North Dakota Oil & Gas Research Council

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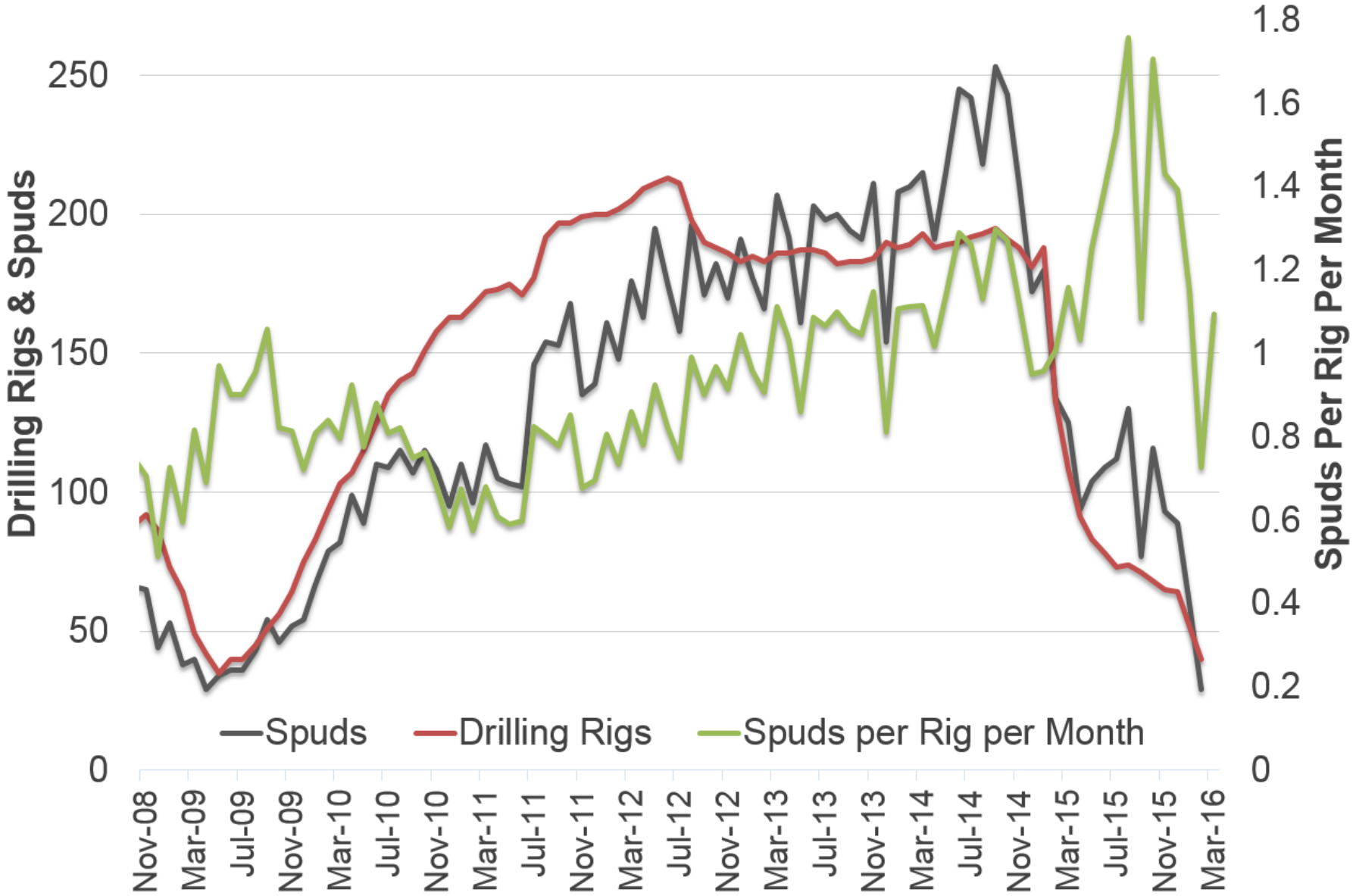
Director
North Dakota Pipeline Authority

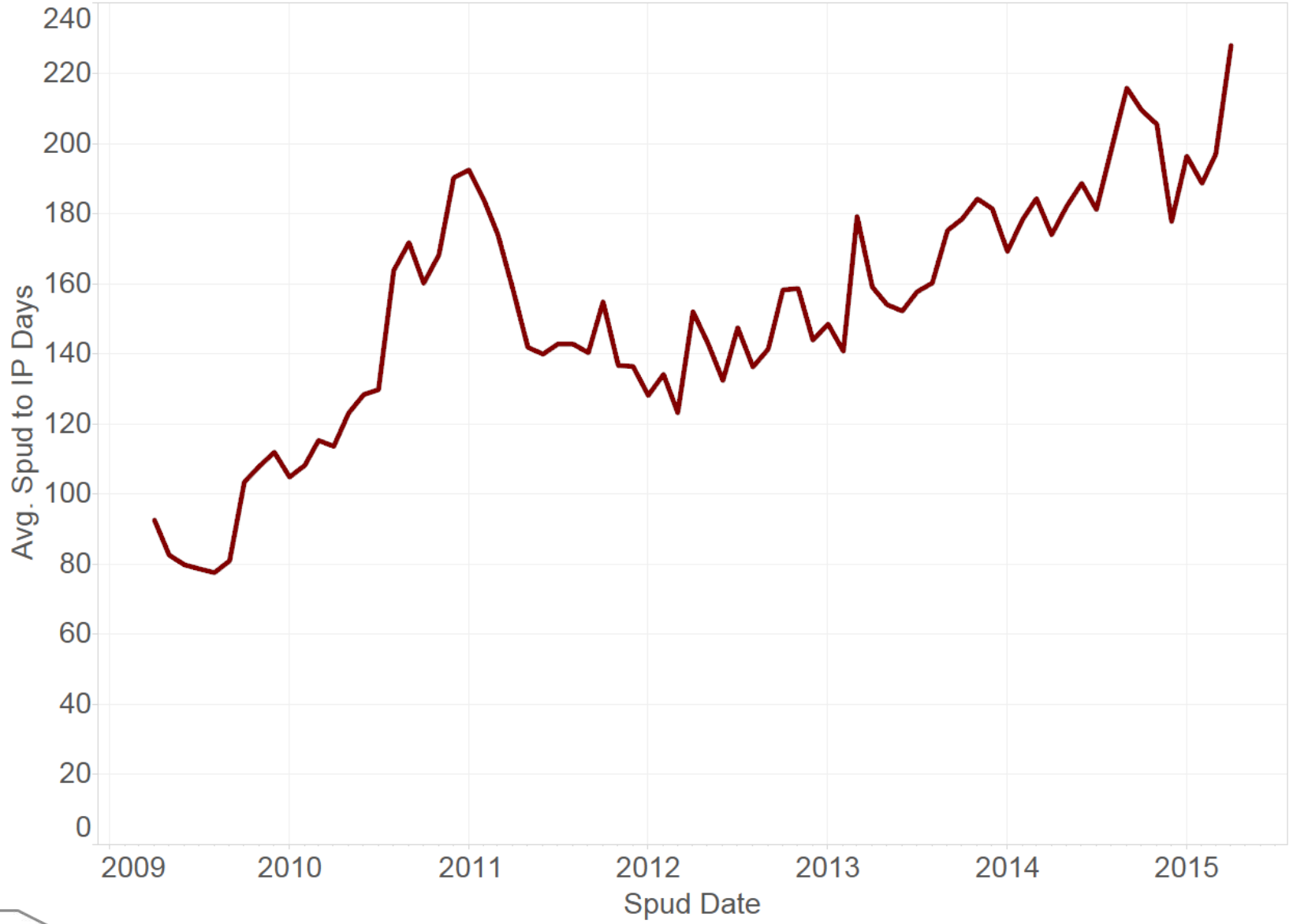
May 9, 2016

North Dakota Drilling Activity

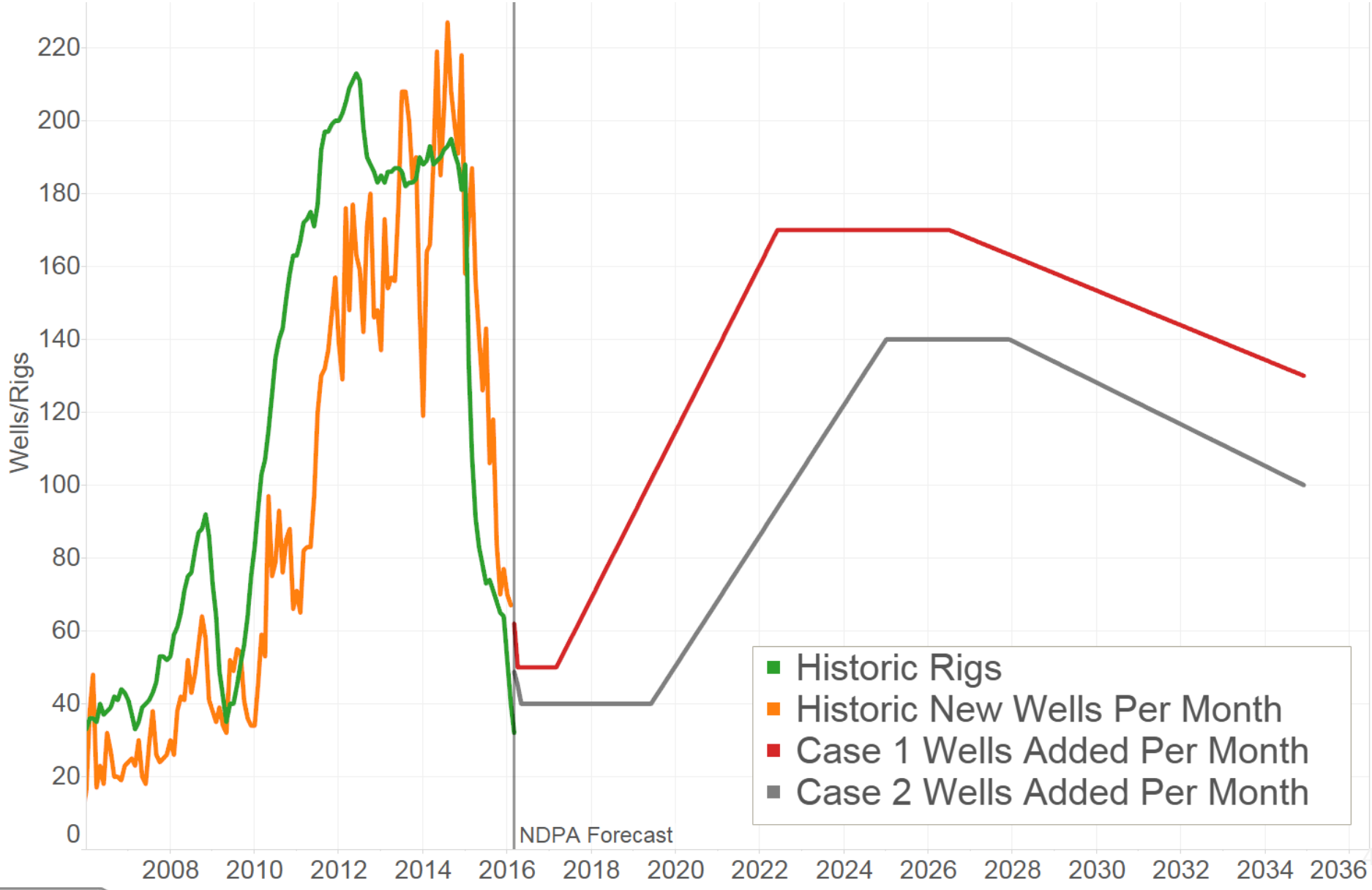


Understanding Current Production Dynamics

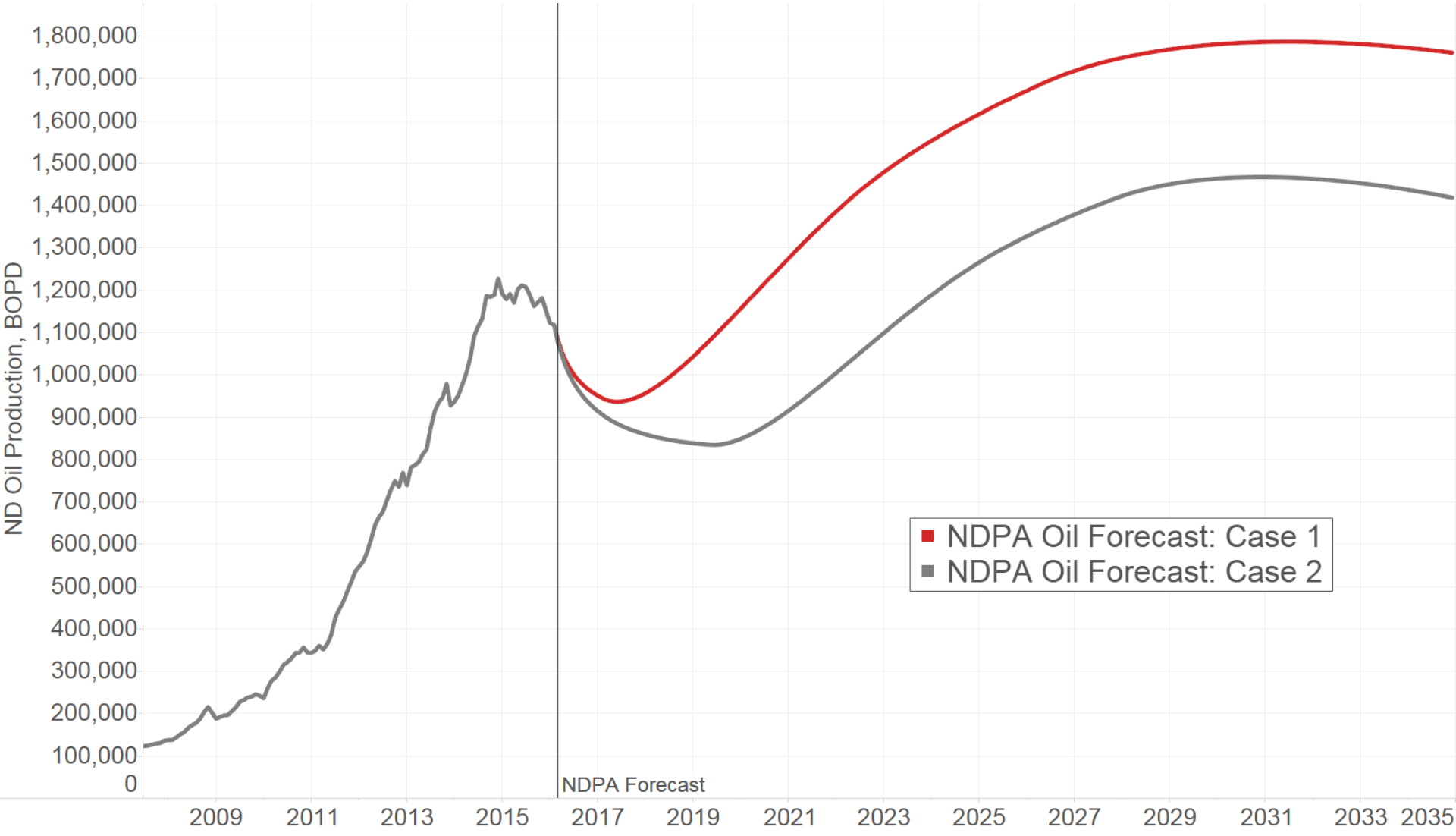
Non-Confidential Spud to Initial Production Timeline



North Dakota Forecast Activity Assumptions



North Dakota Oil Production Forecast

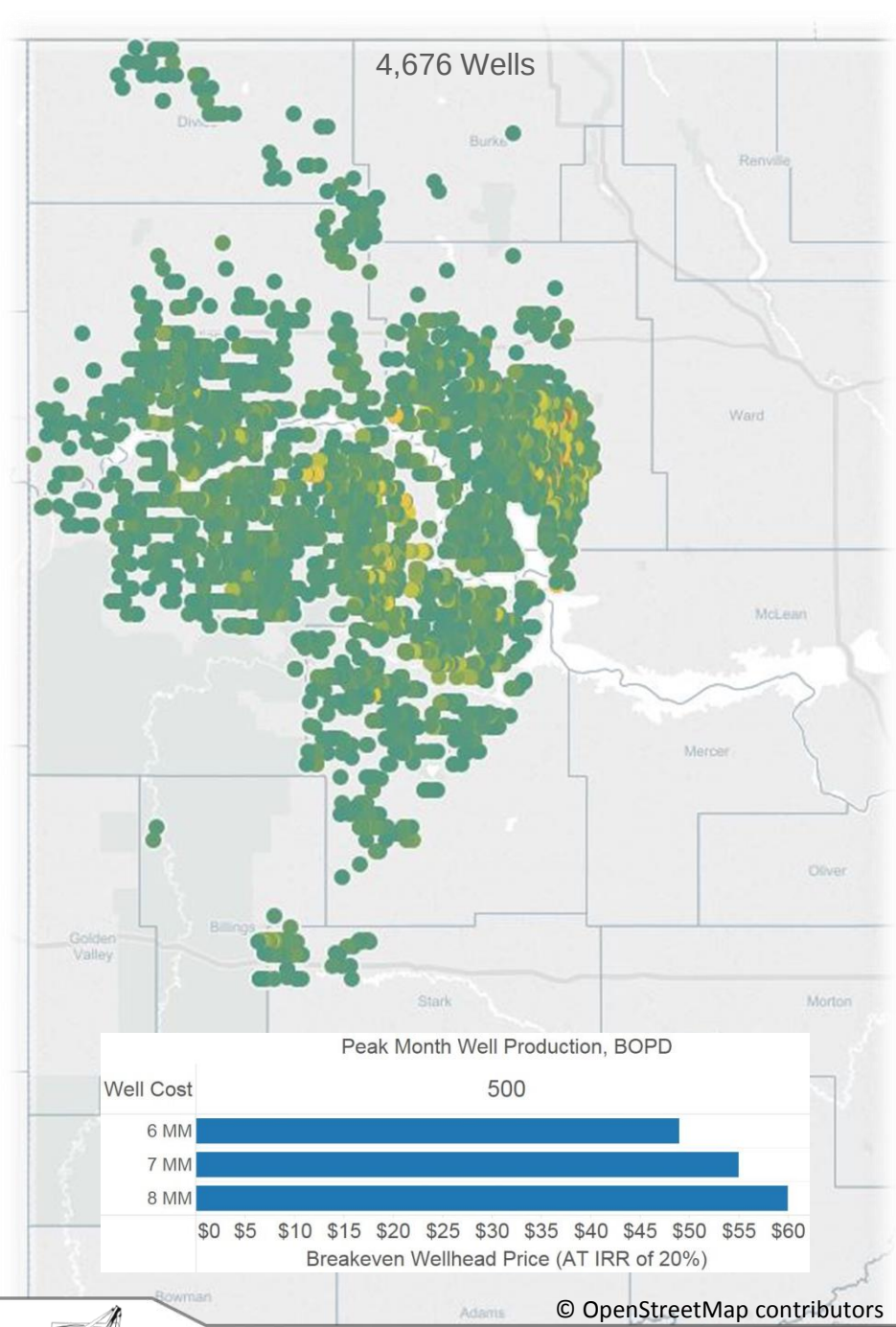


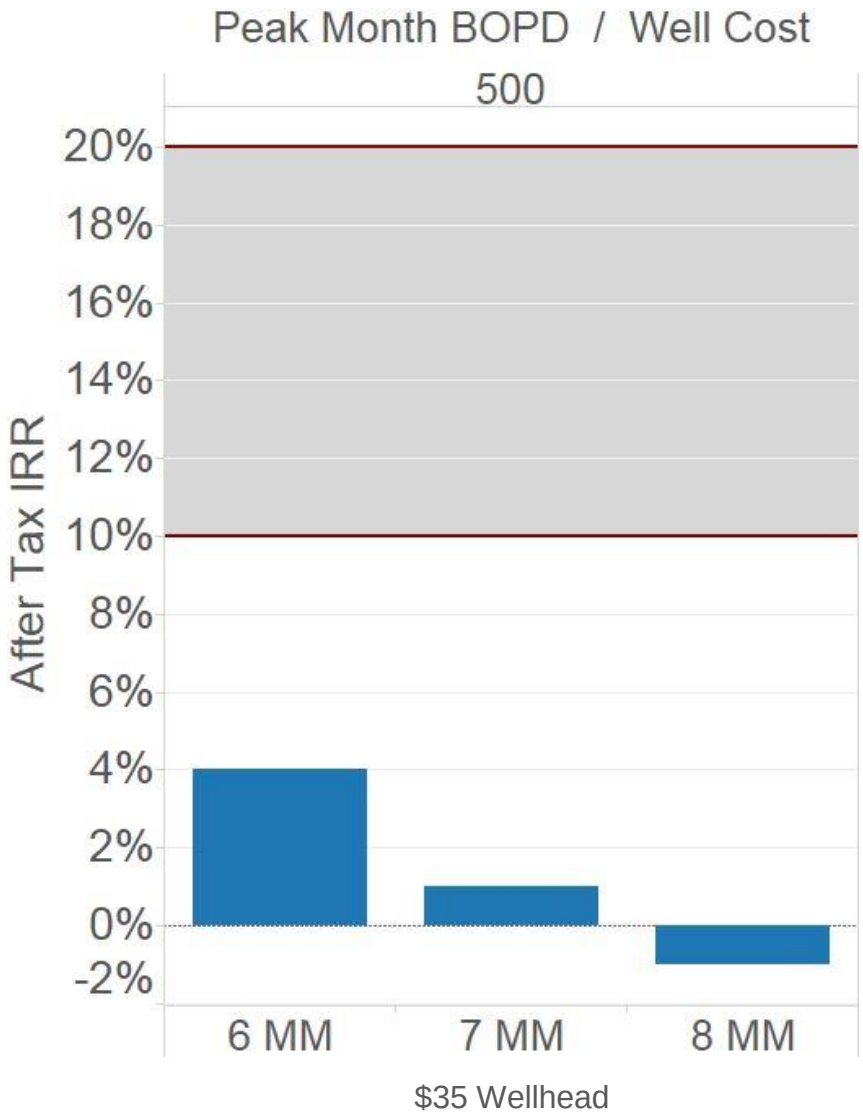
Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.

