NATURAL GAS & NGL BUILD OUT

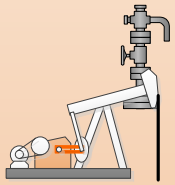
…shale changed everything

The Fundamentals...

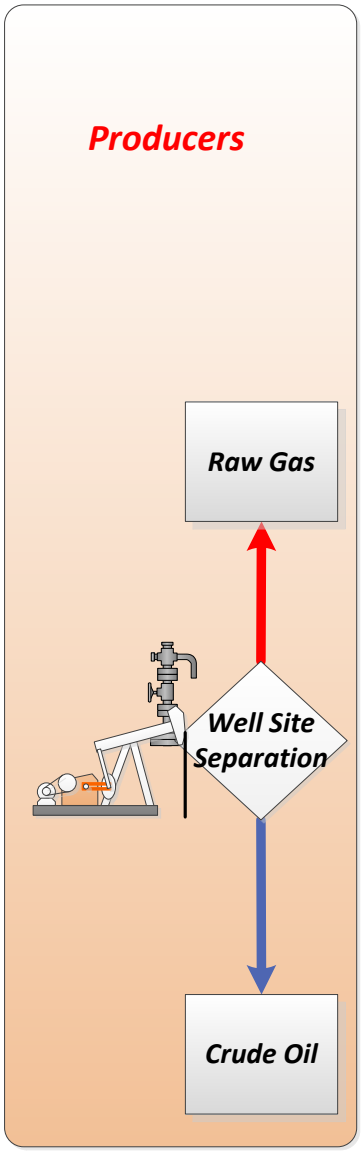
Three distinct entities…

Three distinct entities…

Producers



Three distinct entities…



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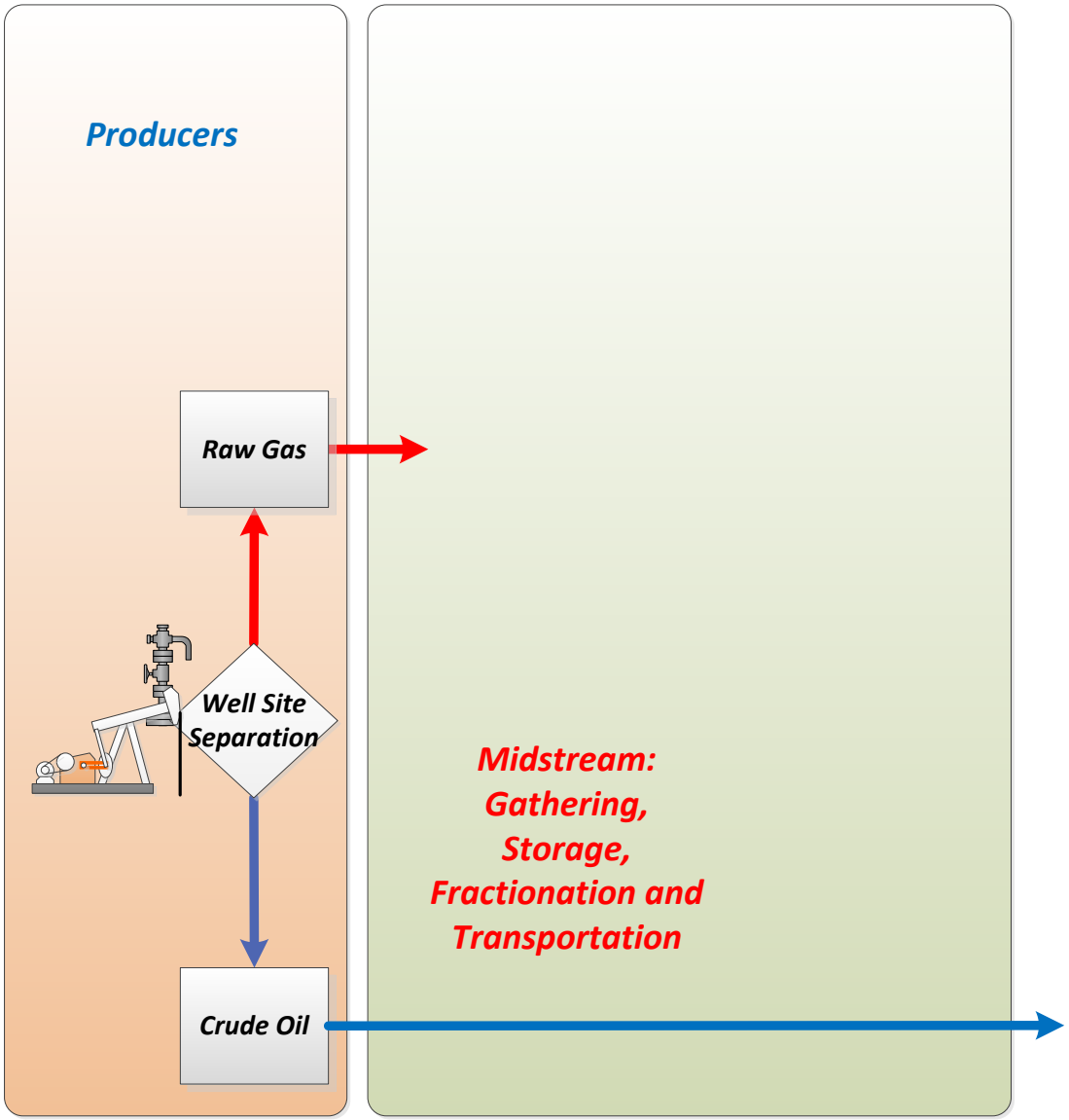

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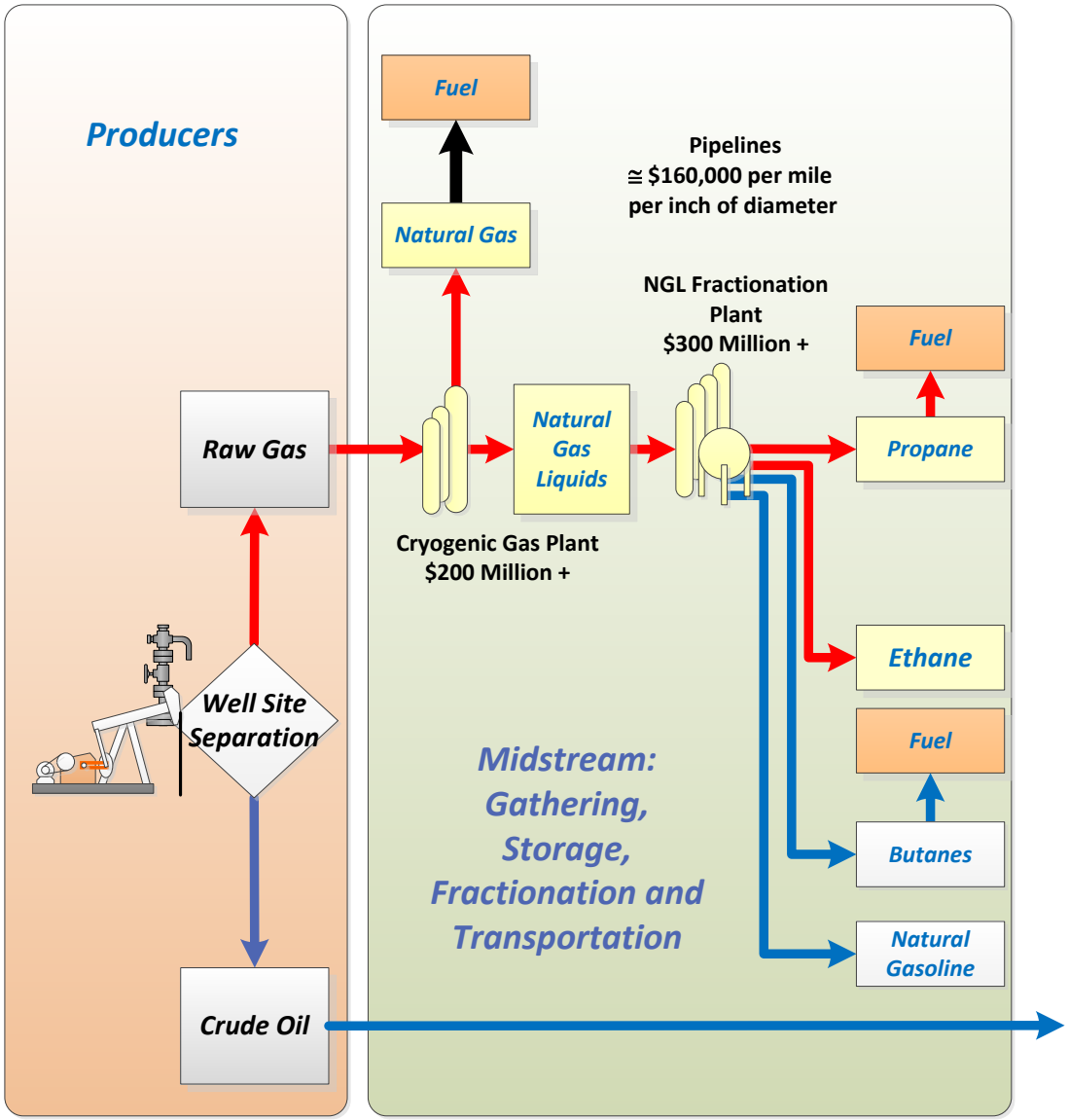

