From the Piceance Basin to the Pacific Rim:
Measuring the Impact of the Oil Price Collapse

Presentation to:
Energy & Environment Symposium
Rifle, CO

By:
John Harpole
Presentation Outline

• What is Happening? Why?
  – The recent collapse in crude oil prices.
  – The reasons for the price collapse.

• What does it mean for worldwide and U.S. production?
The House of Saud’s Motivation

2009-2014 Global Liquids Supply Growth Breakdown (MMbpd)
Supply Growth (09-14): 8.06 MMbpd

- OPEC NGLs, 1.74 MMbpd (22%)
- OPEC Oil, 1.55 MMbpd (19%)
- Non-OPEC, Ex-US Supply, -0.07 MMbpd (-1%)
- Other*, 0.41 MMbpd (5%)
- US Liquids, 4.42 MMbpd (55%)

Source: IEA, Raymond James research
*Includes processing gains and biofuels

The Production War is on!

• On November 27, 2014 at an OPEC meeting in Vienna, the Saudis said,

  “Yakfee!”
  or
  “Enough!”

• They resisted calls from OPEC members Iran, Iraq and Venezuela to reduce the production target of 30 million barrels per day.

Source:
Major Takeaways

• Crude oil prices are depressed due to the current global oversupply.

• The crude oil oversupply will take between 1 to 3 years to correct, unless a major structural event takes supply out (OPEC, etc.)

• Current crude oil prices are too low and will rise to meet demand. $100/b is no longer going to be the normal.

• Marginally economic areas across the U.S. will be negatively impacted. Geography and crude quality can tip the sales either way.

• North American LNG exports will be affected in the near-term.

Source: The Outlook for U.S. Crude: Implications for Colorado, Bernadette Johnson, Ponderosa Advisors
Source: *My top ten energy charts of the year for 2014*, Mark J. Perry, American Enterprise Institute, January 5, 2015
Percent Change in Employment: Texas vs. US Minus Texas
December 2007 to November 2014

Source: BLS

Source: My top ten energy charts of the year for 2014, Mark J. Perry, American Enterprise Institute, January 5, 2015
America's Net Petroleum Imports, 1971-2014

From 24.3% in 1971 to 60.3% in 2005

From 60.3% in 2005 to 27% in 2014 (Jan.-Nov.)

Source: EIA

Source: My top ten energy charts of the year for 2014, Mark J. Perry, American Enterprise Institute, January 5, 2015
Oil at $65 Until Mid-2015: Kuwait Official

“The reason, according to Iranian Oil Minister, Bijan Namdar Zanganeh, was to keep prices low enough and long enough to threaten the U.S. shale oil industry and restore OPEC’s market share in America. Shale extraction requires expensive methods such as fracking and horizontal drilling, and many observers say it isn’t profitable if the price of oil drops below $65 per barrel.”

Source: Real Money, The Street Ratings, By: Oilprice.com, December 11, 2014
## OPEC Member States

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>Africa</td>
<td>1969</td>
<td>33,779,668</td>
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<td>Angola</td>
<td>Africa</td>
<td>2007</td>
<td>12,531,357</td>
<td>1,246,700</td>
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<tr>
<td>Iran</td>
<td>Middle East</td>
<td>1960[^A2]</td>
<td>75,875,224</td>
<td>1,648,000</td>
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<td>Iraq</td>
<td>Middle East</td>
<td>1960[^A2]</td>
<td>28,221,180</td>
<td>437,072</td>
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<td>Kuwait</td>
<td>Middle East</td>
<td>1960[^A2]</td>
<td>2,596,799</td>
<td>17,820</td>
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<td>Libya</td>
<td>Africa</td>
<td>1962</td>
<td>6,173,579</td>
<td>1,759,540</td>
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<td>Nigeria</td>
<td>Africa</td>
<td>1971</td>
<td>146,255,300</td>
<td>923,768</td>
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<td>Qatar</td>
<td>Middle East</td>
<td>1961</td>
<td>824,789</td>
<td>11,437</td>
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<tr>
<td>Saudi Arabia</td>
<td>Middle East</td>
<td>1960[^A2]</td>
<td>28,146,656</td>
<td>2,149,690</td>
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<tr>
<td>United Arab Emirates</td>
<td>Middle East</td>
<td>1967</td>
<td>4,621,399</td>
<td>83,600</td>
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<td>Venezuela</td>
<td>South America</td>
<td>1960[^A2]</td>
<td>26,414,816</td>
<td>912,050</td>
</tr>
</tbody>
</table>

| Total            |                 | 369,368,429    | 11,854,977 km²             |
It’s About Geopolitical Power & Market Share for the Saudis

