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**Energy Policy Research Foundation, Inc. (EPRINC)**

**Italian Embassy, EPRINC Embassy Series**

**May 28, 2015**

# Scene Setting - Sustaining North American Production in a Low Oil Price Environment

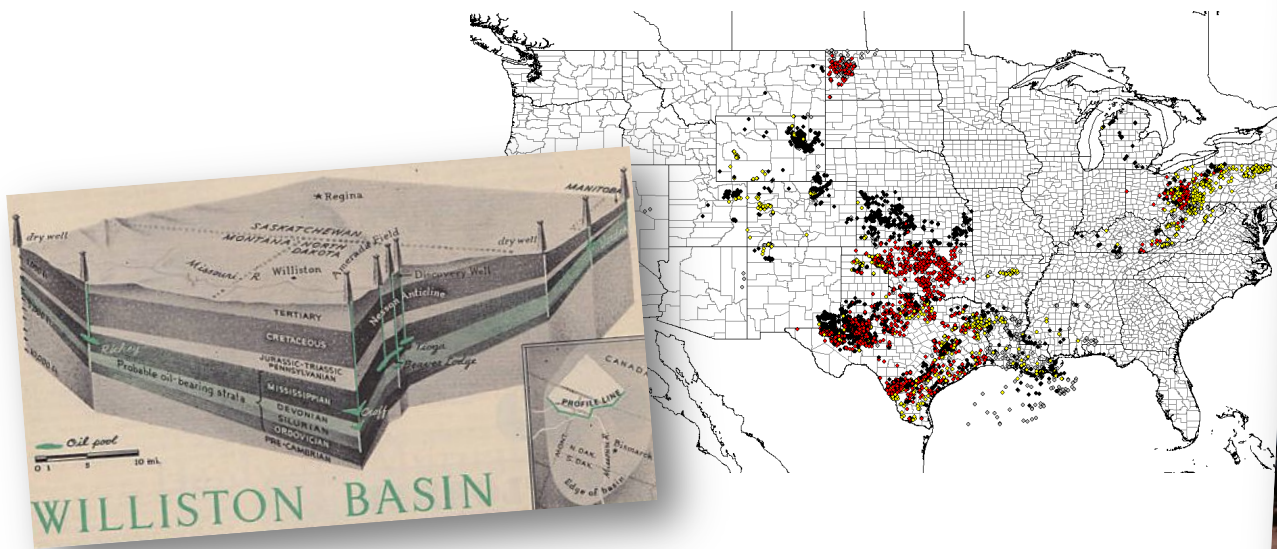


Photo by Trisha Curtis

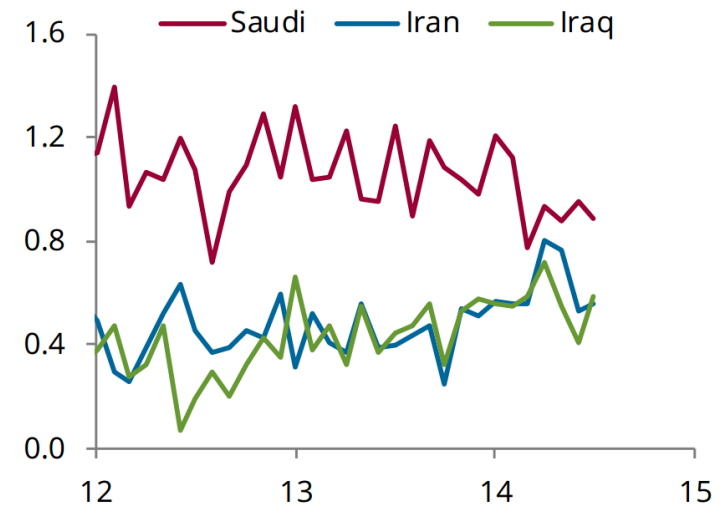
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## When oil prices started to slip

Several events taken together along with lowered expectations of Chinese and European economic growth caused oil prices to weaken

- 9 mbd plus U.S. production
- Some strong non-OPEC production in 2014
- Significant volumes of crude moving from the U.S. to Canada displacing African barrels (Bakken and Eagle Ford)
- Libyan crude unexpectedly comes on the market
- ISIS is pushing barrels on the market
- Draghi spooks markets with negative inflation expectations for Europe in Jackson Hole Sept 2014
- People begin to actually believe the negative data out of China
- Saudi's share of crude into China and Asia eroded by volumes from Iran and Iraq
- Rise in dollar

**Fig 2: Chinese imports from Middle East, mb/d**



Source: China Customs, Energy Aspects

Source: Energy Aspects, Aug 24<sup>th</sup>, 2014, WSJ Nov 4 2014

# Introductory Comments

- Significant production growth in North America poses substantial benefits across the entire petroleum sector (upstream, midstream, and downstream)
- Prudent policy making is important – this is an abundant resource which can be developed economically and safely, clarity on regulations is critical (exports, infrastructure, BLM fracking etc.)
- Overall strong production growth and resulting lower oil prices are a net positive for the U.S. economy. (By mid-2014 capital spending in the energy sector exceeded \$150 billion or 1% of GDP.)
- A stable North American production platform poses significant benefits to Europe and the world – reduction in price volatility throughout recent cutbacks
- ME and global production are very important to prices despite potential trade flow adjustments (will this change that much with exports?)
- U.S. unconventional production has come on quickly and drilling activity responded aggressively to lower oil prices. **Swing producer? Not in the OPEC sense.**

# 2015 Announced CAPEX Cuts

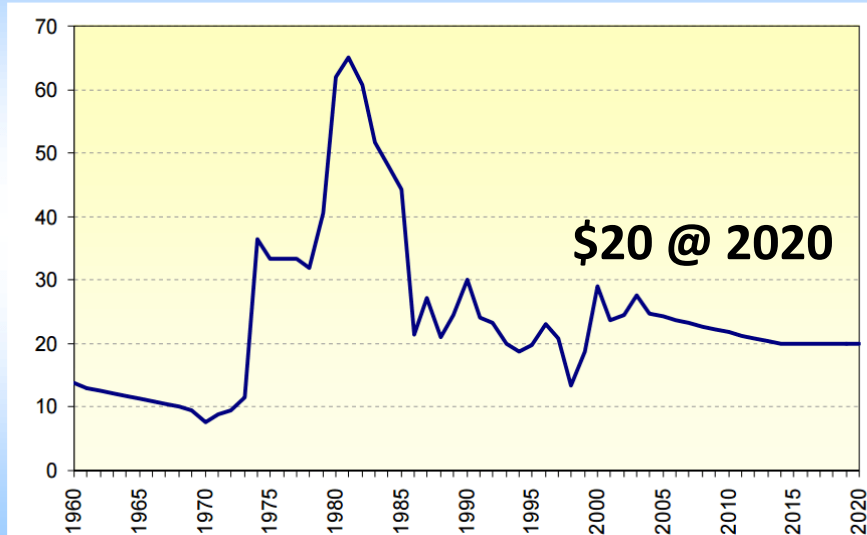
Company	2014 Capex (millions)	2015 Capex (millions)	% Change				
BP	\$23,800.00	\$20,000.00	-16%	Denbury Resources Inc	\$1,100.00	\$550.00	-50%
CNOOC	\$17,200.00	\$11,200.00	-35%	Emerald Oil Inc	\$225.00	\$72.50	-68%
ConocoPhillips	\$16,870.00	\$11,500.00	-32%	Swift Energy	\$400.00	\$100.00	-75%
Occidental Petroleum	\$8,700.00	\$5,800.00	-33%	Marathon Oil	\$5,500.00	\$4,400.00	-20%
Chevron	\$40,000.00	\$35,000.00	-13%	Goodrich Petroleum	\$375.00	\$175.00	-53%
Hess	\$5,600.00	\$4,700.00	-16%	Repsol	\$4,150.00	\$2,700.00	-35%
Continental Resources	\$5,200.00	\$2,700.00	-48%	Bellatrix Exploration	\$400.00	\$200.00	-50%
Murphy Oil	\$3,430.00	\$2,300.00	-33%	Cabot Oil and Gas	\$1,600.00	\$900.00	-44%
Concho Resources	\$2,600.00	\$2,000.00	-23%	Chesapeake Energy	\$6,700.00	\$3,750.00	-44%
Sanchez Energy	\$2,100.00	\$1,200.00	-43%	Chinook Energy	\$135.00	\$45.00	-67%
Halcon Resources	\$1,600.00	\$400.00	-64%	Complex Energy	\$2,700.00	\$1,200.00	-45%
Rosetta Resources	\$1,200.00	\$750.00	-38%	Concho Resources	\$3,000.00	\$2,000.00	-33%
Oasis Petroleum	\$1,425.00	\$800.00	-44%	Diamondback Energy	\$425.00	\$425.00	-6%
Diamondback Energy	\$710.00	\$425.00	-40%	Encana Energy	\$2,550.00	\$2,800.00	10%
PDC Energy	\$650.00	\$557.00	-14%	Gulfport	\$1,100.00	\$660.00	-40%
Bonanza Creek Energy	\$667.00	\$420.00	-37%	Linn Energy	\$1,550.00	\$730.00	-53%
Breitbart Energy Partners	\$375.00	\$200.00	-47%	Lonestar Resources	\$140.00	\$93.00	-34%
Stone Energy	\$875.00	\$450.00	-49%	Magnum Hunter			
Laredo Energy	\$1,000.00	\$525.00	-48%	Resources	\$400.00	\$100.00	-75%
EOG Resources	\$8,300.00	\$5,000.00	-40%	Newfield Exploration	\$2,000.00	\$1,200.00	-40%
Shell	\$35,300.00	\$35,000.00	-1%	Nighthawk Energy	\$22.40	\$25.00	12%
Statoil	\$20,000.00	\$18,000.00	-10%	Parex Resources	\$290.00	\$150.00	-48%
Eni	\$13,900.00	\$11,600.00	-17%	Whiting Petroleum	\$4,000.00	\$2,000.00	-50%
BG Group	\$9,400.00	\$6,500.00	-31%	ExxonMobil	\$38,500.00	\$34,000.00	-12%
Apache Corp	\$9,500.00	\$3,800.00	-60%	Cairn India	\$1,200.00	\$500.00	-58%
				Sasol	\$4,150.00	\$3,735.00	-10%
				<b>Average:</b>	<b>6216.188</b>	<b>4855.25</b>	<b>-36%</b>