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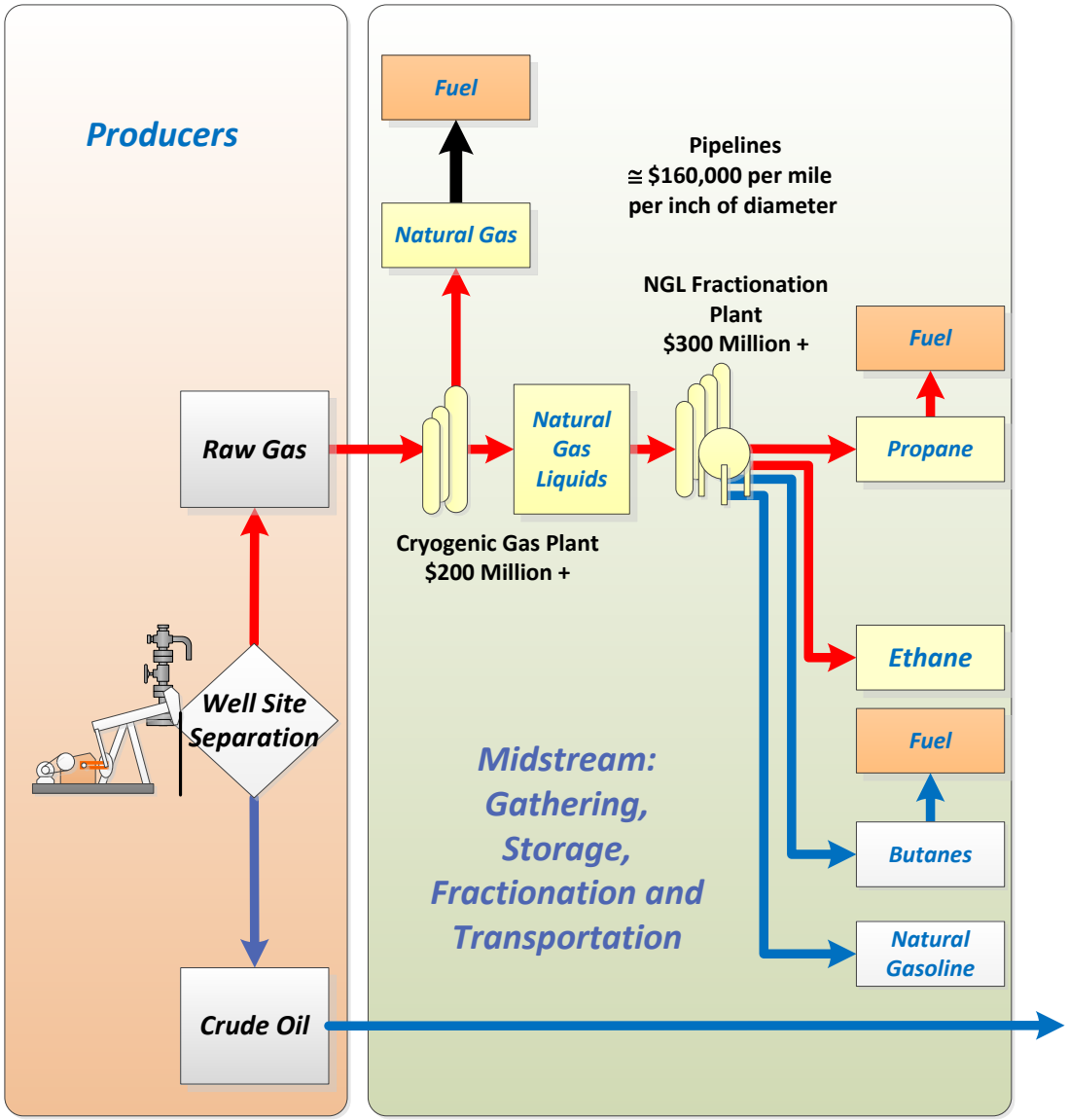
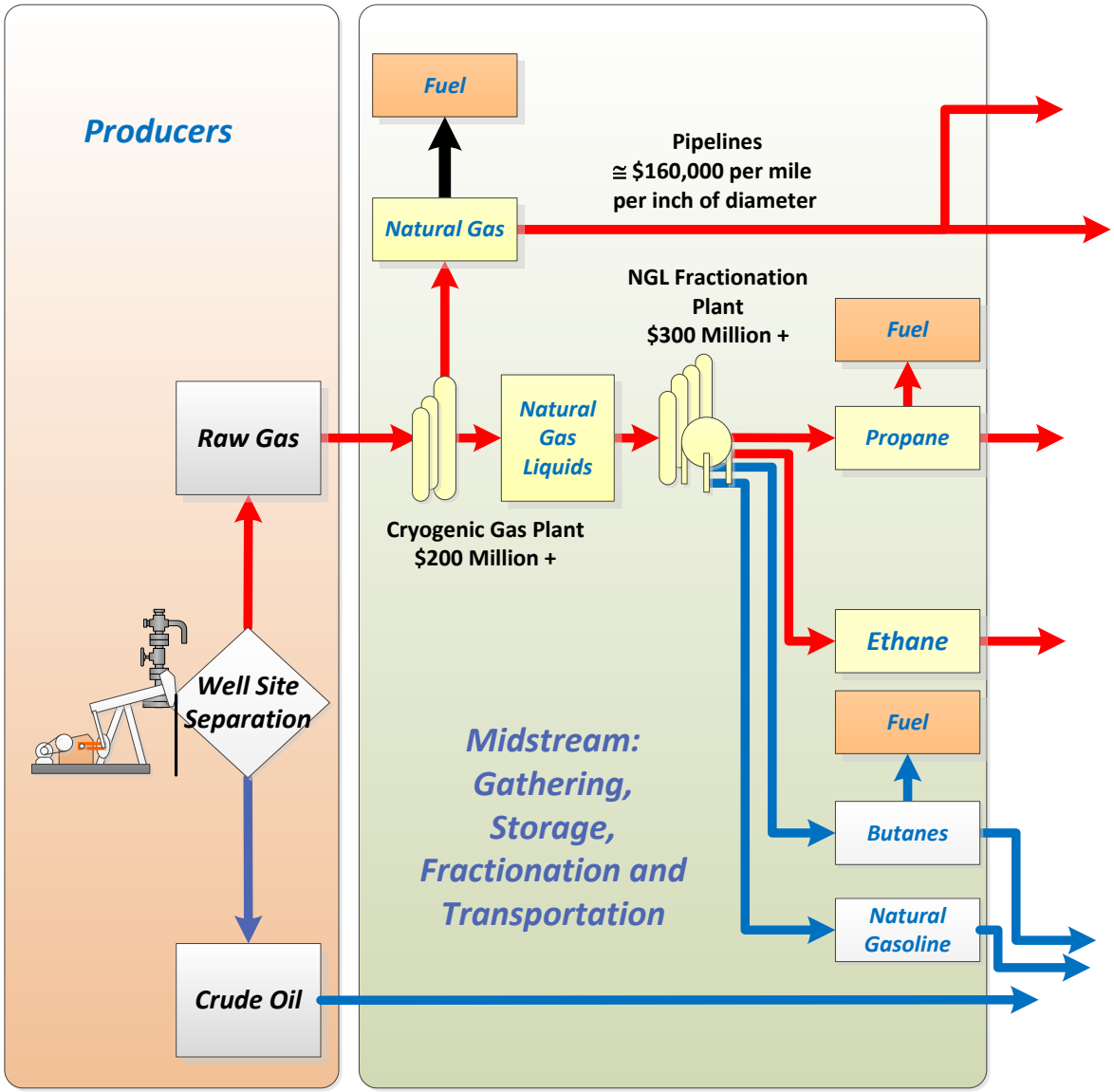


Important:

- **Without a gas and NGL take away production is shut-in!**
- 95% of produced hydrocarbons on a Btu value to fuels.
- Only 2% of gas and 55% of NGLs by volume go to petchem

