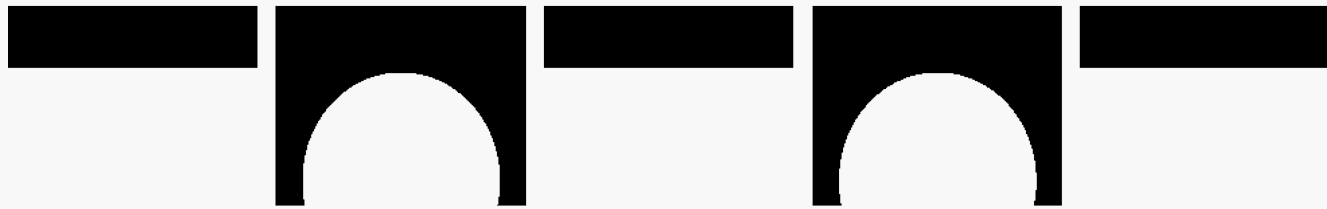


Midstream Industry: economic outlook

PETRAL CONSULTING



knowledge to bridge the gap

presented to USAEE – Houston Chapter
November 2012

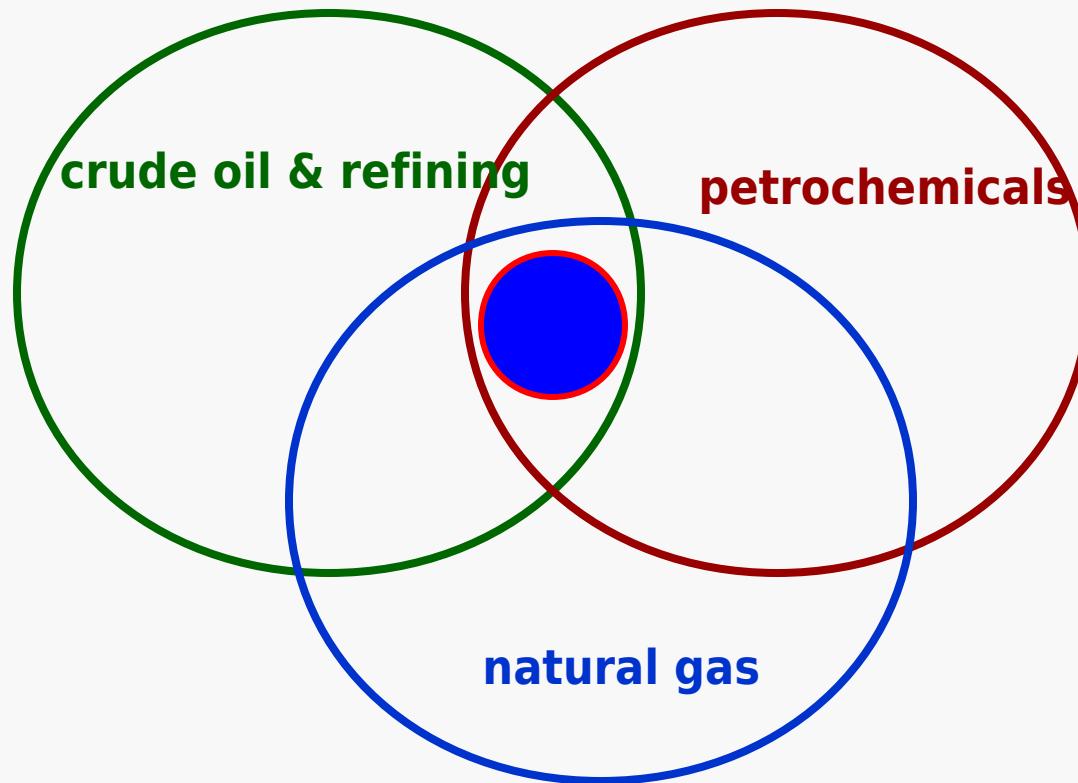
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an overview

