It's Not the "3:10 to Yuma"
It's the $3.50 to Meeker That Matters

Presentation to:

Grand Junction Chamber of Commerce Energy Briefing

By:
John Harpole

Mercator Energy

April 12, 2017

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OPEC's Strategy?

"In 2016, when OPEC ***completes this objective of cleaning up the American marginal market***, the oil price will start growing again," said Fedun, who's made a fortune of more than $4 billion in the oil business, according to data compiled by Bloomberg. ***"The shale boom is on a par with the dot-com boom. The strong players will remain, the weak ones will vanish."***

- Leonid Fedun, VP and Board Member at OAO Lukoil (LKOD)

Source: *OPEC Policy Ensures U.S. Shale Crash, Russian Tycoon Says,* Asst Natl Dir Melony B. DeFord, Tea Party Command Center, November 28, 2014

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A Game of Chicken?

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

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

Source: Reuters, *The Saudi Arabian Oil Conspiracy and What it Might Mean for Your Portfolio,* The Motley Fool, Adam Galas, January 18, 2015

Survival of fittest as oil tumbles below $65, Bloomberg News, December 1, 2014

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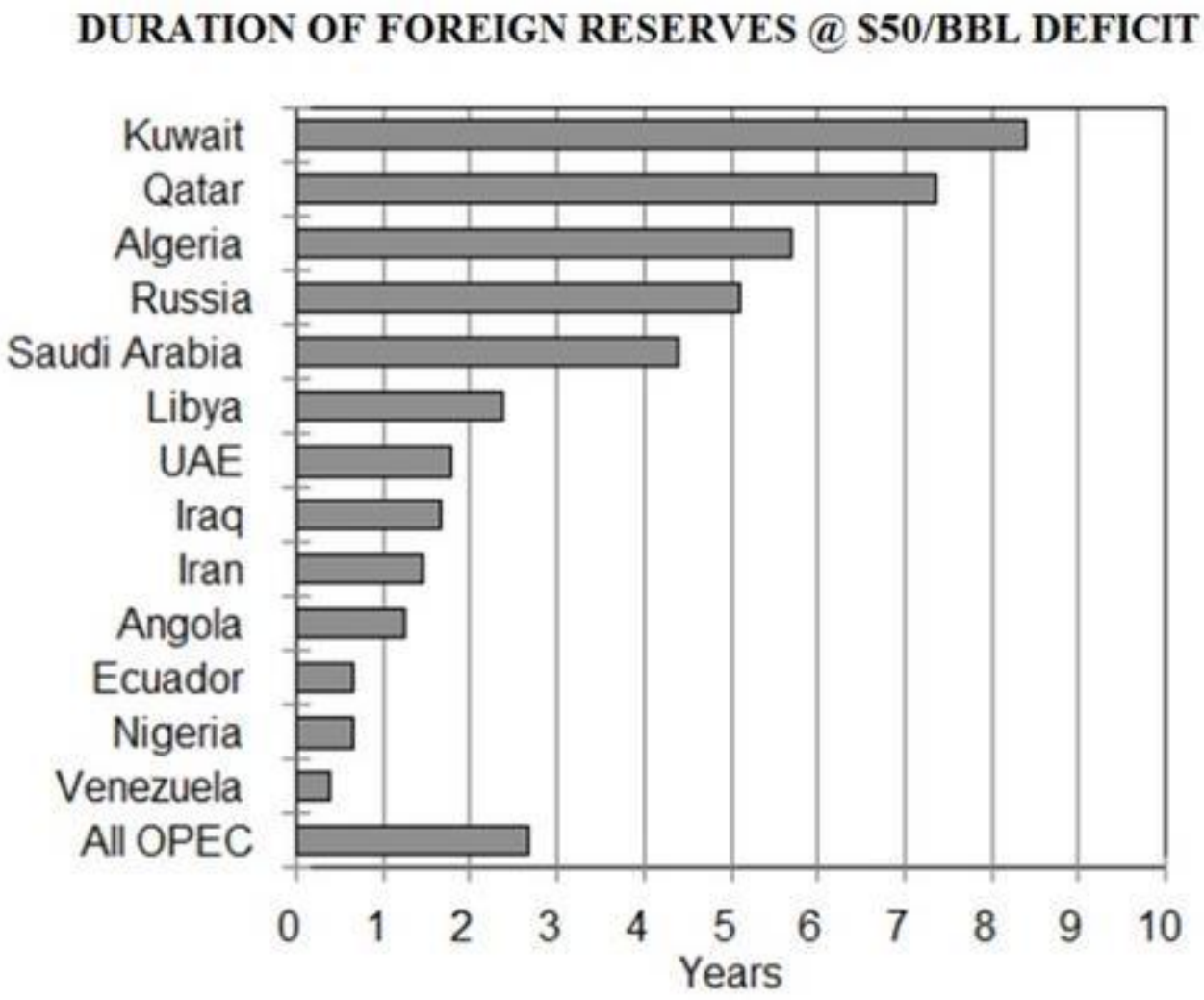
Survival of the Fittest?

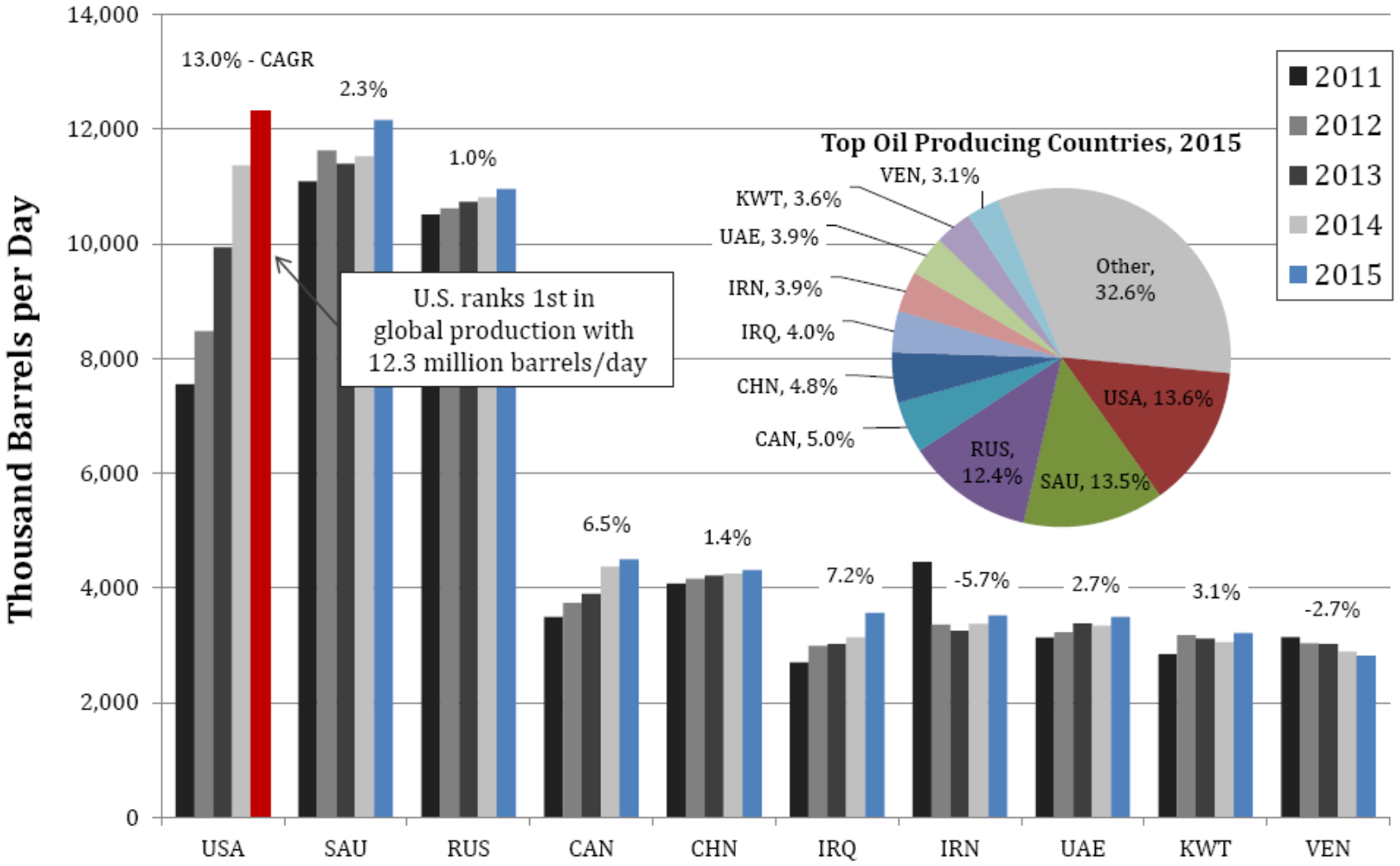


Saudis have staying power; $750 billion in foreign country reserves

Source: Oilprice.com, *The Saudi Arabian Oil Conspiracy and What it Might Mean for Your Portfolio,* The Motley Fool, Adam Galas, January 18, 2015

Global Oil Production Leaders, 2011-2015

U.S. ranks 1st in global production with 12.3 million barrels/day



Source: International Energy Agency

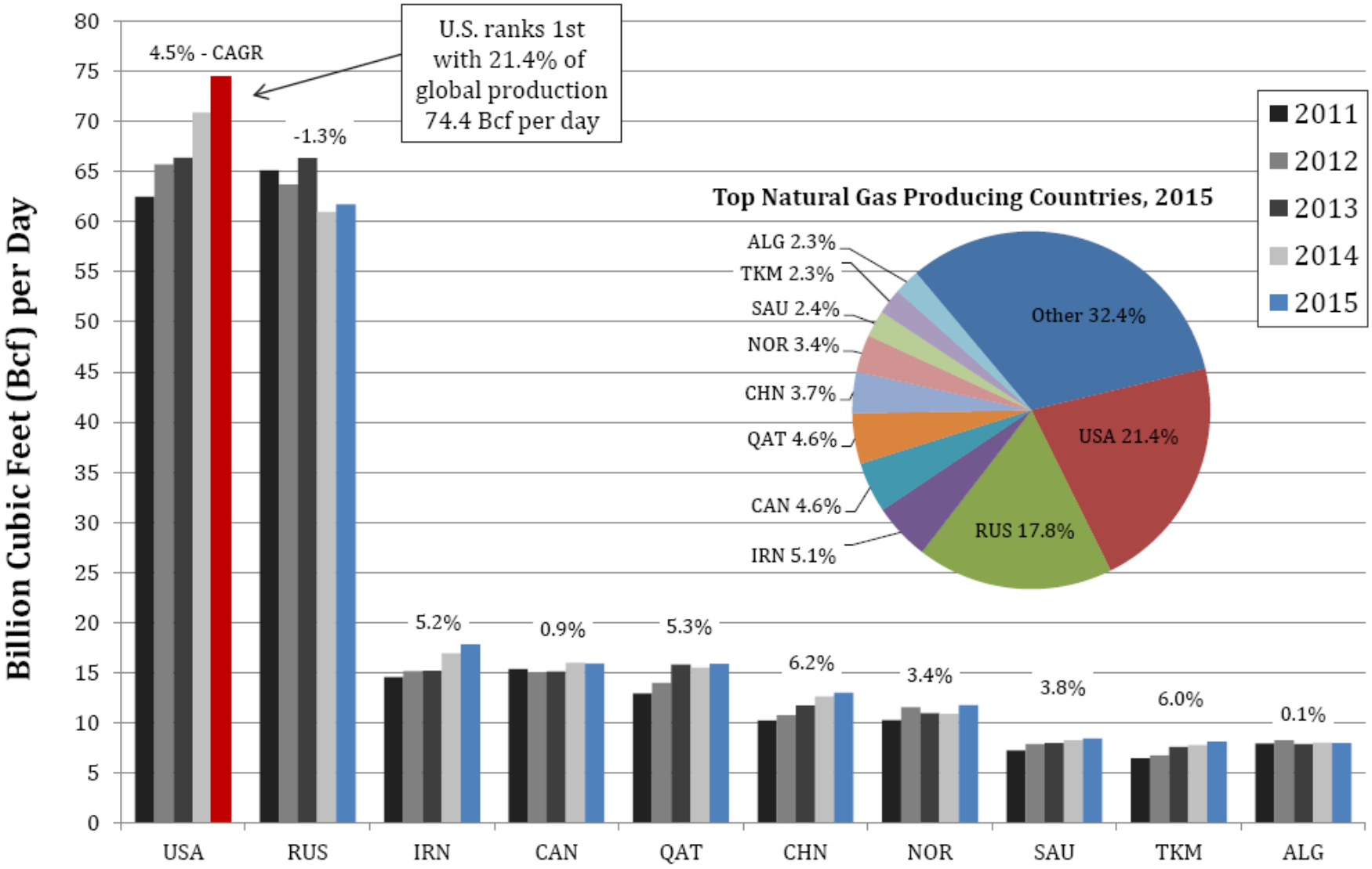
Note: Includes crude oil, natural gas liquids, feedstocks, additives, and other hydrocarbons; 2015 data represents estimates; the compound annual growth rate (CAGR) reflects the 2011 to 2015 period.

Fig. 9

Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Global Natural Gas Production Leaders, 2011-2015

U.S. is 1st and growing; top-10 producers account for 68% of global production



Source: International Energy Agency

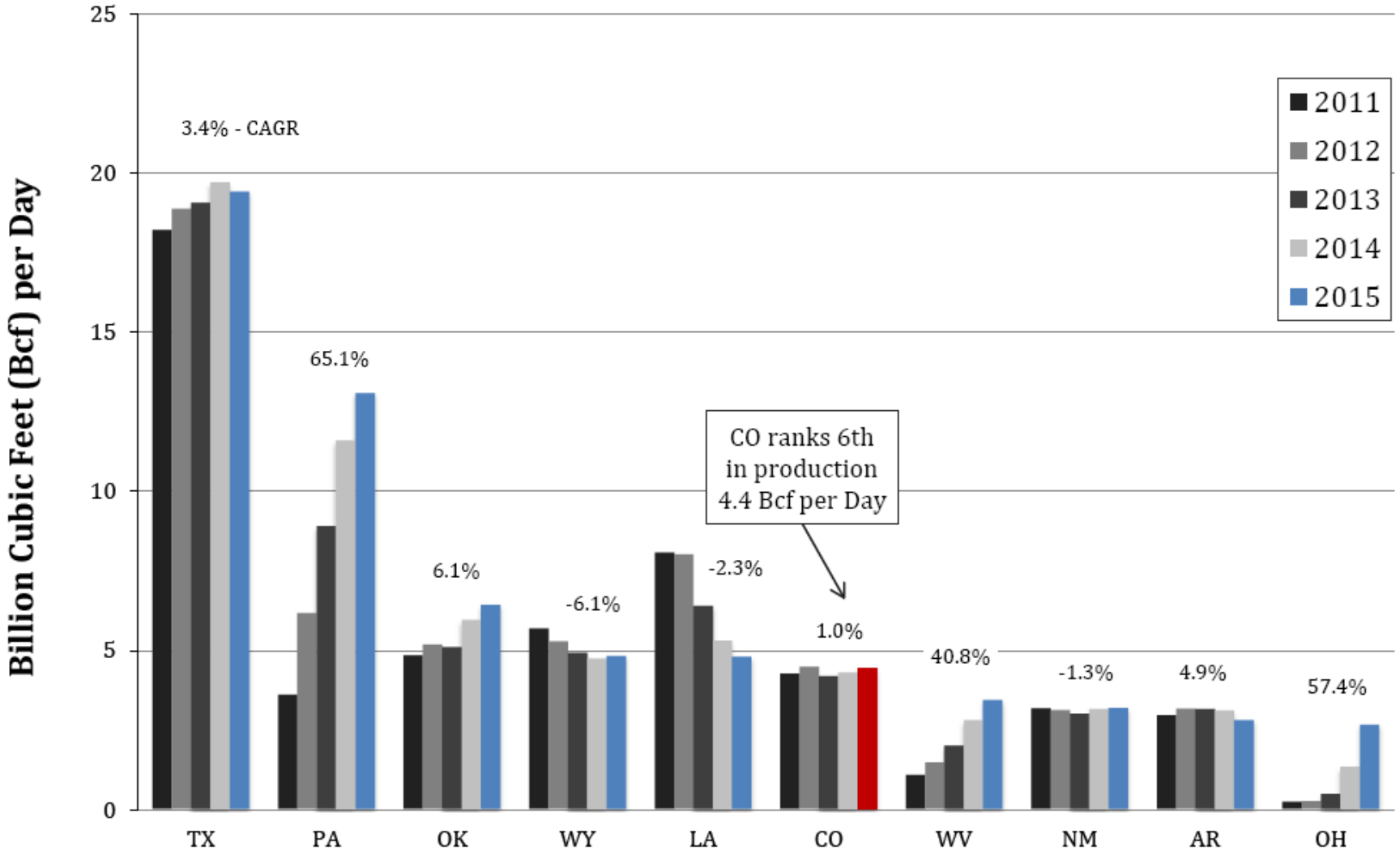
Note: 2015 data represents estimates; the compound annual growth rate (CAGR) reflects the 2011 to 2015 period.