Key Economic Assumptions

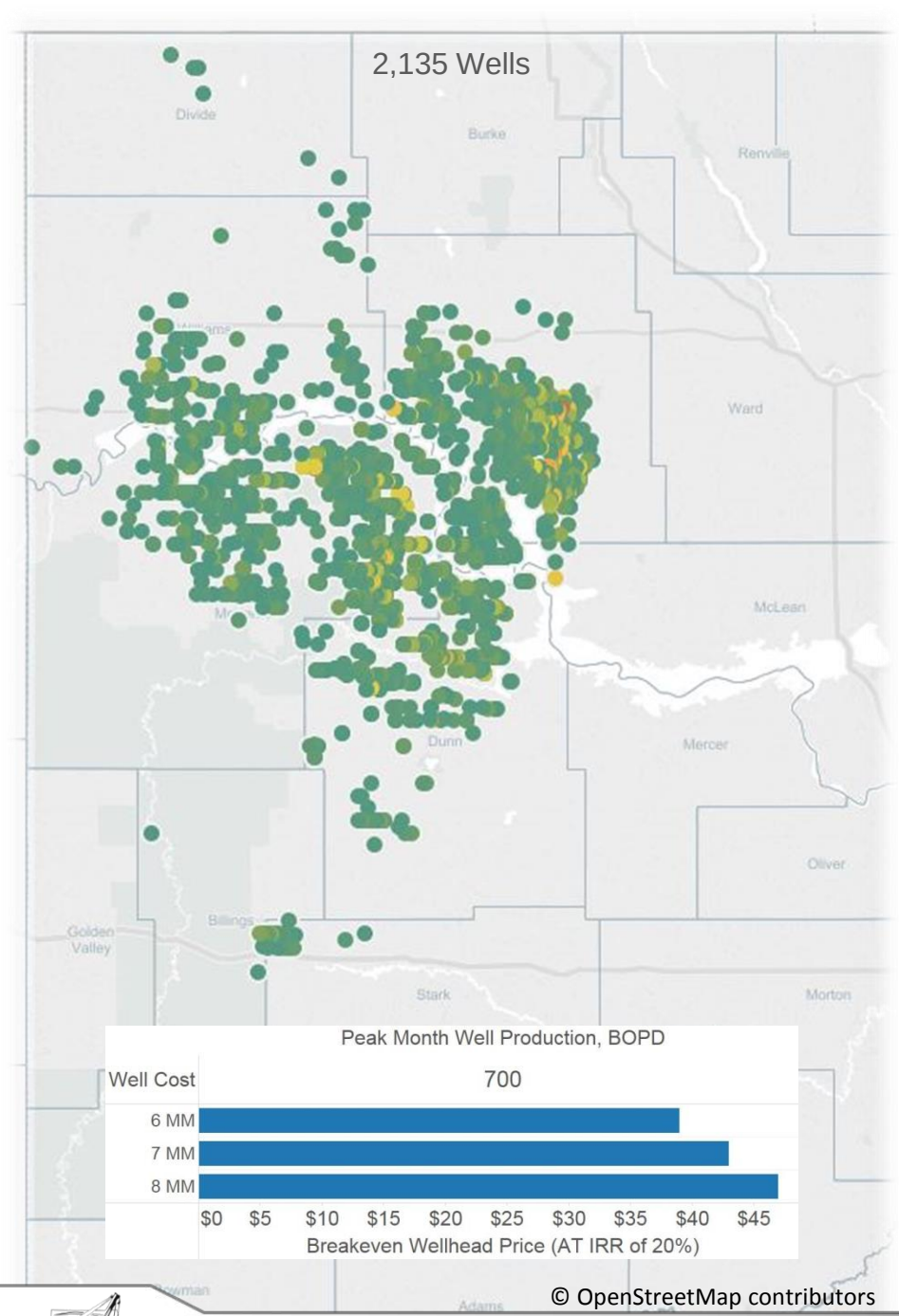
- $6-$8 Million Well Costs
- $35/BBL & $3.00/MCF Wellhead Pricing
- 1/6 Royalty
- Zero Flaring
- Assumed 10-20% IRR to drill (calculated after production taxes and royalties)
- No Tax Incentives Included
- Production rate is 30-day average
- All Bakken/Three Forks wells drilled in 2008+