Three distinct entities…



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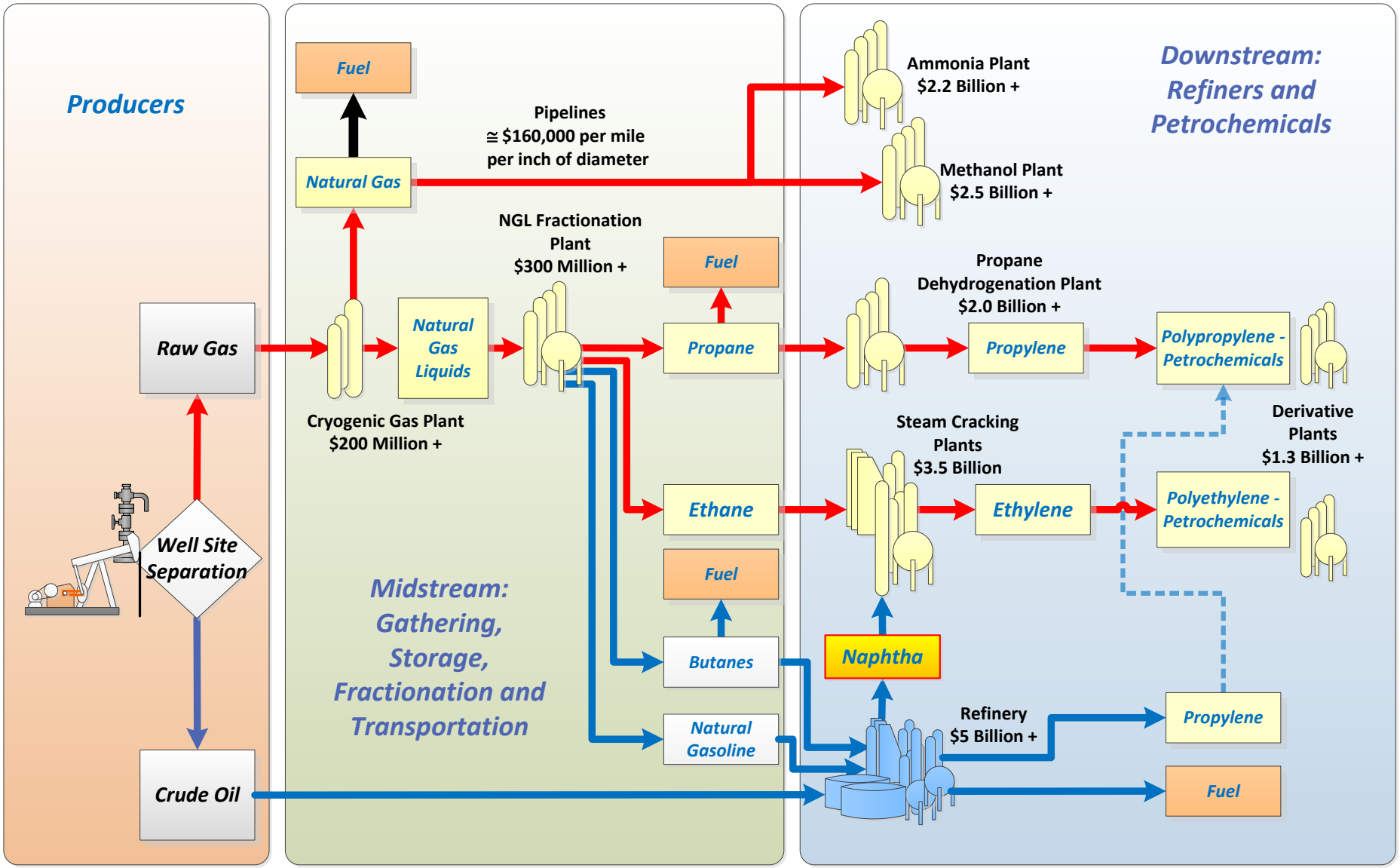
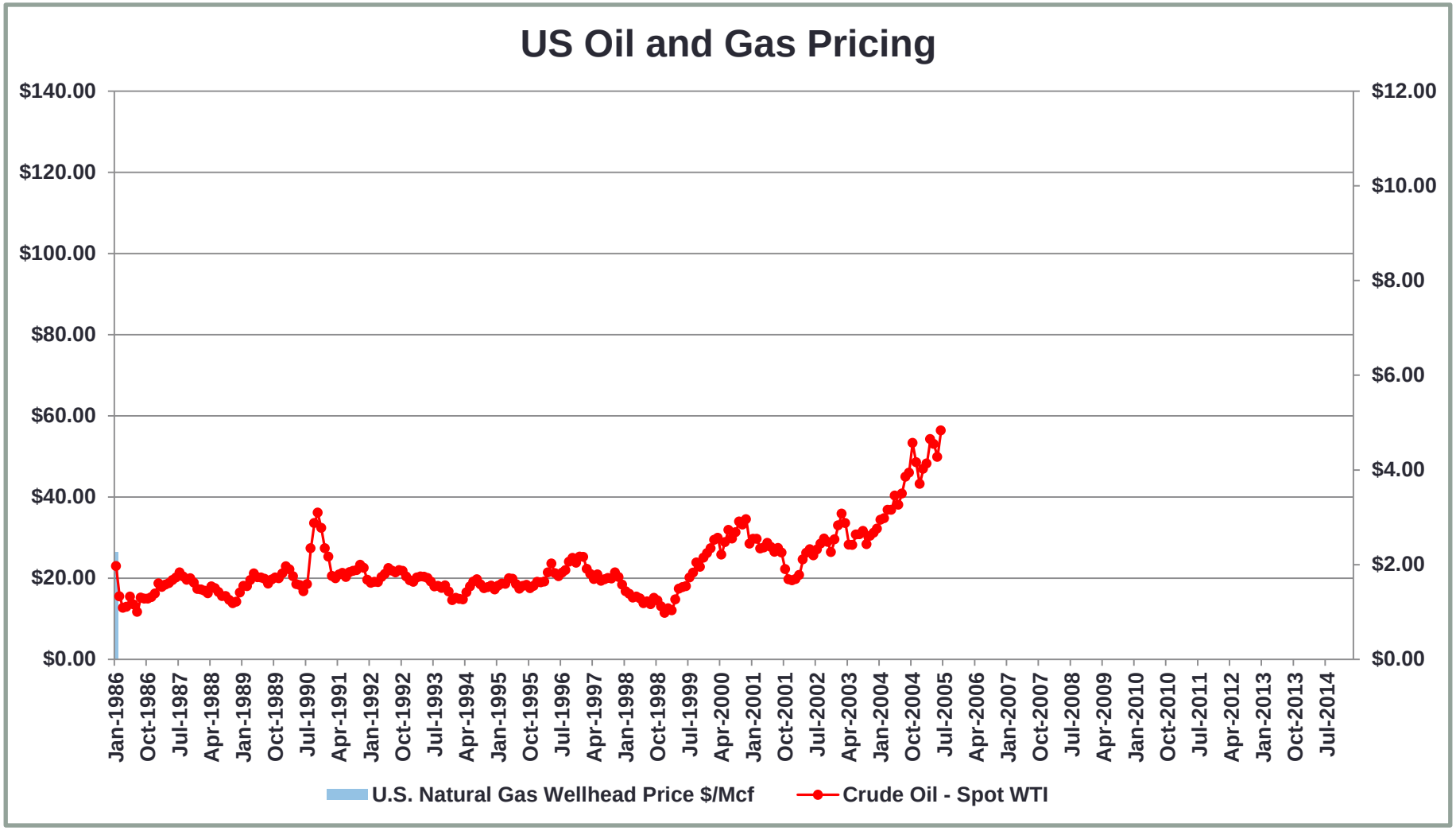


The History...

1981 – 2005

- Low oil and gas prices
- Decreasing US production


US Oil and Gas Pricing
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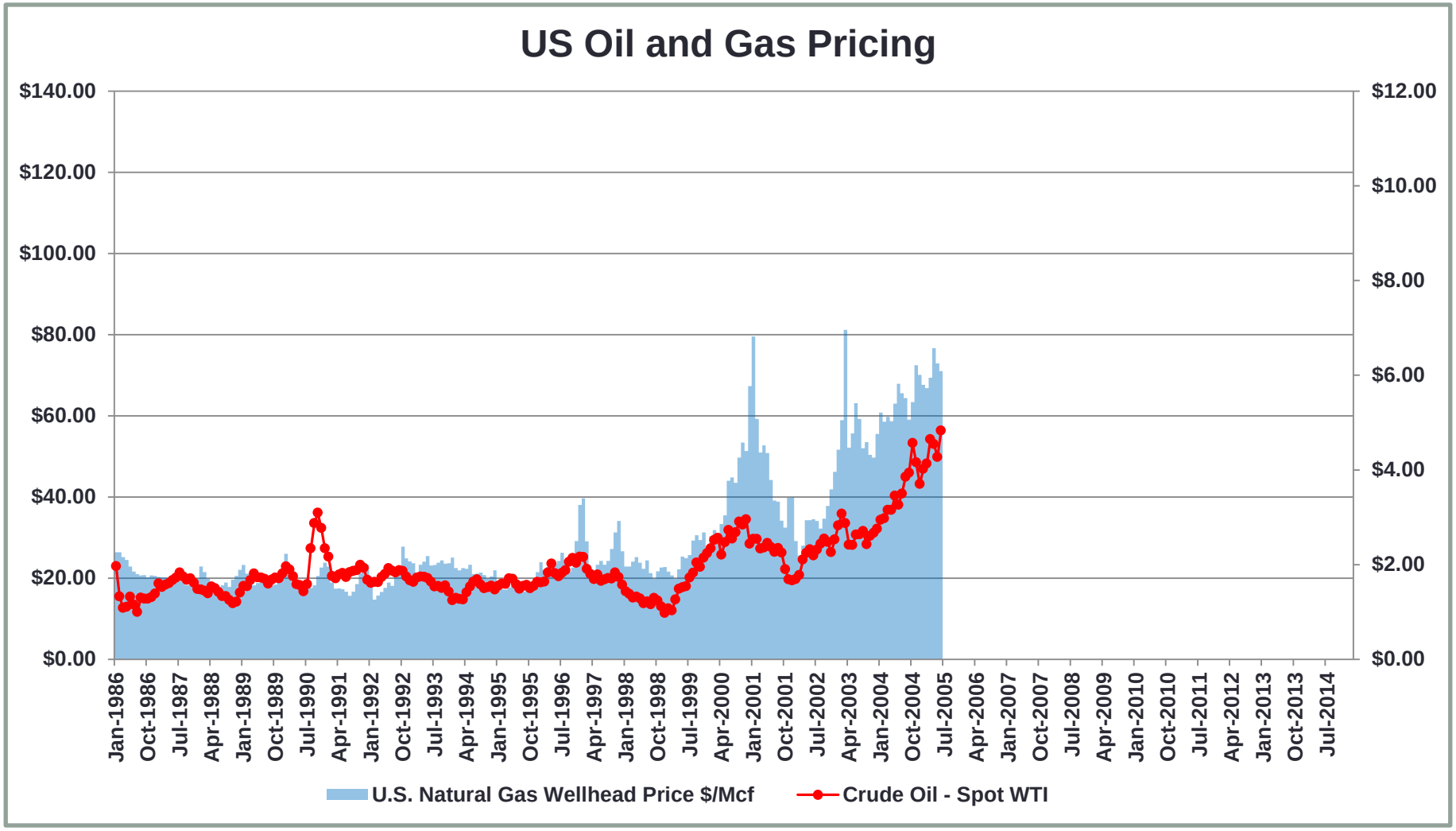
U.S. Natural Gas Wellhead Price $/Mcf
Crude Oil - Spot WTI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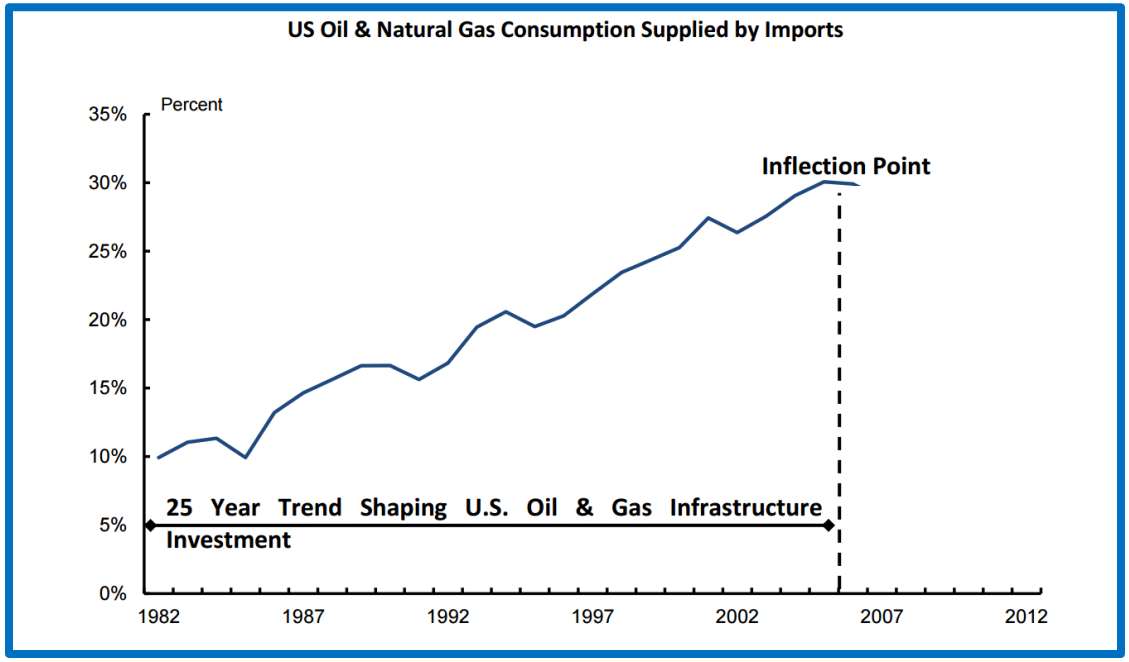
1981 – 2005