- ❖ founded in 1988
- ❖ PCC provides extensive ongoing analysis & forecasts to a diverse group of clients
- ❖ PCC mission & objectives:
 - » We help clients understand the dynamics of NGL markets & economic interactions between midstream, petrochemicals, refining, and oil & gas production
 - » We help clients understand differences in dynamics between domestic & international markets
- ❖ *PCC provides ongoing services:*
 - » *NGL Markets in North America*
 - » *Olefins Markets in North America*
 - » *Monthly Ethylene Production & Feedslate Survey*

midstream industry

the bull's-eye at the center of the vortex



Midstream in North America: **an industry of contradictions**

**a niche business of
details & minutiae
as important as
changes in the big picture**

**a business based on
millions of contracts
& person to person
relationships**

**a business based
on technology as old as 1912
and as new as 2012**

what is midstream?

physical assets

- » gas gathering pipelines
- » gas plants
- » raw mix pipelines, fractionation & storage
- » purity products distribution systems

management expertise

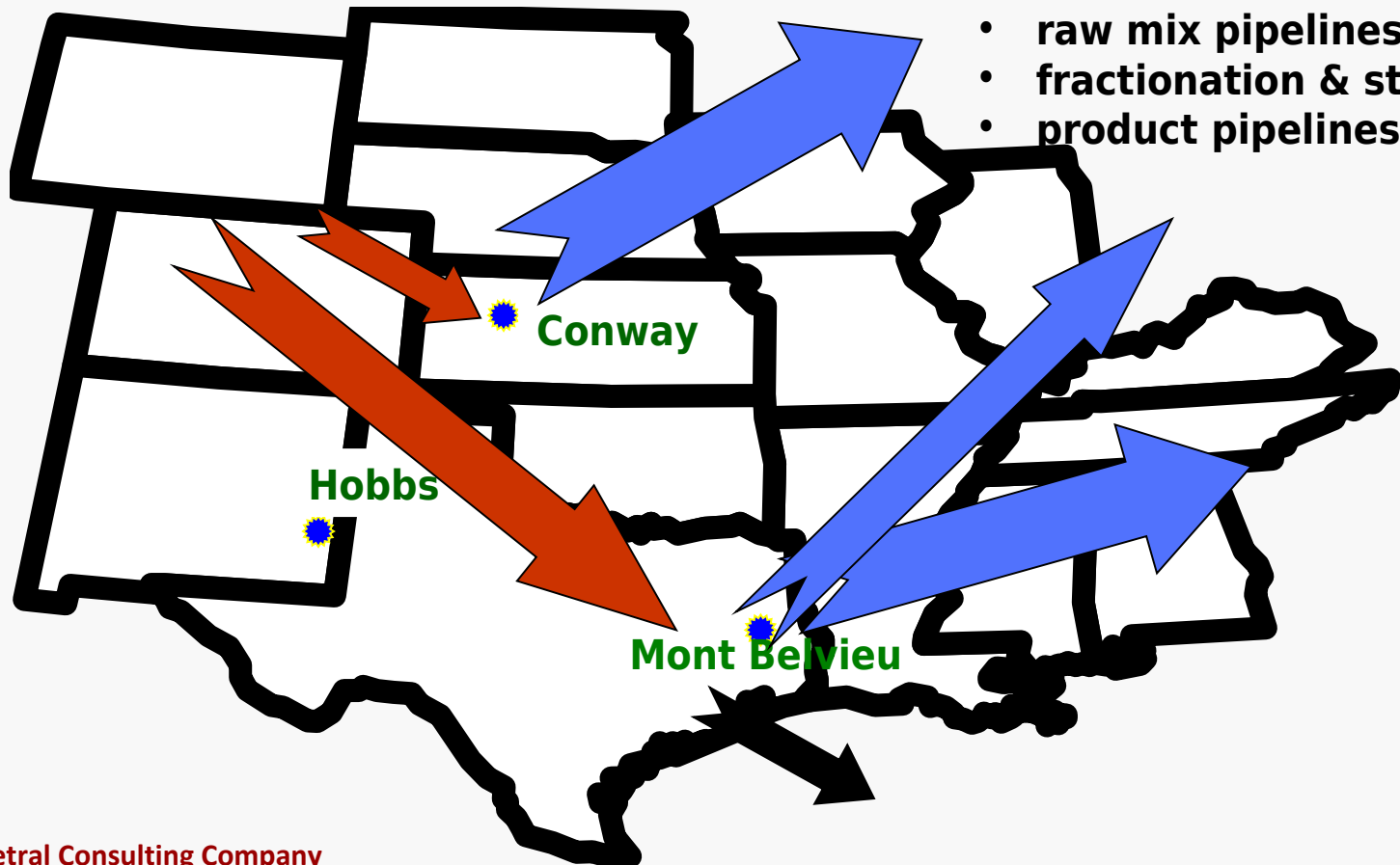
- » NGL marketing
- » contract negotiations
- » understanding the economic influences of major industries as suppliers & customers
- » identifying major industry trends
- » recognizing & understanding short term market aberrations