Saudi Arabia total oil production (1980-2013)

thousand barrels per day

Source: U.S. Energy Information Administration
### A Game of Chicken?

<table>
<thead>
<tr>
<th>Nation</th>
<th>Oil price per barrel required to break even or balance budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>US producers</td>
<td>$38-$77</td>
</tr>
<tr>
<td>Qatar</td>
<td>$58</td>
</tr>
<tr>
<td>Kuwait</td>
<td>$59</td>
</tr>
<tr>
<td>UAE</td>
<td>$90</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>$92</td>
</tr>
<tr>
<td>Angola</td>
<td>$94</td>
</tr>
<tr>
<td>Russia</td>
<td>$101</td>
</tr>
<tr>
<td>Iraq</td>
<td>$116</td>
</tr>
<tr>
<td>Venezuela</td>
<td>$117</td>
</tr>
<tr>
<td>Algeria</td>
<td>$119</td>
</tr>
<tr>
<td>Ecuador</td>
<td>$122</td>
</tr>
<tr>
<td>Nigeria</td>
<td>$124</td>
</tr>
<tr>
<td>Iran</td>
<td>$136</td>
</tr>
</tbody>
</table>

According to data compiled by Bloomberg, “prices have dropped below the level needed by at least 9 OPEC member states to balance their budgets.”


*Survival of fittest as oil tumbles below $65*, Bloomberg News, December 1, 2014
NGK15 - Natural Gas (NYMEX)

Source: Nasdaq.com, End of day Commodity Futures Price Quotes for Natural Gas (NYMEX)
**North American Natural Gas**

**Demand Ranges by Selected Sector**

Significant demand growth is possible in the LNG, transportation/HHP and power sectors through 2020 in Bcf per day.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Lower Demand Range</th>
<th>Middle Demand Range</th>
<th>Upper Demand Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>2.5</td>
<td>4.5</td>
<td>10.0+</td>
</tr>
<tr>
<td>LNG Export</td>
<td>2.4</td>
<td>6.0</td>
<td>12.0+</td>
</tr>
<tr>
<td>CNG/LNG Vehicles</td>
<td>0.5</td>
<td>2.5</td>
<td>5.0+</td>
</tr>
<tr>
<td>Industrial (U.S. and Oil Sands)</td>
<td>2.5</td>
<td>4.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Mexico Exports</td>
<td>0.5</td>
<td>1.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Source: Encana Corporate Presentation, August 2013; Industrial Energy Consumers of America; Bentek Energy; Raymond James; Michael Smith, Chairman & CEO Freeport LNG, Industry Sources
U.S. and Canada: Natural Gas Production vs. Consumption

Source: BP Statistical Review, Raymond James research
World LNG Estimated October 2014 Landed Prices

January 2015 World LNG Prices ($U.S./MMBtu)

Estimated April 2015 World LNG Prices ($U.S./MMBtu)

The Japanese Crude Cocktail Story
The Oil Derivative LNG Contract

- LNG prices in Pacific Basin (ie – Japan, South Korea, China) are closely tied to crude oil prices
- On a Btu equivalent
  - Crude oil at $100 per barrel translates to a JCC price of $14.85 for LNG delivered to Asia (Japan, South Korea, China) (Rule of Thumb LNG Asia - 14.85% of Brent Crude)
- The oil price decline has eliminated the U.S. LNG export advantage
Is the U.S. LNG Price Arbitrage/Advantage Over? NO!