- Low oil and gas prices
- Declining US production

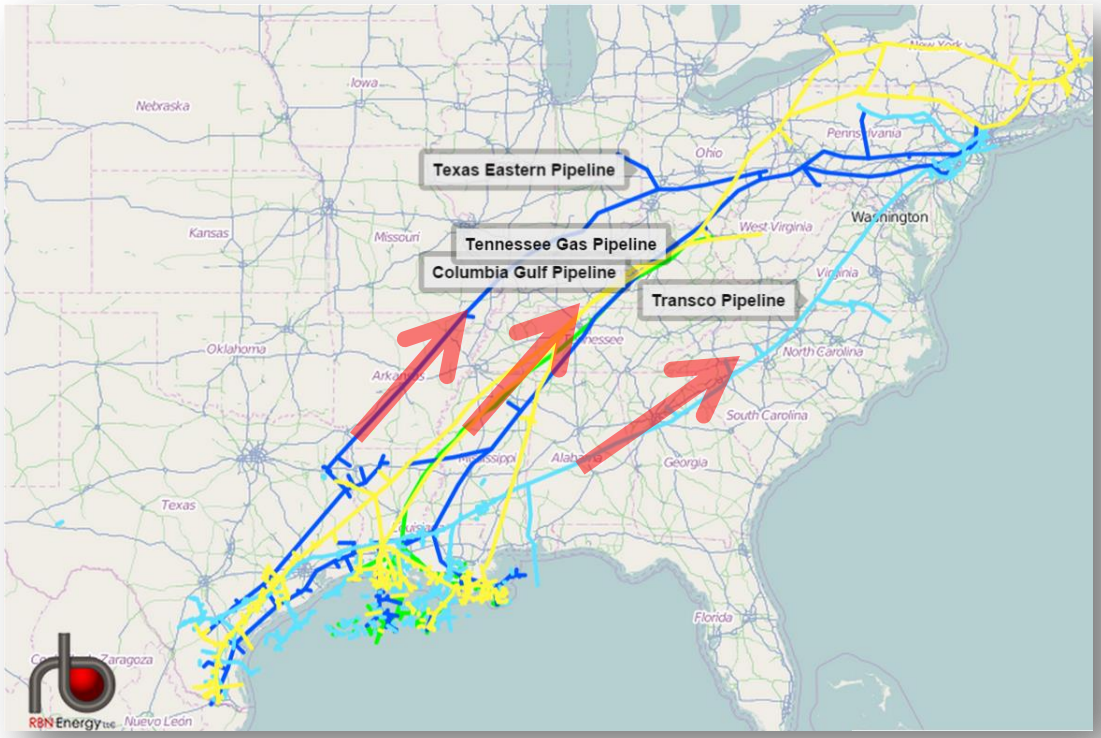
- Increasing imports



1981 – 2005

- Low oil and gas prices
- Declining US production

- Midstream gas: inbound & to the NE

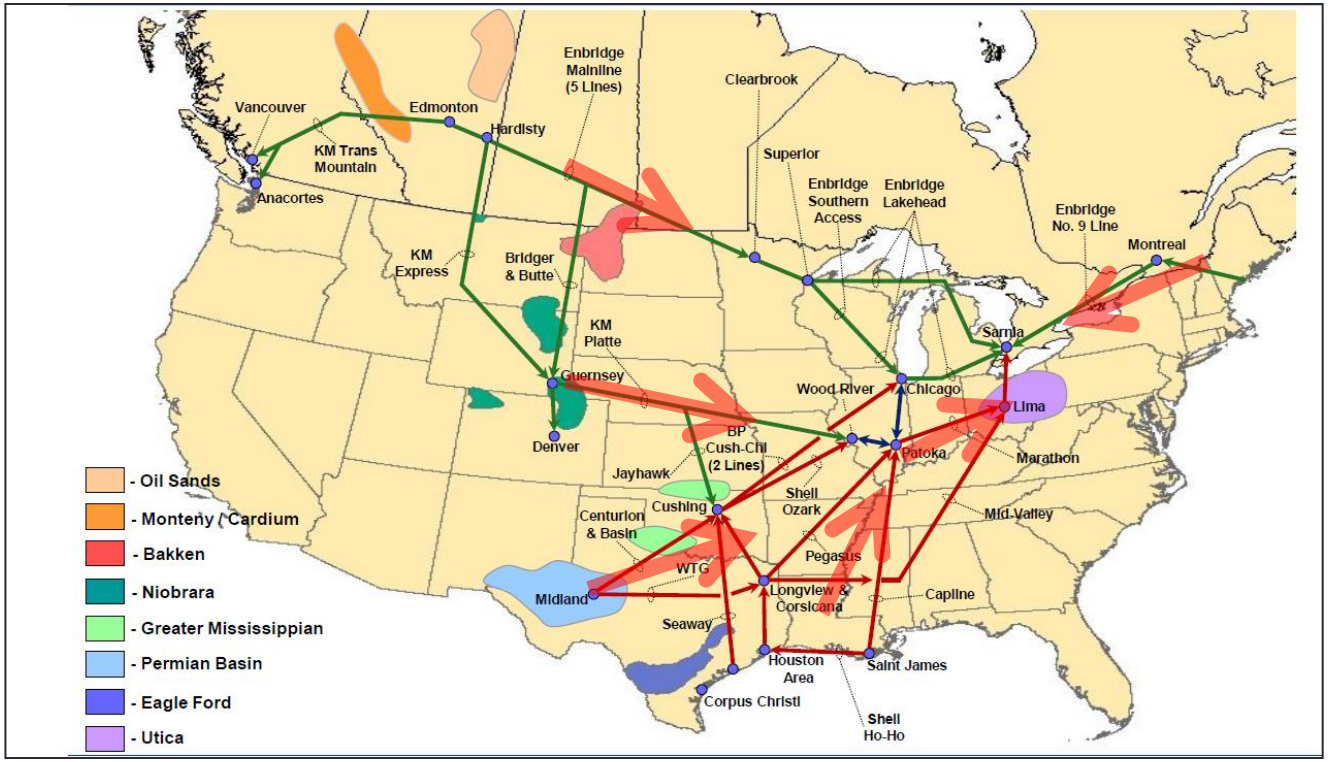


Major US Gas Trunk Lines

1981 – 2005

- Low oil and gas prices
- Decreasing US production
- Refiners buying SA

• Midstream oil: imported & inbound

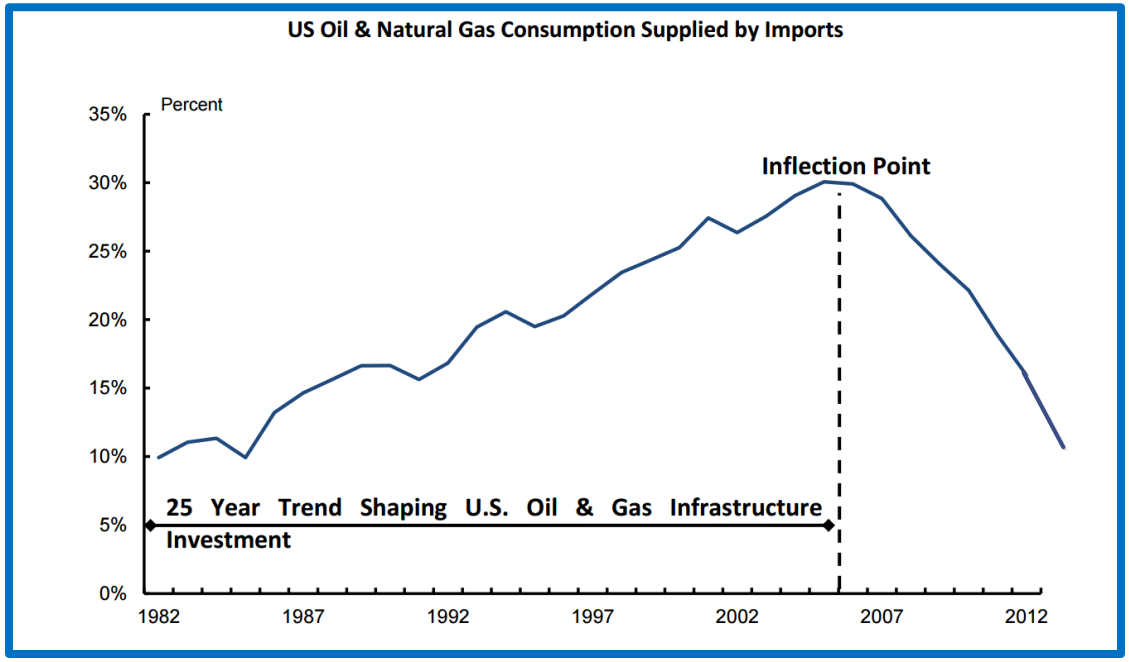