**Average CAPEX cut: 36%**

# Past forecasting errors



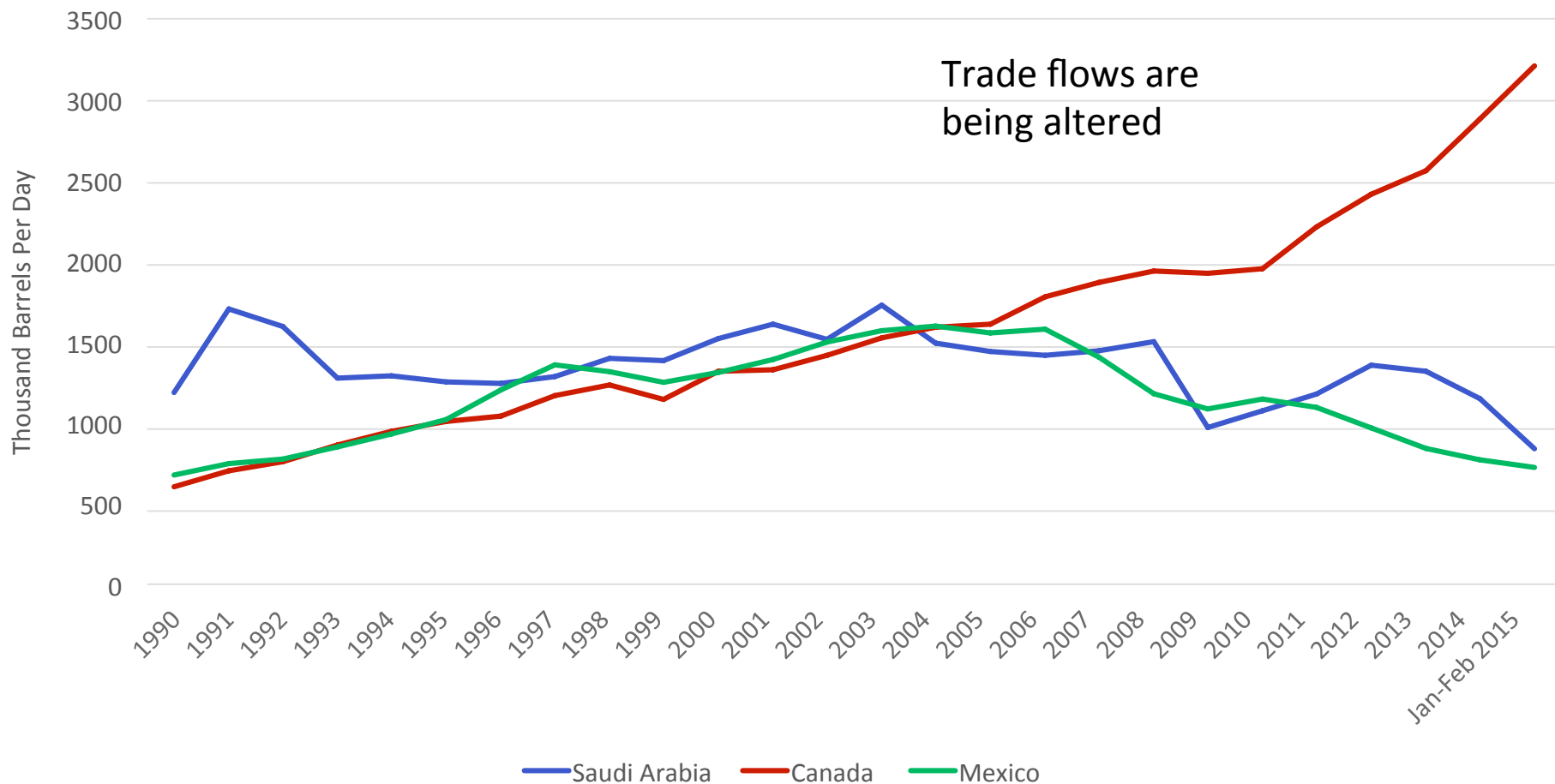
## Real oil price assumption, \$(2003)/b



Low oil price forecasts from 1990s through the mid-2000s can be attributed to two major forecasting errors:

- 1) The extrapolation forward of an ongoing, stable low price environment
- 2) The expectation that OPEC would currently be producing from 45 mbd to 60 mbd – It currently produces about 30 mbd

