Wyoming: At the Crossroads of the Boom

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Wyoming Pipeline Authority
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North American Oil Production

July U.S. Oil Production
7.5 mbd

Source: EIA
EPRINC’s Forecast for Major U.S. Shale Plays

EPRINC forecasts an additional 1.5 mbd by 2022

Source: HPDI data with EPRINC forecast estimates
CAPP 2013 Updated Production Forecast

Source: CAPP
U.S. Rig Count

Source: Baker Hughes
Permit Activity

Source: HPDI September 2013, Past 90 Days
Current Shale Oil Play Production

Barrels Per Day

- Bakken - North Dakota
- Eagle Ford - Texas
- Permian Basin - Texas and New Mexico
- Niobrara/Codell - Colorado
- Anadarko Basin

Source: NDPA, HPDI
EPRINC U.S. Forecast vs. Others

U.S. Total Imports, U.S. Production, U.S. Canadian Imports

Source: EIA
Global Shifts in Crude Oil Flows

Source: EIA, ENI World Oil Book
Wyoming Oil Production

July Production 173,000 b/d

Source: EIA
Compared to Top Producing States

North Dakota Field Production of Crude Oil Mbbl/d

Wyoming Field Production of Crude Oil Mbbl/d

Texas Field Production of Crude Oil Mbbl/d

Source: EIA
Compared to Neighbors....

Source: EIA

Wyoming Field Production of Crude Oil Mbbl/d

Utah Field Production of Crude Oil Mbbl/d

Colorado Field Production of Crude Oil Mbbl/d
Wyoming Wells

Source: HPDI Oct 2013
Wyoming Rig Count

Source: Baker Hughes
Wyoming Rig Count vs. Texas and North Dakota

Source: Baker Hughes
Wyoming Pipelines

Source: CAPP, ArcGIS Hart Energy
Wyoming’s Play in Crude by Rail

Source: Wyoming Pipeline Authority Base Map
U.S. Federal Land Map

Source: NationalAtlas.gov
Canadian Pipeline Export Options

- **Kinder Morgan’s** Transmountain line off BC coast - currently 300,000 b/d capacity-recent announcements to expand up to 800,000 b/d (early 2017)
- **(Now Spectra)** Platte line to Wood River 280,000 b/d-full
- **Enbridge** mainline system currently transporting over 1.5 mbd with potential capacity around 2.5 mbd—Northern Gateway off BC coast planned 525,000 b/d, several other planned expansions
- **TransCanada’s** Keystone 581,000 b/d-full—XL would add 700,000 b/d, Energy East Pipeline Project 500 to 800k

Nearly full pipelines creates need for XL and Gateway opportunities for rail

Source: Canadian Energy Pipeline Association
Market Saturation

Source: CAPP Crude Oil Forecast June 2013
Pipeline Choke Points

Source: EPRINC Choke Point Map using Hart ArcGIS Mapping software
Shifting Crude Flows

Source: EIA, EPRINC

New Capacity
2013-2015 (mbd)
Inbound: Cushing, Ok 1.97
Outbound: Cushing, OK 1.55
Inbound: Gulf Coast 3.52

Midwest (PADD 2) Receipts by Pipeline from Gulf Coast (PADD 3)
Gulf Coast (PADD 3) Receipts by Pipeline from Midwest (PADD 2)

Thousand Barrels Per Day

Jan-00 Jan-01 Nov-02 Apr-04 Sep-05 Feb-07 Jul-08 Dec-09 May-11 Oct-12
Pipelines and Proposed Projects

The majority of this new pipeline capacity, roughly 7.7 mbd (as estimated by EPRINC), is composed of pipeline reversals, expansions, twinning, repurposing, and retrofitting.

Source: CAPP Crude Oil Forecast June 2013
Where light sweet Bakken and heavy (blended bitumen) needs to go...

Total Coking Capacity vs. Atmospheric Crude Distillation Capacity by PADD

Cokers = Heavy refining capability

Source: AFPM map, EIA data for graph
Canadian vs. Total Foreign Imports by PADD

Source: EIA Data
Regional Pricing Disparities

- Western Canadian Select -$33 to WTI

Source: Flint Hills, EIA, CME Group, and estimates
Cushing Stocks vs. WTI Brent Differential

Source: EIA
Rising Production and Imports

Source: EIA
Price of Canadian Crude Imports

- U.S. production surge
- Lack of adequate outbound capacity to refining centers
- Market saturation

Landed Cost: “The dollar per barrel price of crude oil at the port of discharge. Includes charges associated with the purchase, transportation, and insuring of a cargo from the purchase point to the port of discharge. Does not include charges incurred at the discharge port (e.g., import tariffs or fees, wharfage charges, and demurrage).”

Source: EIA
Crude Oil Composition by Refining District

Source: CAPP 2013 Refinery Survey
Refinery Acquisition Cost of Crude Oil

Source: EIA
Refinery Utilization by PADD

Source: EIA
PADD II will be importing more HEAVY crude...