Fig. 20

Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Natural Gas Production by State, 2011-2015

Colorado's production has remained stable since 2011;
U.S. production has increased at a CAGR of 4.3% since 2011



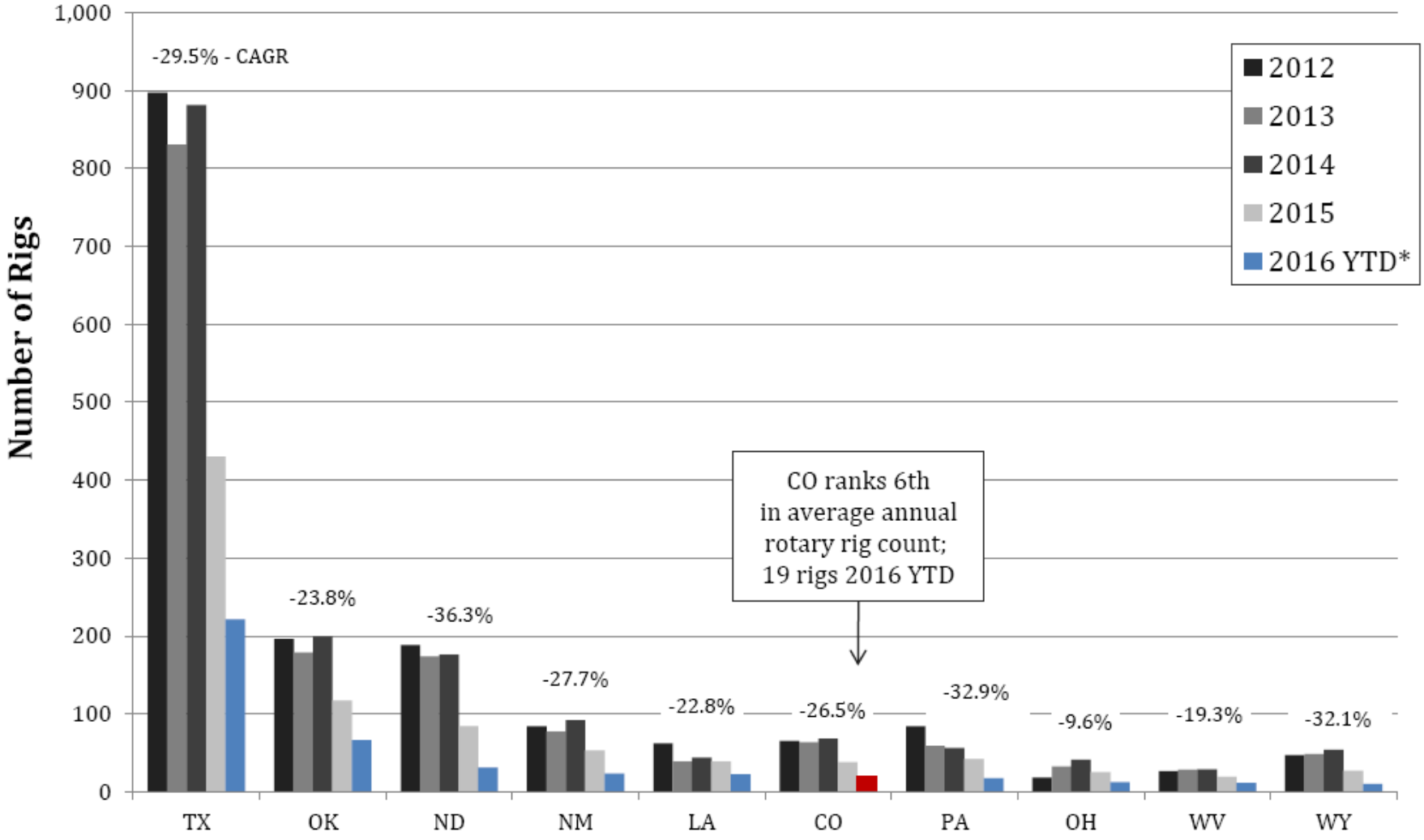
Source: U.S. Department of Energy, Energy Information Administration
Note: The compound annual growth rate (CAGR) reflects the 2011 to 2015 period.

Fig. 13

Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Annual Average Rotary Rig Count, 2012-2016

DJ-Niobrara formation driving Colorado rotary rig count activity; 1,456 new wells were drilled in 2015; as of August 2016 there were 53,724 active wells in Colorado

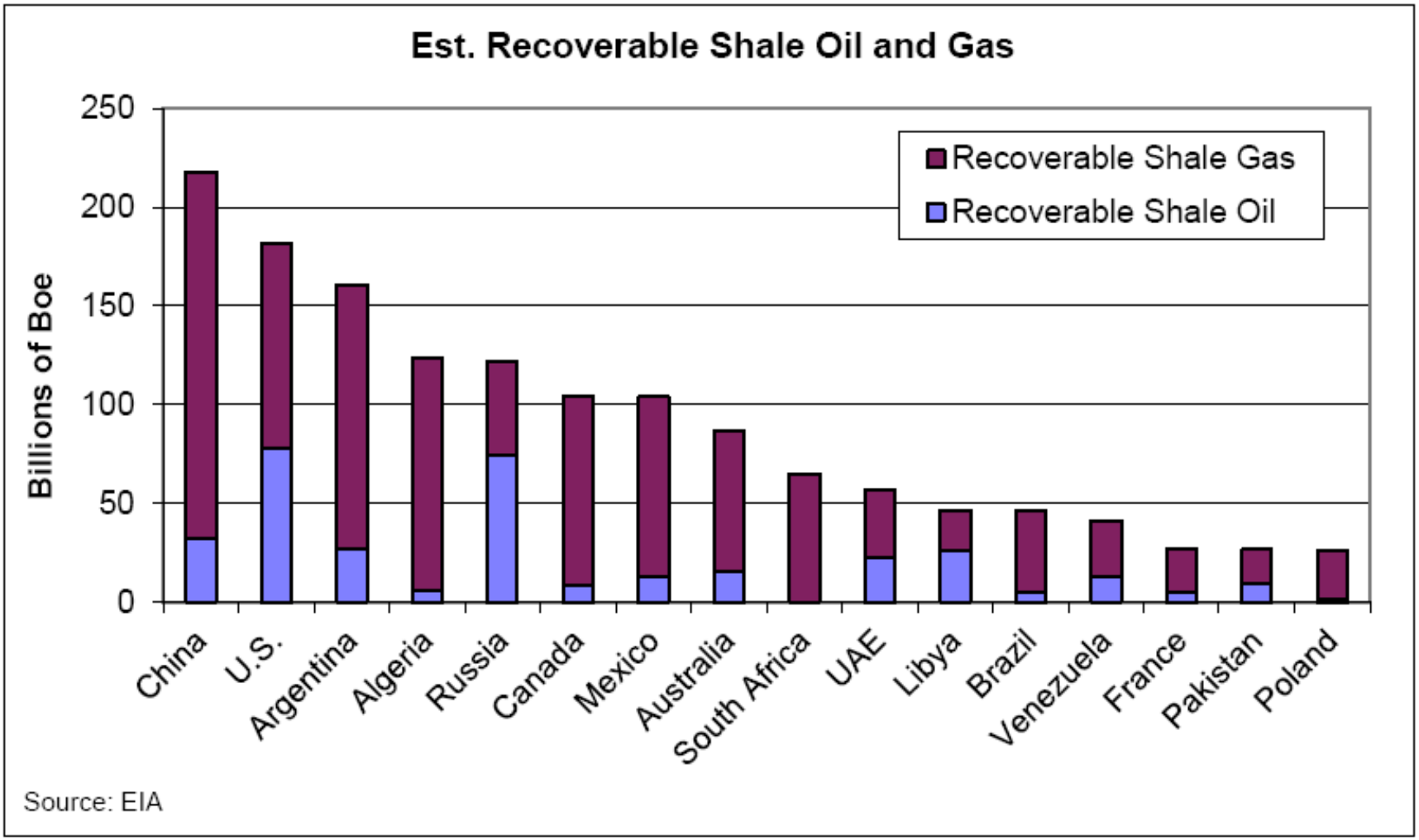


Source: Baker Hughes; Colorado Oil and Gas Conservation Commission

**2016 year-to-date represents January to September average; the compound annual growth rate (CAGR) reflects the 2012 to 2016 period.*

Fig. 4

Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition



Source: *Energy Stat: 80% of Resource, 2% of Production: Will Shale Outside U.S./Canada Ever Move the Needle?,* Raymond James U.S. Energy Research, January 30, 2017

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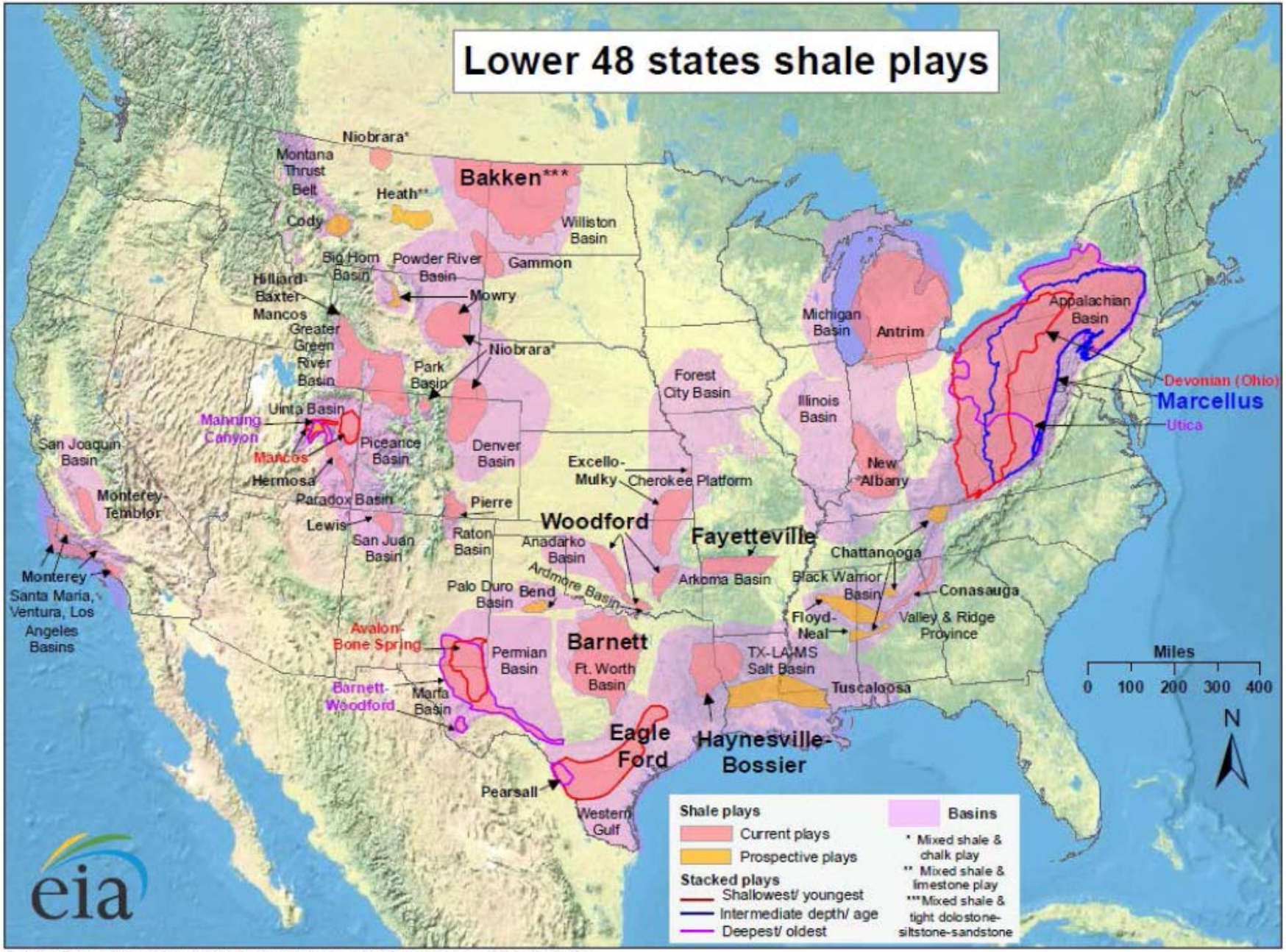


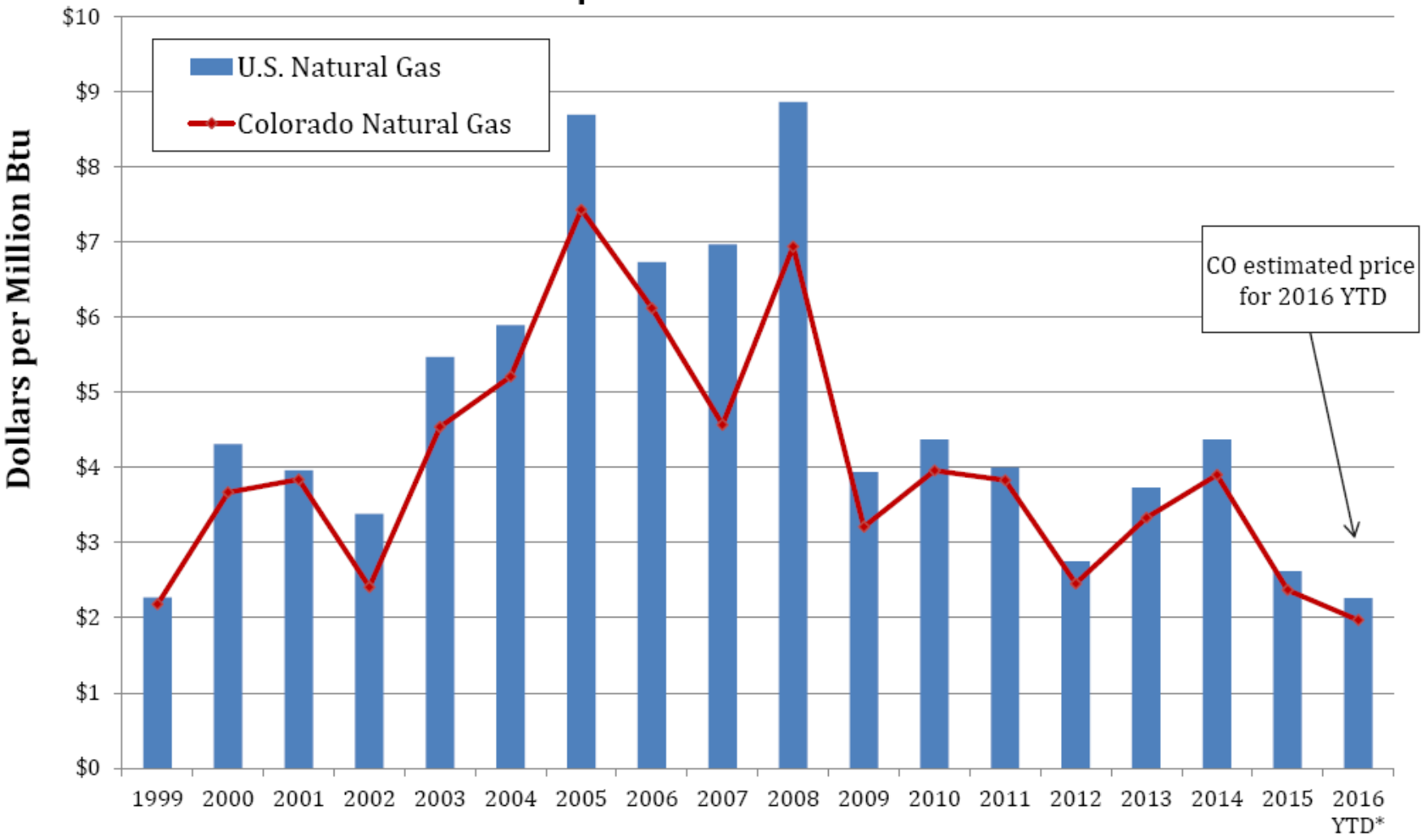
Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

Fig. 15

Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Average Annual Natural Gas Prices, 1999-2016

Colorado wellhead prices trend below the benchmark trading price to account for fuel transportation costs to markets outside the state



Source: U.S. Department of Energy, Energy Information Administration

Note: Henry Hub is a common trading benchmark price. Does not include 2014 polar vortex price spike for Colorado.

**2016 year-to-date data represents U.S. average daily spot price from January to August. 2012 to 2016 Colorado price estimated.*

Fig. 12

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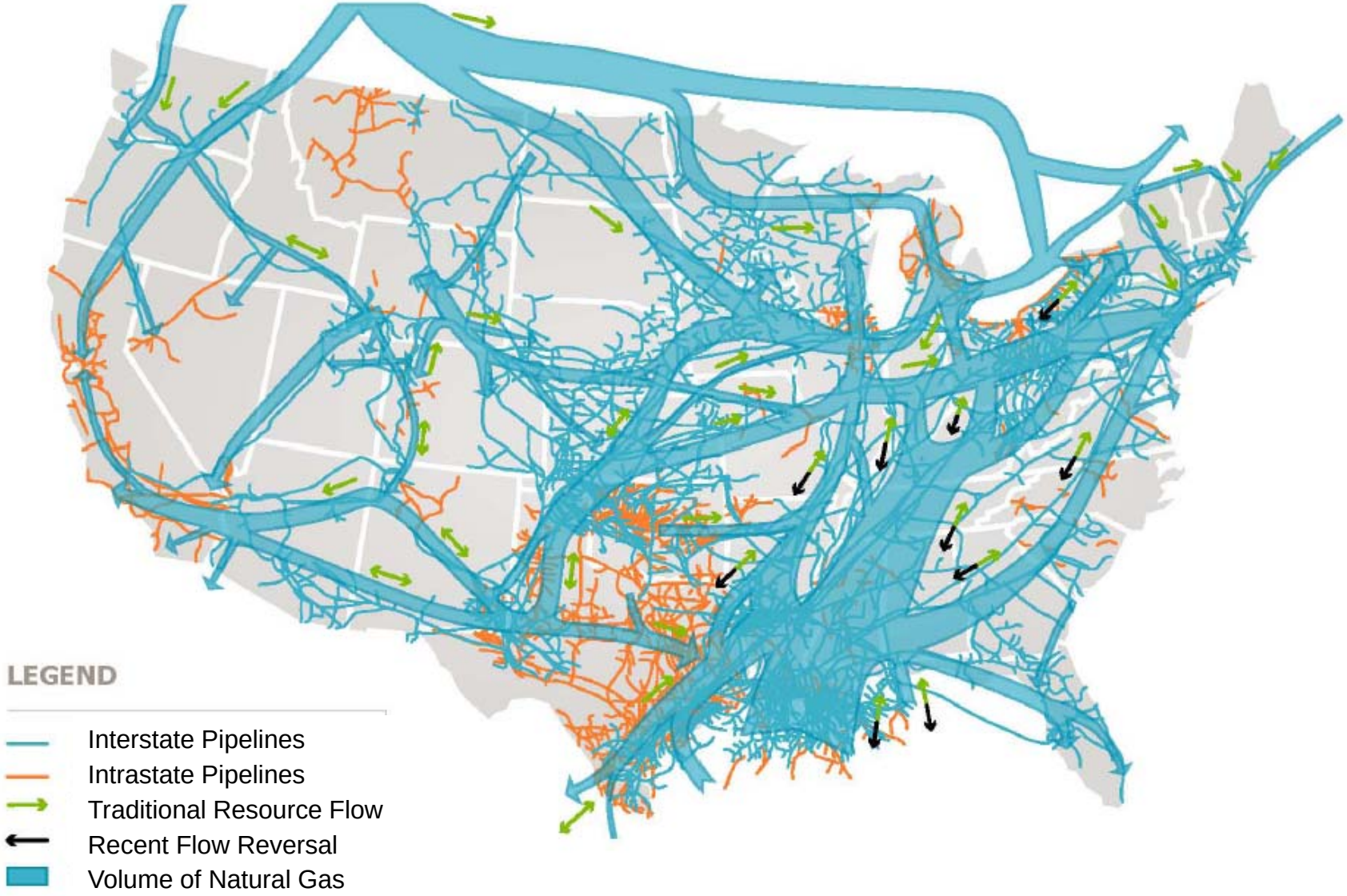
Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Map of Natural Gas Pipeline Infrastructure