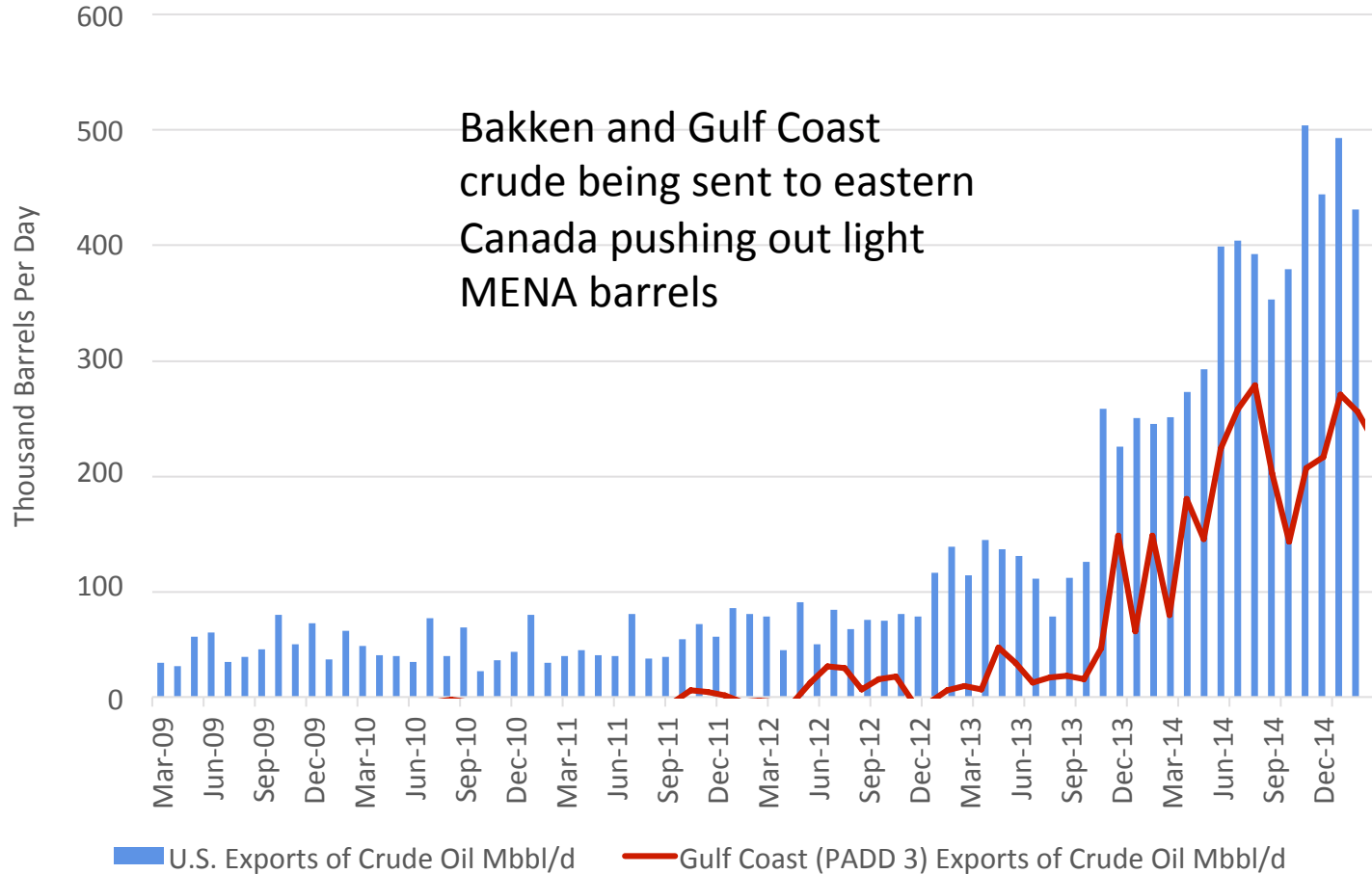
# Imports from Saudi Arabia, Canada, and Mexico



Source: EIA

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# U.S. crude oil exports to Canada



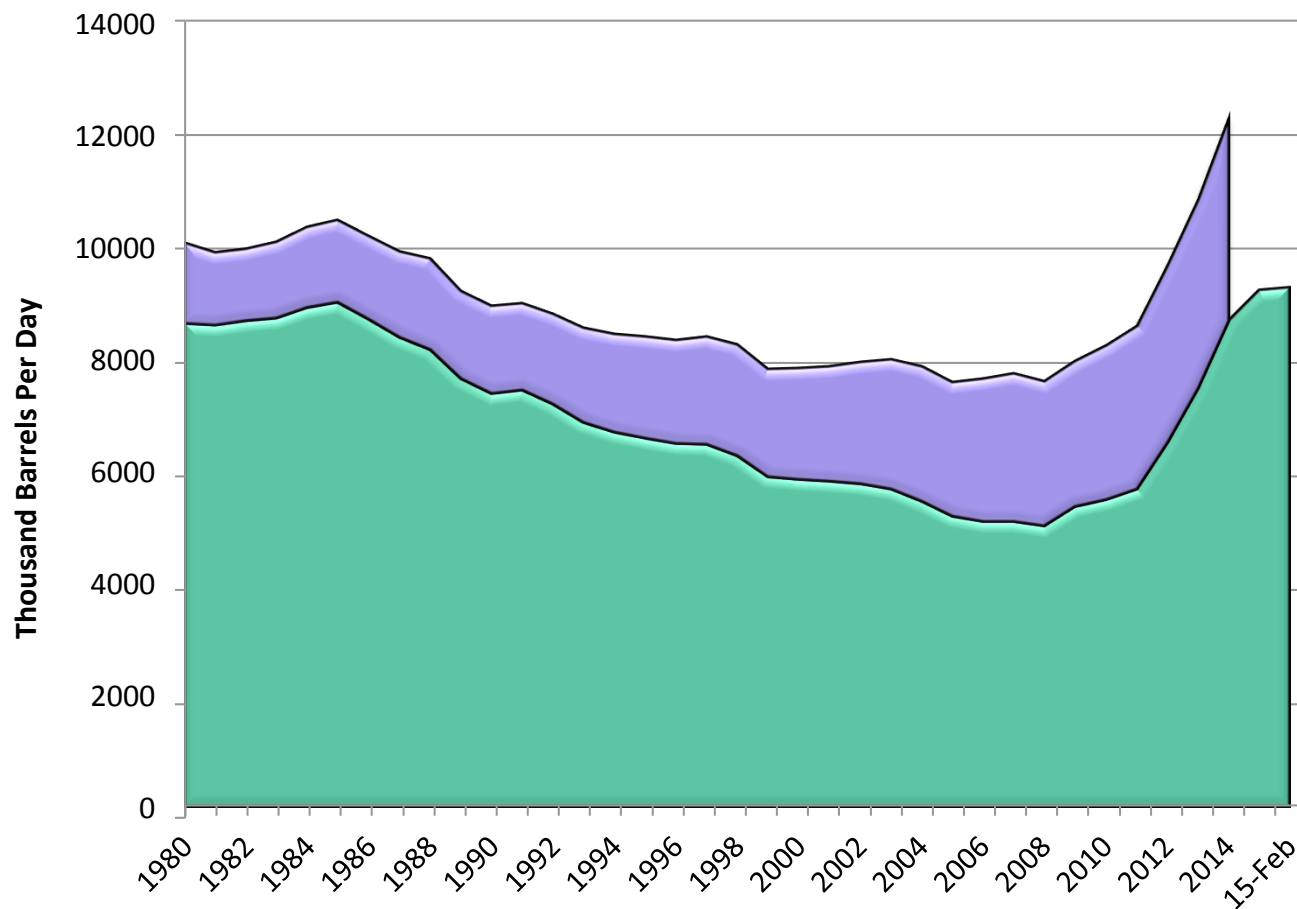
Jan 2015 - over 500,000 b/d to Canada – mostly to eastern Canada (refining capacity 800,000 b/d)

