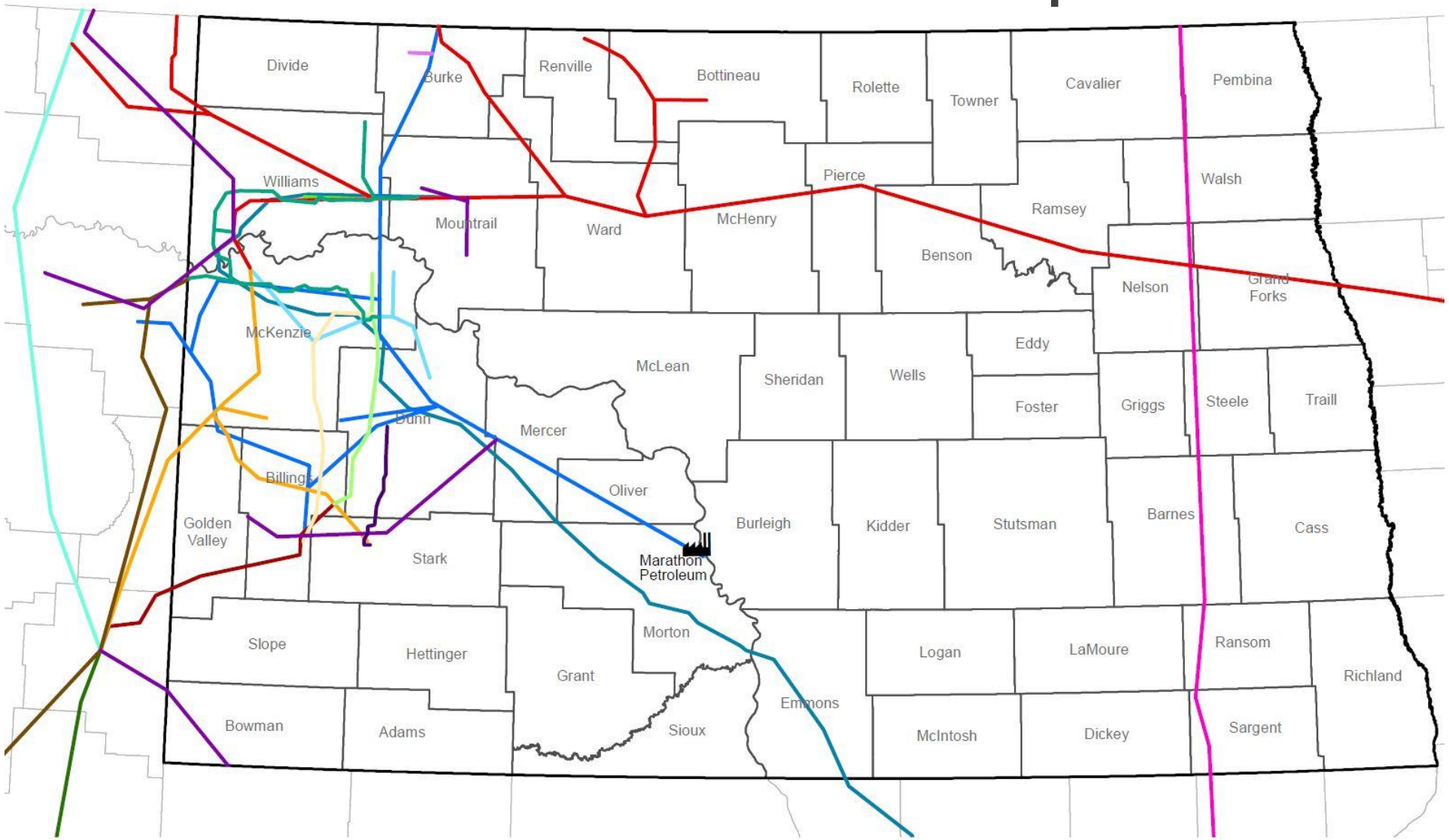
House Energy and Natural Resources Committee

