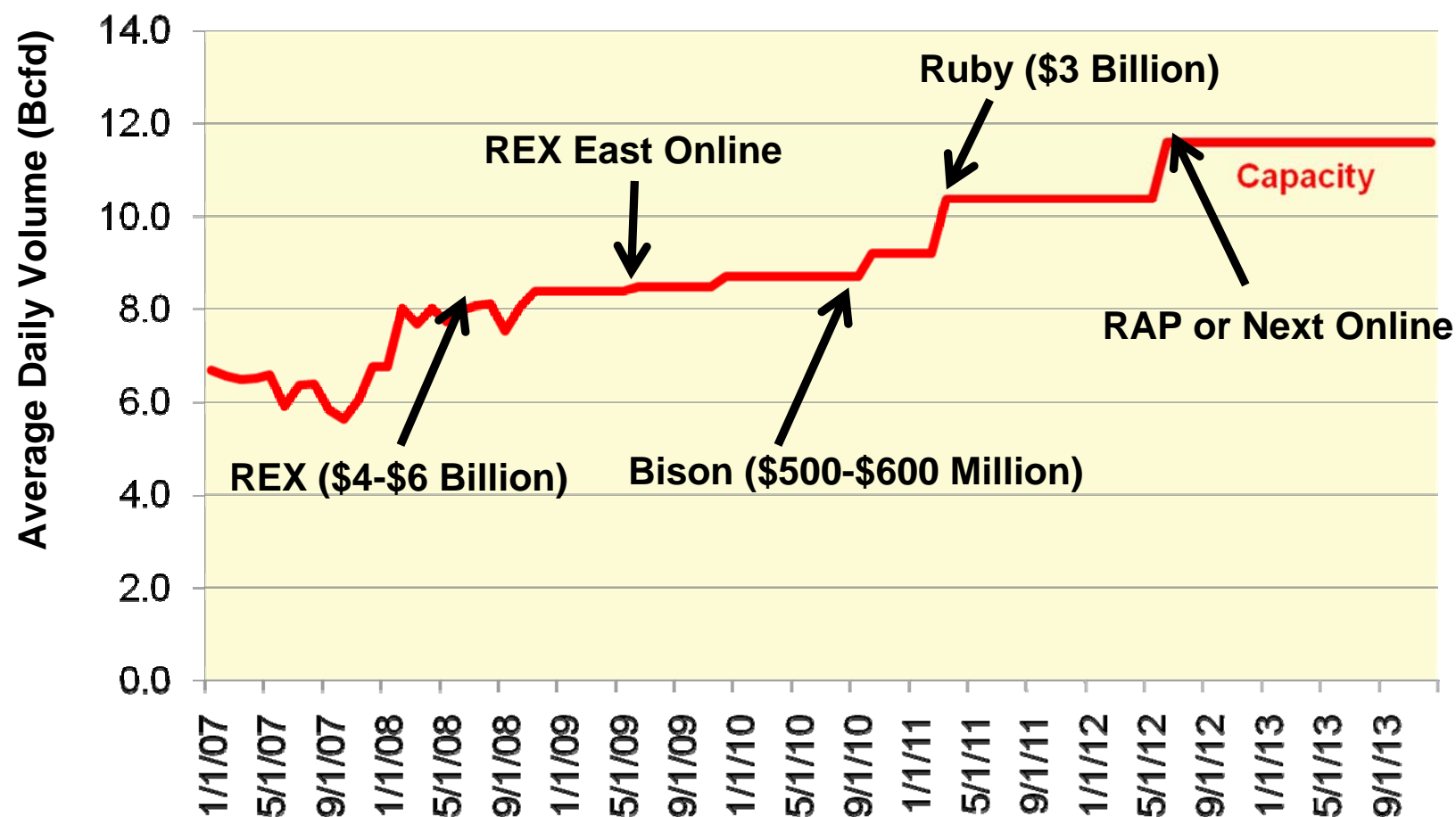
# *All Rockies Export Outlets Are Constrained*



# *When Capacity Is Tight, Prices Fall*

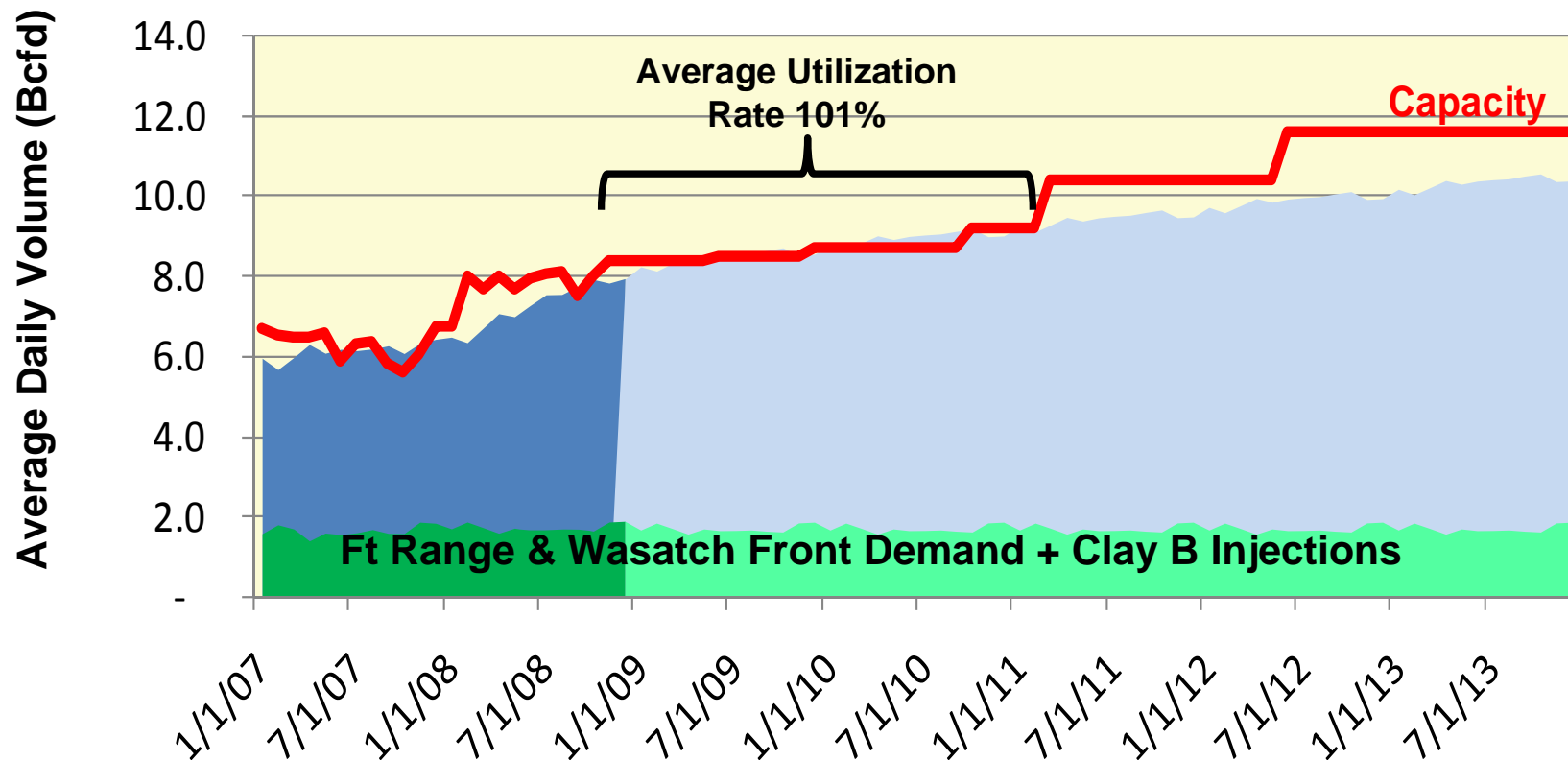


# Rockies Capacity Additions



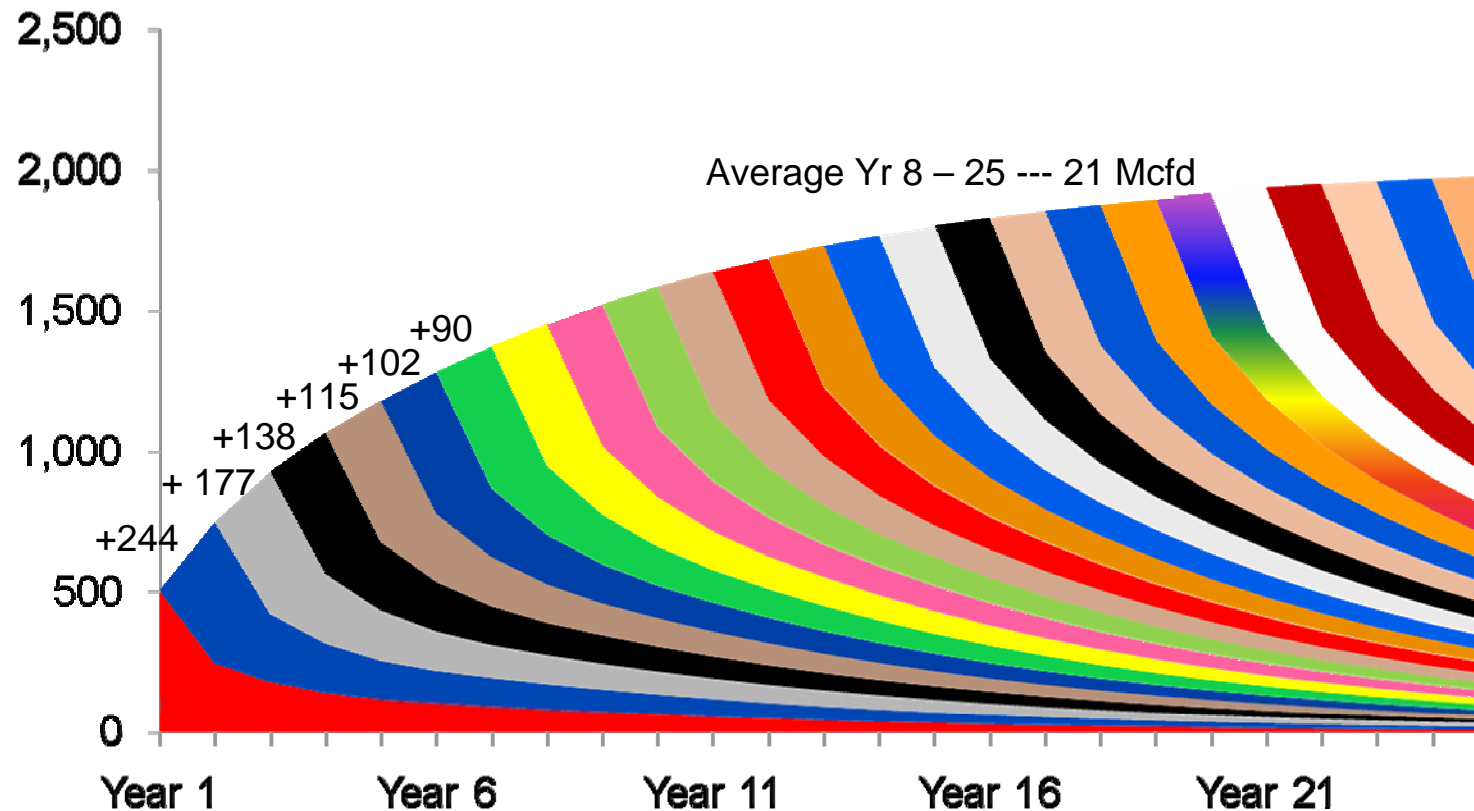
# *Business As Usual – Prices Too Low To Support Drilling*