Source: EIA

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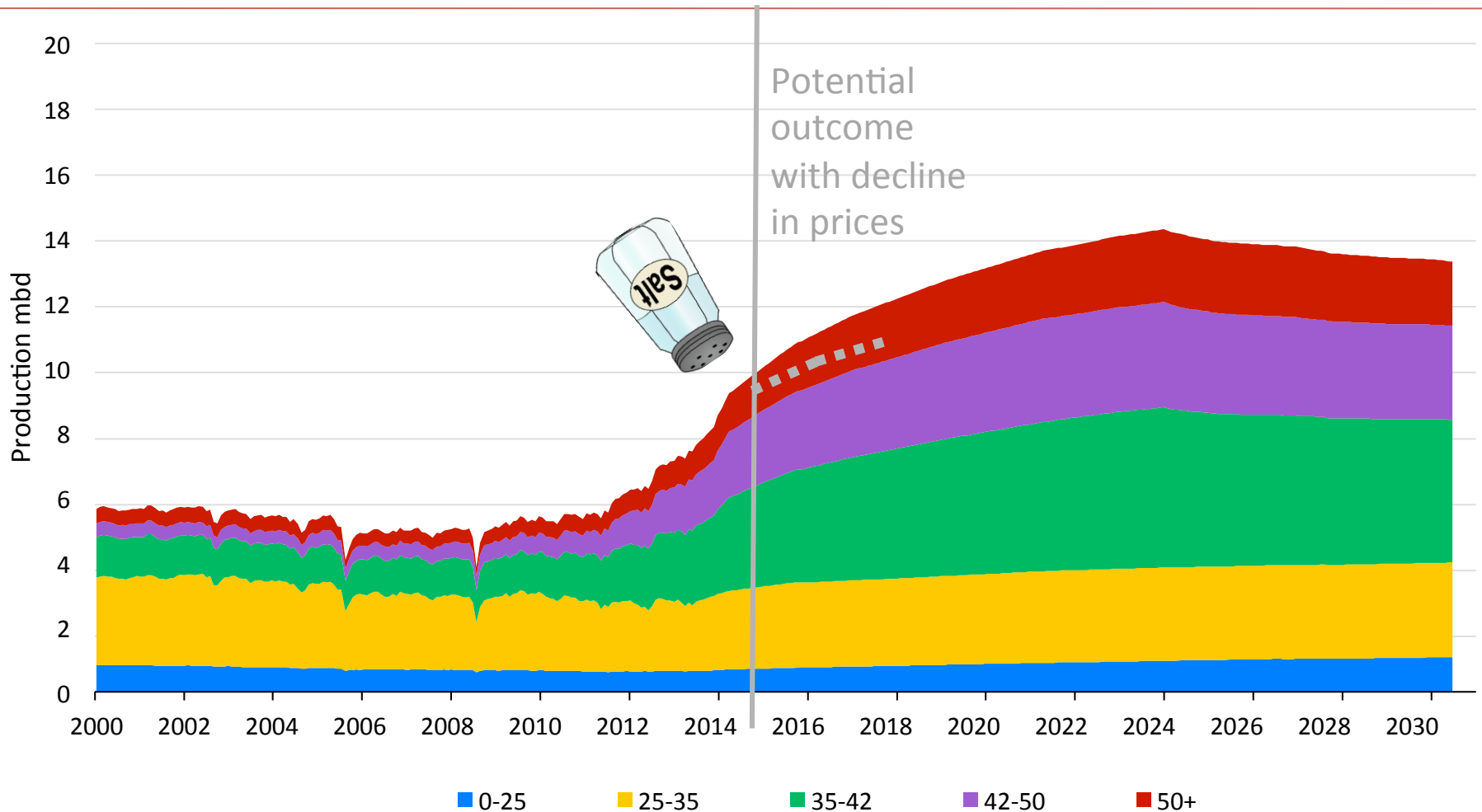
# North American Oil Production



**U.S. 9.2 mbd (Feb 2015)**  
**Canada 3.7 mbd (Dec 2014)**  
**North America = 12.9 mbd**

Canadian Crude Oil Production

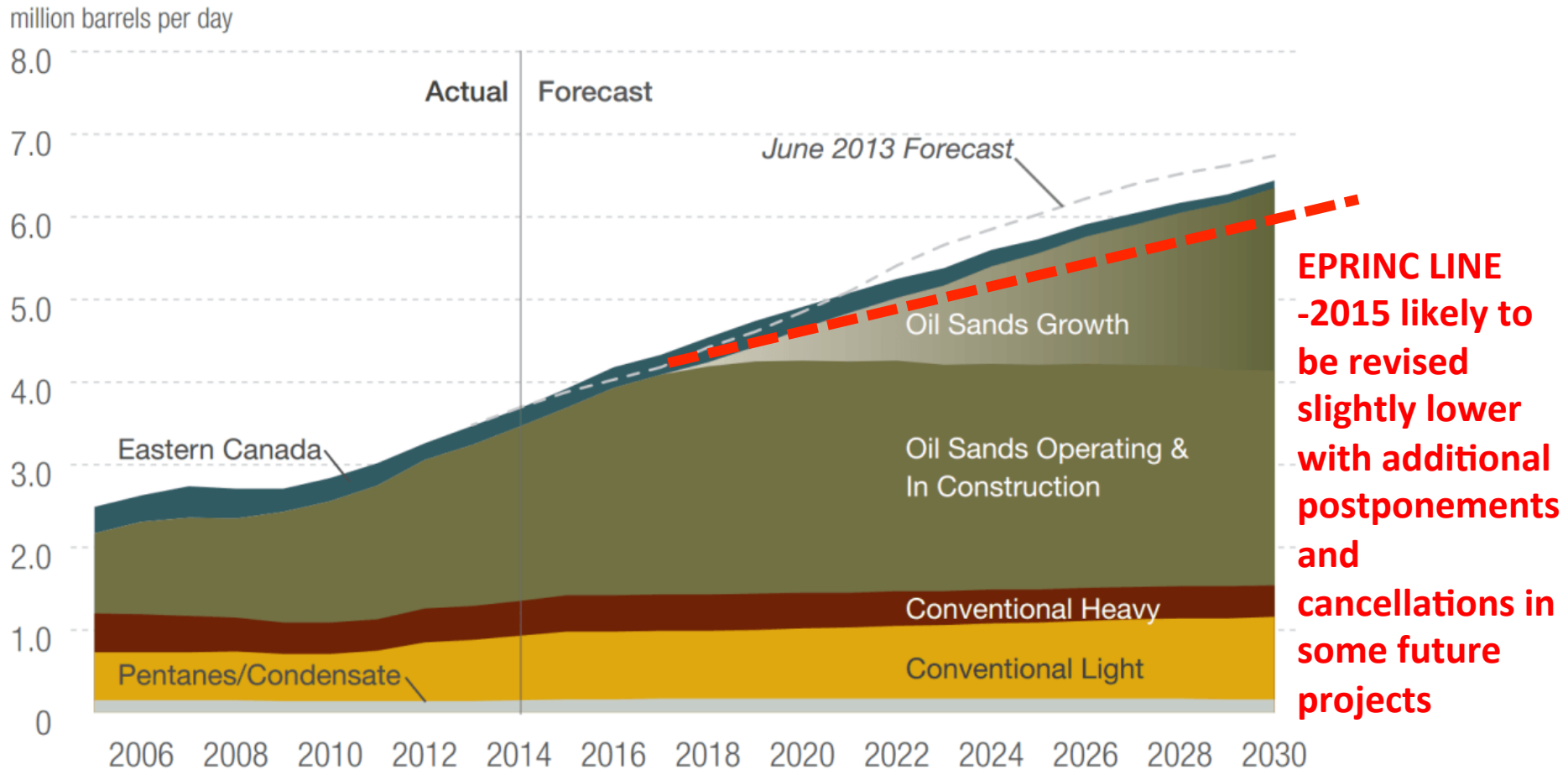
# EPRINC Production Evaluation...what production *could* be...



Source: EPRINC/Ponderosa

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# CAPP's Canadian crude oil forecast