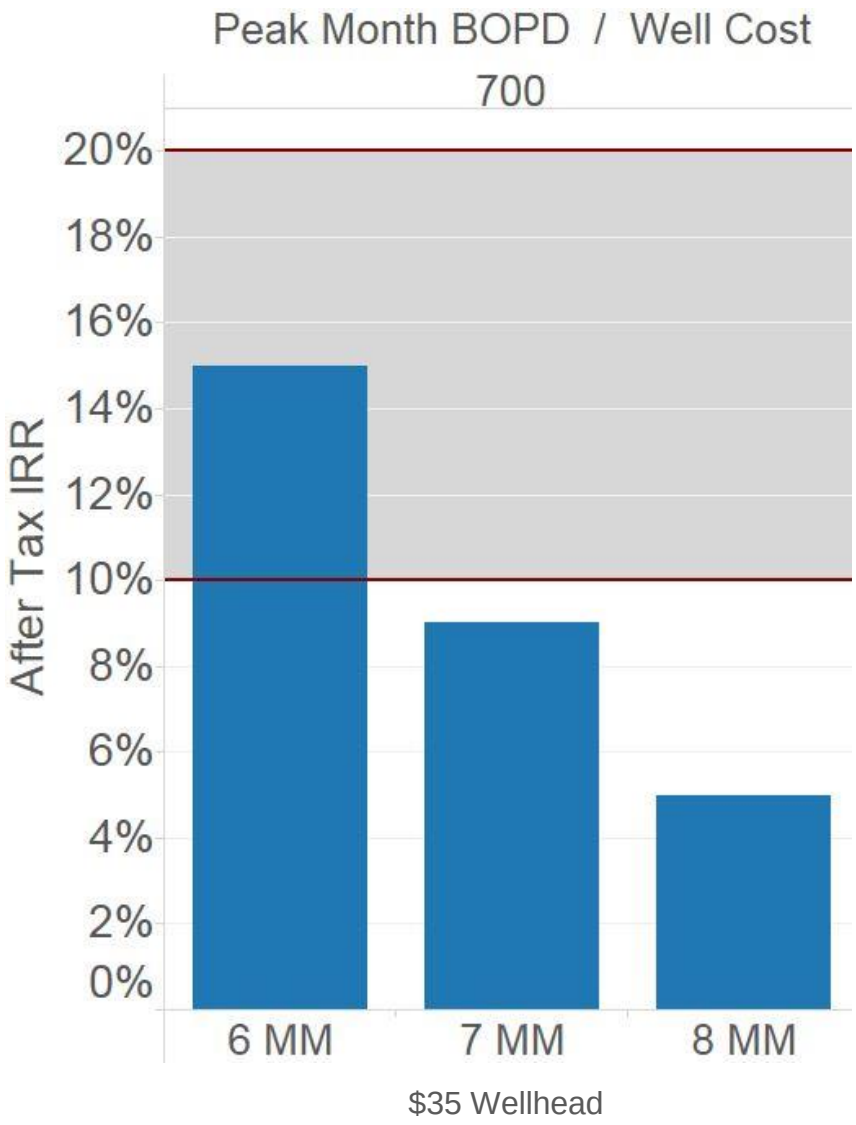
Peak Month Minimum 500 BOPD



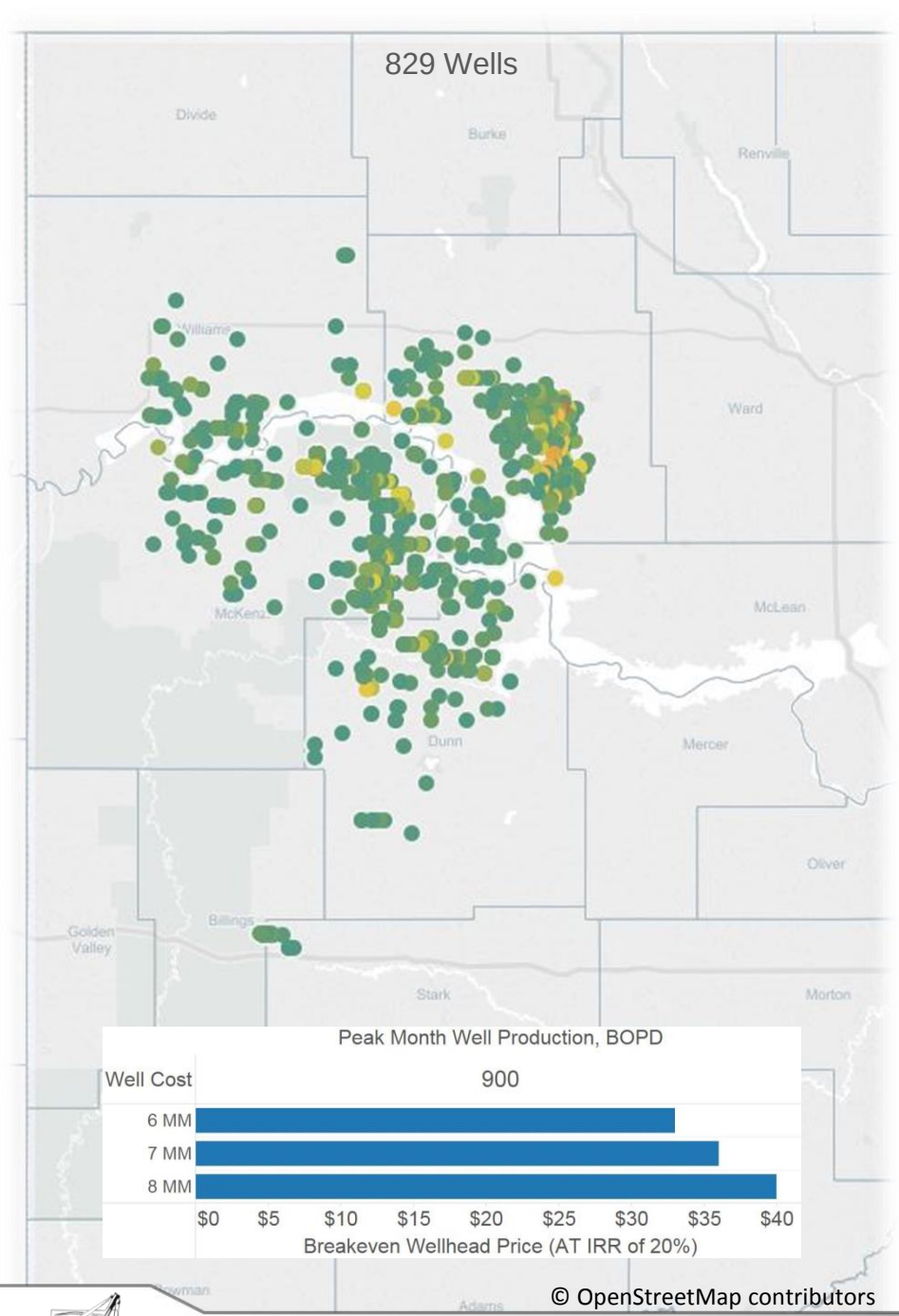


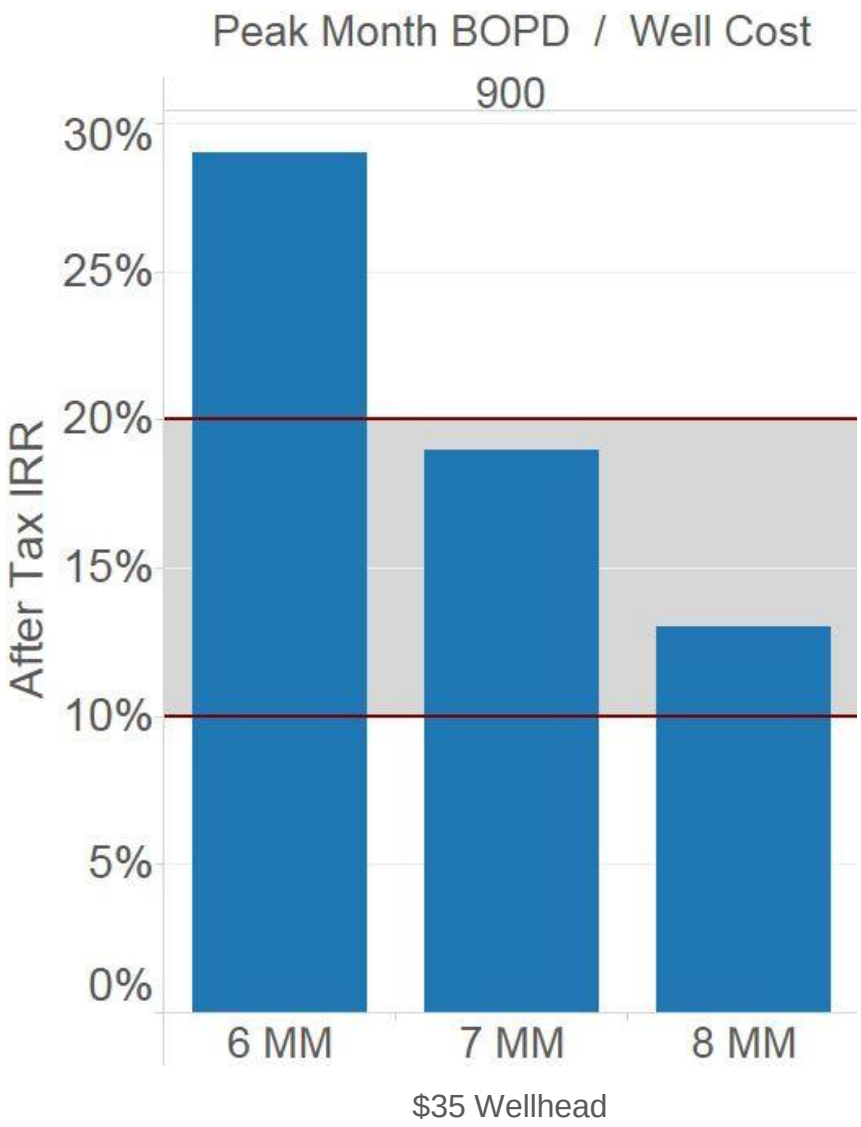
Peak Month Minimum 700 BOPD



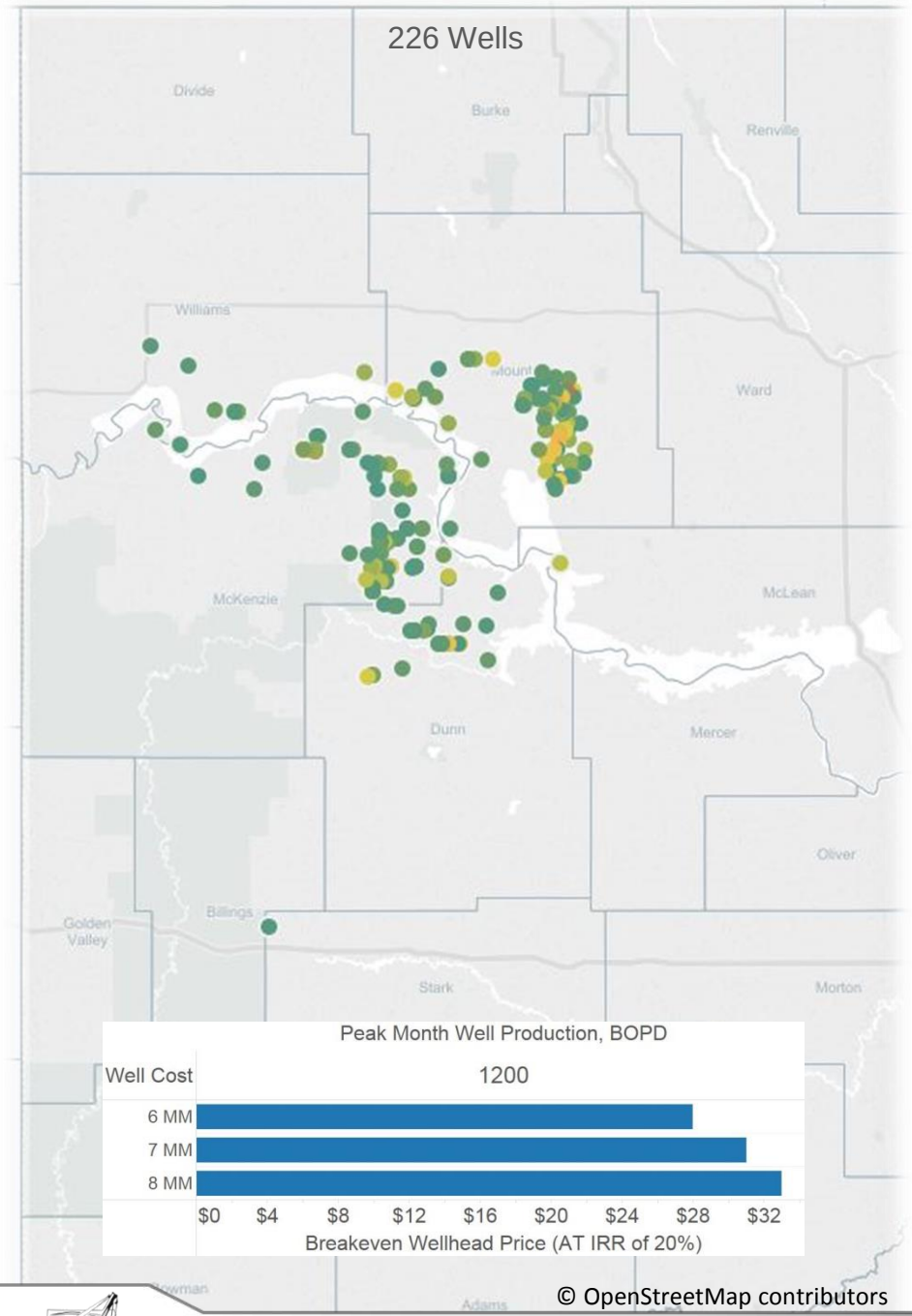


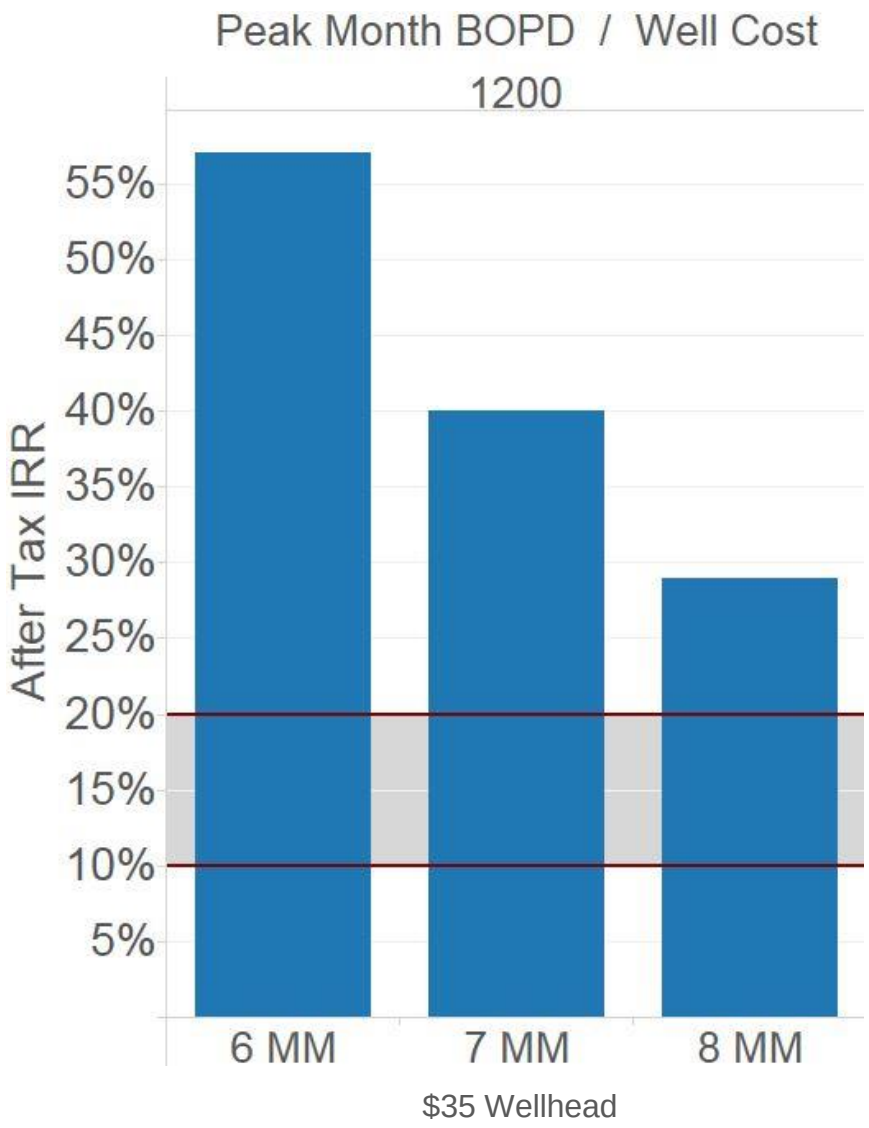
Peak Month Minimum 900 BOPD



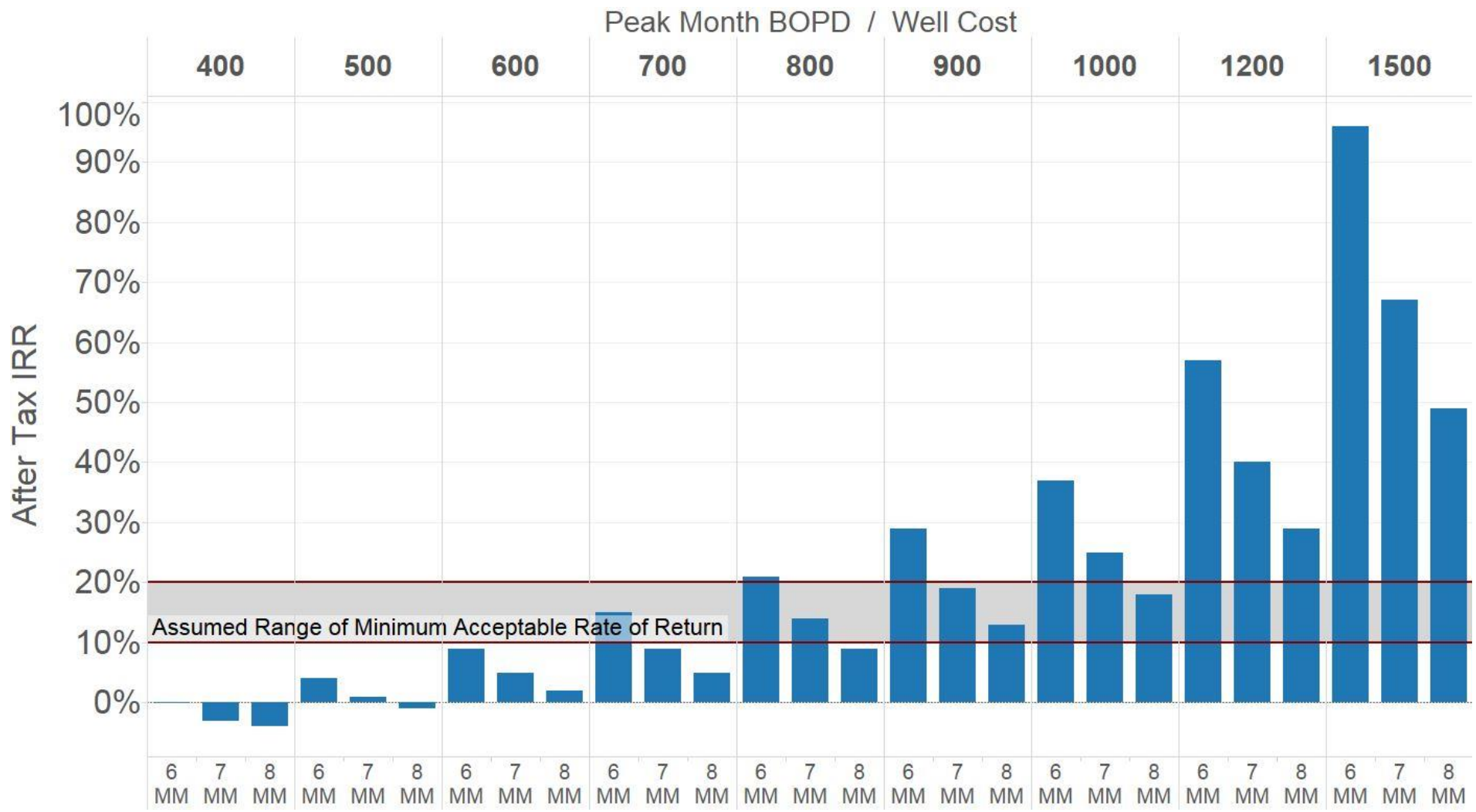


Peak Month Minimum 1,200 BOPD

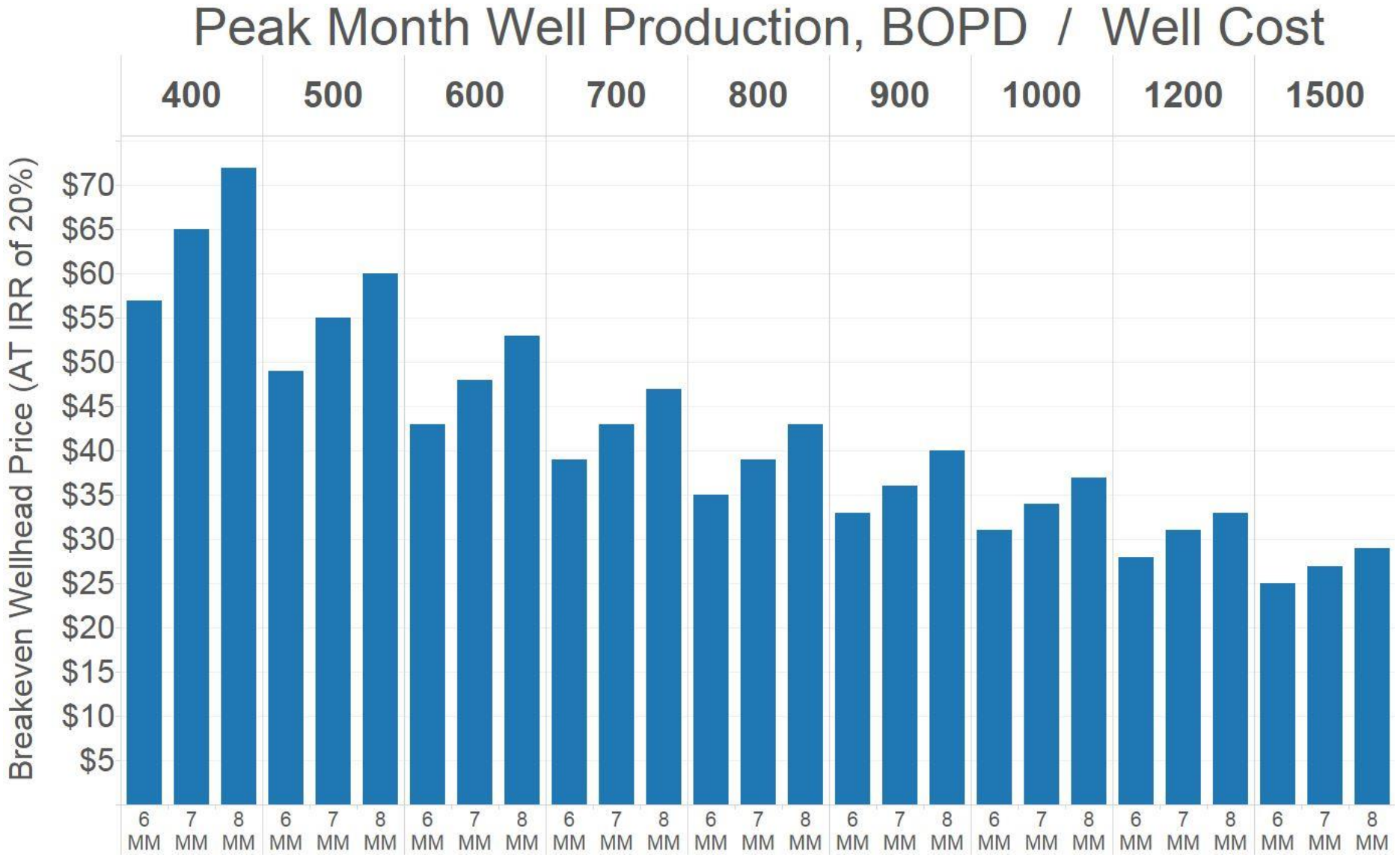




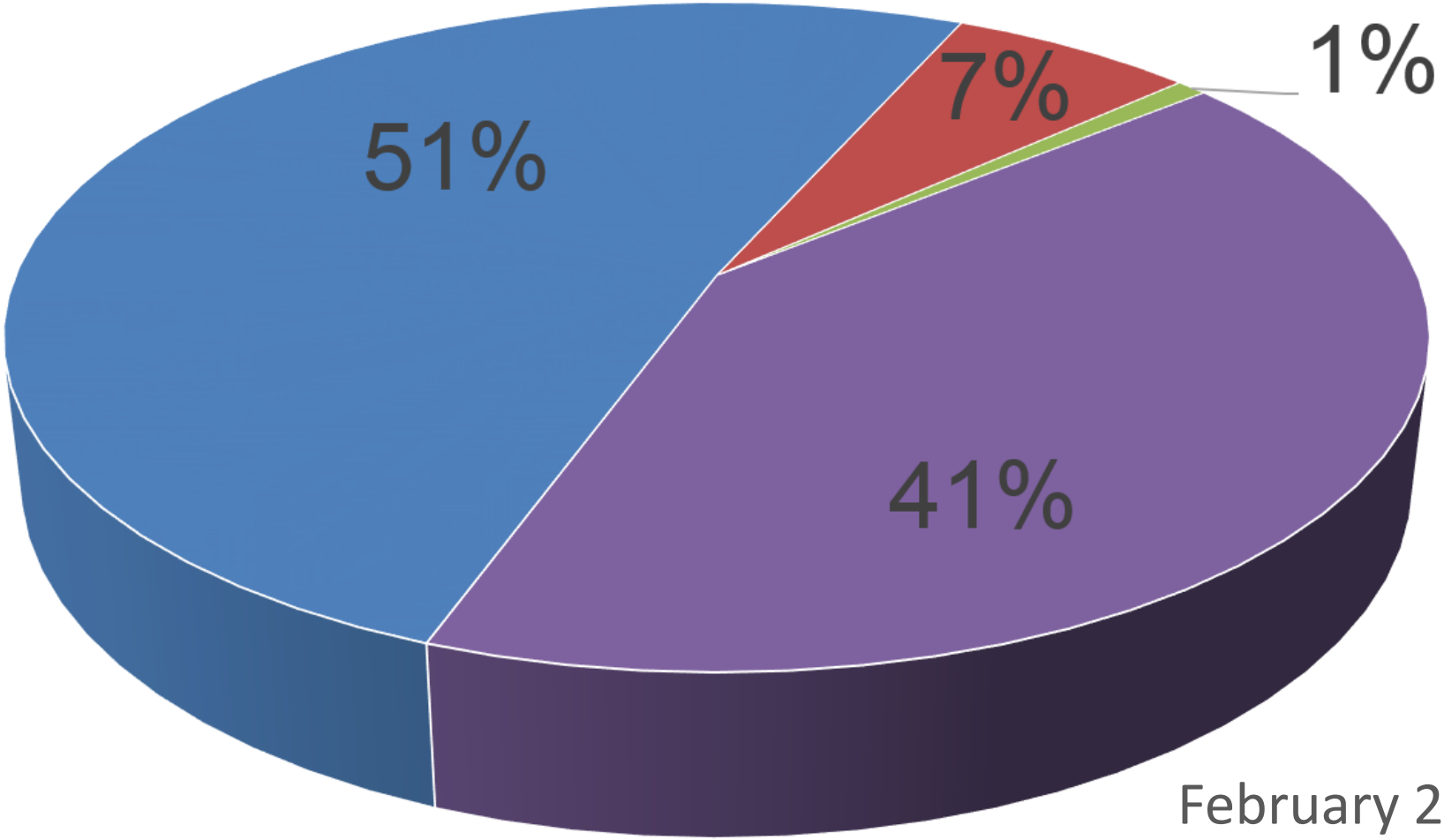
Summary of $35 Wellhead Oil



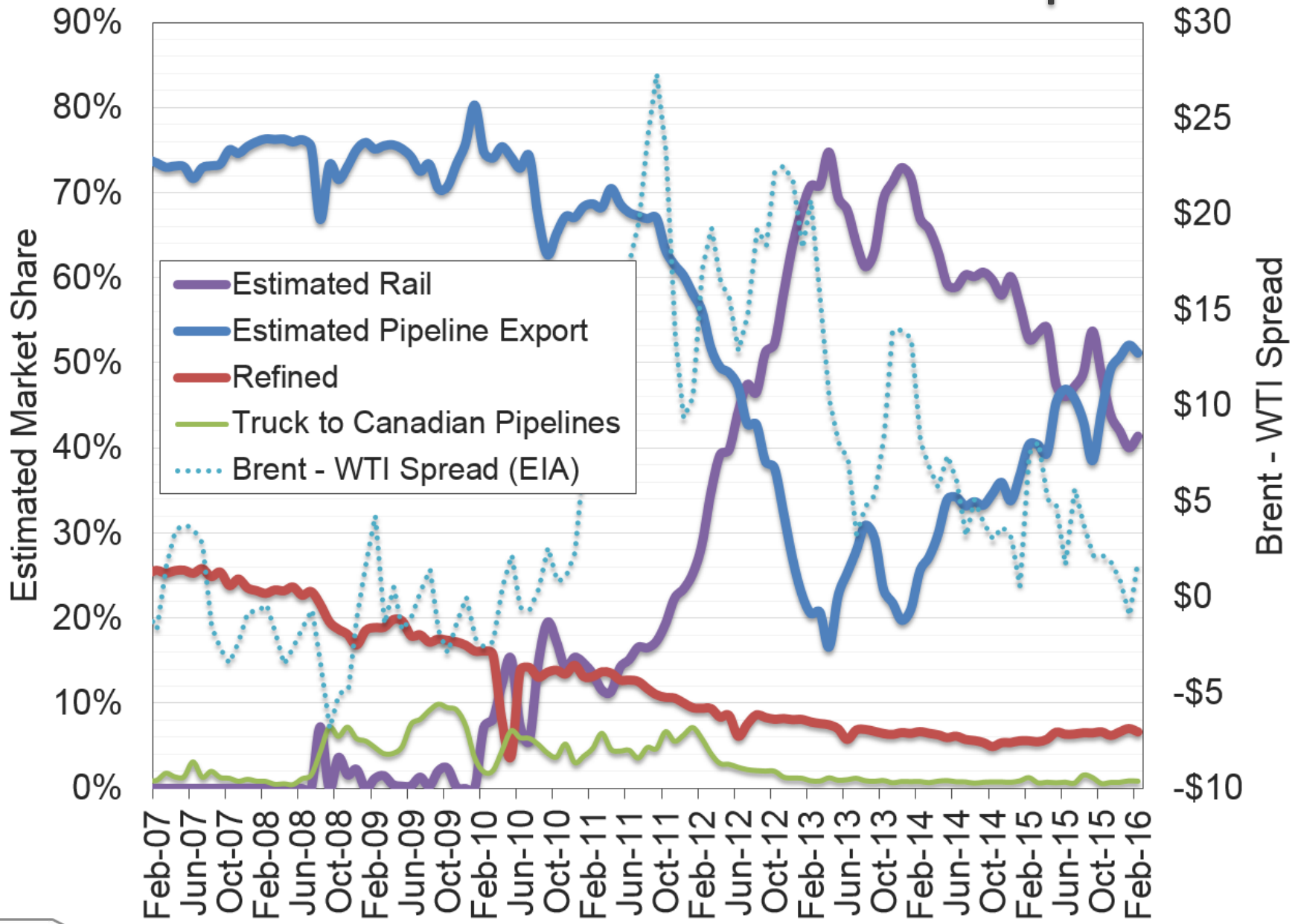
Breakeven Summary



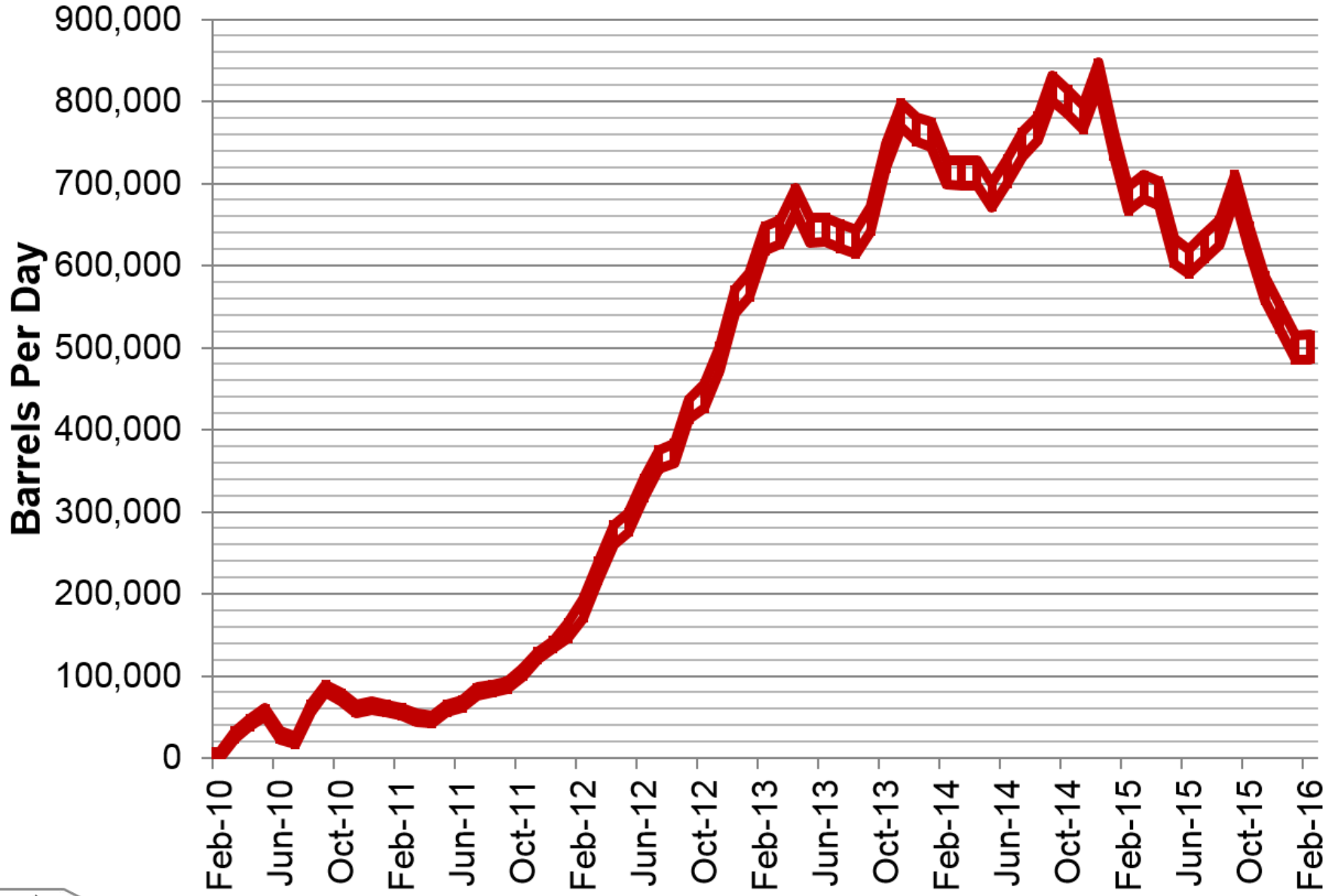
Estimated Williston Basin Oil Transportation



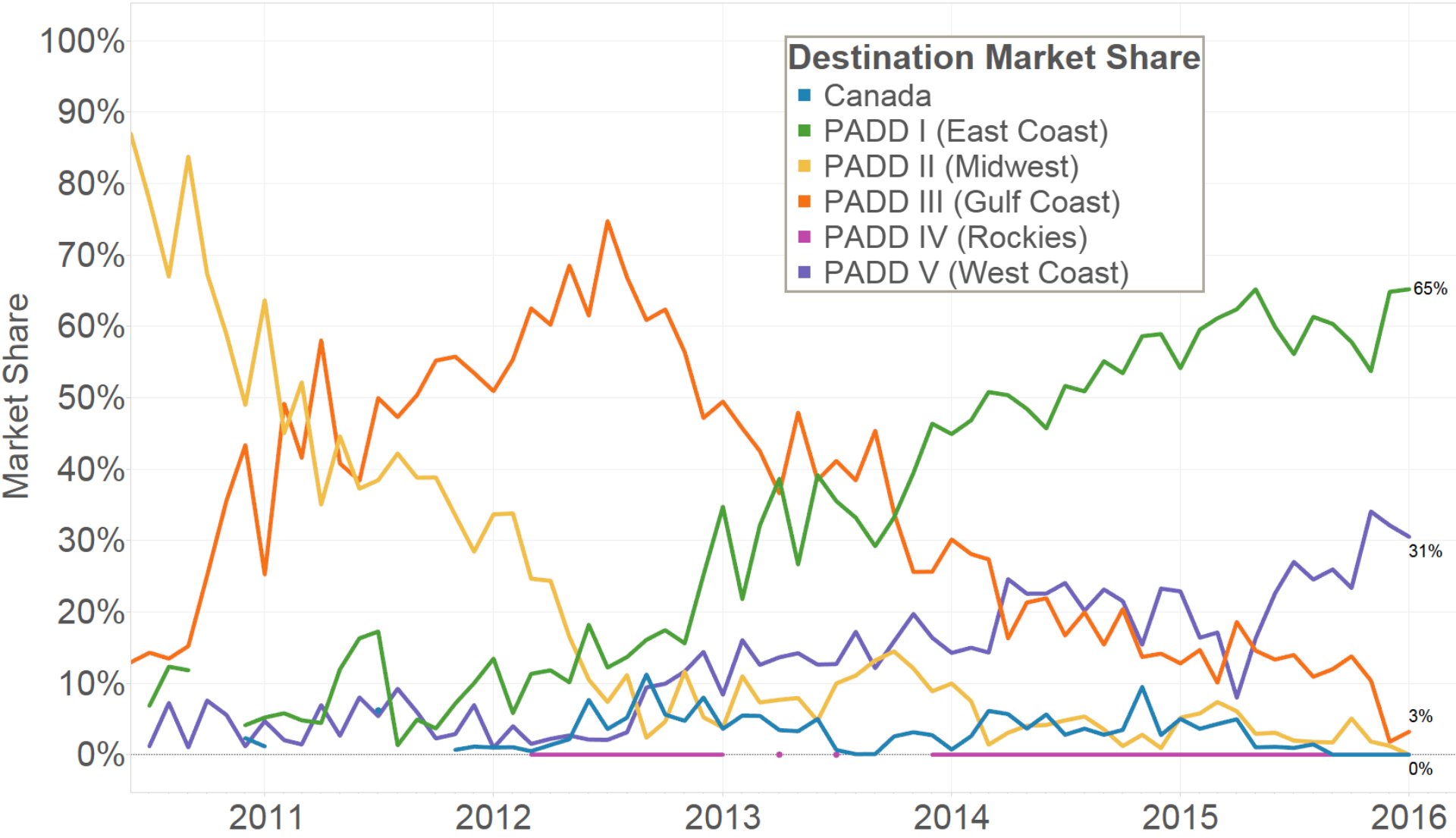
Estimated Williston Basin Oil Transportation



