

House Energy and Natural Resources

North Dakota Pipeline Authority

January 6, 2016

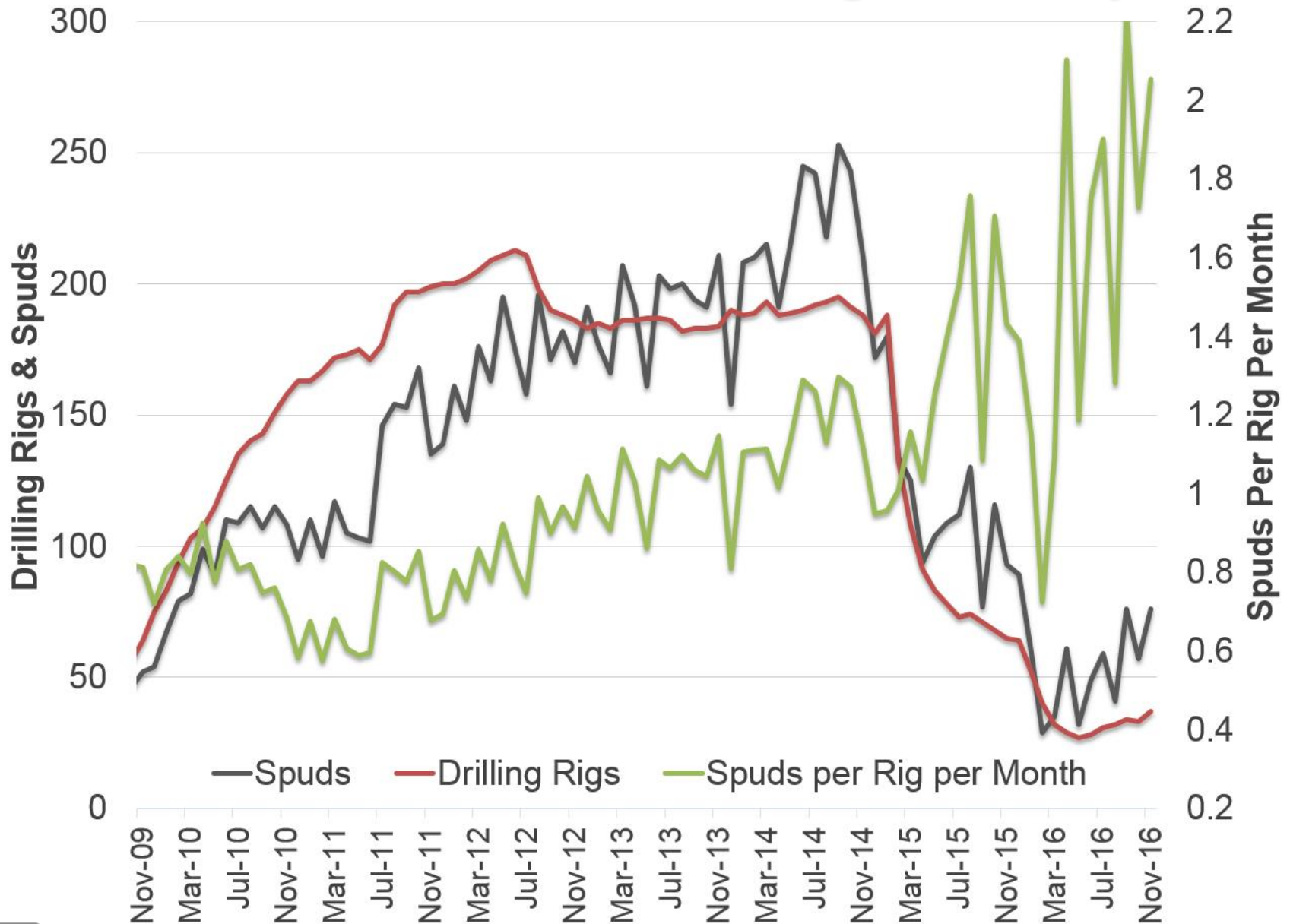


Presentation Outline

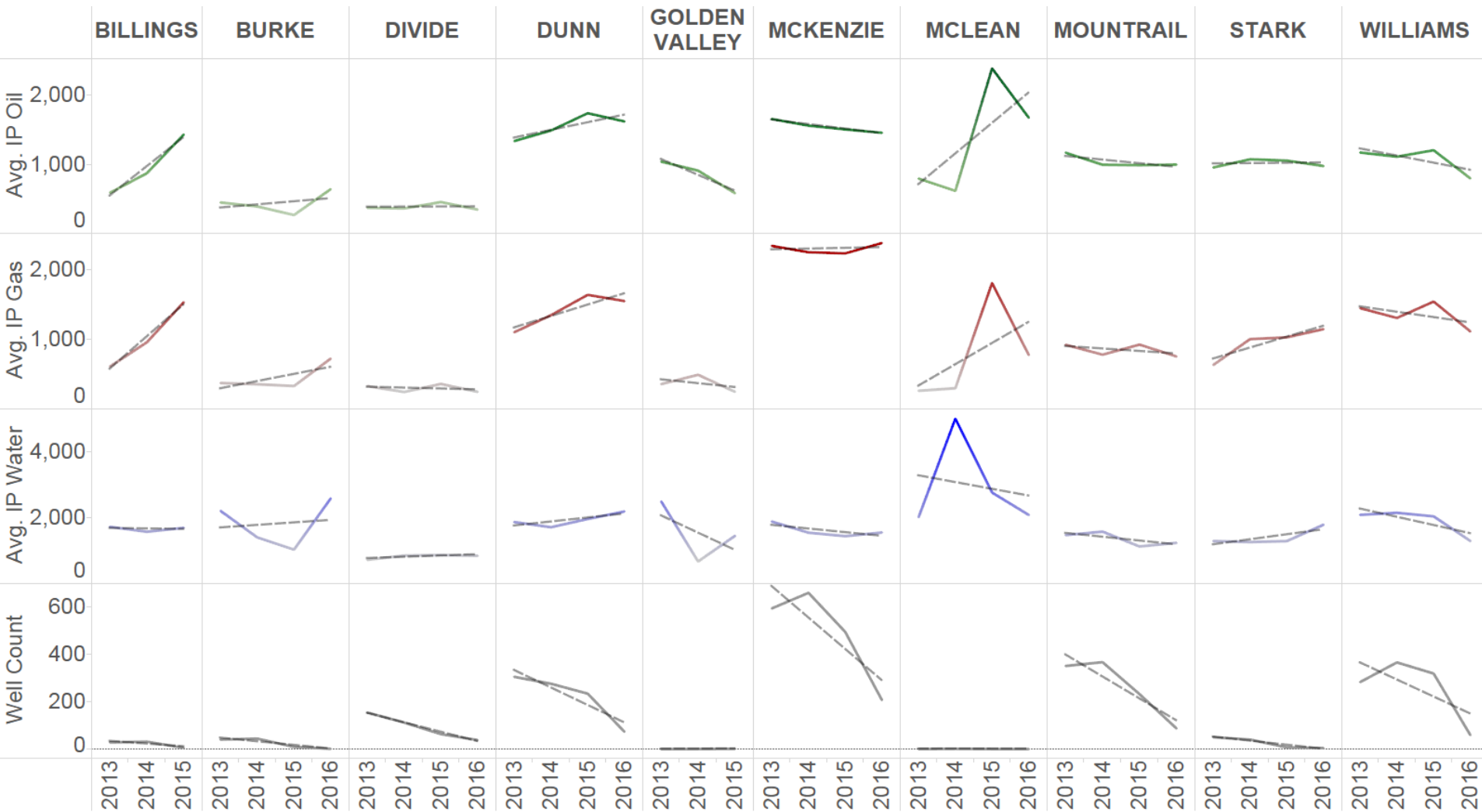
- Understanding current and future oil production
 - Activity
 - Drilling economics
 - Forecasts
- Williston Basin oil transportation dynamics
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- North Dakota natural gas production
 - Flaring and gas capture
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North Dakota Drilling Activity



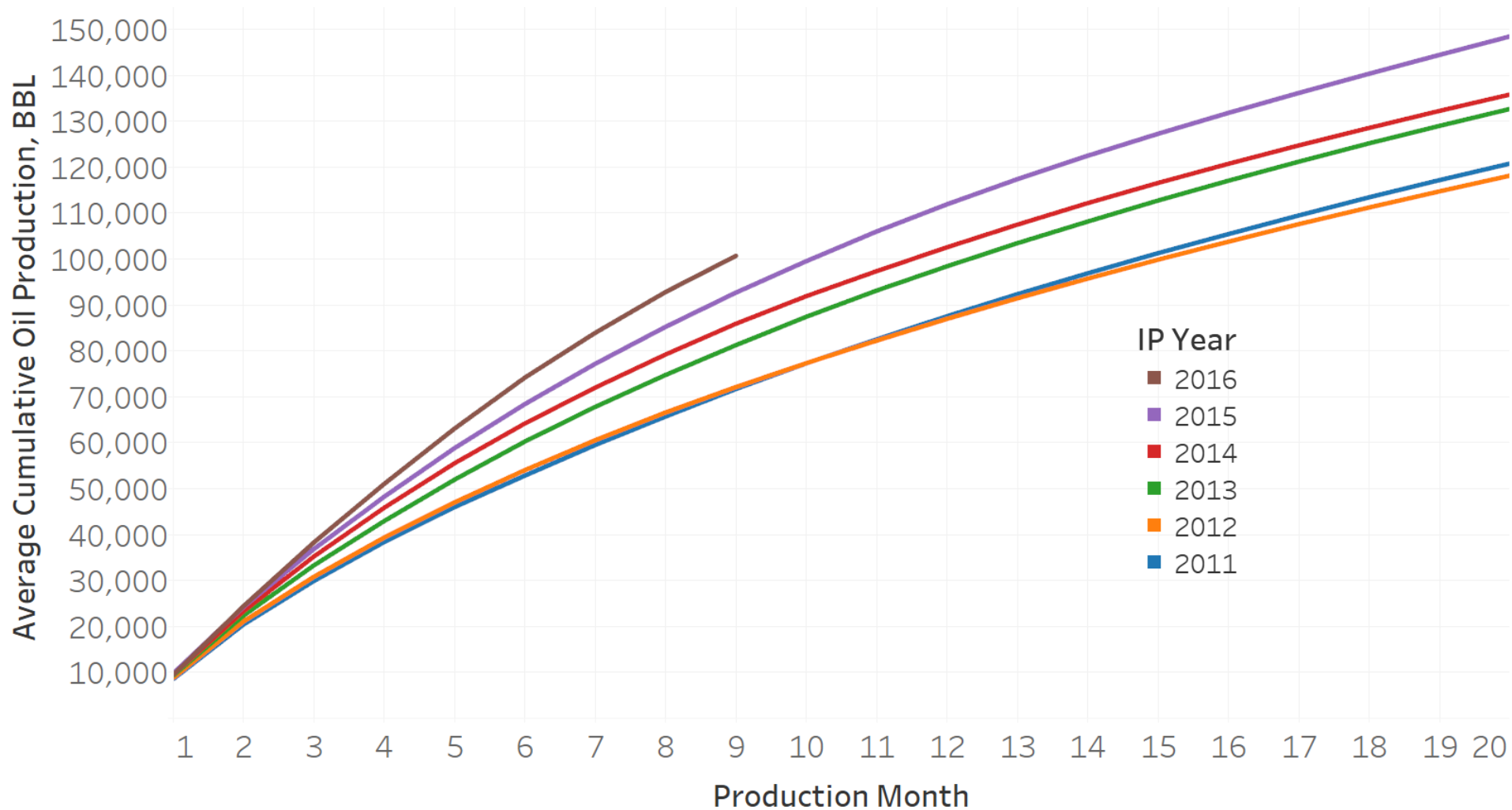
Bakken IP Rates



Initial Production (IP) Year – 2016 YTD Non-Confidential



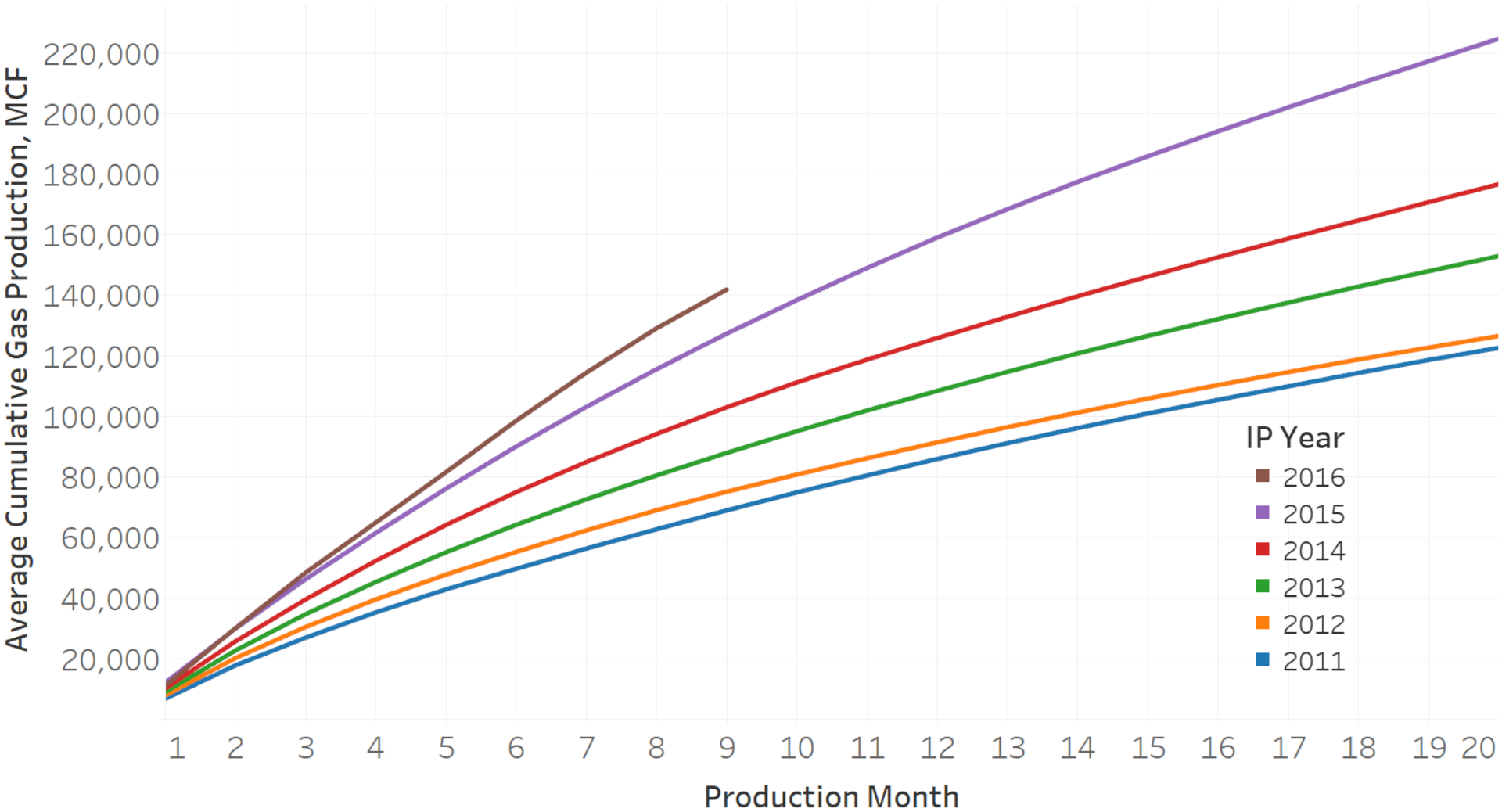
Improving Well Performance



Average BKN/TF Well Performance in Williams, McKenzie, Dunn, & Mountrail Counties (Minimum 1 bopd)



Improving Well Performance



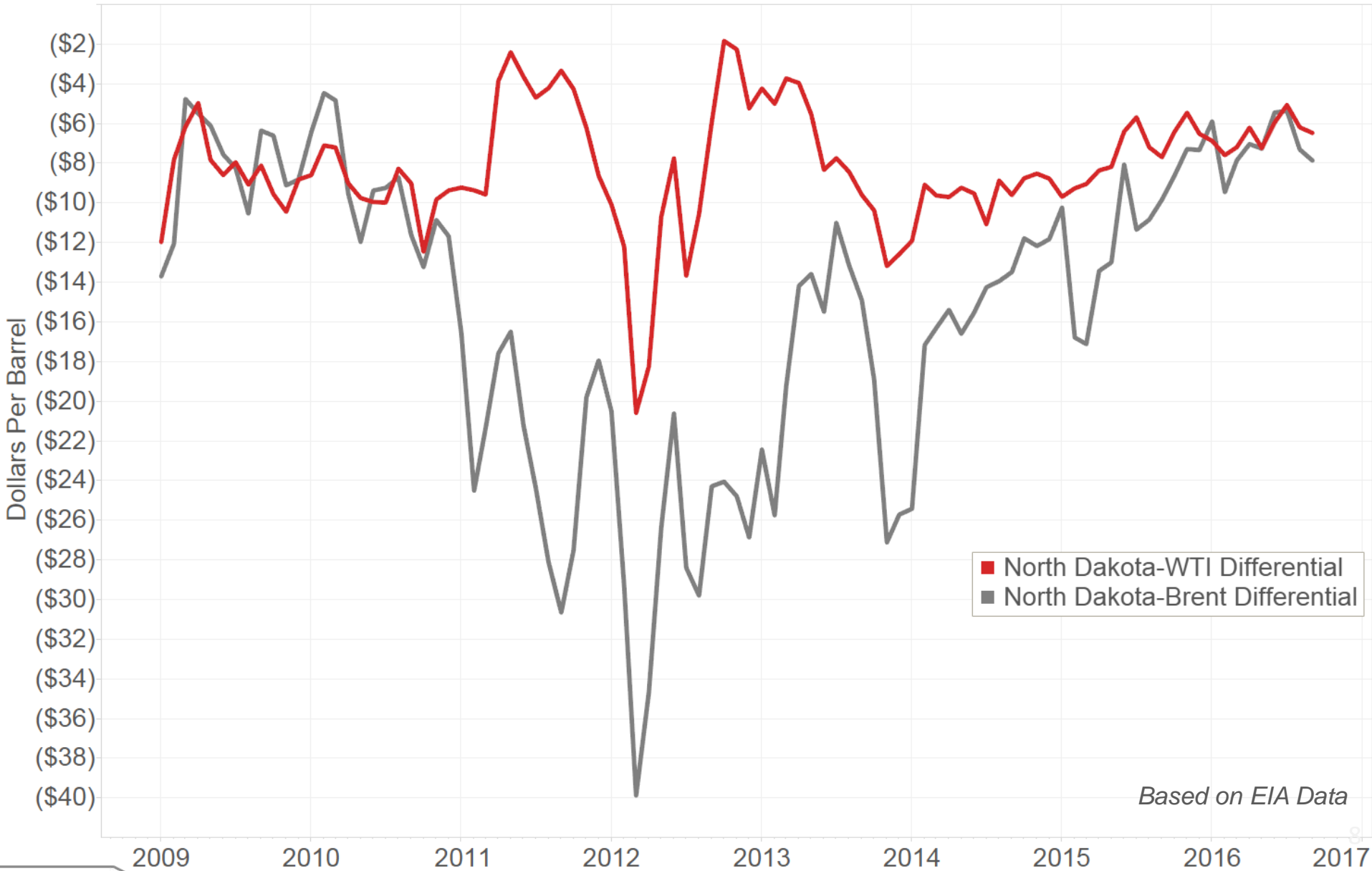
Average BKN/TF Well Performance in Williams, McKenzie, Dunn, & Mountrail Counties (Minimum 1 bopd)



A Quick Look at Bakken Drilling Economics...



North Dakota Oil Differential

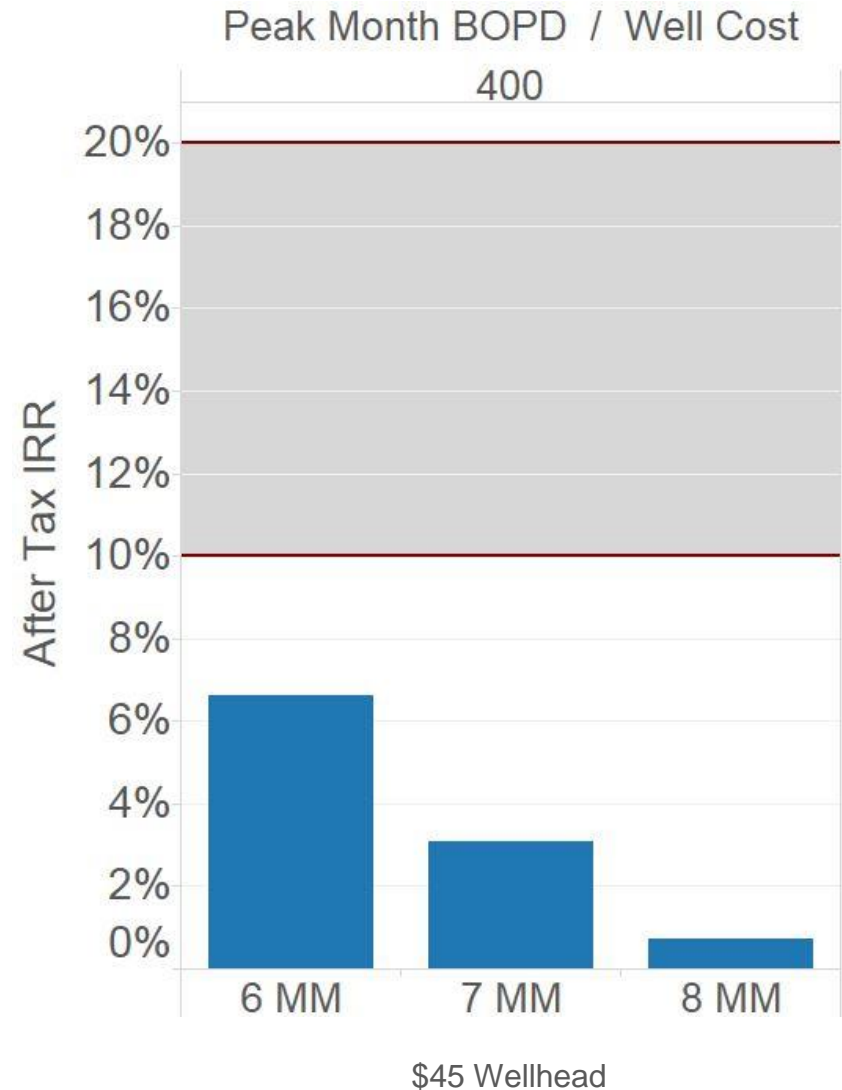
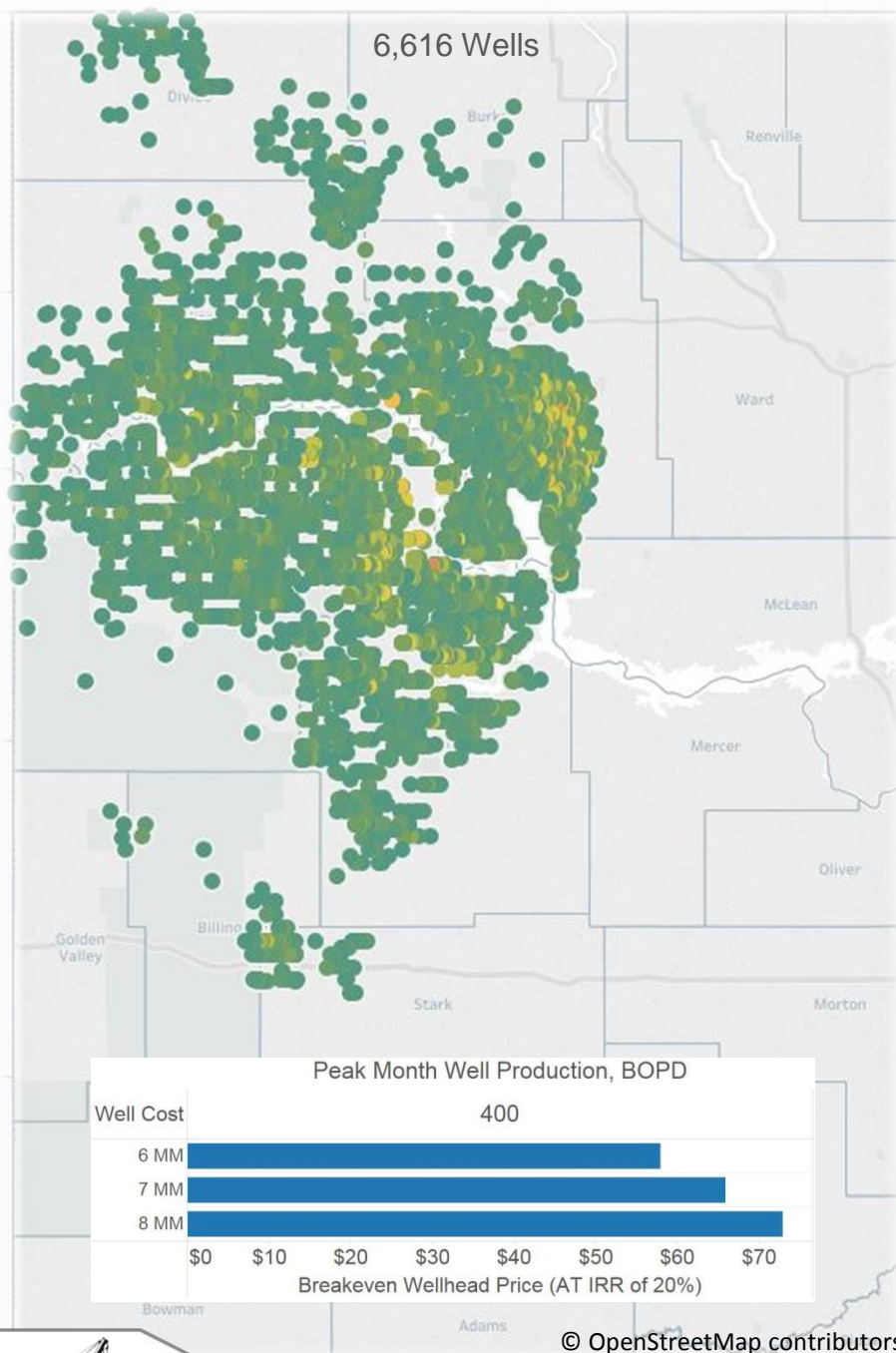


