



Liquids From Shales

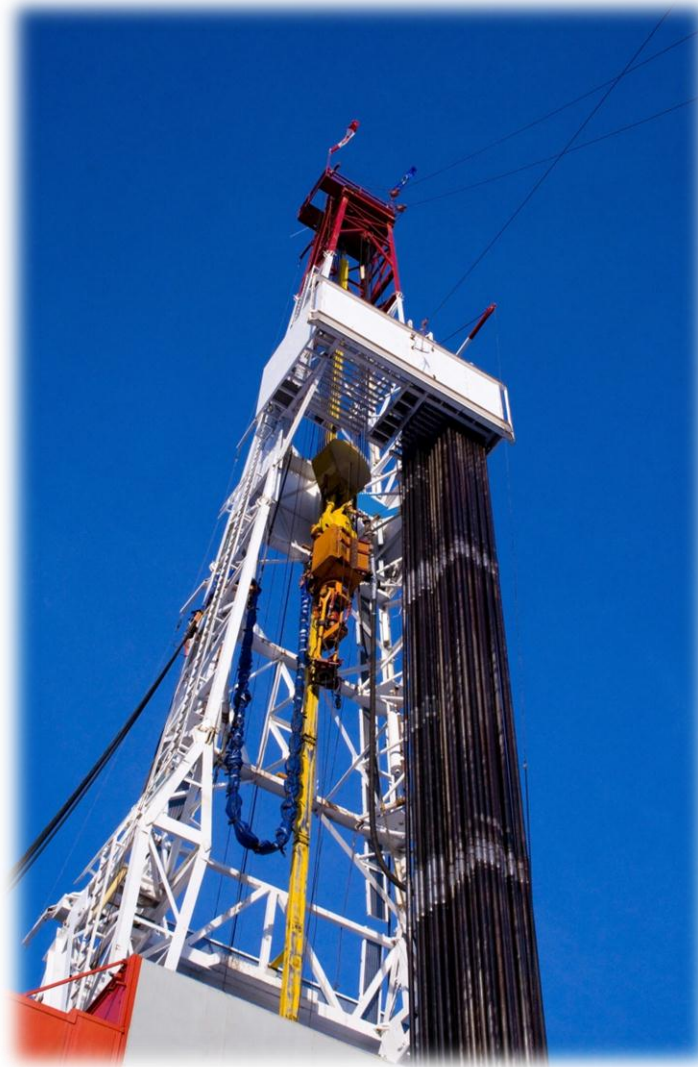
11th Annual Tulane Engineering Forum

Tom Sherman

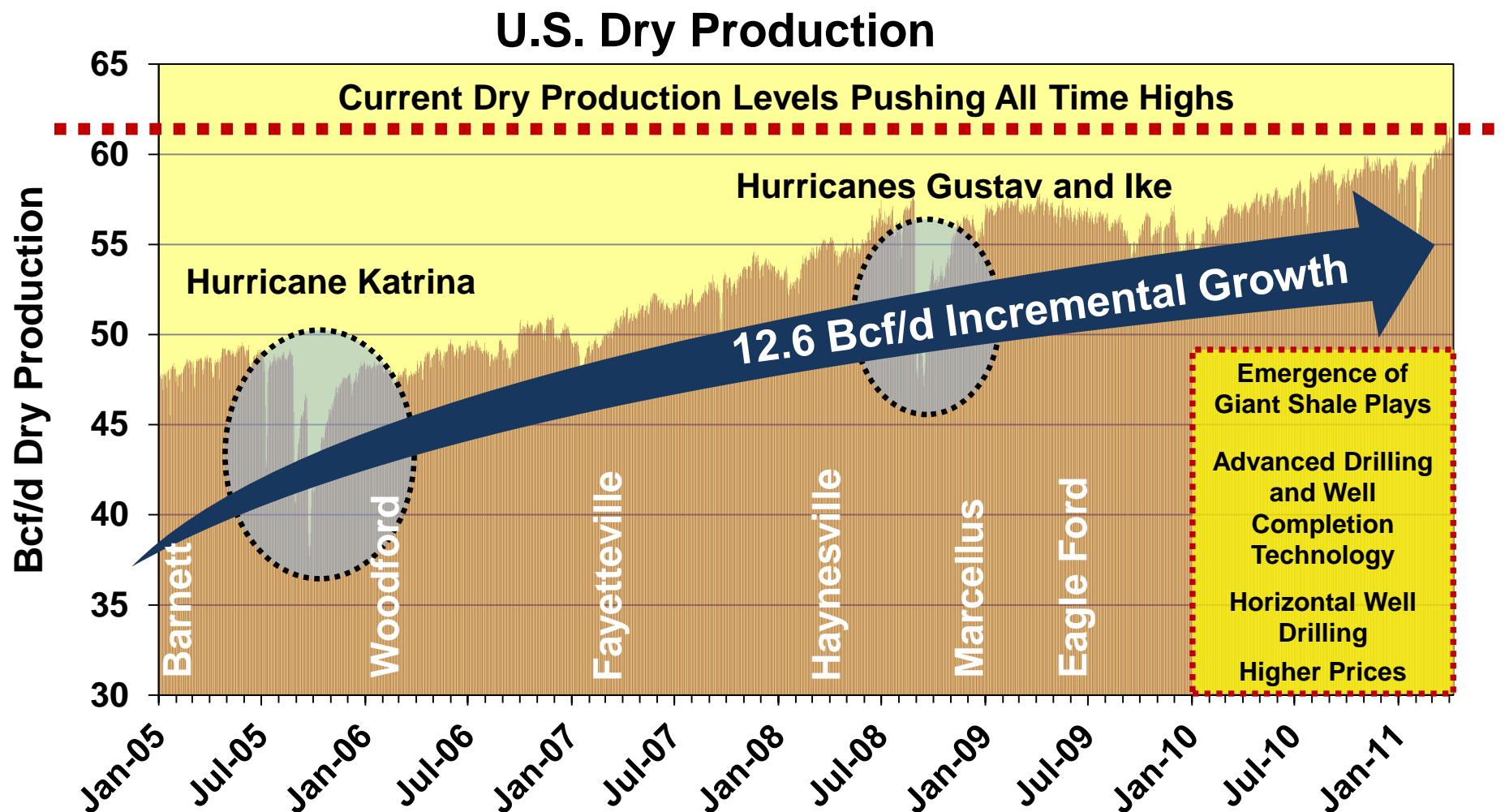
April 15, 2011

Agenda: Liquids From Shales

- ❖ **U.S. Supply Overview**
- ❖ **Resource Plays**
- ❖ **Price Relationships Between Dry Gas, Wet Gas and Crude**
- ❖ **Where Do the Liquids Come From?**
- ❖ **Shifting Corporate Strategies – Rigs Do Their Talking**
- ❖ **Economics of Liquid Plays**