Estimated ND Rail Export Volumes

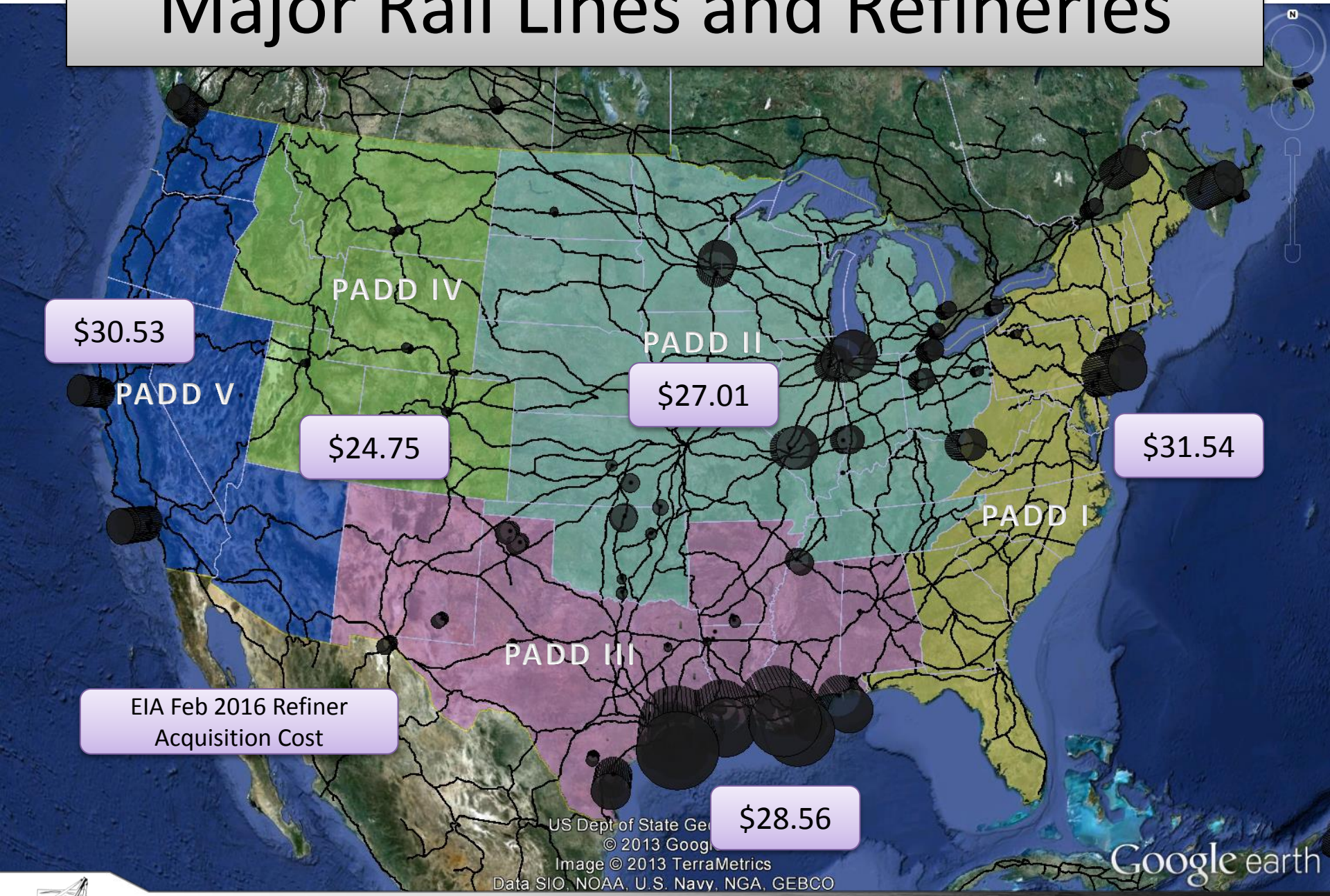


Rail Destinations Market Share (Jan 2016)

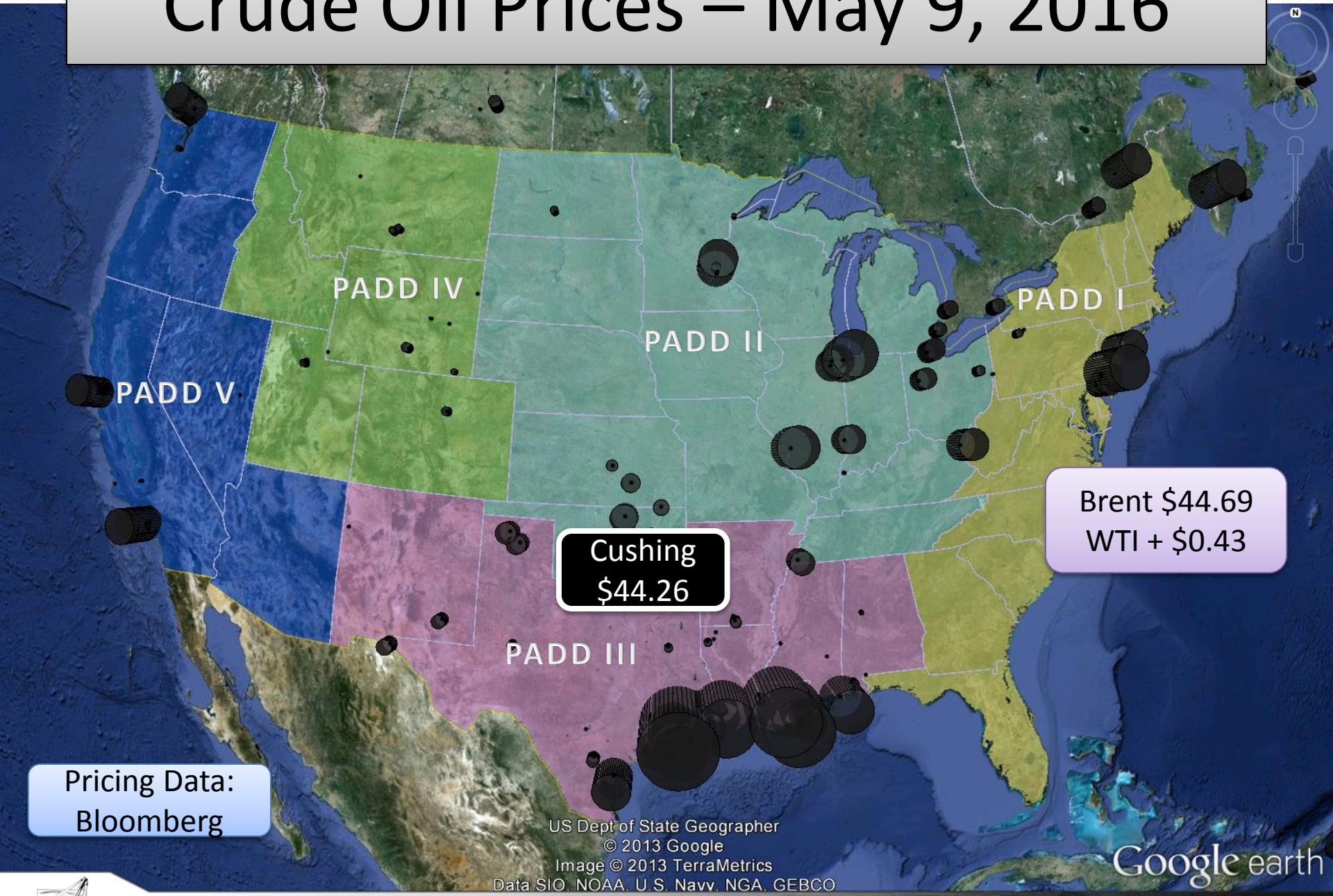


Data for Rail Destination Market Share Provided by the US Energy Information Administration

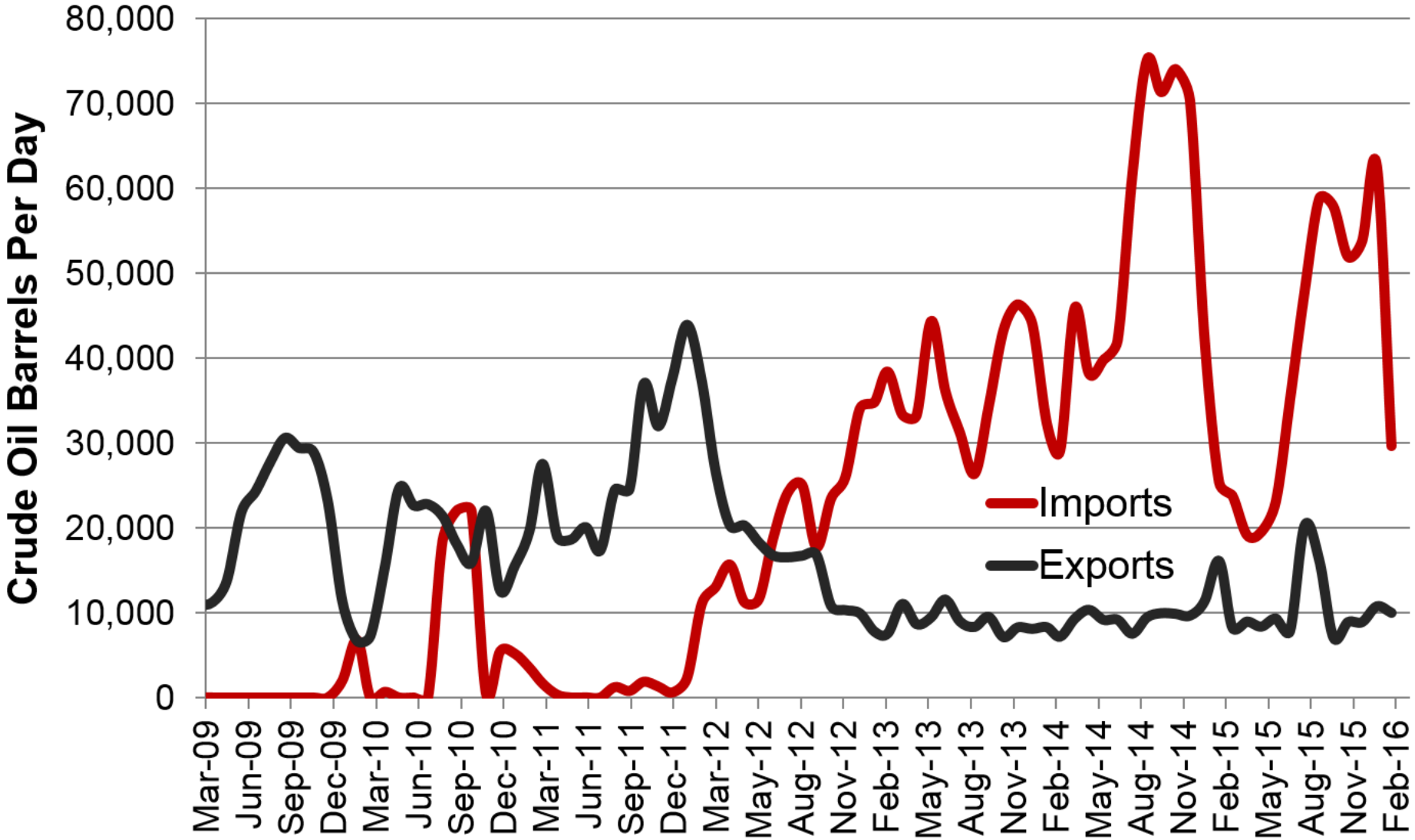
Major Rail Lines and Refineries



Crude Oil Prices – May 9, 2016

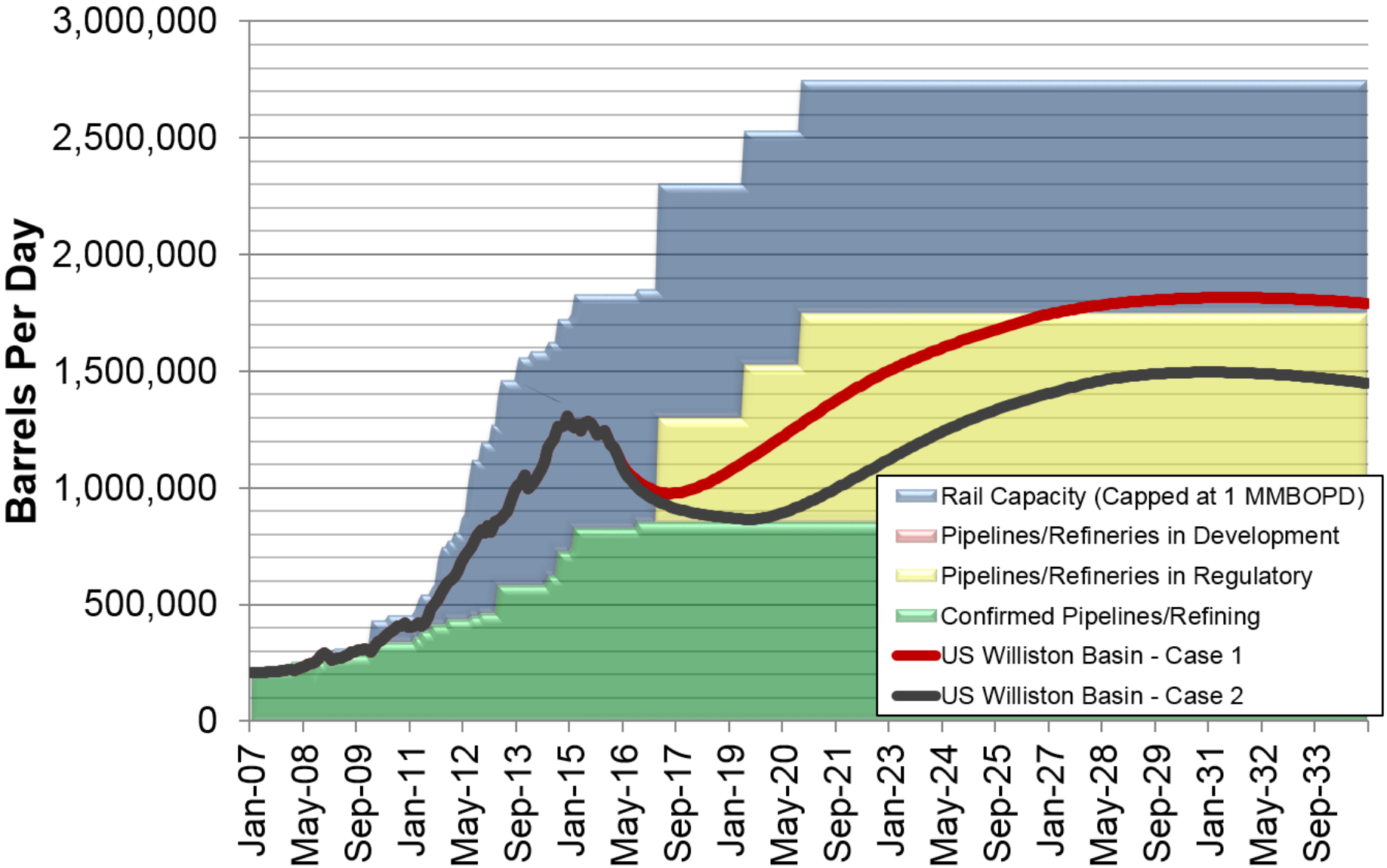


Williston Basin Truck Imports and Exports with Canada



Data for truck imports/exports chart is provided by the US International Trade Commission

Williston Basin Oil Production & Export Capacity, BOPD



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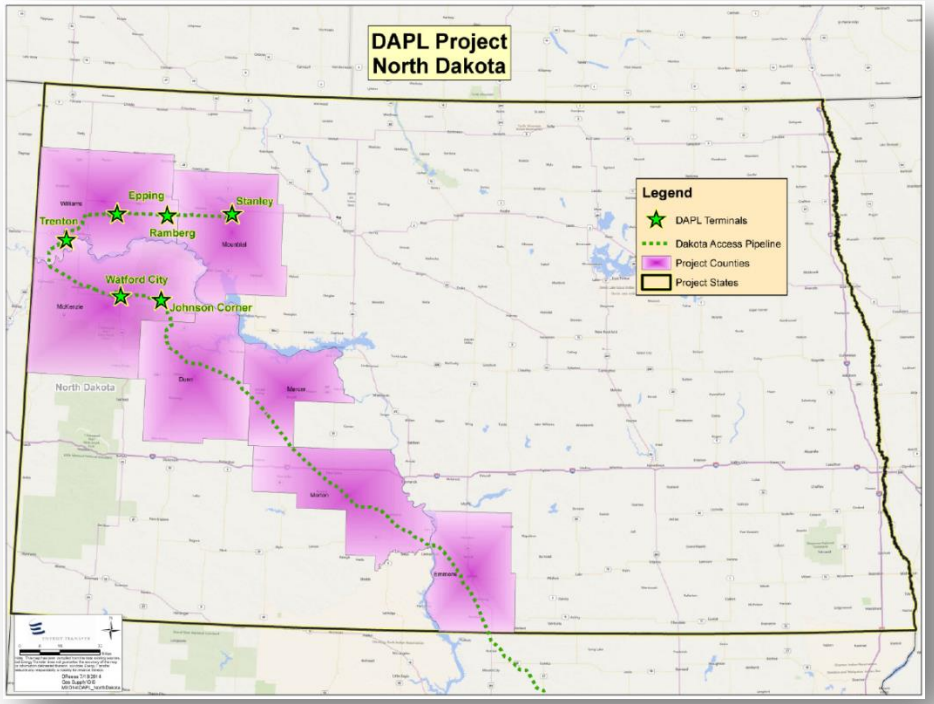
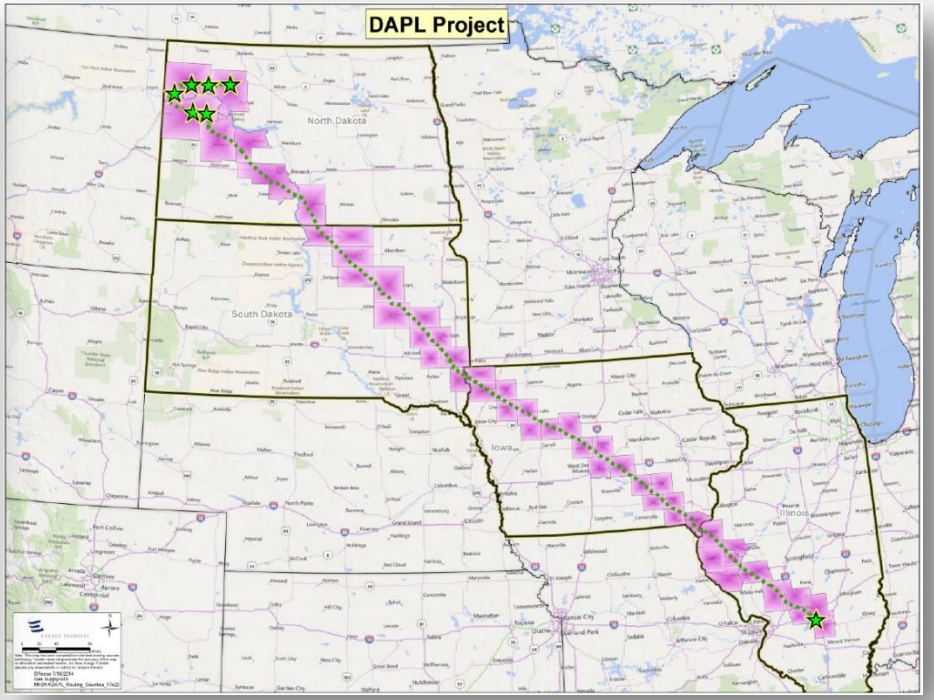
Energy Transfer Partners: Dakota Access

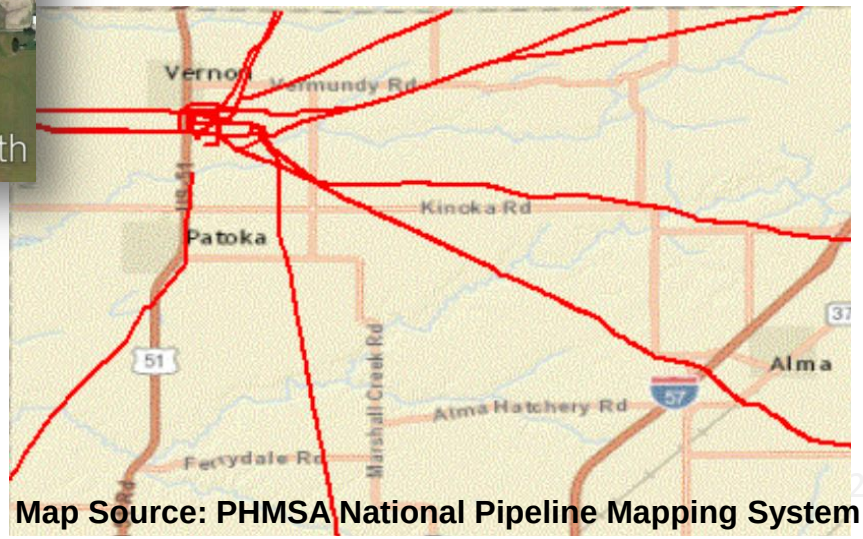




- Successful Open Season During the First Half of 2014
- 450,000 BOPD Capacity to Patoka, IL (30”)
- Expandable Up To 570,000 BOPD if Shipper Demand Exists
- Target In-service Date: Late 2016

