PetroChemWire

Managing Price Risk Along the Resin Supply Chain

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The Road to Risk Management

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Not News: Risk Management

- Futures contracts have been used in various markets for hundreds of years.
- Exchanges in Chicago & Minneapolis standardized futures trade in agricultural markets in the late 19th century.
- Energy futures developed in the 1980s -- *about 100 years into the industry's history.*

1865: Grains
1870: Cotton
1872: Butter, Cheese, Eggs,
1882: Coffee, Cocoa, Sugar
1961: Pork
1972: Currencies

1978: Heating Oil
1983: Crude Oil
2008: NGLs
2009: Ethylene
2010: Polyethylene, Polypropylene
2011: Propylene

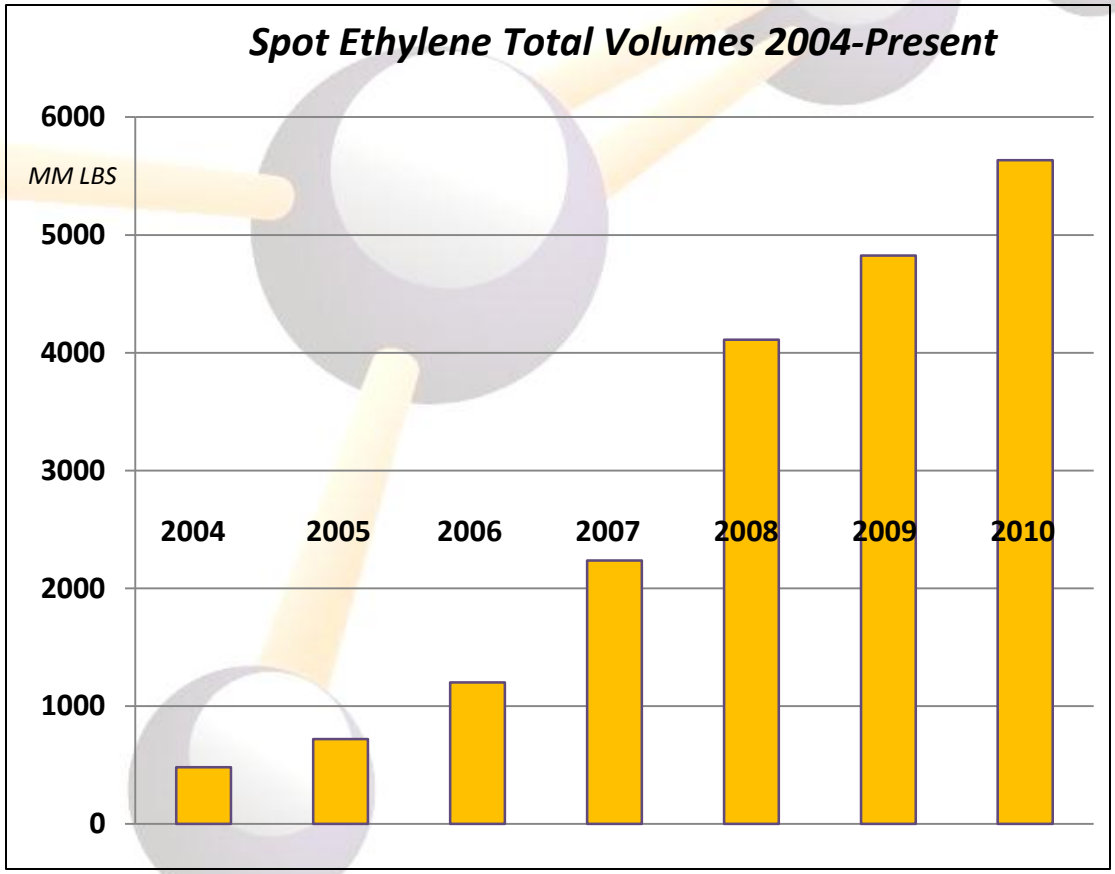
What has changed in the resin markets?