Key Economic Assumptions

- \$6-\$8 Million Well Costs
- \$45/BBL & \$2.00/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+

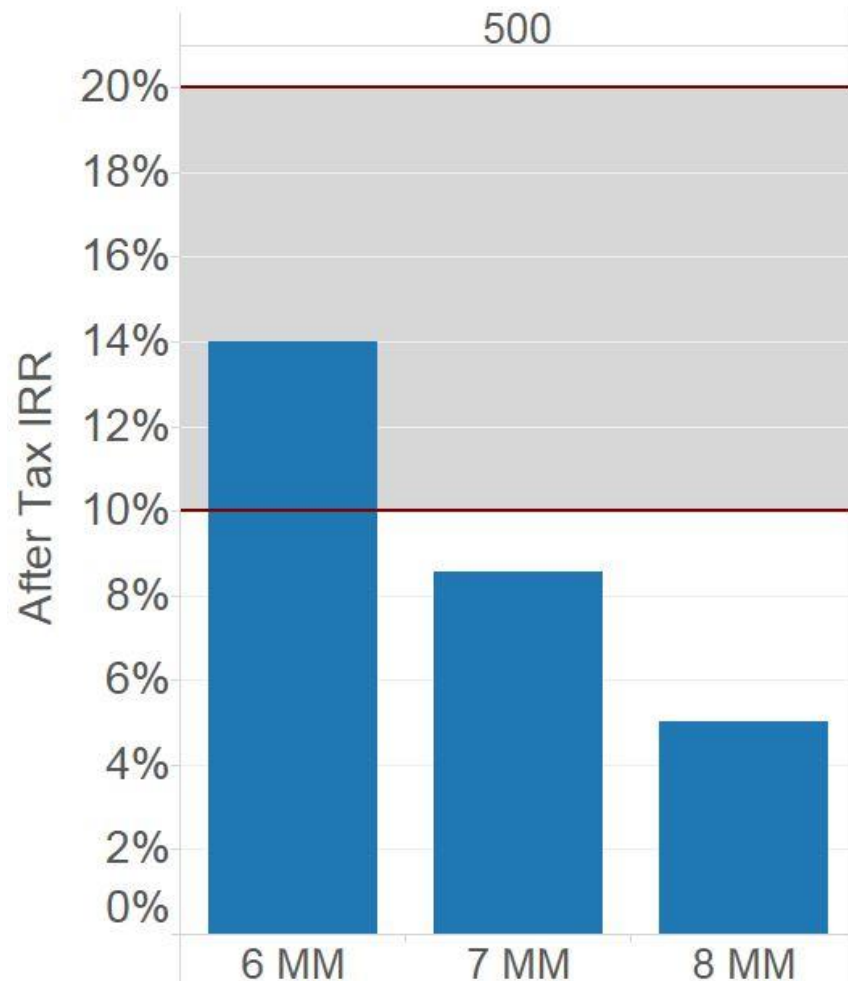


Peak Month Minimum 400 BOPD

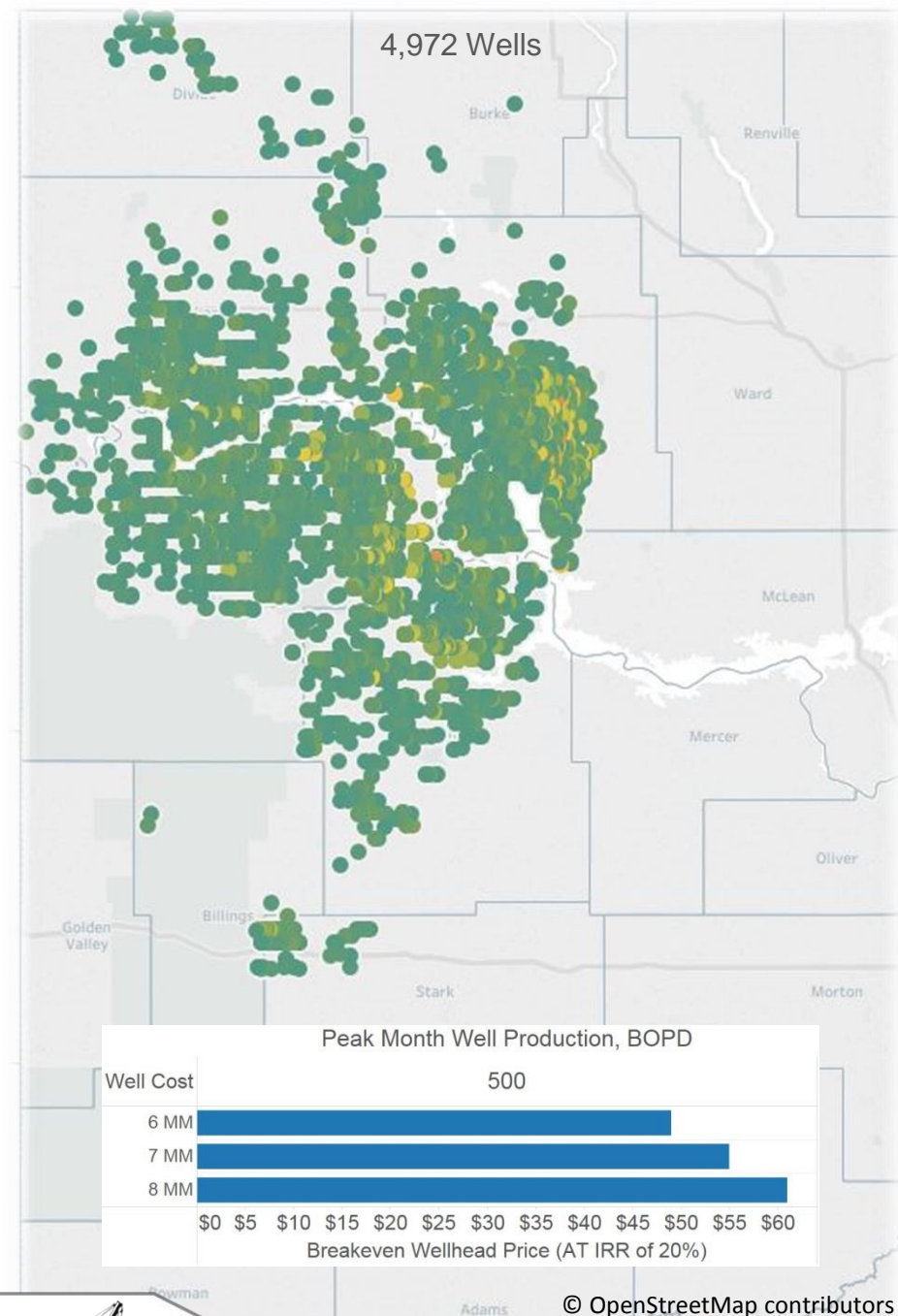


Peak Month Minimum 500 BOPD

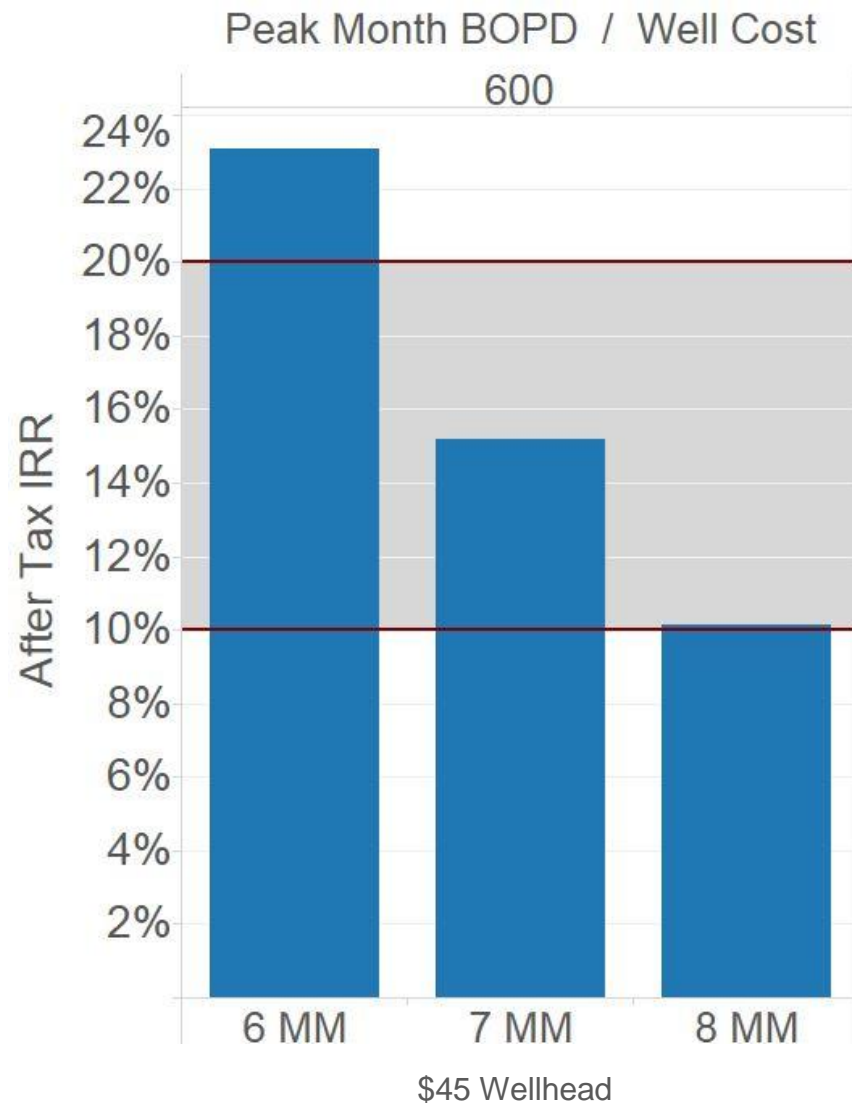
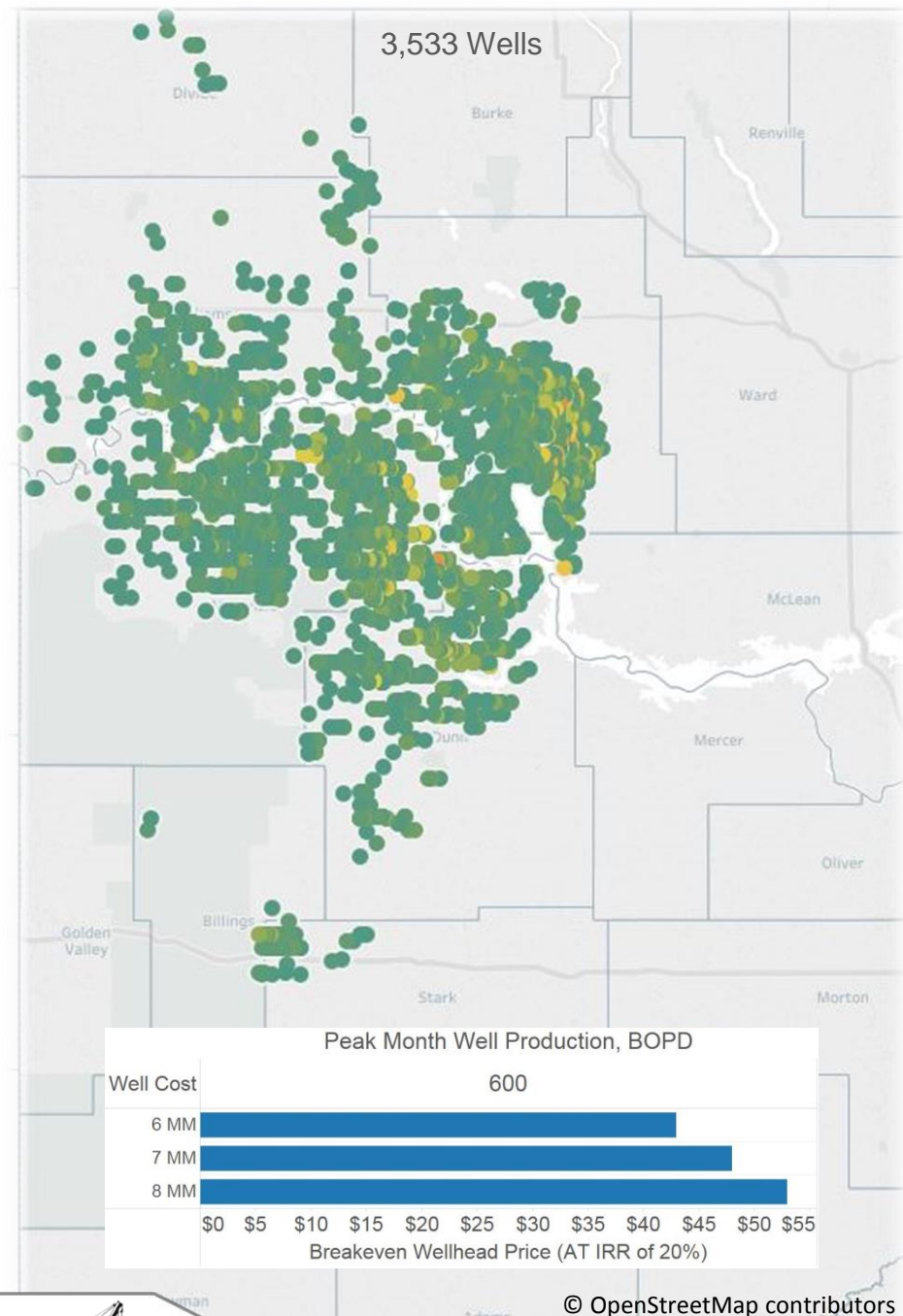
Peak Month BOPD / Well Cost
500



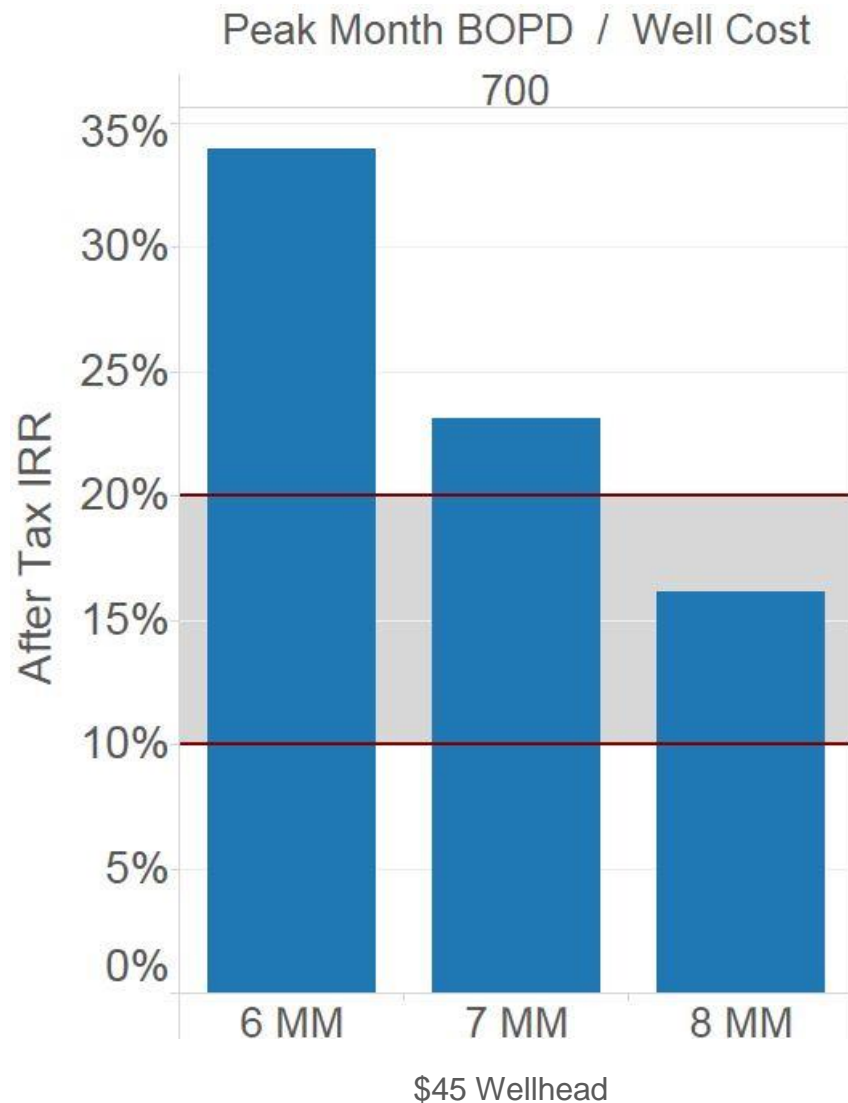
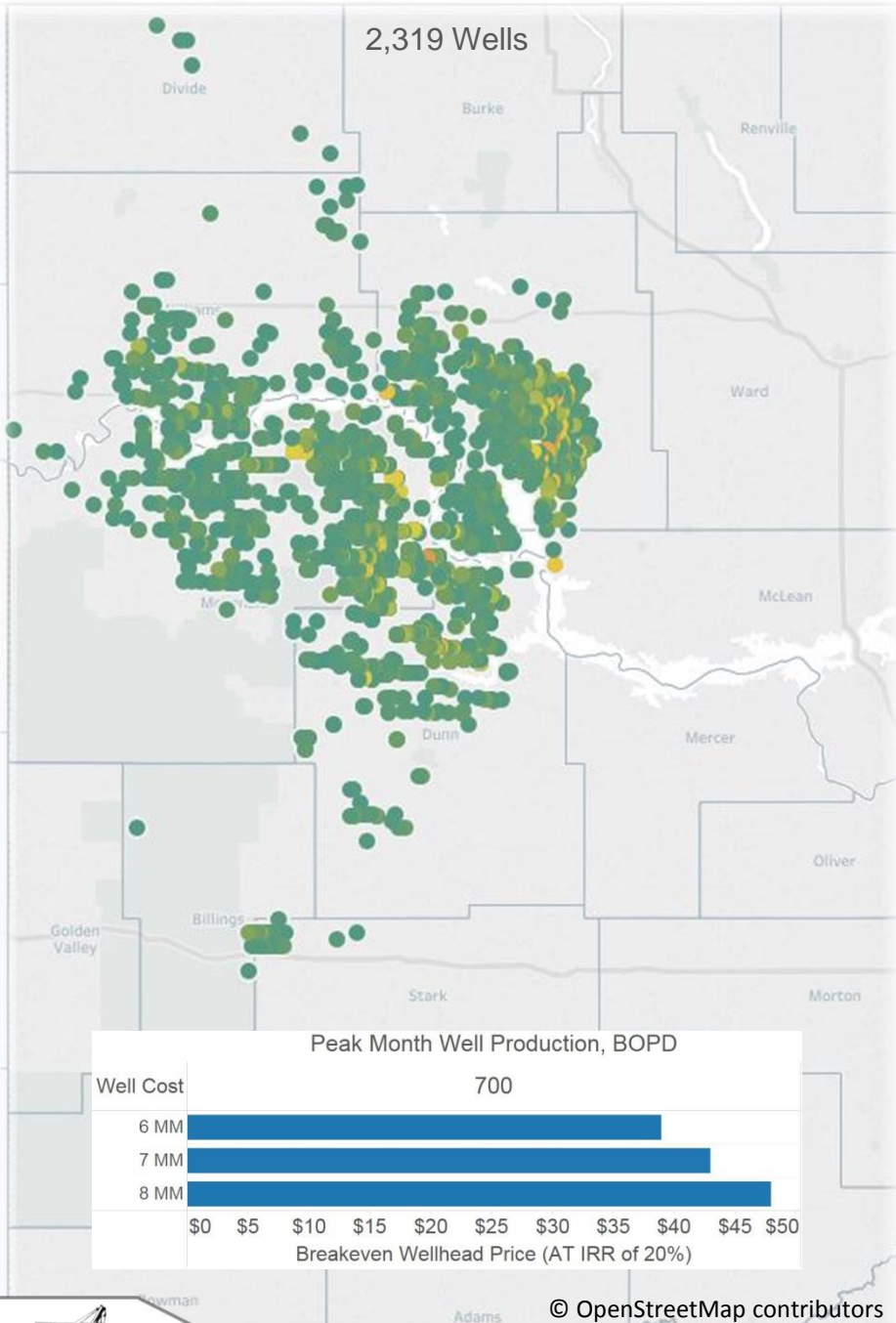
\$45 Wellhead



