May 21, 2014

Natural Gas Marketing Overview
Supply & Transportation Management
North American Pipeline Infrastructure

- 366,000 miles of inter/intrastate pipelines
- 1,300 local distribution centers
Pipeline Infrastructure

- Gathering Lines
  - Small diameter pipe
  - Wellhead to processing plant
- Processing Plant
  - Extraction of natural gas liquids and impurities
- Mainline Transmission Systems
  - Large-diameter pipe
  - Long haul molecules from producing region to market
- Market Hubs/Centers
  - Pipeline intersections
- Underground Storage Facilities
  - Depleted wells, reservoirs, aquifers and salt caverns
  - Inventory management, supply backup, system balancing
- Peak Shaving
  - High demand, volatile swing
  - Storage inventories, LNG, propane
Pipeline Infrastructure

Source: Energy Information Administration, Office of Oil and Gas
Pipeline Transportation – Service Level

- **Firm Transportation**
  - Demand / Reservation
    - Maximum Daily Quantity
    - Charged full reservation cost, stranded cost if not fully utilized
  - Commodity
    - Charged only on actual volumes delivered
- **Interruptible**
  - Commodity charge only, premium
- **Overrun**
  - If available system capacity, interruptible service
  - Premium commodity charge on volume used
- **Fuel**
  - In-kind, volumetric, varies by pipeline
- **Cashout**
  - Plus OR minus imbalance at the end of every day or month
  - Actual supply cost to reconcile contract to zero
  - Tiered prices apply premiums to balances outside tolerance
Pipeline Electronic Bulletin Boards
Marketer Book Development

- Clients

  - Industrial & Commercial Clients

    - Priced NYMEX or Index-based
      - Back to back deals
      - Various hedging mechanisms

    - Natural Gas utilities
      - Utilities are normally the largest holder of pipeline assets
      - Pricing generally NYMEX/Index-based
      - Baseload and opportunistic purchases
        » Fill storage
        » Displace off-system sales, etc.
      - Peaking
        » Manage storage assets
        » Curtailment capabilities with end-use customers; interruptible rates
      - Daily market purchases
        » Cash market (fixed price/GDD)
Marketer Book Development

- **Electric utilities**
  - Multi-vendor sourced
  - Less asset (pipeline/storage capacity) ownership
  - Pricing much more cash-based
    - Load swings caused by weather, unit adds/drops, etc.
    - Very short-term in nature (hourly’s, intra-day vs. annual/seasonal)
    - NG-EP spark spread make buyers less price sensitive than other bid markets
      - Less time for price discovery-negotiation
      - Less competitors
Marketer Book Development

- **Upstream Suppliers**
  - **Producers**
    - Do not assume any transportation responsibilities
    - Diversified by supply basin (Gulf Coast, Canada, Appalachia, etc.)
  - **Marketers**
    - City-gate delivered volumes based upon trade terms
    - Often “sleeved” deals to balance out positions where another party has greater relative strength/presence
  - **Utilities**
    - Off-systems sales to other utilities/generators to optimize monetization of assets
    - Arbitrage pricing differentials between pricing index locations
Marketer Book Development

● Capacity
  ● Pipelines
    – Secure firm capacity to serve baseload needs for strategic geographic needs
      » Connect supply with markets
      » Assets pooled for optimization activities
      » Term/Volumes are never precise, so constantly fine-tuned in daily markets
  ● Firm capacity broken in tranches
    – Primary firm – usually procured via pipeline via open season/negotiation
      » Secondary firm – Released capacity
        » Can be recalled by releasing party
    – Interruptible capacity
      » Cheapest source of capacity negotiated with pipeline
      » Least reliable especially in winter/hot summers
    – Delivered gas supplements any shortfalls
    – Marketers perform daily optimization routines based upon load and prices to determine how gas is ultimately routed
Marketer Book Development

- **Storage**
  - Serves as “swing” supply source to avoid gaps between supply and load
  - Marketers tend to only procure storage capacity when they can financially buy/sell futures and profit
    - Must pay for the “carry cost” of money on long gas position and capacity costs
  - Popular to ally with utility and have “shared savings” on optimization activities
Regional Natural Gas Prices vs. NYMEX HH

Index – NYMEX = Basis Differential

January 2012

SoCal $0.376
CIG $(0.104)
Waha $(0.044)
NYMEX $3.084
Chicago $0.226
TCO $0.026
Transco Zn 6 $2.136
FGT ZN 3 $0.056

Index Prices
SoCal $3.460
CIG $2.980
Waha $3.040
TCO $3.110
Chicago $3.310
Transco Zone 6 $5.220
FGT ZN 3 $3.140

Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System
Regional Natural Gas Prices vs. NYMEX HH

TCO = $3.11
NYMEX = $3.084
Basis Diff = $0.026

Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System
Regional Natural Gas Prices vs. NYMEX HH

CIG = $2.98
NYMEX = $3.084
Basis Diff = $(0.104)

Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System
Regional Market Price Spikes

● Fundamental Drivers
  ● Weather Demand
    ● Extreme hot weather
    ● Extreme cold weather
  ● Supply Curtailments
    ● Freeze offs
    ● Shut ins
  ● Capacity Curtailments
    ● Pipe maintenance
    ● High flow constraints
    ● Low flow constraints
    ● Pipeline explosions
    ● Hurricanes
  ● Utility Constraints
    ● Operational Flow Orders
      – Extreme weather
      – Storage constraints
Regional Market Price Spikes

● Range of Spikes
  ● Reasonable Movement
    ● Normal Supply / Demand changes
      – Ranges will vary by market
        » Storage information release; Thursday 10am
        » Change in weather patterns
        » Political announcements
  
  ● Extreme Movement
    ● Drastic Supply/Demand changes
      – Ranges will vary by market
        » Storage injection/withdrawal that misses analyst expectations
        » Extended periods of cold or hot weather
        » Force-Majeure
      – Perfect Storm
        » Multiple drivers at once, worst case scenarios
        » What the market will bare, demand driven
NE Pipeline Infrastructure

- Expected growth in gas fired power demand will be offset by future infrastructure build outs.
  - Tennessee Gas – Niagara Expansion
  - Columbia Gas Transmission – East Side Expansion
  - Transco - Woodbridge Delivery Lateral
  - Algonquin Incremental Market
  - Millennium Hancock Compressor
  - Many more pending or partially operating – See map

- The Electric Power and Natural Gas industries are coordinating efforts to jointly make recommendations to FERC to better harmonize the energy sector industries.
  - Adjusting nomination cycles, start of gas day, No Bump rules.
  - It is understood that Power generators currently prefer interruptible capacity (IT) over Firm due to the variability in their volumetric requirements as well as the economics of IT capacity. Will this always be the case?