• U.S. LNG prices delivered to Asia can compete at $60 oil = $8.91 per MMBtu equivalent to Tokyo Harbor

  $3.50/MMBtu  3 year Henry Hub price forecast
  $1.00/MMBtu  ppl cost of transport to LNG facility
  $2.00/MMBtu  liquefaction cost
  $2.00/MMBtu  shipping cost
  $8.50 MMBtu  Delivered cost to Asia

• U.S. needs $60-65 crude oil price to breakeven
Energy Mix in Japan — before and after Fukushima

LNG mainly compensate for the decline of nuclear power.

Electricity Generation by Fuel

Source: National Bureau of Asian Research
Japanese LNG cost nearly doubled after Fukushima

After the Great East Japan Earthquake, Japan’s LNG demand has increased by 30% due to the shut down of nuclear power plants. (2010fy 70million tons → 2012fy 90million tons)

In addition, Japan’s LNG import price, linked to crude oil import price, has soared.

As a result, the overall cost of LNG imports to Japan has increased from 3.5 trillion yen a year to around 6 trillion yen. ※1 trillion yen = $10.7 billion

Source: National Bureau of Asian Research
Comparison of Asian Spot vs. Asia Oil Indexed Contract ($/MMBtu)

Source: NextEra Energy Newsletter, April 7, 2015
“First Four” LNG Projects Still Moving Forward

- **Sabine Pass LNG (Louisiana)**
  - Four 4.5 mtpa trains (currently under construction) will be able to liquefy a total of 2.2 Bcf/d
  - Trains 1 & 2 expected to come online in late 2015 or early 2016
  - Trains 3 & 4 expected to come online 2016-17
  - Off-takers: BG Group, GAIL (India), Gas Natural Fenosa and Korea Gas (together have agreed to take 16 mtpa)

- **Cameron LNG (Louisiana)**
  - Joint venture of Sempra Energy, GDF Suez, Mitsui & Co. and Mitsubishi Corp.
  - Three 4 mtpa trains (currently under construction) will be able to liquefy 1.7 Bcf/d
  - All trains are expected to be fully operational in 2019
  - Off-takers: GDF Suez, Mitsui and Mitsubishi

Source: *Is That All There Is? Will an LNG Surplus and Cheap Oil Cap LNG Exports?* Rusty Braziel, RBN Energy, January 26, 2015
“First Four” LNG Projects Still Moving Forward

- **Freeport LNG (Texas)**
  - Two 4.6 mtpa trains (currently under construction) will be able to liquefy 1.4 Bcf/d
  - Trains 1 & 2 expected to be online in 2018
  - FID and construction start up on third train expected soon
  - Off-takers: Osaka Gas, Chuba Electric, BP Energy, Toshiba Corp. and SK E&S LNG have committed to take all 3 trains’ total capacity

- **Cove Point (Maryland)**
  - One 5.75 mtpa train expected to liquefy up to 770 MMcf/d
  - Expected to be online late 2017
  - Off-takers: Sumitomo Corp. and GAIL (India) have each contracted for 2.3 mtpa of liquefaction capacity

Source: *Is That All There Is? Will an LNG Surplus and Cheap Oil Cap LNG Exports?* Rusty Braziel, RBN Energy, January 26, 2015
What Basins are Competitive in This Price Environment?
The Active Rig Count Is Already Down 25% From the Peak & Will Continue To Fall

Sources: The Outlook for U.S. Crude: Implications for Colorado, Bernadette Johnson, Ponderosa Advisors
DataWright Rigdata
The U.S. Rig Fleet Has Lost At Least 528 Rigs To-Date...More Rigs Will Come Off

This Rig Drop Is Different Than 08/09 Because Rigs Are More Productive

Sources: The Outlook for U.S. Crude: Implications for Colorado, Bernadette Johnson, Ponderosa Advisors
DataWright Rigdata
Supply Update
Asian Investments – WCSB Natural Gas

INPEX acquisition from Nexen
STX Energy acquisition from Encana
Petronas & Progress
Petrochina acquisition from Shell
Mitsubishi & Encana
Sinopec acquisition of Daylight Energy
Toyota Tsusho acquisition from Encana

Mitsubishi, Japanese utilities, Jagmeg, KOGAS & Penn West
KOGAS & Encana

~30 billion of proposed Asian investments in the WCSB

Source: GTN Annual Customer Meeting, Roland Guebert, TransCanada Pipelines, April 18, 2013
Decline of Natural Gas Price Index Since 2008 and Piceance Basin Rig Count 2008-Current (By Quarter)