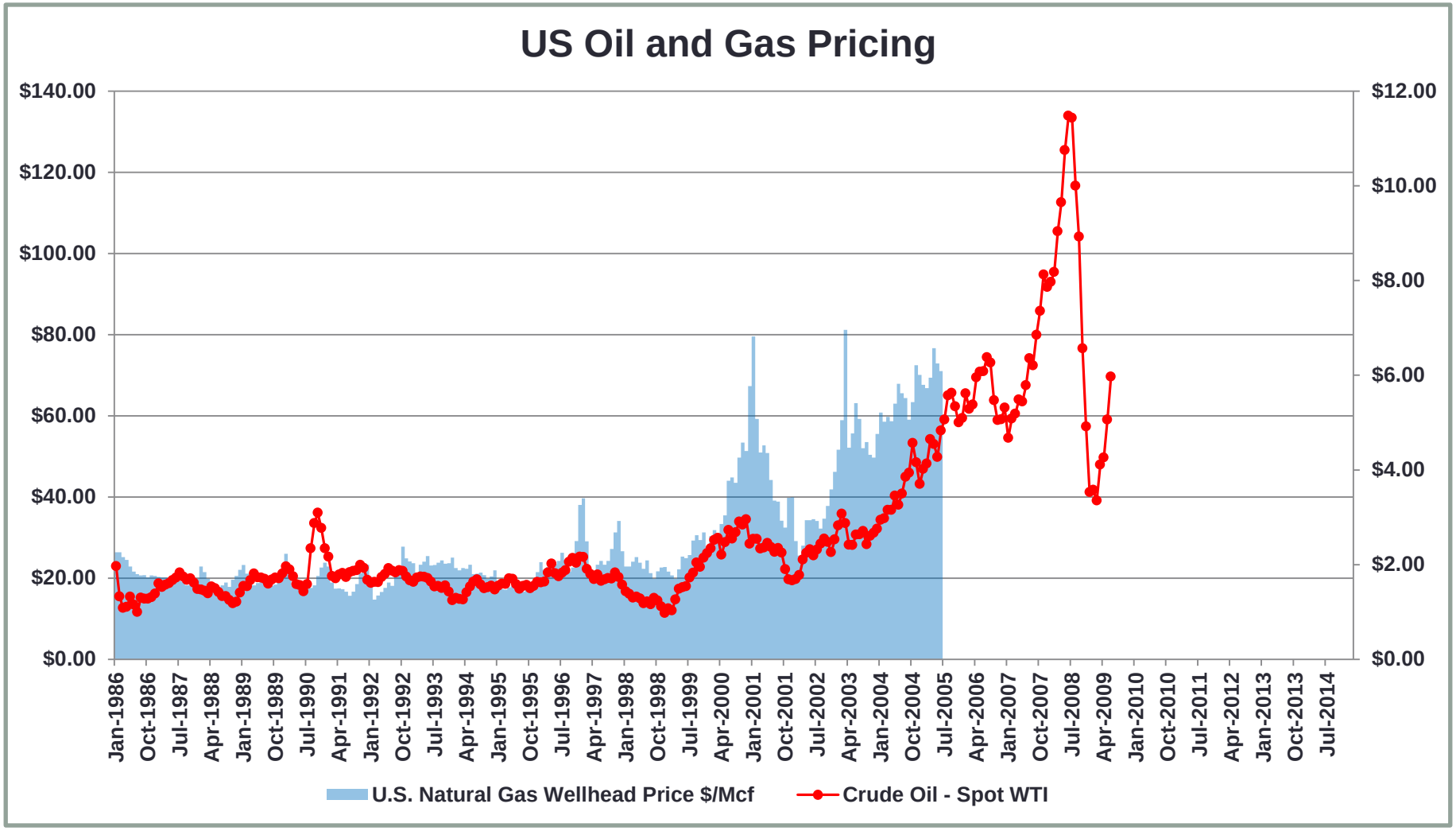
Major US Oil Pipe Lines

2005 – 2009

- Prices increase
- Production increases

- Decreasing imports

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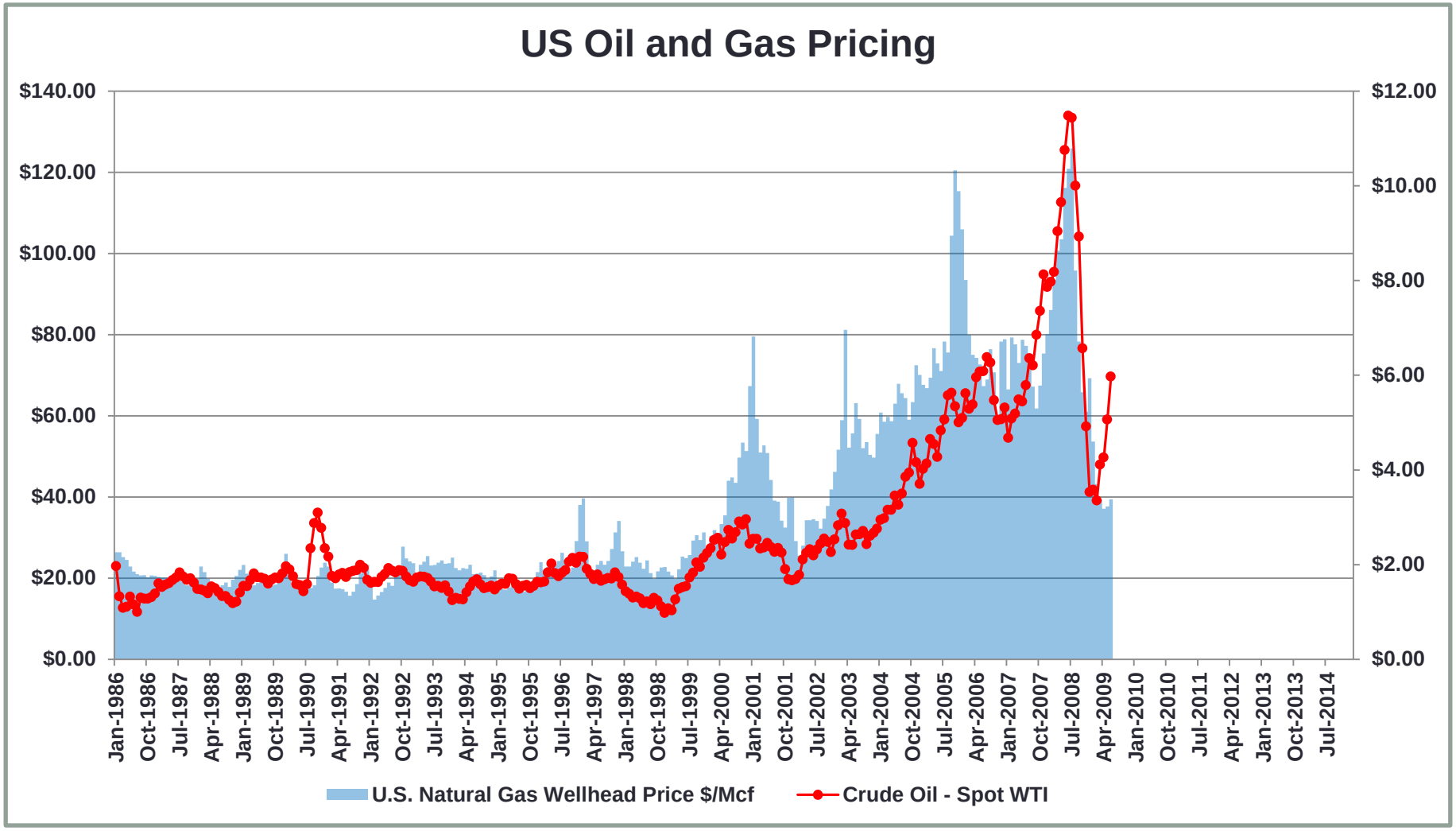
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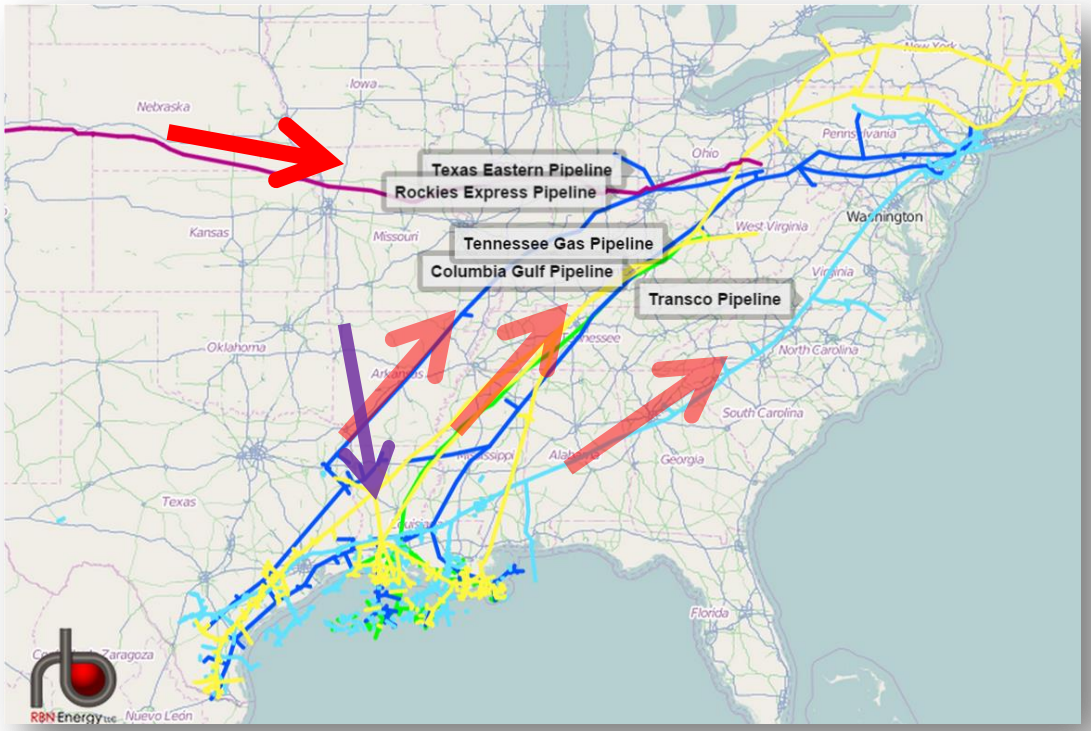
2005 – 2009

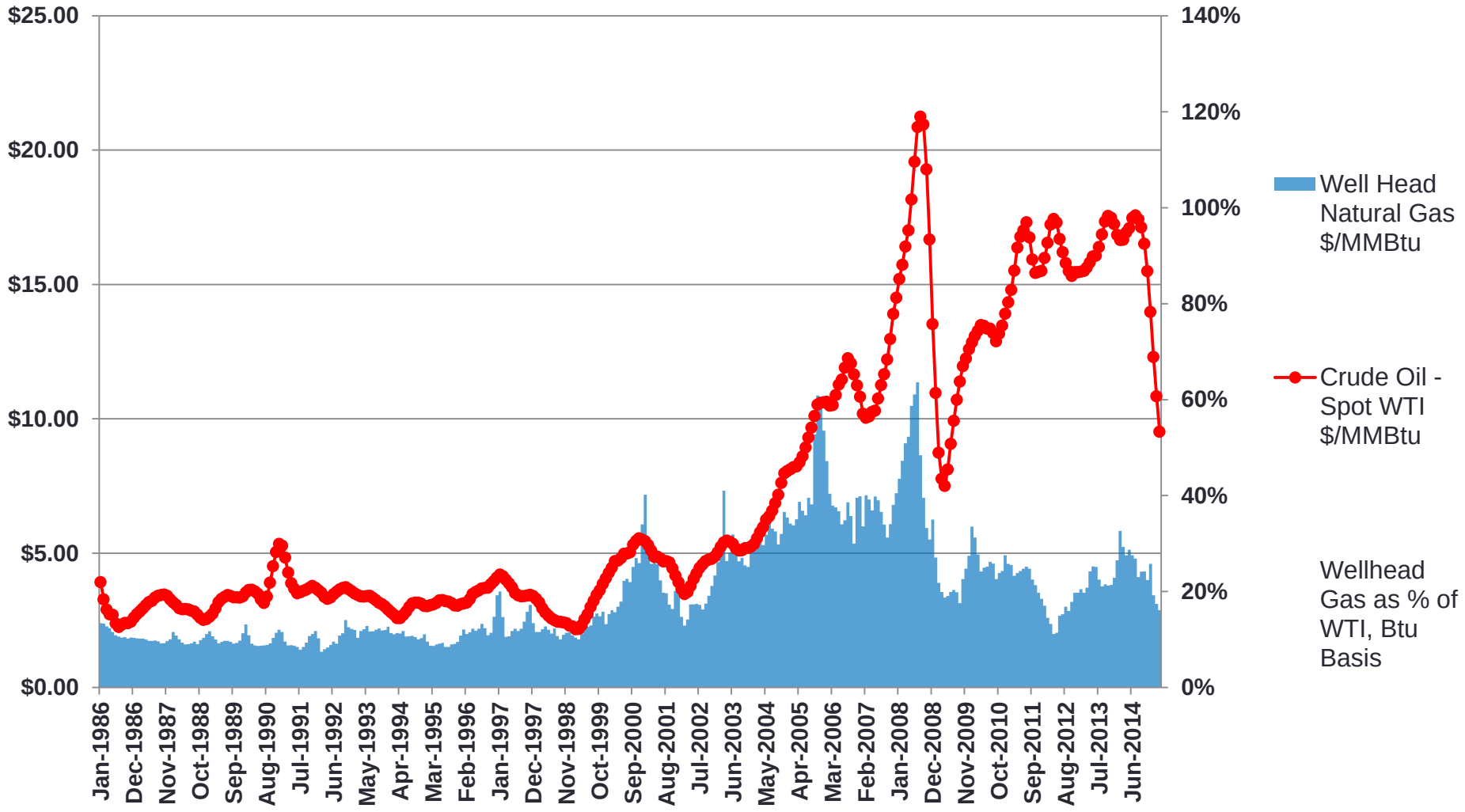
- Prices increase
- Production increases

- REX hits the Midwest and Haynesville hits Henry Hub...