Assumes Drilling Remains Constant At Dec 08 Rate



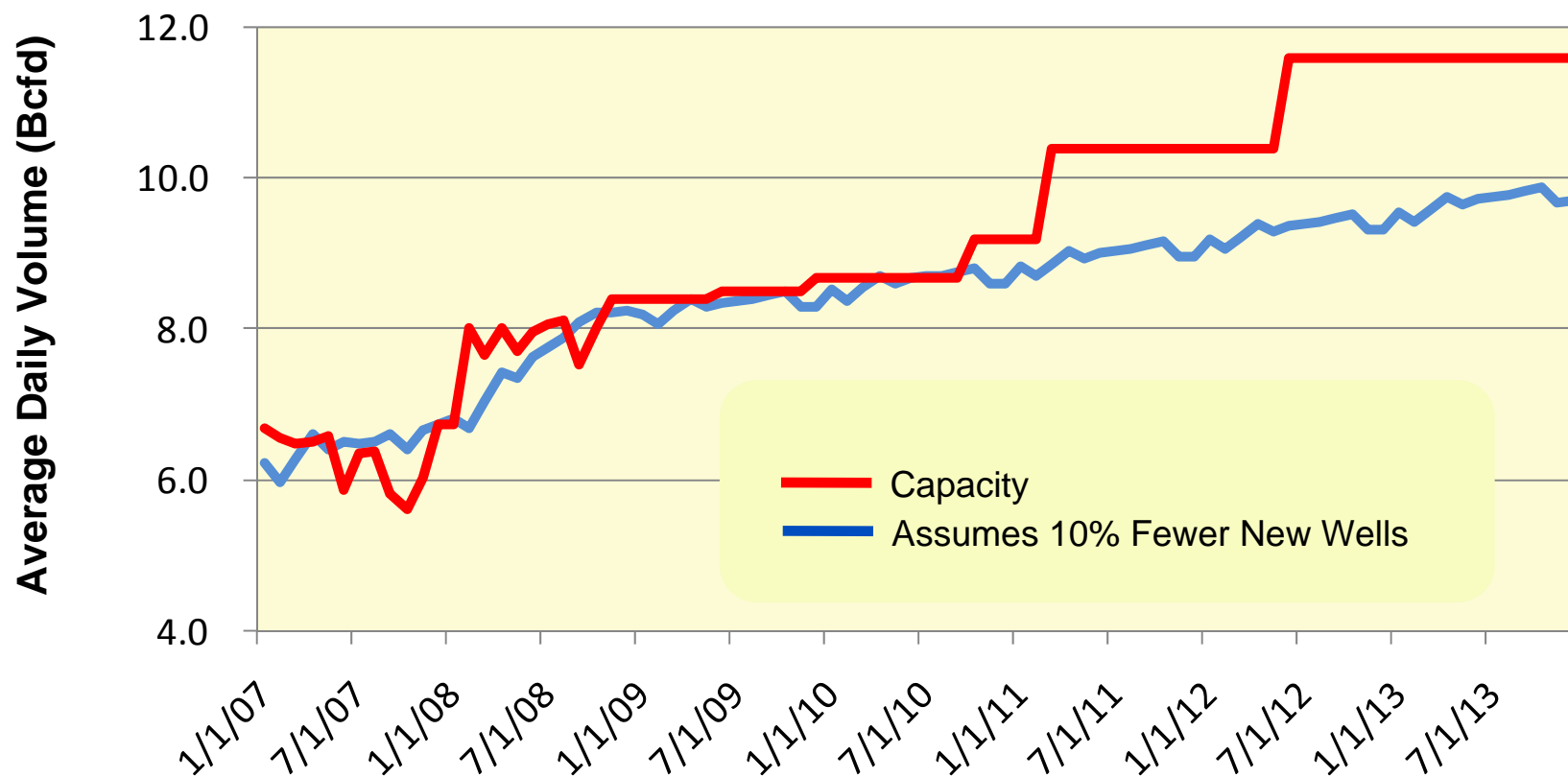
# *Steep Decline Rates Mean That Each Well Adds Less Incremental Volume*

Average Daily Production From A Mamm Cr Well, Piceance Basin (Mcf/d)