- Increase in upstream transparency
  - Ethylene hub increased spot market liquidity
  - CME/NYMEX ethylene futures launched 2009

  - PGP hub has opened at Mont Belvieu
  - CME/NYMEX PGP futures launched 2010

Newsletters reflect the increase of liquidity & transparency

Liquidity: Increasing



The Road to Transparency

- Resin pricing in the US has historically lacked specific transparency.
- Contract deltas were ‘known’ but the prices themselves were not.
- Newsletters focused on export prices to represent the spot market.

The Road to Transparency

- As monomer prices became clearer on a daily basis, the relevance of the spot resale market emerged in the resin markets.

- Auctions for some resins began to have increasing relevance as correlations between spot monomers and spot resins developed.

The Road to Transparency

- Gradually, resins began to be offered and bid on an FOB Houston bulk railcar basis.

- Over the past year, the FOB Houston market for HDPE blow molding, LLDPE film and HoPP injection have been bid, offered and transacted on a daily basis.

Liquidity and Hubs

- A hub enables a commodity to trade frequently and with confidence of its basis.
- Hubs include Henry Hub (nat gas), Cushing (WTI) and Mont Belvieu (ethylene, PGP).
- As with ethylene and propylene, a “hub mentality” is developing around the US resin markets.

Hub Mentality

- Hubs create the opportunity to easily sell into and draw from a central location.
- Delivery logistics and freight rates are negotiated outside of the FOB Houston price.
- A bulk railcar basis creates the option to deliver domestically or bag at site for export.

What do hubs have to do with me?

- Producers can sell into the hub and send their product to it.
- Consumers can buy from the hub and receive delivery from it.
- Resellers (broker/dealers) can buy at the hub and sell out of it.

What do hubs have to do with me?

- The price at the hub serves as a cash market benchmark.
- Specifics of each deal are worked out as a premium to the hub price (such as delivery).
- A strong cash market benchmark enables swaps markets to exist.