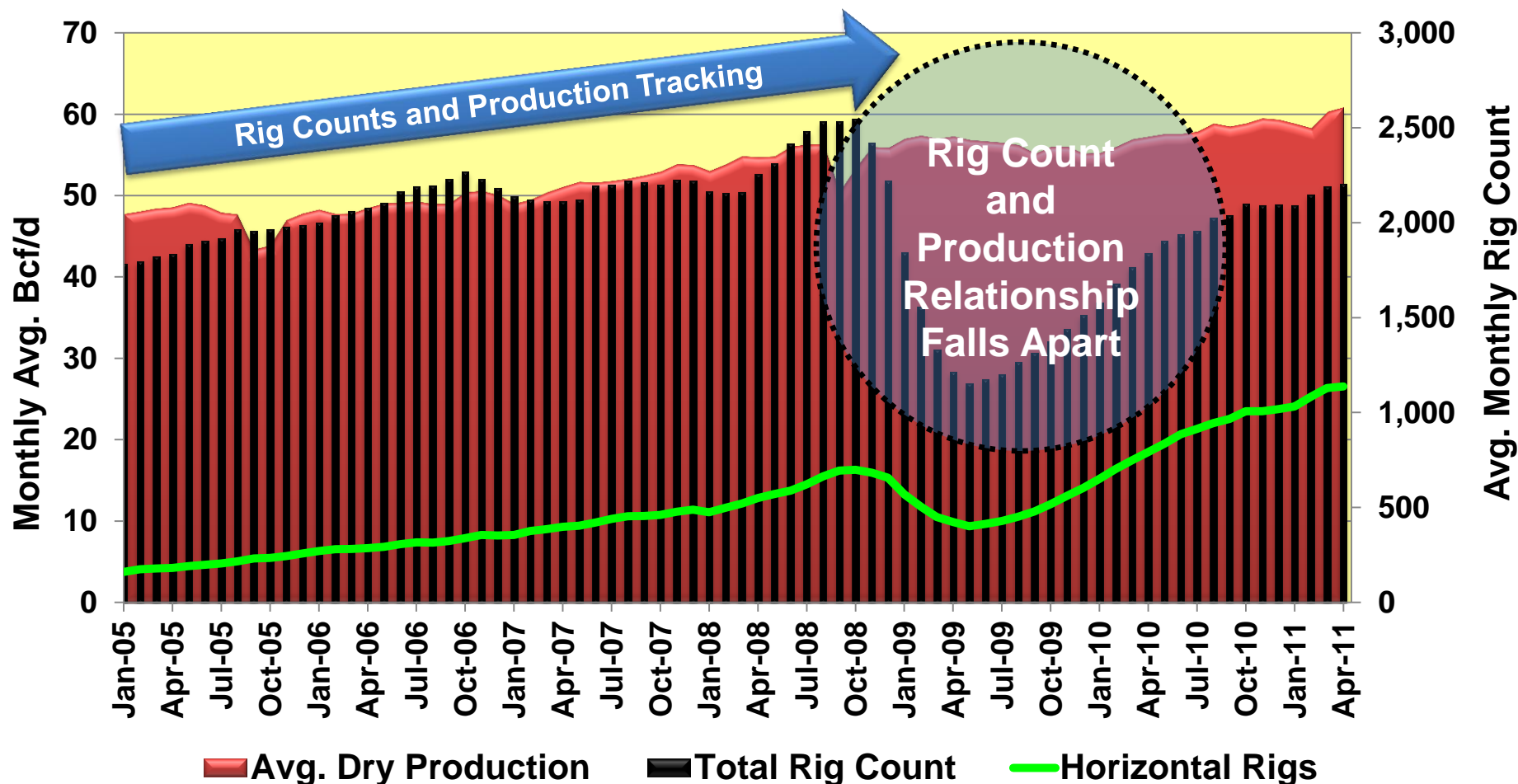
Strong Production Growth Since 2005



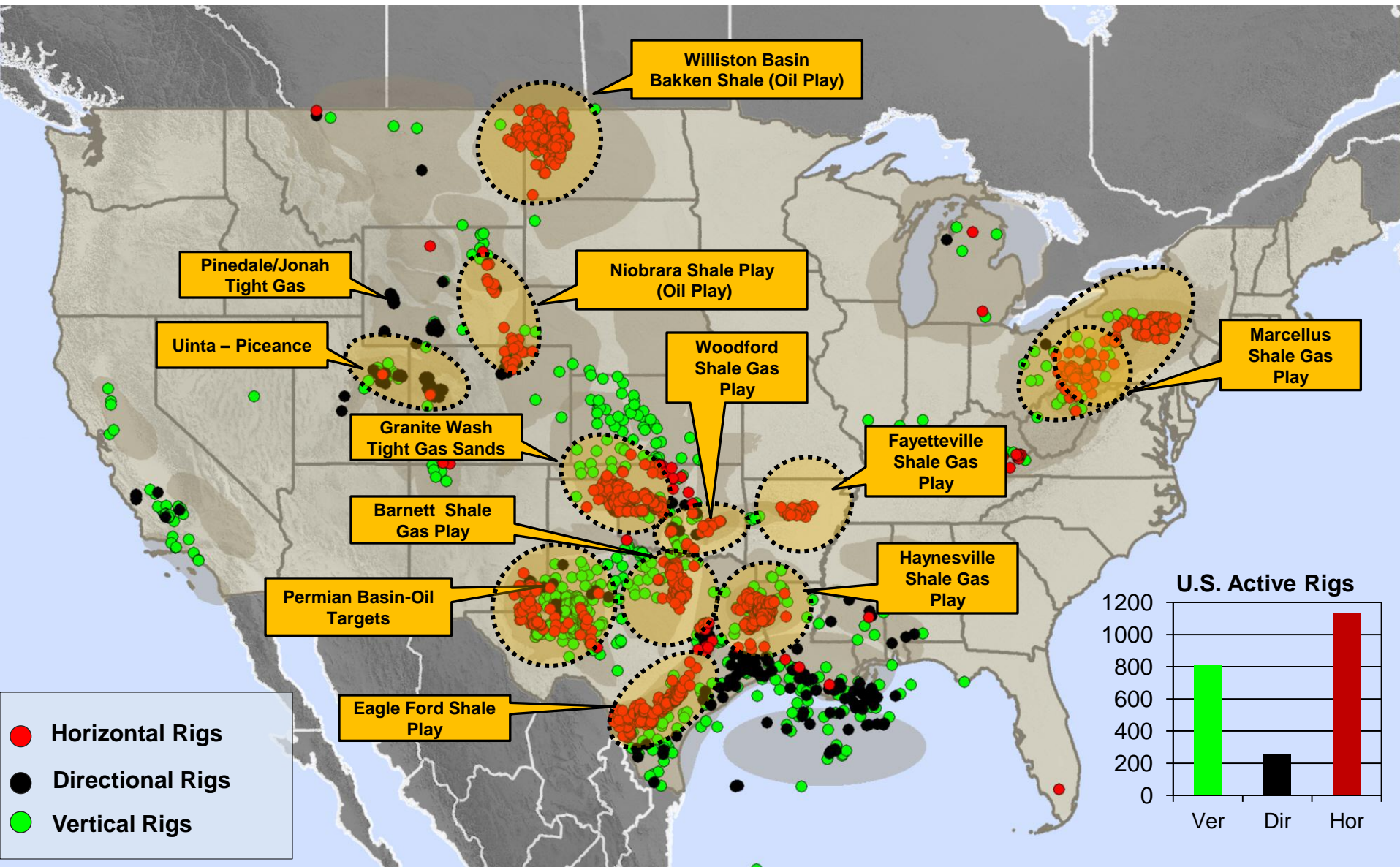
U.S. Production vs. Rig Count

Weak Prices Fail To Curtail Production as Efficiencies Overtake Declines