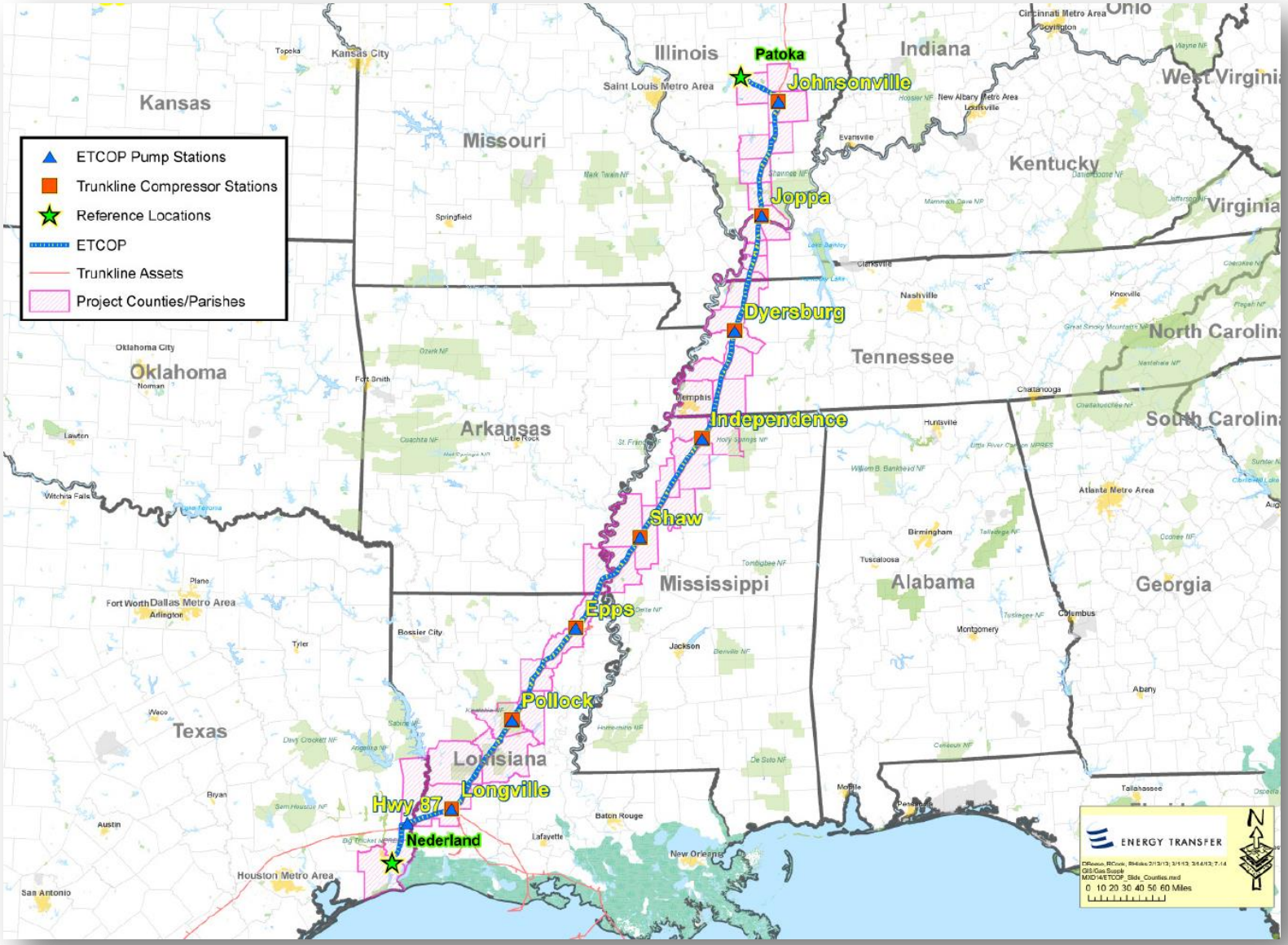
Map Source: Energy Transfer Partners

Patoka, IL Crude Hub



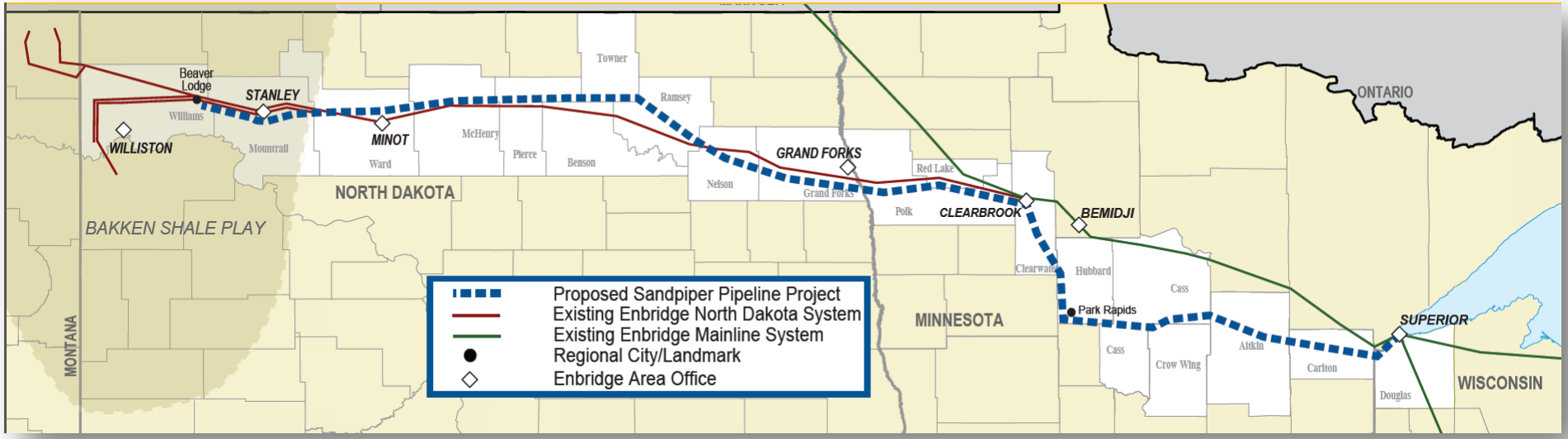
Map Source: PHMSA National Pipeline Mapping System

Energy Transfer Crude Oil Pipeline



Map Source: Energy Transfer Partners

Sandpiper Pipeline



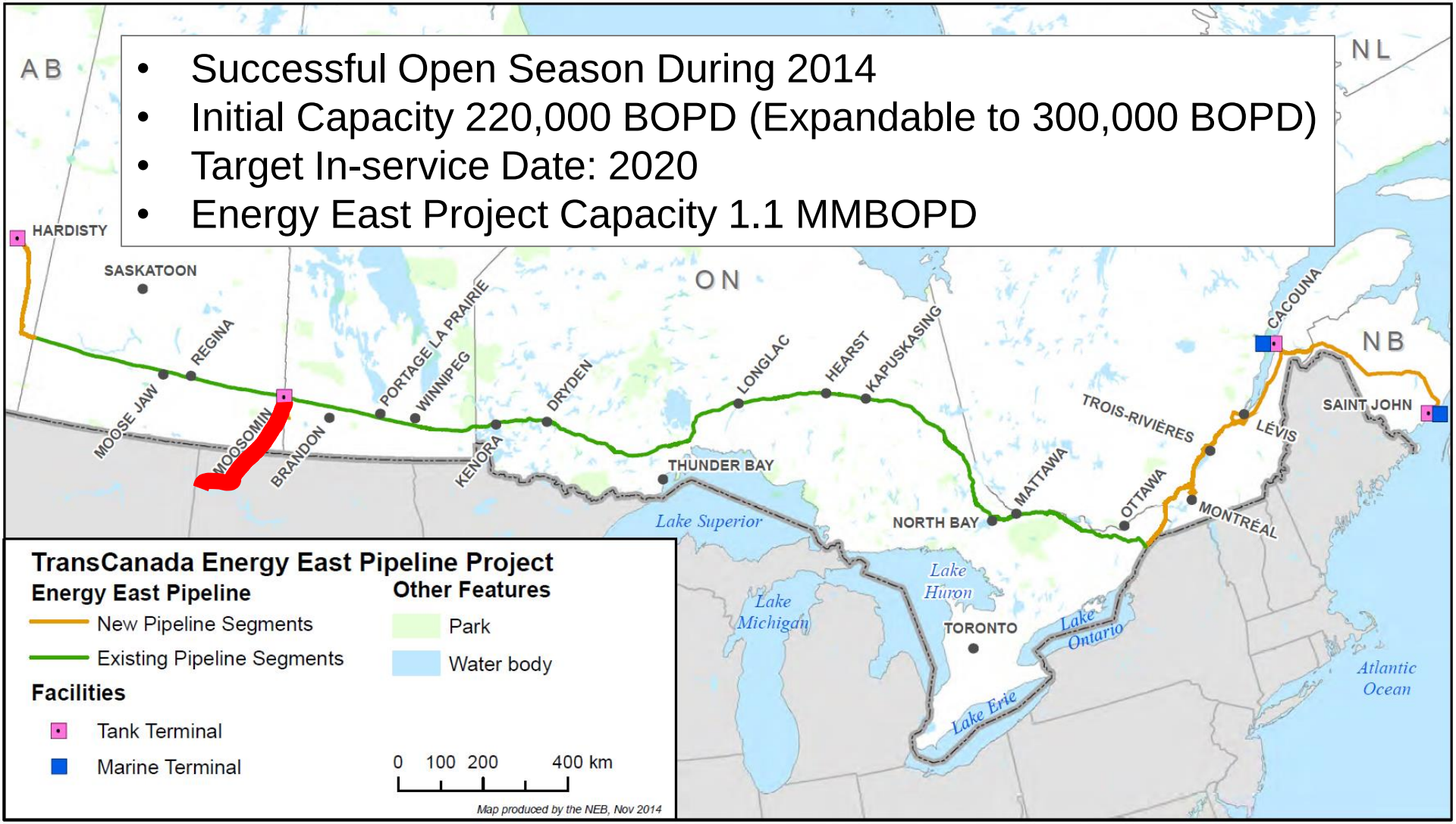
North Dakota Pipeline Company LLC - formerly known as Enbridge Pipelines (North Dakota) LLC

- Open Season Dates: November 26, 2013 – January 24, 2014
- 225,000 BOPD ND Capacity to Clearbrook, MN (24”)
- 375,000 BOPD Clearbrook, MN to Superior, WI (30”)
- Target In-service Date: 2019

Map: Enbridge

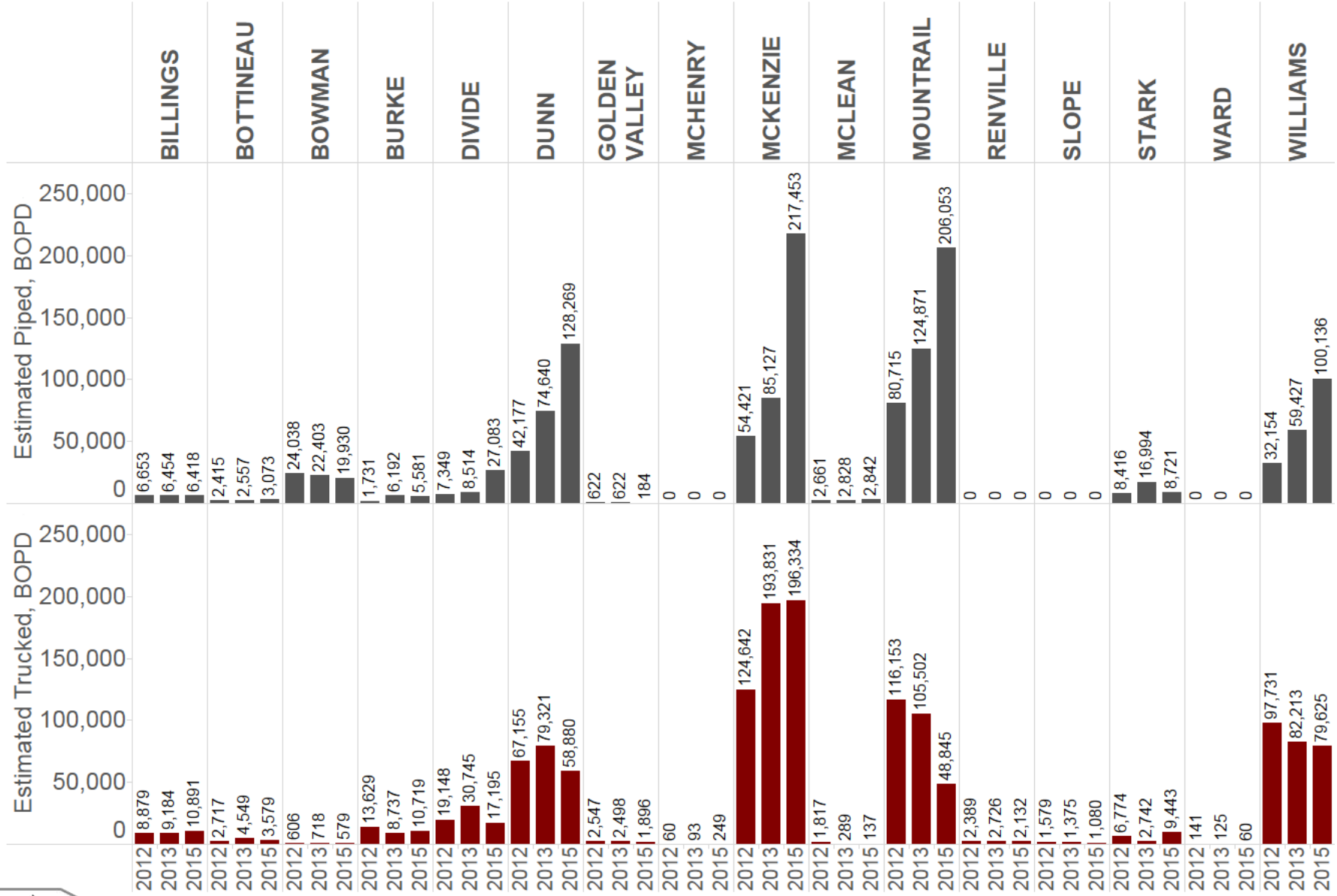
TransCanada: Upland Pipeline

- Successful Open Season During 2014
- Initial Capacity 220,000 BOPD (Expandable to 300,000 BOPD)
- Target In-service Date: 2020
- Energy East Project Capacity 1.1 MMBOPD

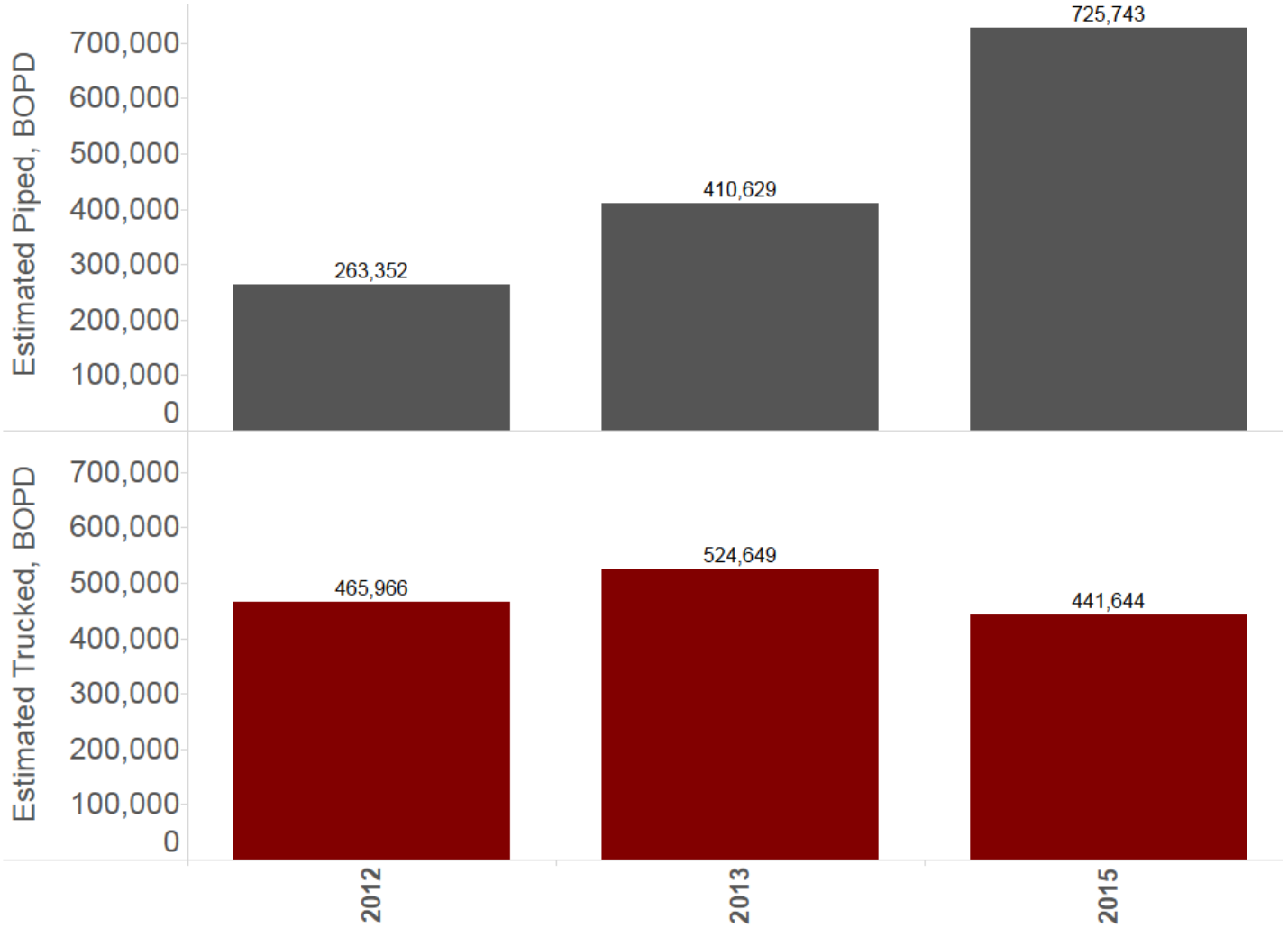


Map: NEB – NDPA Upland Addition

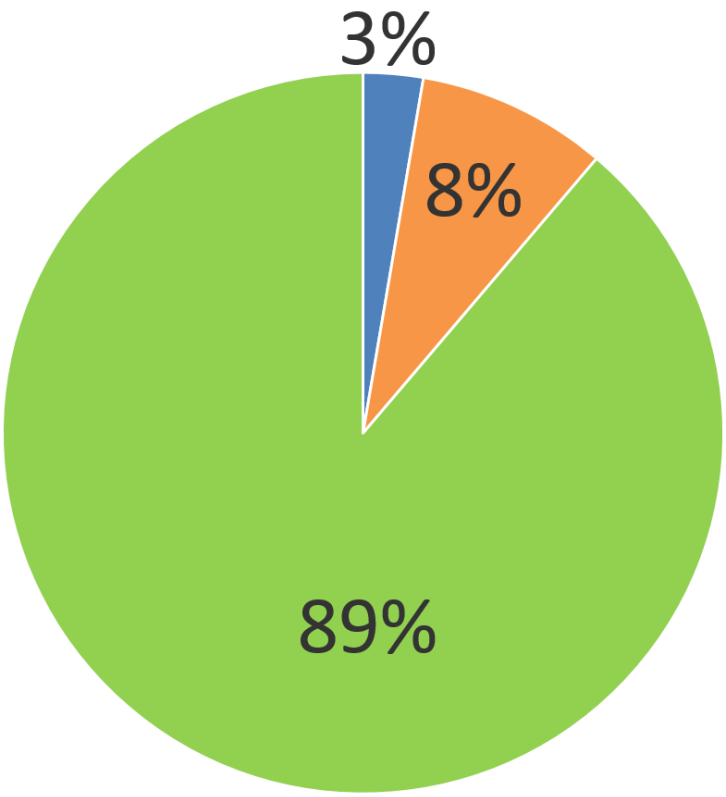
Evolution of Oil Gathering in ND



Evolution of Oil Gathering in ND Statewide Totals



Solving the Flaring Challenge



Statewide

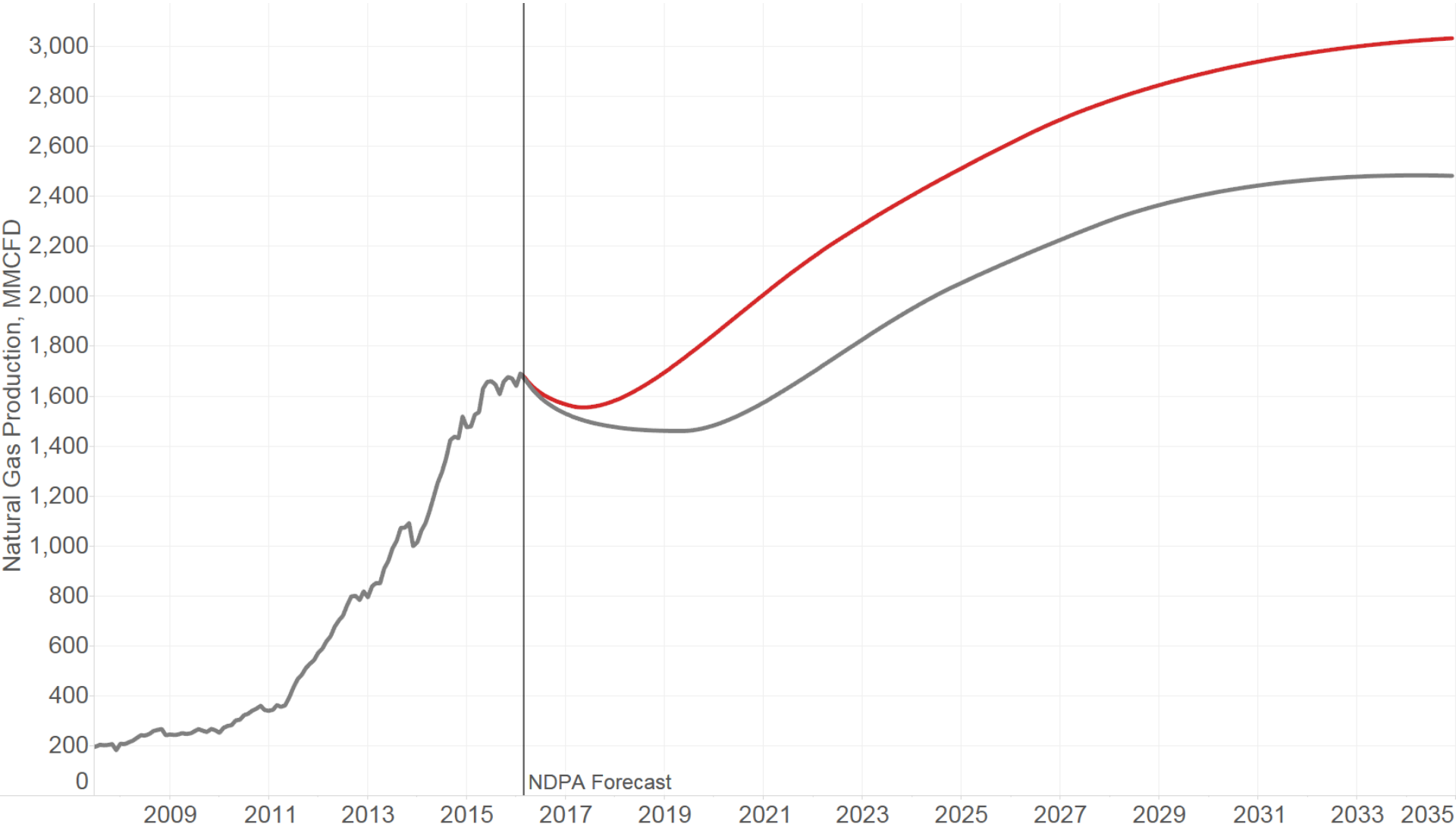
GREEN – % of gas captured and sold
Blue – % flared from zero sales wells
Orange – % flared from wells with at least one mcf sold.