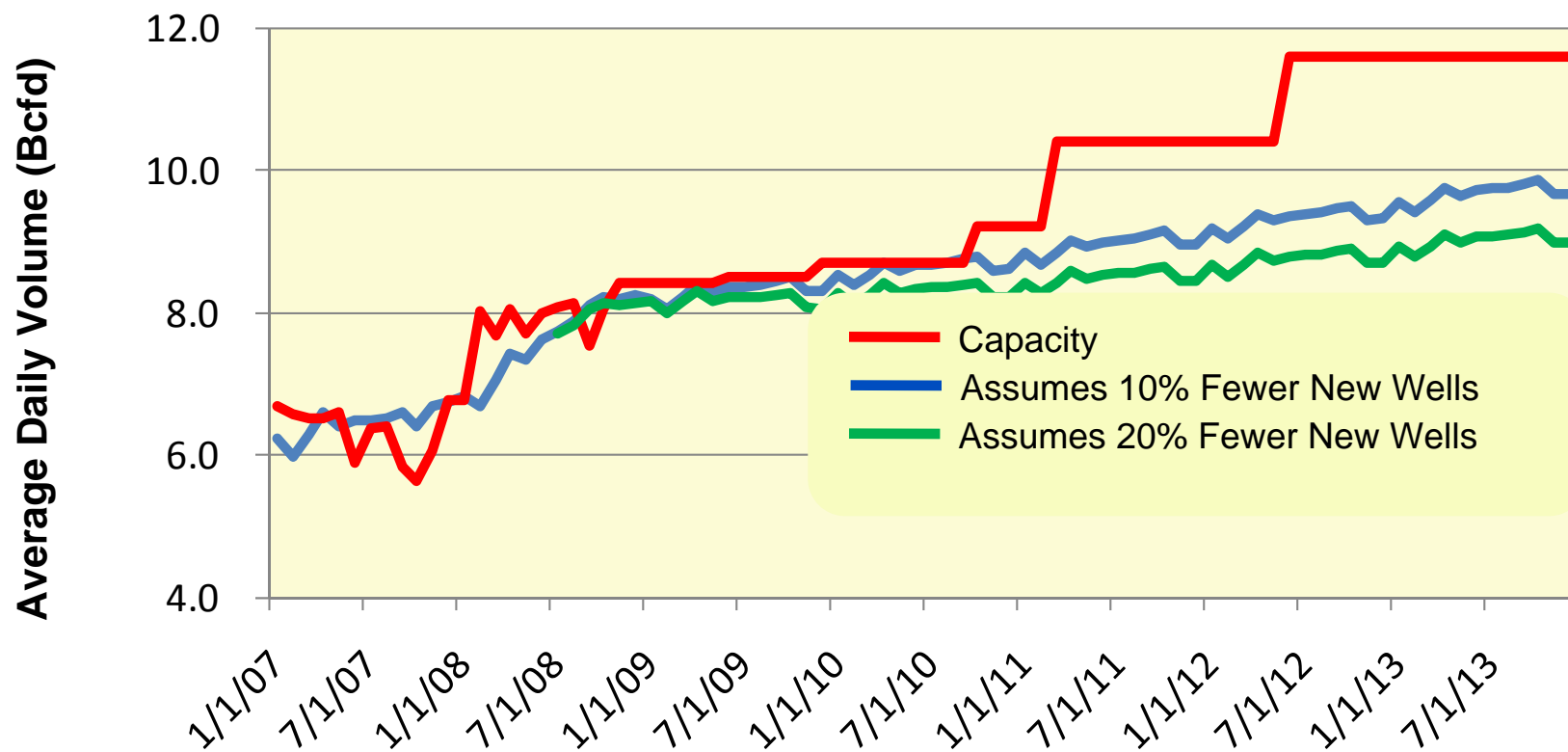


Assumes one well drilled per year

# *Reducing Drilling By 10% Accomplishes Little*

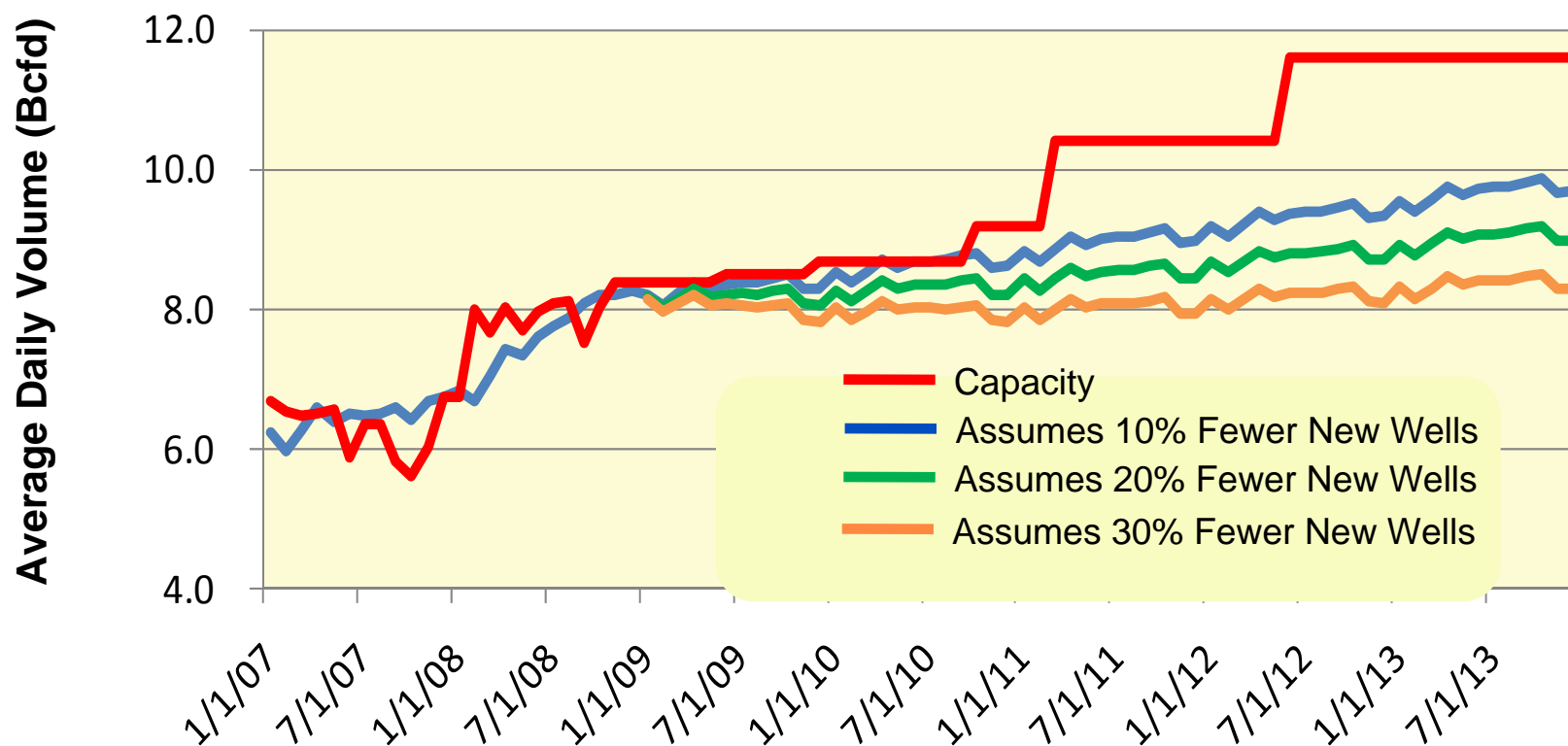


# *20% Fewer Wells Approaches Capacity*

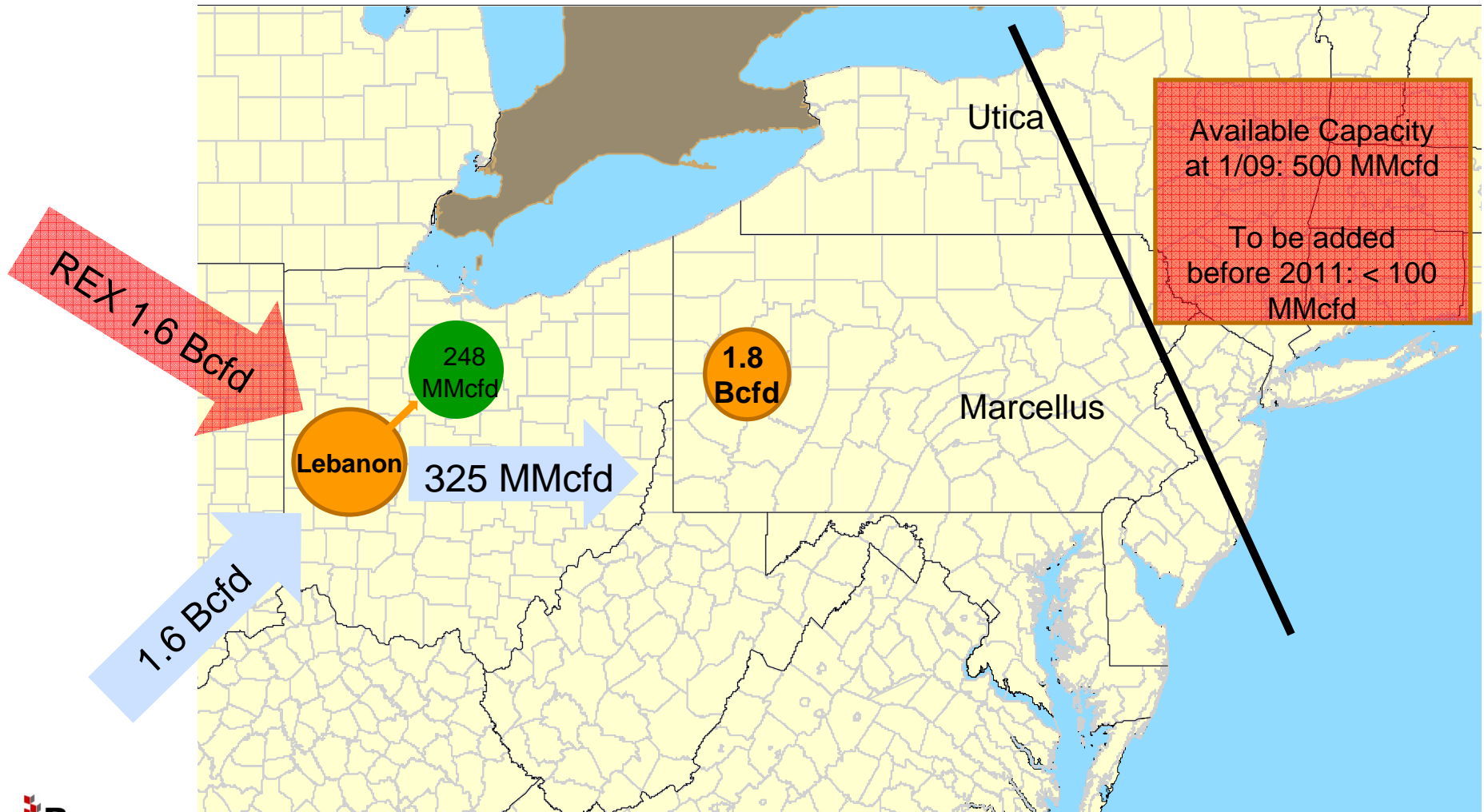




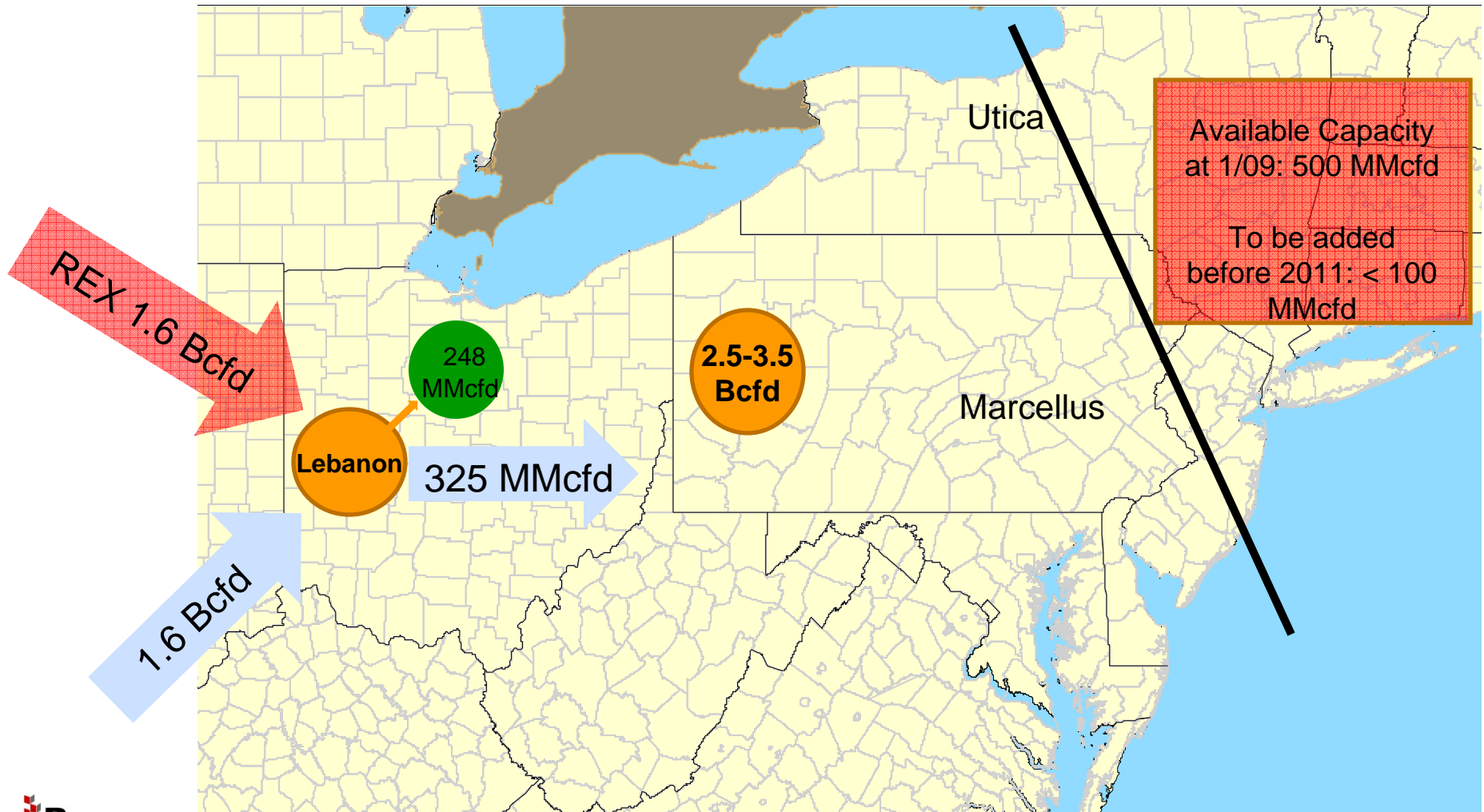
# *30% Fewer Wells Drilled Drops Production Below Capacity*