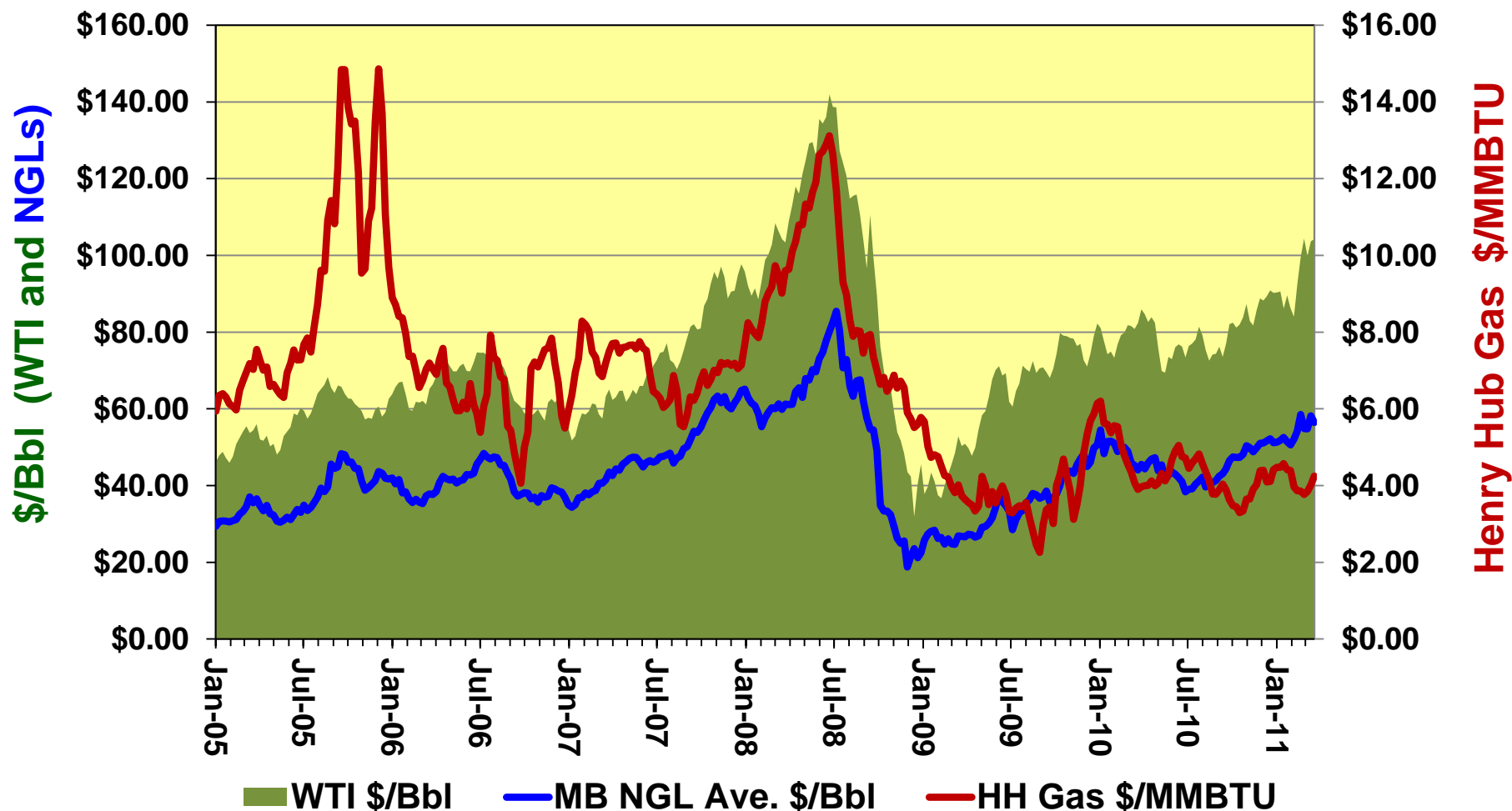
Lower U.S. 48 Dry Production



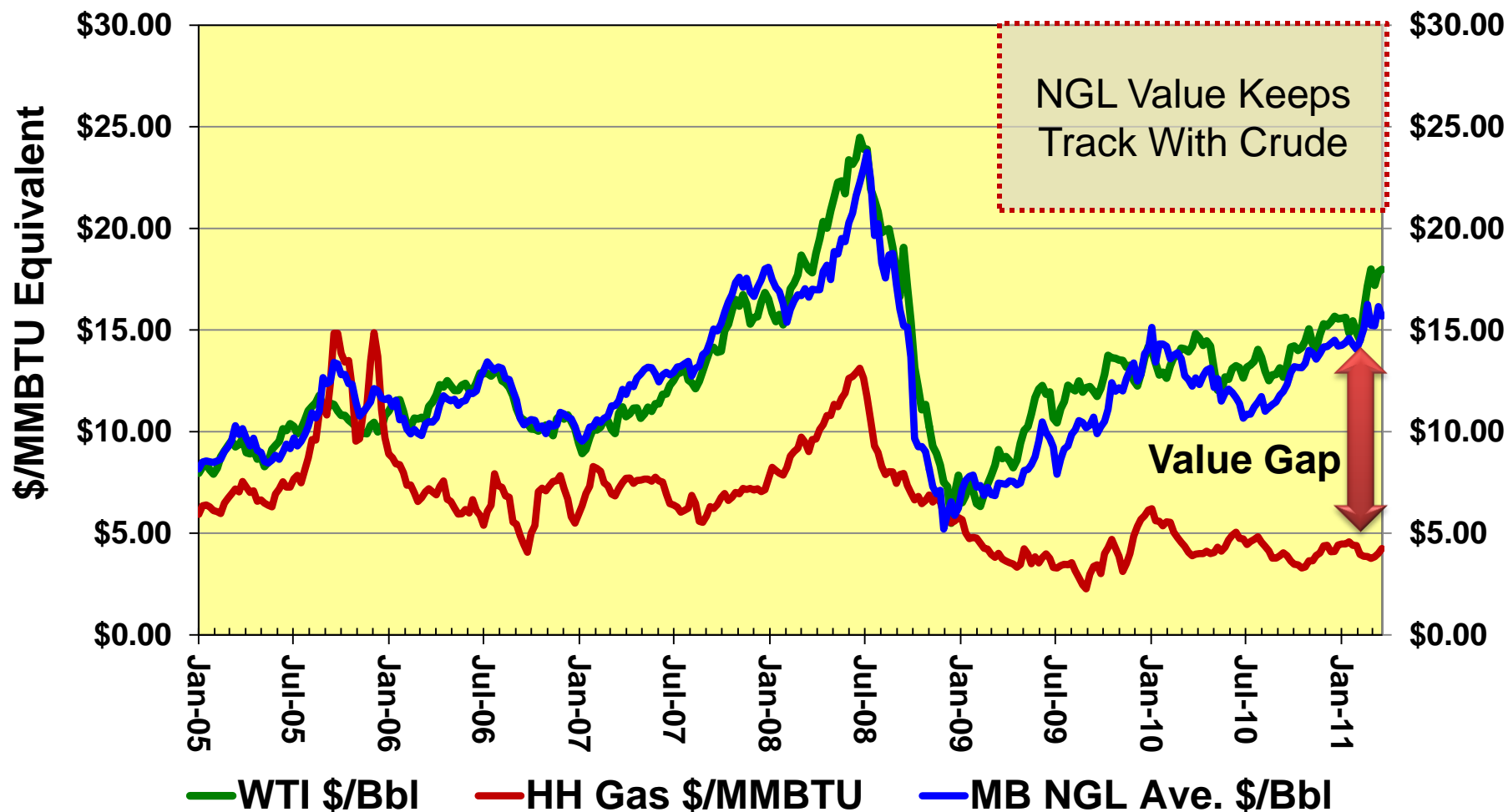
U.S. Active Rig Locations: Resource Plays Dominate