Source: *Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System*

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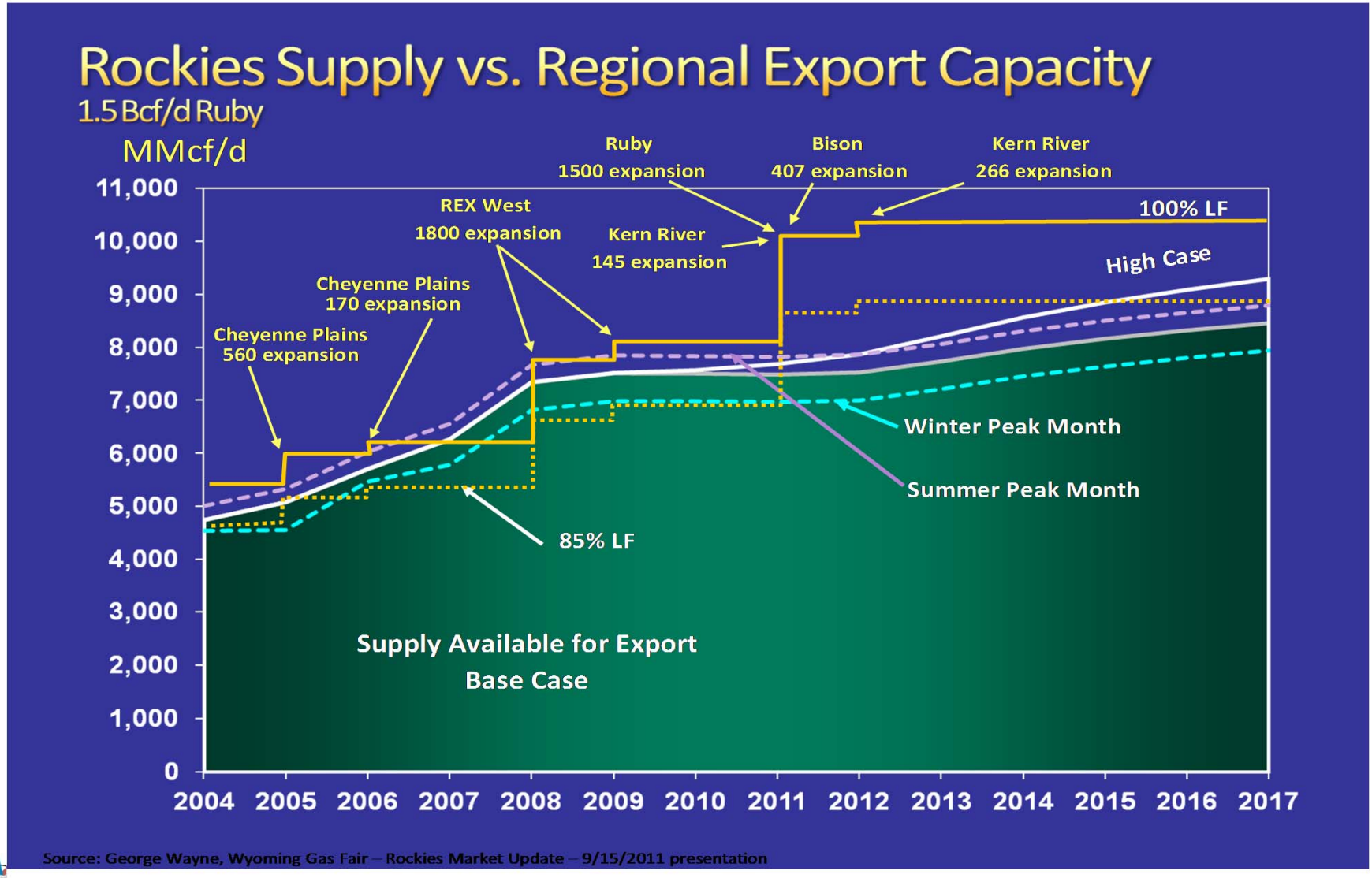
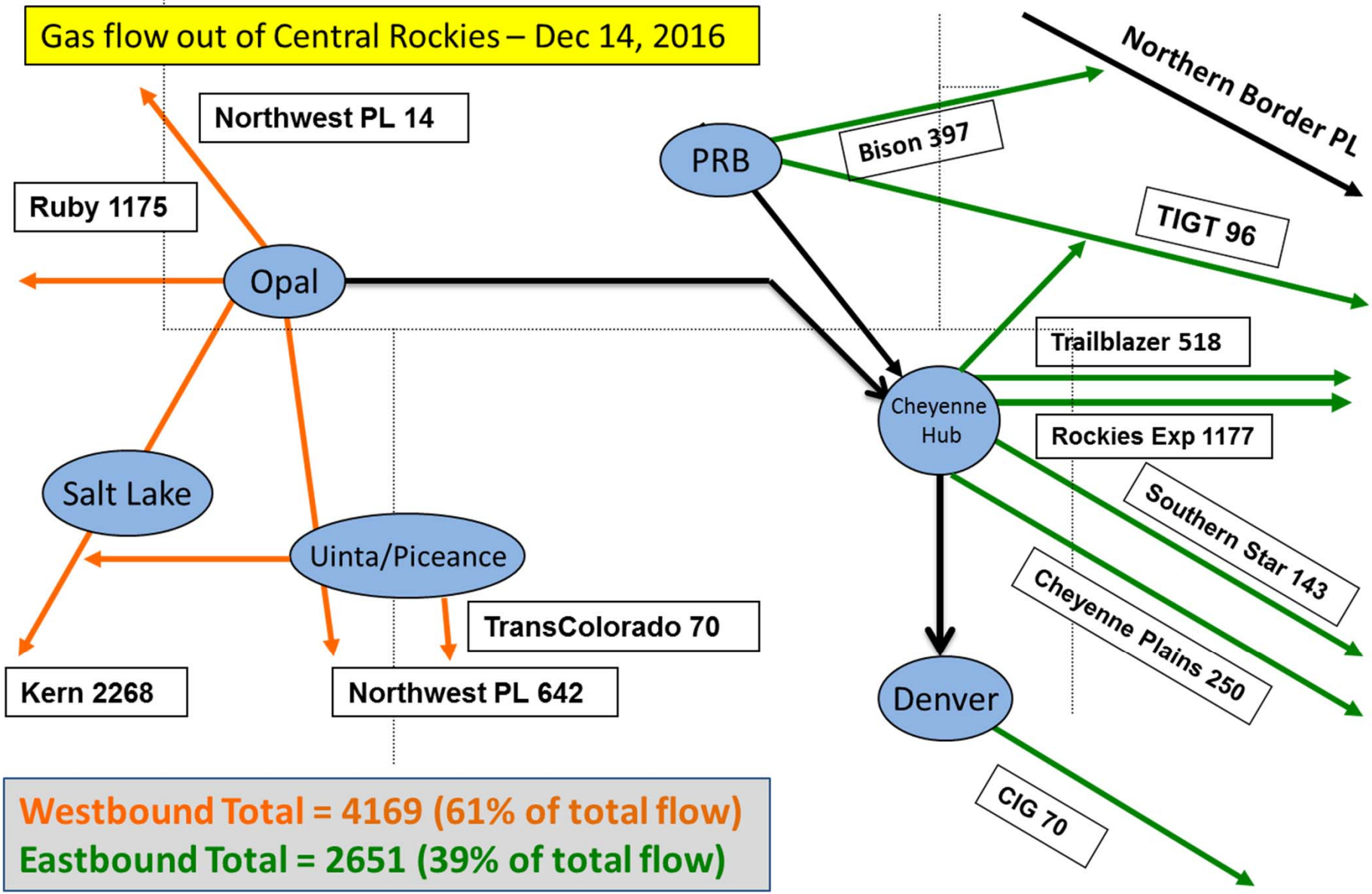
Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Rockies Supply vs. Regional Export Capacity



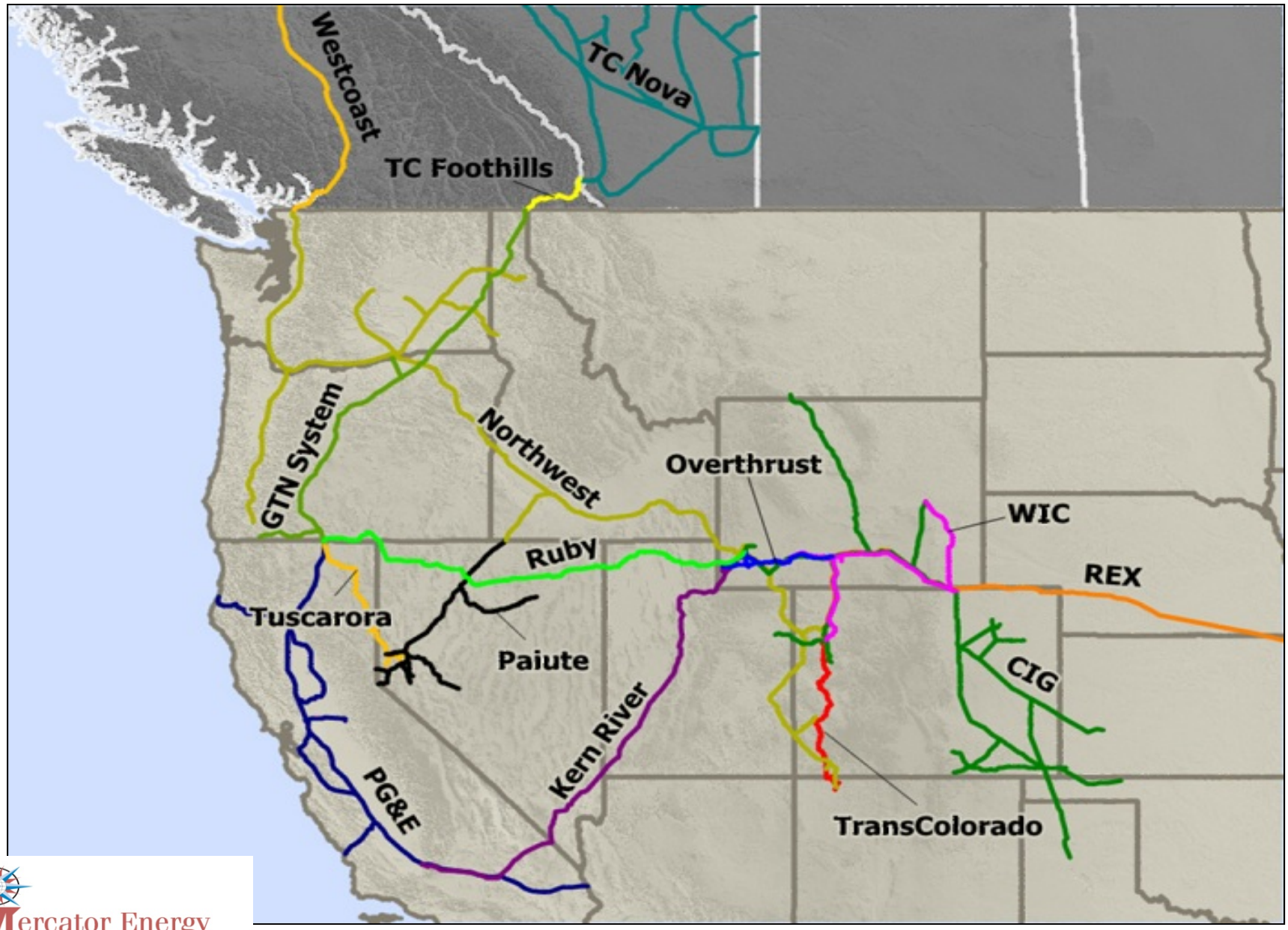
Source: George Wayne, Colorado Interstate Gas

Rockies Pipeline Infrastructure



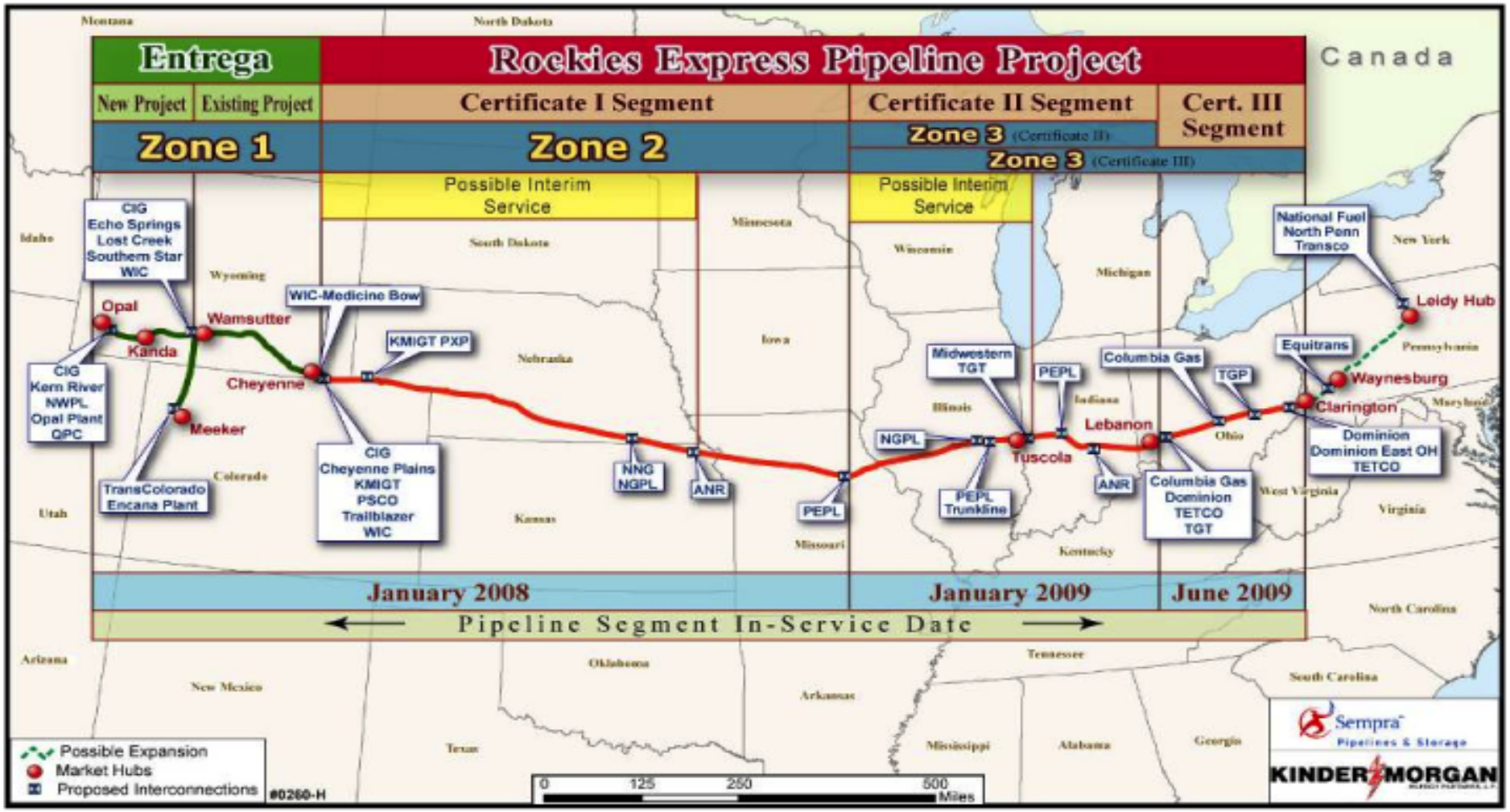
Source: Brian Jeffries, Wyoming Pipeline Authority (WPA)

Rockies Pipeline Infrastructure



Source: Bentek Rockies Observer

Rockies Express Pipeline



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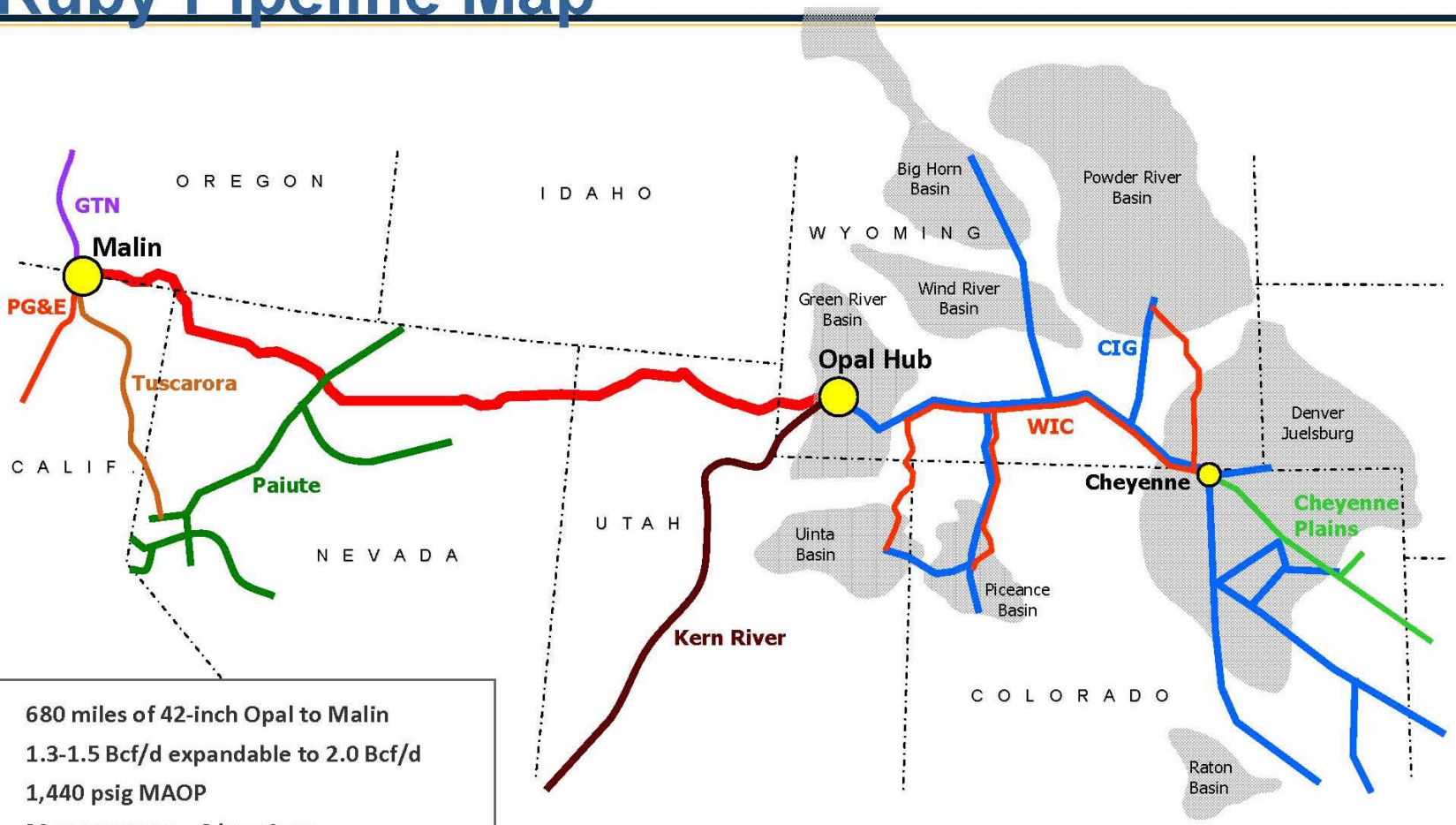
Ruby Pipeline Map