Piceance Basin Map
Annual Natural Gas Production in Counties That Contain the Piceance Basin

<table>
<thead>
<tr>
<th>County</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
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<tbody>
<tr>
<td>Delta</td>
<td>0.001</td>
<td>0.005</td>
<td>0.006</td>
<td>0.002</td>
<td>0.025</td>
<td>0.401</td>
<td>0.065</td>
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<tr>
<td>Garfield</td>
<td>70.305</td>
<td>88.285</td>
<td>116.868</td>
<td>149.824</td>
<td>209.714</td>
<td>270.231</td>
<td>351.613</td>
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<tr>
<td>Gunnison</td>
<td>0.121</td>
<td>0.110</td>
<td>0.040</td>
<td>0.079</td>
<td>0.079</td>
<td>0.007</td>
<td>0.556</td>
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<tr>
<td>Mesa</td>
<td>5.668</td>
<td>5.027</td>
<td>7.695</td>
<td>9.345</td>
<td>7.807</td>
<td>10.755</td>
<td>15.478</td>
</tr>
<tr>
<td>Pitkin</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Rio Blanco</td>
<td>31.240</td>
<td>31.414</td>
<td>35.936</td>
<td>34.159</td>
<td>33.622</td>
<td>37.579</td>
<td>48.159</td>
</tr>
</tbody>
</table>

**TOTAL (Bcf)**
126.878 142.330 179.723 211.935 270.804 338.495 435.612

**TOTAL (MMcf/d)**
346.7 389.9 492.4 50.6 739.9 927.4 1193.5

**Y/Y % Change**

<table>
<thead>
<tr>
<th>County</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>0.019</td>
<td>0.026</td>
<td>0.010</td>
<td>0.009</td>
<td>0.015</td>
<td>0.061</td>
<td>0.646</td>
</tr>
<tr>
<td>Garfield</td>
<td>443.400</td>
<td>565.152</td>
<td>610.868</td>
<td>648.453</td>
<td>676.333</td>
<td>702.767</td>
<td>4903.811</td>
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<tr>
<td>Gunnison</td>
<td>1.183</td>
<td>1.475</td>
<td>1.410</td>
<td>2.078</td>
<td>1.901</td>
<td>1.974</td>
<td>11.012</td>
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<tr>
<td>Mesa</td>
<td>30.651</td>
<td>42.788</td>
<td>38.476</td>
<td>37.992</td>
<td>41.662</td>
<td>47.134</td>
<td>300.477</td>
</tr>
<tr>
<td>Pitkin</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Rio Blanco</td>
<td>48.119</td>
<td>54.468</td>
<td>76.041</td>
<td>99.841</td>
<td>106.274</td>
<td>90.586</td>
<td>727.438</td>
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</table>

**TOTAL (Bcf)**
539.522 684.079 743.887 807.718 844.436 859.534 6184.952

**TOTAL (MMcf/d)**
1478.1 1869.1 2038.0 2212.9 2313.5 2348.5 N/A

**Y/Y % Change**

23.9% 26.4% 9.0% 8.6% 4.5% 1.5% N/A

Note: These figures are largely driven by Piceance production, but may contain some production from other formations.
Source: Colorado Oil & Gas Conservation Commission data, NGI’s Shale Daily calculations
The LNG Delivery Chain

Source: King & Spalding Energy Newsletter, August 2014
Rockies Pipeline Infrastructure

Source: Bentek Rockies Observer
Basis Differential Between Northwest-Rockies and NYMEX 2010-Current