Peak Month Minimum 600 BOPD



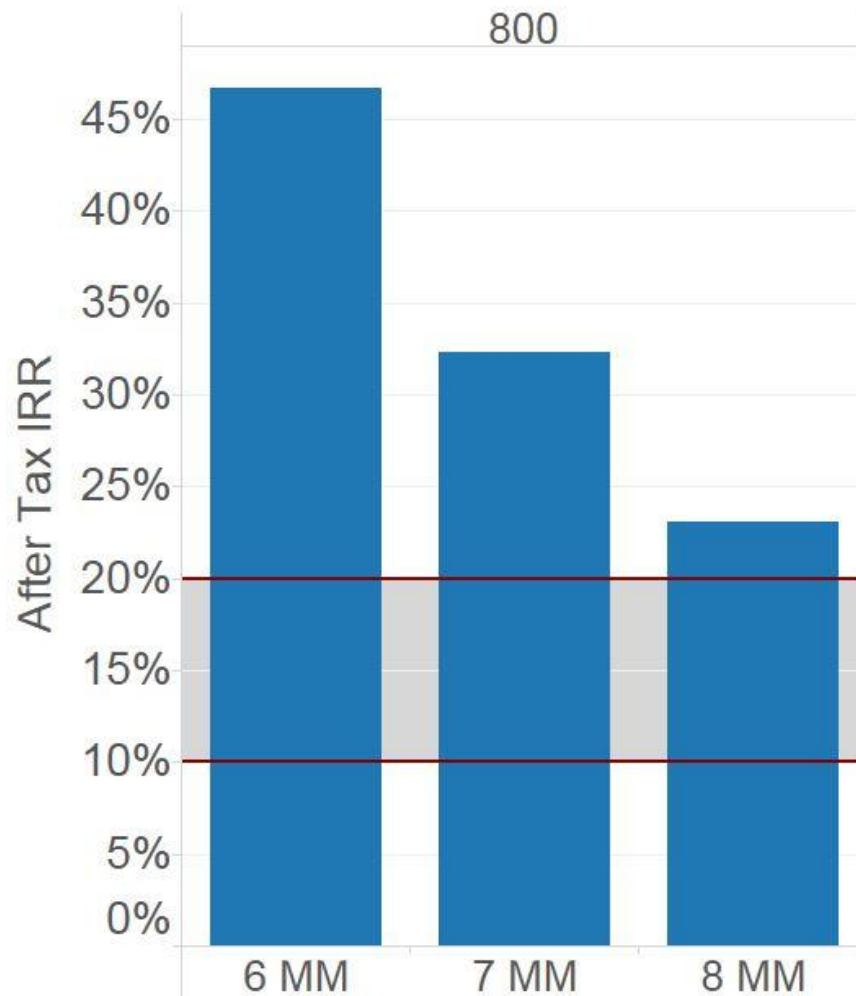
Peak Month Minimum 700 BOPD



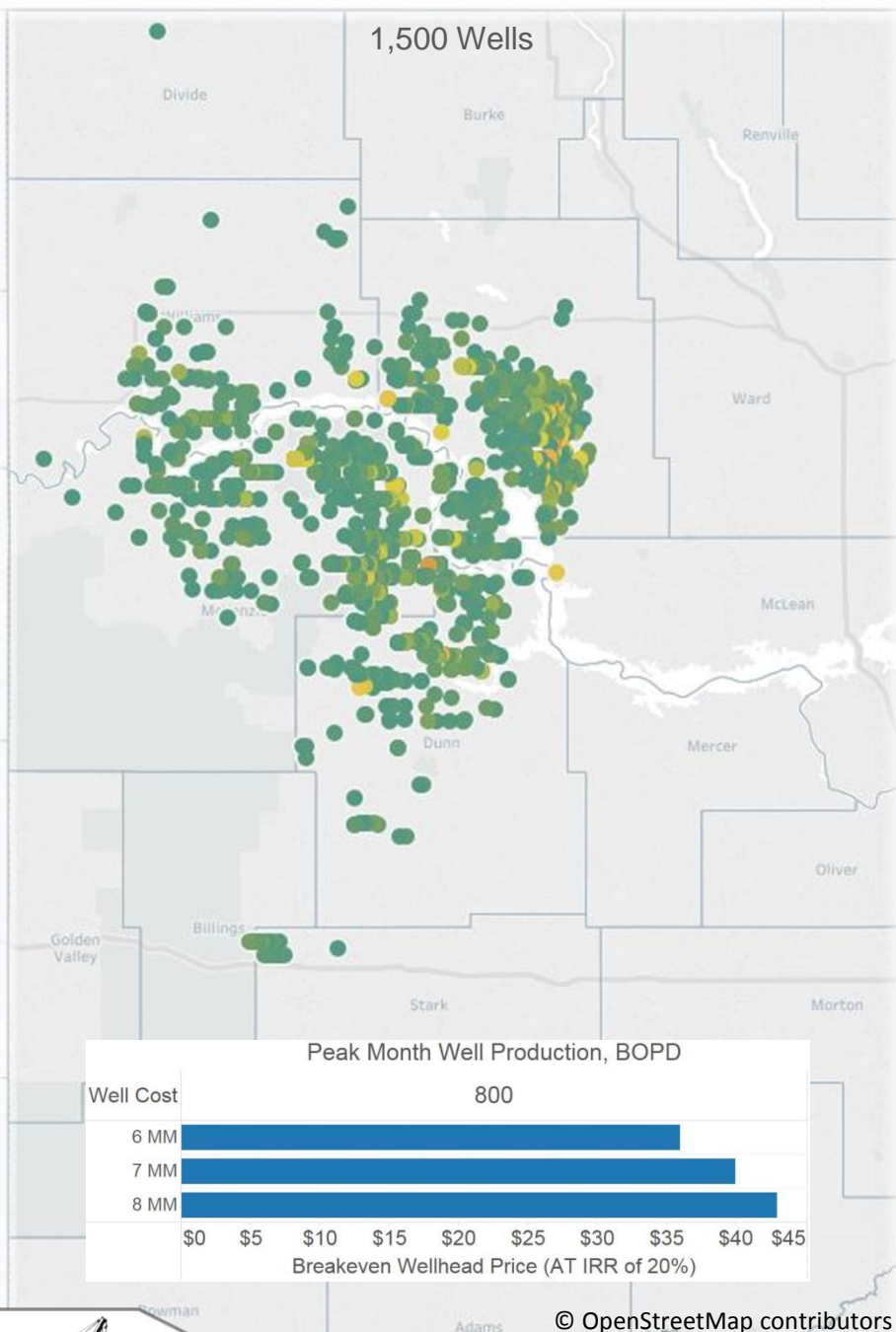
Peak Month Minimum 800 BOPD

Peak Month BOPD / Well Cost

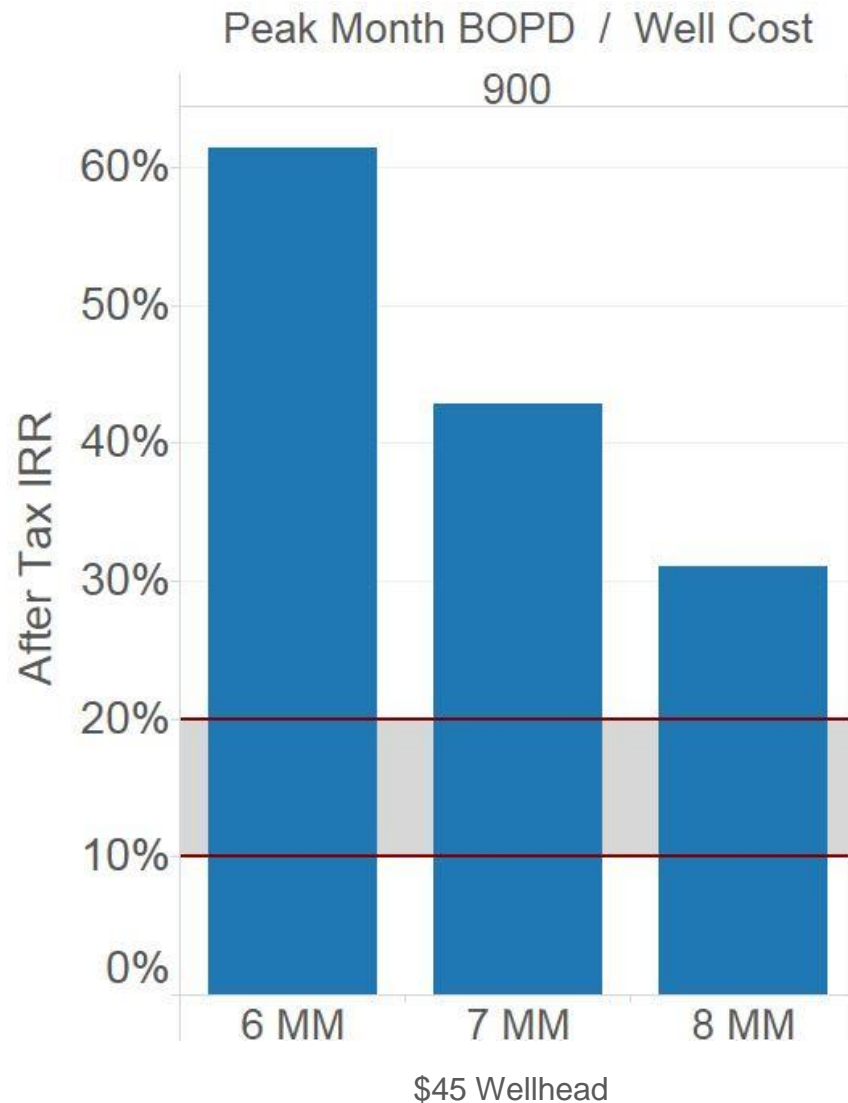
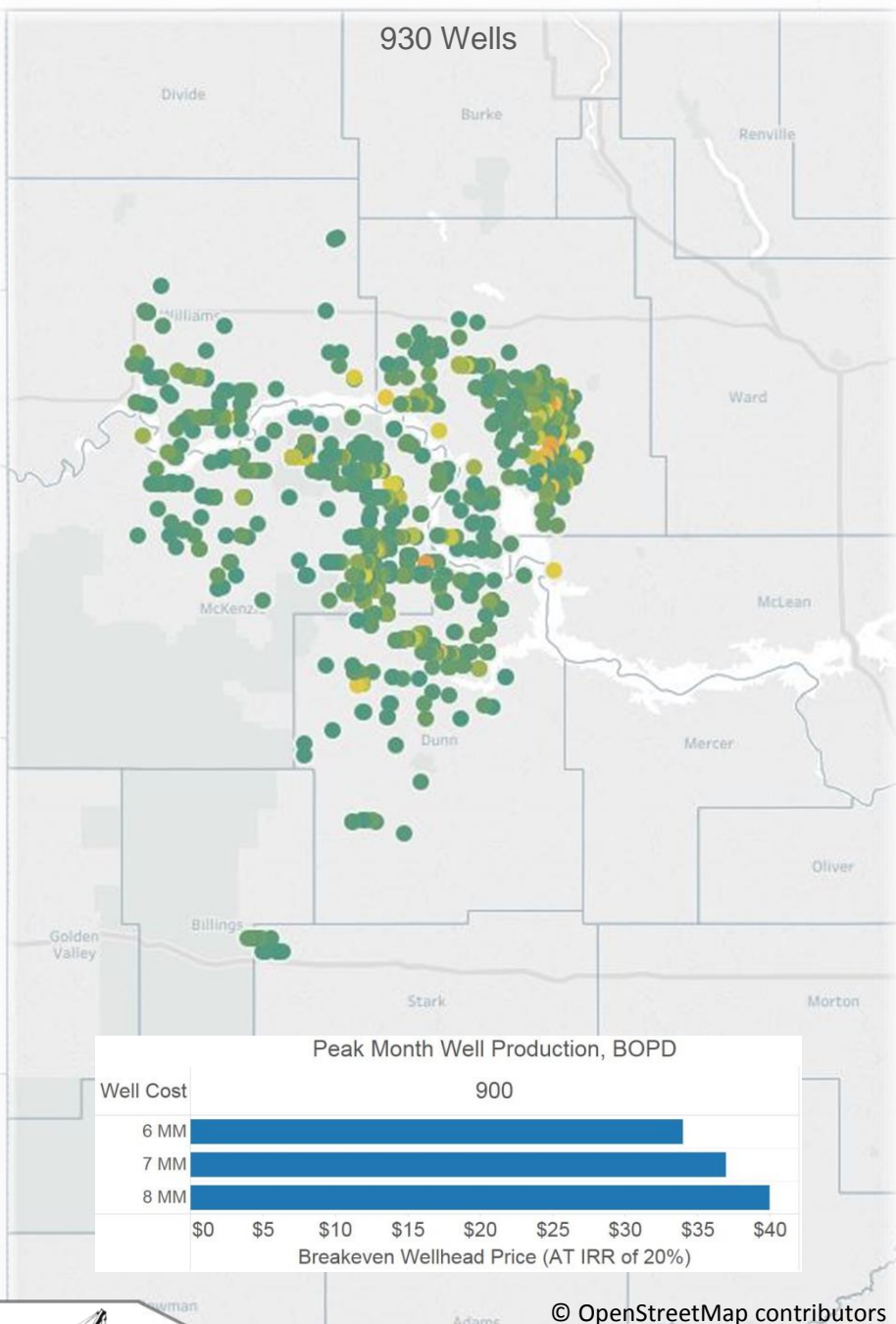
800



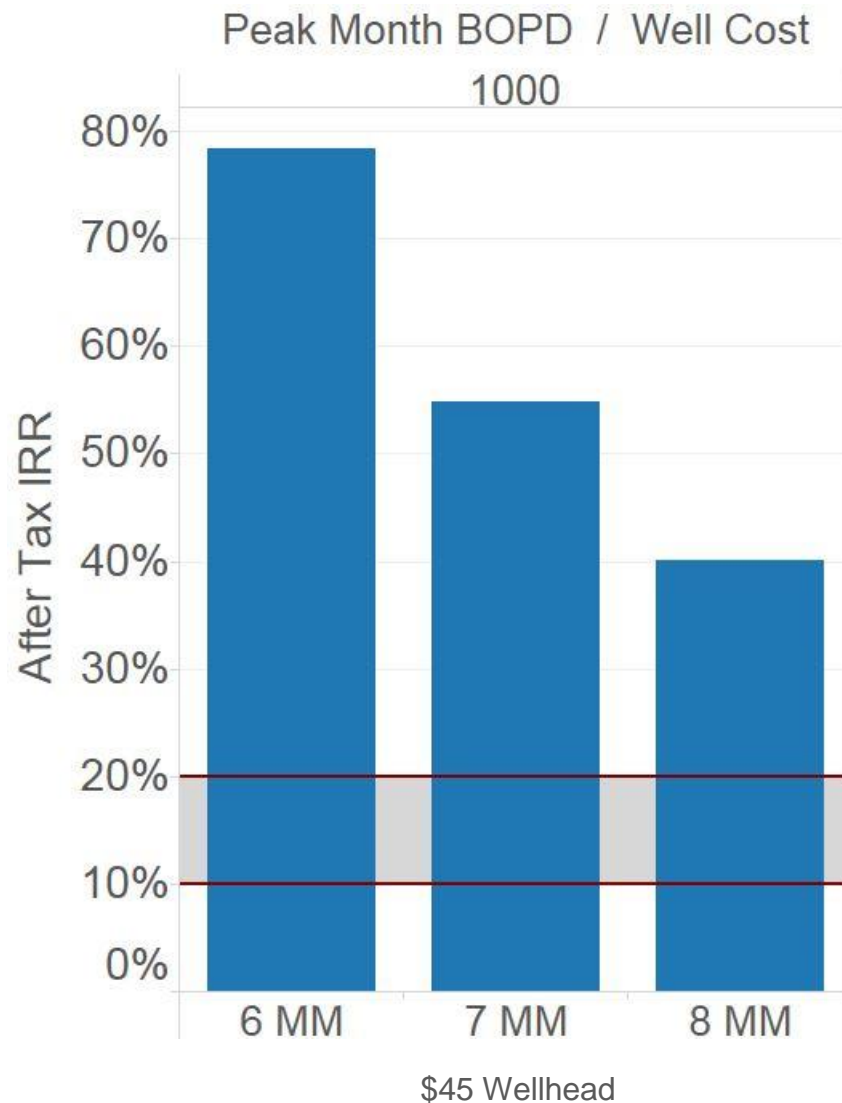
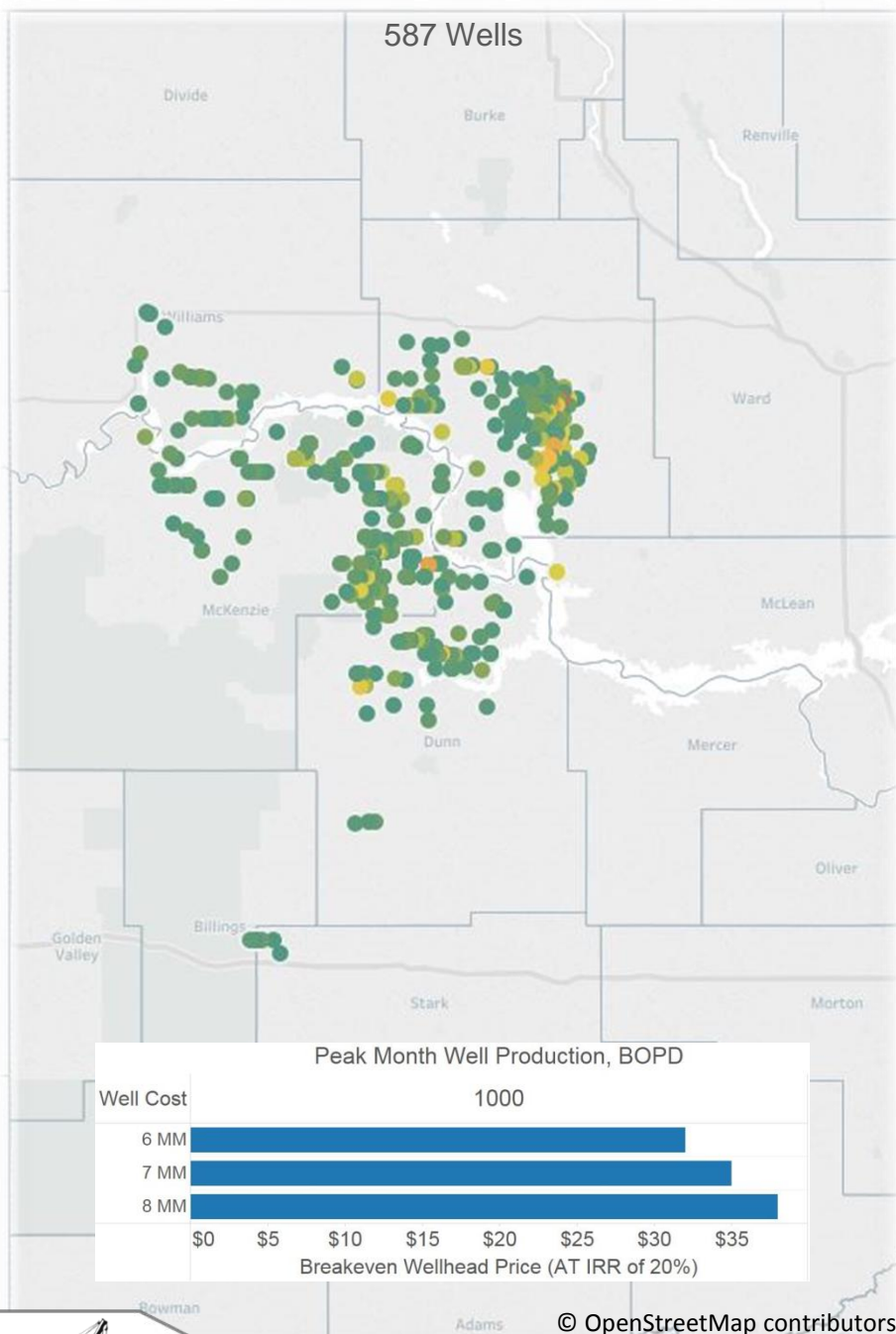
\$45 Wellhead



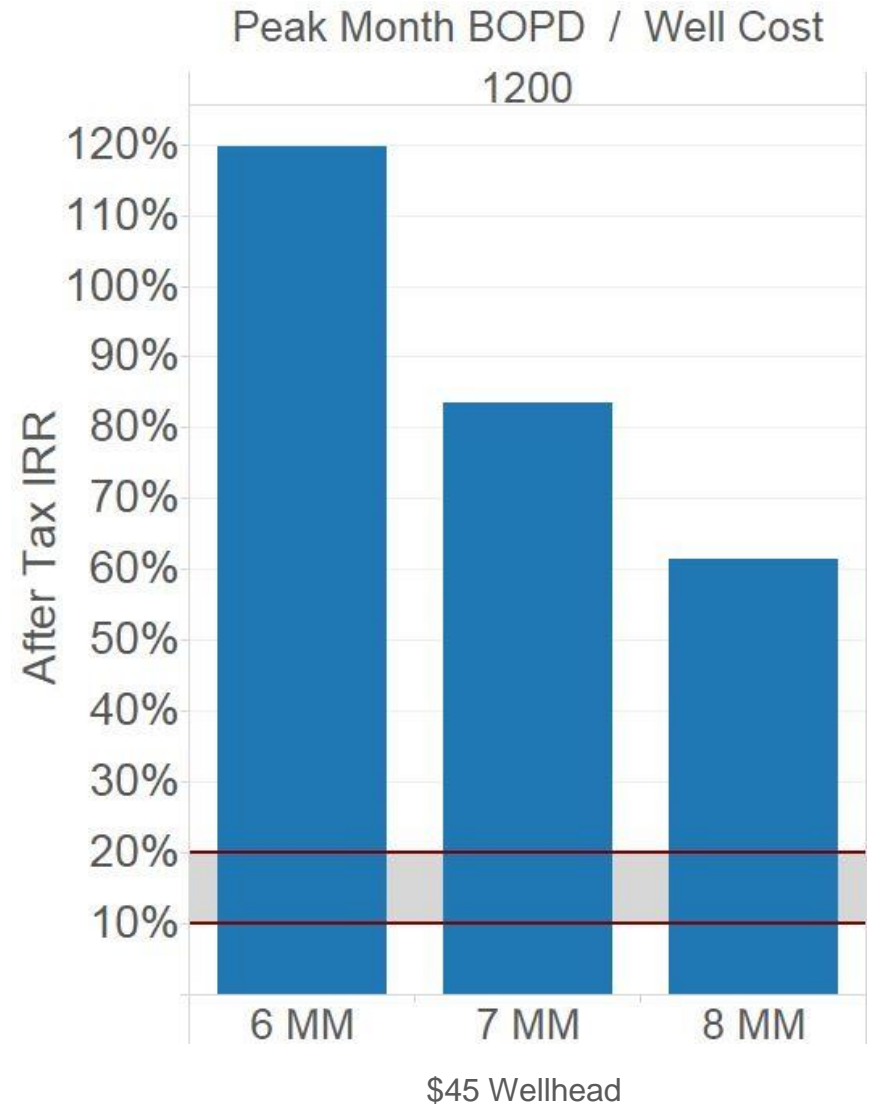
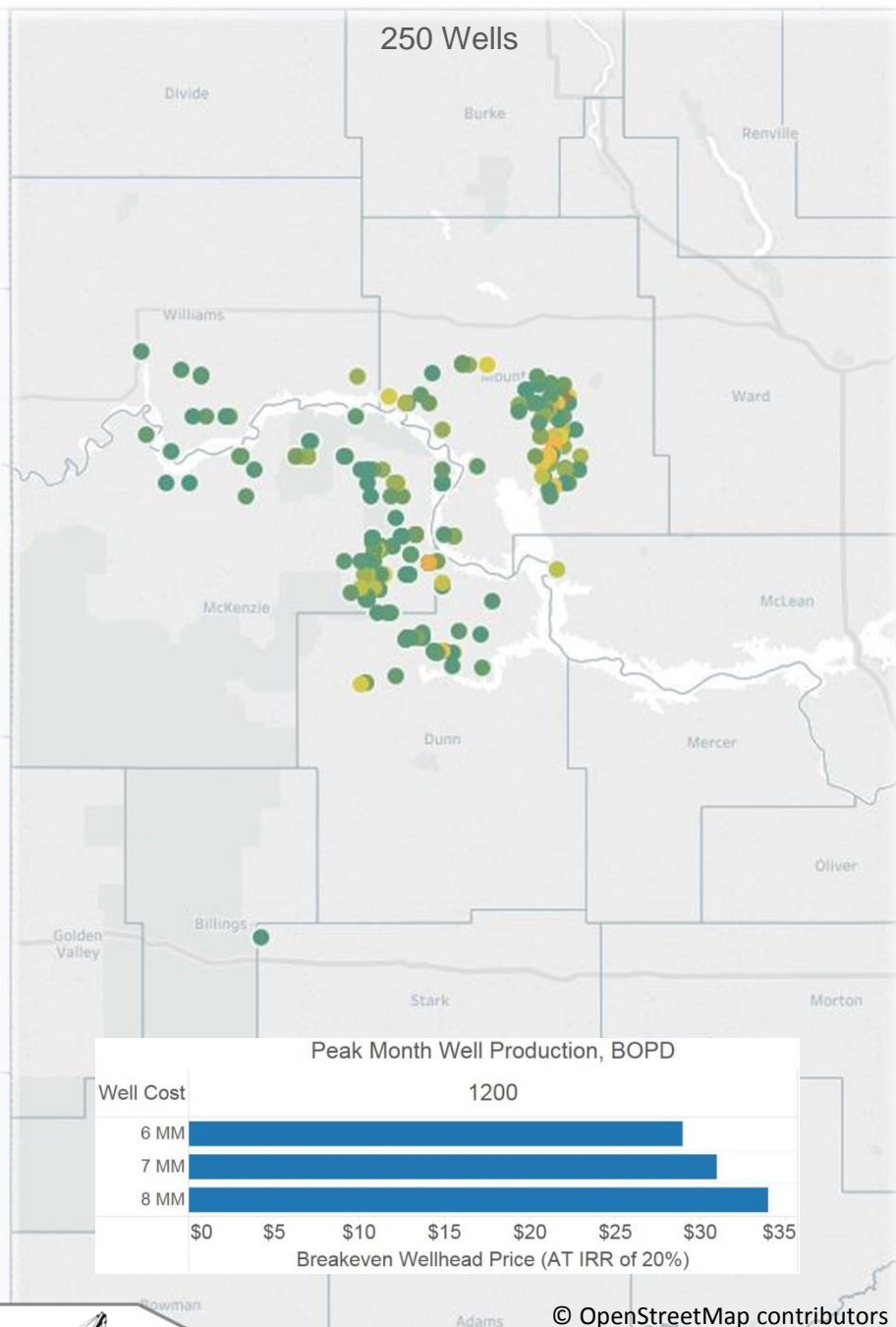
Peak Month Minimum 900 BOPD



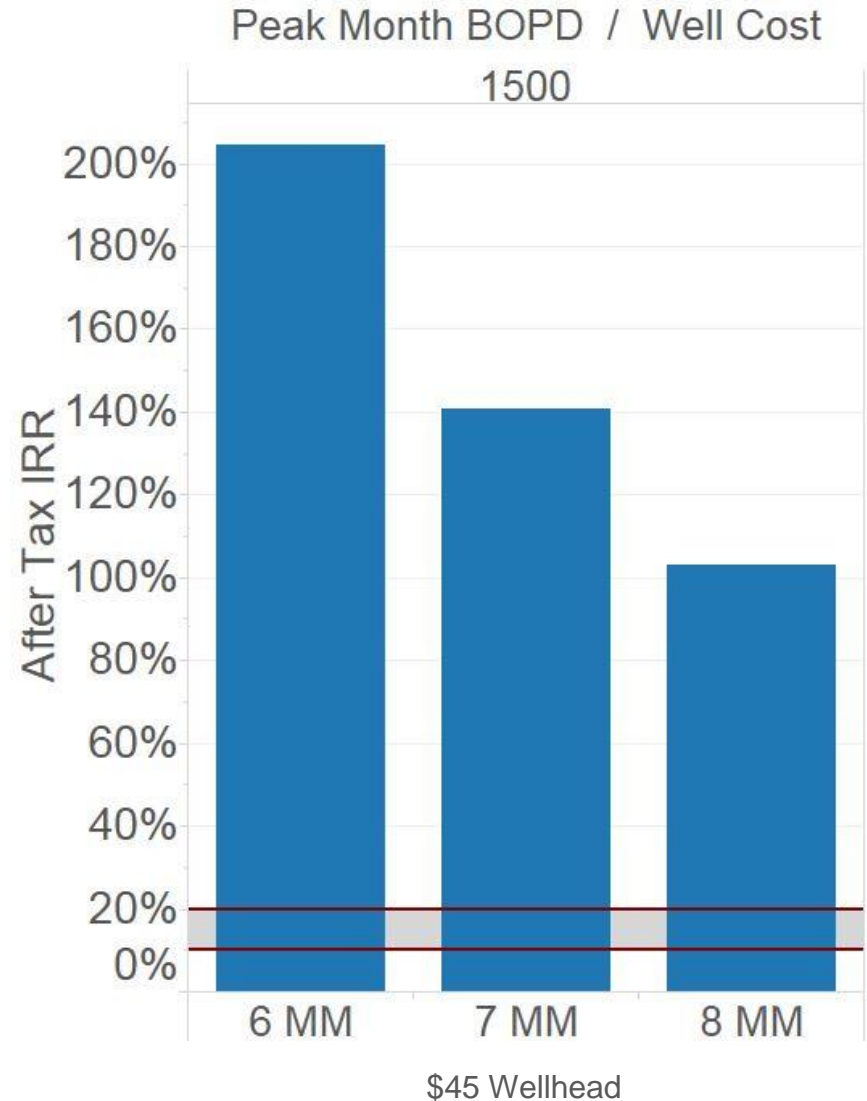
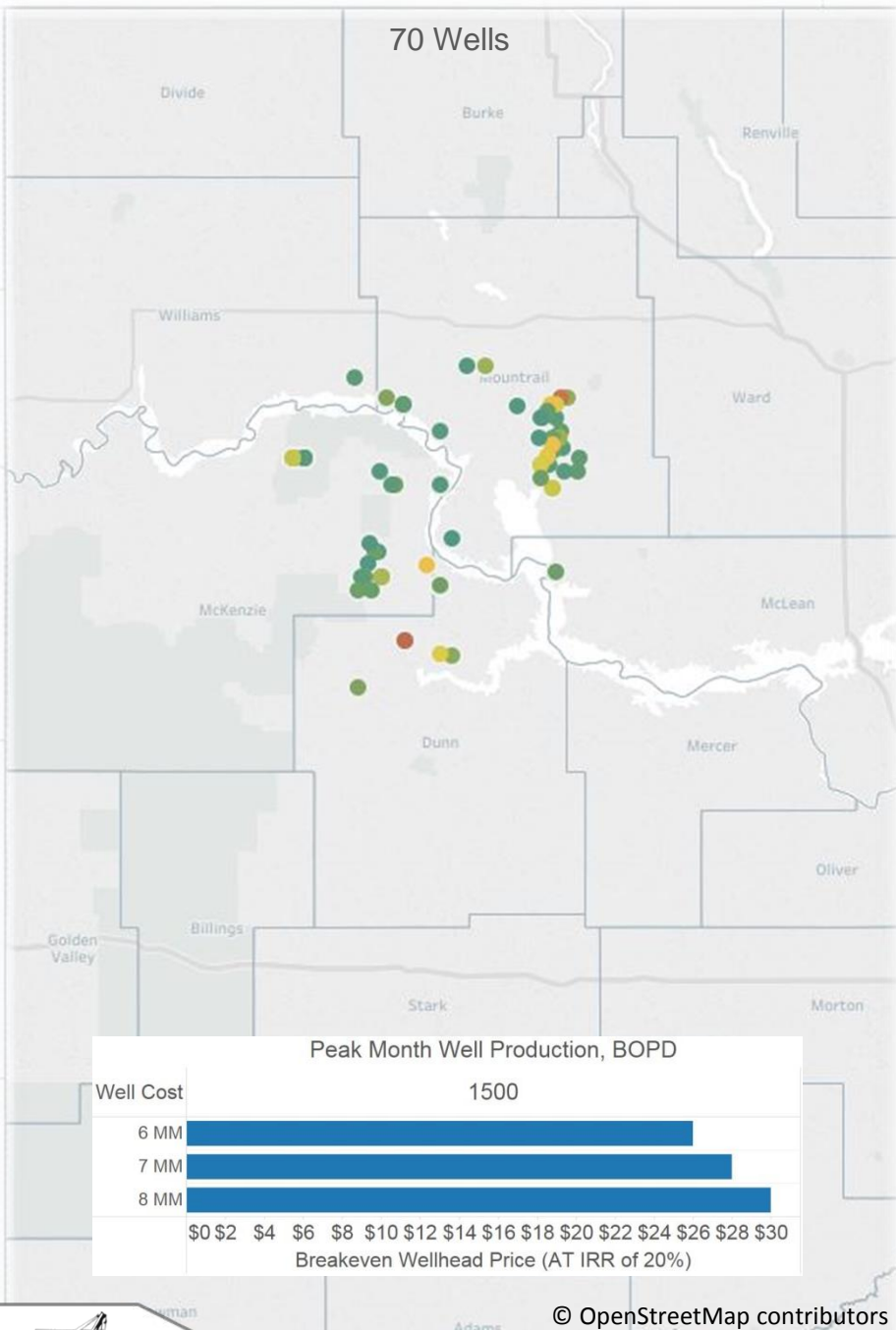
Peak Month Minimum 1,000 BOPD