Simple Terms

Blue – Lack of pipelines
Orange – Challenges on existing infrastructure

February 2016 Data – Non-Confidential Wells

North Dakota Gas Production Forecast



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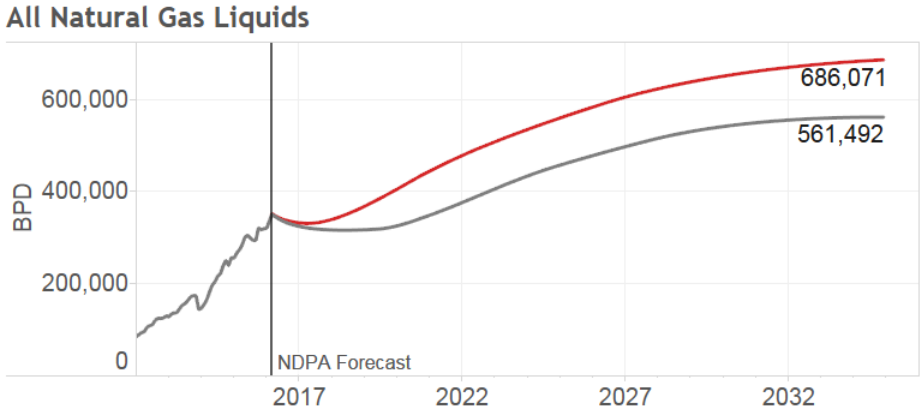
Example Bakken Gas Quality

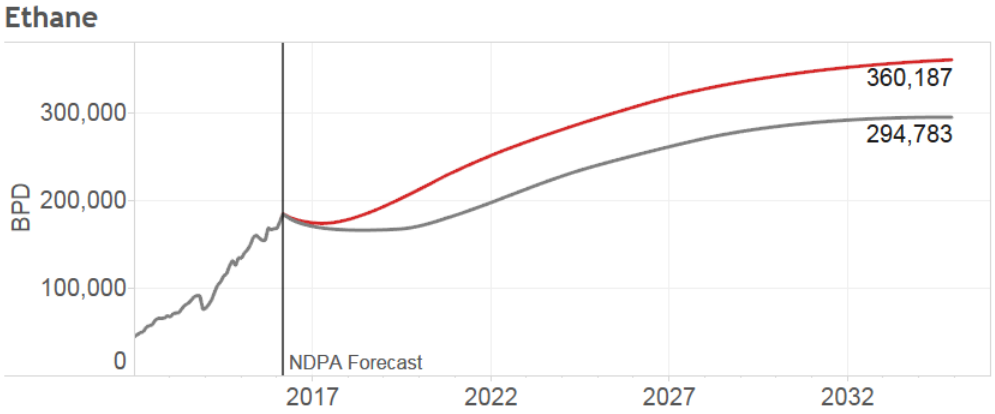
Component	Mole %	GPM	% of Liquids
Nitrogen	5.21%	NA	NA
Carbon Dioxide	0.57%	NA	NA
Hydrogen Sulfide	0.01%	NA	NA
Methane	57.67%	NA	NA
Ethane	19.94%	5.32	52.5%
Propane	11.33%	3.11	30.7%
Isobutane	0.97%	0.32	3.1%
Normal Butane	2.83%	0.89	8.8%
Isopentane	0.38%	0.14	1.4%
Normal Pentane	0.55%	0.20	2.0%
Hexane+	0.36%	0.16	1.5%
Totals	**99.82%**	**10.14**	**100.0%**

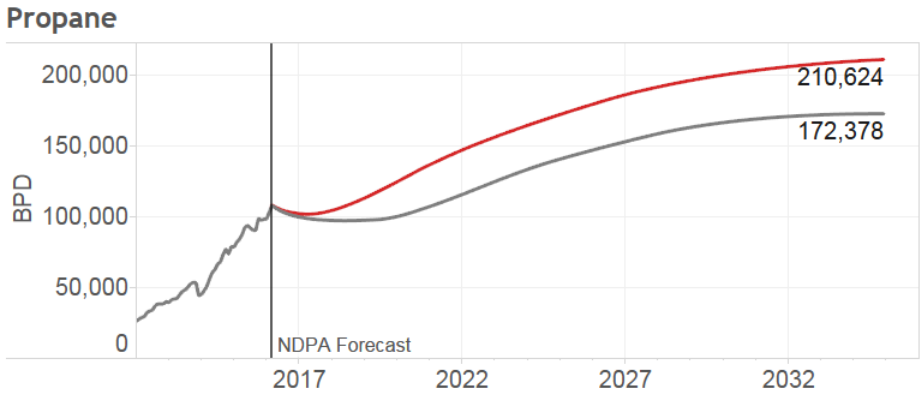
Gas Stream BTU Value	1,399

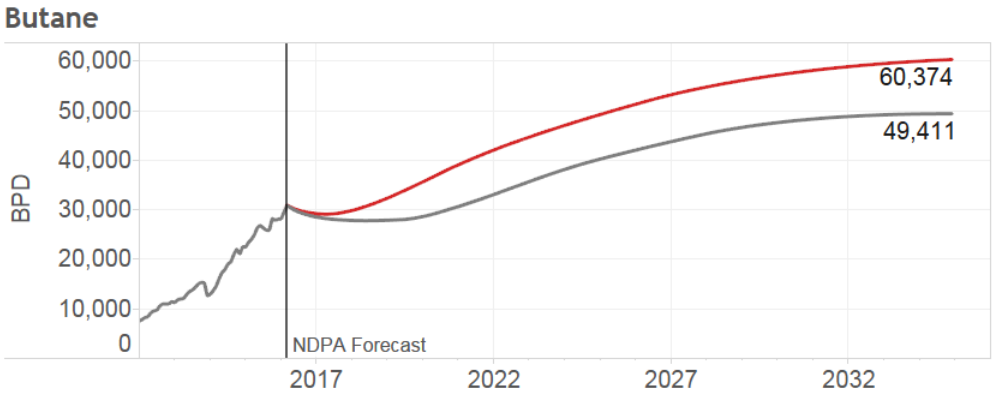
Mole % Source: Energy & Environmental Research Center (EERC)

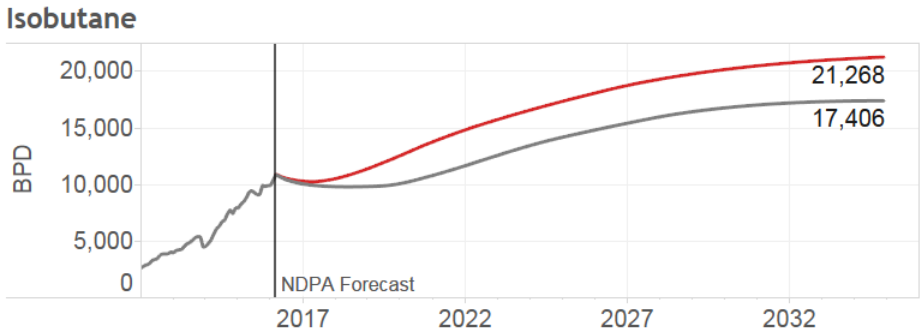
North Dakota Captured* NGL's

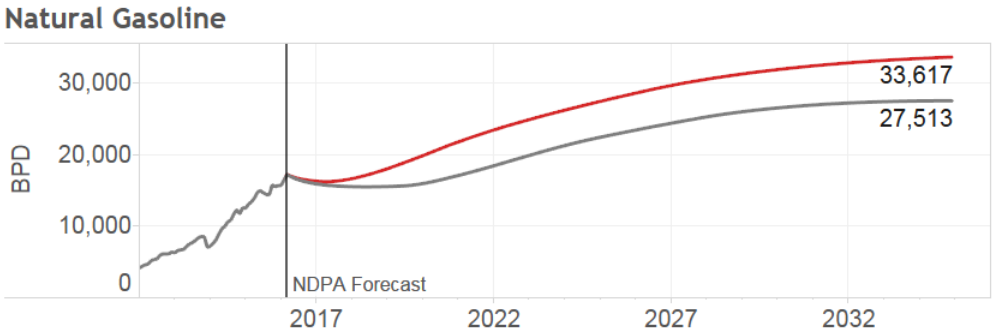






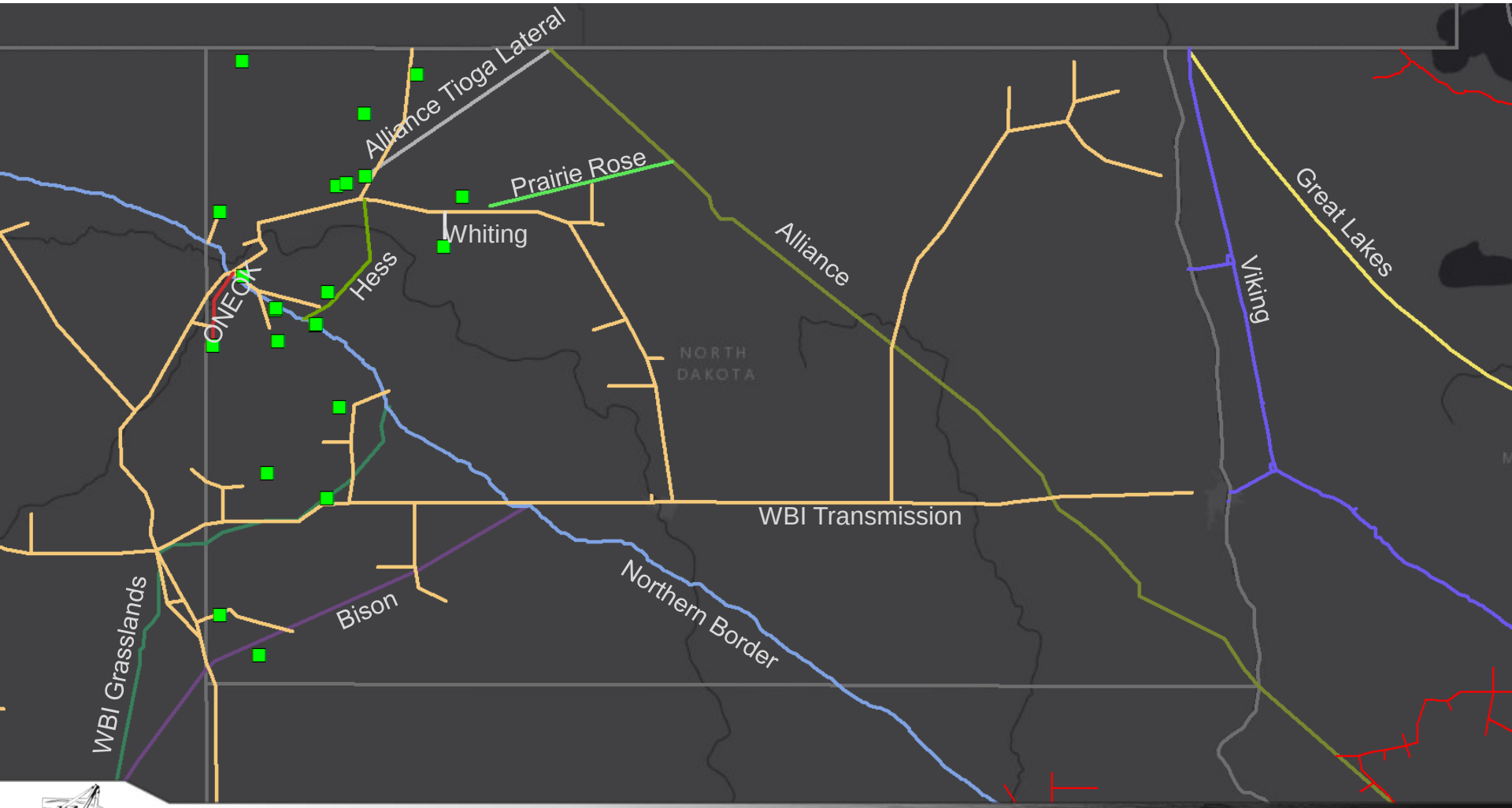




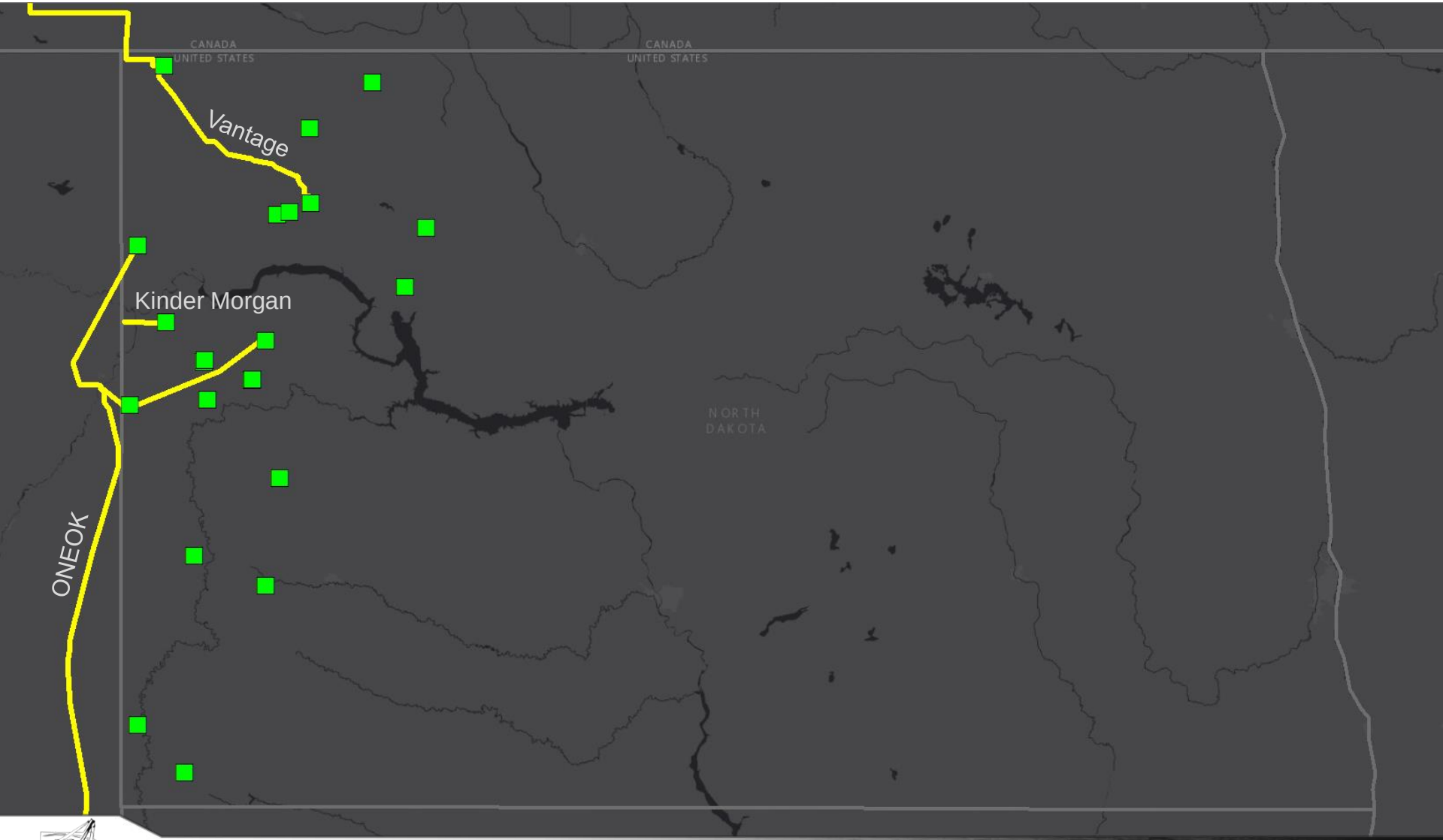


**Non-flared NGL's & Assumes 10 GPM*

Major Gas Pipeline and Processing Infrastructure



Dedicated NGL Pipelines



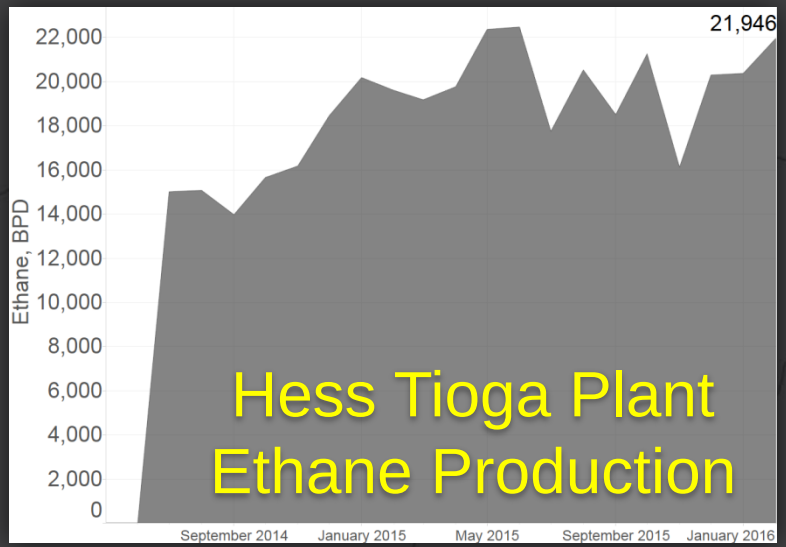
Vantage Ethane Pipeline

10”, 80 Mile Pipeline
Capacity: 68,000 BPD

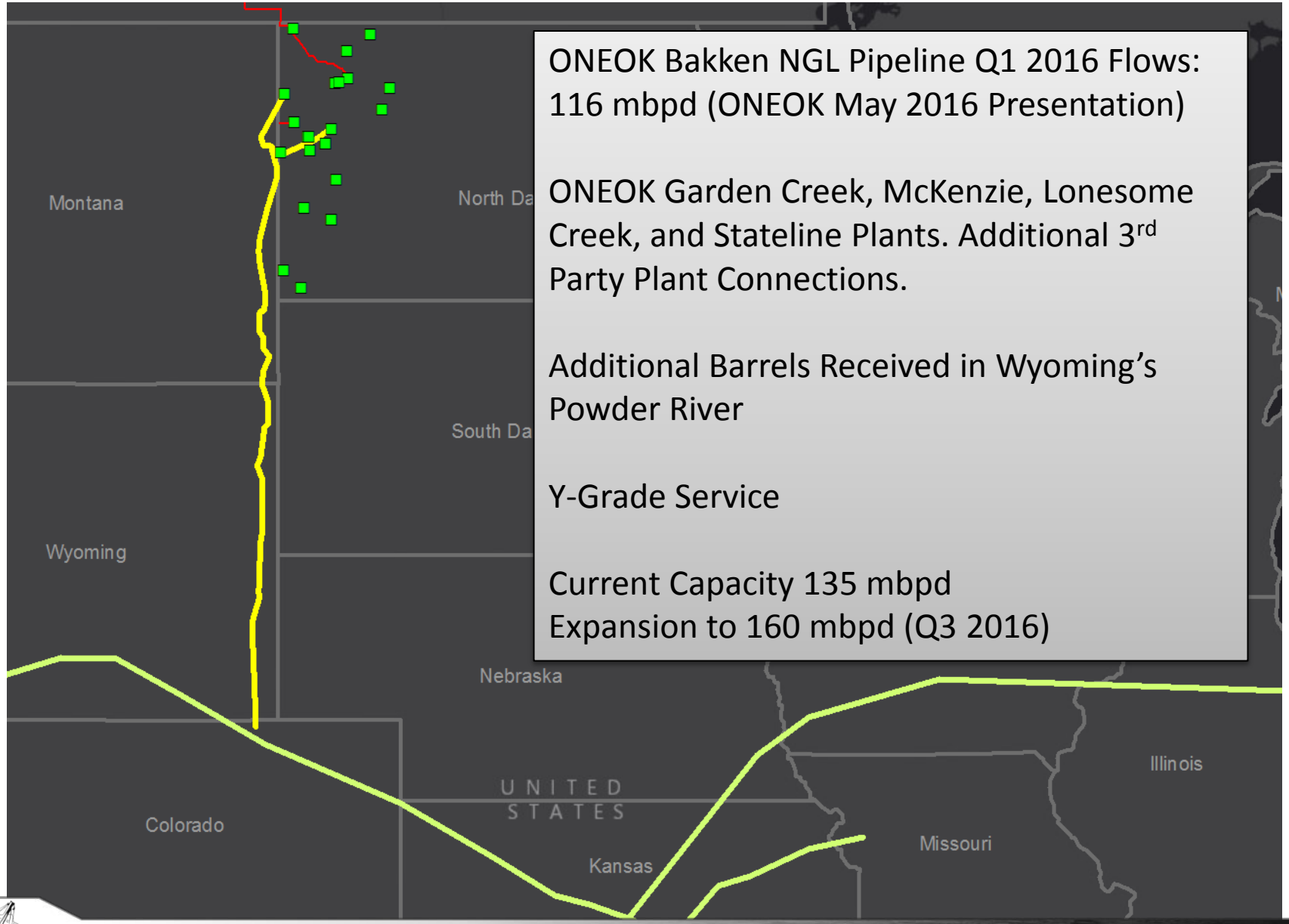
Purity Ethane to Canada

Source: Tioga Gas Plant

Expanding to ONEOK Stateline Plants (Q3-16)



ONEOK Bakken NGL Pipeline



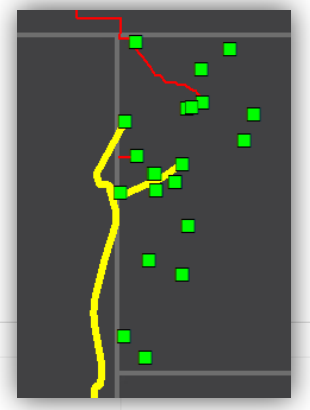
ONEOK Bakken NGL Pipeline Q1 2016 Flows: 116 mbpd (ONEOK May 2016 Presentation)

ONEOK Garden Creek, McKenzie, Lonesome Creek, and Stateline Plants. Additional 3rd Party Plant Connections.