Rockies Express Pipeline
# REX (Entrega) Anchor Shippers

<table>
<thead>
<tr>
<th>Shipper</th>
<th>Capacity</th>
<th>Contract Expiration</th>
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</thead>
<tbody>
<tr>
<td>Berry Petroleum Company</td>
<td>10,000</td>
<td>11/11/2019</td>
</tr>
<tr>
<td>Bill Barrett Corporation</td>
<td>25,000</td>
<td>11/11/2019</td>
</tr>
<tr>
<td>BP Energy Company</td>
<td>200,000</td>
<td>11/11/2019</td>
</tr>
<tr>
<td>ConocoPhillips Company</td>
<td>250,000</td>
<td>11/11/2019</td>
</tr>
<tr>
<td>Encana Marketing (USA) Inc.</td>
<td>500,000</td>
<td>2/13/2022</td>
</tr>
<tr>
<td>Marathon Oil Company</td>
<td>12,000</td>
<td>11/11/2019</td>
</tr>
<tr>
<td>Occidental Energy Marketing, Inc.</td>
<td>120,000</td>
<td>12/8/2019</td>
</tr>
<tr>
<td>Sempra Rockies Marketing LLC</td>
<td>100,000</td>
<td>11/11/2019</td>
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<tr>
<td>WPX Energy Marketing, LLC</td>
<td>165,000</td>
<td>12/31/2015</td>
</tr>
<tr>
<td>Wyoming Interstate Company, L.L.C.</td>
<td>80,000</td>
<td>12/8/2019</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><strong>1,462,000</strong></td>
</tr>
</tbody>
</table>
Basis Differential Between Northwest-Rockies and NYMEX 2005-2009

Ruby Capacity

Source: Bentek Energy
Ruby Pipeline Map

- 680 miles of 42-inch Opal to Malin
- 1.3–1.5 Bcf/d expandable to 2.0 Bcf/d
- 1,440 psig MAOP
- Measurement – 8 locations
- 64% +/- Public Land
- 2 National Forests – Cache and Fremont
REX Capacity

REX White River to Wamsutter

Source: Bentek Energy
REX Capacity

REX Wamsutter to Chey Hub

Bcf/d

Source: Bentek Energy
## Growth in Piceance Basin Pipeline Take-away Capacity

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>CIG (Net)</td>
<td>90,000</td>
<td>90,000</td>
<td>90,000</td>
<td>90,000</td>
<td>90,000</td>
<td>195,000</td>
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<tr>
<td>Northwest Pipeline North</td>
<td>330,000</td>
<td>330,000</td>
<td>330,000</td>
<td>330,000</td>
<td>780,000</td>
<td>800,000</td>
</tr>
<tr>
<td>Northwest Pipeline South</td>
<td>440,000</td>
<td>440,000</td>
<td>440,000</td>
<td>440,000</td>
<td>440,000</td>
<td>655,000</td>
</tr>
<tr>
<td>Questar Pipeline (Net)</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
<td>35,000</td>
</tr>
<tr>
<td>TransColorado</td>
<td>350,000</td>
<td>385,000</td>
<td>385,000</td>
<td>385,000</td>
<td>385,000</td>
<td>385,000</td>
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<tr>
<td>WIC</td>
<td>30,000</td>
<td>30,000</td>
<td>350,000</td>
<td>350,000</td>
<td>350,000</td>
<td>552,000</td>
</tr>
<tr>
<td>REX / Entrega (Segment 1)</td>
<td>500,000</td>
<td>500,000</td>
<td>750,000</td>
<td>1,300,000</td>
<td>1,300,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Pipeline Export Capacity</strong></td>
<td><strong>1,265,000</strong></td>
<td><strong>1,800,000</strong></td>
<td><strong>2,120,000</strong></td>
<td><strong>2,370,000</strong></td>
<td><strong>3,370,000</strong></td>
<td><strong>3,922,000</strong></td>
</tr>
</tbody>
</table>

* All numbers in MMBtu/Day
Wyoming Interstate Company (WIC) System

Source: El Paso Pipeline Partners, L.P. Form S-1
Gas flow out of central Rockies – Oct 13, 2014

10.2 Bcf per day capacity

Westbound Total = 3714 (58 % of total flow)

Eastbound Total = 2707 (42 % of total flow)

Source: Brian Jeffries, Wyoming Pipeline Authority (WPA)
Rockies Supply vs. Regional Export Capacity