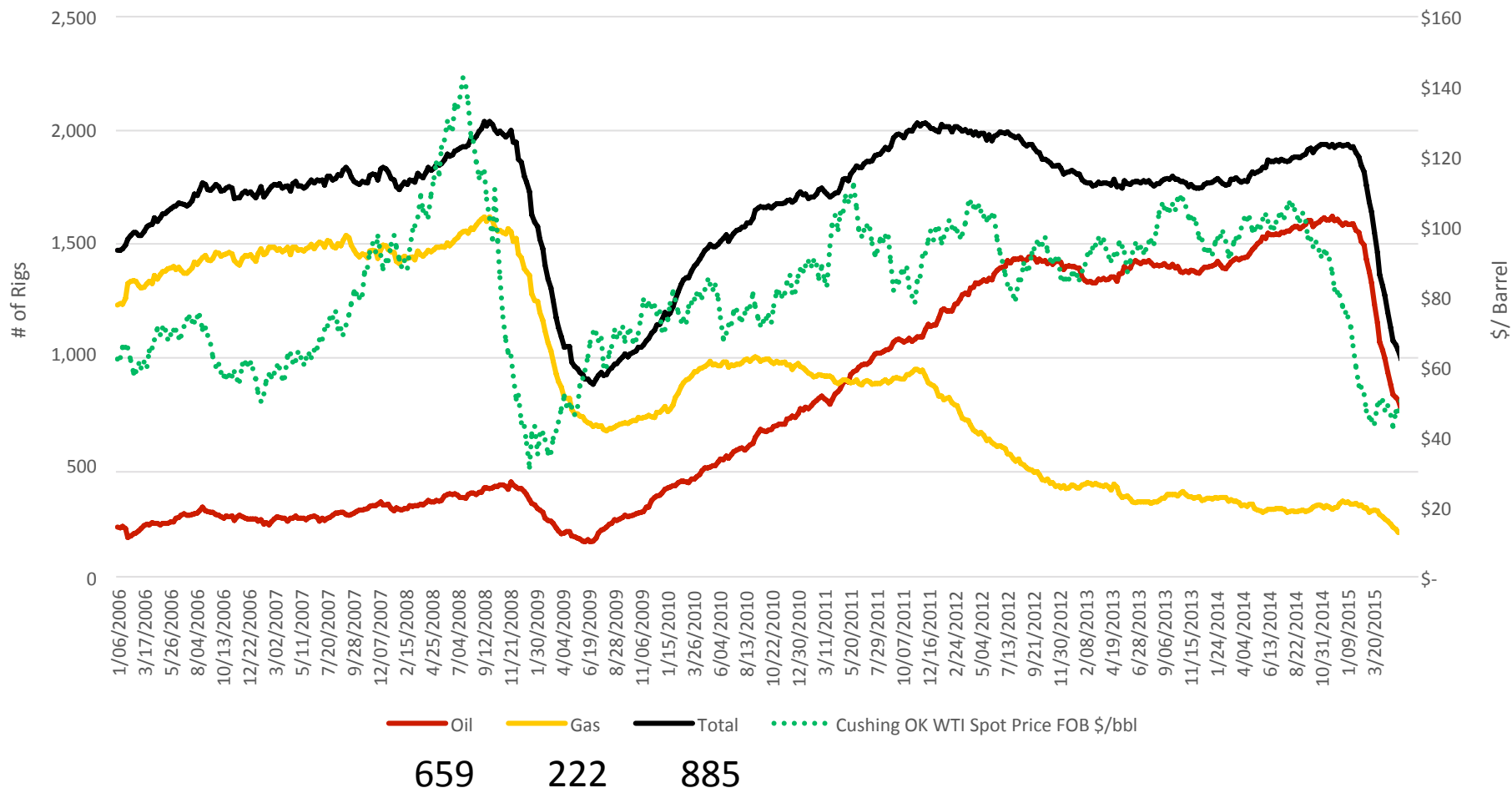


Source: CAPP 2014, "Crude Oil Forecast. Markets, and Transportation"

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# Storage and Rig Count

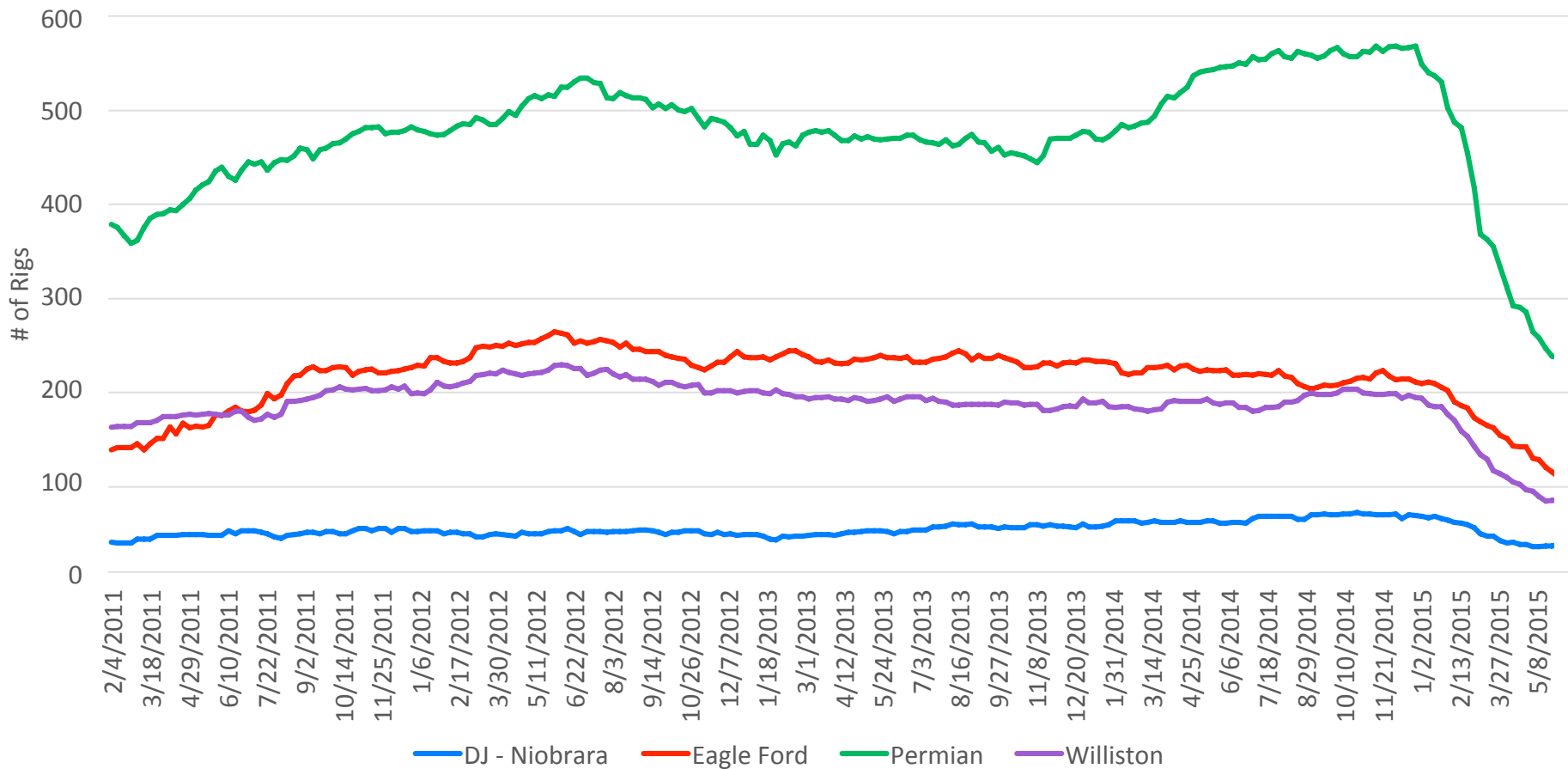
# U.S. rigs and WTI



Source: Baker Hughes, EIA

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# Permian rigs take the biggest dive