Additional Barrels Received in Wyoming's Powder River

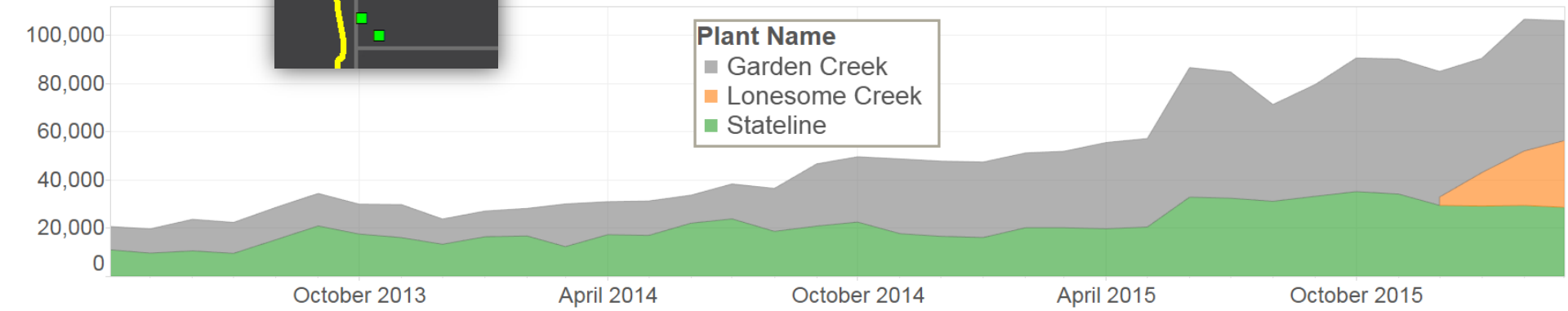
Y-Grade Service

Current Capacity 135 mbpd
Expansion to 160 mbpd (Q3 2016)

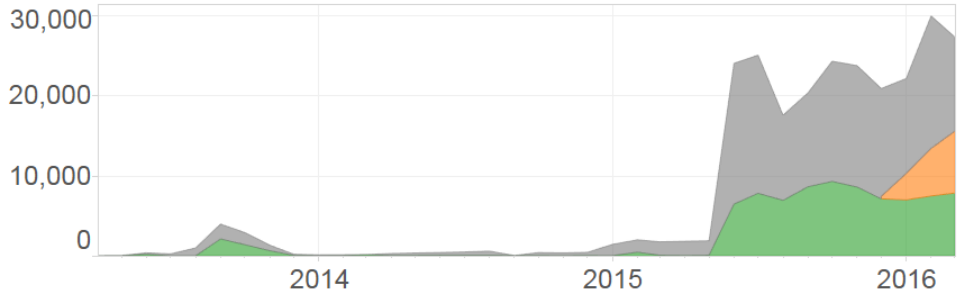


ONEOK Plant Volumes Connected to NGL Pipeline

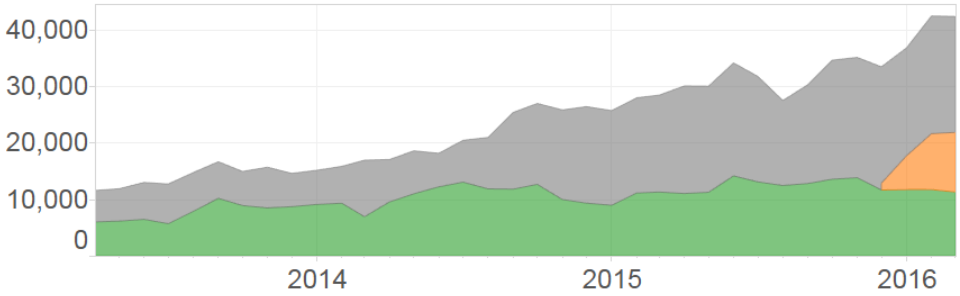
All NGLs, BPD



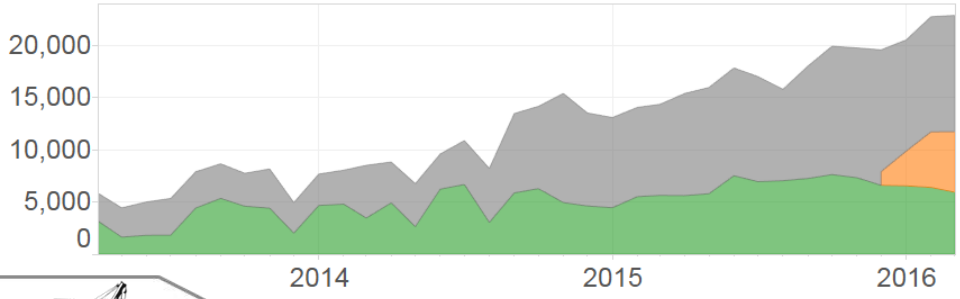
Ethane, BPD



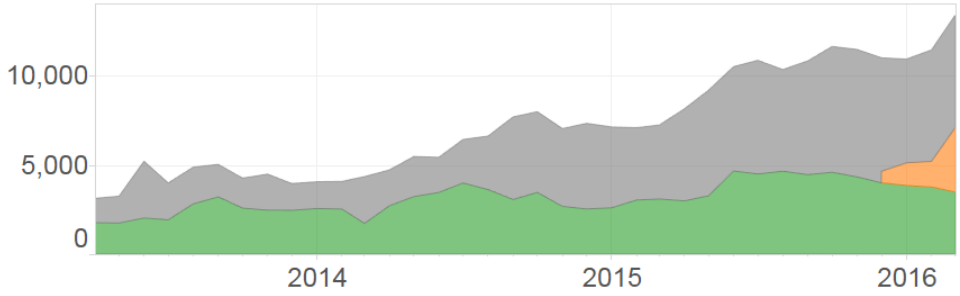
Propane, BPD



Butane, BPD

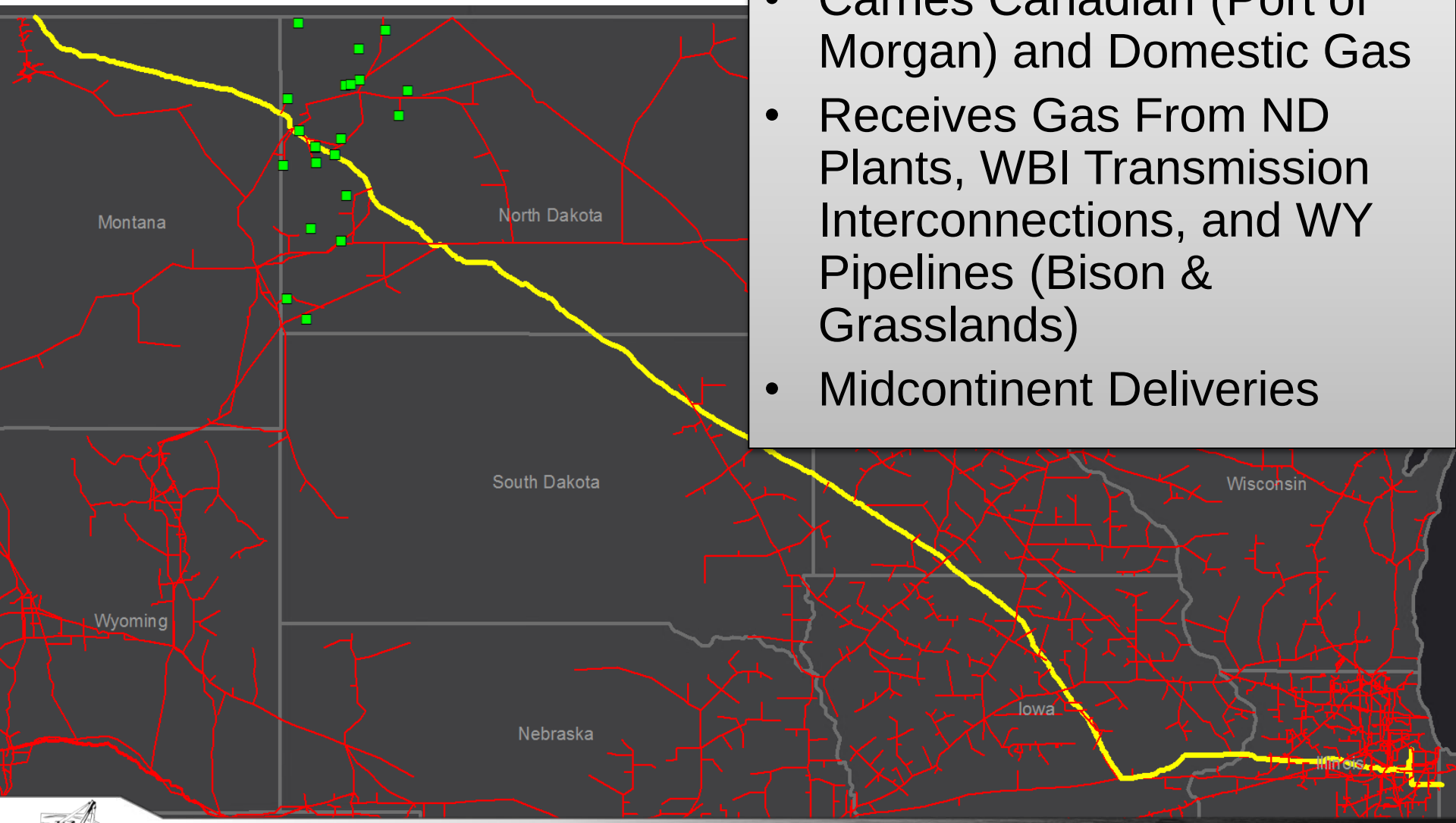


Natural Gasoline, BPD

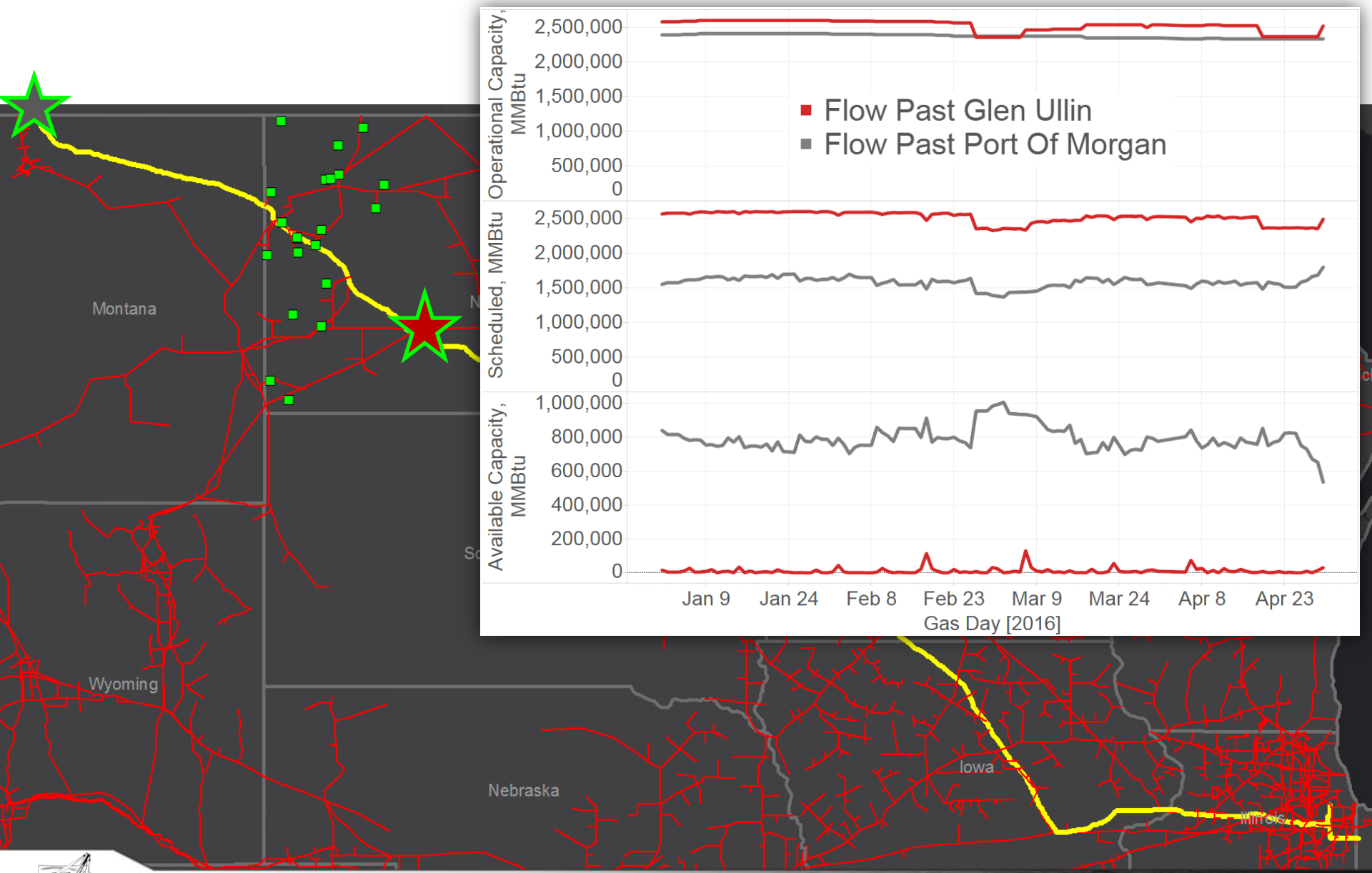


Northern Border Pipeline

- 42” Pipeline
- Carries Canadian (Port of Morgan) and Domestic Gas
- Receives Gas From ND Plants, WBI Transmission Interconnections, and WY Pipelines (Bison & Grasslands)
- Midcontinent Deliveries

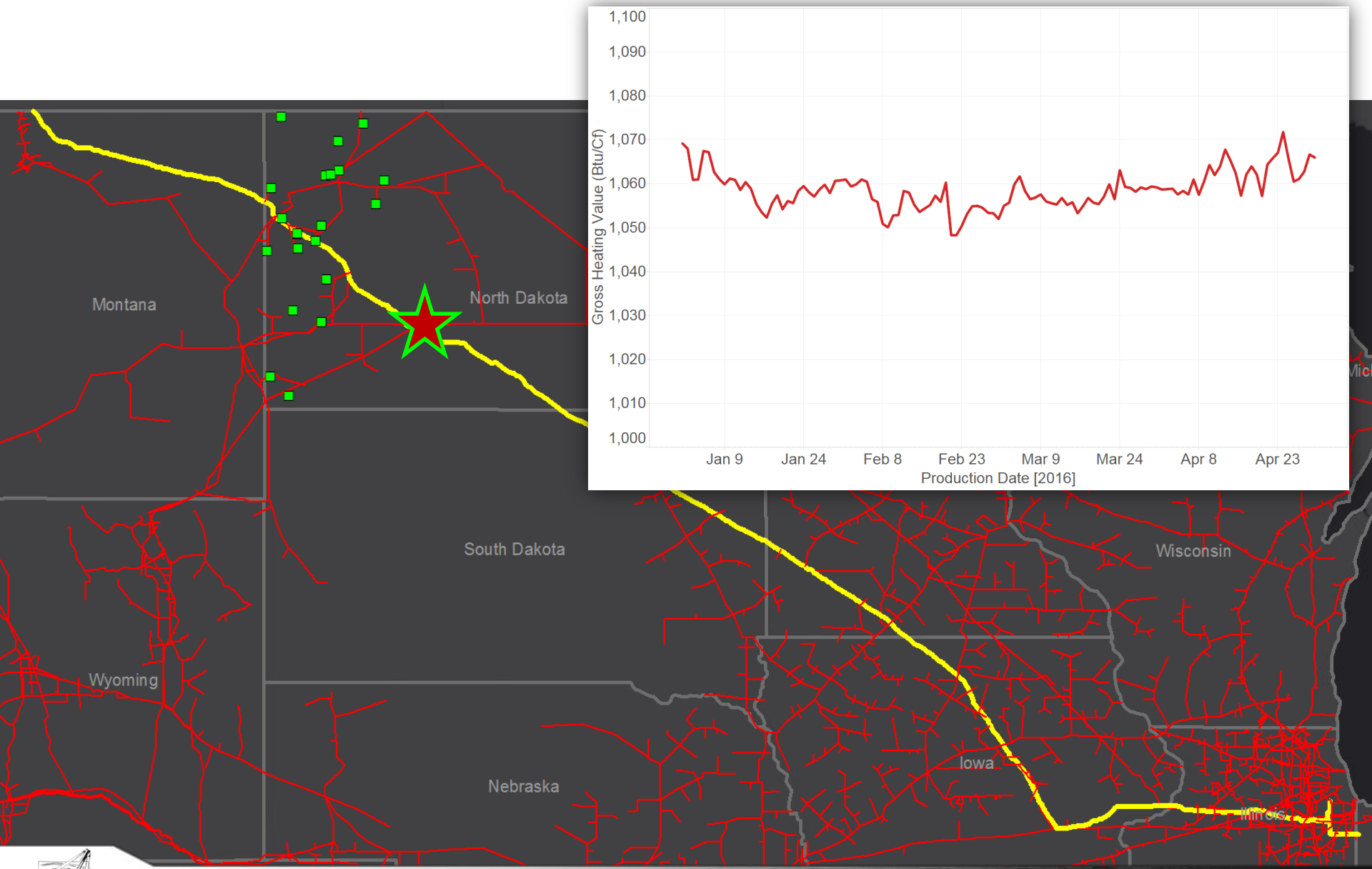


Northern Border Pipeline* (2016)



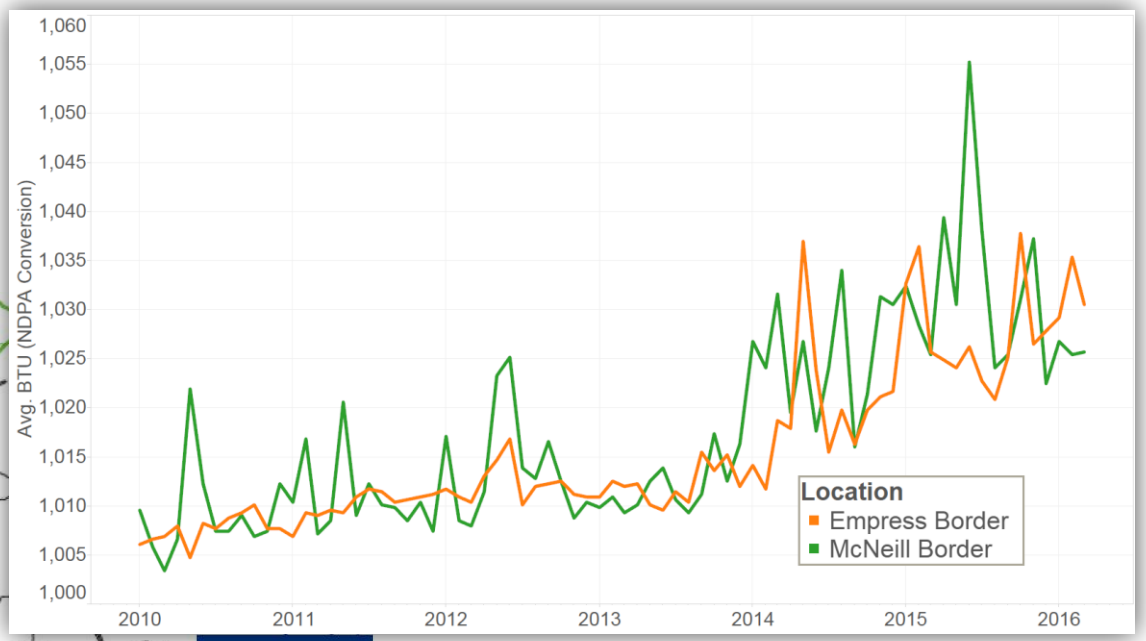
*Data Source: Northern Border IPS

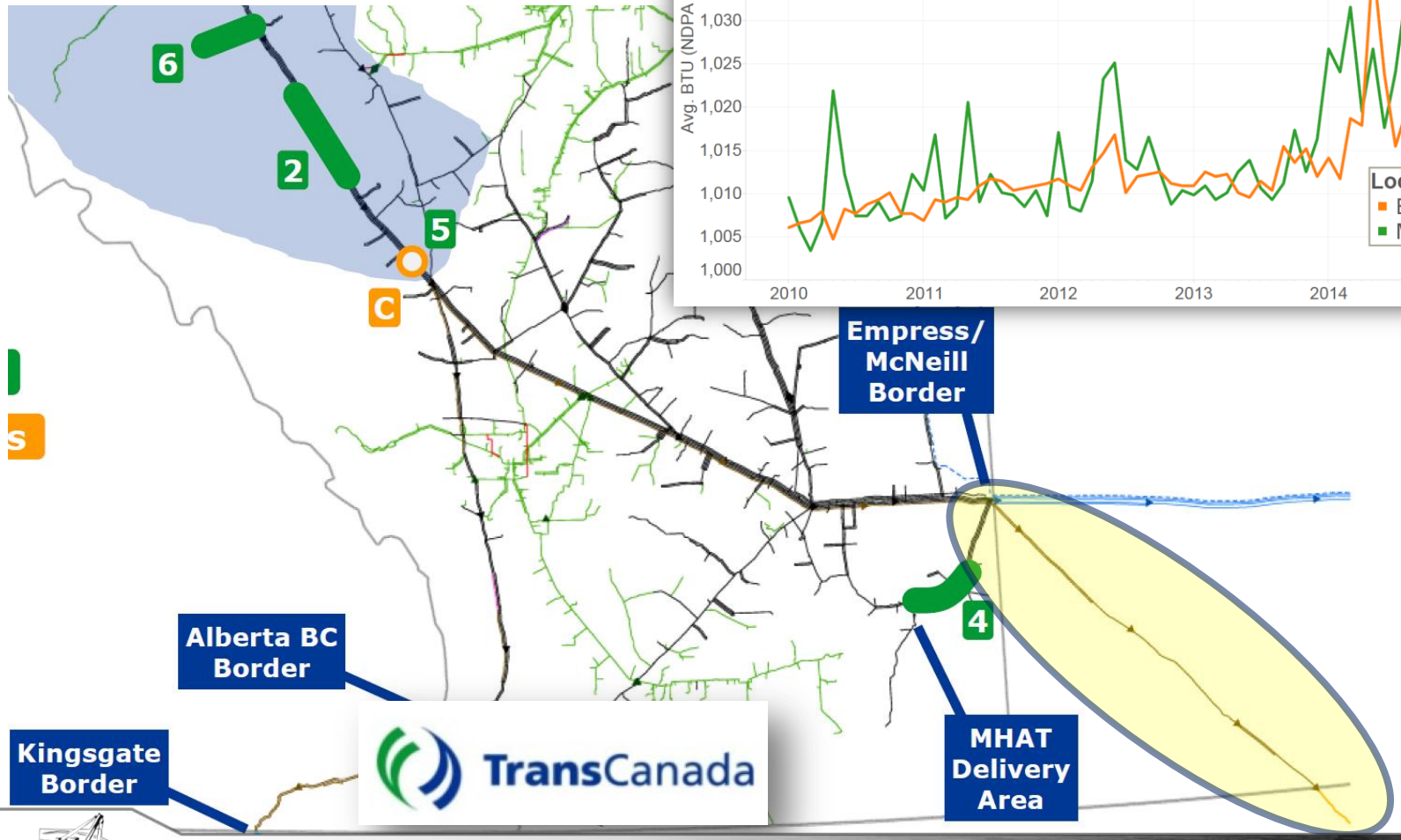
Northern Border Glen Ullin* (2016)