# *Constraints Are Developing In The Appalachia Market*

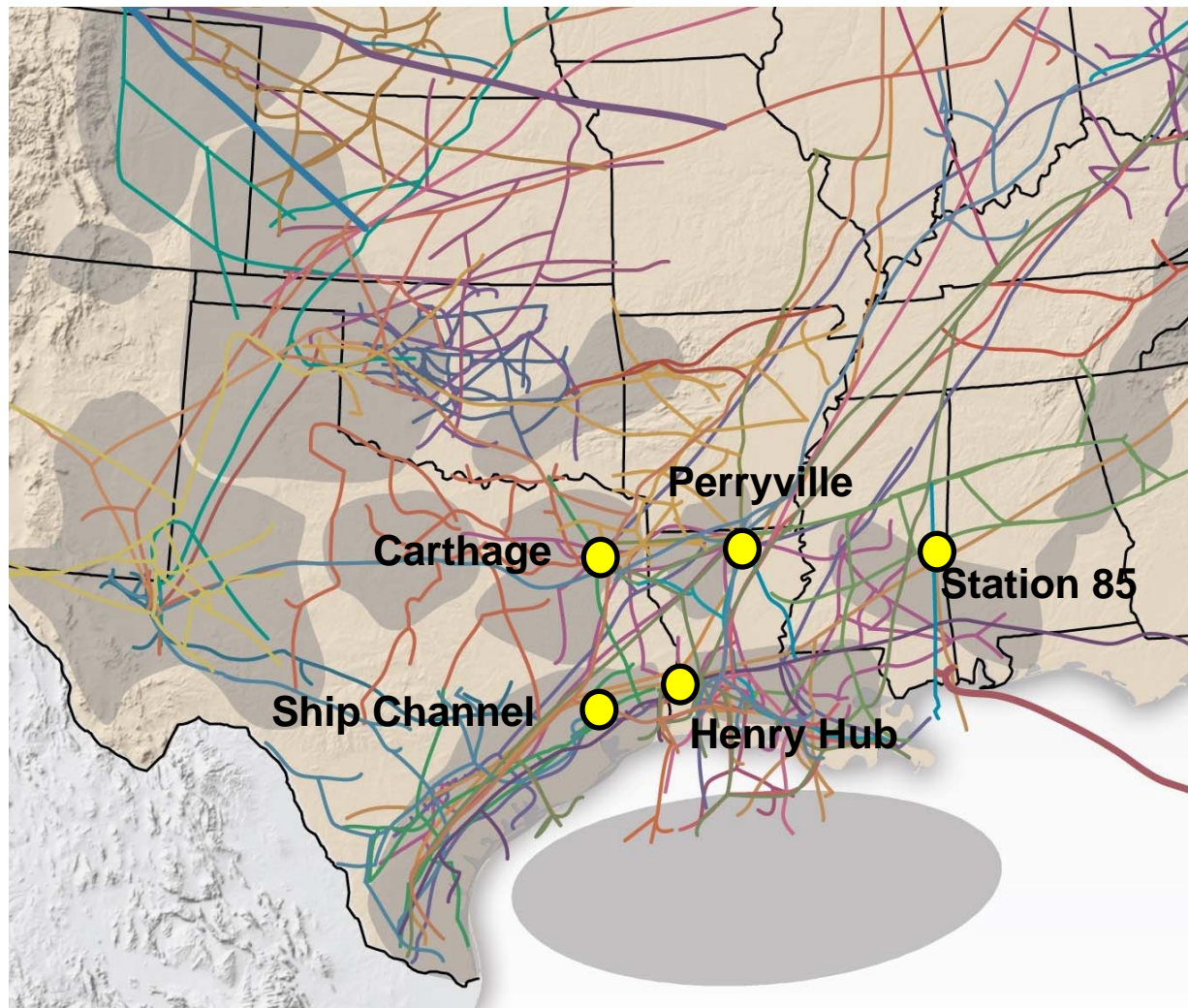


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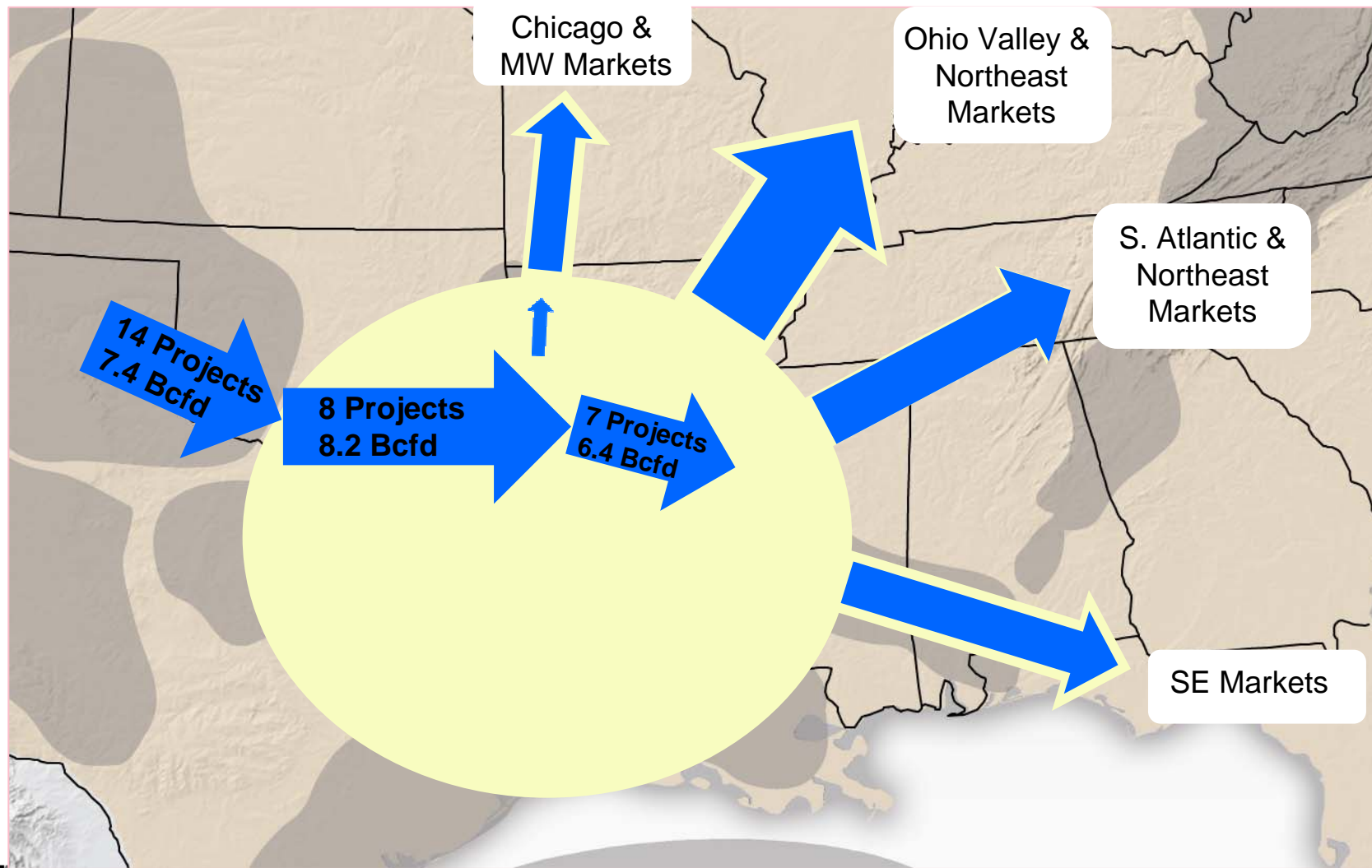