Gas, Oil and NGL Price Comparison

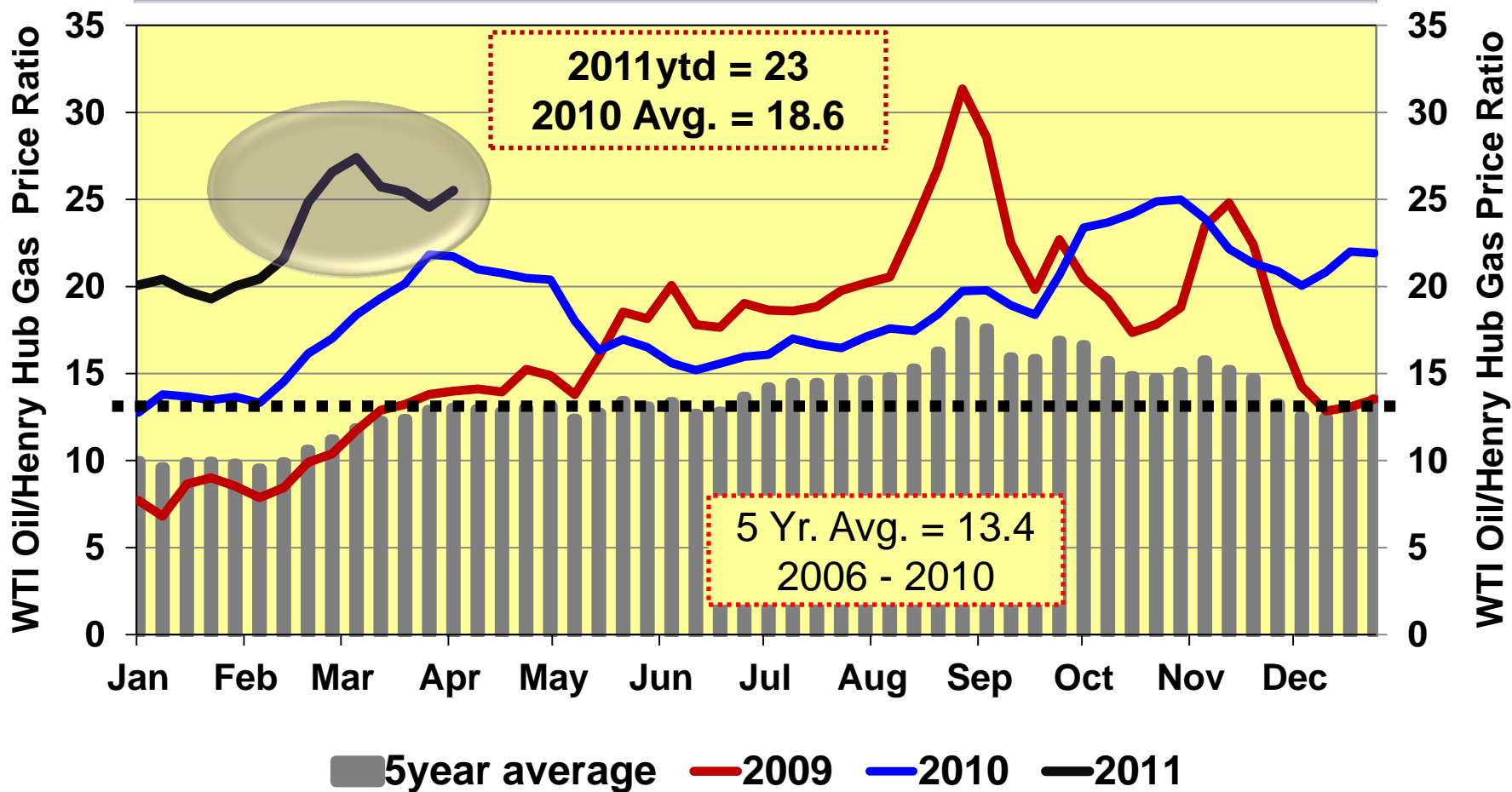


Gas, Oil and NGL Price Comparison: MMBTU Equivalent



Gas and Oil Not Trading On BTU Equivalent

If Traded on a BTU Equivalent the Ratio Should Be ~ 6



Characteristics of World Class Liquids Shale Plays

**When All These Come
Together – Lease
Prices Soar.**

\$5,000 - \$10,000 /acre

Application
of Horizontal
Drilling
Technologies

Repeatable
Over a Large
Area

Large In-
Place
Reserve
Base

Combination
Of Liquids
and Gas –
Key Geologic
Criteria

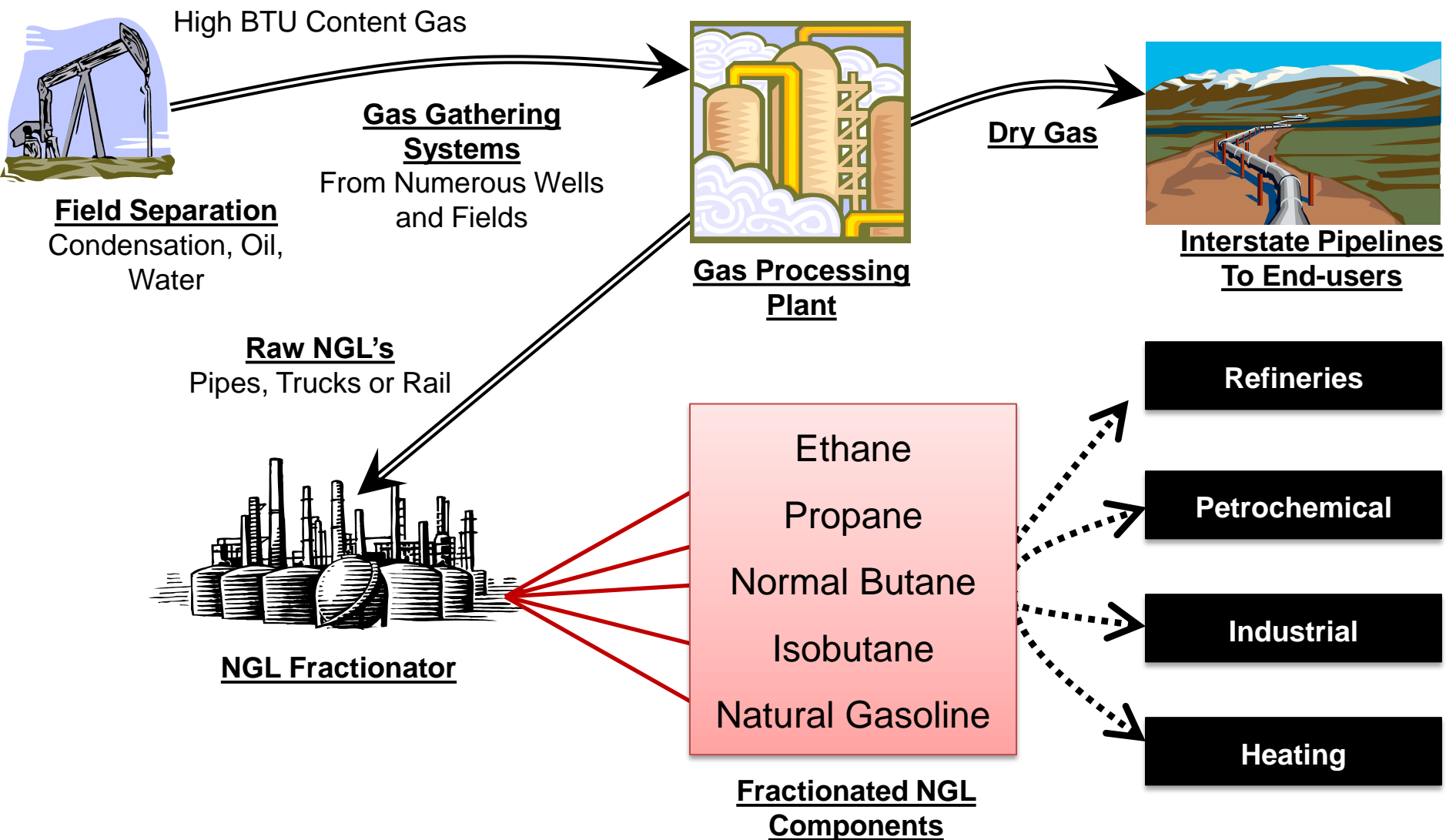
Bakken Shale

Eagle Ford

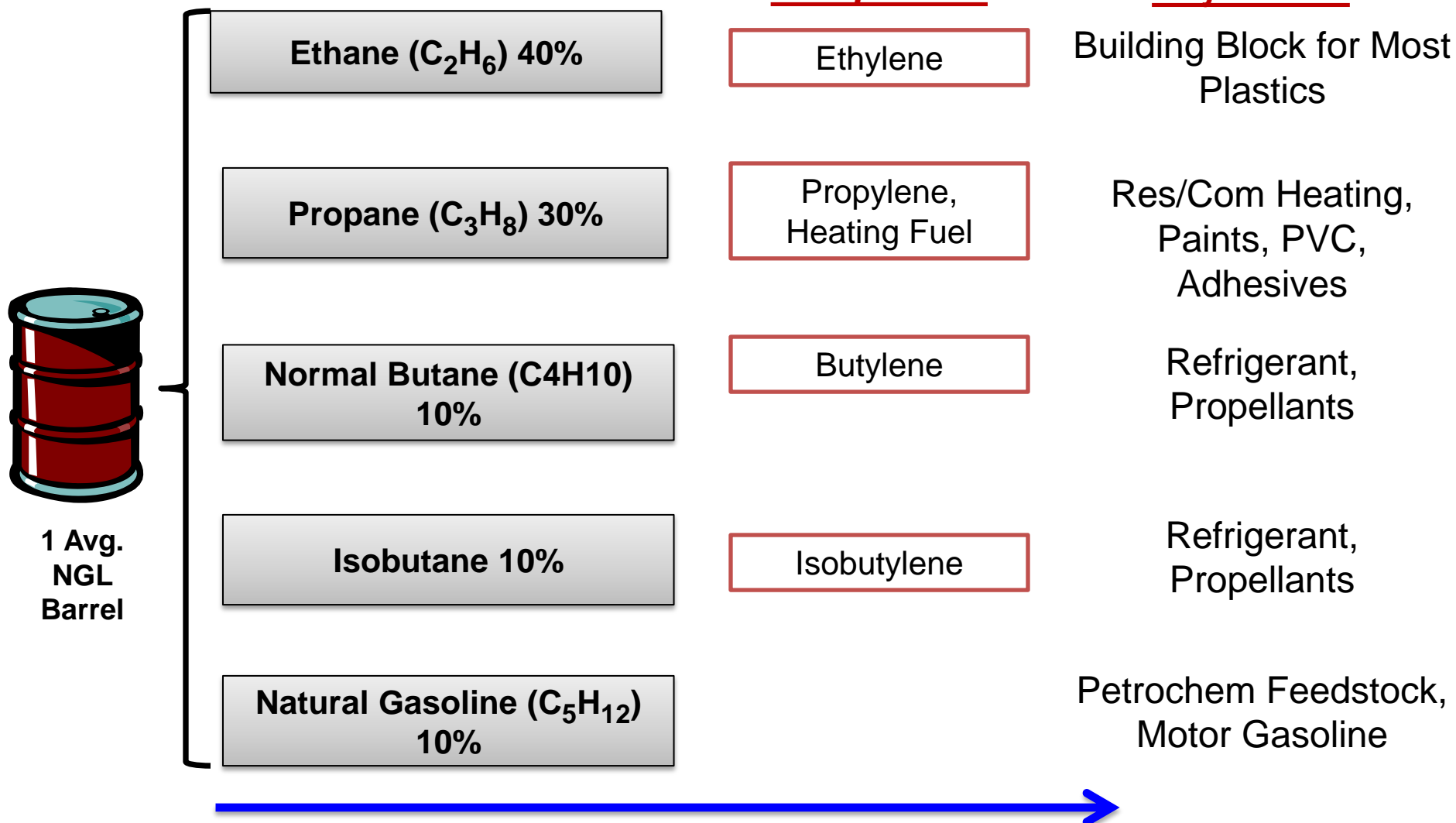
Marcellus (SW)

