Commodity Thoughts

SPEE

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October 3, 2012

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Summary

- **Oil prices**
  - **Near term**
    - Middle East tension
    - Saudi production
    - China/global demand
  - **Long term**
    - Supply growth lags demand growth
    - Supply and demand must balance
    - Price is the equalizer
      - Marginal consumer sets the price

- **Natural gas**
  - Too much supply
  - Gas - coal - demand

- **NGL**
  - Way oversupplied
OECD Inventories  (NAM vs. non-NAM)

"That's mathematics, son. You can argue with me, but you can't argue with figures“   — Foghorn Leghorn

Source: IEA, TPH
OECD Inventories (Crude vs. non-crude)

Crude OECD Inventories

Non-Crude OECD Inventories

Source: IEA, TPH
Observations

- OECD inventories trending ~normal in 2012
  - Saudi 9.8 mmbpd
  - Iraq ramping 3.0 mmbpd
  - U.S. supply +0.6 mmbpd y/y
  - Demand concerns Europe/China

- Next 6 months?

- Long term
  - Oil should be strong
    - Upward bias to $100/bbl long term outlook
“This is U.S. history. I see the globe right there”
Jeff Spicoli, Fast Times at Rigdeumont High
Oily Basin Economics - price required for 10% ATROR

- Analysis uses flat gas prices ($3 and $4/mcf) and solves for oil price necessary to achieve 10% after-tax rate of return
- Regions reflect average type curves for each region, calibrated to well data where possible
- Most basins still economic below $80/bbl WTI but sustained low prices will drive E&Ps to cut activity for (1.) marginal wells in each region and (2.) liquidity as payout is >1yr for most areas

Current WTI = $85/bbl

Source: TPH Energy Research
Onshore Oil Production

U.S. Onshore Oil Production
(excludes Alaska)

“If I had to do it all over again, I’d still hit that shot”
Roy McAvoy, Tin Cup

Source: EIA
Demand:
- +782 kbd in ’11, +320 kbd in ’12 (vs. IEA +0.72 mmbpd in ’11, +0.82 mmbpd in ’12)
- Non-OECD growth more than offsets OECD declines.

Non-OPEC Supply:
- -159 kbd in ’11, +637 kbd in ’12 (vs. IEA +0.1 mmbpd in ’11, +0.7 mmbpd in ’12)
- U.S. continues to grow at -200-700 kbd, 2-7x the additions from Brazil.

OPEC
- Base case ’12 call on OPEC = 30.2 mmbd (May’12 prod of 31.9 mmbd)
- Base case Saudi cut of 1.1 mmbpd on average.
Onshore Gas Production Growth

- Onshore Gas Rig Count
- Onshore Gas Production

Rig Count

Onshore Gross Gas Production, bcf/day

Jan-97 to Jan-14

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Futures, Are They Accurate?

"You can't lose what you don't put in the middle"
Mike McDermott, Rounders
Gas Storage - Plenty Of Supply

![Graph showing working gas levels from January to December 2012 with normal, min, and max lines. The graph indicates a significant increase in working gas from January to October, with a peak in December.]
Gas produced from oil and liquids-rich plays is ~17% of the total gas stack. These plays account for ~35% of the gas growth going forward.
Electric Power Generation Coal/Gas Demand

Coal Consumed for Electric Generation

Natural Gas Consumed for Electric Generation

Source: EIA, TPH research
U.S. Coal Production (thru 2011)

Annual U.S. Coal Production (1949-2011)

Recession years: ’75, ’83, ’93, ’02, ’09

2009 down 9% y/y

Source: ISI, EIA/DOE, Tudor, Pickering, Holt & Co.
NGL Production

U.S. Production of Natural Gas Liquids

“"The only thing better than one crawfish dinner is five crawfish dinners”
Coach Red Beaulieu, The Waterboy

Source: EIA
Floodgates Open: Pipes and Fracs by 2014

US NGL Production, MBPD

2013-14 = the end of major NGL bottlenecks

New pipes nearly double takeaway capacity

Source: Public filings, TPH estimates
Given lengthy lead times for cracker construction (5-7 years), we expect an ethane glut in 2H 2013-2018. We assume all potential ethylene projects are constructed.

**US Ethane Supply/Demand Forecast**

- Ethane from Fractionation
- Ethane Supply from Y-Grade Pipes*
- DOW Expansions
- Other Brownfield Expansions
- Newbuild Crackers (CPC DOW Sasol RDS)
- Formosa Expansion
- Ethane Exports to Canada
- Projected C2 Supply/(Deficit)

Source: SEC filings, company press releases

Note: Dark blue bar indicates pipe capacity for which corresponding fractionation has not yet been announced.
US Slides Down the Global NGL Cost Curve


Source: EIA, TPH estimates
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