Source: George Wayne, Colorado Interstate Gas
# Current DOE LNG Export Approvals

<table>
<thead>
<tr>
<th>Company</th>
<th>Maximum Non-FTA Quantity (BCF/D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabine Pass Liquefaction, LLC</td>
<td>2.2</td>
</tr>
<tr>
<td>Freeport LNG Expansion, LP and FLNG Liquefaction, LLC</td>
<td>1.4</td>
</tr>
<tr>
<td>Lake Charles Exports, LLC</td>
<td>2.0</td>
</tr>
<tr>
<td>Dominion Cove Point LNG, LP</td>
<td>0.77</td>
</tr>
<tr>
<td>Freeport LNG Expansion, LP and FLNG Liquefaction, LLC*</td>
<td>0.4</td>
</tr>
<tr>
<td>Cameron LNG, LLC</td>
<td>1.7</td>
</tr>
<tr>
<td>Jordan Cove Energy Project, LLC</td>
<td>0.80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9.27</strong></td>
</tr>
</tbody>
</table>

Source: NERA Economic Consulting
Pacific Connector Pipeline

Source: Oregon Green Energy Guide
## Export License Volumes for Canadian LNG Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Total (Tcf)</th>
<th>Annual (Tcf)</th>
<th>Daily (Bcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora LNG</td>
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¹Canadian gas export license granted  
²Nova Scotia terminal site  
³Oregon terminal site  

Source: National Energy Board
Cross Section from West to East of the Piceance Basin

Source: Hood and Yurewicz, 2008

*Figure 3-3: Cross Section from West to East Across the North Central Portion of the Piceance Basin, Illustrating Basin Asymmetry and Synclinal Structure. Shows Relative Position of Oil-shale-bearing Strata of the Green River Formation Relative to the Deeper Gas Bearing Mesaverde Group.*
Piceance Basin Producers Who Have Drilled Mancos Wells

- Encana Oil & Gas (USA) Incorporated
- Black Hills Plateau Production LLC
- Maralex Resources Incorporated
- WPX Energy Rocky Mountain LLC
- Chevron USA Incorporated
- Oxy USA WTP LP
- Piceance Energy LLC
- Gunnison Energy Corp
Partial List of Current Piceance Basin Operators

- Encana Corporation
- WPX Energy
- Caerus Oil and Gas
- Gunnison Energy LLC
- Foundation Energy Management
- Vaquero Energy, Inc.
- Piceance Energy LLC
- Chevron Corporation
- Marathon Oil Corporation
- Occidental Petroleum Corporation
- Noble Energy Inc.
- Laramie Energy, LLC
- Mesa Energy Partners, LLC
- Southwestern Energy Ventures Company, LLC
- BOPCO, L.P.
- XTO Energy Inc.
- Wexpro
- Whiting Petroleum Corporation
- LINN Energy, LLC
North American LNG Import/Export Term

Existing

**U.S.**
A. **Everett, MA**: 1.035 Bcfd (GDF SUEZ - DOMAC)
B. **Cove Point, MD**: 1.8 Bcfd (Dominion - Cove Point LNG)
C. **Elba Island, GA**: 1.6 Bcfd (El Paso - Southern LNG)
D. **Lake Charles, LA**: 2.1 Bcfd (Southern Union - Trunkline LNG)
E. **Offshore Boston**: 0.8 Bcfd, (Excelerate Energy – Northeast Gateway)
F. **Freeport, TX**: 1.5 Bcfd, (Cheniere/Freeport LNG Dev.)
G. **Sabine, LA**: 4.0 Bcfd (Cheniere/Sabine Pass LNG)
H. **Hackberry, LA**: 1.8 Bcfd (Sempra - Cameron LNG)
I. **Offshore Boston, MA**: 0.4 Bcfd (GDF SUEZ – Neptune LNG)
J. **Sabine Pass, TX**: 2.0 Bcfd (ExxonMobil – Golden Pass) (Phase I & II)
K. **Pascagoula, MS**: 1.5 Bcfd (El Paso/Crest/Sonangol - Gulf LNG Energy LLC)

**Canada**
L. **Saint John, NB**: 1.0 Bcfd, (Repsol/Fort Reliance - Canaport LNG)

**Mexico**
M. **Altamira, Tamulipas**: 0.7 Bcfd, (Shell/Total/Mitsui – Altamira LNG)
N. **Baja California, MX**: 1.0 Bcfd, (Sempra – Energía Costa Azul)
O. **Manzanillo, MX**: 0.5 Bcfd (KMS GNL de Manzanillo)