Justin J. Kringstad
Geological Engineer
Director
North Dakota Pipeline Authority

January 7, 2021

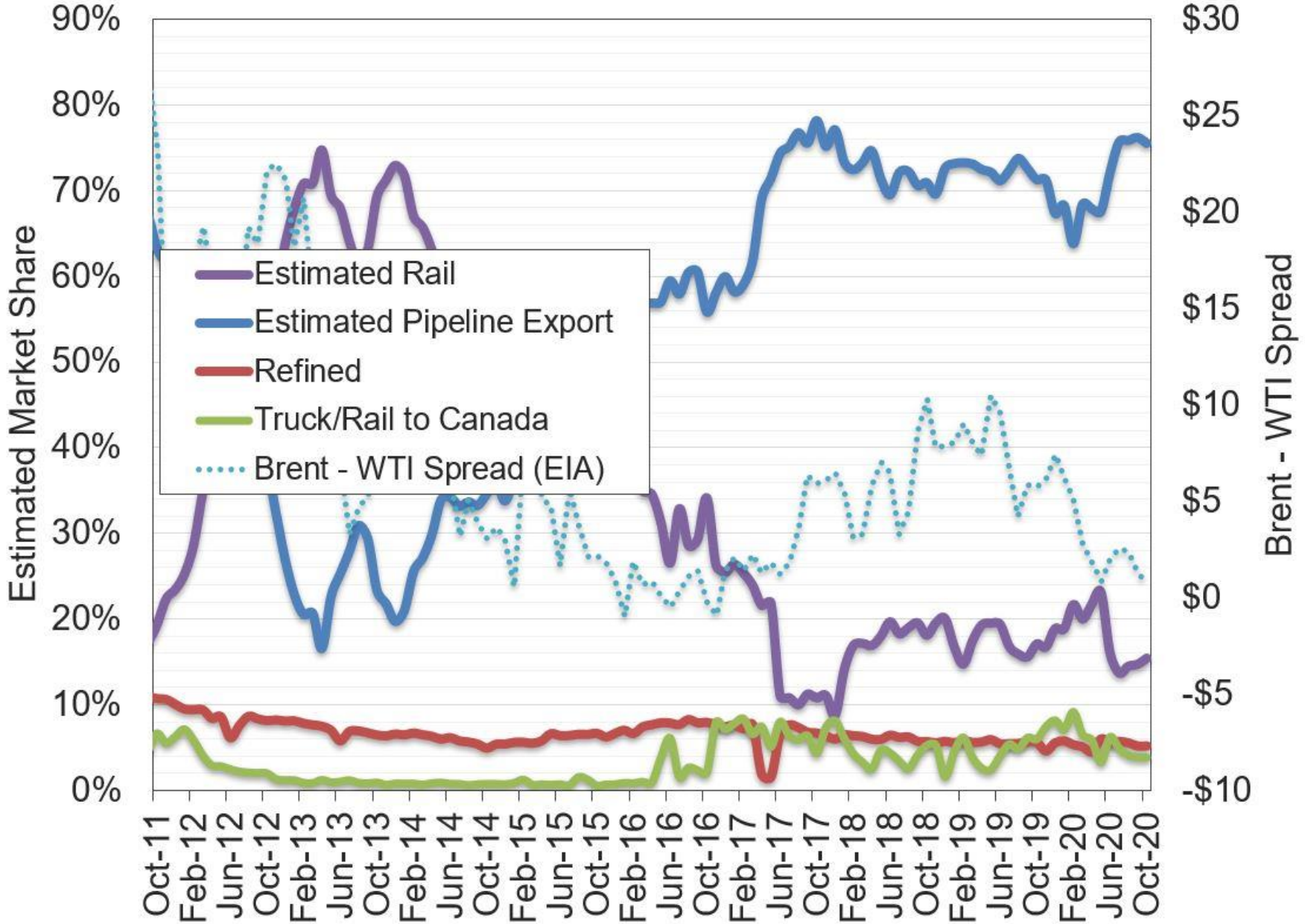
North Dakota Oil Transmission Pipelines



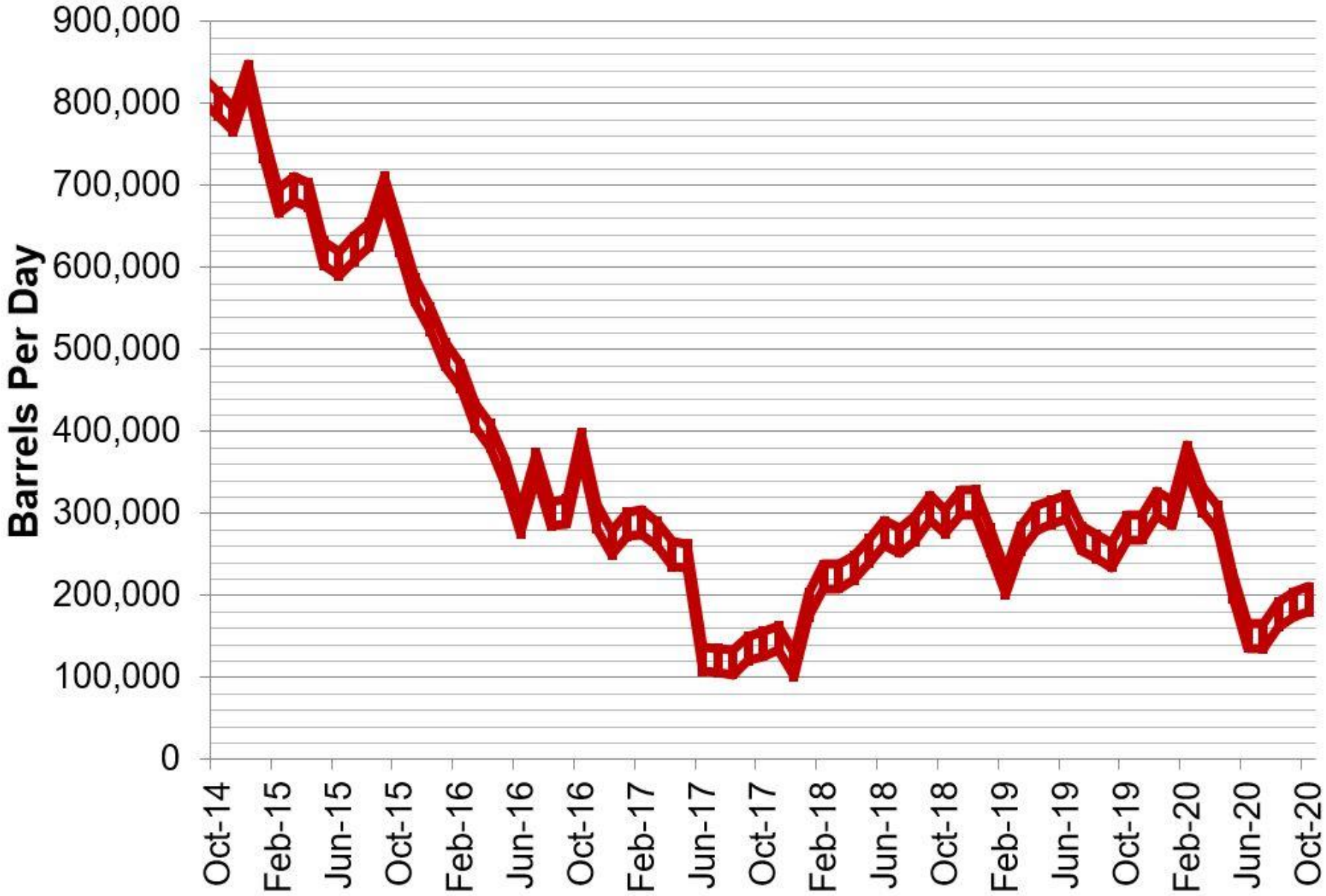
US Williston Basin Oil Production, BOPD

MONTH	ND	Eastern MT*	SD	TOTAL
January	1,430,646	57,435	3,091	1,491,172
February	1,505,045	55,409	3,070	1,563,524
March	1,433,732	57,699	2,946	1,494,377
April	1,223,974	49,025	2,610	1,275,609
May	860,586	37,014	2,466	900,066
June	893,756	42,769	2,680	939,205
July	1,042,086	48,344	3,435	1,093,865
August	1,165,371	46,800	2,807	1,214,977
September	1,223,107	42,805	2,837	1,268,749
October	1,222,871			
November				
December				