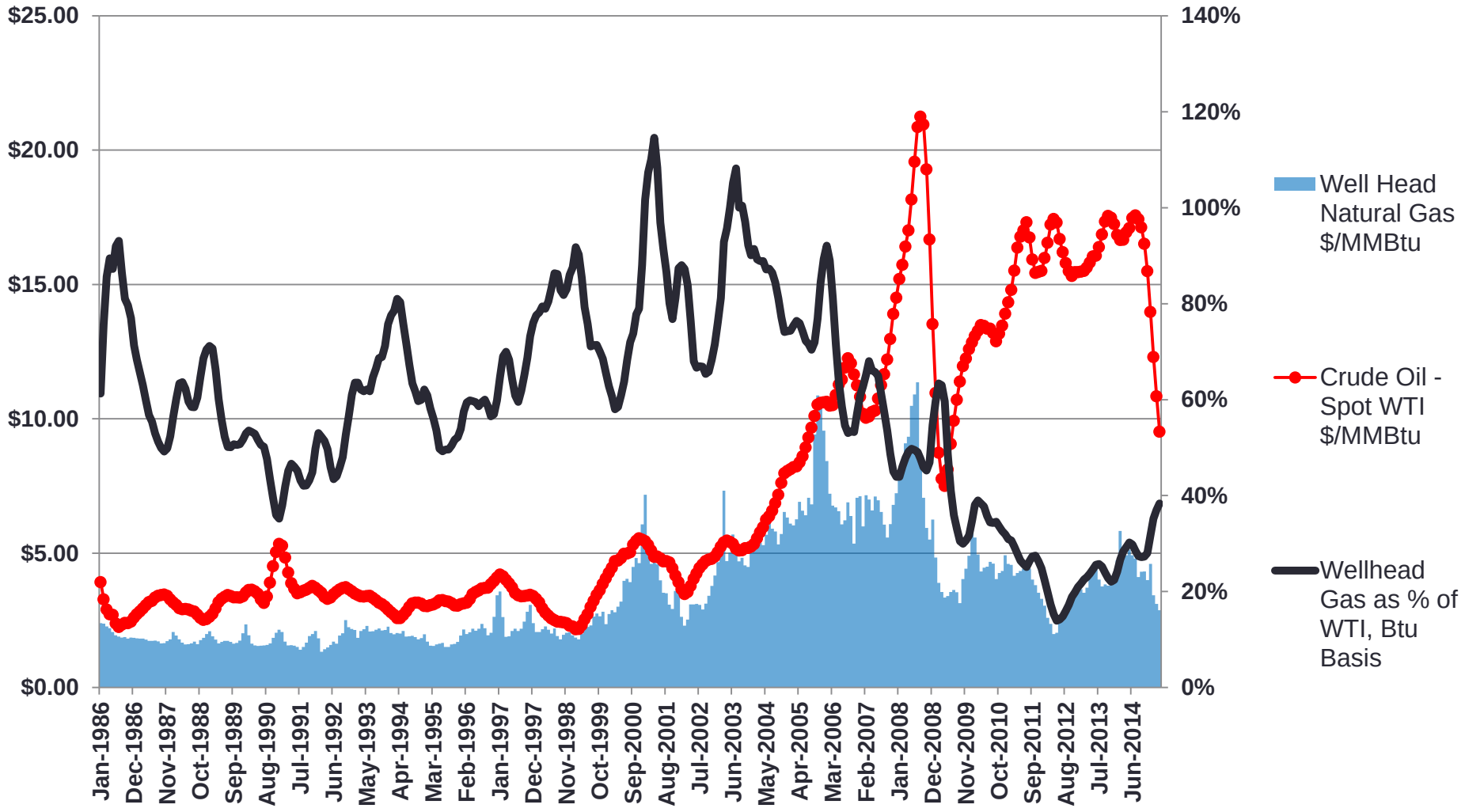


Major US Gas Trunk Lines

Gas disassociates from crude



…and gas disassociates from crude.