# *The Southeast Supply Area Is Complex*

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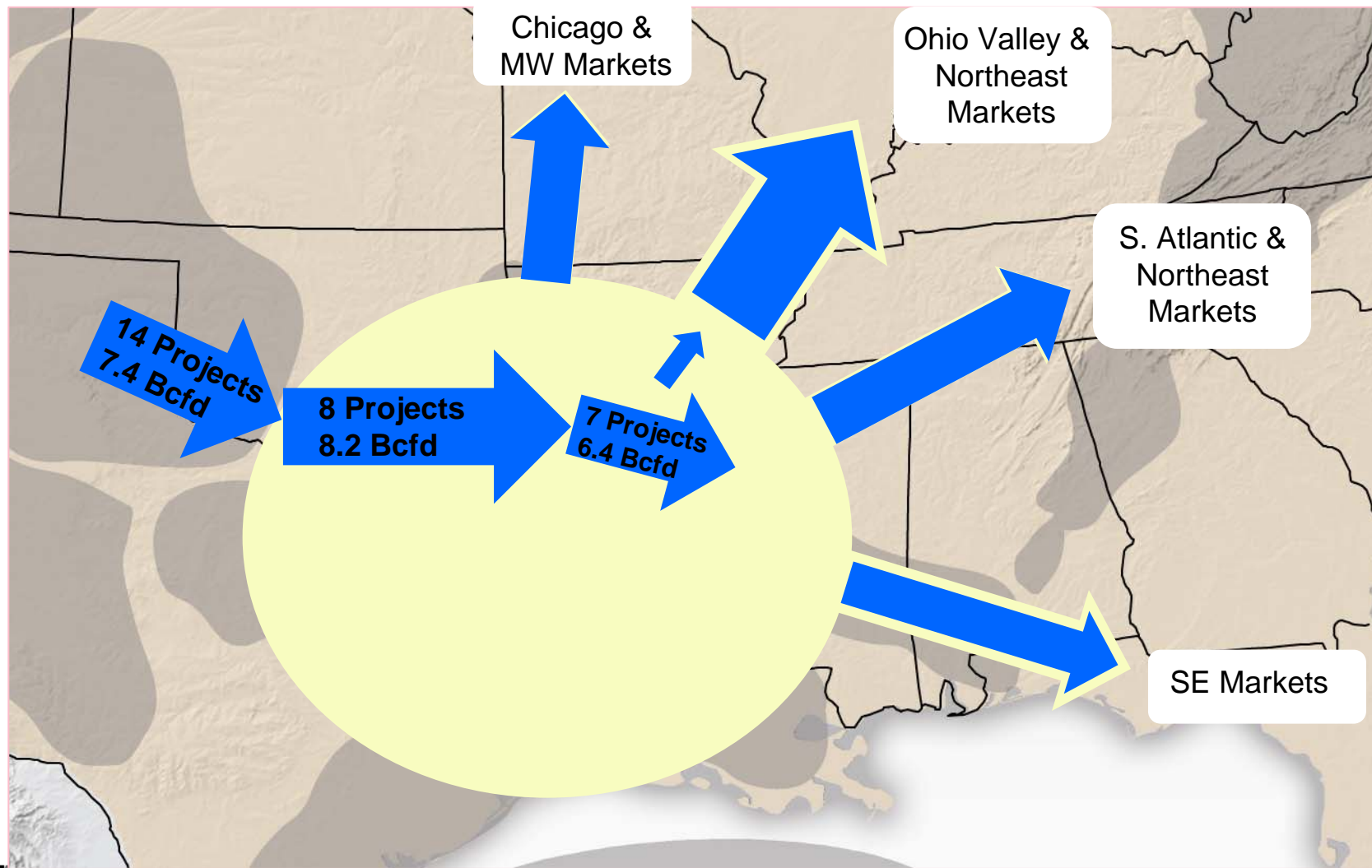