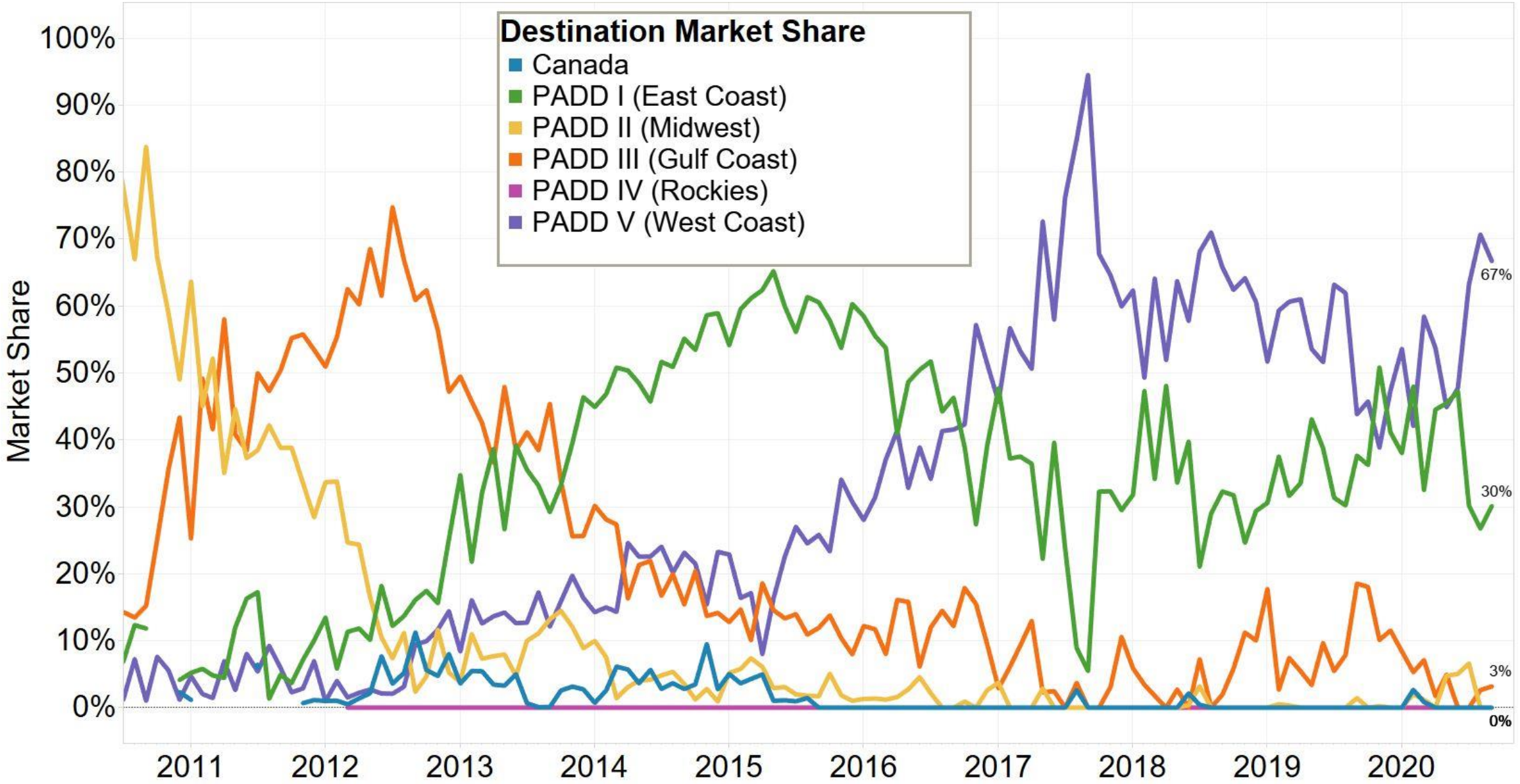
Estimated Williston Basin Oil Transportation