- 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

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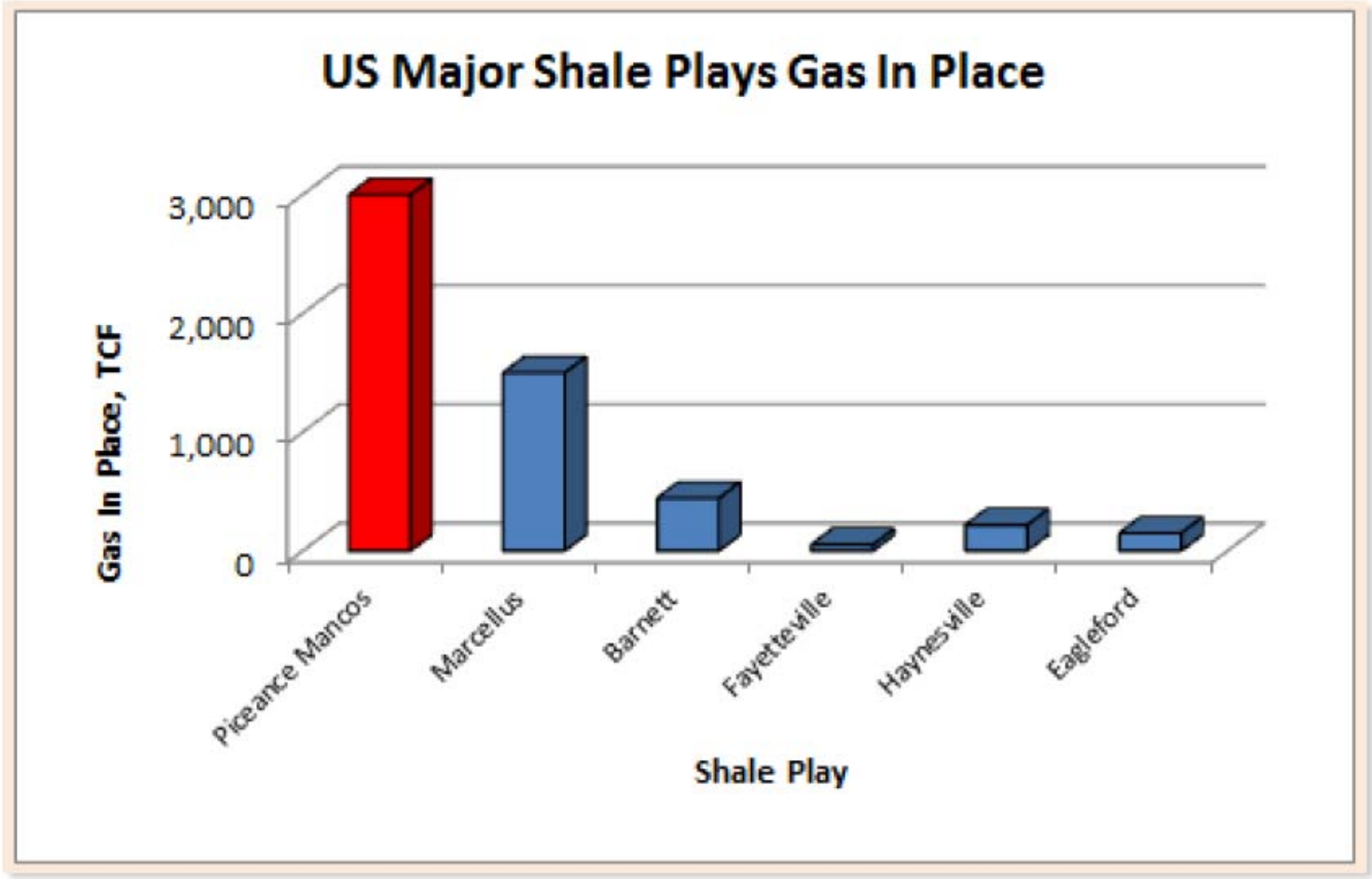

Source: *The Mancos Shale is an Emerging Giant,* Presentation to Garfield County Energy Advisory Board Meeting, December 1, 2016

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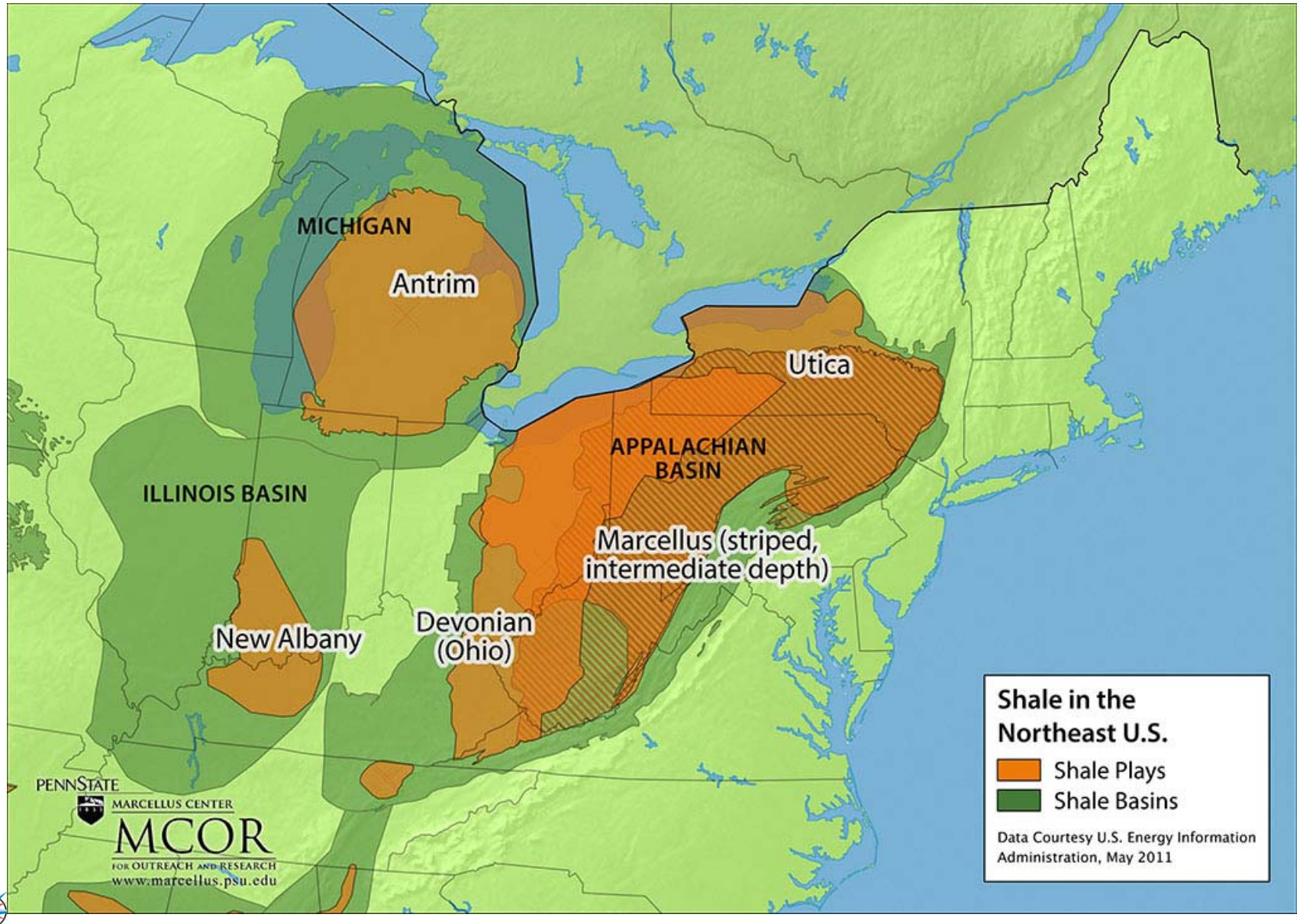
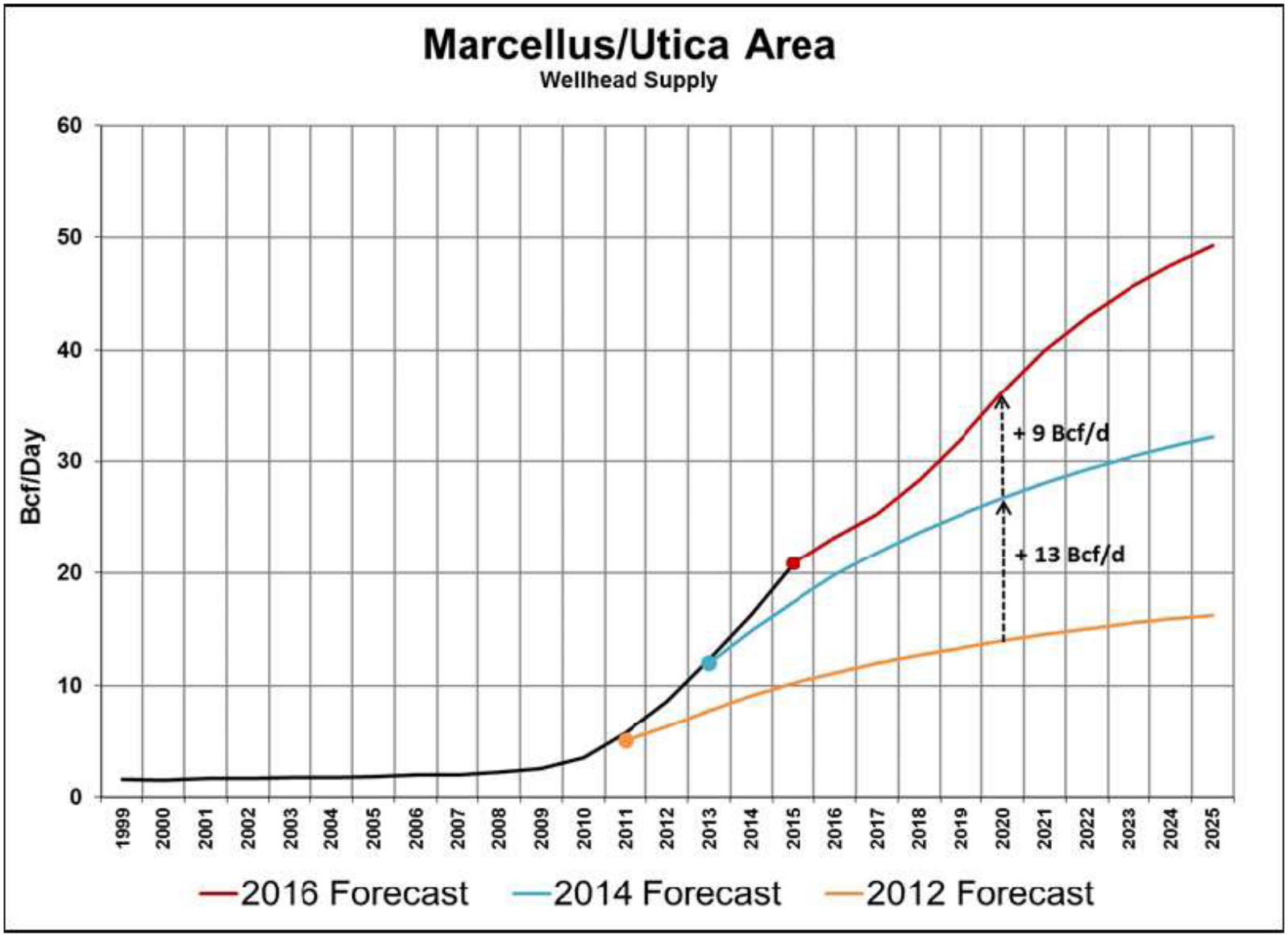
Map of Shale in Northeast U.S.



Source: PennState Marcellus Center for Outreach and Research (MCOR)

Northeast Supply Forecast



Source: *U.S. Natural Gas Outlook,* George Wayne, KinderMorgan, December 2016

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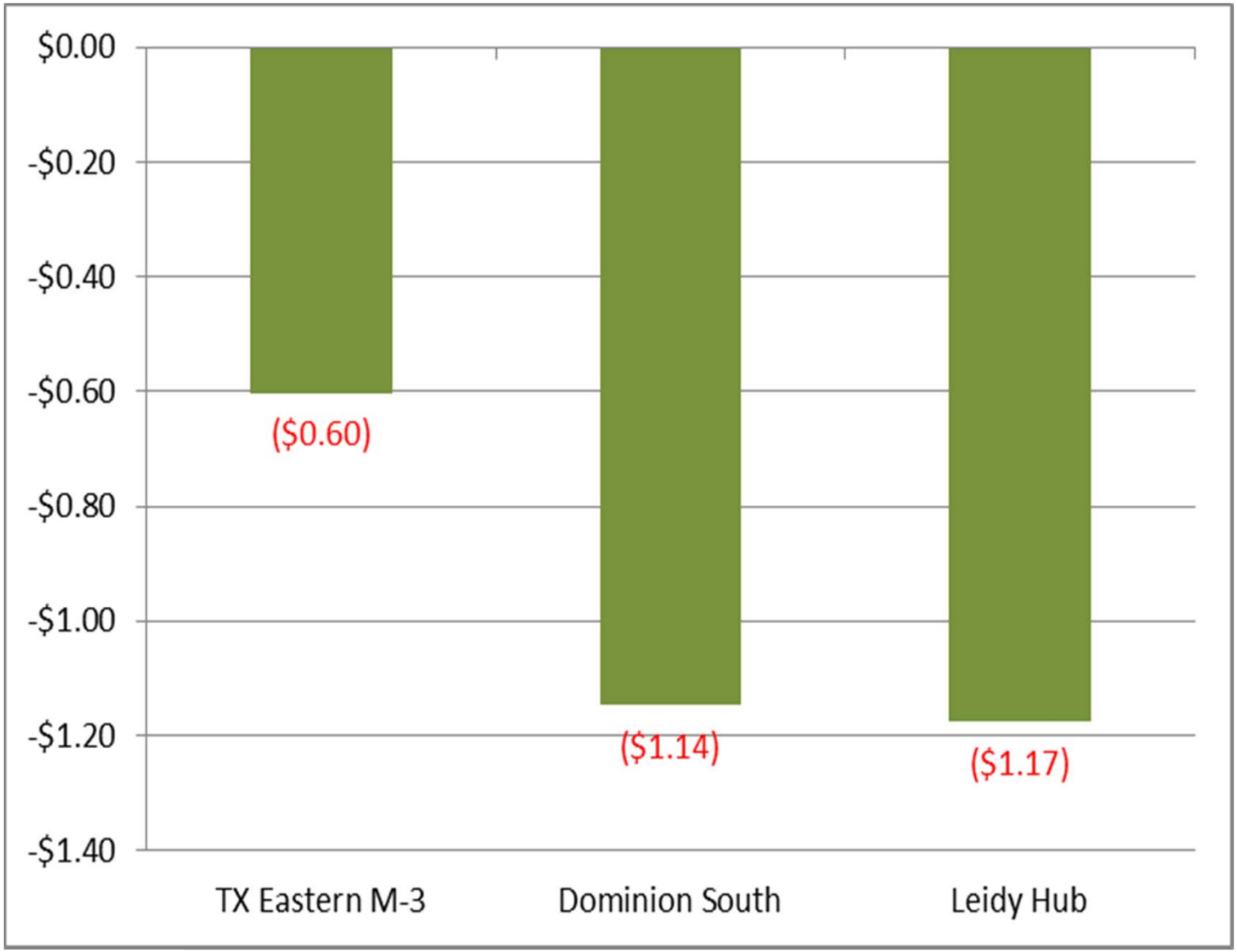
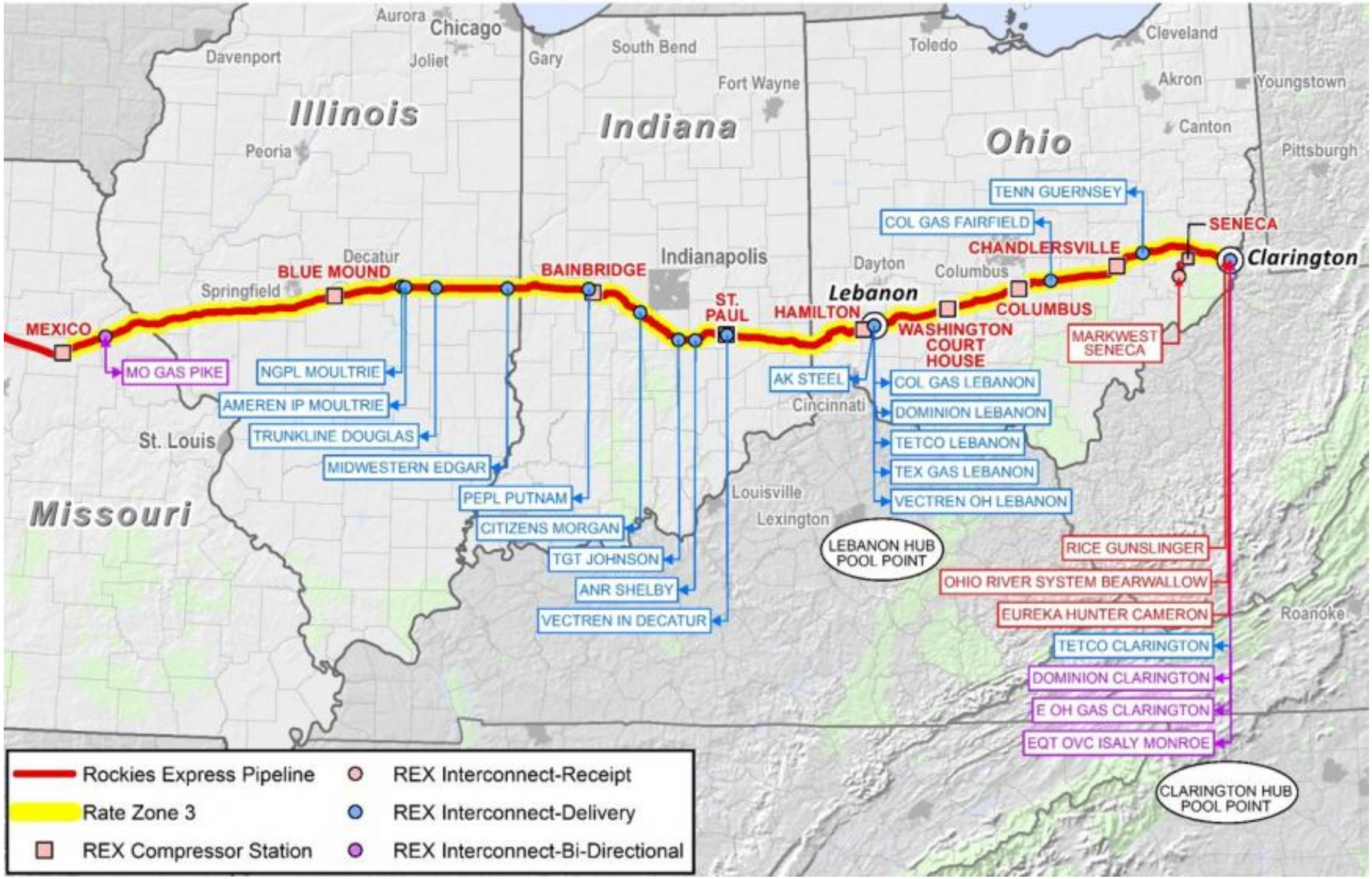
Marcellus Basis Differential – The Haves and Have Nots