# *Pipeline Constraints Will Impact The SE Supply Area As Well*

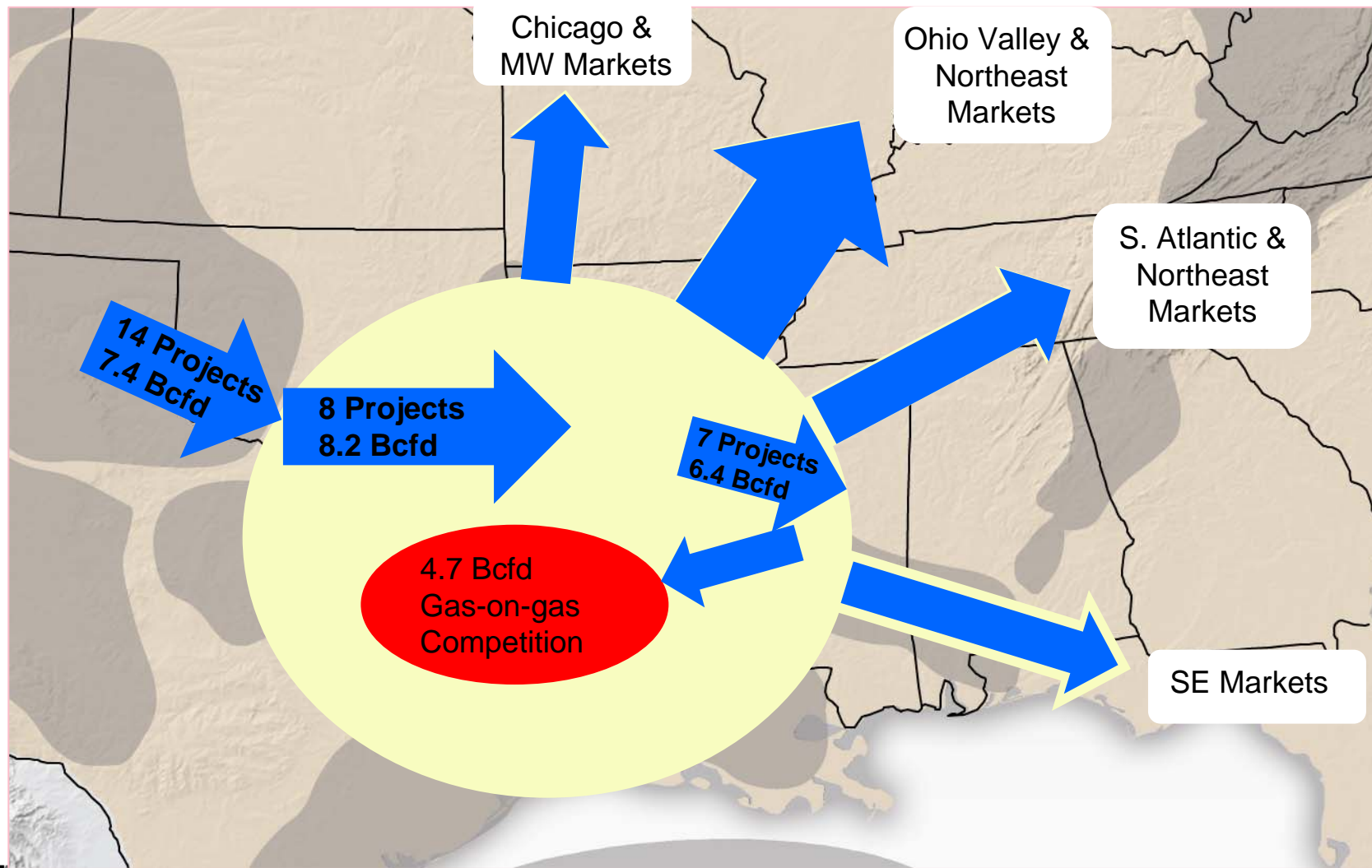




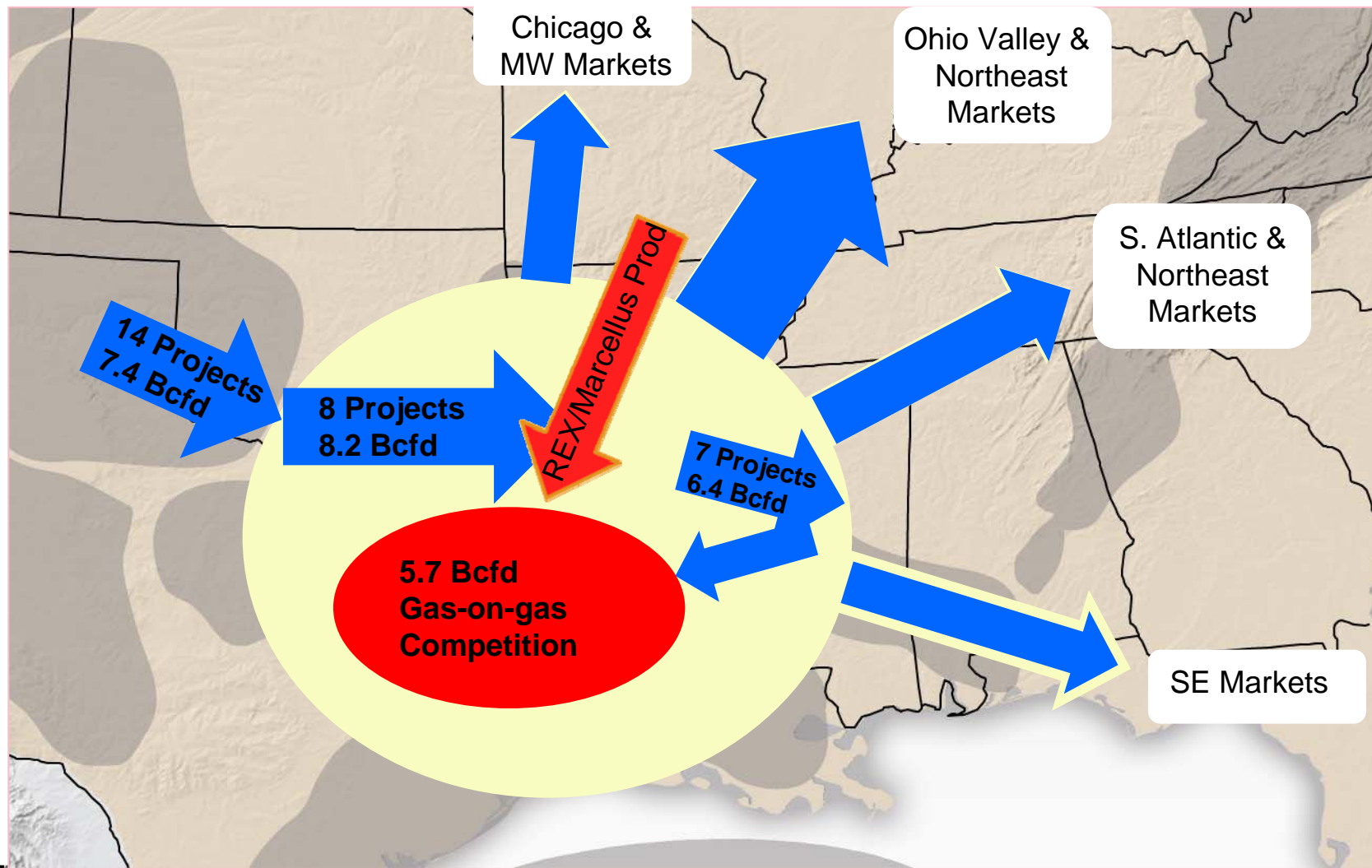
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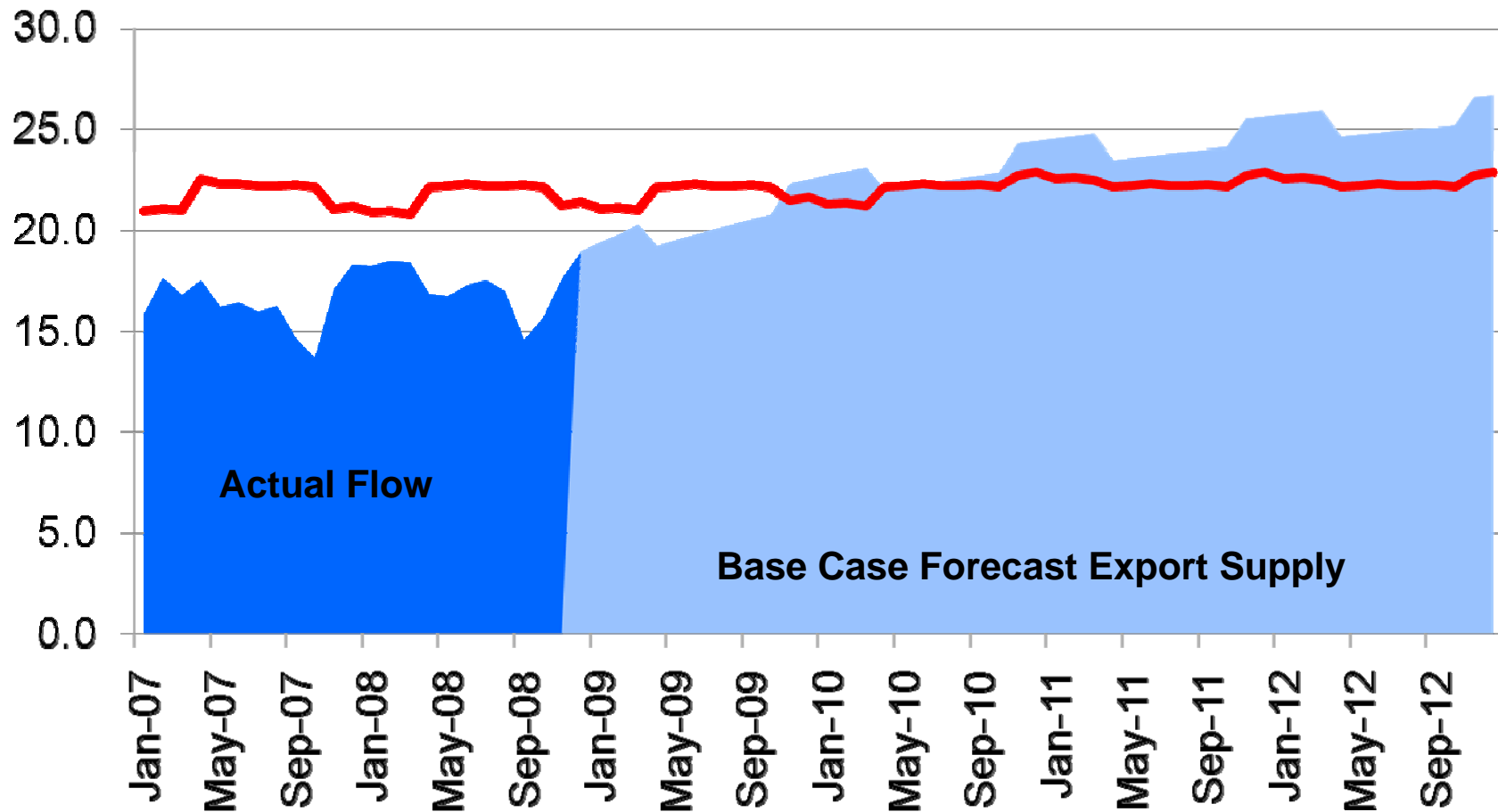


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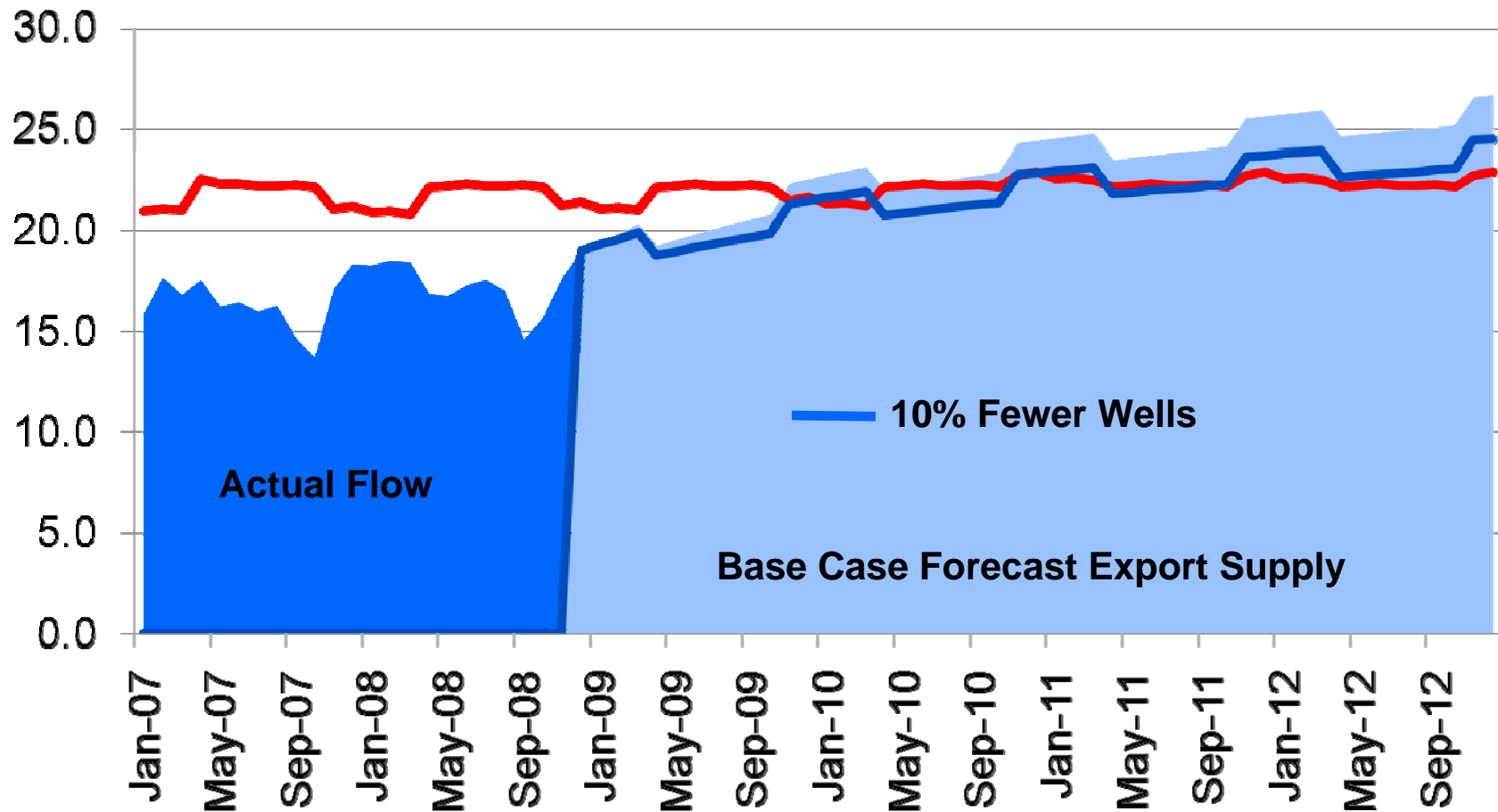