Midstream Industry

geography & major product flow patterns

Elements of the value chain:

- raw mix pipelines
- fractionation & storage
- product pipelines



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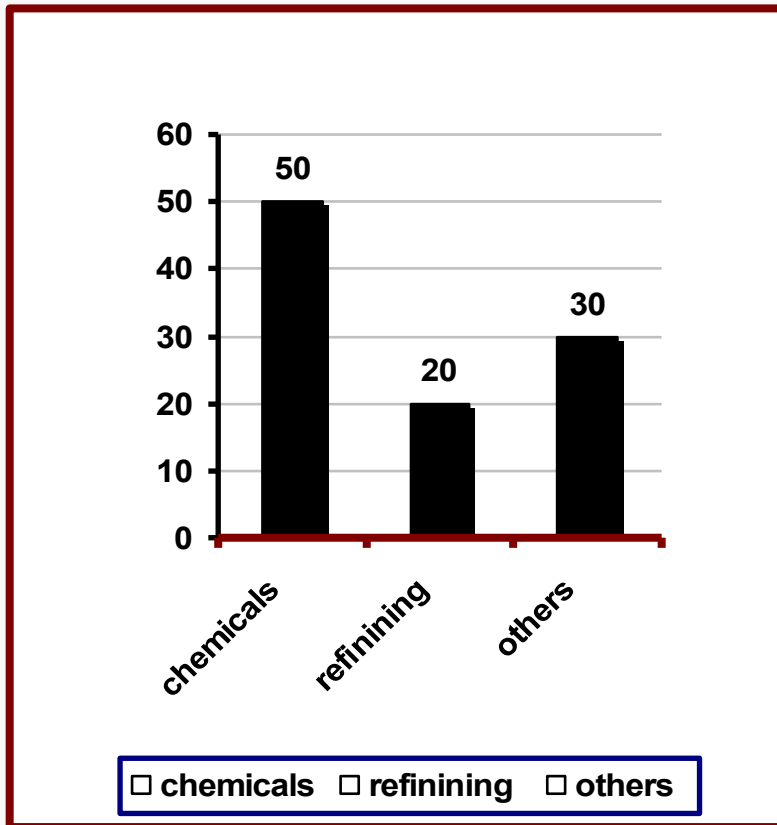
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Midstream Industry

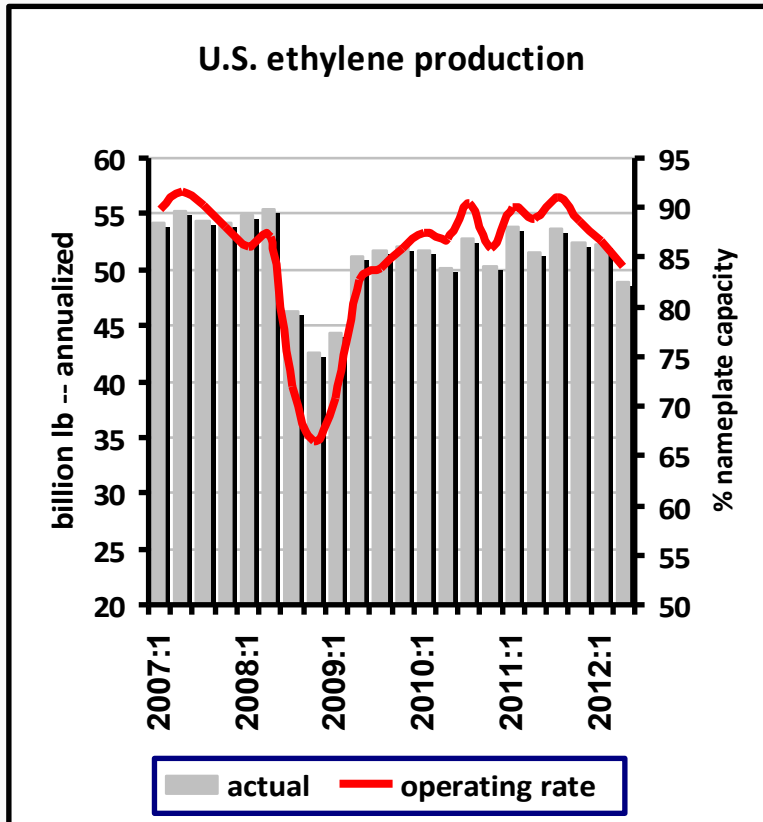
who are our customers?