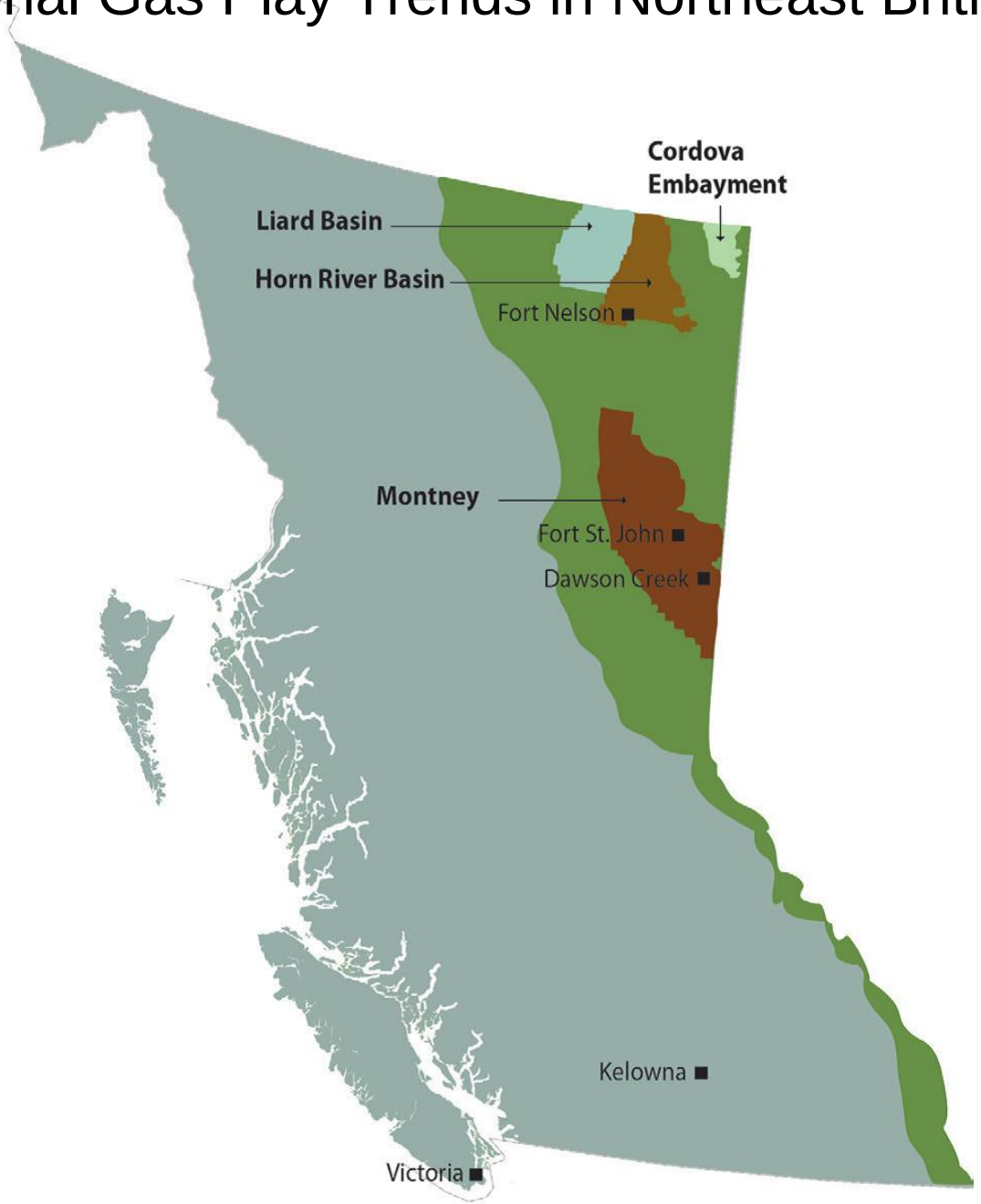
Source: Inside FERC's Gas Marketing Report, S&P Global Platts Publication 2015-2016 information as compared to NYMEX average of last 3 days

Rockies Express Pipeline – Zone 3



Source: *It's Been A Long Time Comin' – New REX Zone 3 Capacity And Northeast Gas Markets, Part 2,* Sheetal Nasta, RBN Energy, LLC, January 30, 2017

Unconventional Gas Play Trends in Northeast British Columbia



Source: *British Columbia's Shale and Tight Resources,* Natural Gas Canada, BC Oil and Gas Commission

List of Proposed BC LNG Export Projects

Aurora LNG	LNG Canada	Steelhead LNG: Sarita LNG
Canada Stewart Energy Project	NewTimes Energy Ltd.	Triton LNG
Cedar LNG	Nisga's LNG	Watson Island LNG
Discover LNG	Orca LNG	WCC LNG Ltd.
Grassy Point LNG	Pacific NorthWest LNG	WesPac
Kitimat LNG	Prince Rupert LNG	Woodfibre LNG
Kitsault Energy Project	Steelhead LNG: Malahat LNG	

Source: *Factsheet: LNG project proposals in British Columbia,* BC Gov News

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BC LNG Export Projects and Their Upstream Supply Pipelines

LNG Project	Pipeline	Pipeline specs
Prince Rupert LNG ($16 billion)	Westcoast Connector Gas Transmission Project ($7.5 billion)	2 – 534-mile, 48” diameter pipelines 4.2 BCF per day
Pacific Northwest ($11.4 billion)	Prince Rupert Gas Transmission ($5 billion) and	559-mile pipeline 2.0 BCF per day
	North Montney Mainline ($1.7 billion)	186-mile pipeline 2.4 BCF per day
Kitimat LNG	Pacific Trail Pipeline ($1.5 billion)	298-mile, 42” pipeline
LNG Canada ($40 billion)	Coastal Gas Link ($4 billion)	416-mile, 48" pipeline 1.7 BCF per day

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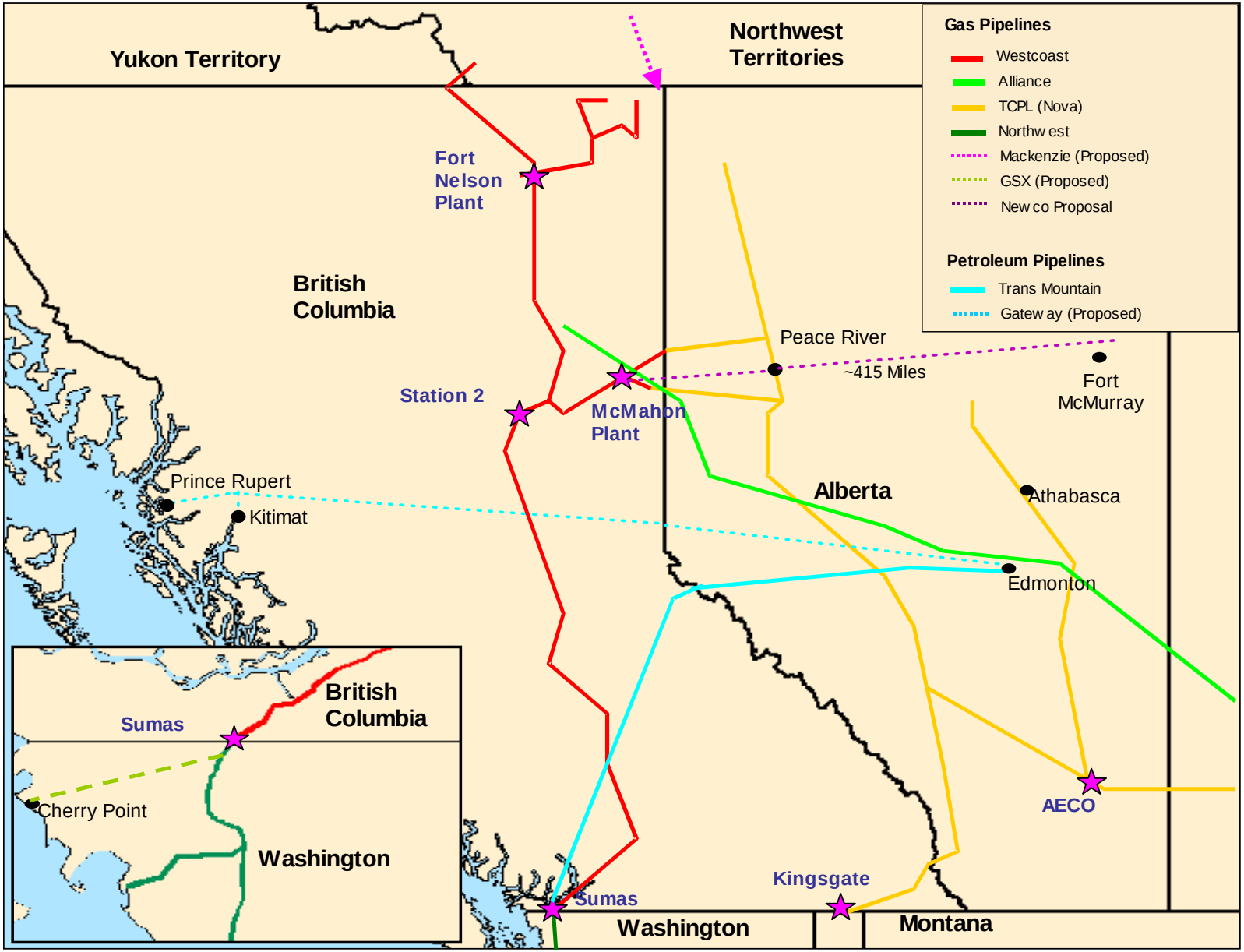
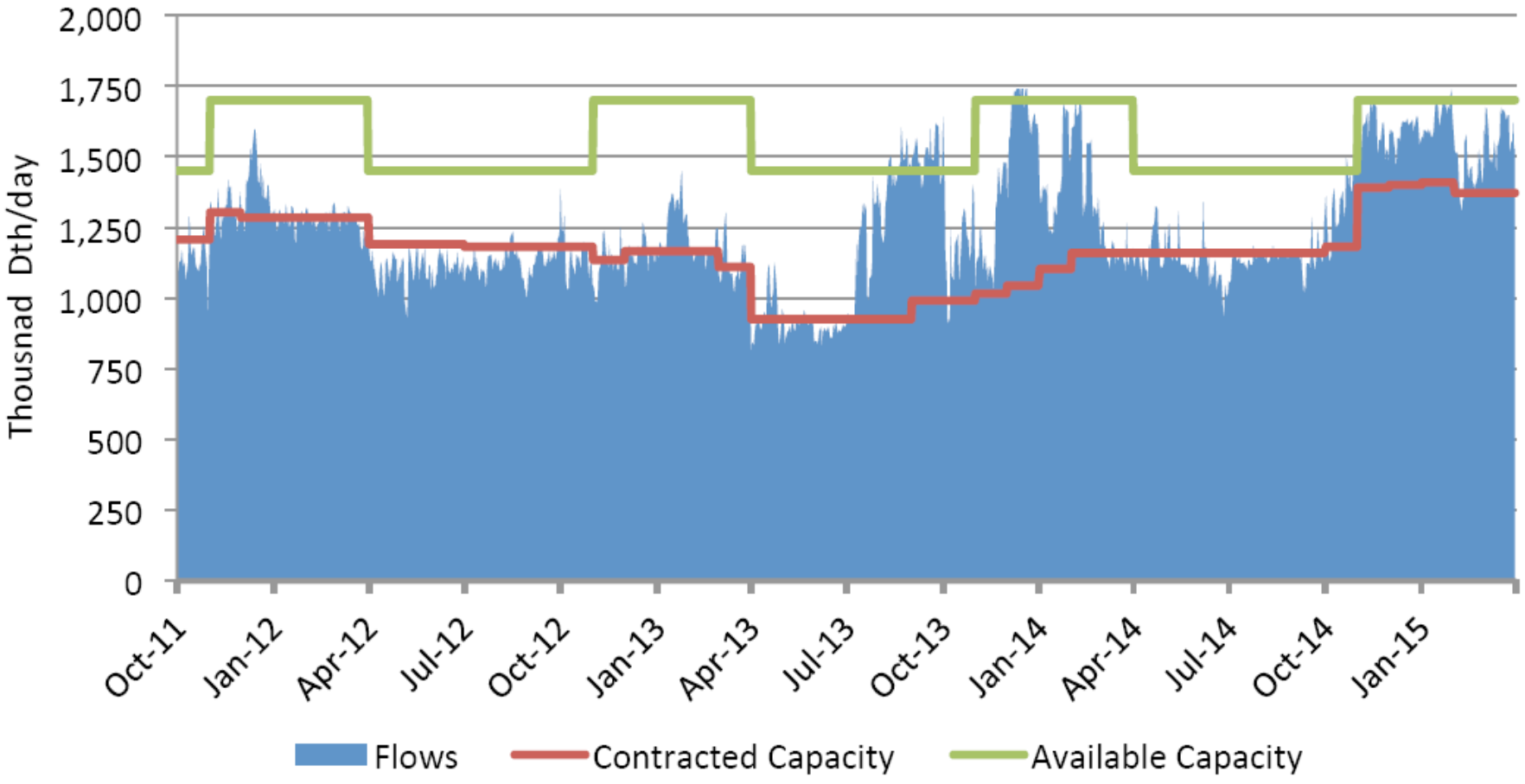
Western Canada Pipeline Schematic



Source: *The Northwest Gas Landscape – Looking Forward*, The Power & Natural Gas Planning Taskforce, July 2015

Pipeline Flows (Spectra) from Station 2 to Sumas



Source: *The Northwest Gas Landscape – Looking Forward*, The Power & Natural Gas Planning Taskforce, July 2015

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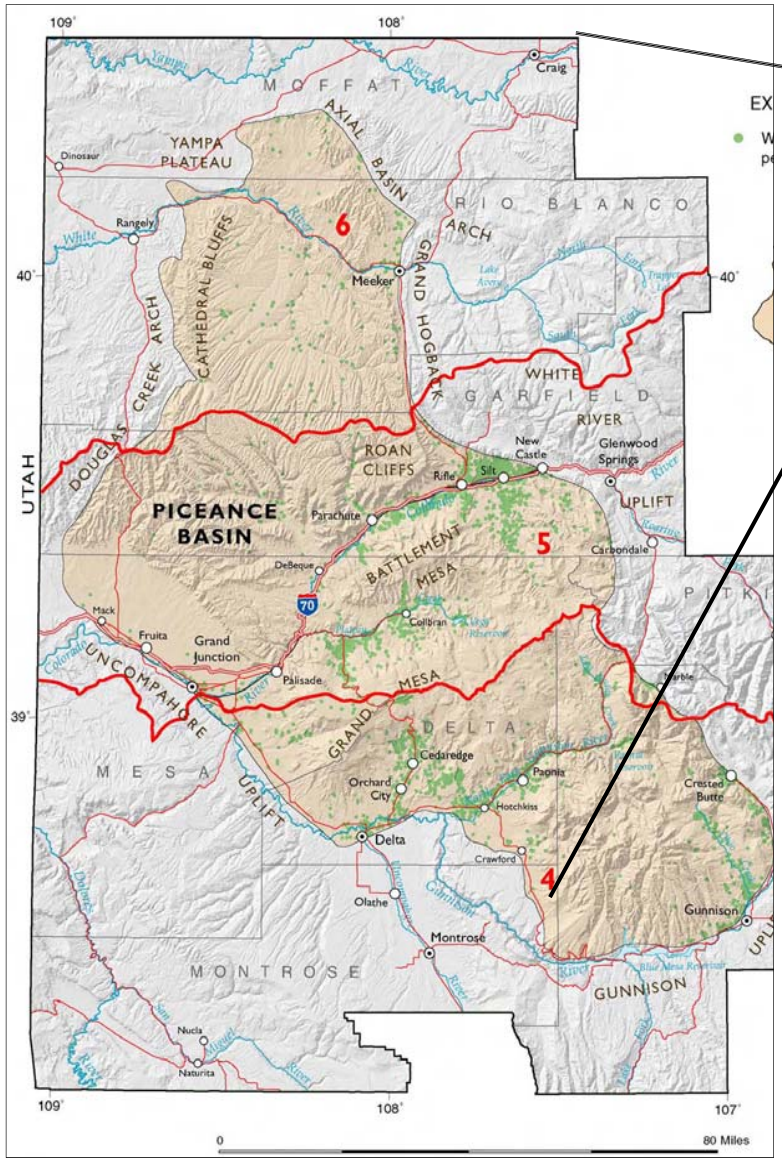
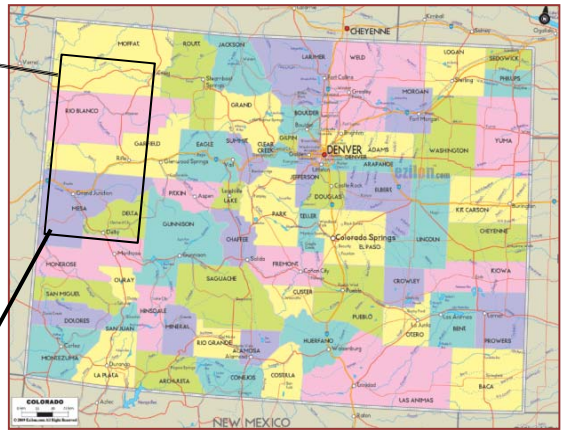
Colorado and Piceance Basin Maps