Estimated ND Rail Export Volumes

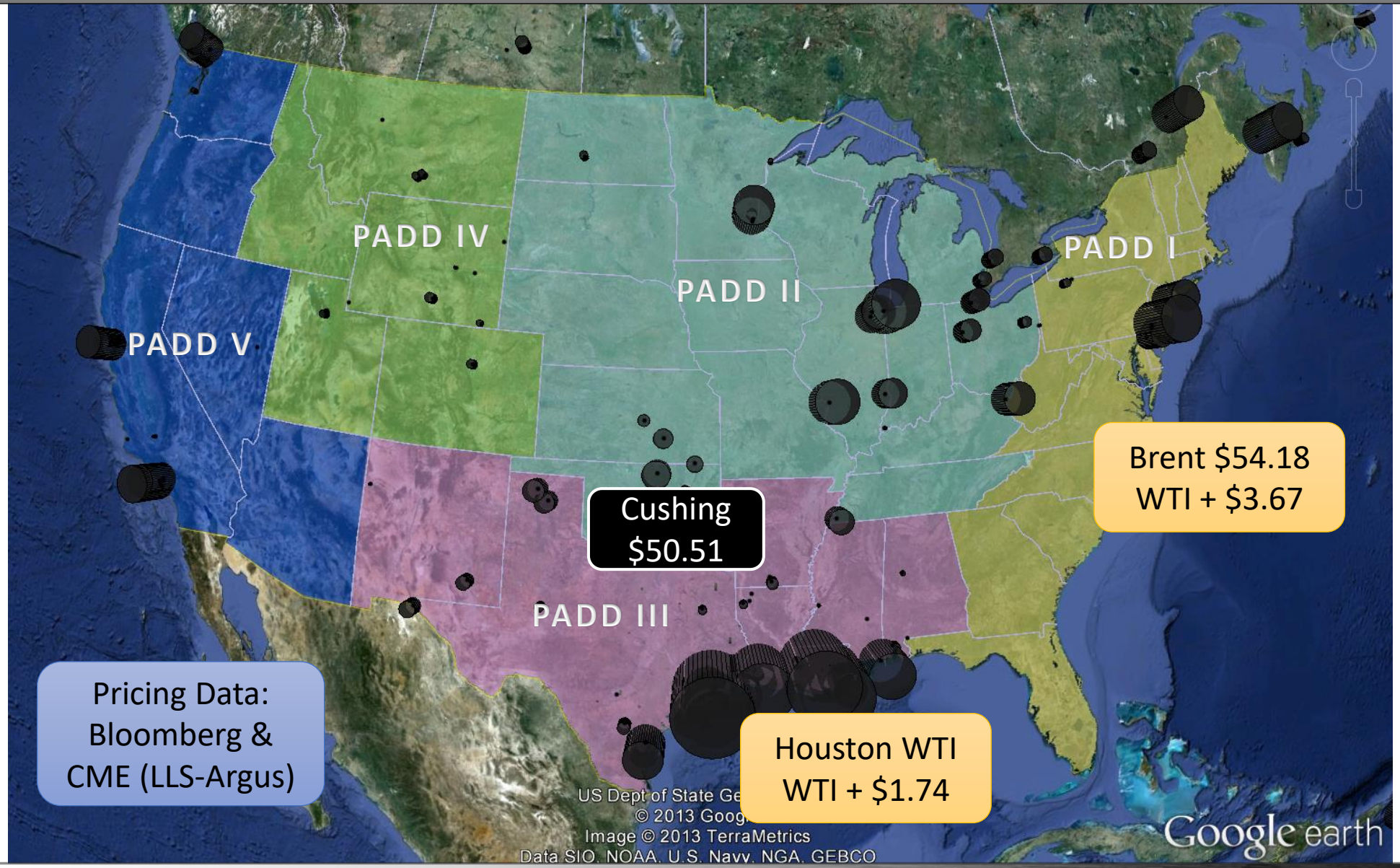


Rail Destinations Market Share (Sep 2020)