- ❖ The petrochemical industry consumes 50% of the total U.S. NGL supply – *ethane is the largest volume petrochemical feedstock; ethylene production is the only outlet for ethane*
- ❖ Refineries consumes 20% of total U.S. NGL supply – primary butanes & natural gasoline
- ❖ Sales to propane retailers account for the bulk of “others”
- ❖ Petrochemicals & refining have few customers who use large volumes; propane retailing has thousands of customers who purchase small volumes

U.S. ethylene production

historic trends & forecast



- ❖ Ethylene producers operate plants in response to downstream sales requirements; the industry operates to keep inventories at minimum levels
- ❖ Most ethylene producers operate to meet internal requirements but most have 5-15% surplus output to sell into the spot market; a few ethylene producers are net short & are major buyers in the spot market
- ❖ U.S. producers export substantial volumes of key downstream products & have to be competitive with alternative sources of supply
- ❖ *Profit margins generally decline when operating rates are below 90% of capacity // by the same token, they improve when operating rates are at 90% or higher*

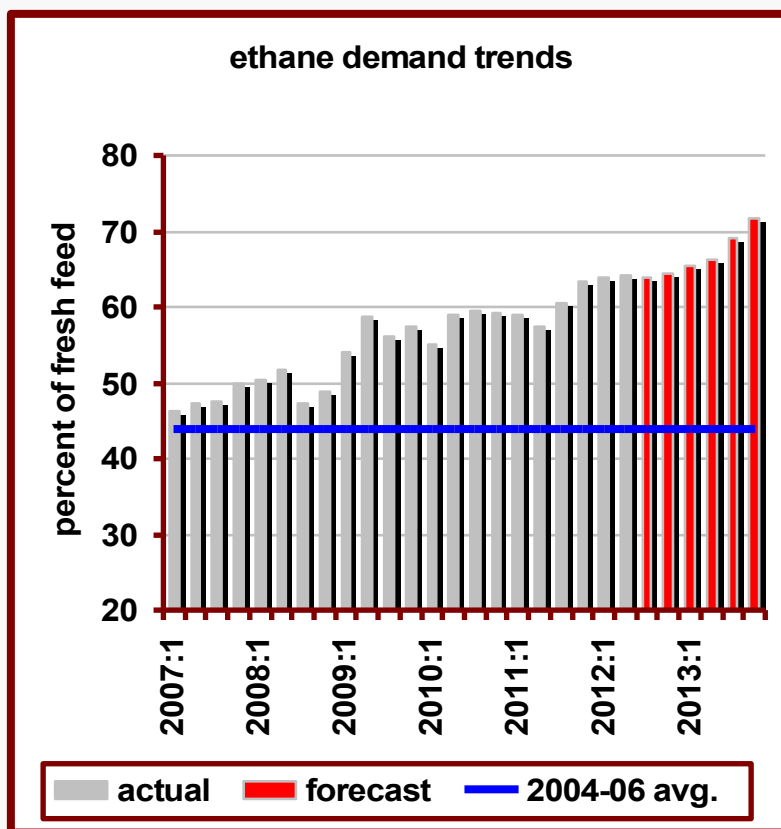
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petrochemical companies are midstream's most important customers