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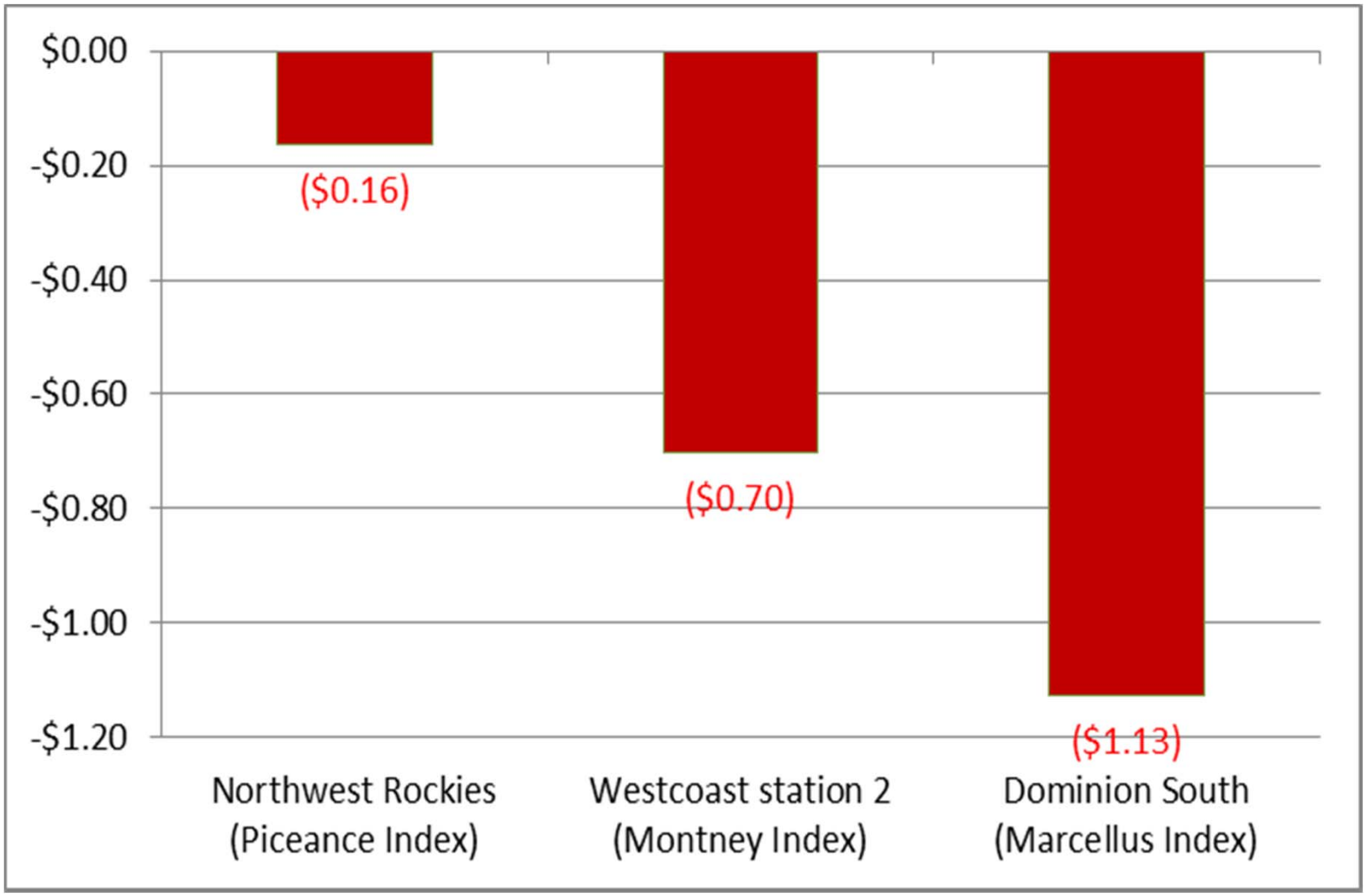
Piceance Basin Price Superiority



Source: Inside FERC's Gas Marketing Report, S&P Global Platts Publication 2014-2016 information as compared to NYMEX average of last 3 days

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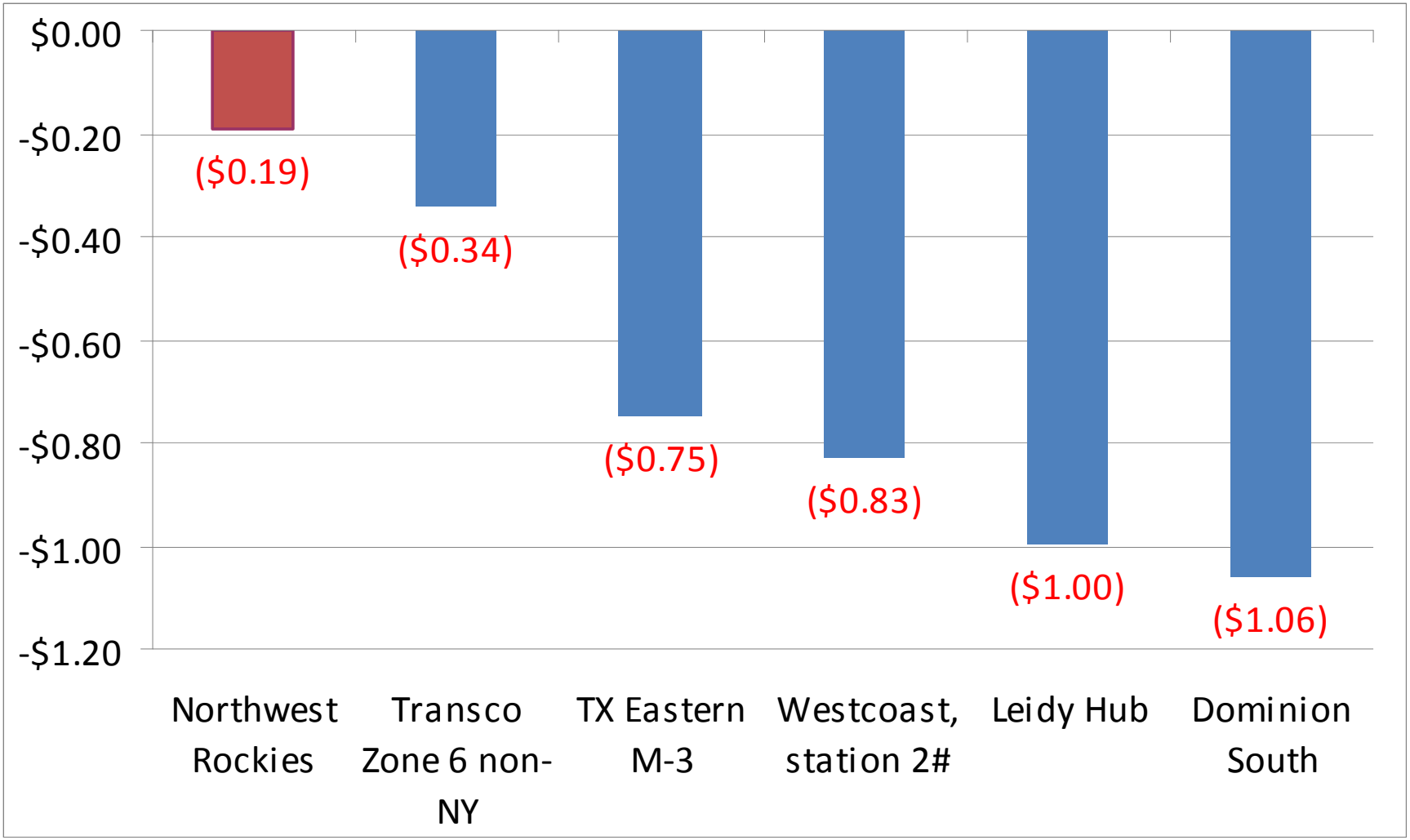
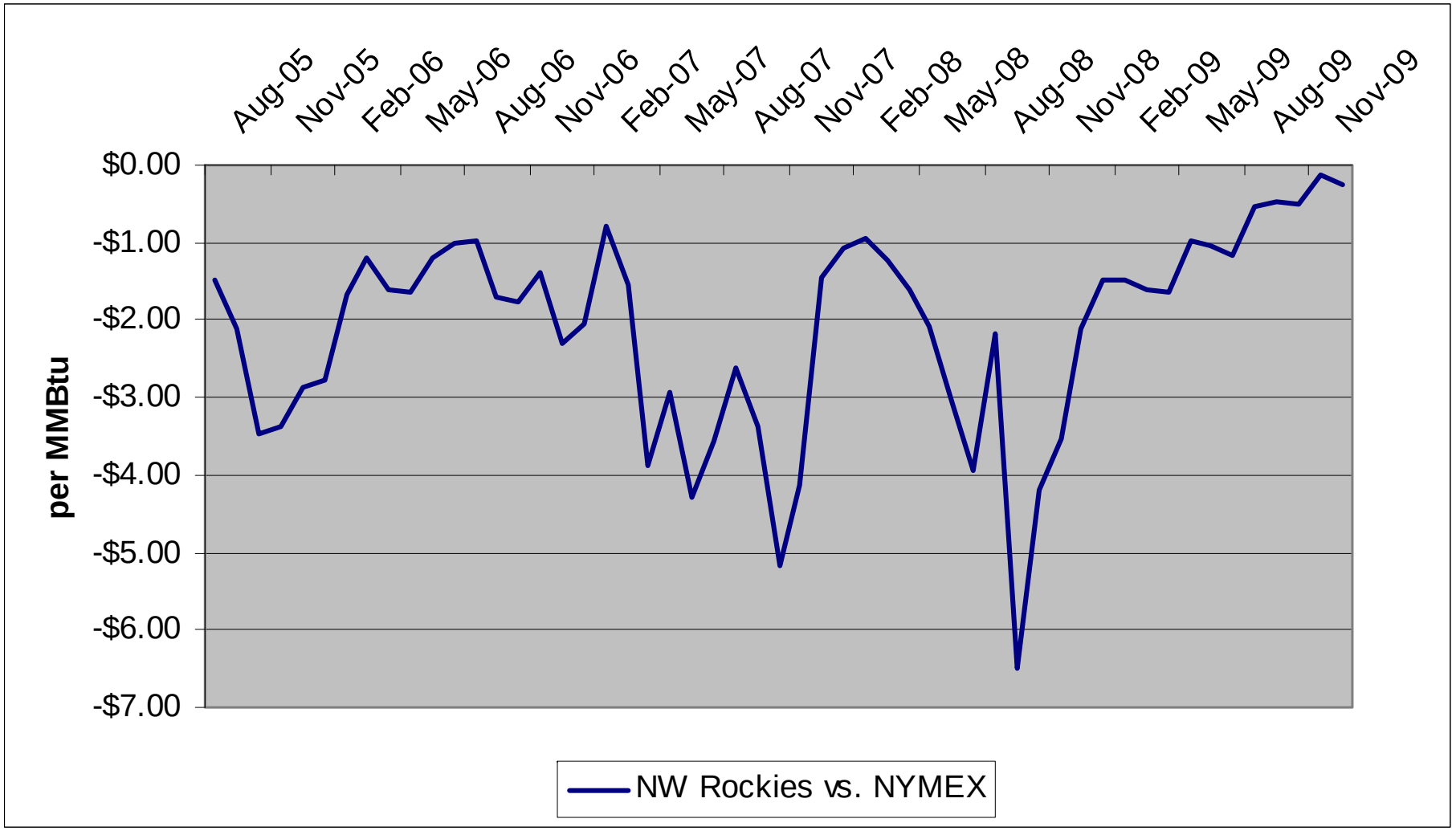
Average Basis Differential for 2016



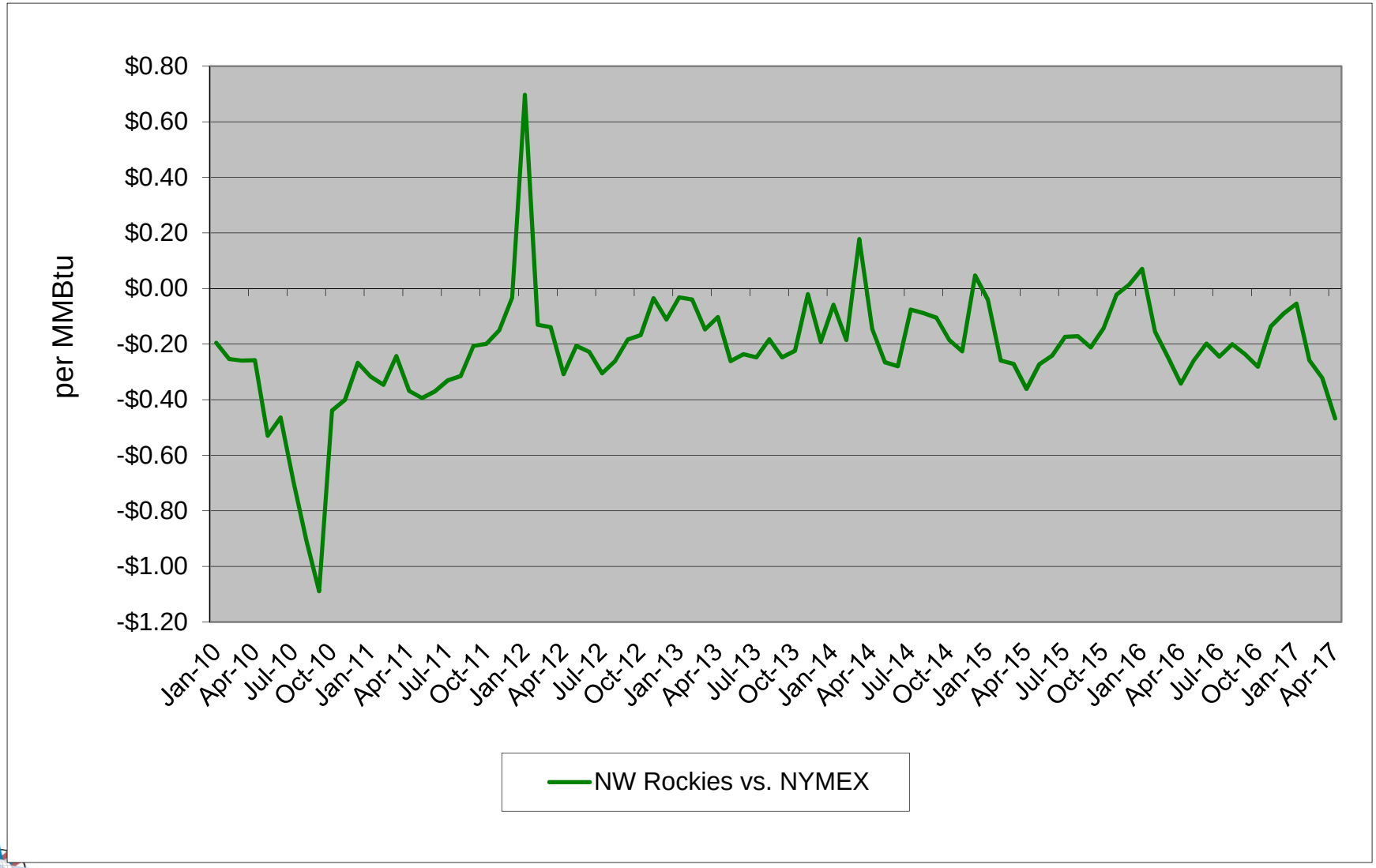
Source: Inside FERC's Gas Marketing Report, S&P Global Platts Publication

Basis Differential Between Northwest-Rockies and NYMEX 2005-2009



Source: Inside FERC's Gas Marketing Report, S&P Global Platts Publication

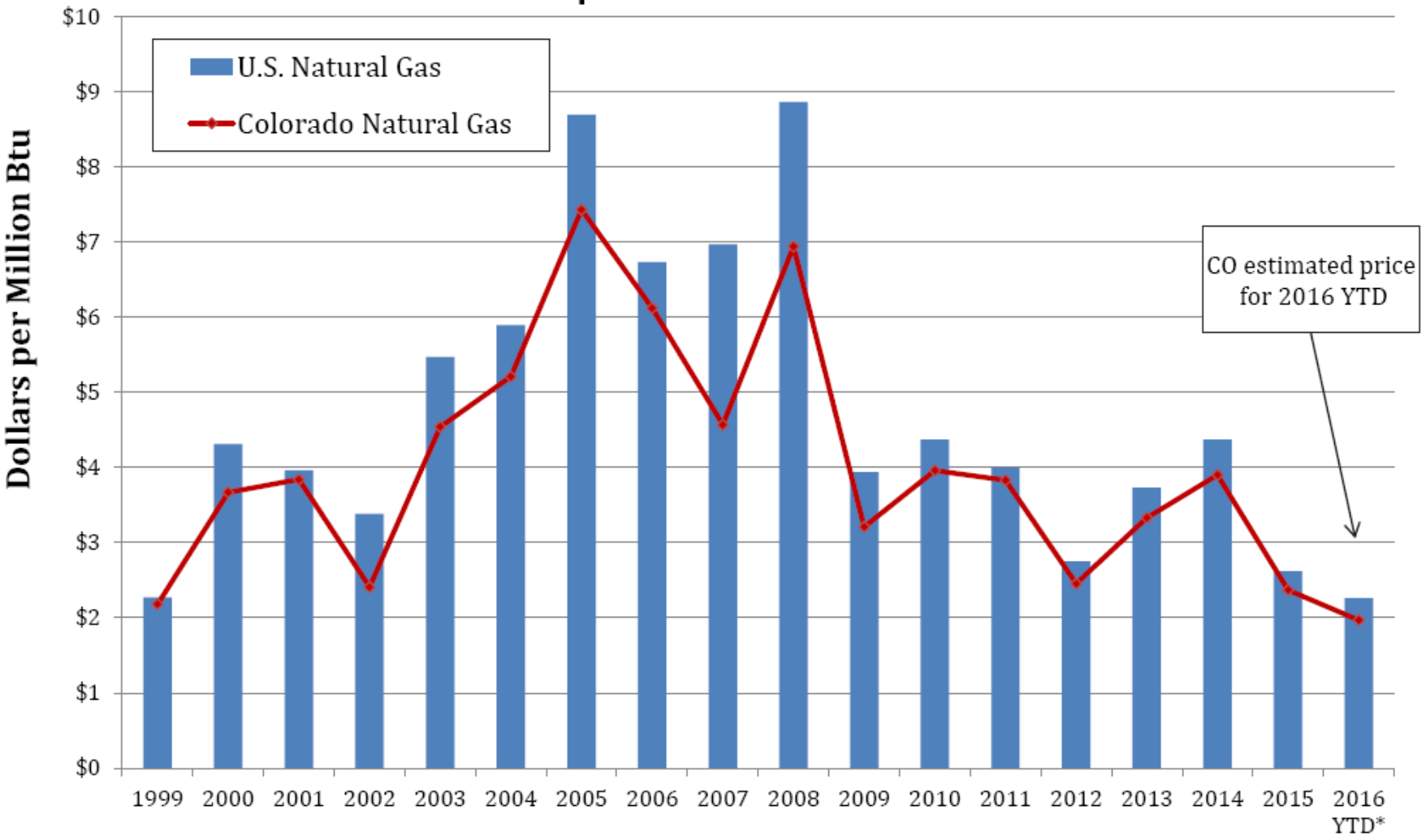
Basis Differential Between Northwest-Rockies and NYMEX 2010-Current



Source: Inside FERC's Gas Marketing Report, S&P Global Platts Publication

Average Annual Natural Gas Prices, 1999-2016

Colorado wellhead prices trend below the benchmark trading price to account for fuel transportation costs to markets outside the state



Source: U.S. Department of Energy, Energy Information Administration

Note: Henry Hub is a common trading benchmark price. Does not include 2014 polar vortex price spike for Colorado.