....absorbing more Canadian crude and pushing out light sweet Bakken crude

<table>
<thead>
<tr>
<th>Refinery</th>
<th>Year</th>
<th>Crude Demand Impact MBPD</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Light</td>
</tr>
<tr>
<td>COP/Cenovus Wood River</td>
<td>End of 2011</td>
<td>-95</td>
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<tr>
<td>Marathon Detroit</td>
<td>End of 2012</td>
<td>-65</td>
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<tr>
<td>BP Whiting</td>
<td>Mid to Late 2013</td>
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<tr>
<td>NCRA/McPherson</td>
<td>2015</td>
<td>-15</td>
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<tr>
<td>BP/Husky Toledo</td>
<td>2018</td>
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<tr>
<td><strong>Total</strong></td>
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<td>-390</td>
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Source: John Auers Turner Mason, NDPA
BNSF’S Crude By Rail Destination System
Daily Crude by Rail Shipment in U.S. and Canada

Source: AAR; Crude and petroleum product includes liquefied gases, asphalt, fuel oil, lubricating oil, jet fuel, etc. U.S. operations exclude U.S. operations of CN and CP. Canadian operations include CN and CP and their U.S. operations. One carload holds 30,000 gallons (or 714.3 barrels).
Pipeline and Rail

- Severely limited due to lack of Keystone XL and lack of historical build out to the coasts – system designed to import into the Gulf and move up

- New markets
- Diversification
- Neat Barrels
- Nimble - Quickly adjustable
- Optionality for Canadian and U.S. crude, NGLS, and other petroleum products

Source: EPRINC Maps using Hart Energy data and ArcGIS Mapping software
Can Get to the Markets Pipelines Can’t and WON’T

Origins will stay the same...destinations will change with the market.

Source: EPRINC map using ArcGis
Spare Capacity

Source: NDPA
Williston Basin Crude Transportation

Williston Basin Production: 955,000 b/d
North Dakota: 875,000 b/d
South Dakota: 5,000 b/d
Eastern Montana: 75,000 b/d

Tesoro Refinery: 68,000 b/d

Truck to Canadian Pipeline: 12,000 b/d

Rail: 670,000 b/d

Pipeline: 241,000 b/d

Source: NDPA, EPRINC Estimates
Potential Issues, Hurdles, and Regulatory Concerns

- Oil prices
- Water Usage
- Oil spills (rail and pipeline)
- Environmental Concerns
- Regs on Federal Land-Fracking
- Infrastructure Delays-PERMITTING
- Lack of prudent policy: failing to connect what is happening on the ground to what is understood in Washington
- Costs incurred
Spills on Rail

Rail Ruptures
As energy companies increasingly ship crude oil by rail, incidents involving oil spills are on the rise. Most of the recent leaks have been relatively small, according to federal data through 2012.

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<th>1</th>
<th>1</th>
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<th>3</th>
<th>1</th>
<th>8</th>
<th>1</th>
<th>9</th>
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<tbody>
<tr>
<td>AMOUNT SPILLED, in barrels</td>
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<td>Less than one</td>
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<td>36</td>
<td>2</td>
<td>1,931</td>
<td>117</td>
<td>94</td>
<td>89</td>
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<tr>
<td>AMOUNT TRANSPORTED, in millions of barrels*</td>
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<td>8.6M</td>
<td>8.8M</td>
<td>7.1M</td>
<td>4.3M</td>
<td>3.4M</td>
<td>4.2M</td>
<td>6.8M</td>
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*Number of barrels is based on carload data multiplied by 30,000.
Sources: Department of Transportation Pipeline and Hazardous Materials Safety Administration; Association of American Railroads

Source: WSJ
Issues and Regulations
Conclusions

• Since 2008 the U.S. and Canada have added over 3 mbd of crude to global production, helping offset issues in Libya and the Middle East.
• Pipelines are being built, but right now their is tightness in the system and an increasing need for Gateway, XL, and other Coastal options for US and Canadian crude.
• Bakken crude has to get to the U.S. East and West Coasts (via rail) and heavy Canadian needs to get to the Gulf and West Coast (via pipeline and rail).
• Roughly 7.7 mbd of new capacity (as estimated by EPRINC) is comprised of pipeline reversals, expansions, twinning, repurposing, and retrofitting. There are serious regulatory and permitting hurdles which deserve consideration.
• Even with a narrowing spread, rail is a serious option for US producers distanced from refining centers, especially Bakken and Canadian crude—markets exist where pipelines do not (especially with XL delay and Gateway uncertainty).
• Market has changes for producers and refiners with optionality, market and regulatory uncertainty
• Rail will be here in the long term, the question is simply how much and where.
• Refineries are going to play a vital role in this renaissance as they adapt to high volumes of light sweet and heavy crude oils.