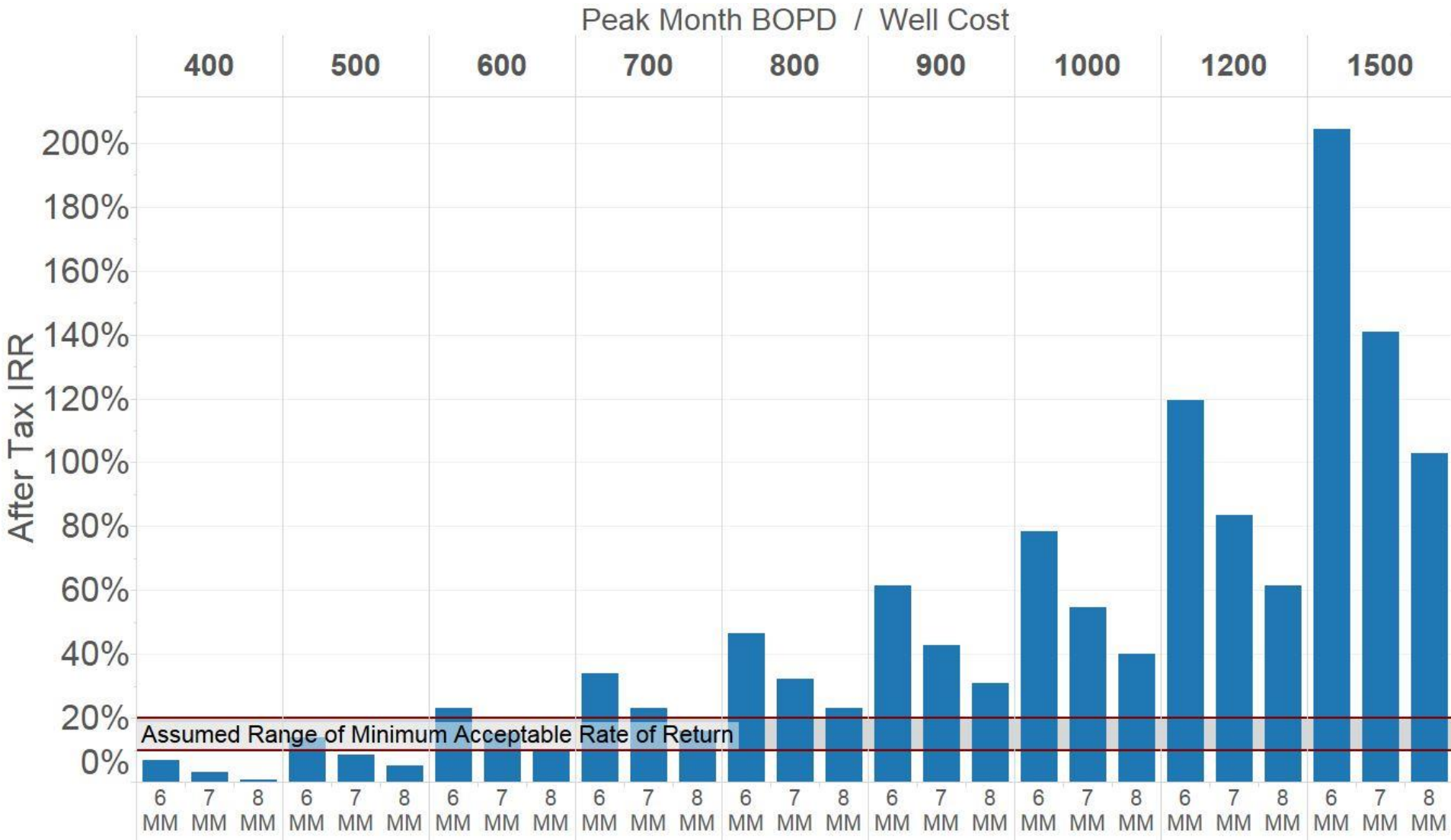
Peak Month Minimum 1,200 BOPD



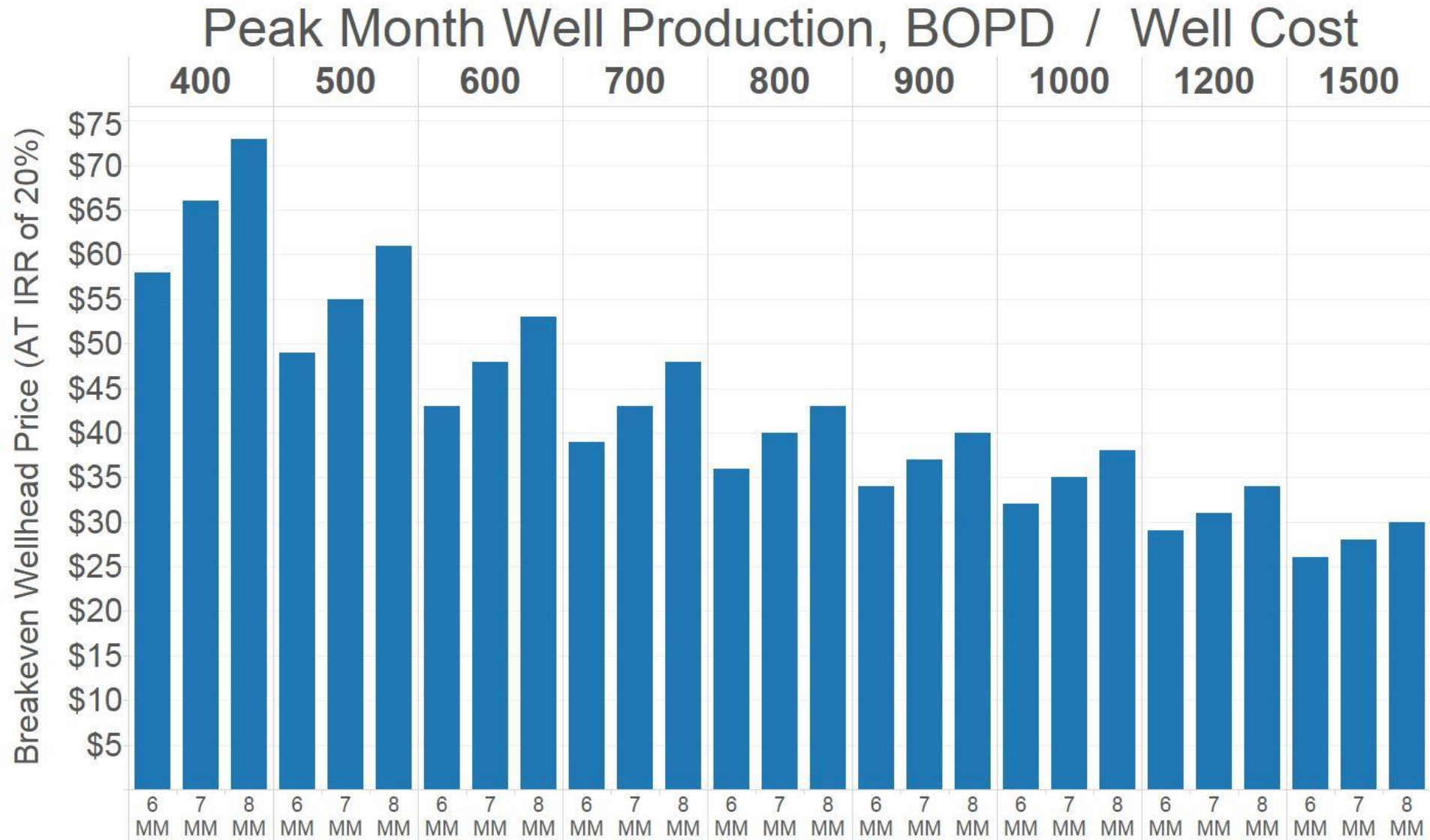
Peak Month Minimum 1,500 BOPD



Summary of \$45 Wellhead Oil



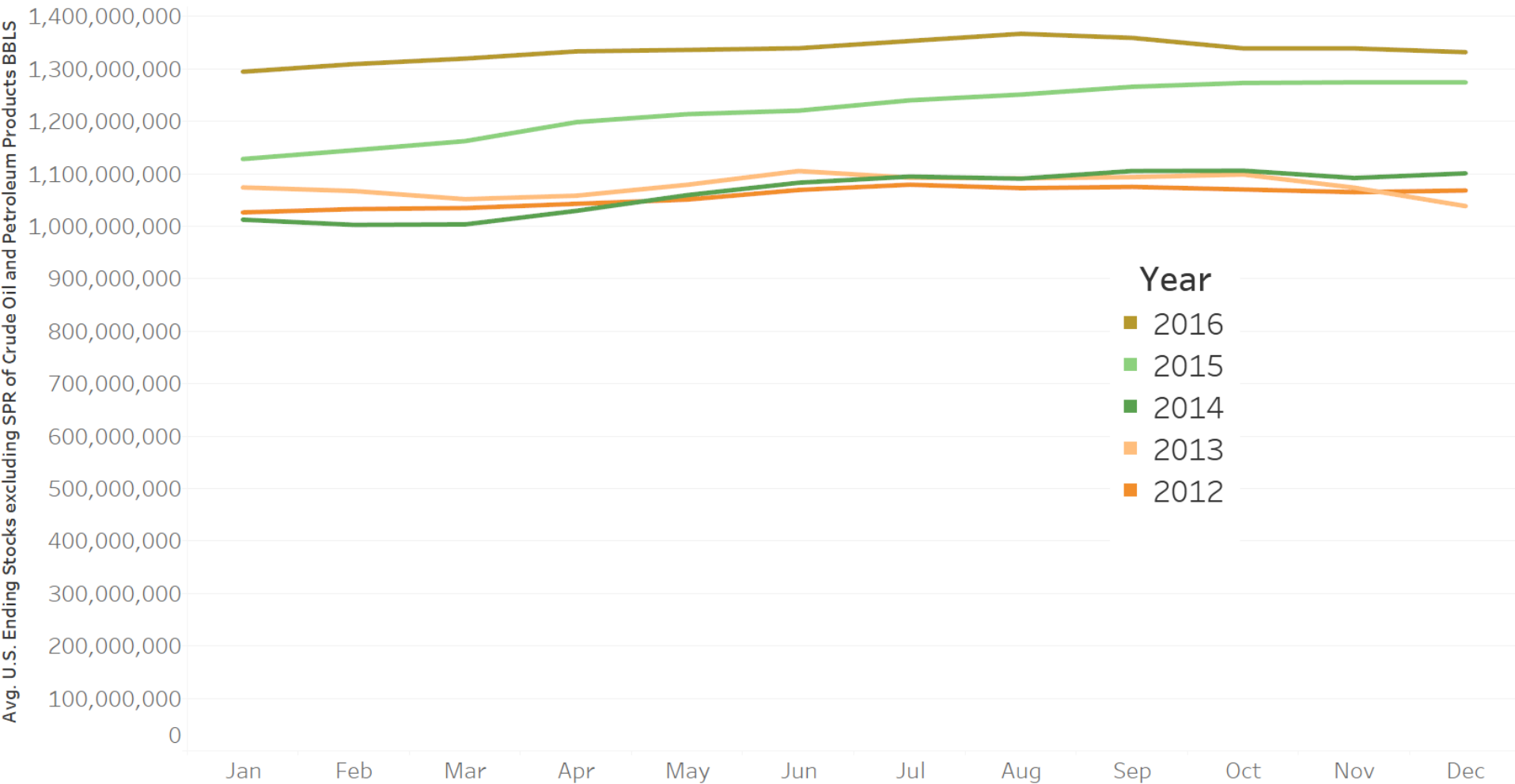
Breakeven Summary



Forecasting Future Activity...



US Crude Oil Storage (Excl. SPR)



Data Source: US Energy Information Administration



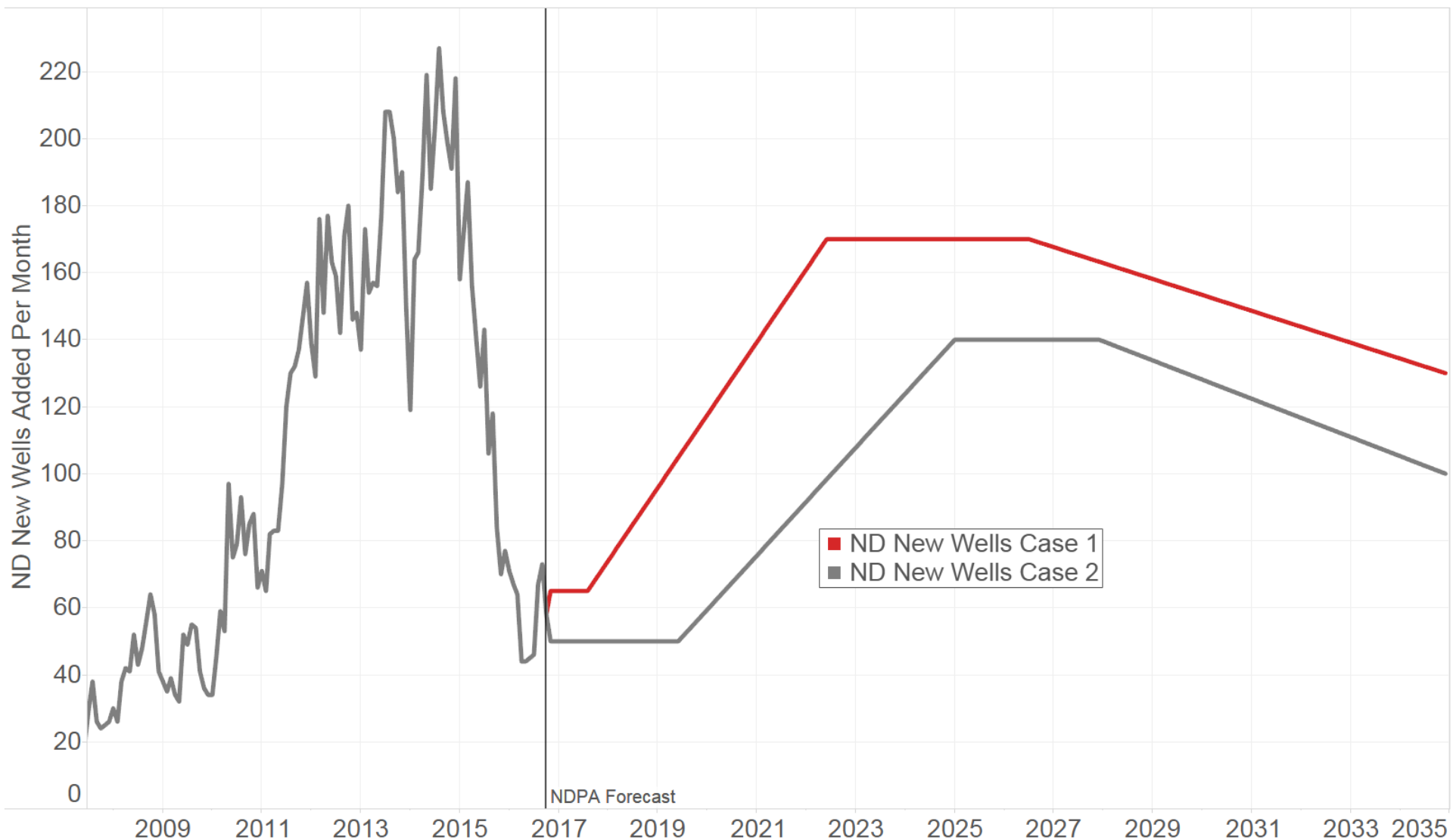
US Crude Oil Storage (Excl. SPR)



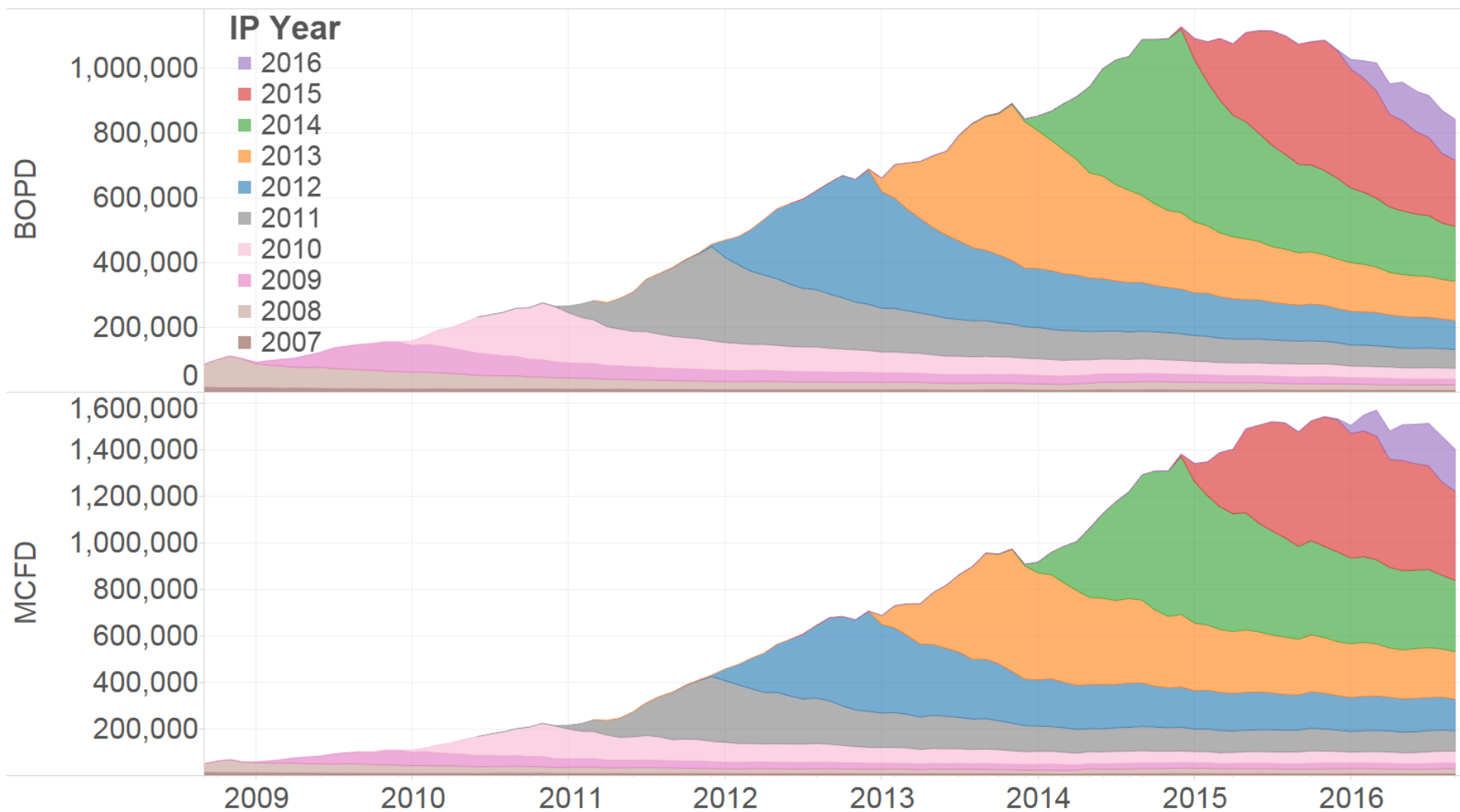
Data Source: US Energy Information Administration



North Dakota Forecast Activity Assumptions



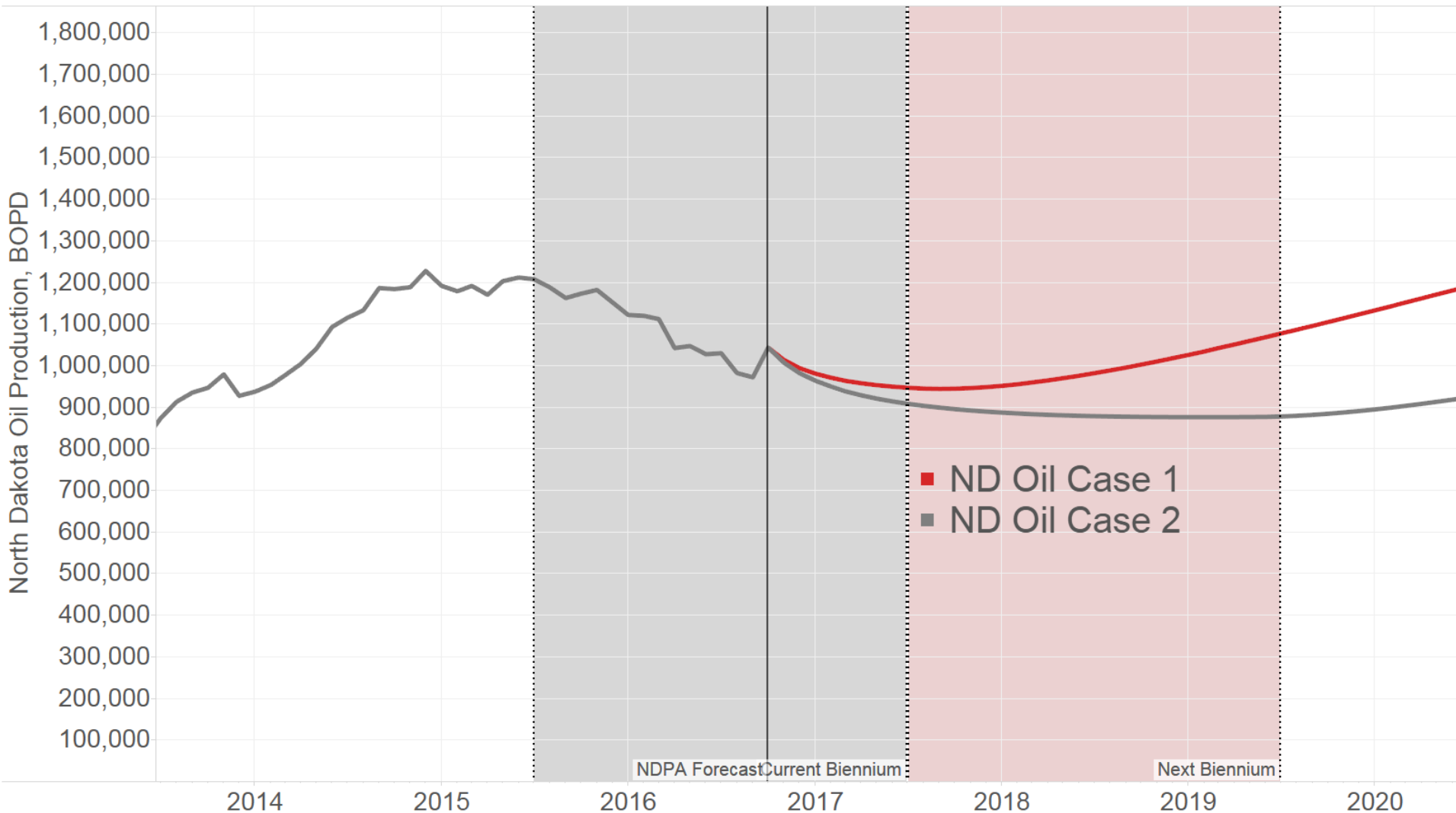
Base Production Declines*



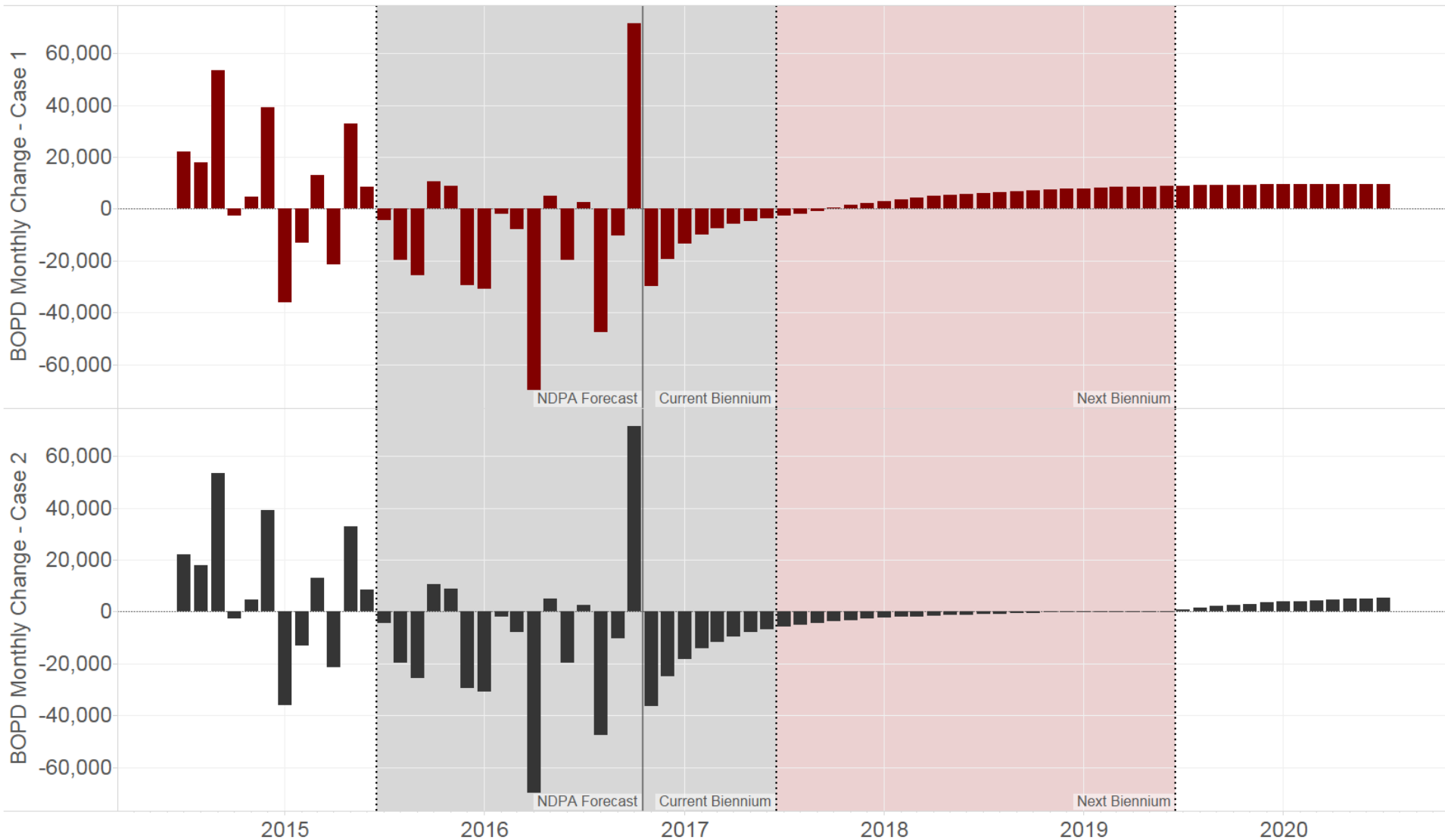
*Non-Confidential Bakken/Three Forks Production Only