- ❖ *Petrochemical consumers are concentrated in the Gulf Coast – from Corpus Christi to New Orleans*
- ❖ *U.S. ethylene producers have extensive flexibility to adjust the mix of feedstocks used to produce primary petrochemicals*
- ❖ *Ethane is a strategically important feedstock – petrochemical companies can produce ethylene with minimum byproducts*
- ❖ *Most ethylene producers increased their capability to consume ethane as ethane supplies increased since 2007*

petrochemical customers: the importance of feedstock flexibility

- ❖ **Feedstock flexibility within the U.S. ethylene industry is a critical parameter for the midstream industry:**
 - » flexibility gives U.S. ethylene producers the capability to offset supply/demand imbalances in various feedstock and co-product markets; they use more when other markets use less – important in maintaining balanced markets & a capability that petrochemical producers elsewhere in the world do not have
 - » feedstock flexibility also creates strong economic relationships that dominate NGL price trends in Mont Belvieu

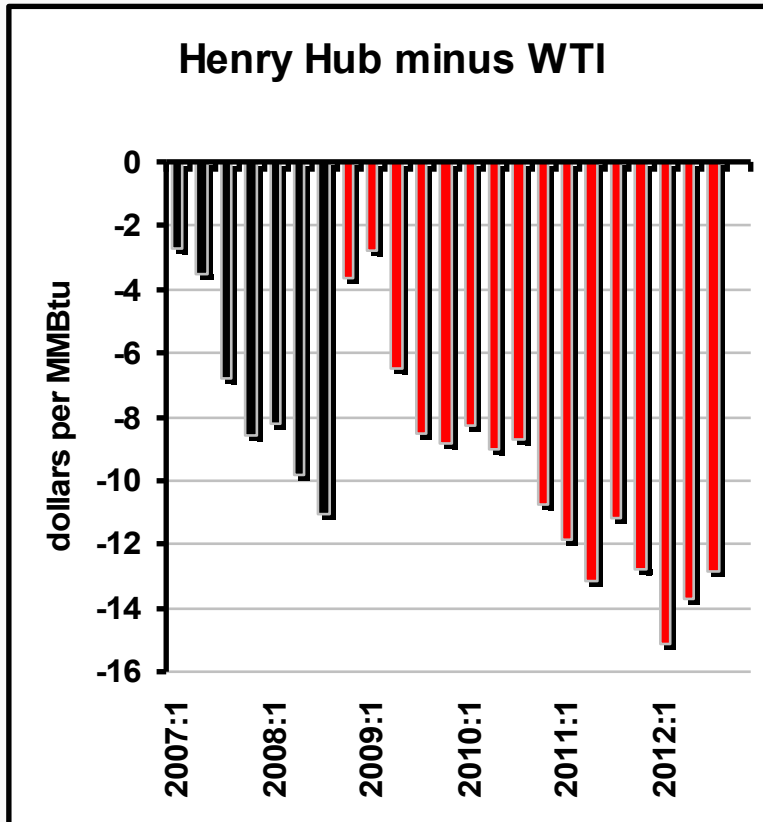
petrochemical industry outlook

- ❖ U.S. ethylene operate primarily to produce products for domestic customers. The most important markets for U.S. exports, historically, were Canada, Mexico & South America – *but not Asia*.
- ❖ Ethylene producers in Europe & Asia have little feedstock flexibility; naphtha is their dominant feedstock. **European and Asian ethylene producers are at an economic disadvantage; as companies in North America act on their cost advantages, European and Asian producers will act to offset.**
- ❖ Ethane supply increased by 125,000 b/d during 2007-2010 (equal to 3-4 billion pounds ethylene) and by another 125,000-150,000 b/d during 2011 & 2012. Ethane prices now give U.S. producers substantial competitive economic advantages versus all other producers except those in the Middle East who use only ethane.
- ❖ Saudi Arabia, the largest petrochemical producer in the Middle East, has a diversified petrochemical industry with feedstock flexibility similar to the Gulf Coast and cost similar to the Gulf Coast but with no prospects for any increase in ethane supply.