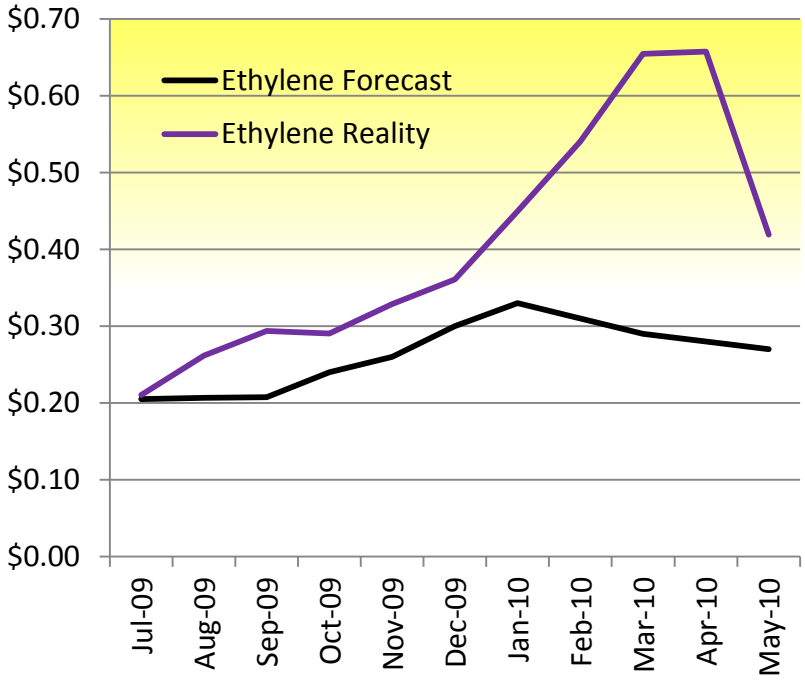
Transparency and Forward Trading

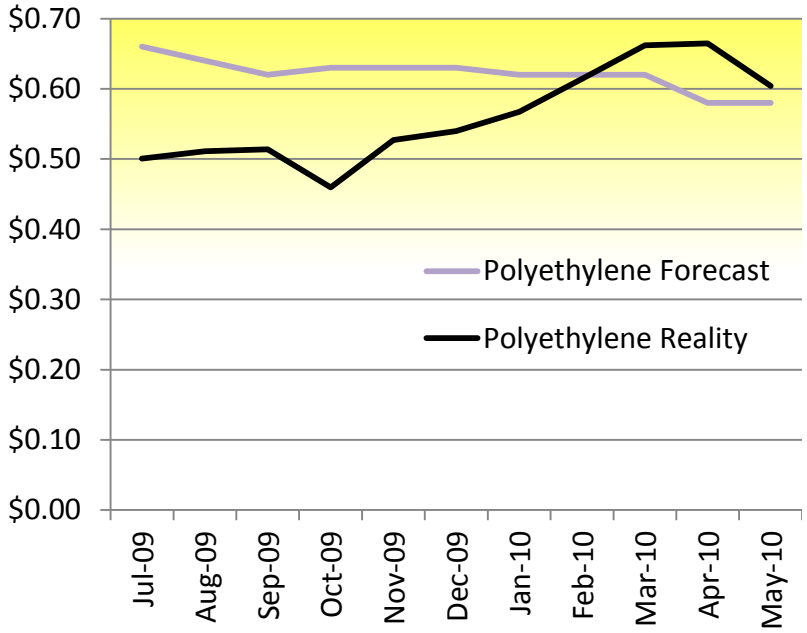
A forward curve reflects prices for a commodity you can lock in <u>today</u> for delivery in the <u>future</u>

A forward curve is not a forecast

Forwards, Futures & Forecasts

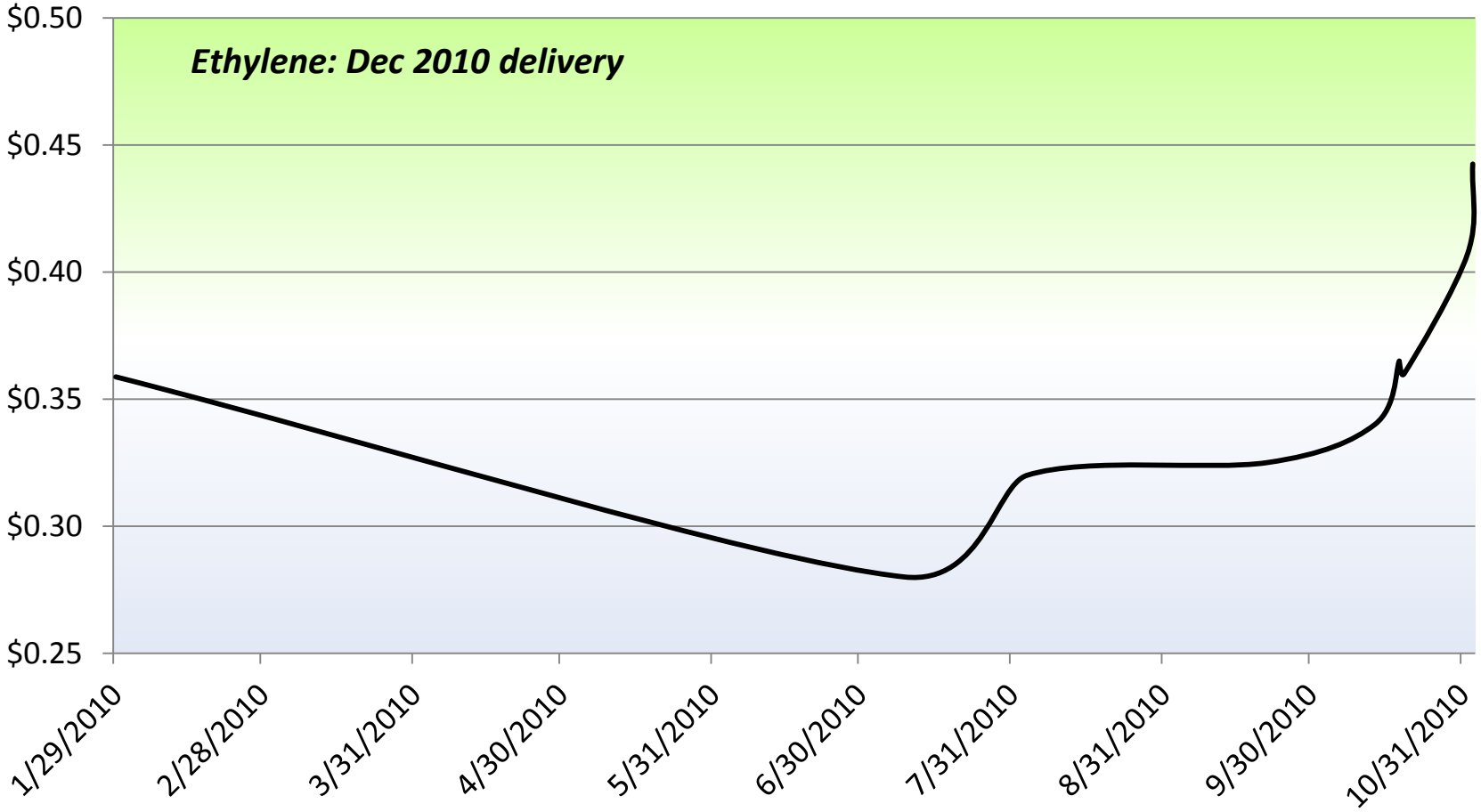
Polyethylene and ethylene markets have historically relied upon price forecasts as their primary method to manage risk.