Niobrara Shale
(Emerging)

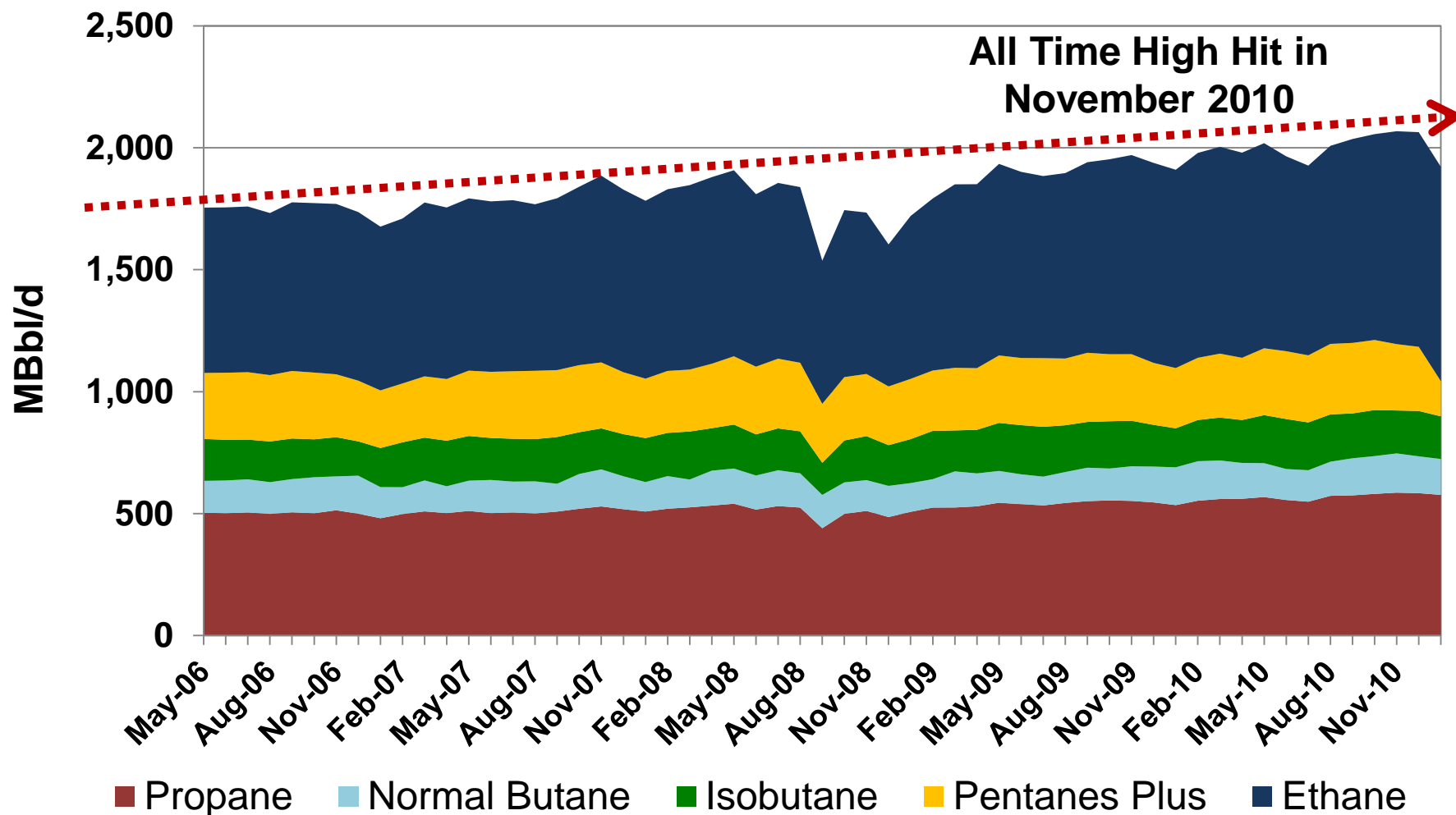
Natural Gas Liquids (NGLs)



