When Energy Markets Go Crazy!

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Heating the Midwest Conference
Green Bay – April 29-May 1, 2014
Overview

• Compare pricing of heating fuels
  • Review of heating fuels used in Wisconsin and their characteristics
  • Price/MMBtu

• The role of biomass for the residential market

• Prognostication
  • Supply and pricing of winter fuels this summer, and upcoming winter
Residential Heating Fuels

Source: US Census Bureau/American Community Survey
Fuel Characteristics

- **Heating Oil**
  - Similar to on-road diesel fuel; more sulfur and red dye
  - Prices generally follow the crude oil market
  - Demand is seasonal – 2013-2014 winter price peaked on February 24 at $3.712/gallon ($26.765/MMBtu)
  - Average seasonal price $3.559/gallon ($25.661/MMBtu)
  - Unregulated fuel

- **Electricity**
  - Available across the state
  - Most expensive fuel for space heating with average seasonal price of $.135/kWh ($39.668/MMBtu)
  - Seasonal consumption more apparent in the summer
  - Regulated fuel
Wisconsin Natural Gas Utility Service Territories and Major Pipelines

Legend
- Natural Gas Transmission Pipelines
- Natural Gas Utility Service Territories
- Other Gas Utilities
- Madison Gas and Electric Company
- Xcel (Northern States Power Company)
- Wisconsin Electric Gas Operations
- Wisconsin Gas
- Alliant (Wisconsin Power and Light Company)
- Wisconsin Public Service Corporation

Source: Public Service Commission of Wisconsin
Fuel Characteristics

- **Natural Gas**
  - Most popular, least expensive fuel for space heating in Wisconsin. Average price for the season is $8.50/MMBtu
  - Emissions: 117 lbs of CO$_2$/MMBtu. HO, 161.3 lbs/MMBtu; propane, 139 lbs/MMBtu.
  - Regulated fuel
  - Utility price set by commodities market

- **Propane**
  - Residential and agricultural customers
  - Price set by commodities market; historically tracks petroleum, recently tracking natural gas
  - Unregulated fuel
Residential Energy Prices

September 2010 through April 13, 2014

$/MMBtu

Heating Oil  Propane  Natural Gas  Electricity
Residential Energy Prices

September 2010 through April 13, 2014

$/MMBtu

Heating Oil  Propane  Natural Gas  Electricity  Wood Pellets  Wood Chips

What’s in a Price?

1. Supply and Demand
2. Seasonality
3. Regulation
Supply and Demand

• Keeping supply and demand in balance
  – Commodities market
    – Propane, heating oil and natural gas
    – Price planning – keeping stable pricing for customers

• Supply variables
  – Storage
  – Pipeline capacity, allocation

• Demand variables
  – Weather
  – Availability of other fuels
LP Production

- LP production increases with the development of natural gas from shale formations
LP Exports

U.S. Exports of Propane and Propylene

Source: U.S. Energy Information Administration
LP Inventories—10/2013

- In October 2013, US propane stocks, middle of historic range
Record Domestic Demand for LP

- Domestic demand hits a record high
Wet Fall

- Wet fall for crop harvesting
Very Cold Winter

- Very cold winter; 19.7% more heating degree days than the previous winter

![Graph showing Normal Population-Weighted HDDs (1981-2000) and Actual Population-Weighted HDDs, January 2013 to March 2014.](image)
Midwest LP Supply Disruptions

- Midwest terminals unable to replenish supply after large demand for crop drying
- Rail delivery disruptions
- Cochin Pipeline reversal
Result? High LP Prices

- Very Cold Winter
- Reduced Inventories
- High Domestic Demand
- Supply Disruptions
- Exports
Natural Gas Pricing

• Cold weather
• High demand
• Spot market volume and percentage

Wisconsin Residential Natural Gas Prices Per Them (includes utility meter charge)

April 2014--$0.9775 Per Therm

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2014-04-29

$0.00 $0.20 $0.40 $0.60 $0.80 $1.00 $1.20 $1.40
Natural Gas Pricing

Henry Hub Natural Gas Spot Price (Dollars per Million Btu)

Henry Hub Natural Gas Spot Price (Dollars per Million Btu)
Regulation and Pricing

- Regulated
  - Price increases are less dramatic
- Unregulated
  - Price spikes are more dramatic
- Datasets
Danger of High Prices

• The danger with high prices
  • Demand destruction

• Example
  • Gasoline prices in 2008
  • LP prices in 2013?
Role of Biomass?

- Biomass as space heating fuel
  - Fuel switching
  - Primary vs. secondary thermal source
- Costs
- Emissions
- Resource proximity and availability
Residential Biomass Consumption

Residential Wood Energy Use

- Fireplaces
- Stoves

trillion Btu/year

Fuel Switching

• Wood vs. LP
  • Energy cost savings are not guaranteed
  • Savings? It depends.
  • Thermal portfolio diversification – thermal “peak shaving”

• Who are the customers?
Pros and Cons

- Homegrown fuel, supports Wisconsin and the Midwest economy, and adds jobs
- Carbon neutral
- Displaces fossil fuels
- Sustainable and renewable fuel with relatively stable pricing
- Variable energy content
- Requires physical presence to tend the unit
- Requires physical strength to load wood or pellets
- Emissions must be controlled
…the Crystal Ball Says…

Natural Gas

• Prices
  • Summer
    • Spot prices will continue to decline. Average Henry Hub price in 2014 expected to be $4.44/MMBtu (the price was $6/MMBtu in February and is now $4.90/MMBtu)
    • Prices will be slightly higher this summer
  • Winter
    • EIA is estimating that households using natural gas can expect to pay about 13% more this winter.

• Supply
  • The working gas in storage at the end of March this year was the lowest in 11 years. A large rebuild is expected through October.
  • EIA expects that demand from the power sector will be lower due to higher prices, but demand from the residential, industrial and commercial sectors is expected to offset the drop in demand.
...the Crystal Ball Says...

Henry Hub Natural Gas Price

(dollars per million Btu)


Historical spot price
STE0 forecast price
NYMEX futures price
95% NYMEX futures upper confidence interval
95% NYMEX futures lower confidence interval

Source: Short-Term Energy Outlook, April 2014

Note: Confidence interval derived from options market information for the 5 trading days ending Apr. 3 2014. Intervals not calculated for months with sparse trading in near-the-money options contracts.
Heating Oil

• Prices
  • Winter – EIA is projecting that households will spend 2% less this winter than last winter due to anticipated 5% decrease in price and 3% increase in consumption.

• Supply
  • Inventories of distillates are projected to start the summer 6 million barrels lower than last summer, and 26 million barrels lower than the 5-year average.
  • These inventories will build throughout the summer, and are expected to be on par with inventories at the end of last summer, which were well below the 5-year average.
Propane

• Prices
  • Winter – EIA is projecting that households will spend 9% more this winter in the midwest and 54% higher nationwide.

• Supply
  • Exports of propane are expected to continue climbing which puts pressure on inventories and supply.
  • The summer build in of supply has begun slowly.
  • The loss of the Cochin pipeline will reduce supply in the Midwest which is being addressed through three new terminals, two in MN and one in WI. These terminals will be served by rail car.
...the Crystal Ball Says...

Electricity

- Prices
  - EIA estimates an increase of about 2% in overall seasonal cost.
  - The pressure on electric prices is the result of commodity costs for fuel and power plant fuel switching.
Questions?

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