Source: Baker Hughes

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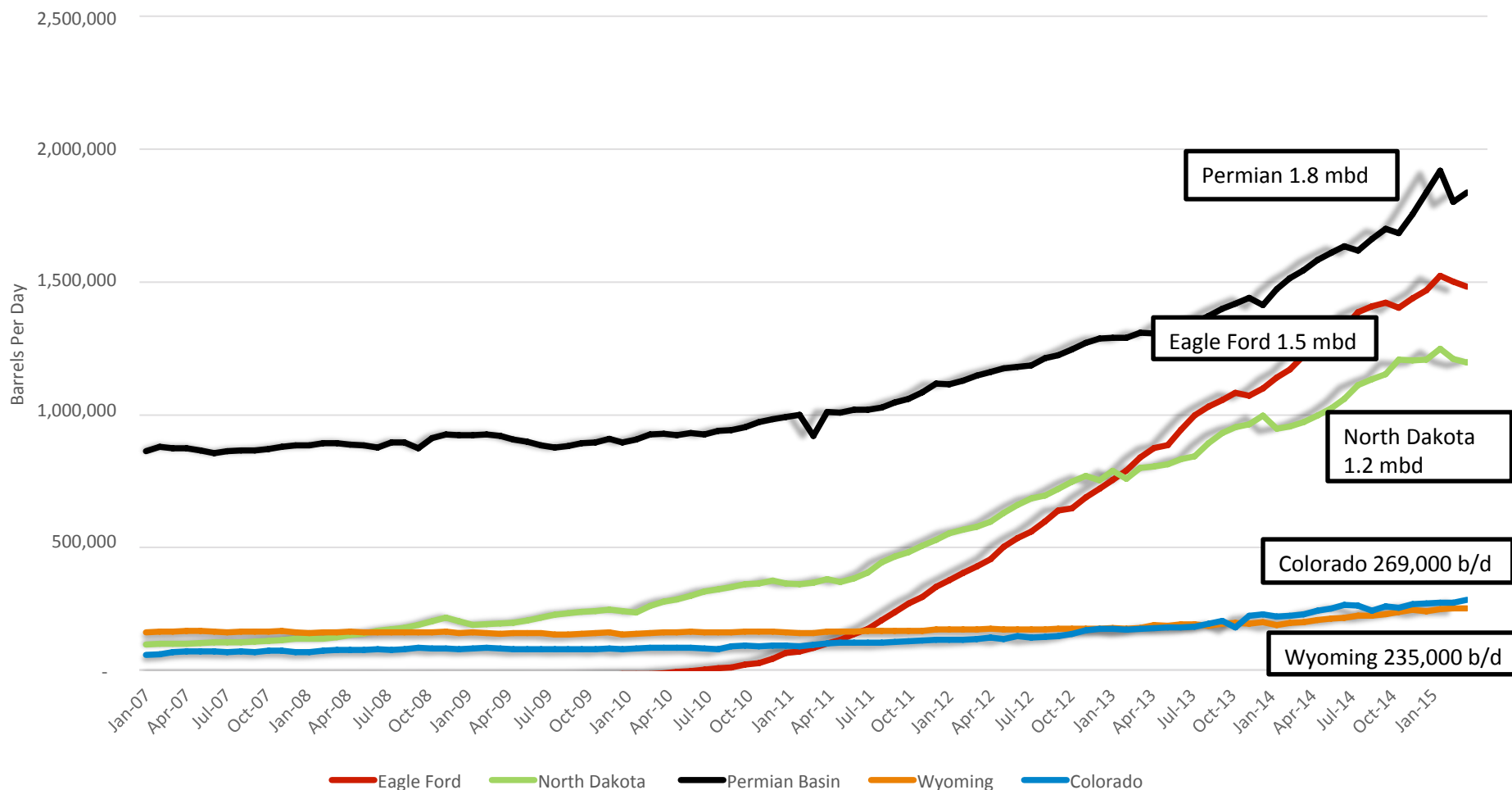
# Drilling more and completing less

- Pressuring service costs lower, drilling, but not completing (completion costs roughly 60% of well costs)
- Around 900 ND wells are waiting on completion. Similar numbers are likely across the country – Eagle Ford and Permian (a few thousand in total)
- Reservoir performance, completion best practices, and cost reduction? Technological and geological advances will likely take a back seat in a low price environment.
- Companies forced to make complex economic and geologic decisions
- Job losses and ability to quickly turn on production...? This limits the ability to bring production on very quickly. Sort of a swing producer, but not in the OPEC sense.
- All dependent on the longevity of low oil prices

# Production and Technology



# Shale oil play production

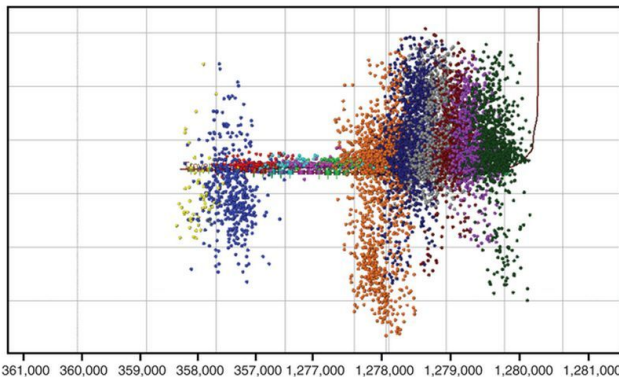


Source: HPDI May 27 2015, EIA, NDPA

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# Technology advances

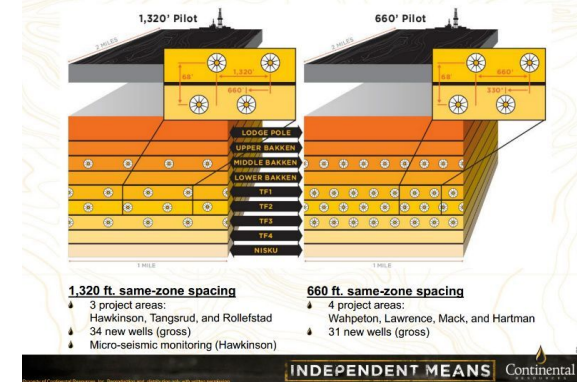
## Microseismic Monitoring



Source: The American Oil and Gas Reporter, Dec 2011;  
Continental Resources November 2014 Investor  
Presentation