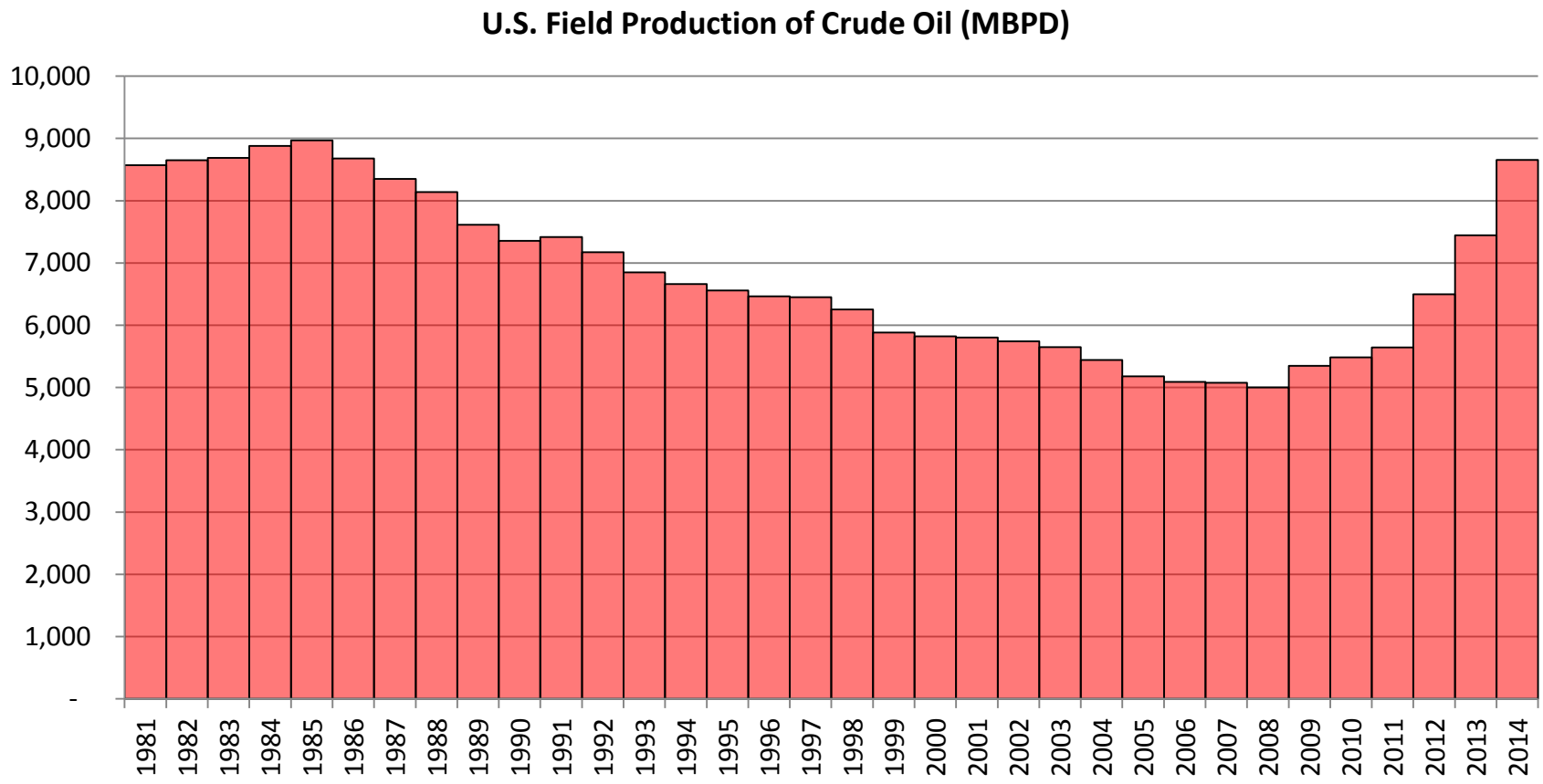


2006 – 2015…

- Result...
- All production up

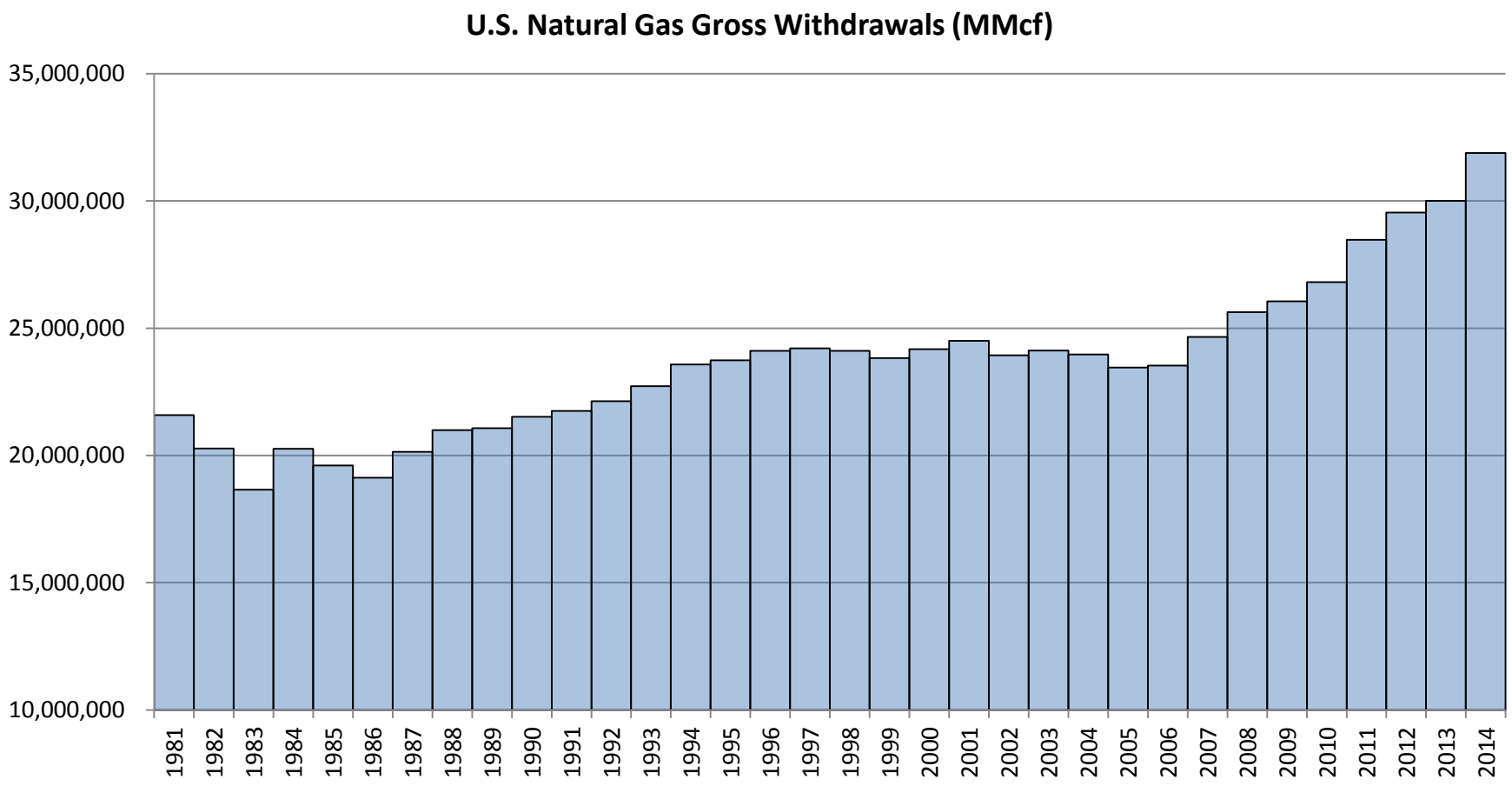
2009 – 2015…

- Crude oil production takes off…



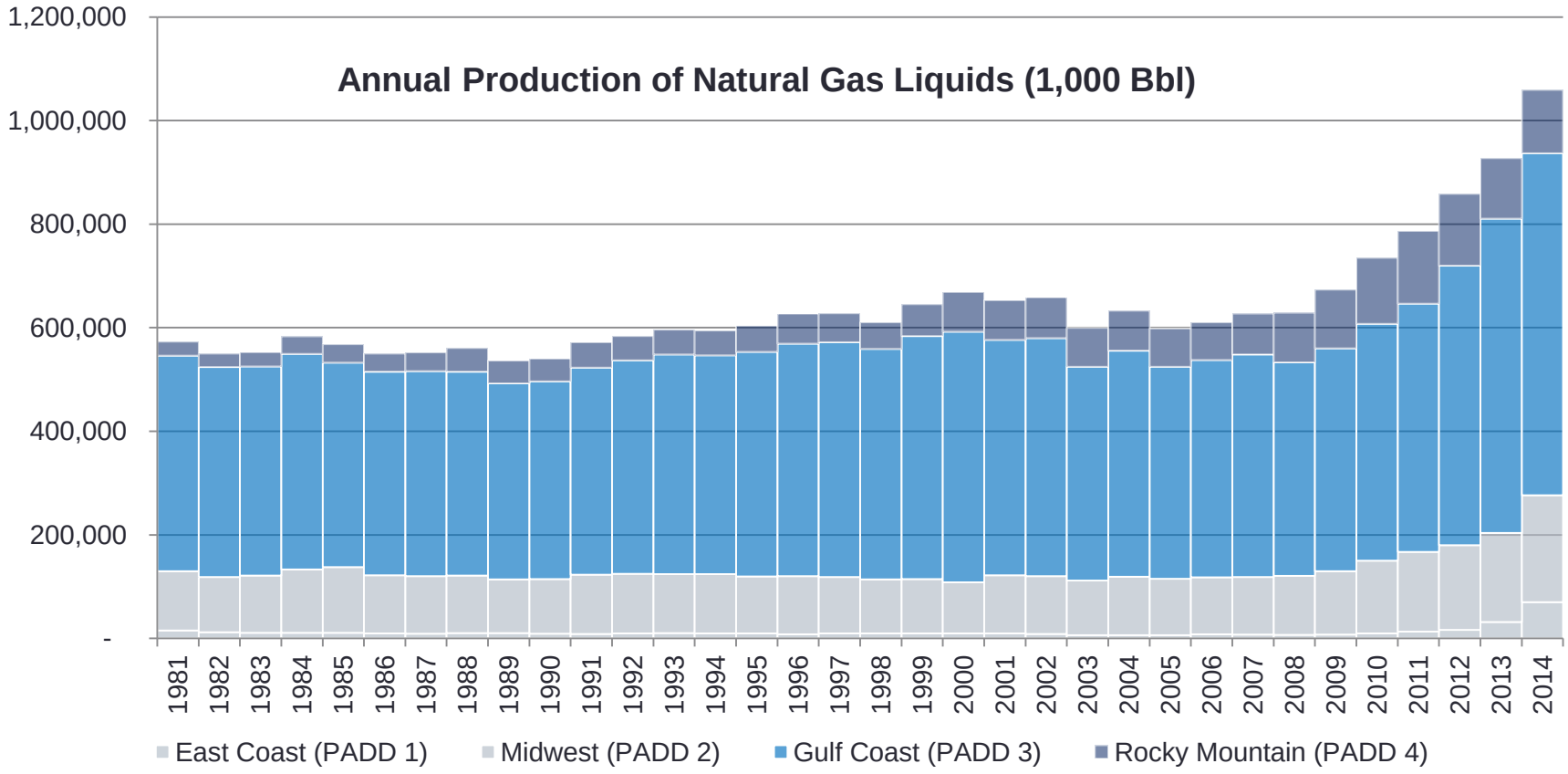
2009 – 2015…

- Gas production continues to grow…!?



2009 – 2015…

- NGL production takes off…



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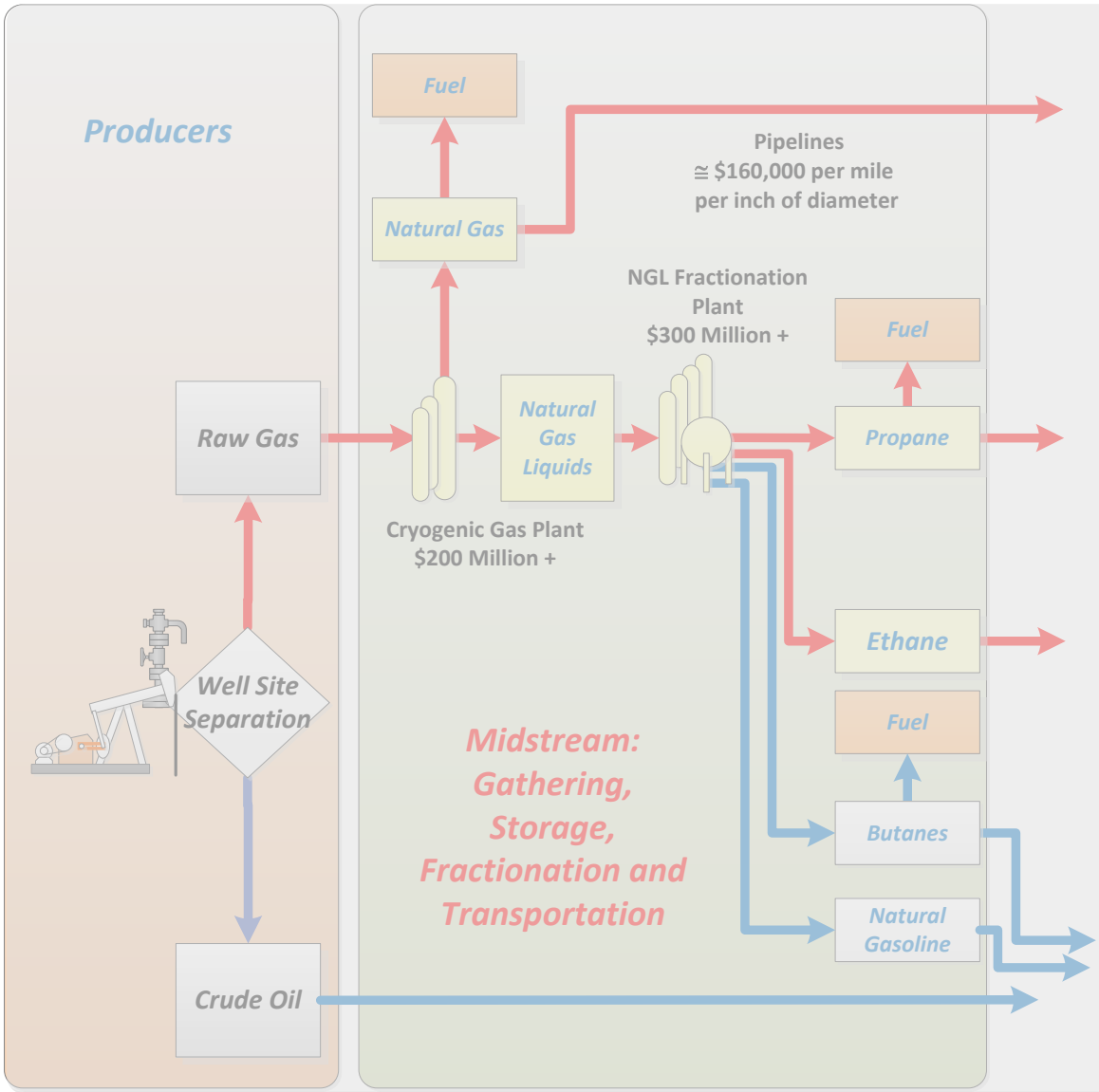

Important:

- Without a takeaway for both gas and NGLs, production is shut-in…

2006 – 2015…

- Result...
  - *All production up…*
  - Associated wet gas produced
  - Gas drillers seek “liquid uplift”
  - The ethane situation…
  - Capital redeploys:
    - re-gasification becomes liquefaction
    - pipeline reversals
  - Pipeline new builds
  - Midstream build out
  - Downstream build out
  - New exports: C_2, C_3, C_4’s

The Money Trail...

Who wins? Loses?

- Midstream MLPs – 100B$ Capex
  - 44 M/U
  - 4 Texas NGL
  - Oil

Oops…

- Regasification
- Trunk Lines
- M/U ‘basis’ differentials
- **The looming Henry Hub crisis**

Who wins? Loses?

- LNG export – the 20 Bcf swing

Oops…

- LNG pricing
  - The Old World Model: ÷ 5
  - The US Toll Plus Model
    - $3 – $3.50 plus 115% HH
    - Competition: 38 goes to 44 Bcf
    - Platts J/KM at $7 down from $20 MMBtu
- **The looming Henry Hub crisis**

Who wins?

- Petrochemicals - 125B$ Capex

- Economics
  - Ammonia: CH_4 to NH_3
  - Methanol: CH_4 to CH_3OH
  - The Crackers: Ethane to ethylene: C_2H_6 to C_2H_4
  - 19 Mar 15 ethane – polyethylene spread: $0.62 per pound. Cash cost = $0.15 per pound!

The Crackers…

- World Scale CAPEX of $5B w/ derivative unit