gas processing profit margins: THE MOST IMPORTANT QUESTIONS

- ❖ **What are the determining parameters?**
 - » processing margins depend on price differentials between crude oil & natural gas
 - » trends in ethylene feedstock demand are critical for maintaining positive recovery margins for ethane
- ❖ **How long will markets support strong crude oil prices & weak natural gas prices?**

pricing differentials: Henry Hub minus WTI



- ❖ Natural gas/crude oil price differentials are a function price trends in both commodities // *with limited market overlap, natural gas prices do not track crude oil prices*
- ❖ *Variations in pricing differentials between Henry Hub & WTI are a rough guide to trends in profit margins for gas plants with “frac spread contracts”*
- ❖ *Many gas processors operate plants based on “percent of proceeds” or “percent of everything” contracts.*

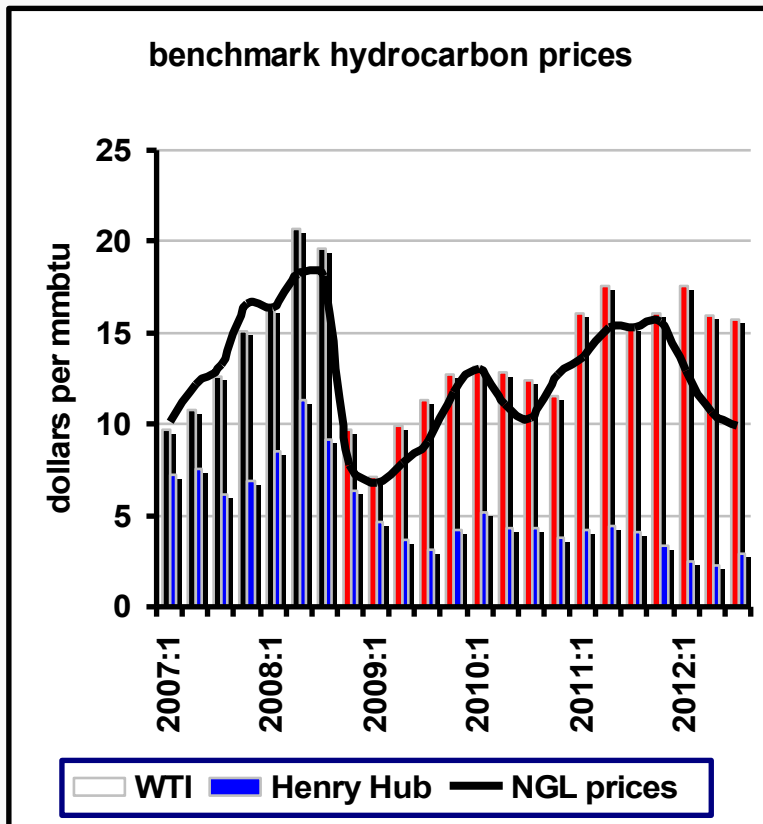
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price trends: natural gas, WTI & NGL



- ❖ The latest trend for gas exploration companies is to become “oil exploration companies” or at the very least to explore in areas likely to yield NGL rich gas.
- ❖ The economics for NGL rich gas versus NGL lean gas are compelling: NGL prices track crude oil prices (*the ethylene industry’s feedstock flexibility is key*)
- ❖ The average shrinkage for all U.S. natural gas is about 4.5 vol. %; the shrinkage for NGL rich natural gas is as high as 8 vol. %. NGL in rich gas increase total value by 50-150 cents per MMBtu – but only after the gas is processed and the NGL content is recovered and sold.

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wrap up

- ❖ **Plentiful NGL supply contributes to a strong petrochemical industry – the most important market for NGL.**
- ❖ **Wide differentials between crude oil & natural gas prices create a very favorable economic environment for both midstream & petrochemical companies.**
- ❖ **For gas producers, NGL rich gas has significantly higher total value after NGL recovery. NGL prices (Mont Belvieu prices) boost total gas value by 50-150 cents per MMBtu.**
- ❖ **Location matters, some gas plants deliver NGL supply to Mont Belvieu while others deliver to Conway. NGL prices in Conway were 5-25 ¢ per gallon less than in Mont Belvieu or 60-180 cents per MMBtu during 2010-2012.**