The forecast was made in June 2009

Forwards, Futures & Forecasts



Forwards, Futures & Forecasts

Markets that have typically functioned on a "this-month" or "as-needed" basis are actually trading the final month of a contract that has been in play for (usually) a year.

Participants are now trading the 2H 2011 market – and the 2012 market.

> *"The future ain't what it used to be."*
>
> *-Yogi Berra*

Forwards, Futures & Forecasts

- Forecasts still have relevance – that's why everyone listens to the predictions of where the banks think oil prices will go.

- Trading the forward markets through futures contracts relies on those forecasts dictating where the contract will ultimately expire.

Swaps Markets

- Swap = A contract where a fixed cash stream is exchanged for a floating cash stream
- Swaps = Pieces of paper that represent physical commodity prices
- Swaps = Deals that trade against an index

How do swaps get value?

- The floating component ensures swaps correlate to the underlying commodity

- A robust, transparent and accurate physical index is critical to a functional swaps market

Swaps Markets

- Swaps enable risk management by allowing parties to set a price for a time period for which the price is not yet known.
- When the swap settles, one party owes the other party money.
- Swaps exist for hedging and speculation. Delivery of material is never taken.

Swaps Market Example

Party A sells Party B a 4Q 2011 Natural Gas Swap, consisting of 4 contracts per month (total 12 contract lots) on the CME/NYMEX, for $3/mmBtu.

The CME/NYMEX Nat Gas Swap Futures Contract settles each month at the expiration price of the physical CME/NYMEX Nat Gas contract.

The average of the settlements for Oct 2011, Nov 2011 and Dec 2011 determines which party owes the other money.

Swaps Market Example

The Oct Nat Gas contract settles on Sep 28 at $3.18/mmBtu.

The Nov Nat Gas contract settles on Oct 27 at $2.80/mmBtu.

The Dec Nat Gas contract settles on Nov 28 at $2.82/mmBtu.

=AVERAGE of $2.9333/mmBtu.

The seller pays the buyer $0.0667/mmBtu.

Each contract = 250,000 Btu

The deal was for 12 contracts.

The seller pays the buyer $2M.

Why would a processor purchase swaps?

Swaps can be used to offset fluctuations in physical resin prices

Basis risk defined

Basis risk in is the risk associated with imperfect hedging using futures. It could arise because of the difference between the asset whose price is to be hedged and the asset underlying the derivative.

How money changes hands

Resin supplier

PCW PP Index

PP railcars

PCW PP Index

NYMEX/CME

50 Cents for swaps

Processor

Risk factors for risk management

- Liquidity

  Will I be stuck in my position?

- Performance

  Will my counterparty flake?