Increasing  
well density

1,320' & 660' Pilot Density Projects: 2013-14

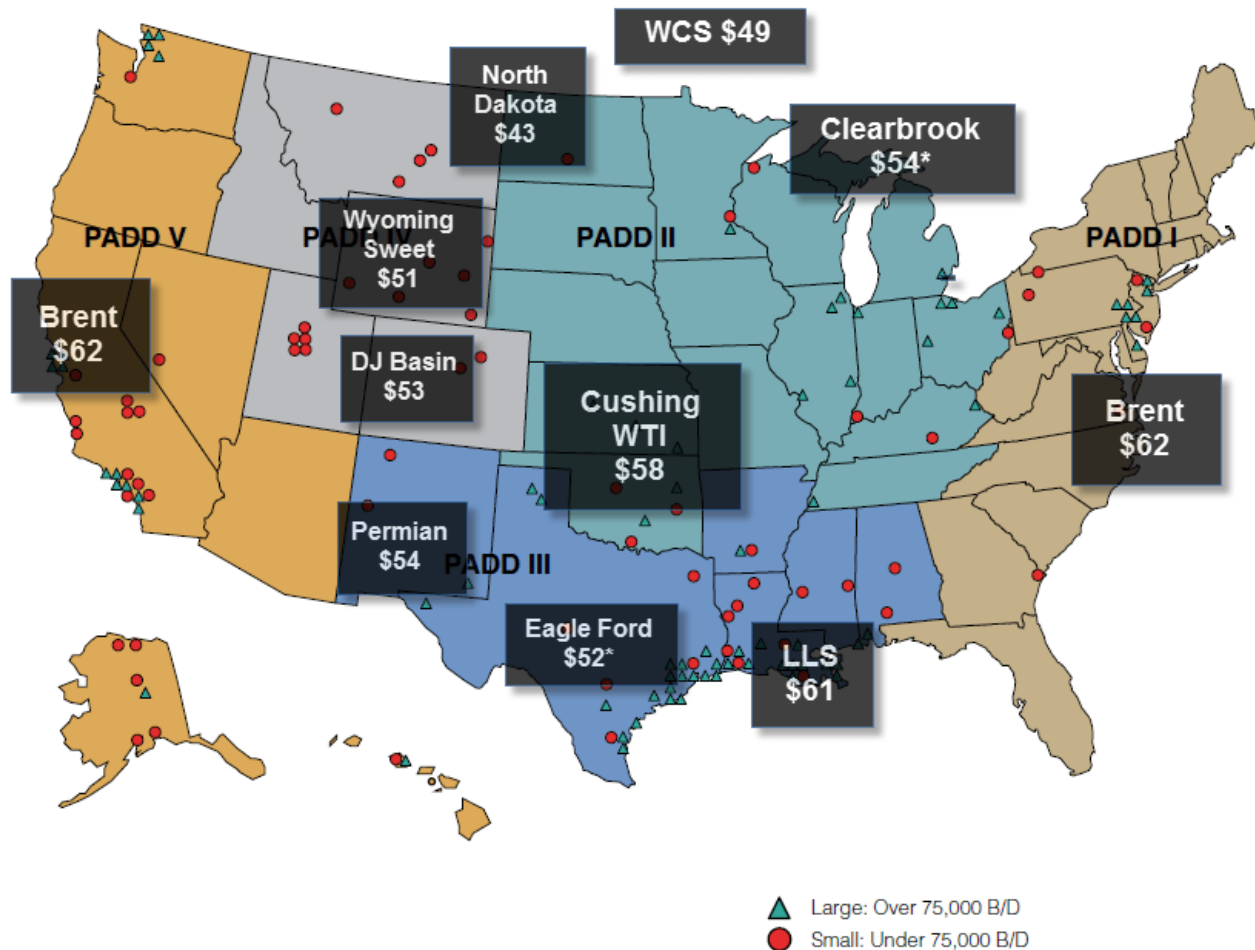


Source: Continental Resources March Investor Presentation, Permission granted

Mud motors  
Horse power  
Better and stronger drill bits

# Pricing and Infrastructure

# Regional Pricing Disparities

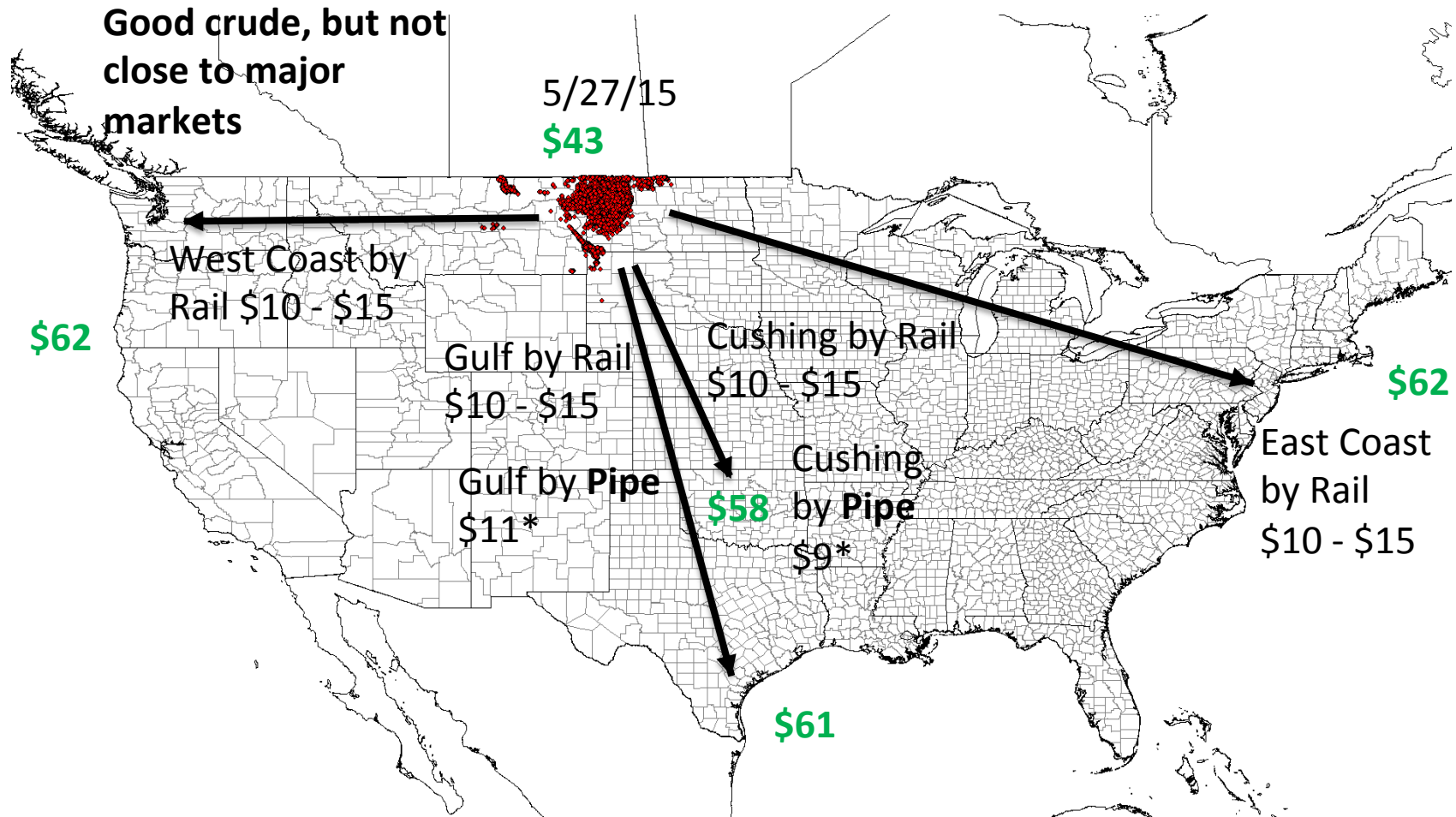


Regulation  
 Infrastructure  
 Exports

Source: May 27, 2015, Map from AFPM, Flint Hills, EIA, CME Group, and estimates

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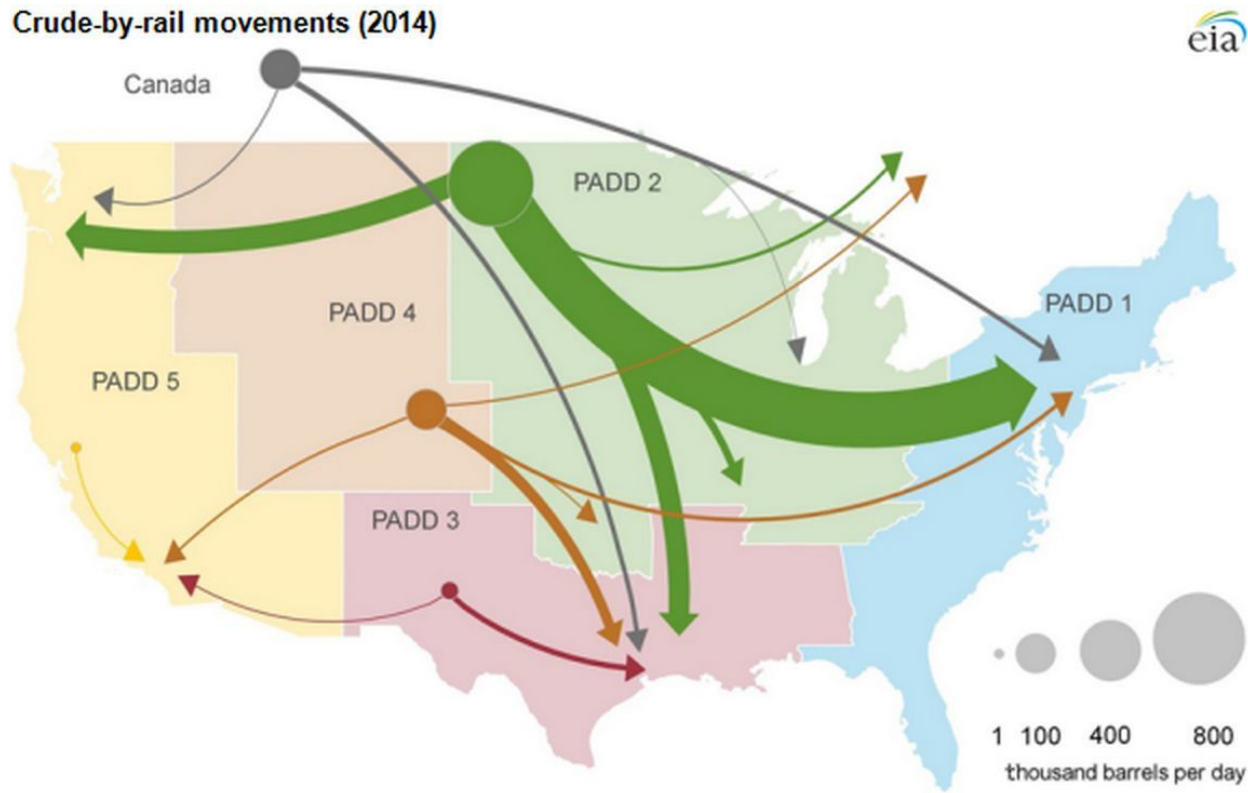
# Bakken netbacks under pressure



Source: HPDI map of Bakken Wells, Flint Hills ND Light Sweet, \*Estimates from RBN blog Feb 2015

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# EIA's new rail data highlights Bakken



900,000 b/d  
crude by rail in  
U.S.