Components of NGL Barrel

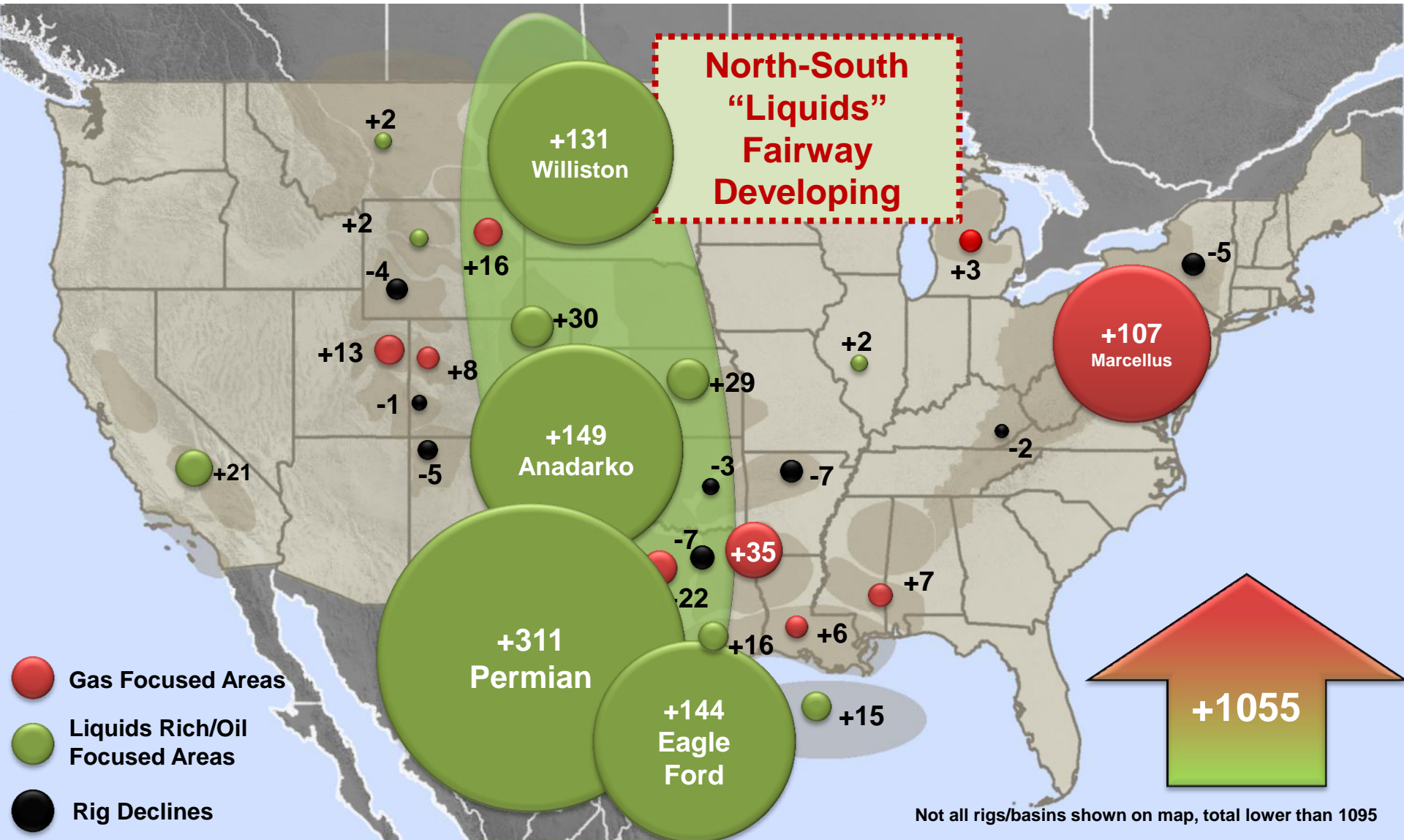


U.S. NGL Production - Gas Plants

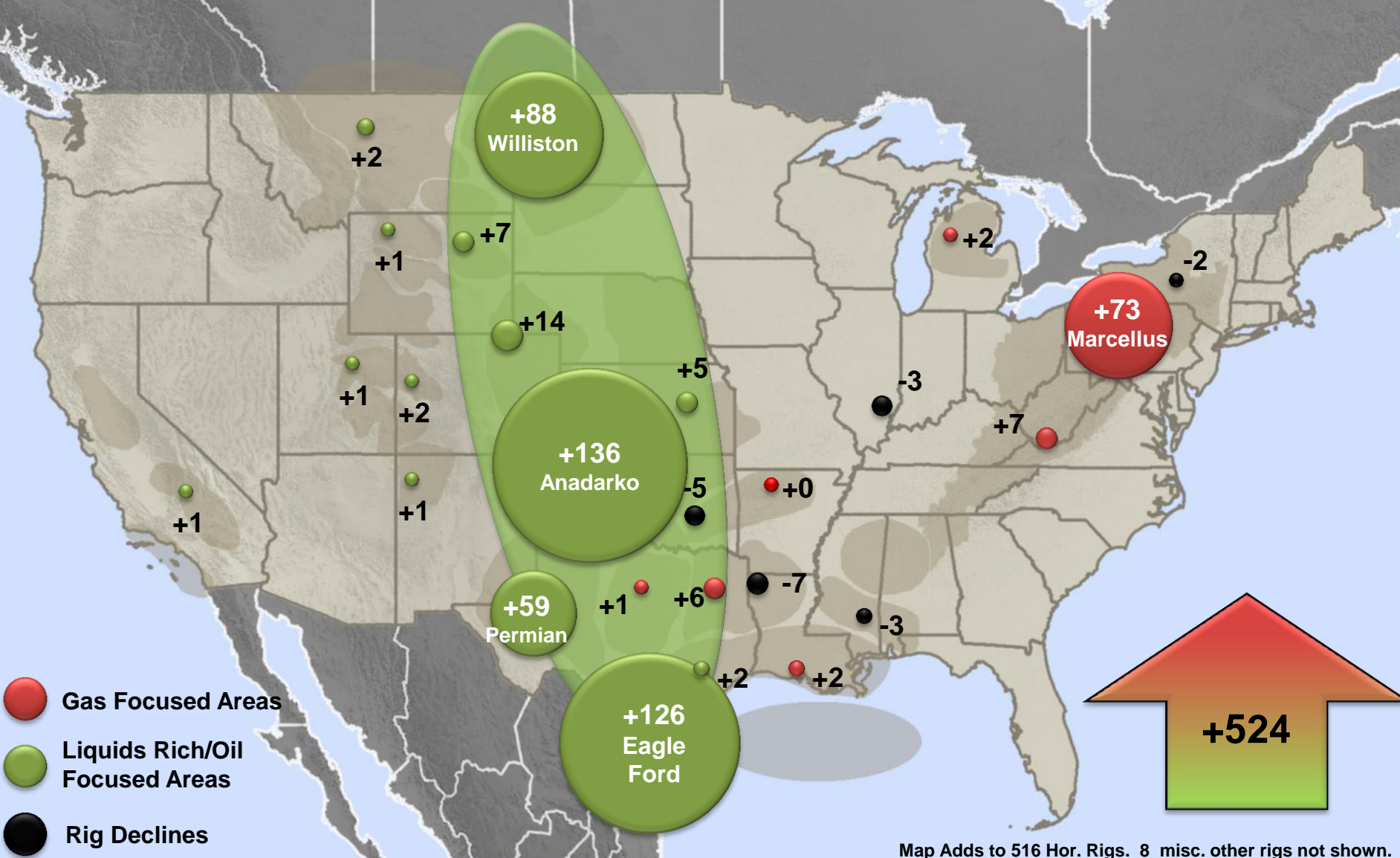


Liquid Rich Plays Attract Attention

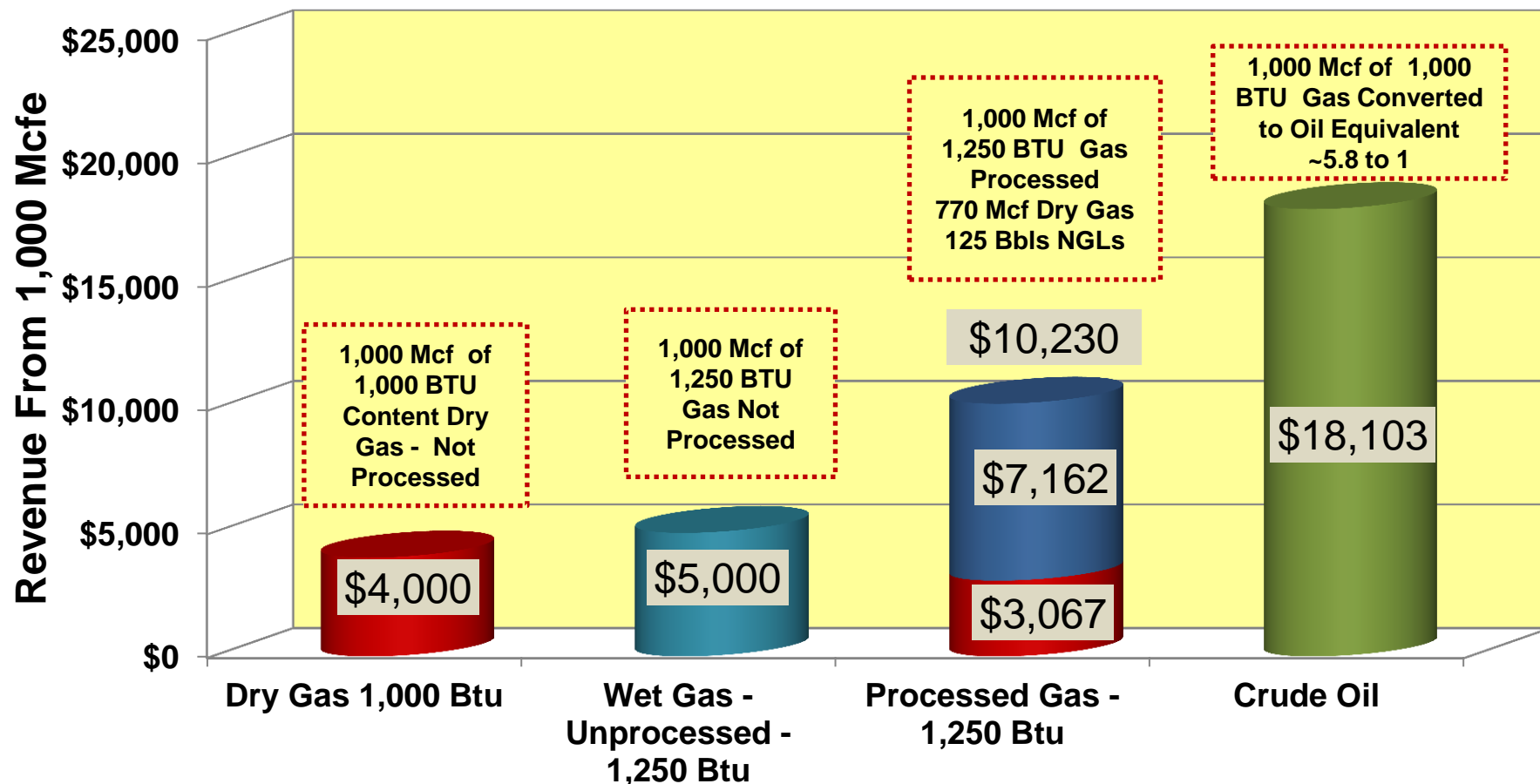
Rig Additions Since Recent Low - May 2009