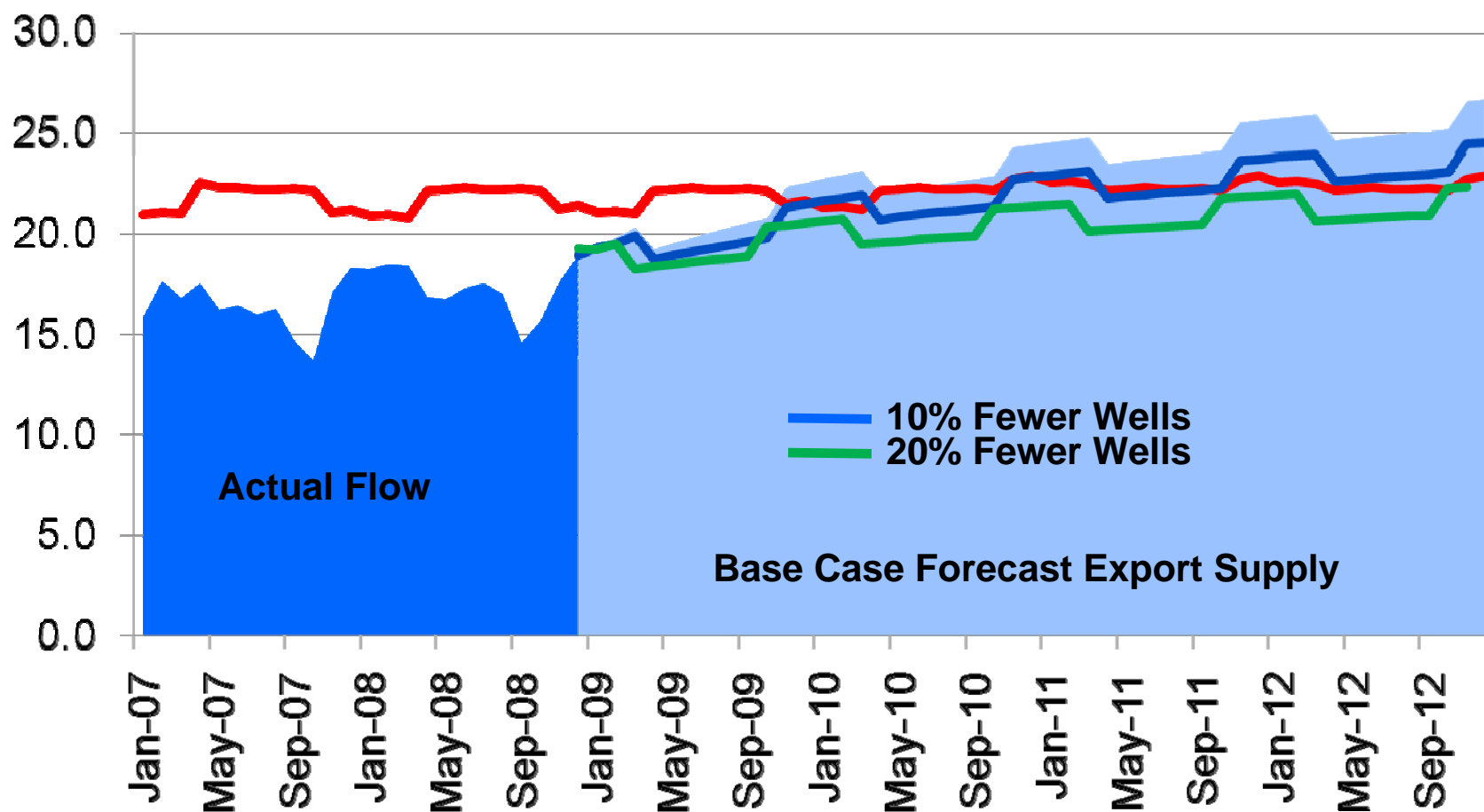
# *SESA Export Capacity Utilization*



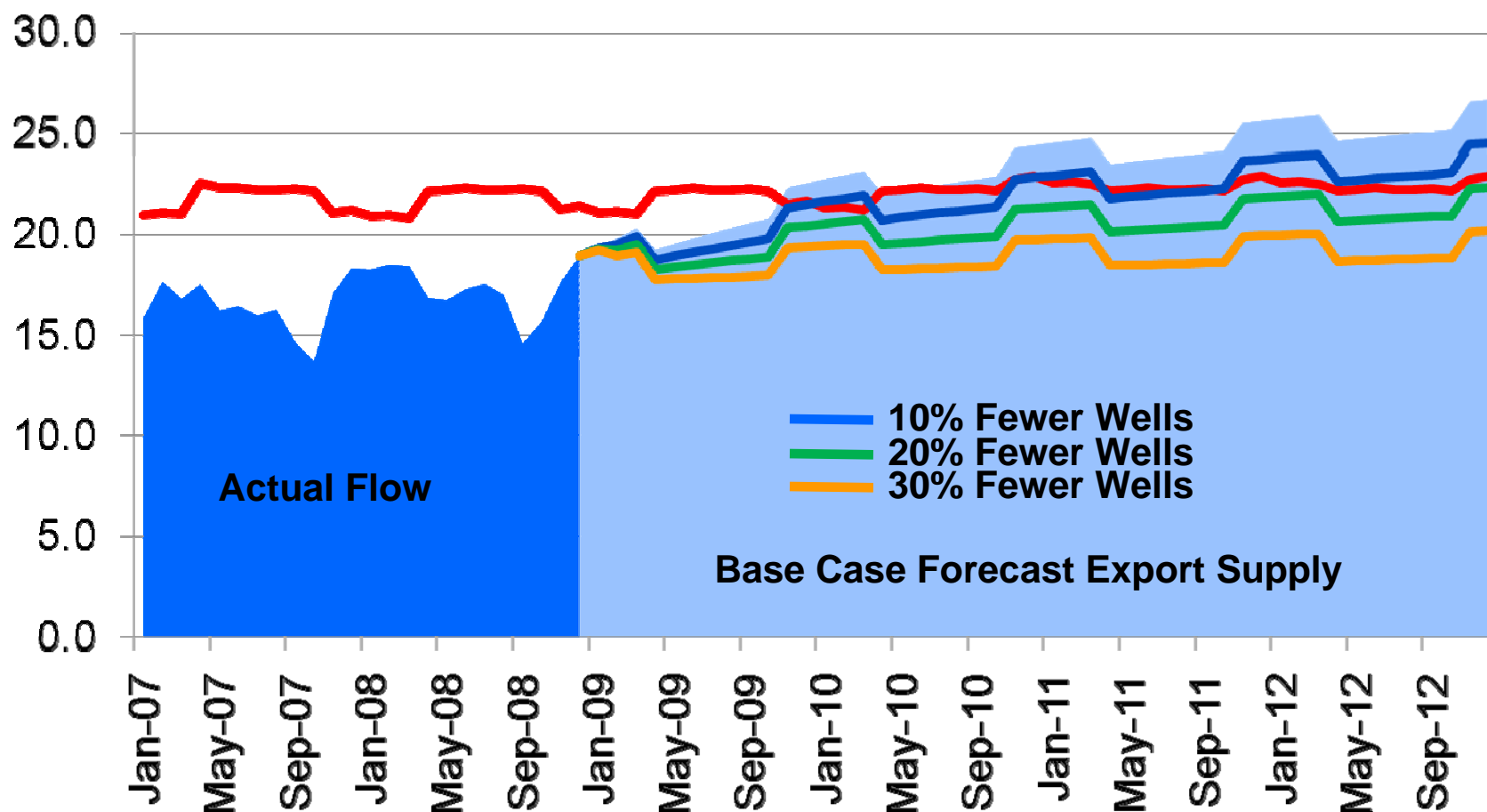
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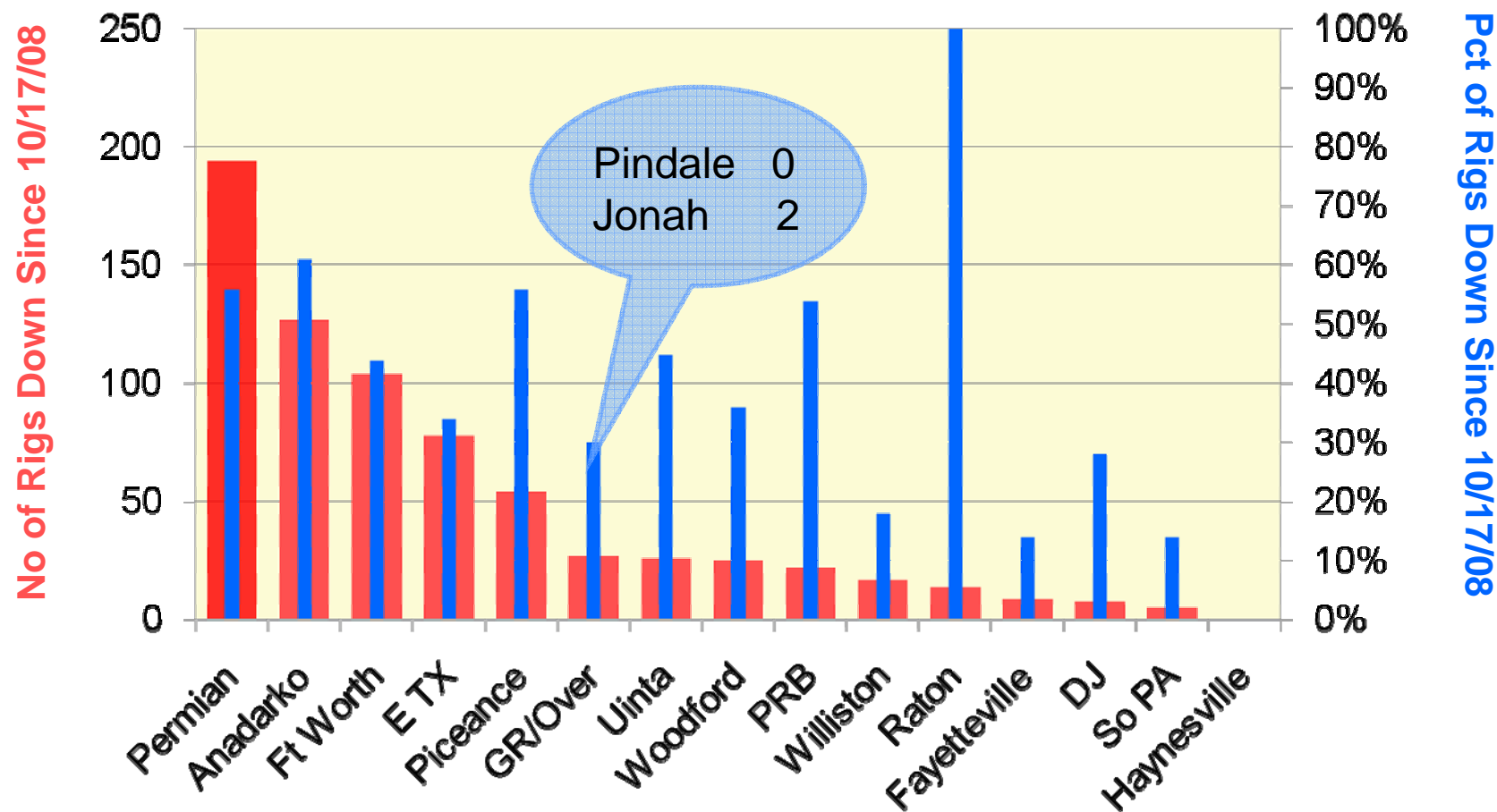
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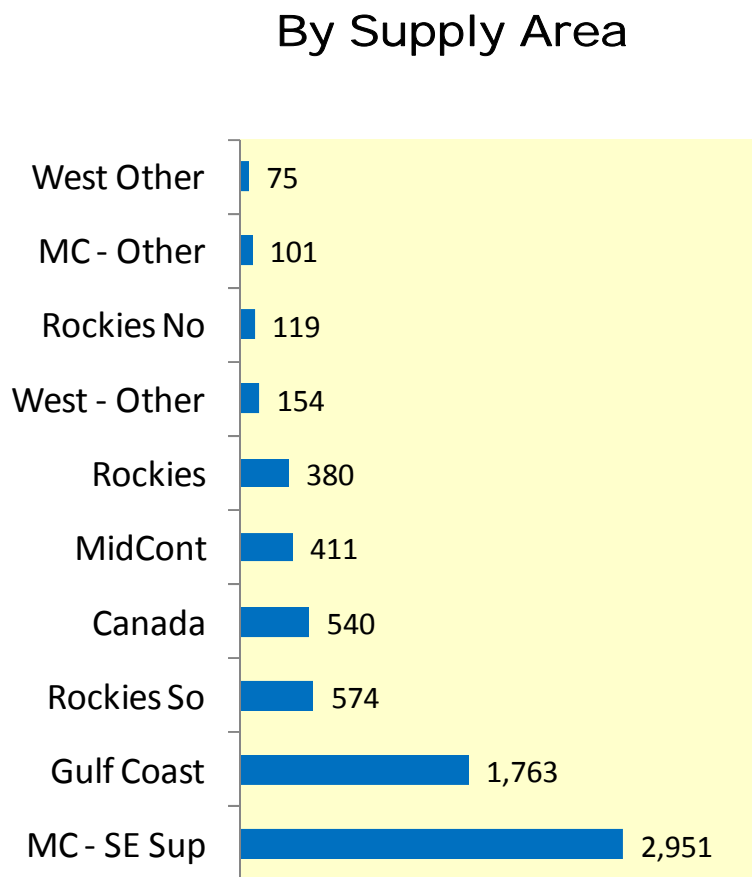
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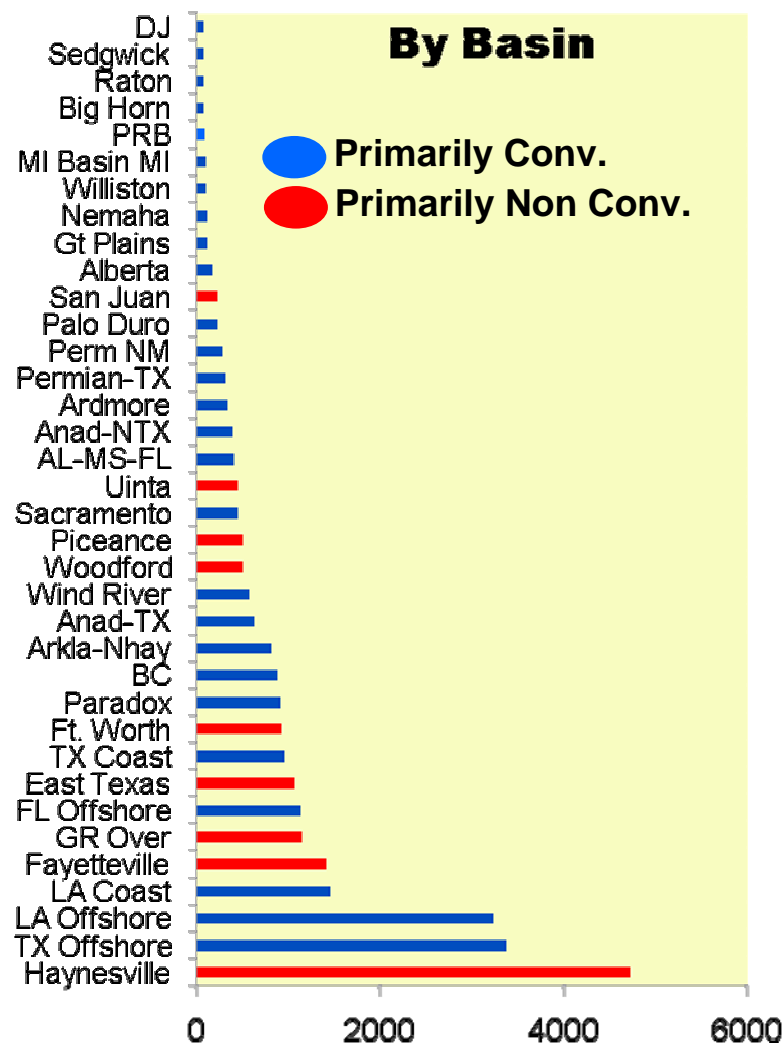
# Drilling Is Off Across The Country,