As of September 30, 2014

Note: There is an existing import terminal in Pefueles, PR. It does not appear on this map since it can not serve or affect deliveries in the Lower 48 U.S. states.
Proposed LNG Export Facilities

North American LNG Export Terminals

Proposed

Export Terminal

**Proposed to FERC**
1. Corpus Christi, TX: 2.1 Bcf/d (Cheniere - Corpus Christi LNG) (CP12-507)
2. Coos Bay, OR: 0.9 Bcf/d (Jordan Cove Energy Project) (CP13-483)
3. Lake Charles, LA: 2.2 Bcf/d (Southern Union - Trunkline LNG) (CP14-120)
4. Astoria, OR: 1.25 Bcf/d (Oregon LNG) (CP09-6)
5. Lavaca Bay, TX: 1.38 Bcf/d (Excelsior Liquefaction) (CP14-71 & 72)
6. Elba Island, GA: 0.35 Bcf/d (Southern LNG Company) (CP14-103)
7. Sabine Pass, LA: 1.40 Bcf/d (Sabine Pass Liquefaction) (CP13-552)
8. Lake Charles, LA: 1.07 Bcf/d (Magnolia LNG) (CP14-347)
10. Sabine Pass, TX: 2.1 Bcf/d (ExxonMobil – Golden Pass) (CP14-517)
11. Pascagoula, MS: 1.5 Bcf/d (Gulf LNG Liquefaction) (PF13-4)
12. Plaquemines Parish, LA: 0.30 Bcf/d (Louisiana LNG) (PF14-17)
13. Robbinston, ME: 0.45 Bcf/d (Kestrel Energy - Downeast LNG) (PF14-19)

**Proposed Canadian Sites Identified by Project Sponsors**
14. Kitimat, BC: 1.28 Bcf/d (Apache Canada Ltd.)
15. Douglas Island, BC: 0.23 Bcf/d (BC LNG Export Cooperative)
16. Kitimat, BC: 3.23 Bcf/d (LNG Canada)

As of September 30, 2014

Office of Energy Projects
**Potential LNG Export Facilities**

**North American LNG Export Terminals**

**Potential**

**Export Terminal**

**POTENTIAL U.S. SITES IDENTIFIED BY PROJECT SPONSORS**
1. Brownsville, TX: 2.8 Bcf/d (Gulf Coast LNG Export)
2. Cameron Parish, LA: 0.16 Bcf/d (Waller LNG Services)
3. Ingleside, TX: 1.09 Bcf/d (Pangea LNG (North America))
4. Cameron Parish, LA: 0.20 Bcf/d (Gasfin Development)
5. Cameron Parish, LA: 1.34 Bcf/d (Venture Global)
6. Brownsville, TX: 3.2 Bcf/d (Eos LNG & Barca LNG)
7. Gulf of Mexico: 3.22 Bcf/d (Main Pass - Freeport-McMoRan)
8. Brownsville, TX: 0.94 Bcf/d (Annona LNG)
9. Gulf of Mexico: 1.8 Bcf/d (Delfin LNG)
10. Brownsville, TX: 0.27 Bcf/d (Texas LNG)
11. Cameron Parish, LA: 1.60 Bcf/d (SCTE LNG)
12. Port Arthur, TX: 0.2 Bcf/d (WesPac/Gulfgate Terminal)
13. Galveston, TX: 0.77 Bcf/d (Next Decade)