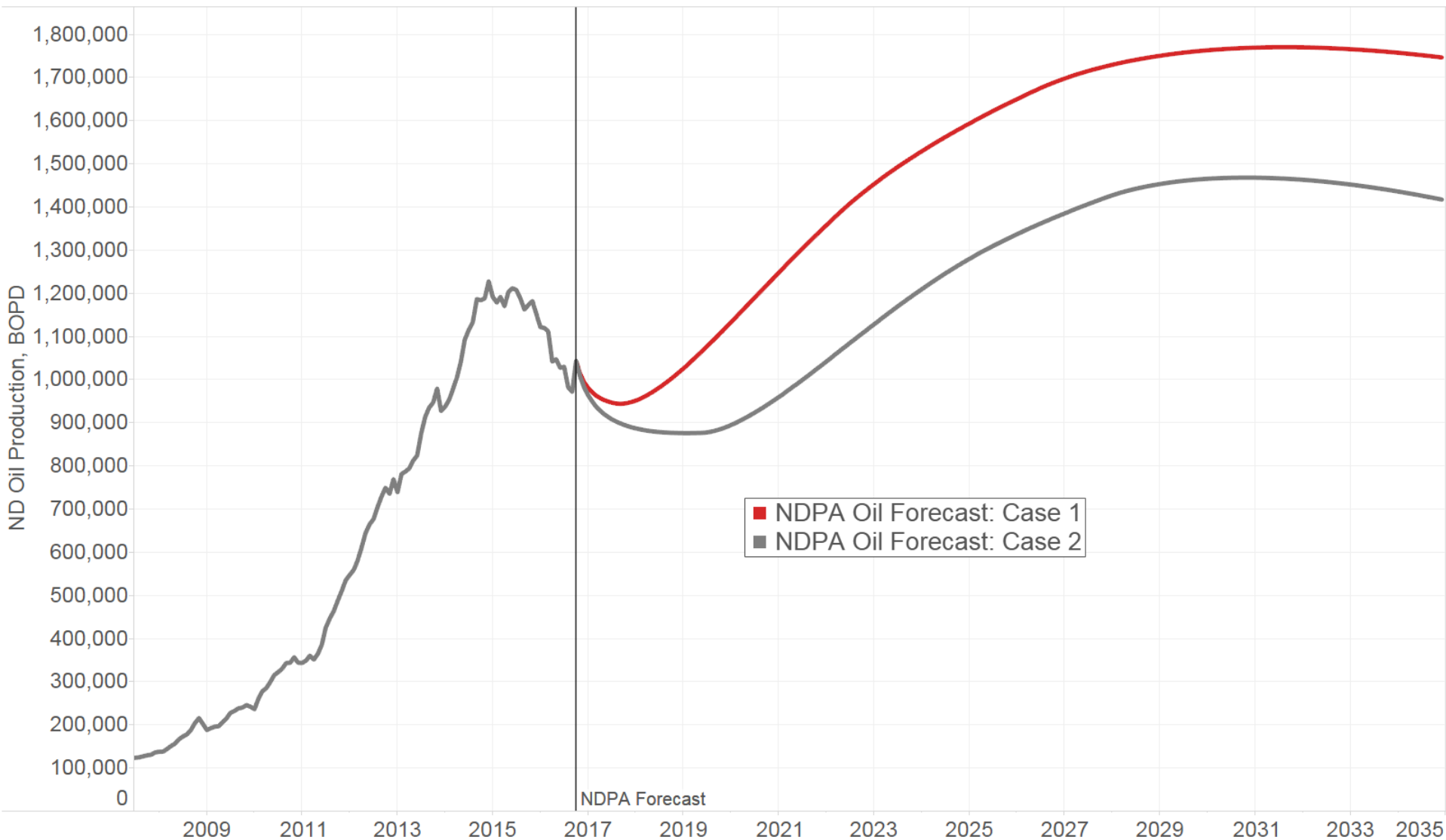
NDPA ND Oil Production Forecast



NDPA ND Oil Production Forecast



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.

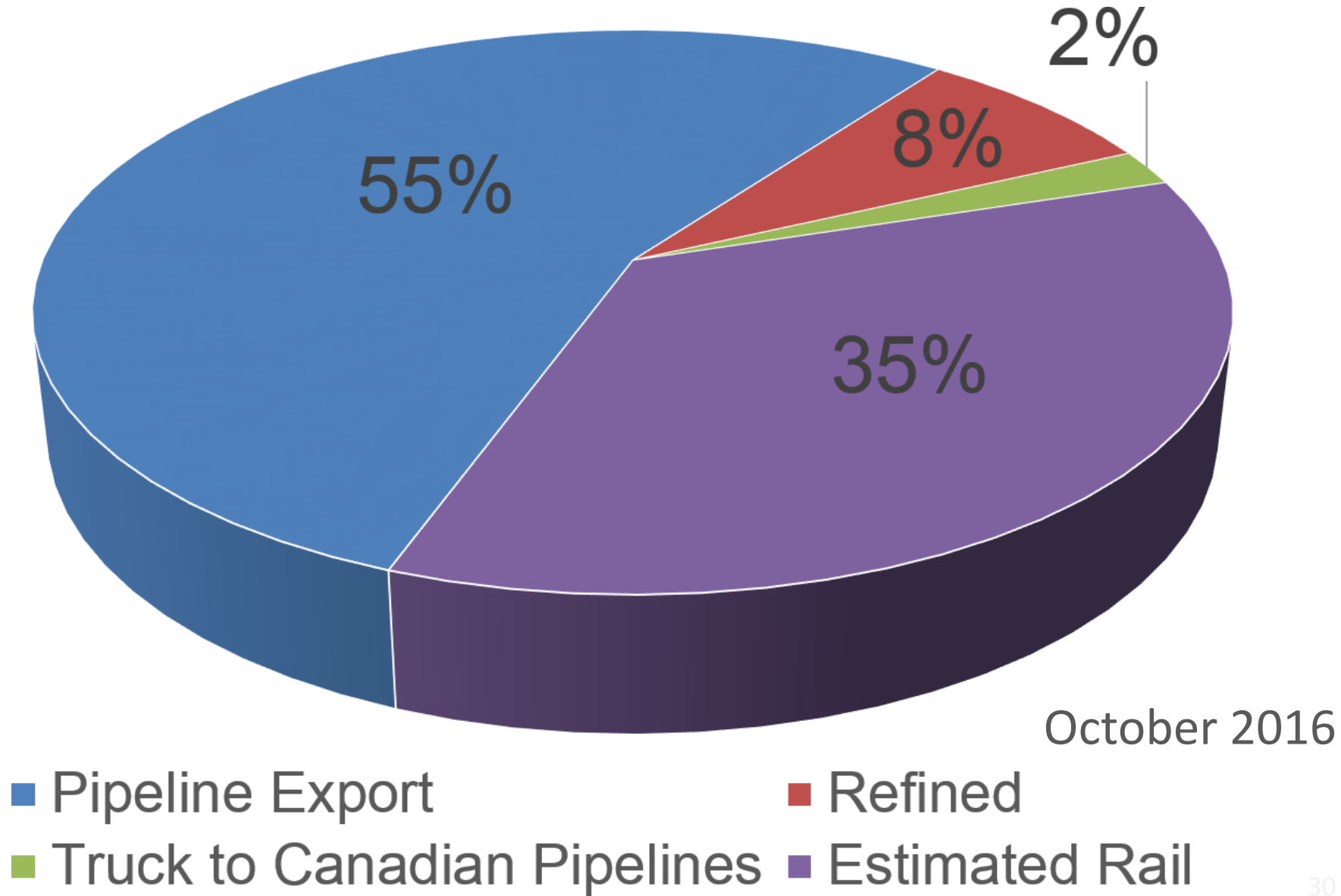


Presentation Outline

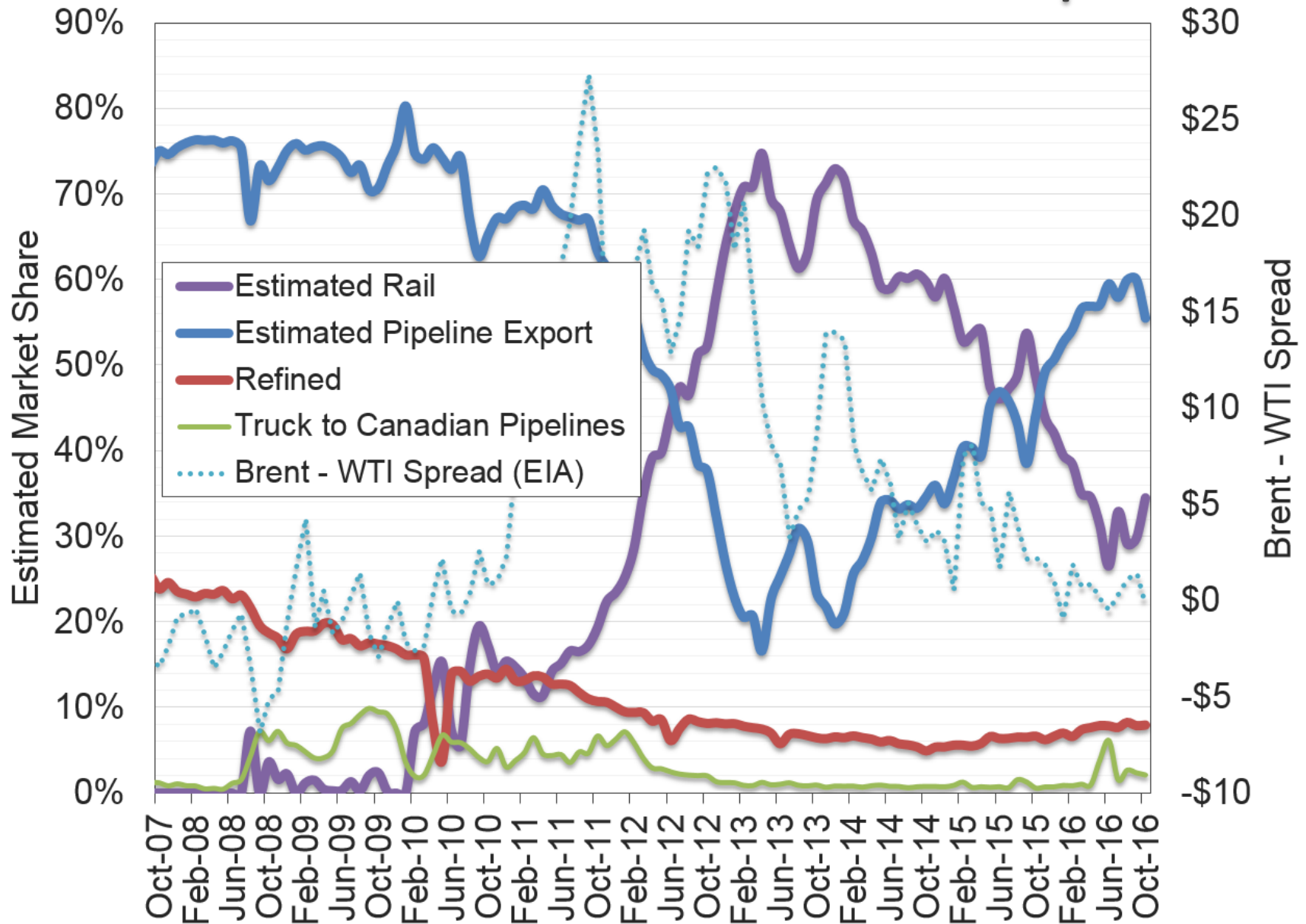
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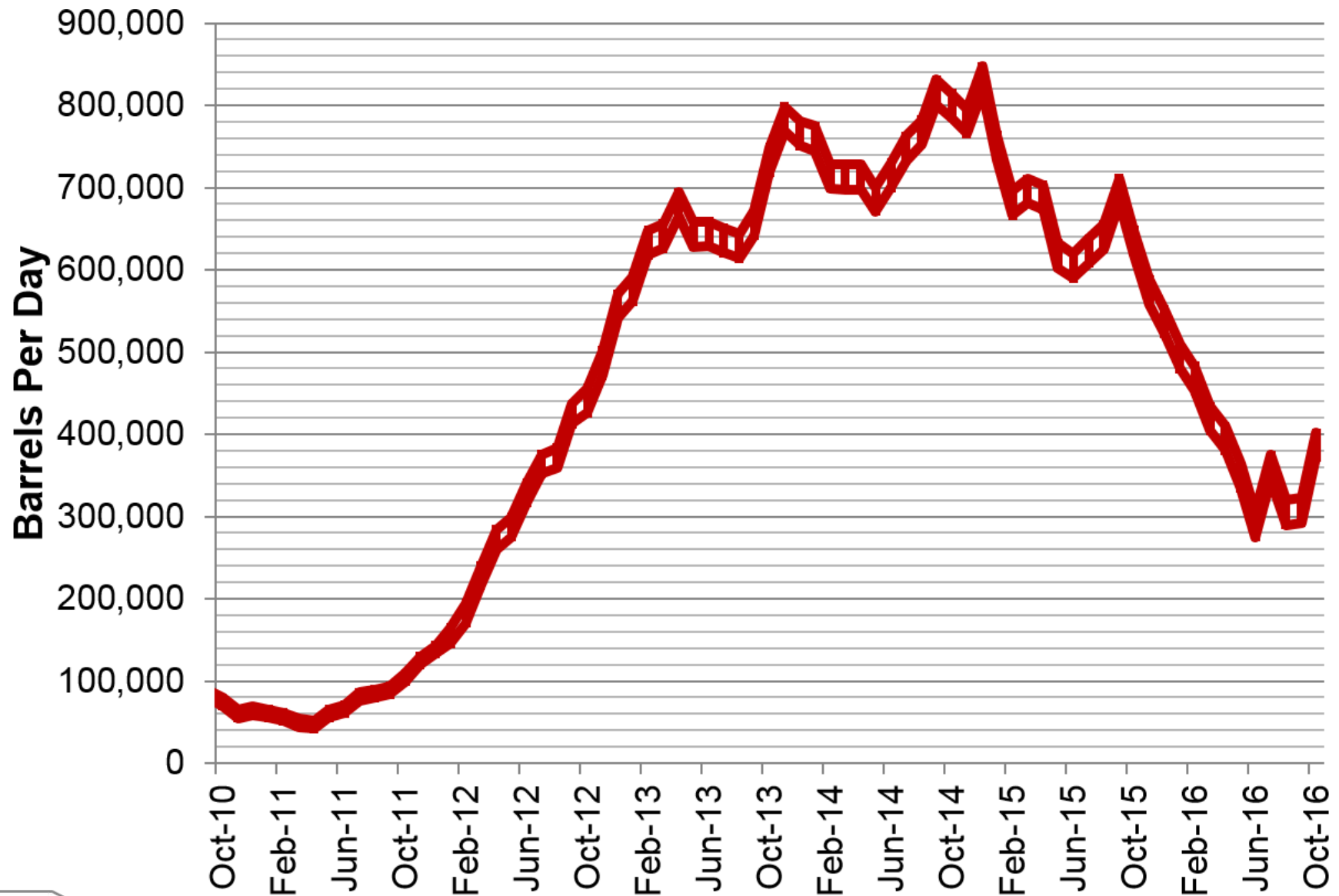
Estimated Williston Basin Oil Transportation



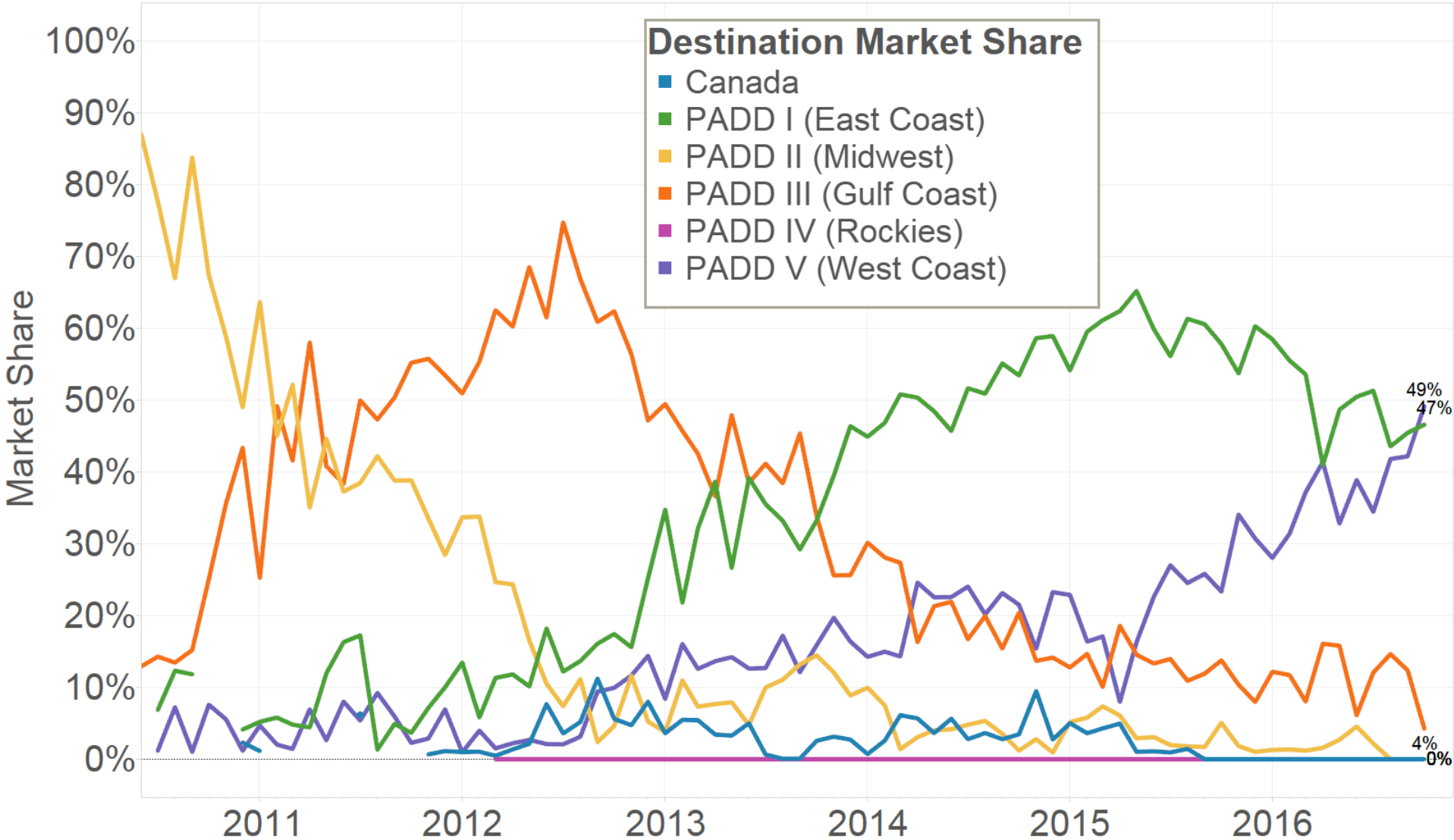
Estimated Williston Basin Oil Transportation



Estimated ND Rail Export Volumes



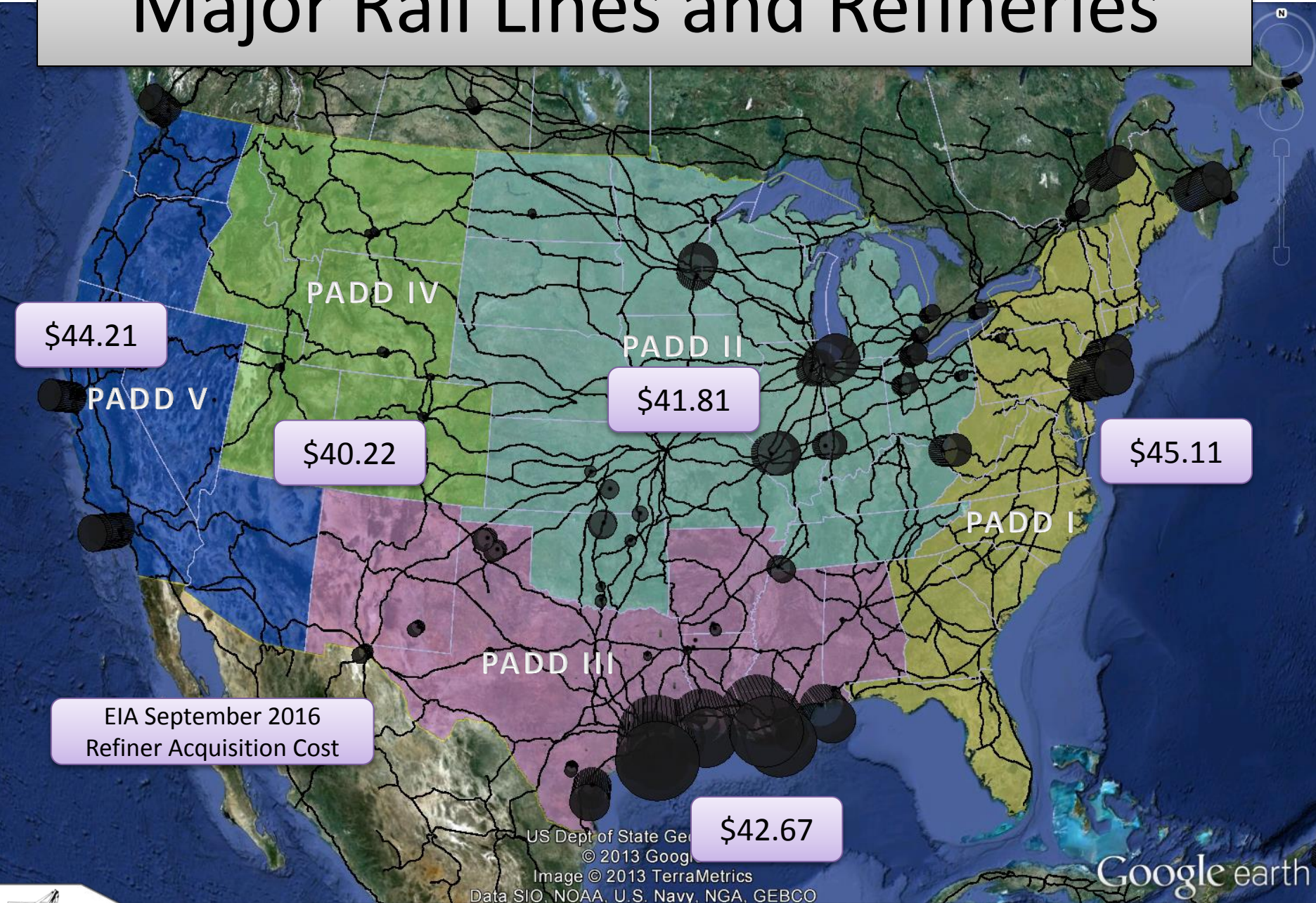
Rail Destinations Market Share (Oct. 2016)