**2016 year-to-date data represents U.S. average daily spot price from January to August. 2012 to 2016 Colorado price estimated.*

Fig. 12

Source: *Resource Rich Colorado, Colorado's National And Global Position in the Energy Economy, Eighth Edition December 2016,* Colorado Energy Coalition

Comparative Rockies Rig Count

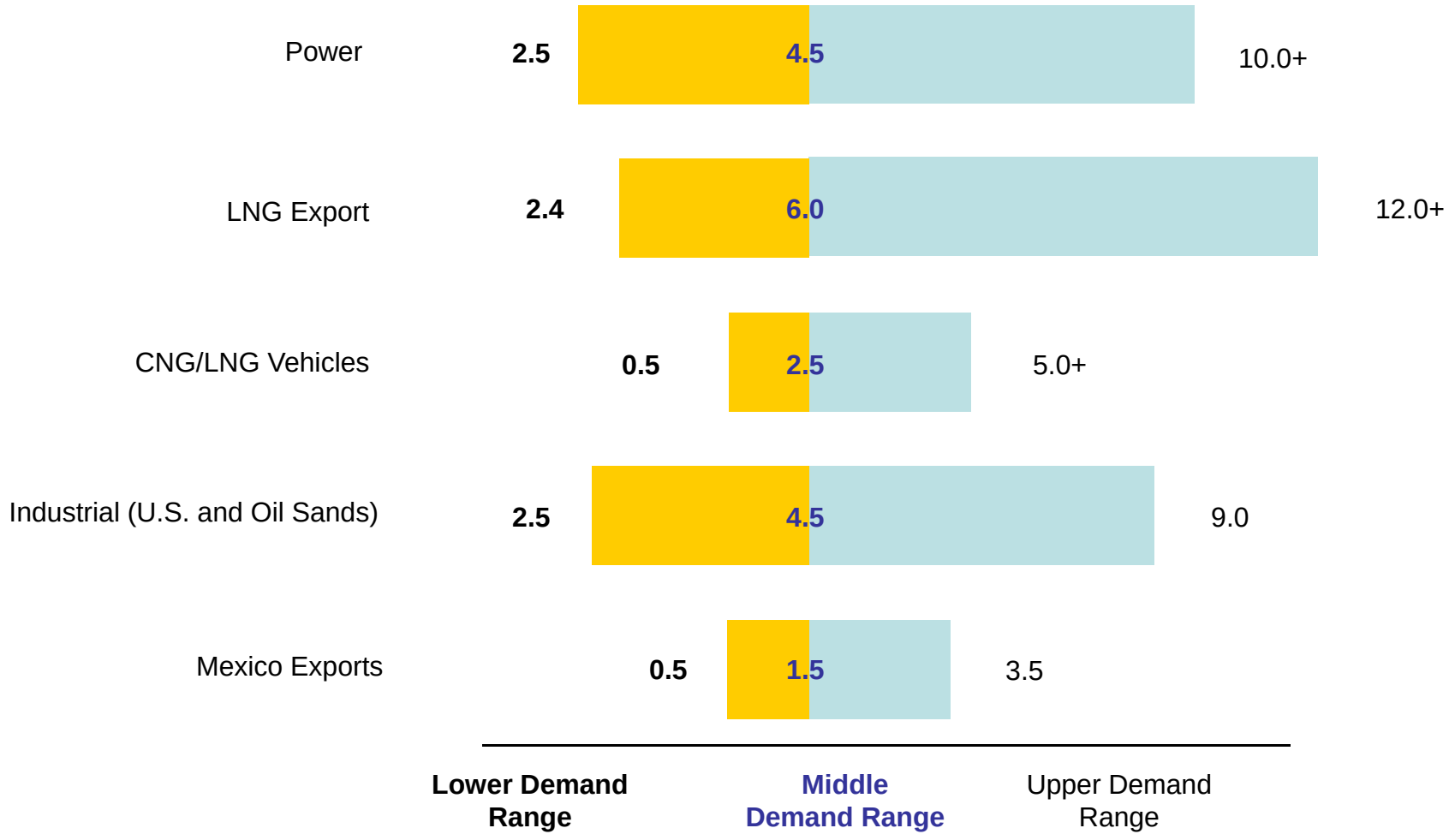
	2014 Average	Quarter 1, 2015	Quarter 2, 2015	Quarter 2, 2016	Quarter 2, 2017
DJ Niobrara	54	44	34	12	24
Piceance Basin	12	10	9	3	6
Uinta Basin	28	14	8	3	8
Powder River Basin	34	23	12	1	8
Greater Green River Basin	17	13	12	6	9
Williston Basin	186	135	95	25	45

Source: Tudor Pickering Holt & Co. Weekly Rig Roundup, February 23, 2015, April 6, 2015 and April 10, 2017

North American Natural Gas

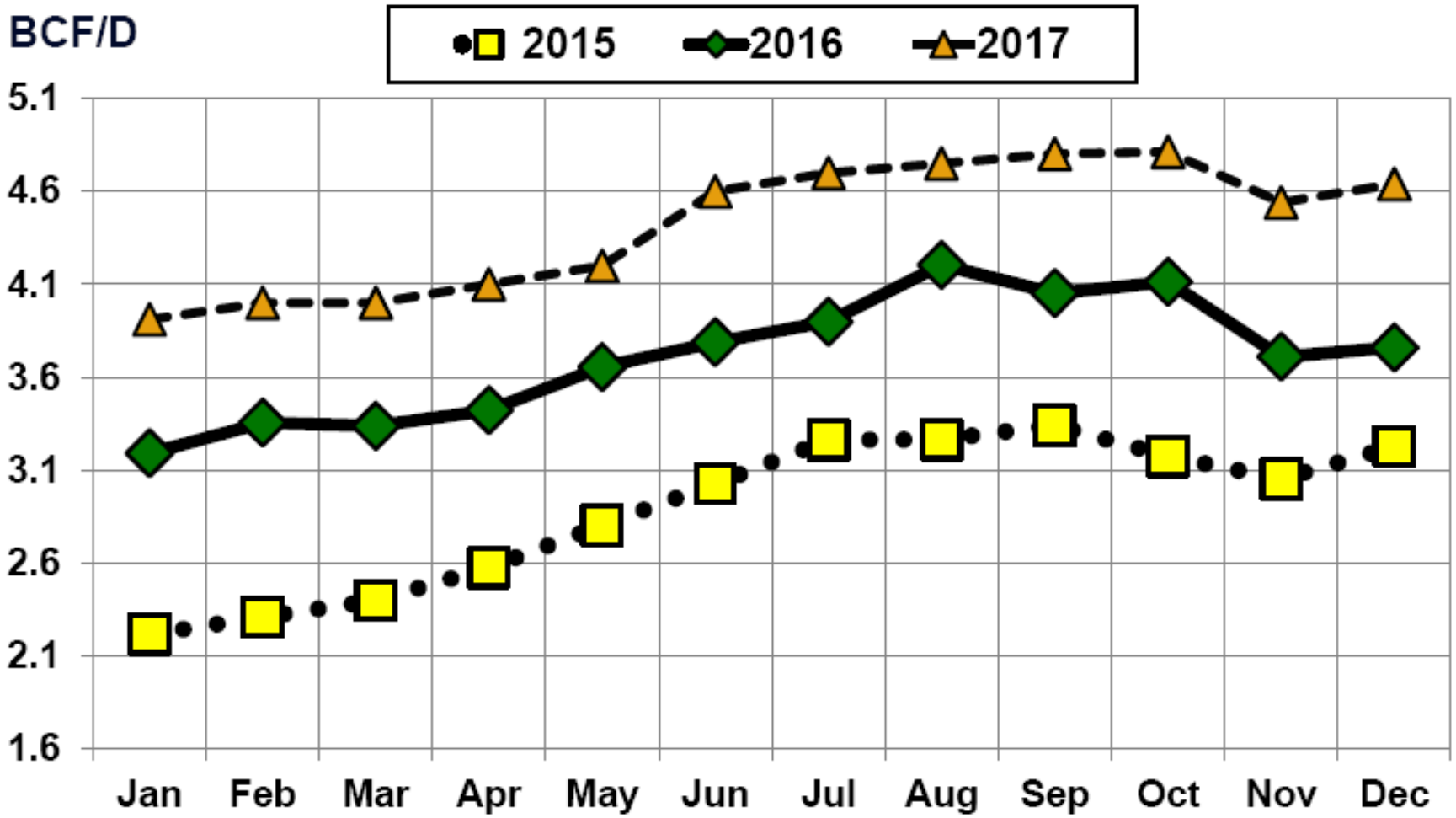
Demand Ranges by Selected Sector

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



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. Net Gas Exports to Mexico by Month



PIRA forecast post-October 2016.

Source: *North American Gas Forecast Monthly,* PIRA, January 30, 2017

Jordan Cove Update

- Feb 10, 2017 – Received FERC approval for pre-filing application, which clears the way for the LNG project to move through the federal permitting process
  - Coordinating with FERC to schedule informational open house meetings
- August 30, 2017 – Project intends to file a formal application
- 2019 – Potential Final Investment Decision (FID)
- 2024 – Anticipated In-Service Date

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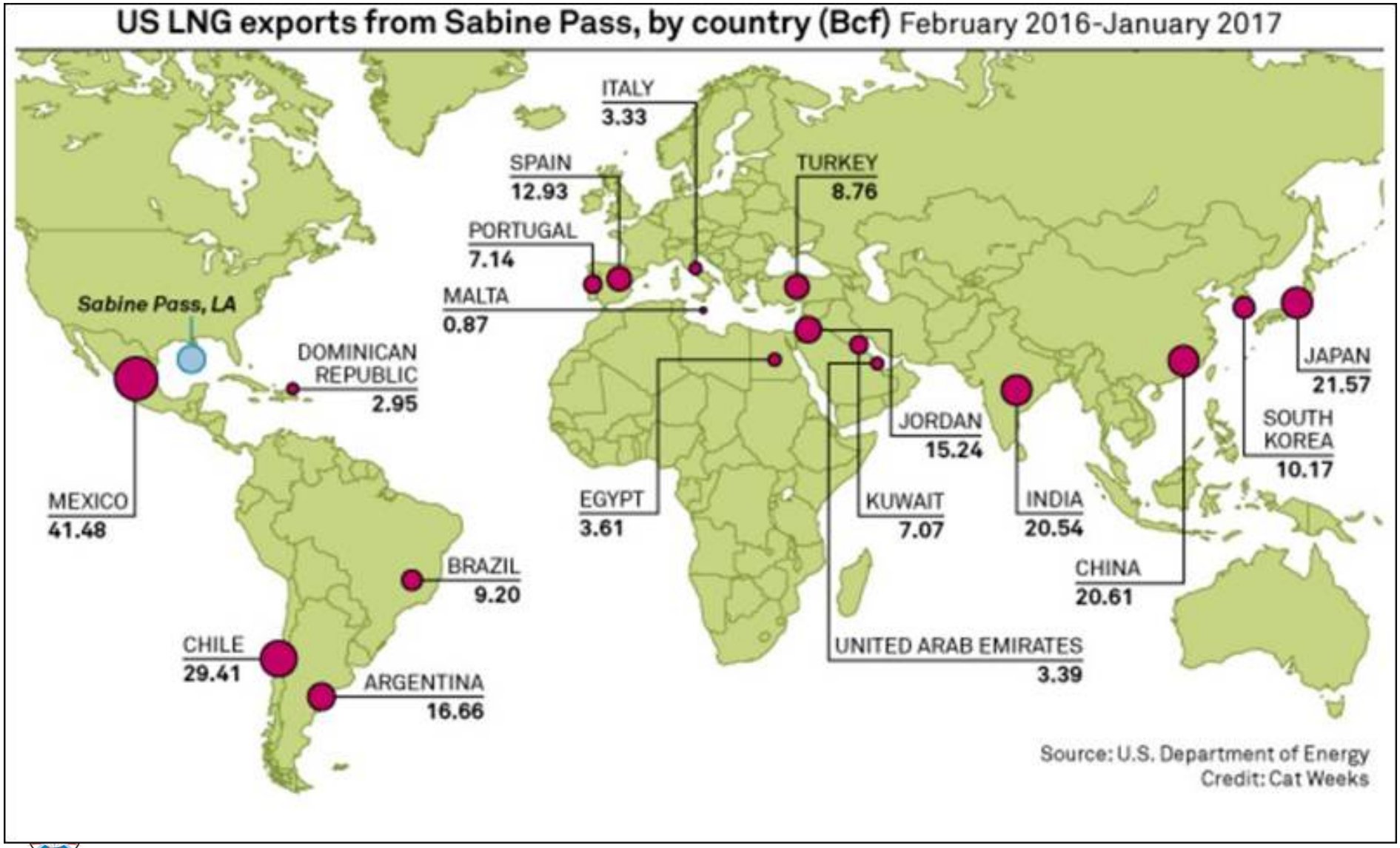
Sources: *Veresen to spend $30 million on Jordan Cove LNG in 2017,* LNG World News, March 3, 2017

Jordancovelng.com

Piceance to Pacific

Source: Veresen Corporate Presentation, November 2014

Cheniere Energy exports 100th LNG cargo



World LNG Estimated October 2014 Landed Prices
($U.S./MMBtu)

Source: Waterborne Energy, Inc. Data in $US/MMBtu. Landed prices are based on a netback calculation.

Note: Includes information and Data supplied by IHS Global Inc. and its affiliates ("IHS"); Copyright (publication year) all rights reserved.

Prices are the monthly average of the weekly landed prices for the listed month.

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

Source: Waterborne Energy, Inc. Data in $US/MMBtu. Landed prices are based on a netback calculation.

Note: Includes information and Data supplied by IHS Global Inc. and its affiliates ("IHS"); Copyright (publication year) all rights reserved.

Prices are the monthly average of the weekly landed prices for the listed month.

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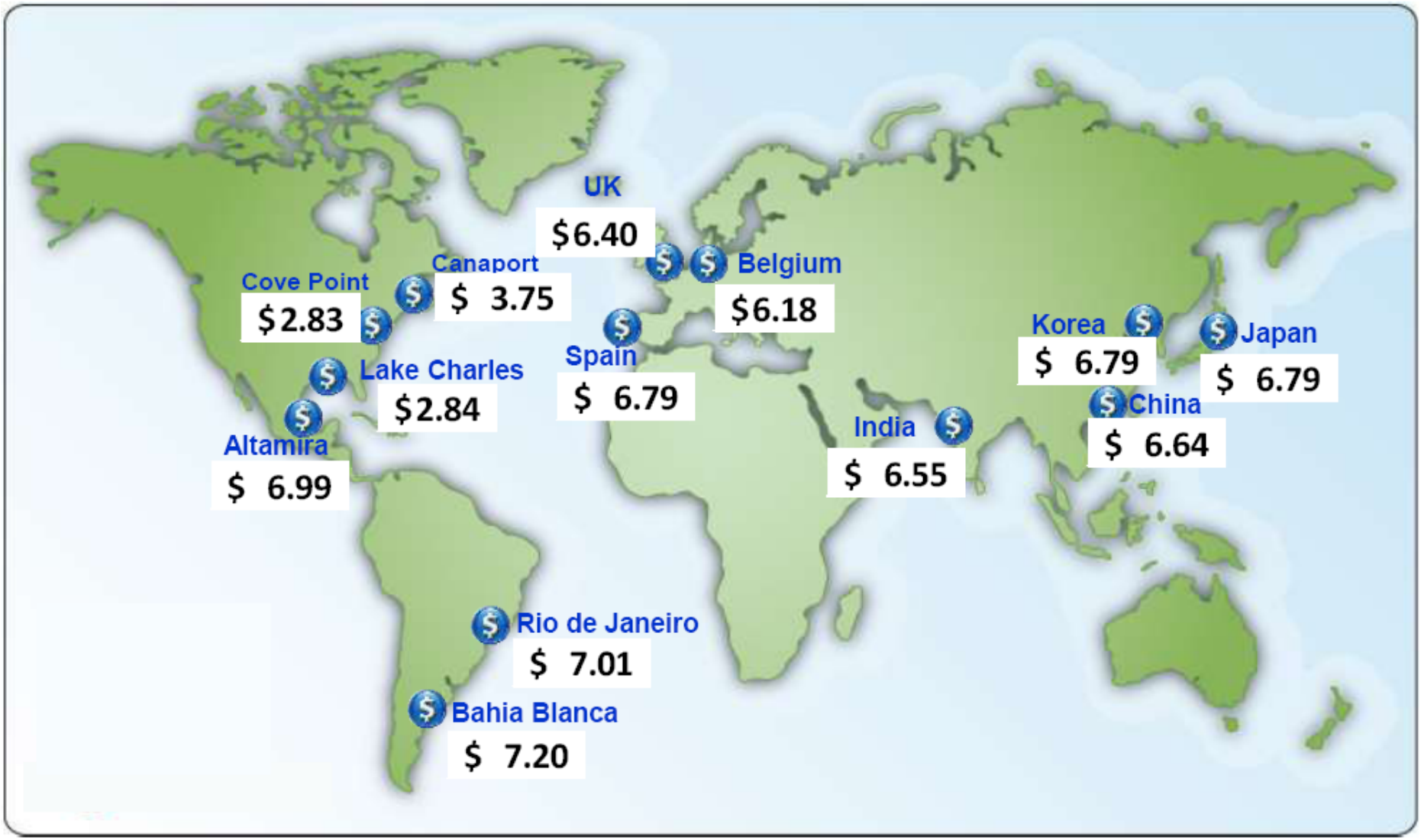
World LNG Estimated February 2017 Landed Prices
($U.S./MMBtu)



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Prices are the monthly average of the weekly landed prices for the listed month.