**POTENTIAL CANADIAN SITES IDENTIFIED BY PROJECT SPONSORS**
14. Goldboro, NS: 1.4 Bcf/d (Pieridae Energy Canada)
15. Prince Rupert Island, BC: 2.91 Bcf/d (BG Group)
16. Melford, NS: 1.8 Bcf/d (H-Energy)
17. Prince Rupert Island, BC: 2.74 Bcf/d (Pacific Northwest LNG)
18. Prince Rupert Island, BC: 4.0 Bcf/d (ExxonMobil – Imperial)
19. Squamish, BC: 0.29 Bcf/d (Woodfibre LNG Export)
20. Kitimat/Prince Rupert, BC: 0.32 Bcf/d (Triton LNG)
22. Kitault, BC: 2.7 Bcf/d (Kitault Energy)
23. Stewart, BC: 4.1 Bcf/d (Canada Stewart Energy Group)
24. Delta, BC: 0.4 Bcf/d (WesPac Midstream Vancouver)
25. Vancouver Island, BC: 0.11 Bcf/d (Steelhead LNG)
26. Prince Rupert Island, BC: 3.2 Bcf/d (Orca LNG)
27. Port Hawkesbury, NS: 0.5 Bcf/d (Bear Head LNG)

*As of September 30, 2014*

**Office of Energy Projects**
Estimates of U.S. Total Natural Gas Resource Base vs. Total U.S. LNG Exports and Consumption

## World LNG Liquefaction Capacity (BCF/D)
Includes Facilities that are Existing, Under Construction & Proposed

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Source: An Overview of the World LNG Market and Canada’s Potential for Exports of LNG, Canadian Association of Petroleum Producers, January 2014
Job Implications

- **Rig crews – 30 people/rig**
- **Colorado-Headquartered Producer Offices**
  - Contract workers (Bonanza Creek has already cut their contract positions)
  - Employees (Magnum Hunter and LINN Energy closing Denver offices)
  - Office consolidations (WPX Energy consolidating Denver office and relocating staff to Tulsa)
- **Service Companies (Schlumberger, Halliburton, Baker Hughes, etc)**
  - Halliburton to cut 6,400 globally
  - Baker Hughes to cut 7,000 globally
  - Schlumberger to cut 9,000 globally
- **Support Workers**
  - Electricians, Welders, etc

Source: The Outlook for U.S. Crude: Implications for Colorado, Bernadette Johnson, Ponderosa Advisors
The “Ferrari” Affect Substantially Reduces The Likelihood Of Price Spikes

One Rig In the Haynesville

6 Month Drilling Curtailment

5 months after drilling restarts, previous production level exceeded

Source: Ponderosa Advisors LLC
Winners

• China/Asia
• Consumer growth; consumer spending
• U.S. nitrogen fertilizer industry
• Steel producers
• Refiners
• Chemical producers
• Aluminum smelters
• Natural gas fired electric generators

Losers

• U.S. Energy Security
• State and local governments in oil & gas producing states
• Oil & gas E&P’s
• Oil & gas employment
• Oil & gas service companies
• U.S. LNG exporters who have not made a Final Investment Decision will face delays
• Renewable energy sector – cheap energy will destroy the “Green Revolution”
• Russia, Iran, Venezuela
Conclusions

• Crude and NGL prices won’t recover for at least 2 years
• U.S. crude, NGL & natural gas production won’t decline as quickly as OPEC expects
• U.S. producers will allocate capital to their highest IRR projects
• U.S. “short cycle” drilling (dependent on near term quarter cash flow) will result in U.S. drillers feeling most of the pain
• The “recovery time” will exceed any hedge terms
What we must recognize and what we must do.

• We must recognize that we are in a global market place and competing with other production areas.

• We must market and sell Western Colorado’s strengths.
  – Predictability and repeatability in production
  – Available gathering and natural gas processing capacity
  – Significant interstate pipeline export capacity
  – A ready and available work force
  – A welcoming political and regulatory environment
How Long Will We Be Stuck in This Ditch?
Citations for Report

All of the information utilized for this report is a compilation of information pulled from the following data sources:

Energy Information Administration (EIA)
Bentek Energy, Jack Weixel
Ponderosa Advisors LLC
Office of Energy Projects
Bloomberg
U.S. Department of Energy
Raymond James and Associates, Inc.
Wikipedia
LNG Blog
American Enterprise Institute
Oilprice.com
Rueters
LNG World News
The Motley Fool
Chevron
Encana Corporation
Waterborne Energy, Inc.
King & Spalding
Midwest Energy Logistics, LLC
National Energy Board
NERA Economic Consulting
LNG Business Review
Colorado Interstate Gas, George Wayne
Tea Party Command Center
Tudor Pickering Holt & Co.
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(303) 478-3233 (cell)