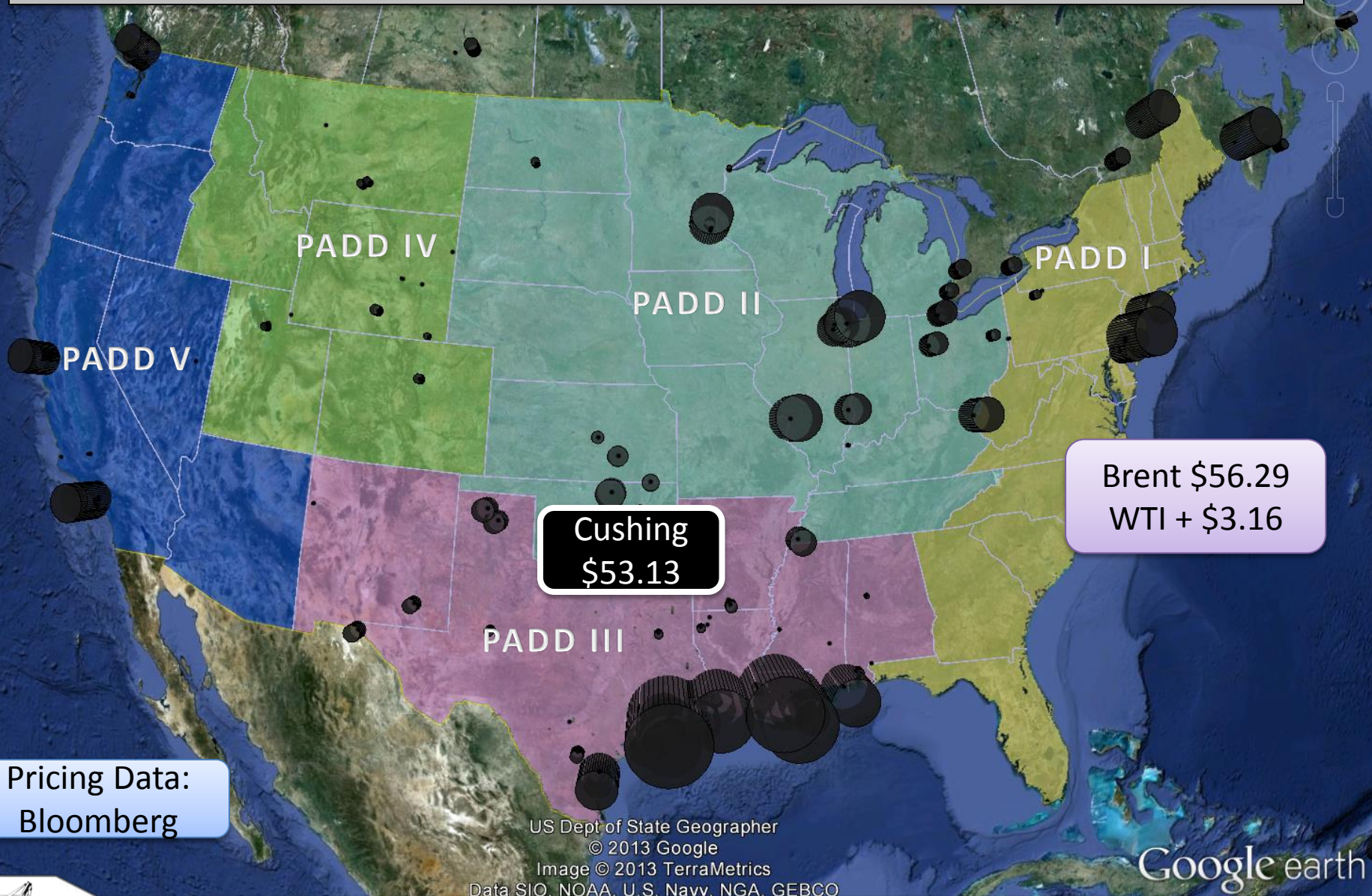
Data for Rail Destination Market Share Provided by the US Energy Information Administration



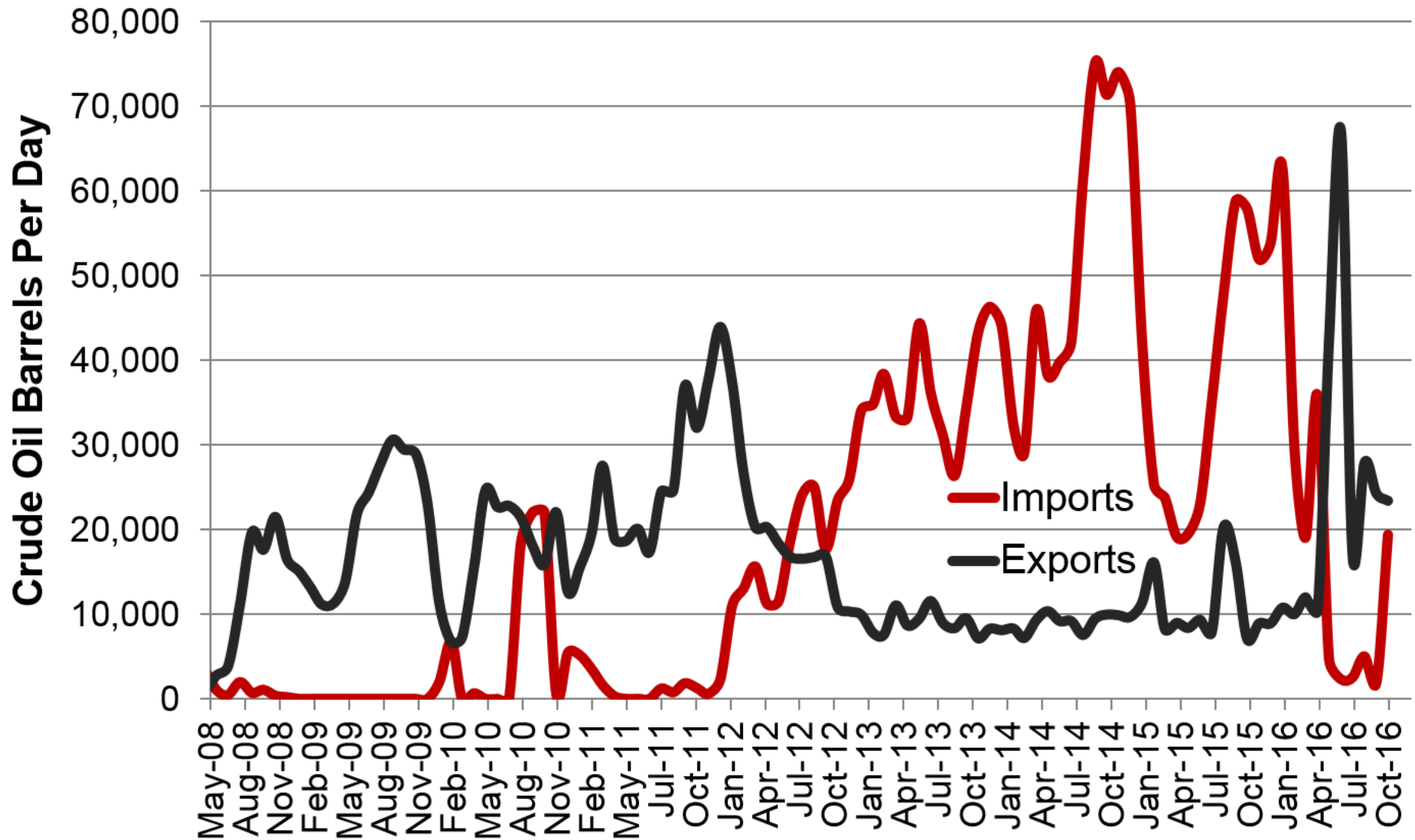
Major Rail Lines and Refineries



Crude Oil Prices – Jan 4, 2016



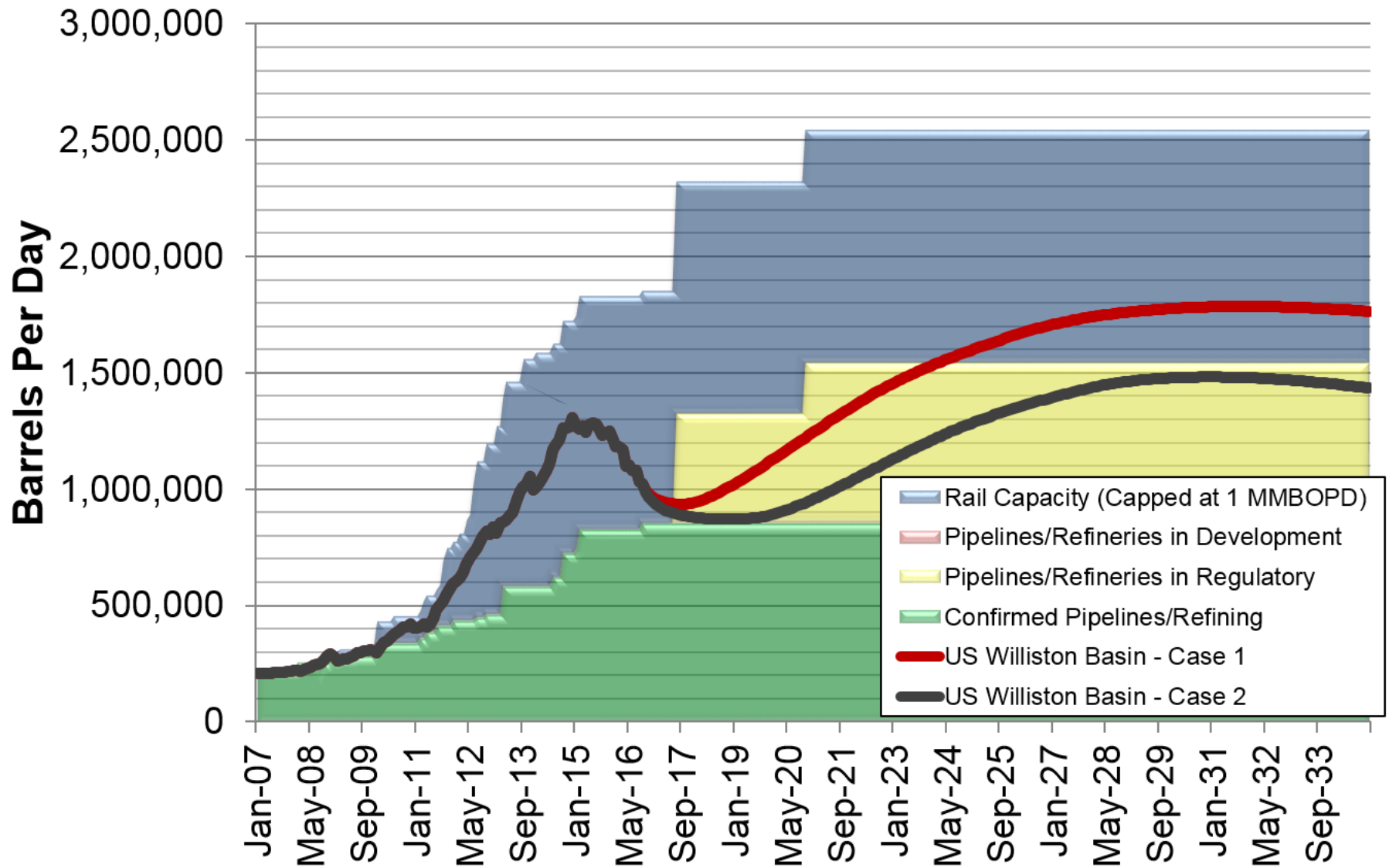
Williston Basin Truck Imports and Exports with Canada



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



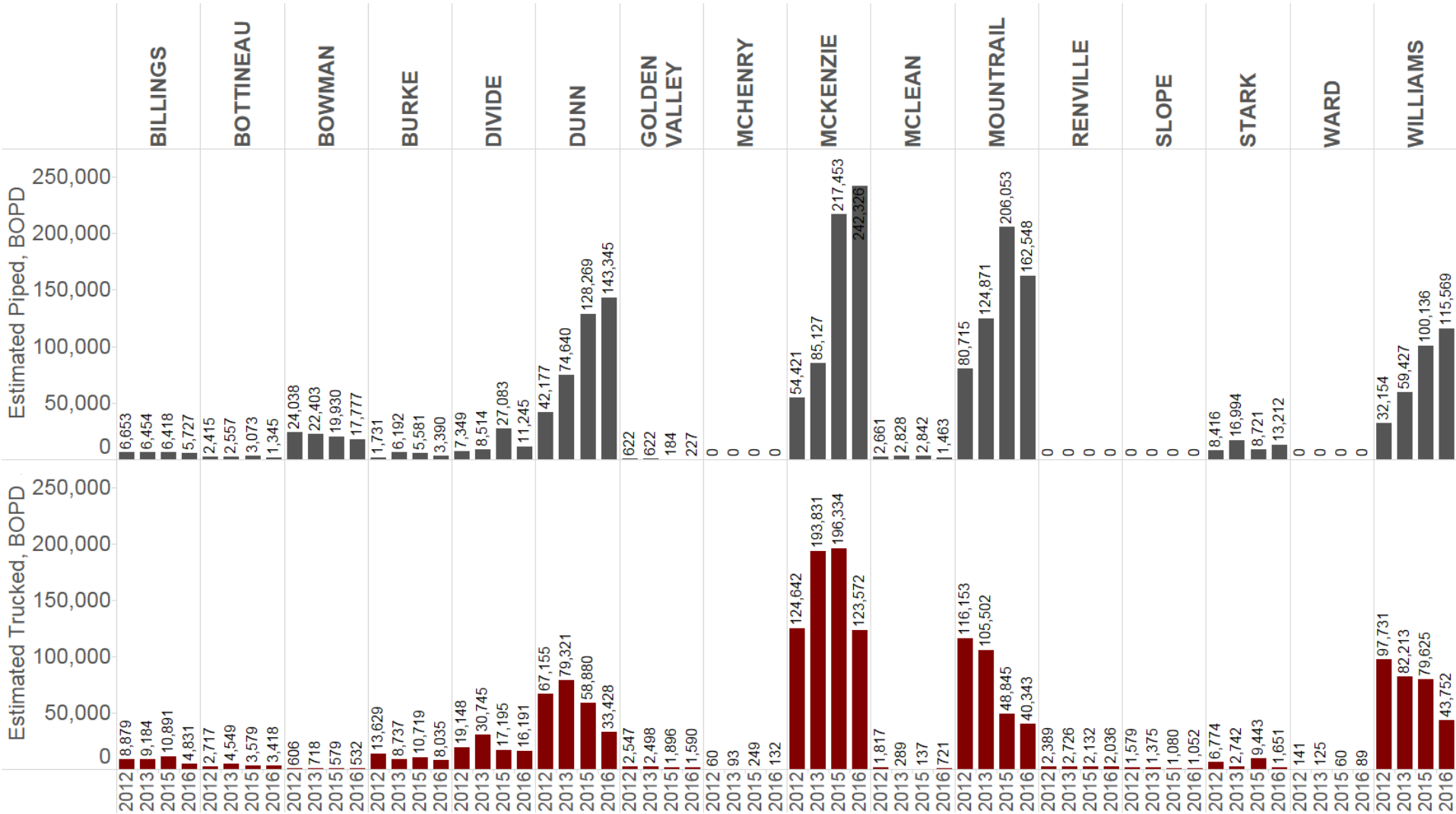
Williston Basin Oil Production & Export Capacity, BOPD



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

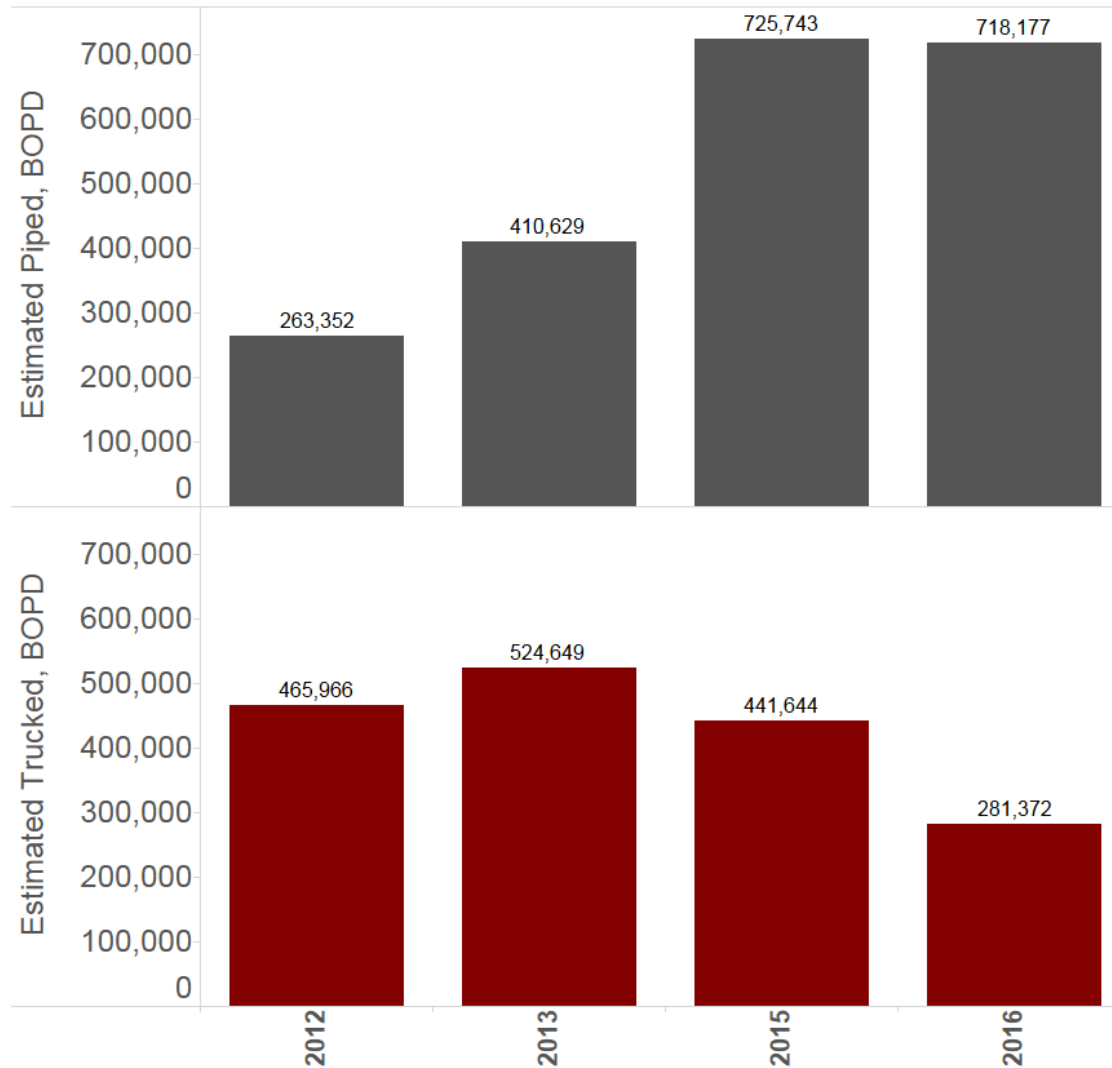


Evolution of Oil Gathering in ND



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Statewide Totals

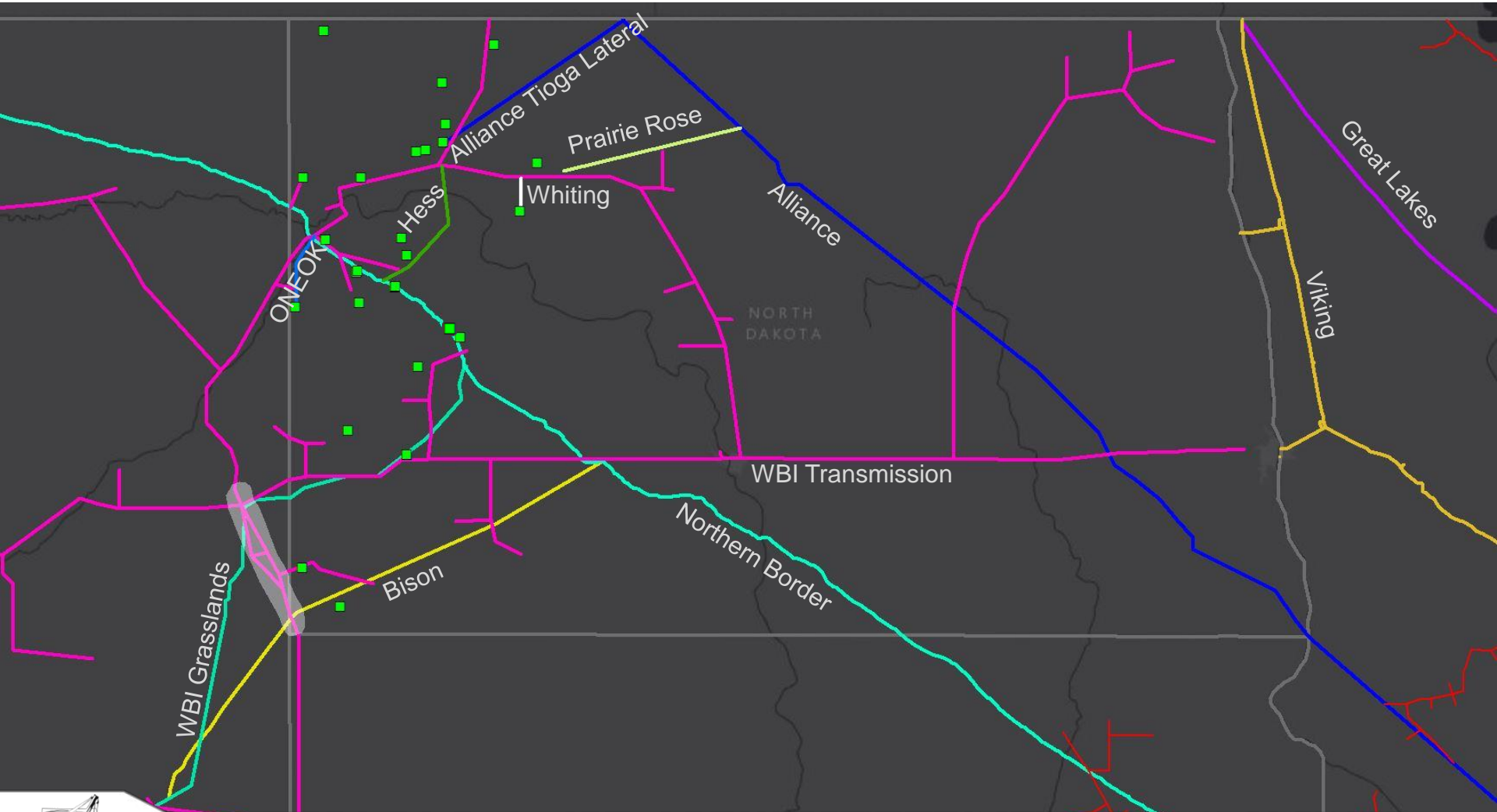


Presentation Outline

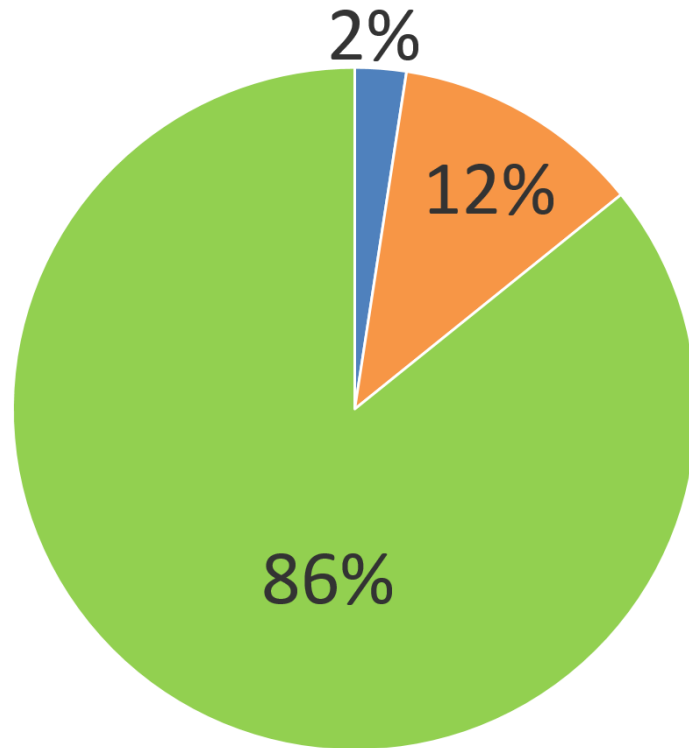
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Major Gas Pipeline and Processing Infrastructure



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.