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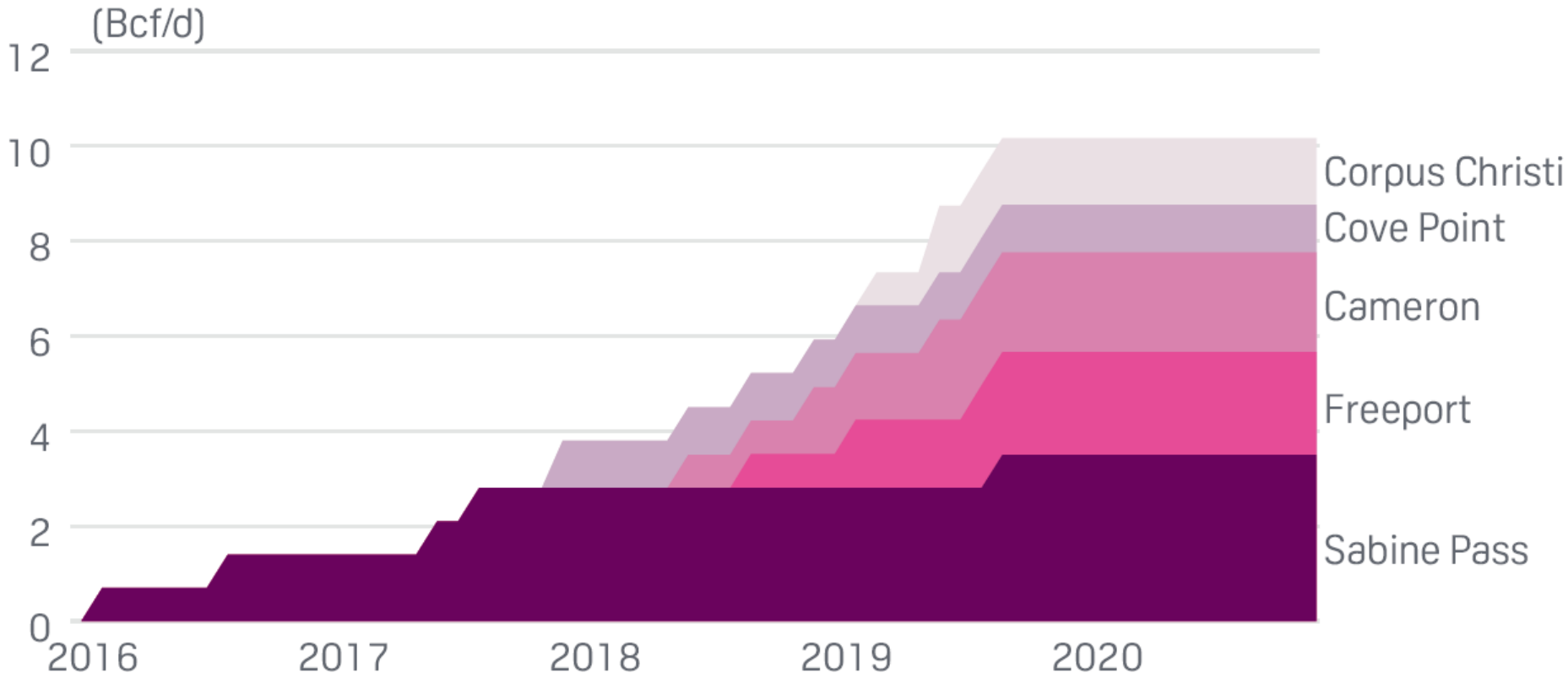
Updated: March 2017

BENTEK LNG CAPACITY BUILD



Source: Platts Analytics' Bentek Energy

Source: *LNG buyers pushing US exporters to be flexible*, Harry Weber, Grant Gunter, Gas Daily, S&P Global Platts Publication, February 10, 2017

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California Statewide Summary of Snow Water Content

(as of March 24, 2017)

North	
Number of Stations Reporting	28
Average snow water equivalent (inches)	39.3
Percent of April Average (%)	142
Percent of normal for this date (%)	142

Central	
Number of Stations Reporting	41
Average snow water equivalent (inches)	48.8
Percent of April Average (%)	169
Percent of normal for this date (%)	170

South	
Number of Stations Reporting	25
Average snow water equivalent (inches)	44.1
Percent of April Average (%)	162
Percent of normal for this date (%)	163

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Source: State of California, Dept. of Water Resources,
Current Regional Snowpack from Automated Snow Sensors

California Statewide Summary of Snow Water Content

(as of March 24, 2017)

State	
Number of Stations Reporting	94
Average snow water equivalent (inches)	44.7
Percent of April Average (%)	159
Percent of normal for this date (%)	160

Statewide Average: 159% / 160%

Source: State of California, Dept. of Water Resources, Current Regional Snowpack from Automated Snow Sensors

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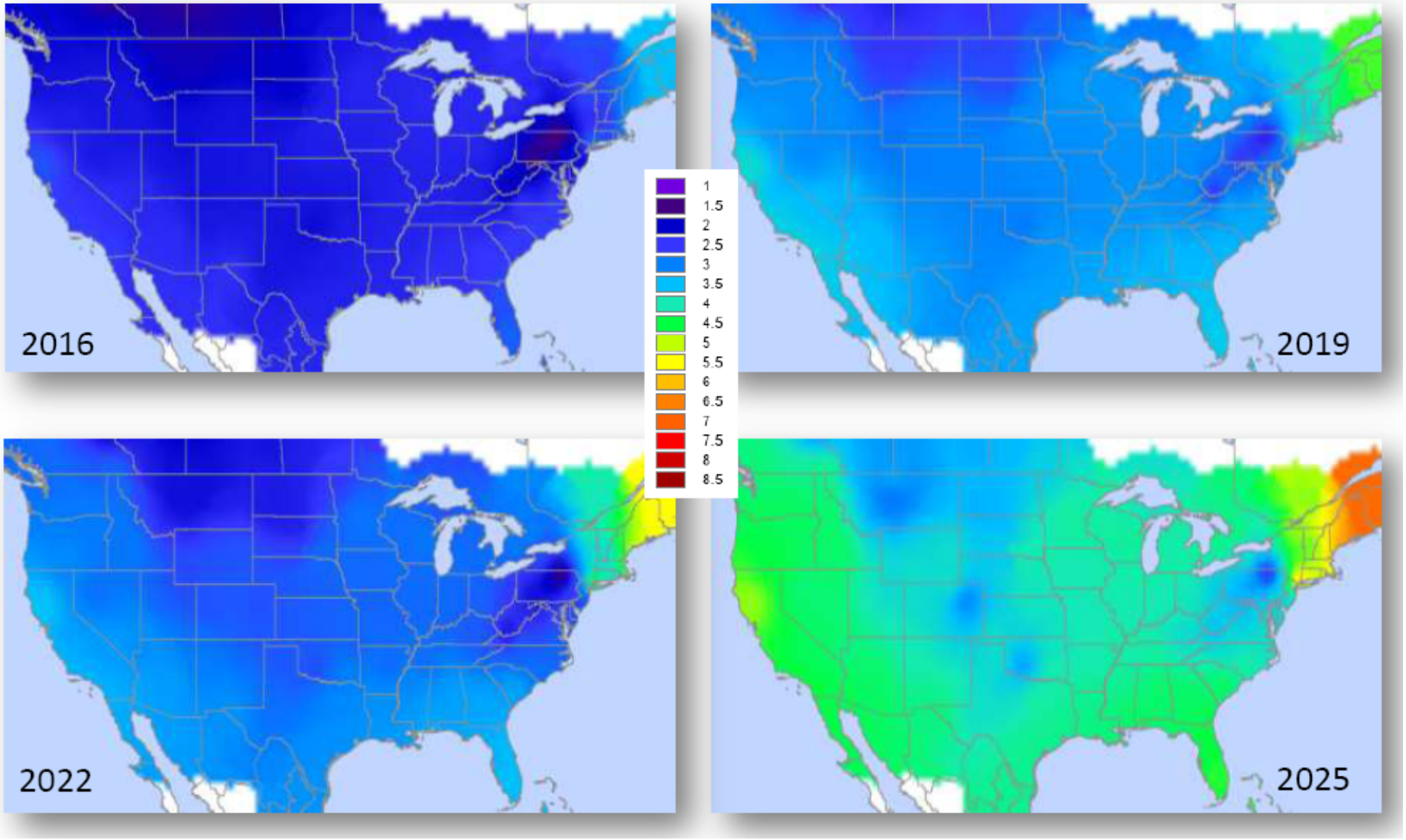
Natural Gas Price Outlook



Source: *U.S. Natural Gas Outlook,* George Wayne, KinderMorgan, December 2016

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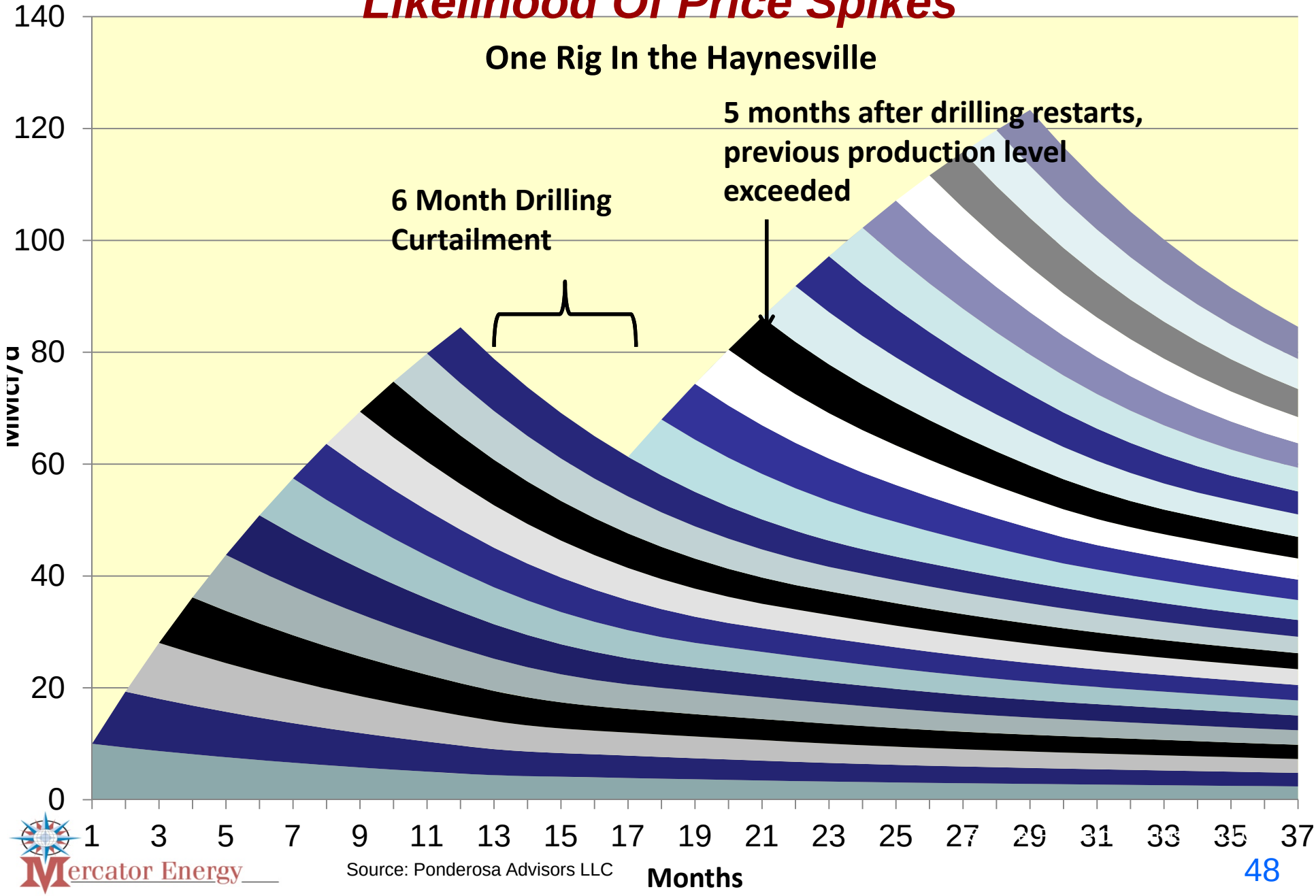
The "Ferrari" Affect Substantially Reduces The Likelihood Of Price Spikes



Source: Ponderosa Advisors LLC

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Conclusions – Current

- With regard to energy, most of our lives have been spent considering all forms of energy as a scarce resource
- Thanks to the Shale Revolution, that will not be the case in the future
- That reality will have many, many geopolitical consequences
- Waiting on market
- We need $3.50 to Meeker to see the Mancos Shale developed

Citations for Report

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

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Ponderosa Advisors LLC
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The Power and Natural Gas Planning Taskforce
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Rueters
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RBN Energy
Chevron
Encana Corporation
Waterborne Energy, Inc.
Colorado Oil and Gas Conservation Commission
Wyoming Pipeline Authority, Brian Jeffries
National Energy Board
PennState Marcellus Center for Outreach and Research
BC Oil & Gas Commission
Kinder Morgan, George Wayne
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Tudor Pickering Holt & Co.
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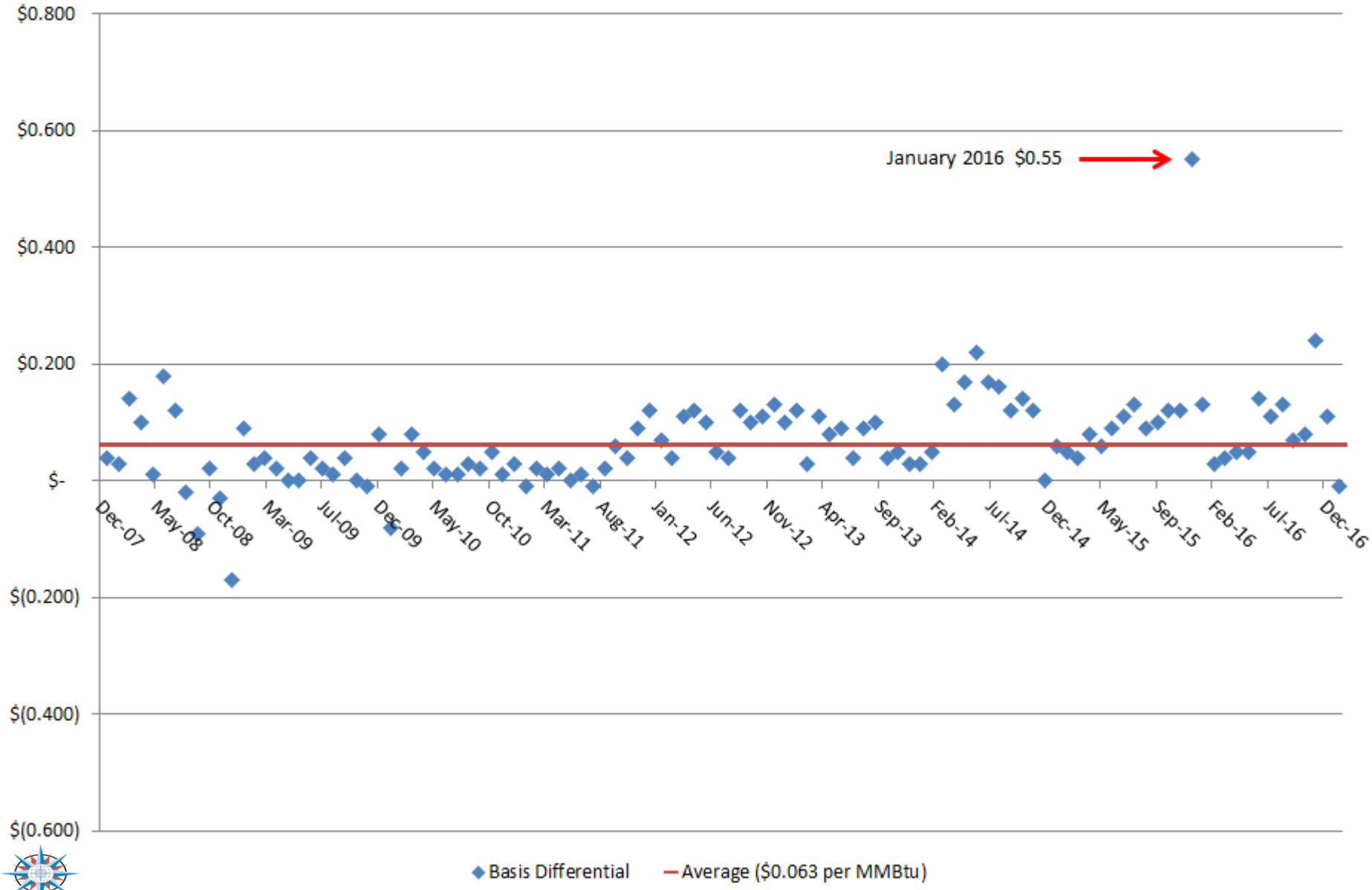
Basis Differential
Kern River Index vs. CIG Rockies



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Source: *Inside FERC's Gas Market Report*, S&P Global Platts Publication