U.S. Refineries Competitive Positions

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Refiners competitive positions

Function of optimizing feedstock costs, operating costs, and revenues through mix of products sold

**FEEDSTOCKS**
- Qualities:
  - Heavy/Light
  - Sweet/Sour
- Location (Distance):
  - Domestic
  - International

**PROCESSING**
- Size
- Complexity
- Treating (sulfur)
- Access to feedstocks & markets
- Nearby competitors

- 85% of output

- *Propane/butane*
- *Chemicals*
- *Gasoline*
- *Jet Fuel*
- *Diesel/heating oil*
- *Lubes*
- *Fuel for ships*
- *Asphalt*
Who does well?

- Being in region and country with good industry margins
- Favorable access to competitive crude oil and natural gas
- Superior cost structure: scale, complexity, efficient operations
- Achieve reliability – avoiding unplanned downtime
- Good operations planning
U.S. refinery locations affect facility competitive position

Operable refinery locations and capacity volumes as of January 1, 2012

Source: EIA. For more refinery statistics: EIA - http://www.eia.gov/petroleum/refinerycapacity/
U.S. capacity concentrations & product flows reflect regional competition.
Competition takes place in a changing environment

- **Demand**: Facing flat demand and changing product mix; growing export opportunities

- **Feedstocks**: Seeing inexpensive natural gas fuel/feed, more domestic light crude oil and Canadian heavy crude oil – but not in the “right” places

- **Regulatory Environment**:
  - Dealing with the blend wall
  - Clean air, clean fuel investments
  - Greenhouse Gas (GHG) concerns

- **Restructuring**: Integrated companies spinning off downstream and midstream (distribution and storage - and sometimes trading)
Demand flip and extra refining capacity

From rising consumption to falling outlook

Consumption Change

<table>
<thead>
<tr>
<th>Million Barrels Per Day</th>
<th>1987-2007</th>
<th>2007-2027</th>
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</thead>
<tbody>
<tr>
<td>Petroleum</td>
<td>4</td>
<td>-2</td>
</tr>
<tr>
<td>Gasoline</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>Distillate</td>
<td>0</td>
<td>-1</td>
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</table>

Sources: EIA Petroleum Supply and AEO 2014 Reference Case

From fears of too little refining capacity to surplus for exporting

Petroleum Product Net Imports

<table>
<thead>
<tr>
<th>Year</th>
<th>Importer</th>
<th>Exporter</th>
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<tbody>
<tr>
<td>2005</td>
<td>1.5</td>
<td>-2.0</td>
</tr>
<tr>
<td>2006</td>
<td>1.0</td>
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<tr>
<td>2007</td>
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<tr>
<td>2008</td>
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<tr>
<td>2009</td>
<td>-0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>2010</td>
<td>-1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>2011</td>
<td>-1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>2012</td>
<td>-2.0</td>
<td>1.5</td>
</tr>
<tr>
<td>2013</td>
<td>-2.0</td>
<td>2.0</td>
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</table>
New supply sources not connected to old refinery delivery infrastructure
### Key pipelines: Distribution lags production

<table>
<thead>
<tr>
<th>MBPD</th>
<th>Pipeline</th>
<th>Estimated Completion</th>
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<tbody>
<tr>
<td>540</td>
<td>Keystone</td>
<td>Current</td>
</tr>
<tr>
<td>215</td>
<td>Ozark</td>
<td>Current</td>
</tr>
<tr>
<td>170</td>
<td>Platte</td>
<td>Current</td>
</tr>
<tr>
<td>190</td>
<td>Spearhead</td>
<td>Current</td>
</tr>
<tr>
<td>150</td>
<td>Seaway Phase 1</td>
<td>Current</td>
</tr>
<tr>
<td>400</td>
<td>Seaway Phase 2</td>
<td>Current</td>
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<tr>
<td>850</td>
<td>Seaway Phase 3</td>
<td>2H 2014</td>
</tr>
<tr>
<td>250</td>
<td>Ho-Ho Reversal – 1</td>
<td>Current</td>
</tr>
<tr>
<td>360</td>
<td>Ho-Ho Reversal – 2</td>
<td>Current</td>
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<tr>
<td>700</td>
<td>Keystone Gulf Coast</td>
<td>Current</td>
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<tr>
<td>600</td>
<td>Flanagan South</td>
<td>Mid 2014</td>
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<td>300</td>
<td>Line 9</td>
<td>2H 2014</td>
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<tr>
<td>300</td>
<td>SAX</td>
<td>2Q 2015</td>
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<tr>
<td>225-375</td>
<td>Sandpiper</td>
<td>1Q 2016</td>
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<tr>
<td>830</td>
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<tr>
<td>1,100</td>
<td>Energy East</td>
<td>2017</td>
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**Sources:** Publicly available Information
Feedstock access not equal shown by refiners’ crude oil acquisition costs

PADDs 2 & 4 expanded crude discounts to Brent

Little change in crude discount to Brent in PADDs 1, 3, & 5

**Source:** EIA, Brent – Brent spot price

**Note:** P1 – PADD 1 etc.
Ways refiners shift to use more light sweet crude oil

- Back out light sweet imports
- Use any “unused” light sweet capacity
- Back down intermediate crudes (especially sweet) to use more light sweet
- If light-heavy price differentials are small enough, back down heavier crude oils, reducing use of coking unit to use more light
- Invest in changes to use more

Financial incentives are large enough to encourage change

Refiners have at least 1 MMB/D of capability to process more light crude in the short term
Competitive positions will shift again if crude exports expand

Delivery of light crude from the Gulf Coast via Jones Act vessel recently ran $5 per barrel (illustrating competition between basins).

While delivering crude from Gulf Coast to Canada (or even to Europe) via foreign-flagged tanker was $2 per barrel.

Illustrative crude oil transportation costs: Rail is most expensive, but flexible

Source: MPC 2/27/2014 Presentation at Simmons Energy Conference

Note: WTI – West Texas Intermediate crude oil, LLS – Louisiana Light Sweet crude oil.
Petroleum product exports: U.S. location and cost advantages in international markets

Note: Represents finished products plus blending components. Most exported product leaves from the Gulf Coast. Arrows do not represent export origination ports.
Refining competitive positions are shifting

**As a result of tremendous changes that will continue for years:**
- Changing access to discounted crude
- Inexpensive natural gas
- Flat/declining U.S. demand, but growing international markets
- Industry restructuring

**And in face of large future uncertainties:**
- How much U.S. crude, where, when, and quality
- Infrastructure’s changing ability to move that crude and impact on discounts
- Refiners’ investments to use more light crude oils
- U.S. and international demand
- Regulatory/statutory changes, e.g.,
  - Crude exports
  - Pipeline changes
  - Rail
  - GHG
Questions?

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