- Index

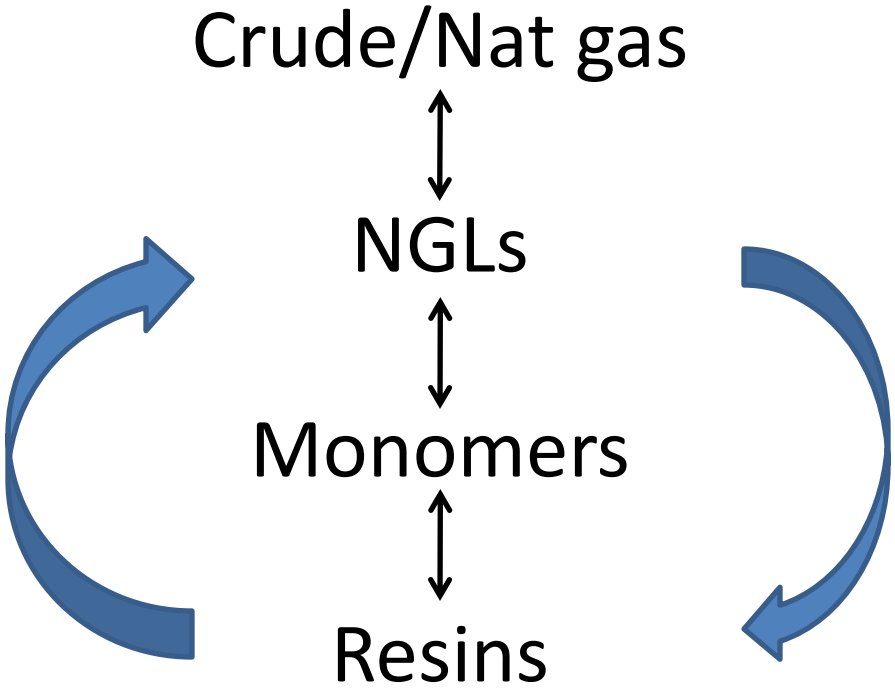
  Is my benchmark reliable?

The reward of a low-risk index

- Confidence and facility of commerce
- Feasibility of risk management tools
- Transparency creates possibility – not bankruptcy! *Do not be afraid.*

It's About More Than Resin

Resin swaps complete the supply chain.



Clearing NGLs, Monomers, and Polymers on CME ClearPort

ClearPort Product Slate: The Growing Spectrum

- The Full NGL Complex
- The Monomers
  - **Ethylene**
    - Physically-Delivered in Mt. Belvieu (both In-Well and Pipeline)
    - Cash-Settled based on the PCW Index
  - **Propylene**
    - Cash-Settled Swap based on PCW Index
- Polymers
  - **Two Physically-Delivered HDPE and PP (FOB Houston)**
  - **Three Cash-Settled Polymer Swaps (based on PCW)**
    - HDPE, LLDPE , and PP Calendar Swaps

The NGL Complex

- Clearing of 41 Cash-Settled and Physically-Delivered NGLs
  - **Liquid Cash-Settled NGL Swaps (both Mt. Belvieu and Conway)**
  - **Physically-Delivered (In-Well) at Mt. Belvieu and Conway**
- Ethane and Propane Listed Through Dec 2015
  - **Propane**
    - 50 Million Barrels Hedged Forward thru Dec 2013
  - **Ethane**
    - 20 Million Barrels Hedged Forward thru Dec 2013

Monomer Product Slate

- Physically-Delivered Ethylene In-Well at Mt. Belvieu
  - Open Interest Through September 2011
  - Expires on Second-to-Last Business Day of the Current Month
  - Advantage: Allows Trading Through the Current Month Similar to Ethane
- Financially-Settled Ethylene Swap (PCW)
  - Monthly Average of PCW Ethylene price at Mt. Belvieu
  - Open Interest Through December 2011
- Polymer-Grade Propylene (PCW) Swap launched Dec 2010

New Cash-Settled Polymer Swaps

(PCW benchmark)

- HDPE High Density Polyethylene Swap
  - FOB Houston High Density Polyethylene of blow molding grade with 0.35 melt and 0.953 density
- LLDPE Linear Low Density Polyethylene Swap
  - FOB Houston Linear Low Density Polyethylene Film Butene grade with 1.0 melt and 0.92 density barefoot or medium adds
- PP Polypropylene Swap
  - FOB Houston homopolymer PP: HoPP - Inj: 12, 20, 35 melt

Expanding Product Slate

- Expanding to the Global Market
  - European and Asian Polymers
- Additional Monomers and Polymers
  - PET Resin Supply Chain
  - Polystyrene Supply Chain