Transfer of Drilling Technology To Liquid Rich and Oil Plays



The Move To Crude --- Liquid Uplift \$\$

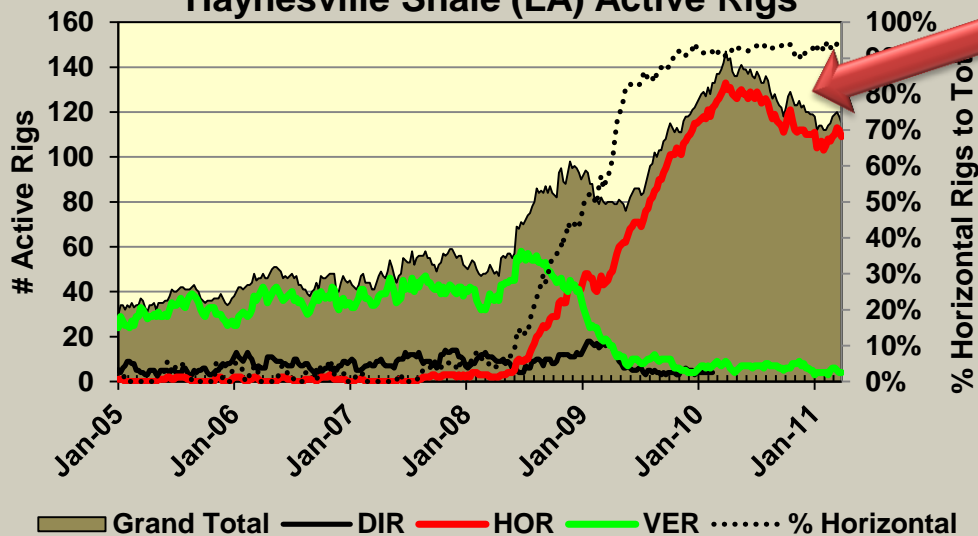


■ Dry Gas Value ■ Wet Gas - Value ■ NGL Value ■ Crude Value

Gas = \$4.00/MMbtu, NGLs = \$57.30/Bbl, Crude = \$105.00/Bbl

Shale Play Economics

Haynesville Shale (LA) Active Rigs



Haynesville Shale

Eagle Ford Shale

- Horizontal Rigs
- Directional Rigs
- Vertical Rigs

Shale Play Economics

Haynesville - Dry Gas Region:

D&C = \$8.5 million

IP = 12,000 Mcf/d

BTU = 1020

1st Year Decline = 80%

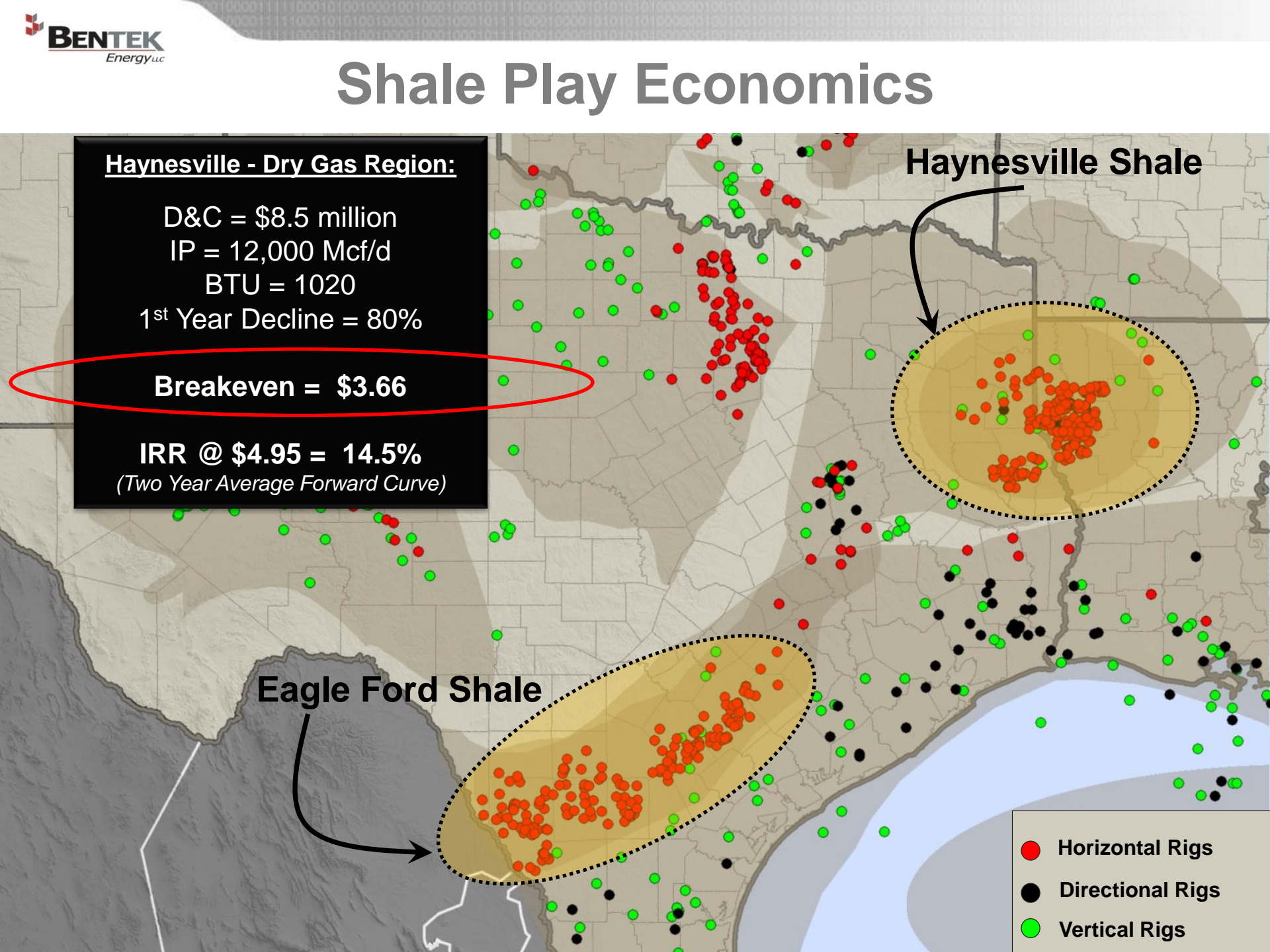
Breakeven = \$3.66

IRR @ \$4.95 = 14.5%

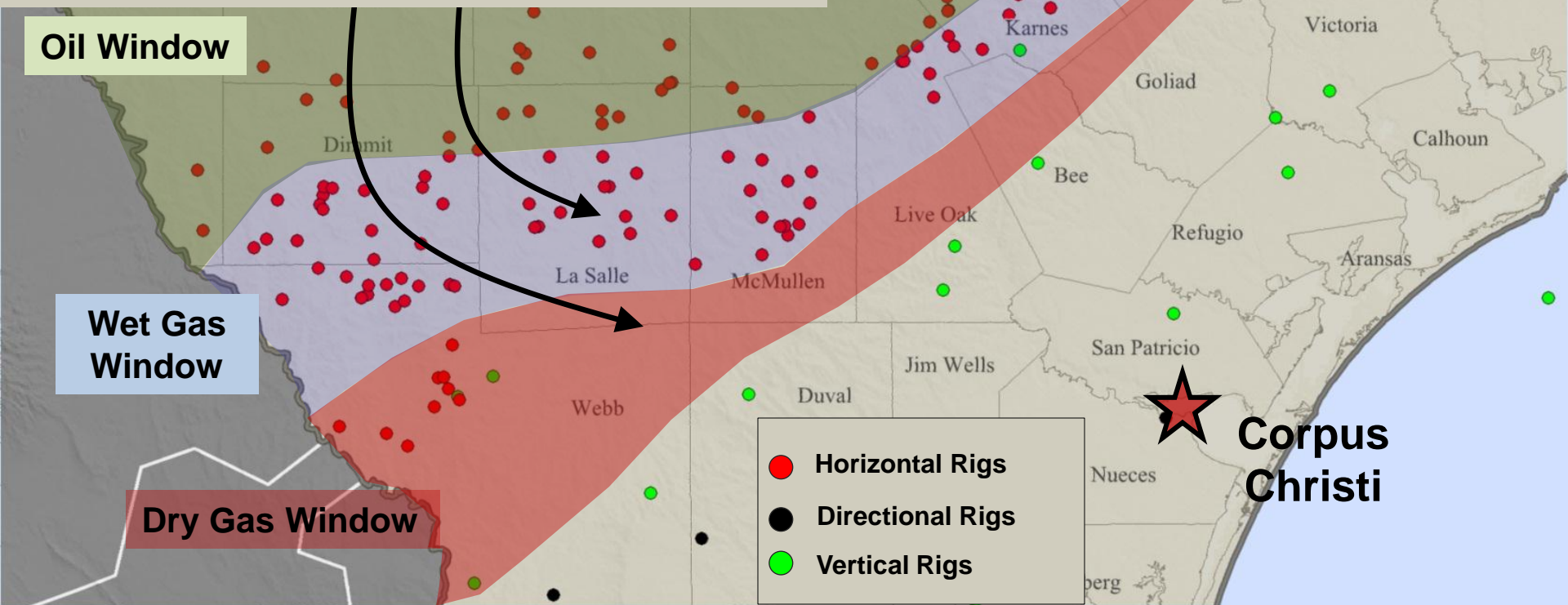
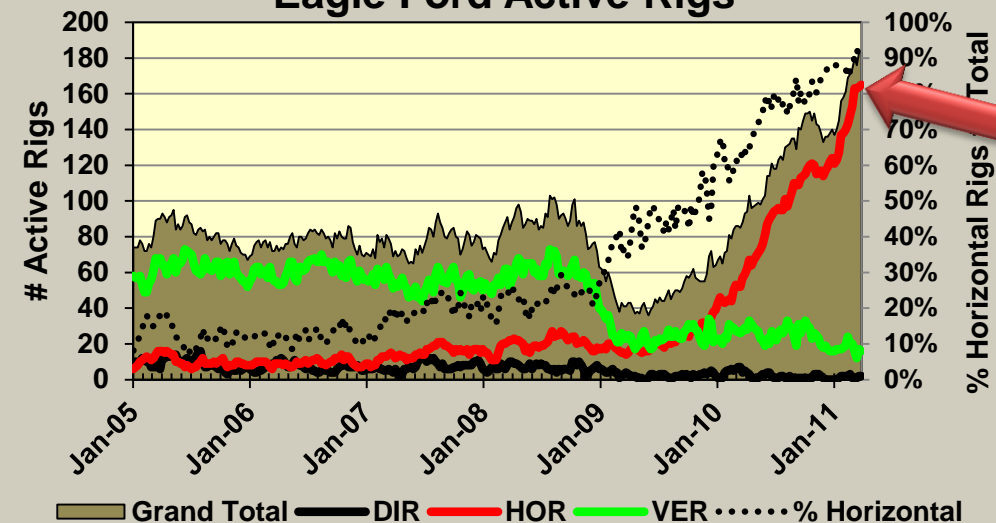
(Two Year Average Forward Curve)

Haynesville Shale

Eagle Ford Shale

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- The map displays the Haynesville and Eagle Ford shale plays in Texas. The Haynesville Shale is highlighted in the north-central region, and the Eagle Ford Shale is highlighted in the south-central region. Both areas are filled with orange dots representing horizontal rigs. Green dots represent vertical rigs, and black dots represent directional rigs. The map also shows county boundaries and the Gulf of Mexico to the south.
- Horizontal Rigs
 - Directional Rigs
 - Vertical Rigs

Eagle Ford Active Rigs



Wet Gas Region w/Condensate:

D&C = \$7.5 million
IP = 5,000 Mcf/d
Condensate = 250 Bbls/d
BTU = 1,250
1st Year Decline = 71%
NGL's = 125 Bbls/MMcf
Residual Dry Gas = 23% Shrink

Breakeven = < \$1.00

IRR @ \$4.95 = 63%

(Based on Two Year average Forward Curve)

Wet Gas Region:

D&C = \$7.5 million
IP = 5,000 Mcf/d
Condensate = Assume No Condensate
BTU = 1,250
1st Year Decline = 71%
NGL's = 125 Bbls/MMcf
Residual Dry Gas = 23% Shrink

Breakeven = < \$1.00

IRR @ \$4.95 = 35%

(Based on Two Year average Forward Curve)

Dry Gas Region:

D&C = \$8.5 million
IP = 9,000 Mcf/d
BTU = 1020
1st Year Decline = 77%

Breakeven = \$4.56

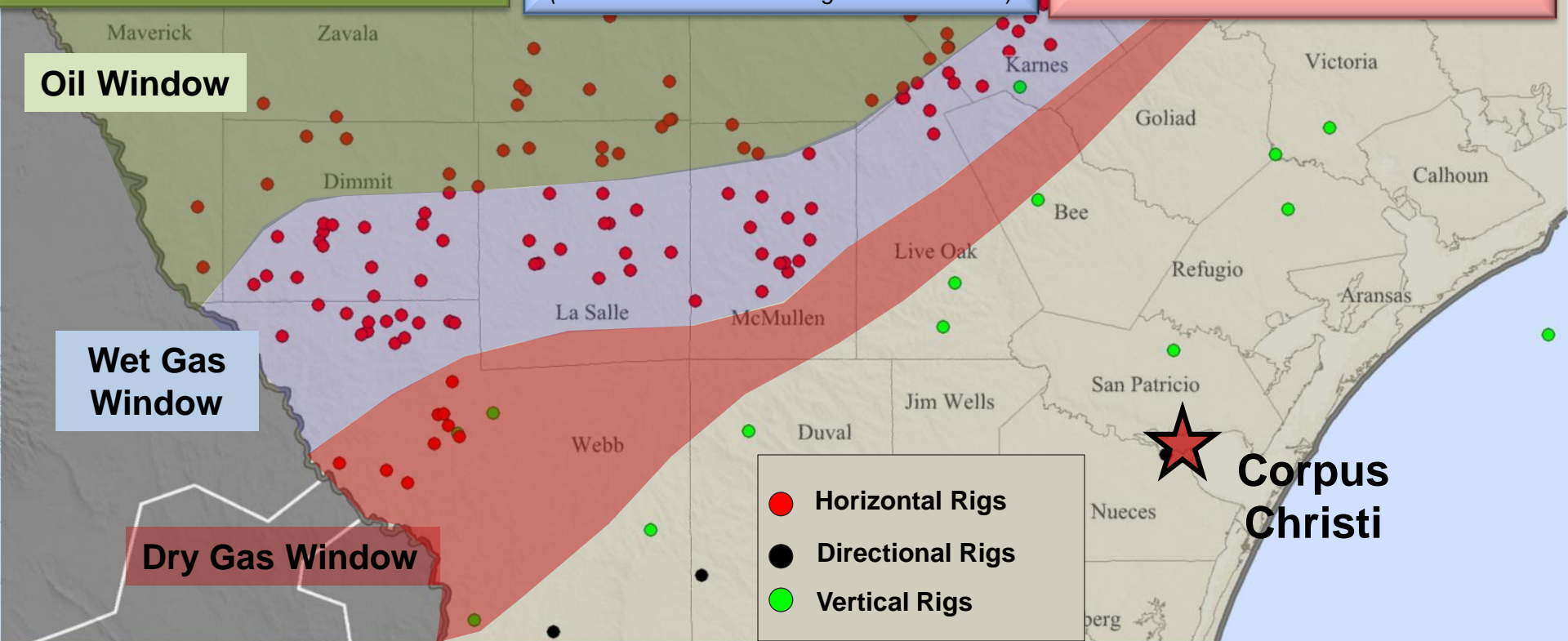
IRR @ \$4.95 = 3%

(Based on Two Year average Forward Curve)

Oil Window

Wet Gas Window

Dry Gas Window



Key Takeaway Points

- **U.S. Supply Has Been Pushed to Record Levels Due to Shale Gas Plays**
- **Natural Gas Prices Have Remained Low Due to Excess Supply**
- **Natural Gas Liquids Increasing as a Result of New Wet Gas Plays**
- **NGL Prices Tracking Crude Prices**
- **Producers Are Adjusting Strategies to take Advantage of Higher Liquid Prices**
- **Economics Very Attractive in Wet Gas and Crude Plays**

The background of the slide is a photograph of an oil drilling rig silhouetted against a vibrant orange and red sunset sky. The rig is positioned in the lower right quadrant of the frame. The sky is filled with scattered clouds, and the overall color palette is dominated by warm, fiery tones.

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