*Data Source: Northern Border IPS

Foothills Pipeline

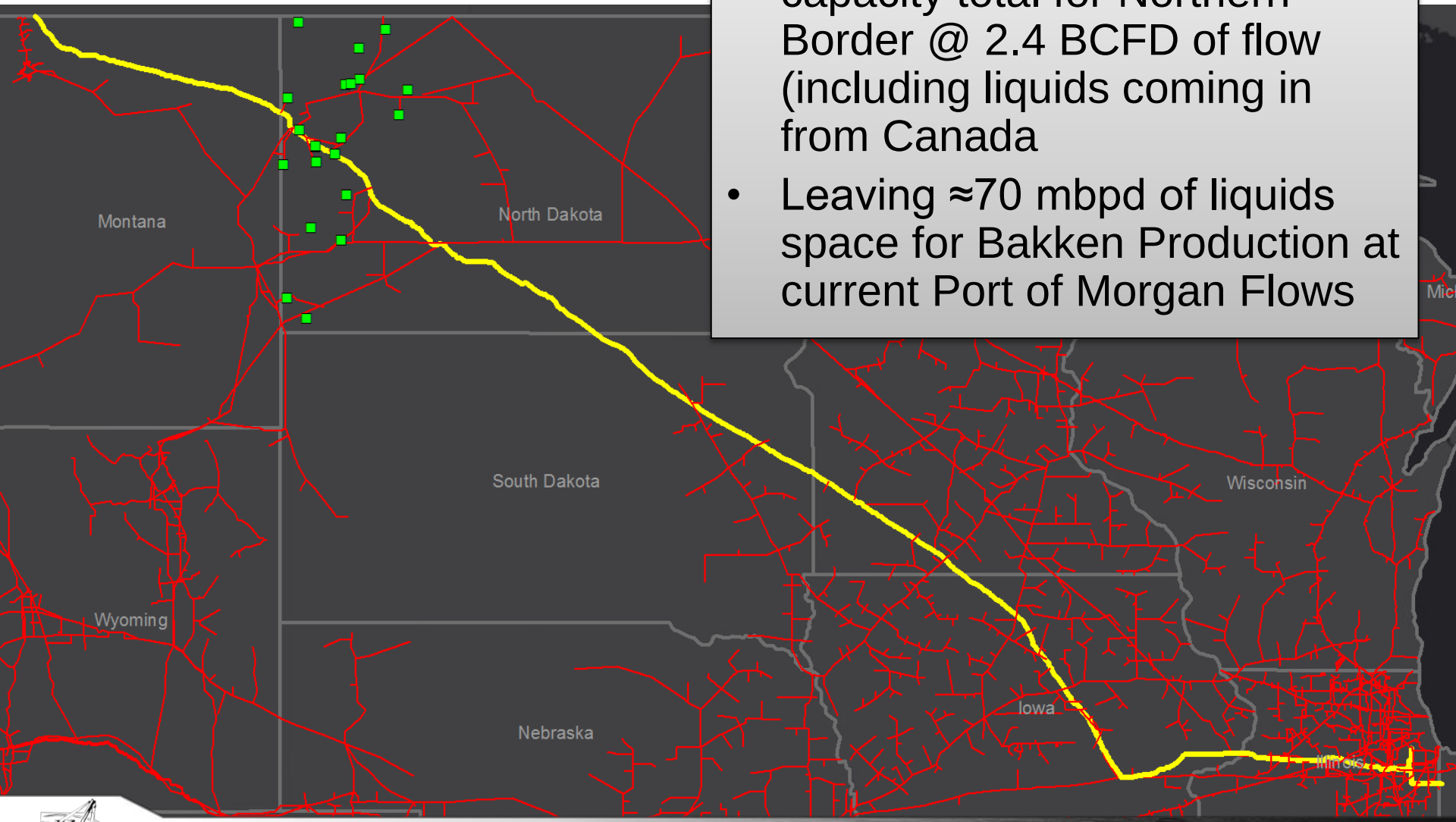




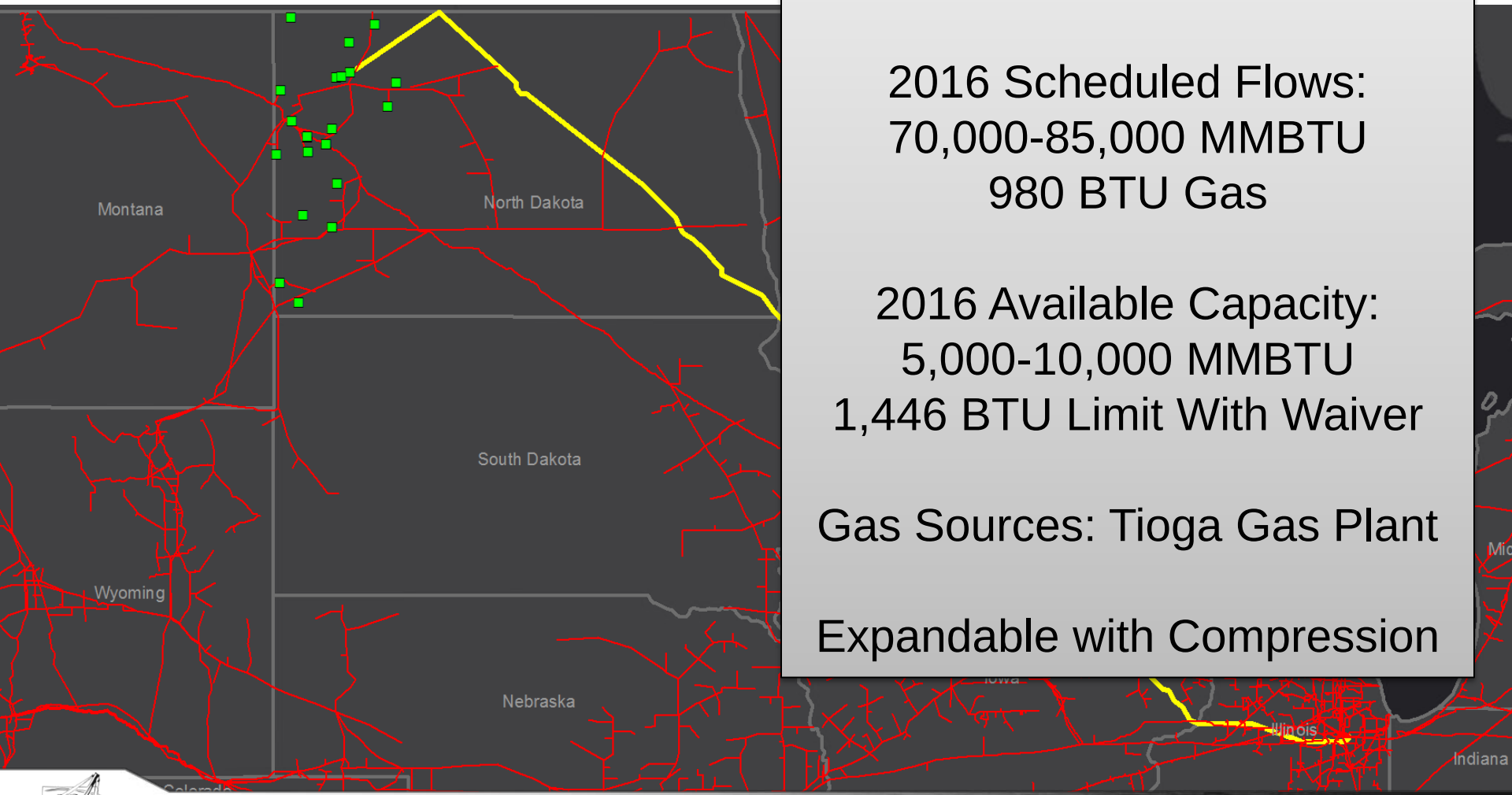
Map & Raw Data Source: TransCanada

Northern Border Pipeline

- Estimated 130 mbpd of liquids capacity total for Northern Border @ 2.4 BCFD of flow (including liquids coming in from Canada
- Leaving ≈70 mbpd of liquids space for Bakken Production at current Port of Morgan Flows



Alliance Tioga Lateral Pipeline



12”, 80 Mile Pipeline
Capacity: 126 MCFD

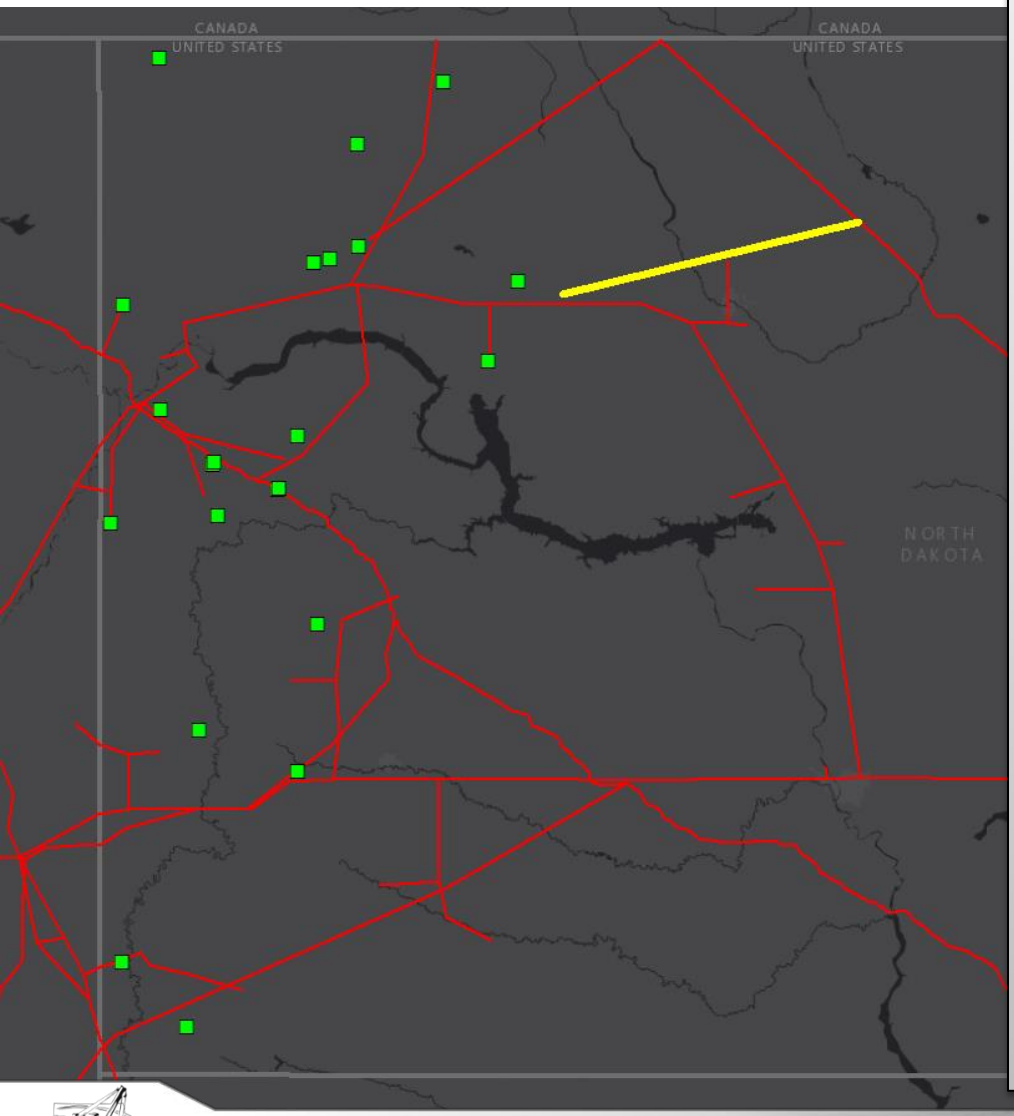
2016 Scheduled Flows:
70,000-85,000 MMBTU
980 BTU Gas

2016 Available Capacity:
5,000-10,000 MMBTU
1,446 BTU Limit With Waiver

Gas Sources: Tioga Gas Plant

Expandable with Compression

Aux Sable Prairie Rose Pipeline



12”, 83 Mile Pipeline
Capacity: 120 MCFD

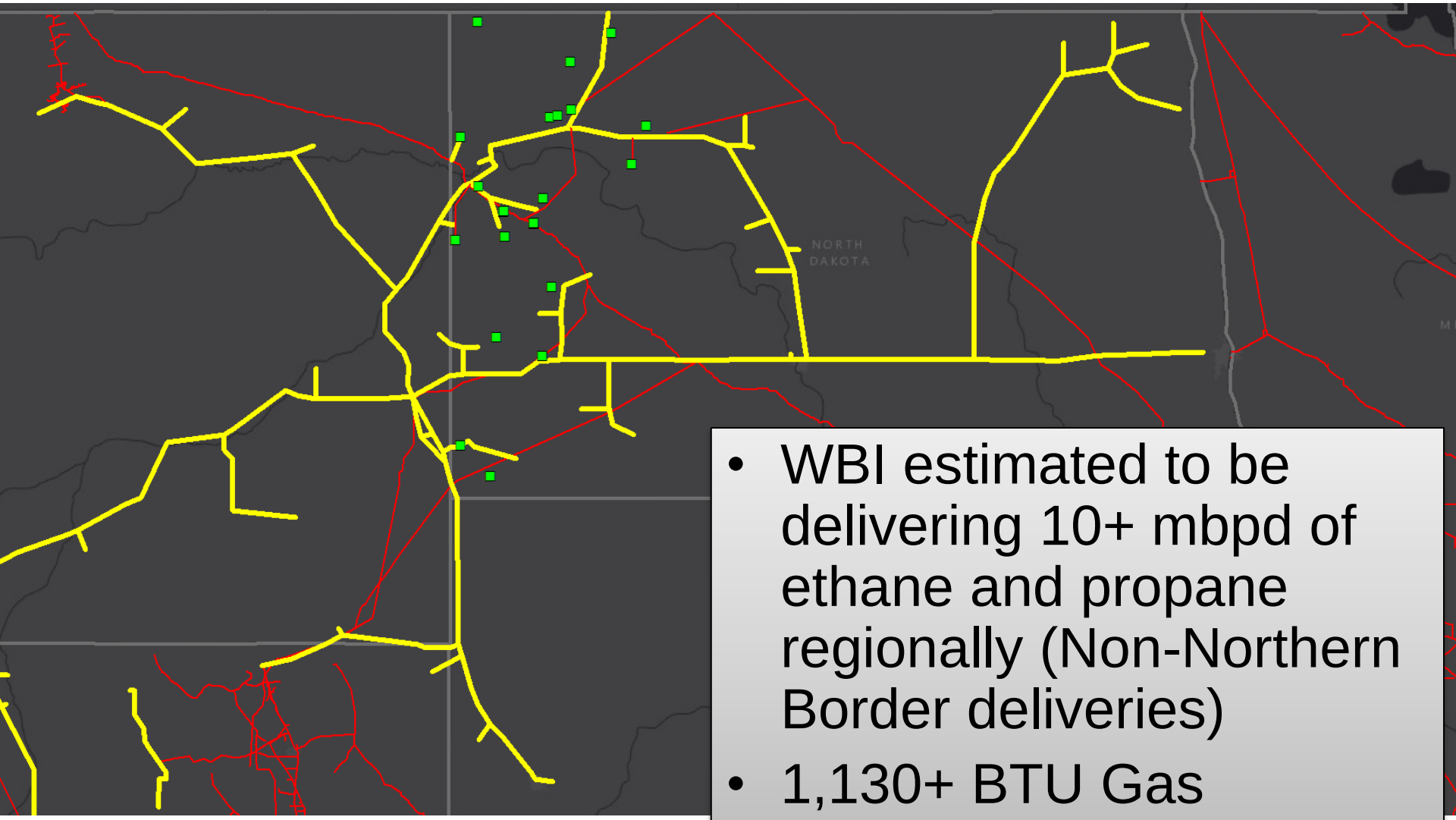
2016 Scheduled Flows:
125,000-140,000 MMBTU
1,330-1,400 BTU Gas

2016 Available Capacity:
15,000-25,000 MMBTU
1,550 BTU Limit With Waiver

Gas Sources: Robinson Lake Plant and 3rd Party Gathering

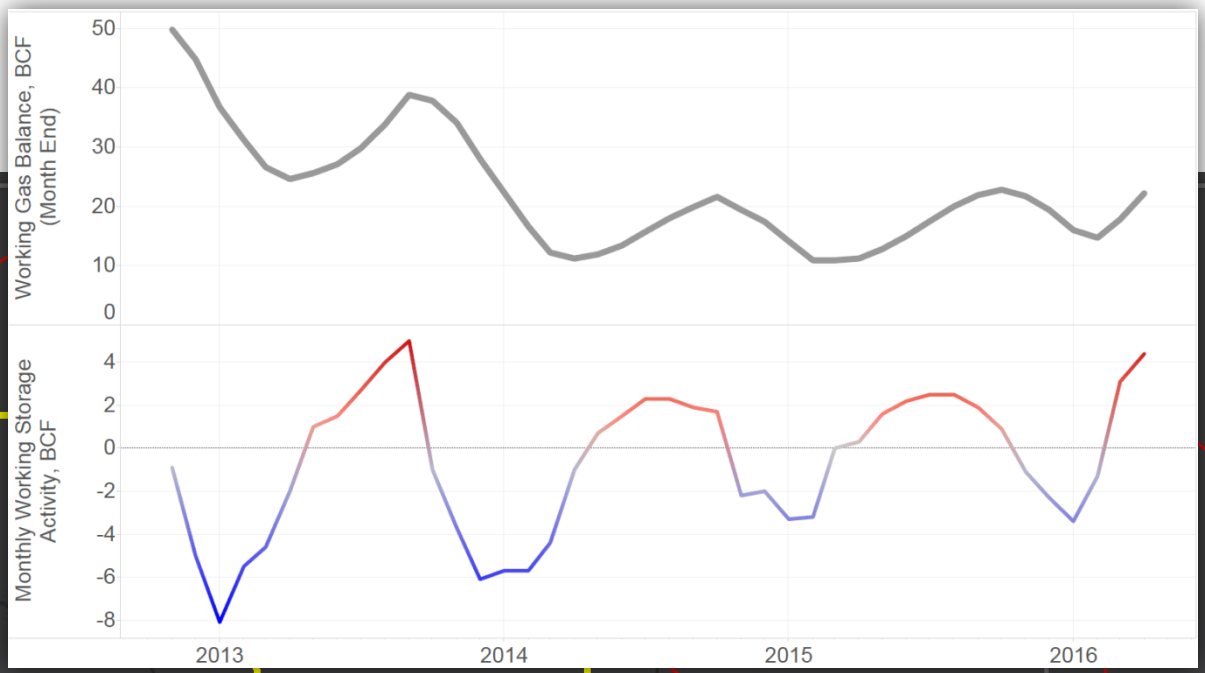
Palermo Truck Rack For NGL Deliveries: 5-10 MBPD

WBI Transmission Pipelines



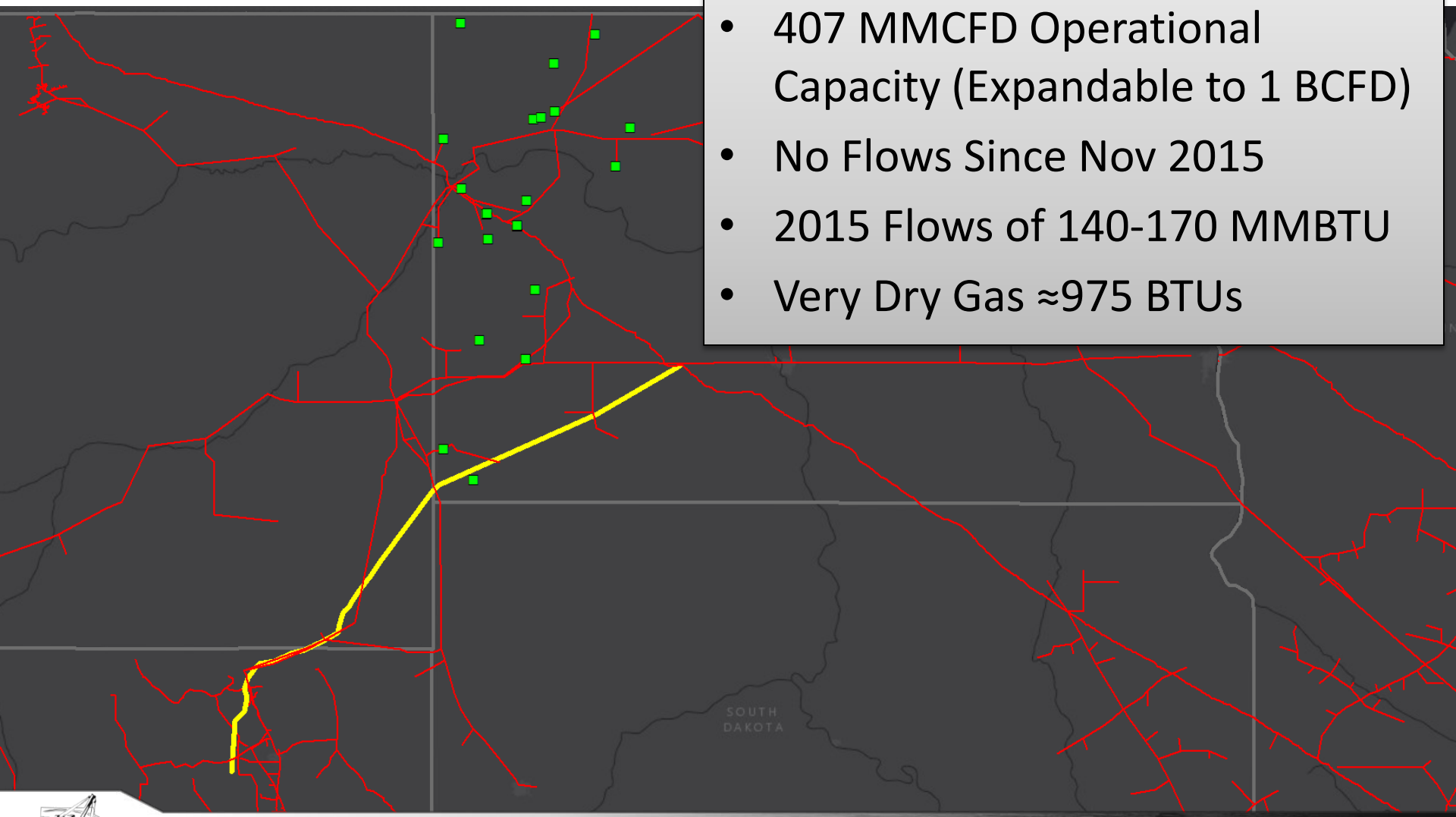
- WBI estimated to be delivering 10+ mbpd of ethane and propane regionally (Non-Northern Border deliveries)
- 1,130+ BTU Gas

WBI Transmission Baker Storage



TransCanada Bison Pipeline

- 302 Miles, 30” Pipeline
- 407 MMCFD Operational Capacity (Expandable to 1 BCFD)
- No Flows Since Nov 2015
- 2015 Flows of 140-170 MMBTU
- Very Dry Gas ≈975 BTUs



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