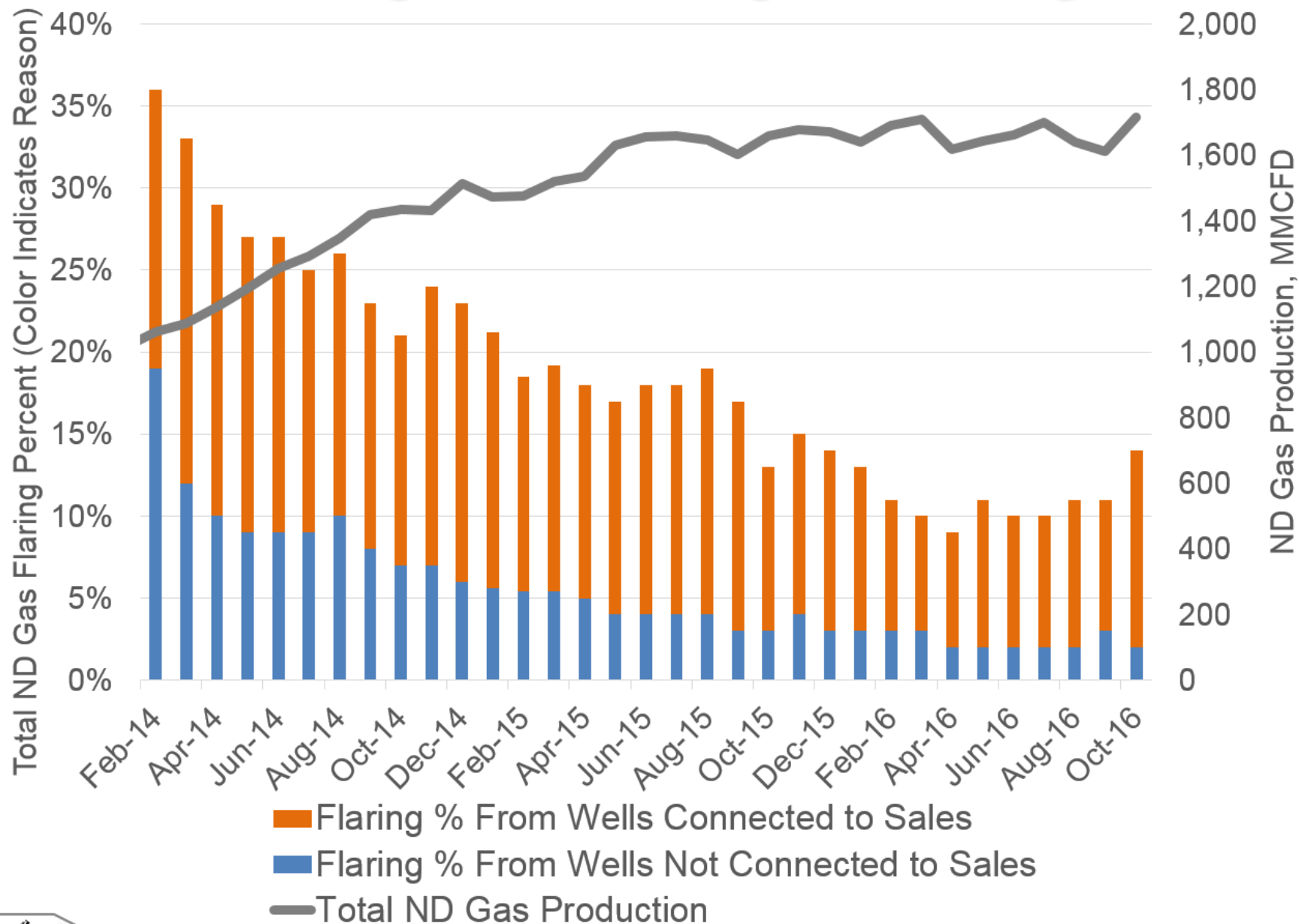
Simple Terms

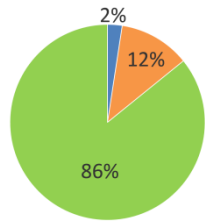
Blue – Lack of pipelines
Orange – Challenges on existing infrastructure