# Average First Year Production

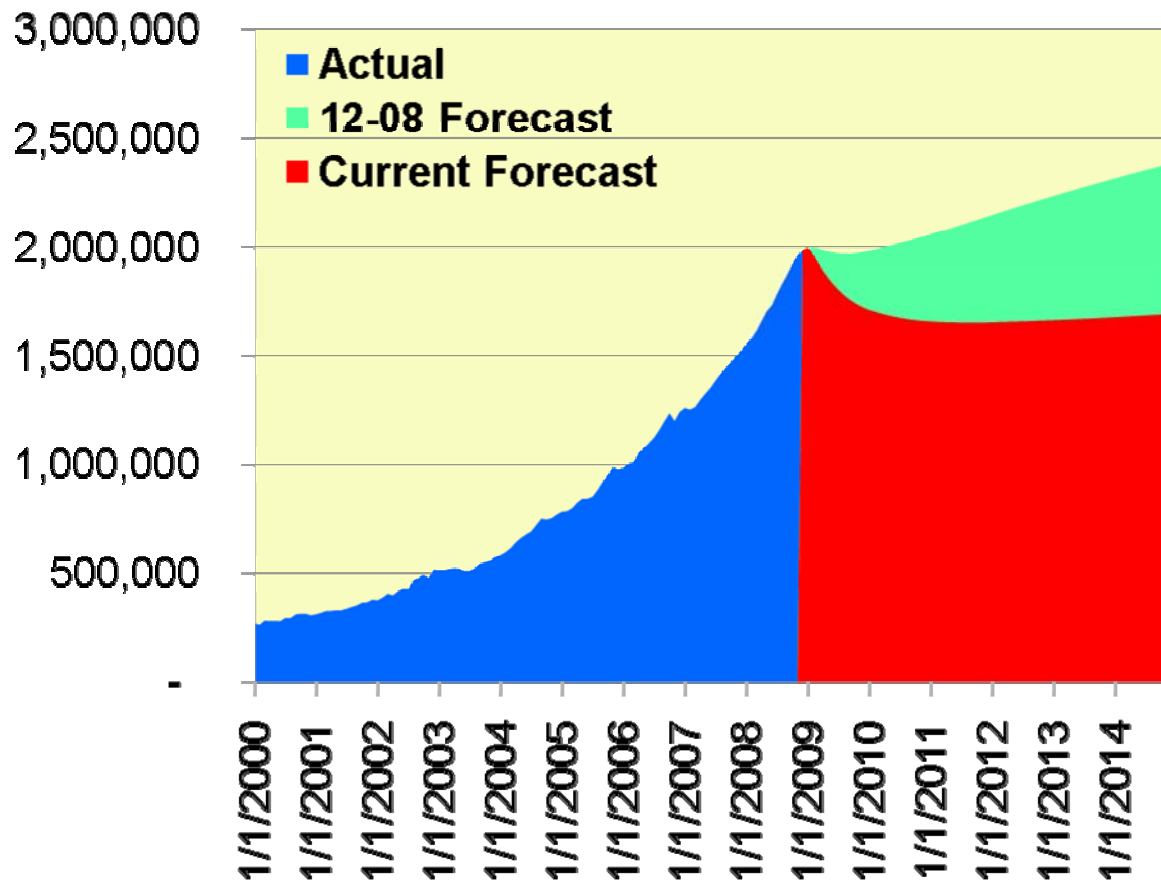


Units: MMcfd



# *The Drilling Decline Will Be Costly*

**Piceance Basin, CO Production Forecast**



- ❖ Reduced drilling will drop production by 994 Bcf over 5 Years.
- ❖ If average value is \$4.50, lost value is \$4.5 Billion.
- ❖ Cost to Colorado:
  - Severance Taxes – \$89 Mill over 5 yrs
  - Property tax base
  - Employee wages

# *Conclusions*

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- ❖ **Natural gas is the GOOD News for consumers.**
- ❖ **2008 belied the notion that the US is running out of natural gas. Prices will continue to fall and may stay in the \$3 to \$6 range for many years.**
- ❖ **On our current pace:**
  - **Exploration activity will fall dramatically in 2009, but total 2009 production may increase slightly over 2008.**
  - **By the end of 2009 drilling declines will arrest production growth.**
  - **Because of technology and pipeline constraints, prices will continue to be volatile, but corrections will happen more quickly and the range narrower.**
  - **Additional pipe capacity is needed but increased demand must come first .**



# *Implications*

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- ❖ **The low cost of natural gas will make alternatives economically less competitive .**
- ❖ **We are faced with an historic opportunity: Gas supplies are sufficient to play the central role in our nation's energy policy:**
  - **It is abundant in the US**
  - **It is relatively cheap**
  - **It is relatively clean**
  - **It is N. American – it provides jobs and tax base**
  - **Its consumption technologies are proven**
- ❖ **State, local and federal government policy is critical to realizing this fragile opportunity.**
- ❖ **Government policy – whether state, federal or local – needs a feedback loop to accommodate market changes. Ultimately markets prevail.**

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