- 700,000 b/d  
Bakken

**Source:** U.S. Energy Information Administration based on data from the Surface Transportation Board and other information

**Note:** Crude-by-rail movements greater than 1,000 barrels per day are represented on the map; short-distance movements between rail yards within a region are excluded.

Source EIA March 31, 2015:

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# Additional Challenges and Regulatory Uncertainty

# Crude by Rail Accidents



LAC MAGENTIC: AP PHOTO/THE CANADIAN PRESS, PAUL CHIASSON



[http://usnews.nbcnews.com/\\_news/2013/12/30/22113442-mile-long-train-carrying-crude-oil-derails-explodes-in-north-dakota?lite](http://usnews.nbcnews.com/_news/2013/12/30/22113442-mile-long-train-carrying-crude-oil-derails-explodes-in-north-dakota?lite)



# Pipeline development still at risk

## Sandpiper Pipeline

\$2.6 billion, 610 miles – 225,000b/d from ND to Superior, Wisconsin

ND approved, but in administrative review in Minnesota

## Energy East Pipeline

\$12 billion project, 1.1 mbd (1 mbd firm long-term contracts)

Now expected 2020 in service date

## NewsRelease



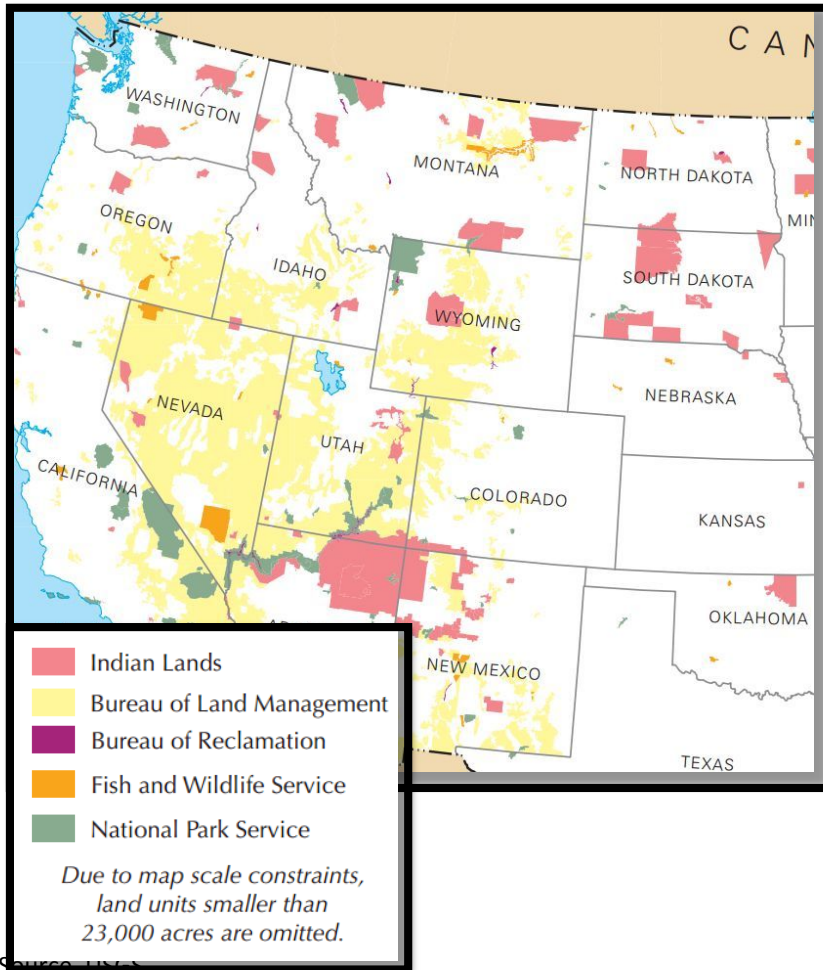
### **TransCanada Alters Québec Scope of Energy East Pipeline Project Decision a Result of Continued Conversations with Communities and Stakeholders**

MONTREAL, Québec – **April 2, 2015** – TransCanada Corporation (TSX, NYSE: TRP) (TransCanada) today announced it is altering the scope of the Energy East pipeline project in Québec as part of its continued commitment to stakeholder consultation, environmental stewardship and community safety. Part of that altered scope includes the decision not to build a marine and associated tank terminals at Cacouna, Québec. Potential alternative terminal options in Québec are being reviewed. Québec and New Brunswick refineries would continue to be connected directly to Energy East.

Source: Energywire, April 10 2015, Daniel Cisick, “Bakken-bearing pipeline meets stiff opposition in the Land of 10,000 Lakes” and TransCanada

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# BLM Fracking Regulations



*Submit detailed information about the proposed operation, including wellbore geology, the location of faults and fractures, the depths of all usable water, estimated volume of fluid to be used, and **estimated direction and length of fractures**, to the BLM with the APD or a Sundry Notice and Report on Wells (Form 3160–5) as a Notice of Intent (NOI) to hydraulically fracture an existing well;*

## Sage Grouse

Source: [http://nationalmap.gov/small\\_scale/printable/images/pdf/fedlands/DOI\\_ALL\\_2.pdf](http://nationalmap.gov/small_scale/printable/images/pdf/fedlands/DOI_ALL_2.pdf)

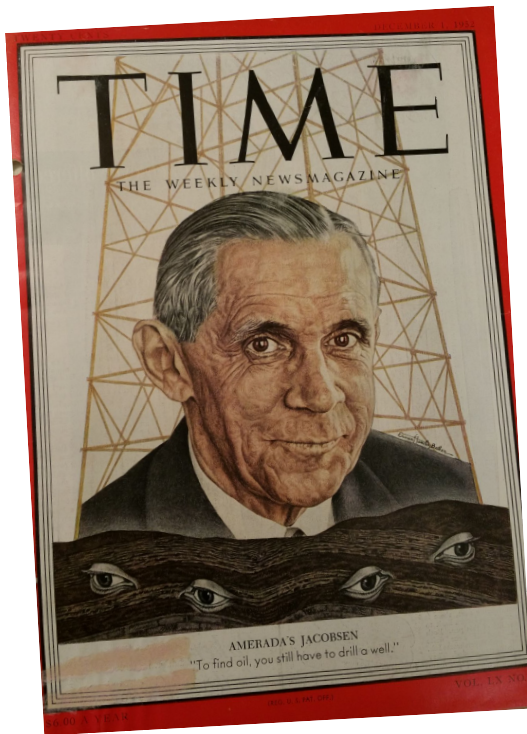
Source: <http://www.gpo.gov/fdsys/pkg/FR-2015-03-26/pdf/2015-06658.pdf>

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## Long-term production stability in North America

- The unconventional oil sector has only been around since 2008
- Unconventional/shale/tight oil has been lumped together with deepwater and other costly oil production types, suggesting that the long-term productivity and economics of this type of production may just not work if prices do not recover back into the \$80s
- ***The youth of the industry, lack of knowledge of the reservoirs, and high cost of production are actually what make U.S. unconventional oil a good long-term investment – the upside remains vast.***
- The industry has yet to integrate geology, completion design, and production into one package.
- Long-term production has simply been an afterthought in the oil boom. The potential to alter well design and completions with long-term production in mind could alter EURs.

# Final Thoughts



**This is a boom and bust business! Right now it is busting, but it will boom again.**



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