Oct 2016 Data – Non-Confidential Wells

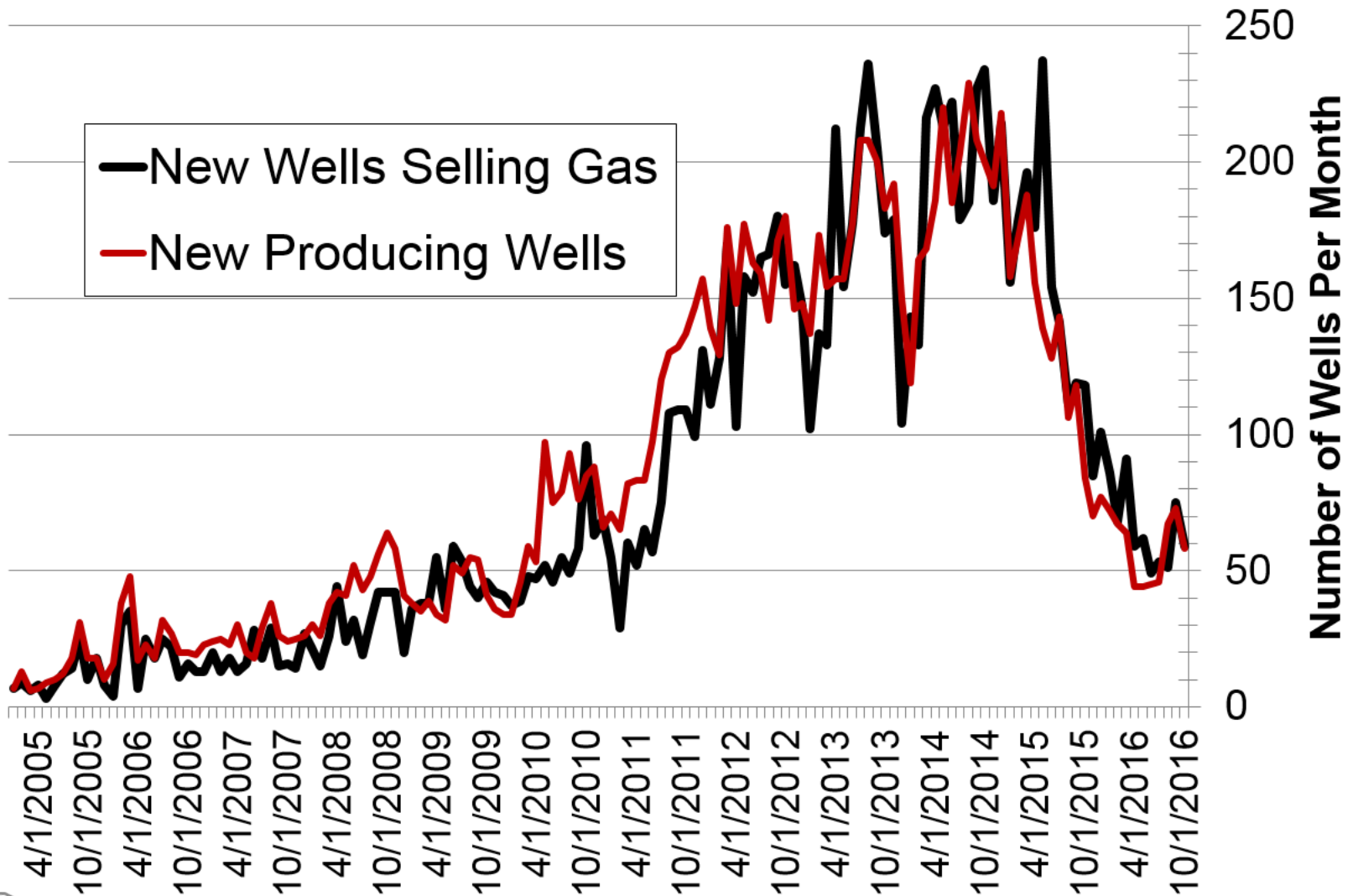


Solving the Flaring Challenge

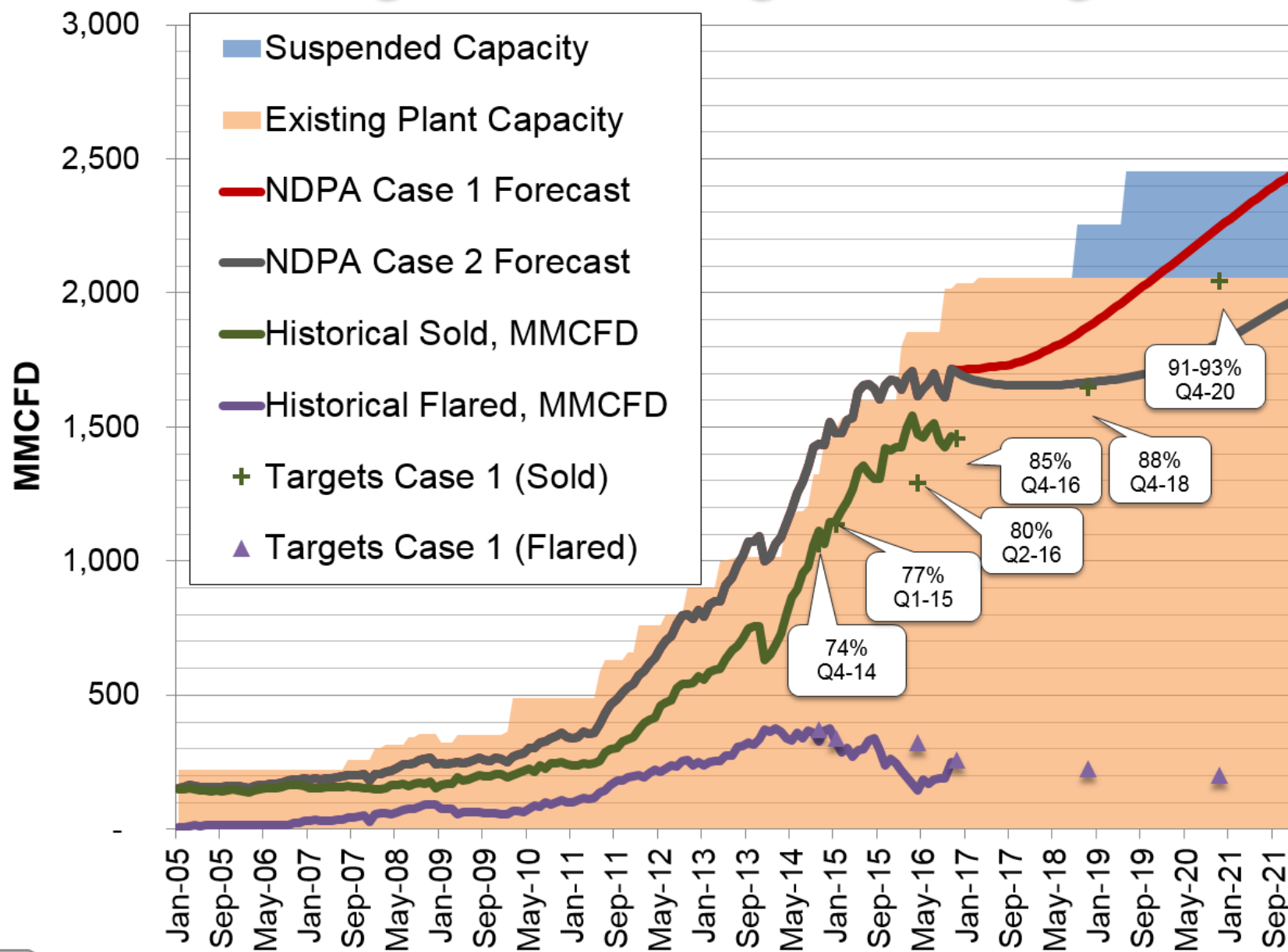




Capturing the 2% Faster Well Connections

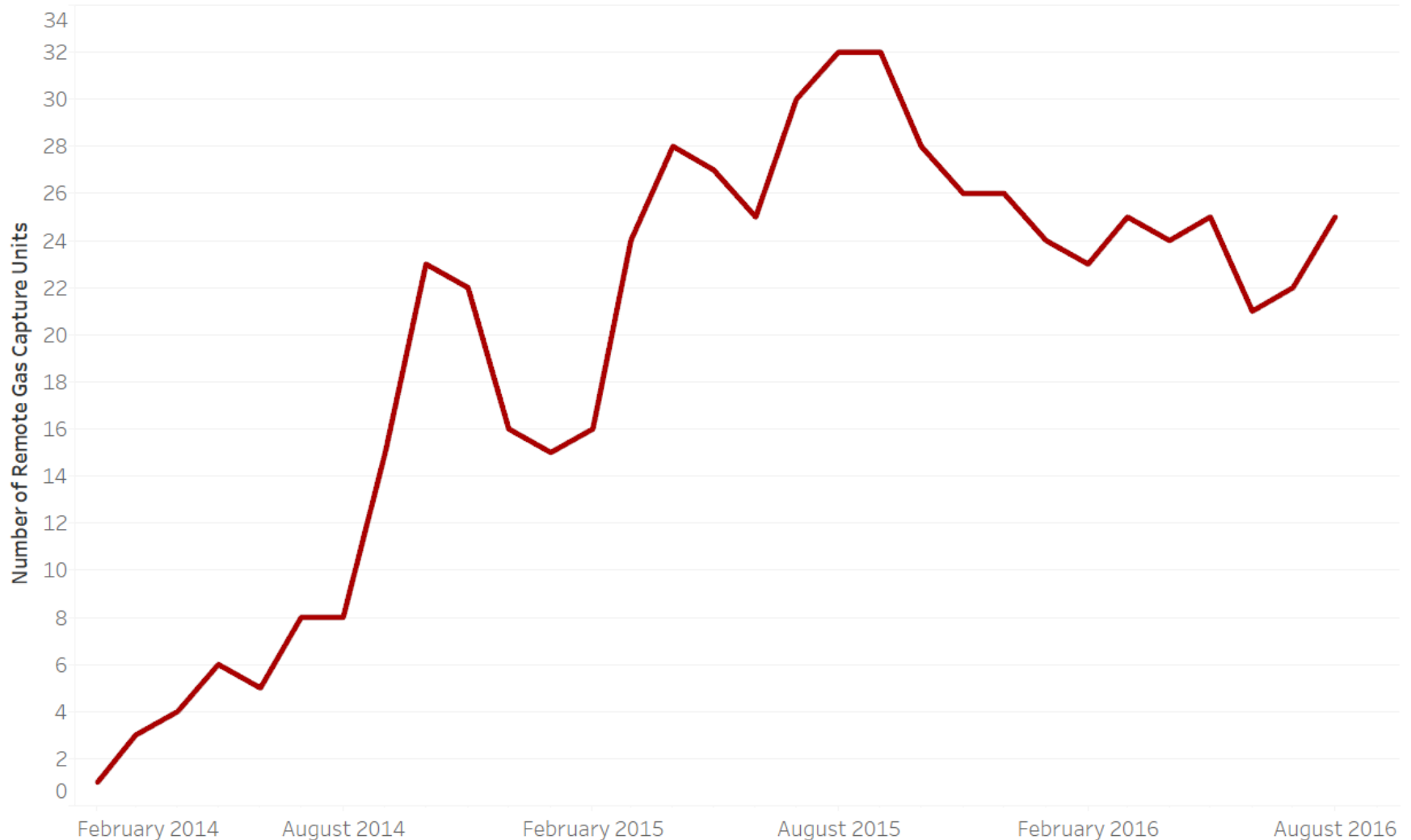


Solving the Flaring Challenge



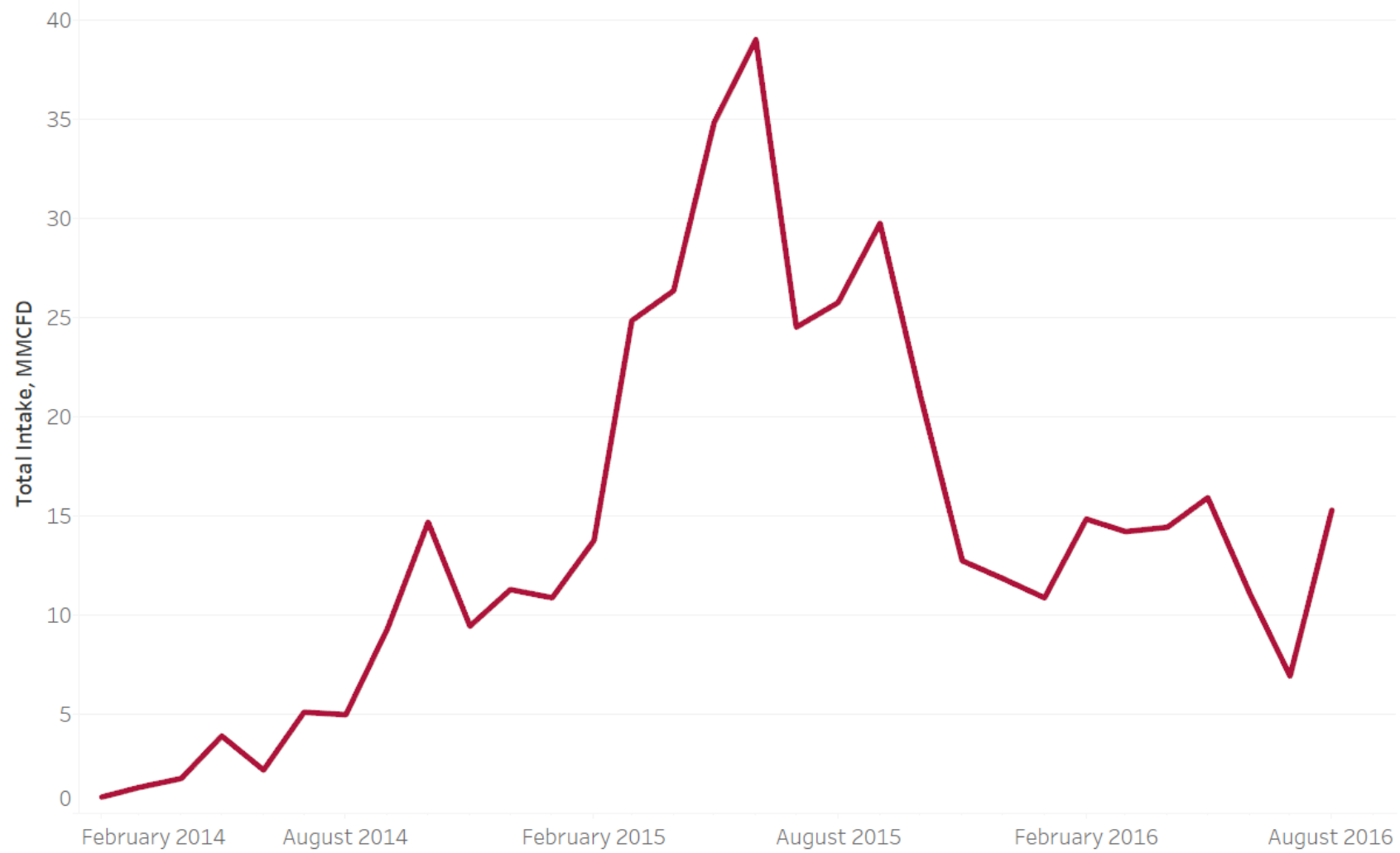
Wellhead Gas Capture – Locations

Number of Remote Gas Capture Units Reporting

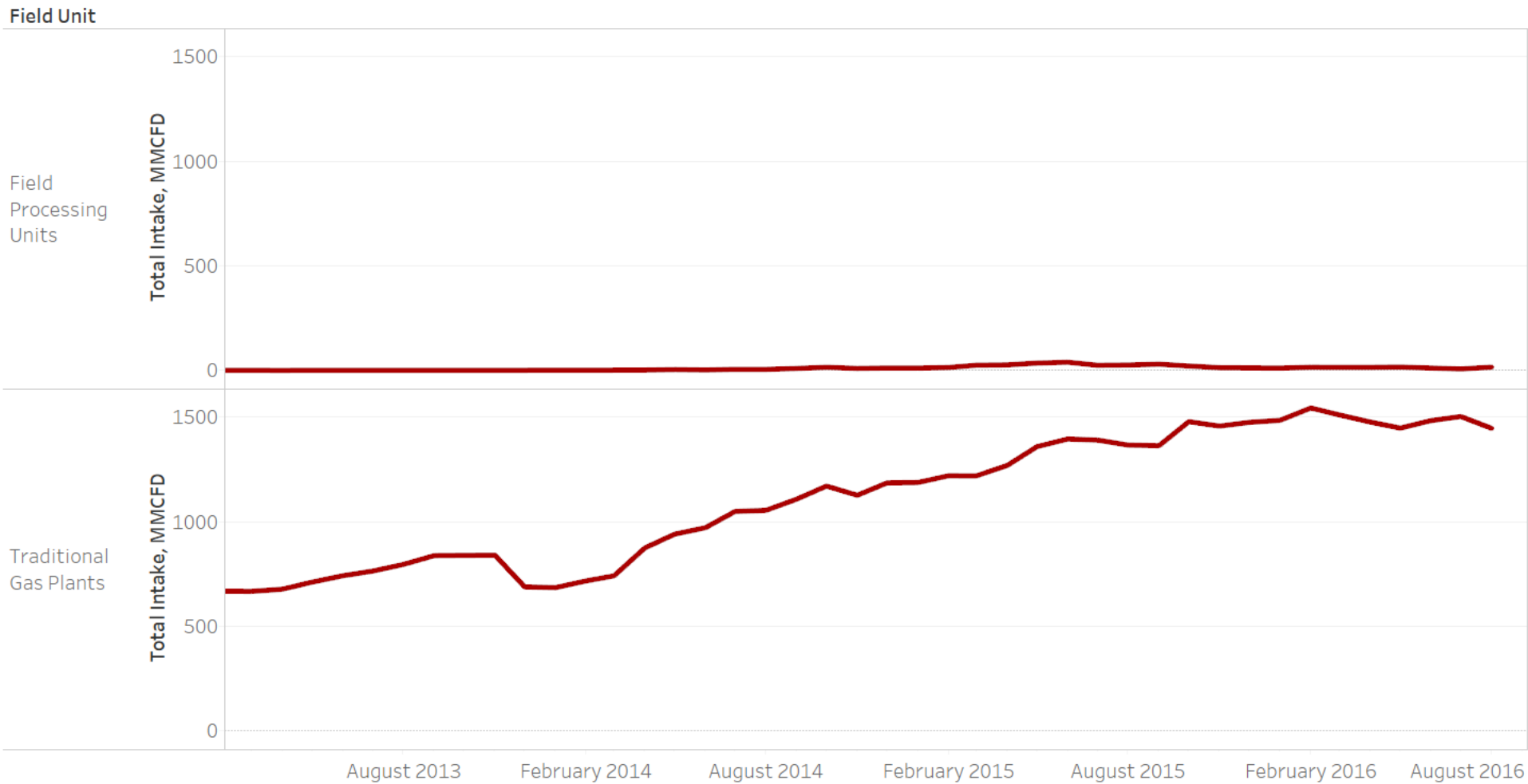


Wellhead Gas Capture – Intake Volume

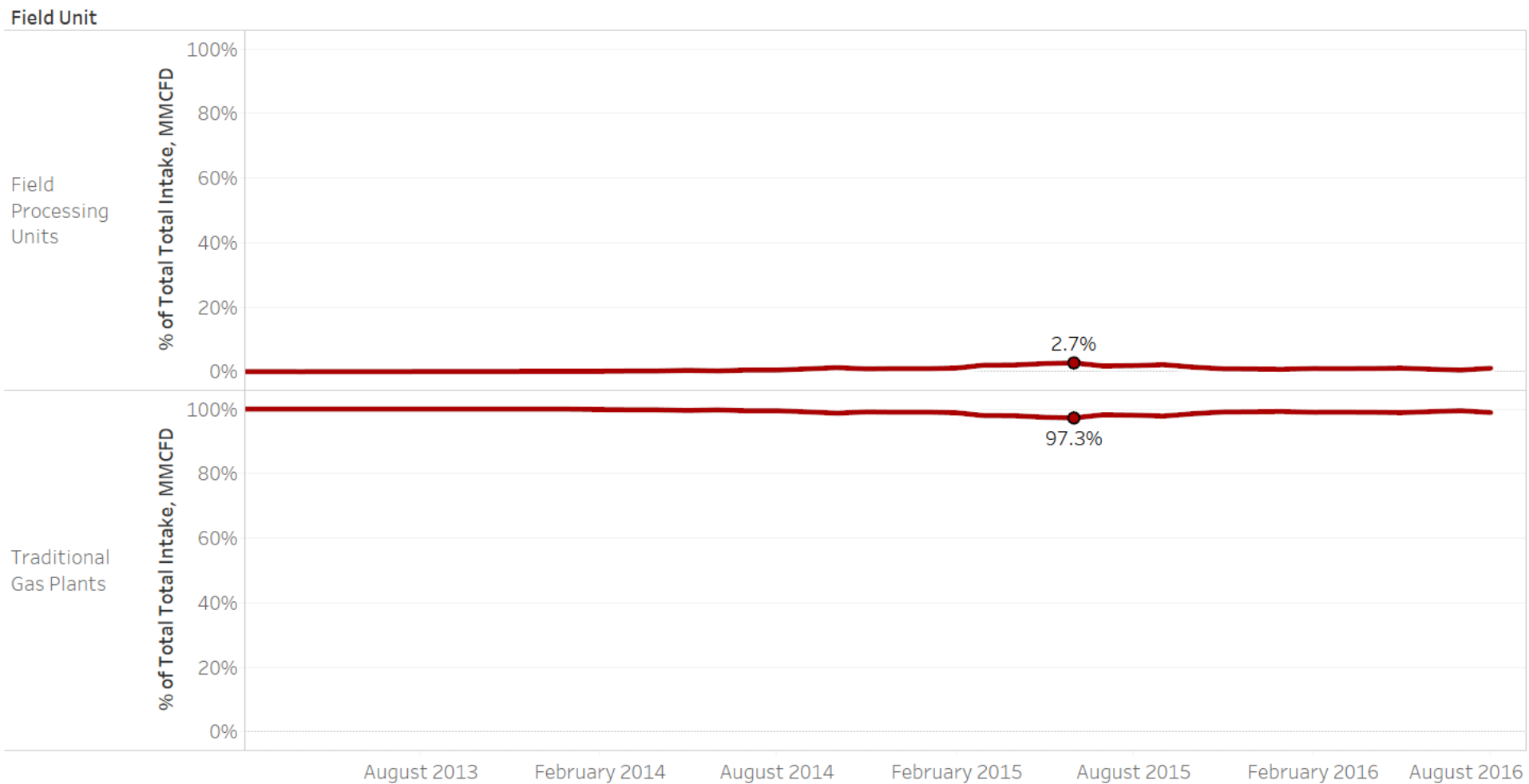
Remote Gas Capture Intake Volumes



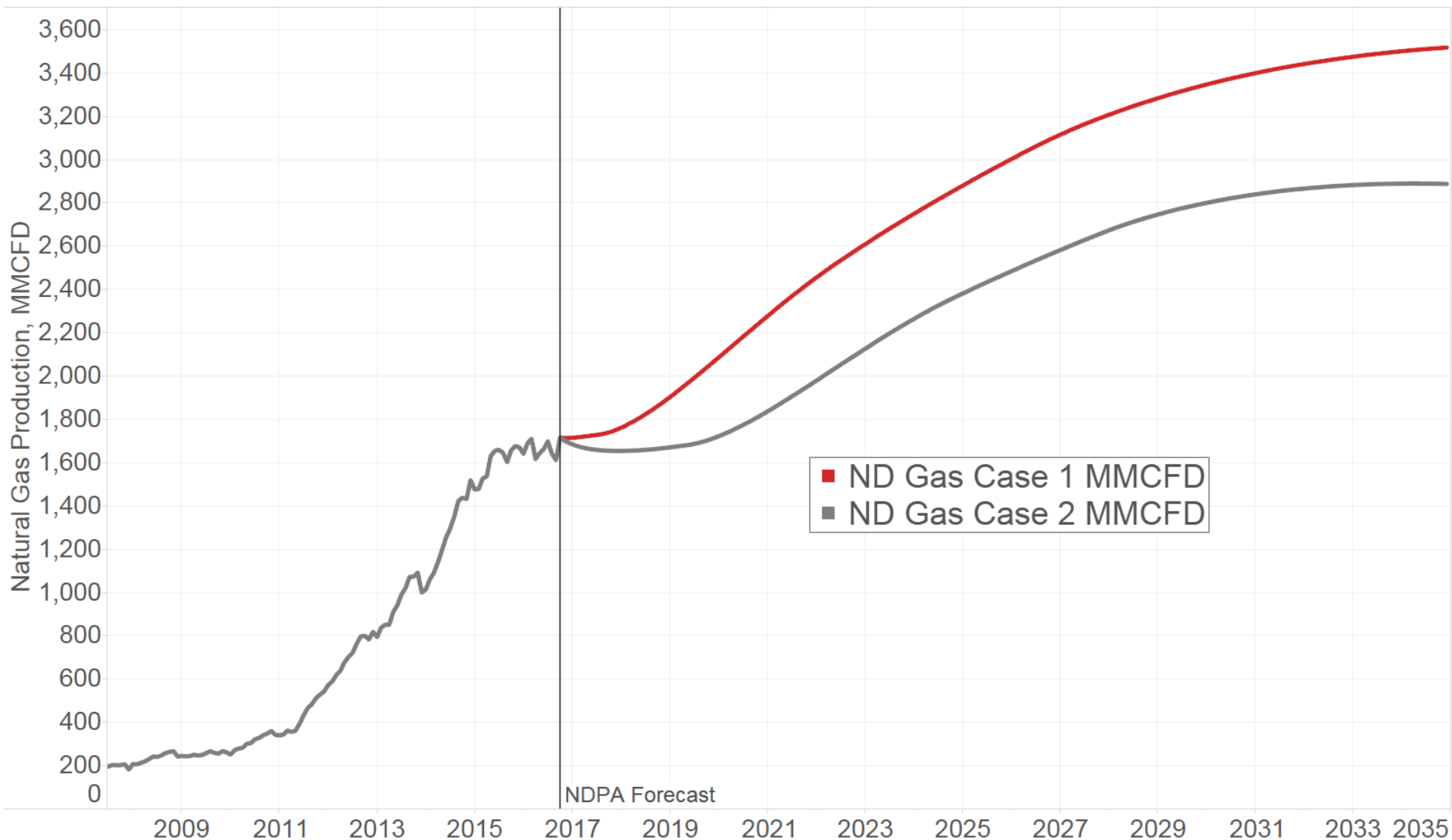
Wellhead & Plant Gas Capture



Wellhead & Plant Gas Capture

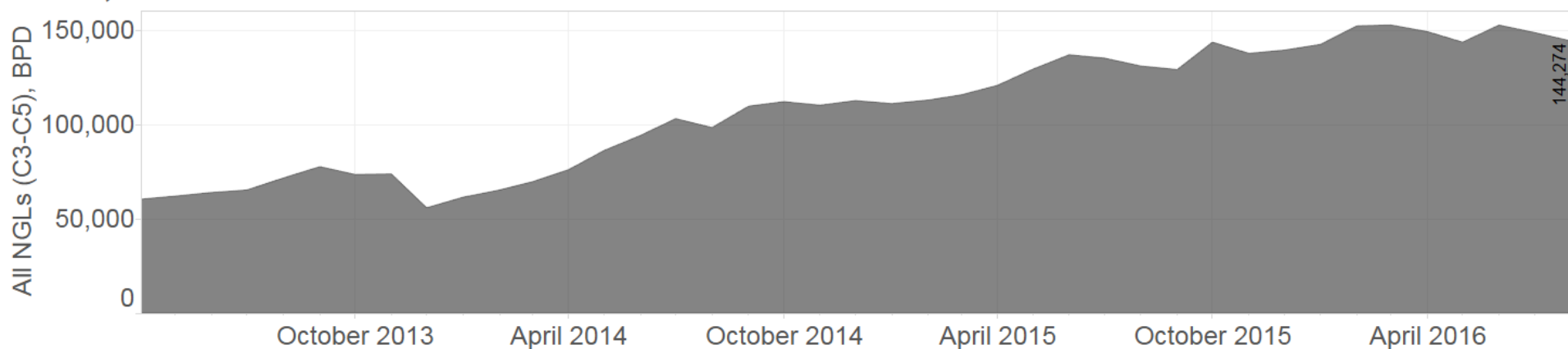


NDPA ND Gas Production Forecast

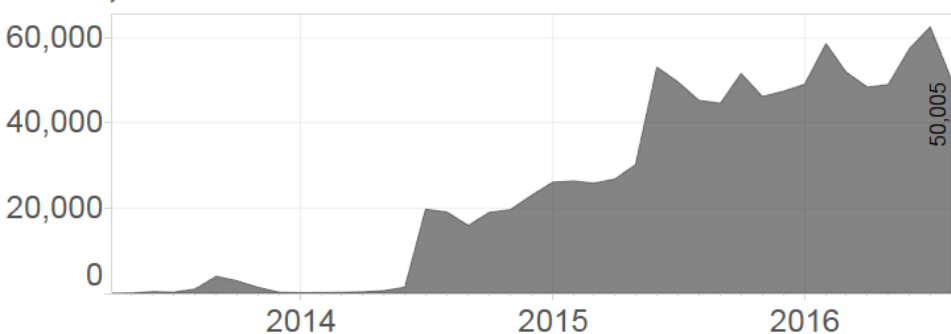


Plant Natural Gas Liquids - (Aug. 2016)

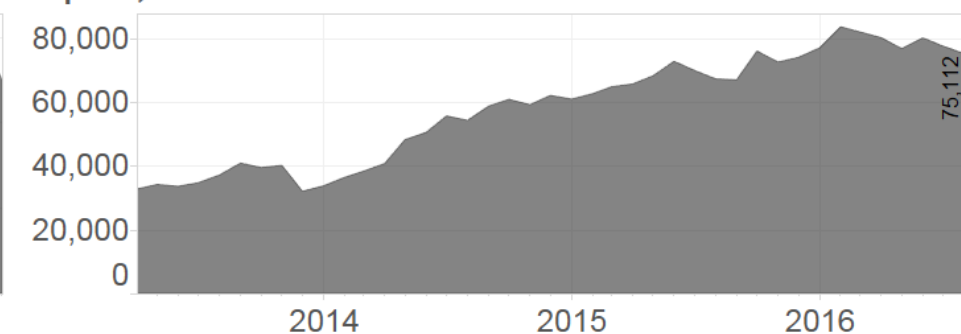
All NGLs, BPD



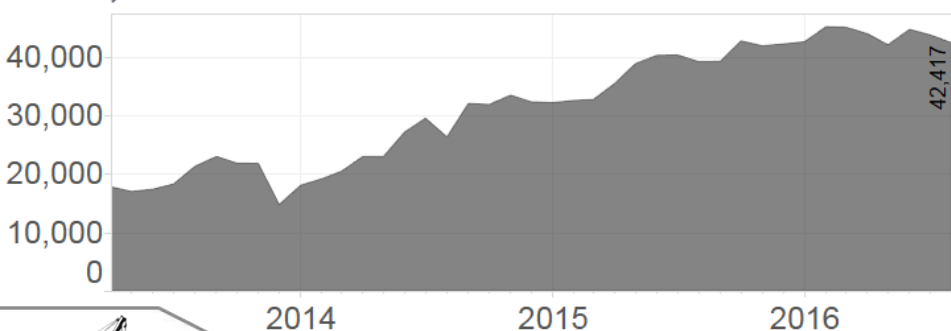
Ethane, BPD



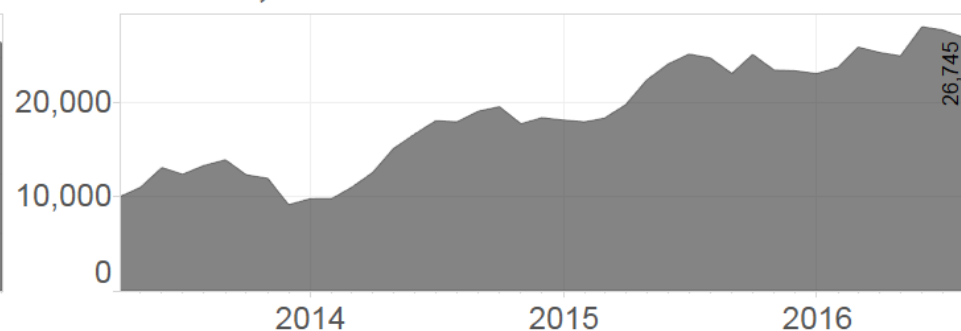
Propane, BPD



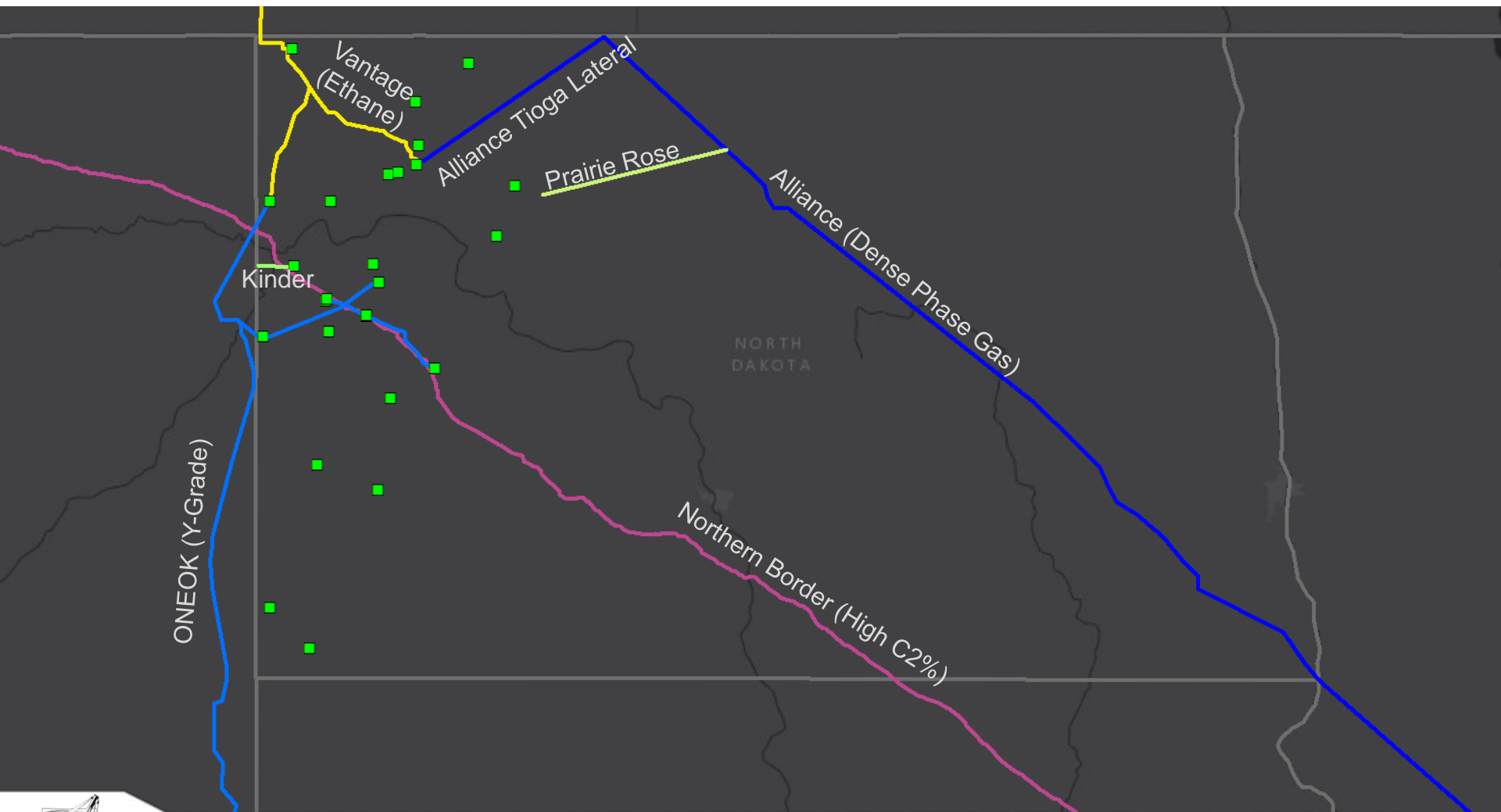
Butane, BPD



Natural Gasoline, BPD

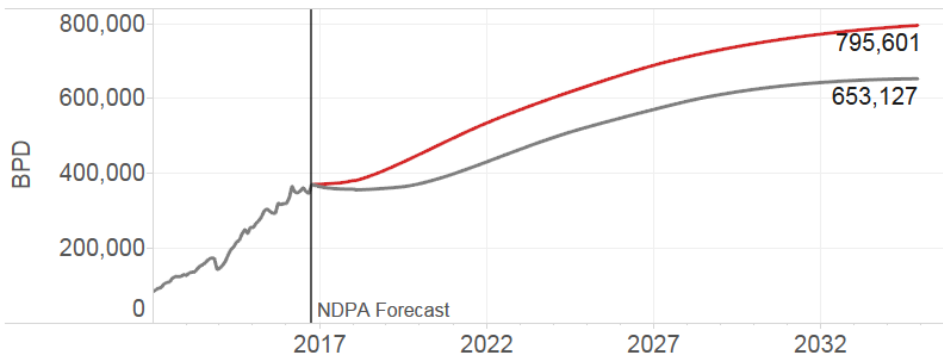


Major NGL Pipeline and Processing Infrastructure

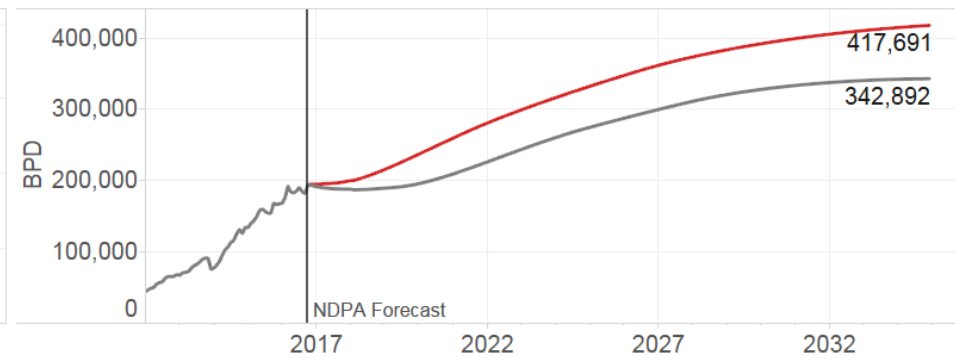


North Dakota Captured* NGL's

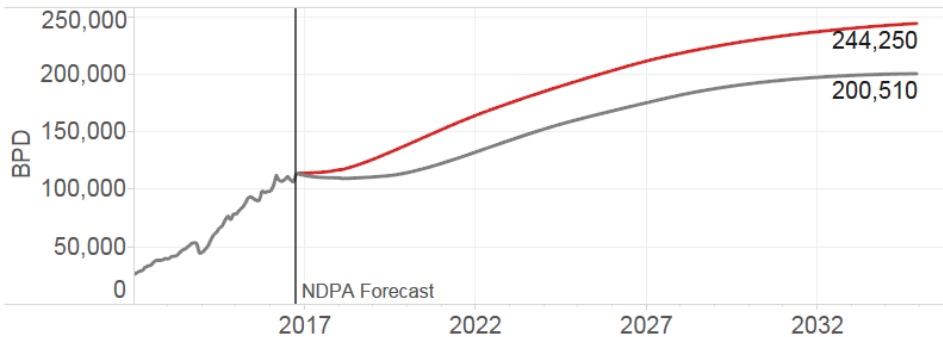
All Natural Gas Liquids



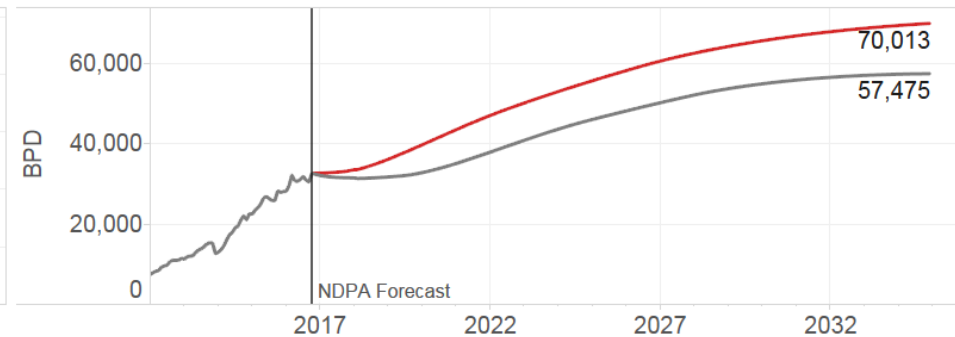
Ethane



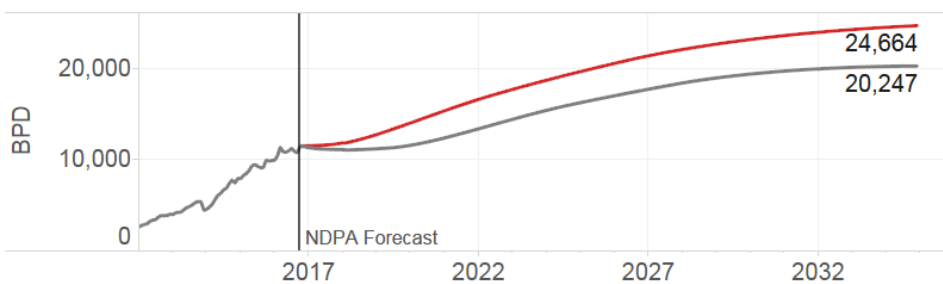
Propane



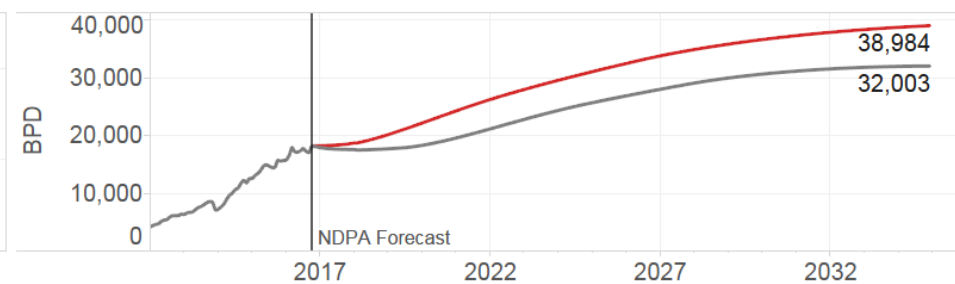
Butane



Isobutane



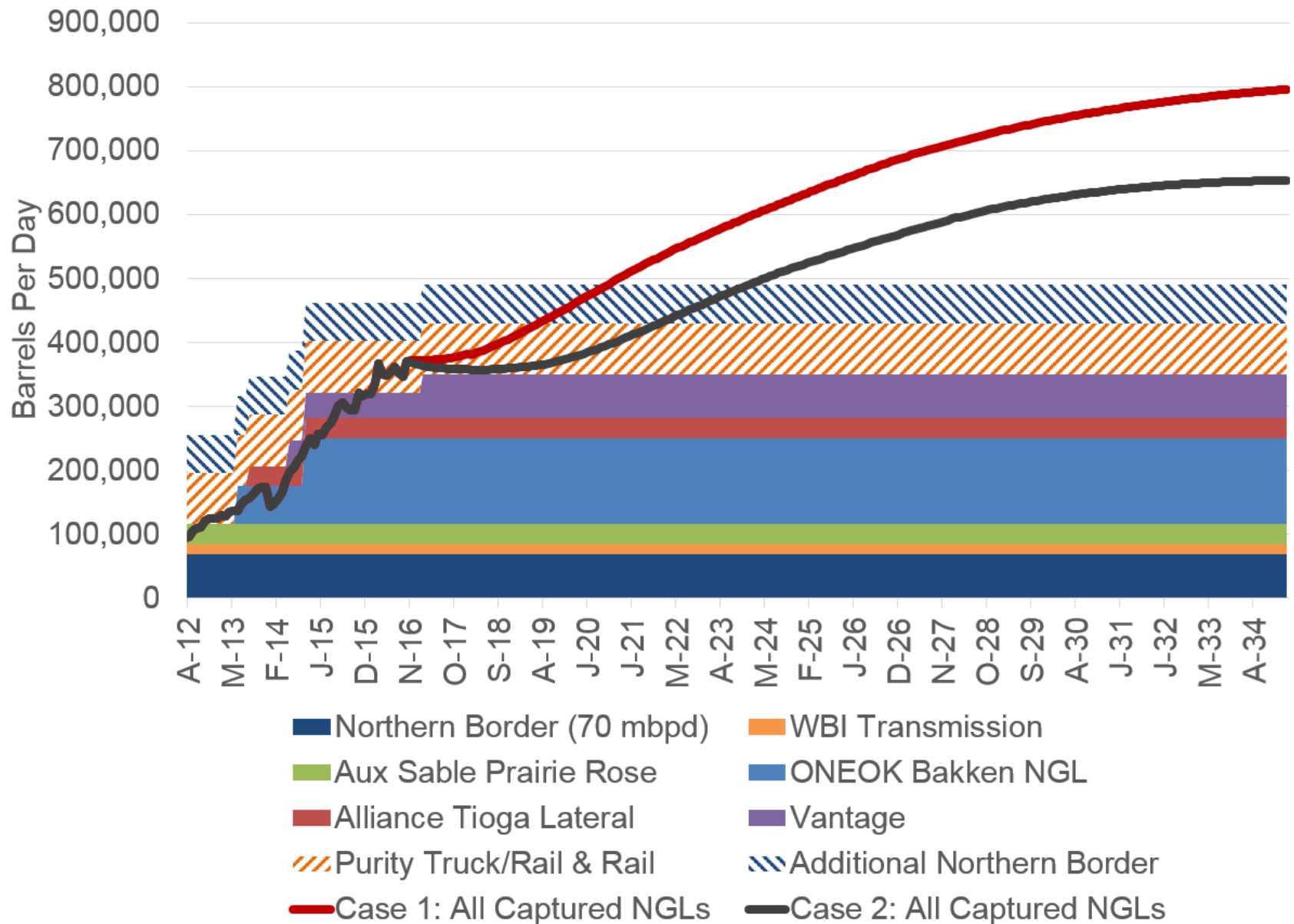
Natural Gasoline



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



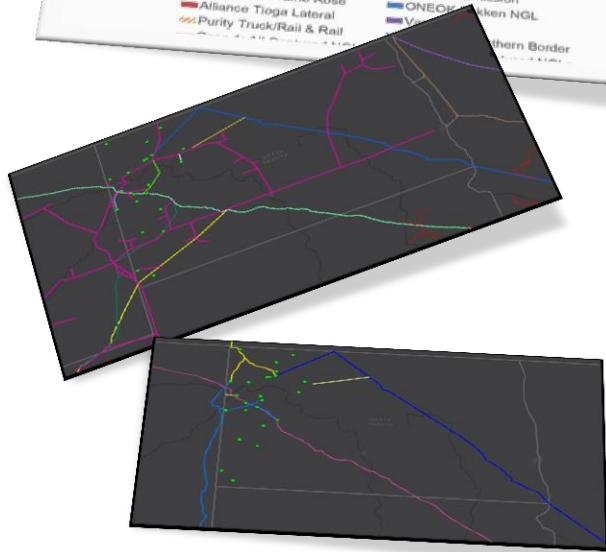
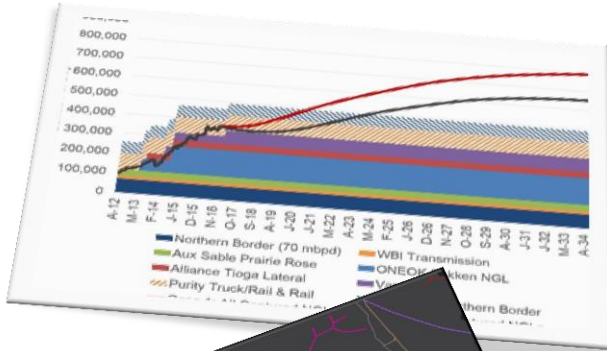
NGL Capacity Is Complicated...



NGL Capacity Is Complicated...

Key Challenges

- Plant complexity varies
 - Y-grade vs purity product
 - Ethane capture equipment
- Scattered plant locations
- Market pricing
- Pipelines vary by type of product they can ship
- Uncertainty of Canadian and Wyoming volumes and quality
- Seasonal product demand



NGL Capacity Is Complicated...

Potential Solutions

- New, expanded, or repurposed pipeline systems
- Local consumption by new petrochemical industries
- Creative market solutions to manage plant NGL/BTUs
- Enhanced oil recovery
- Rail movements of excess products