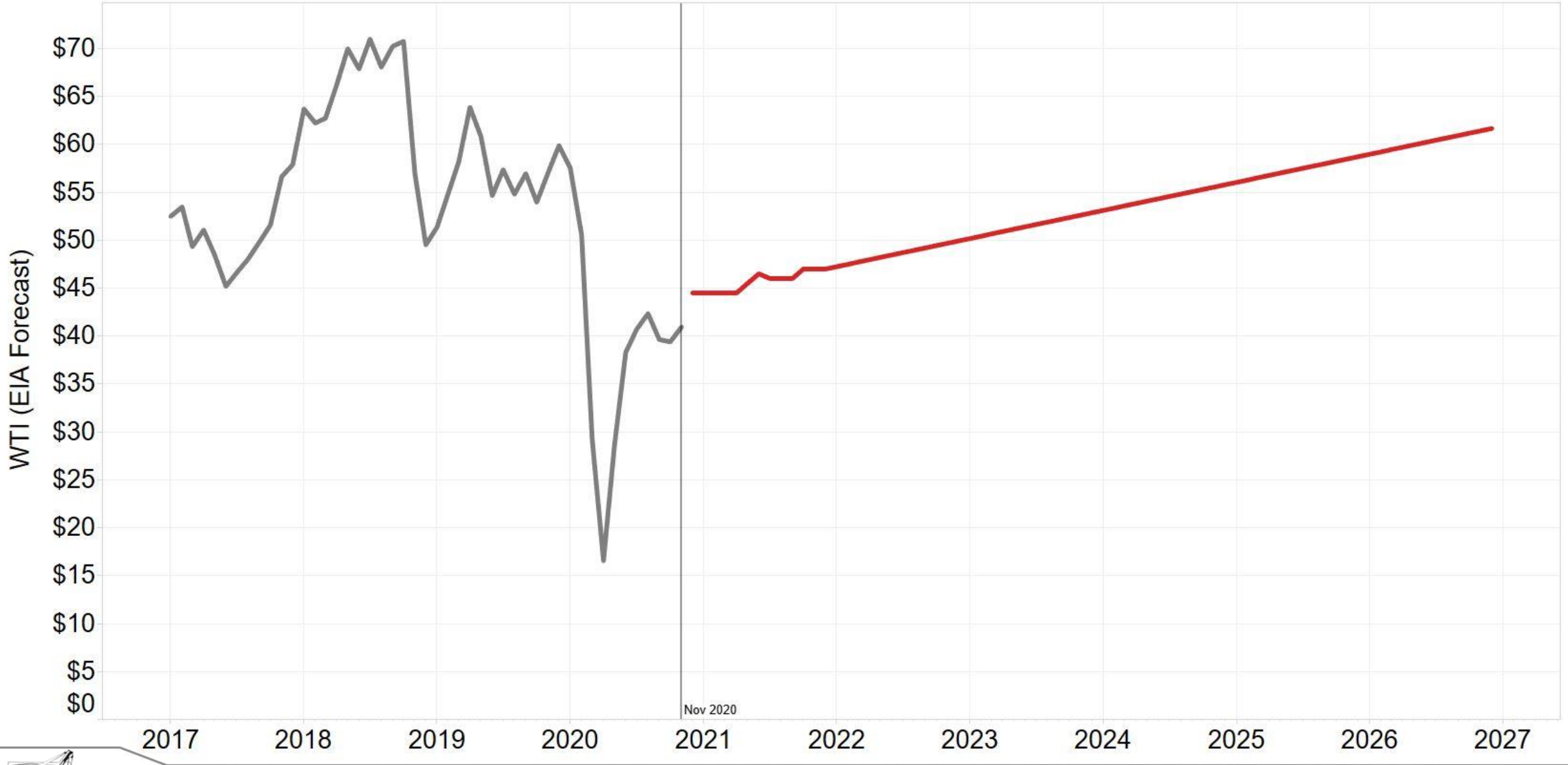


Data for Rail Destination Market Share Provided by the US Energy Information Administration

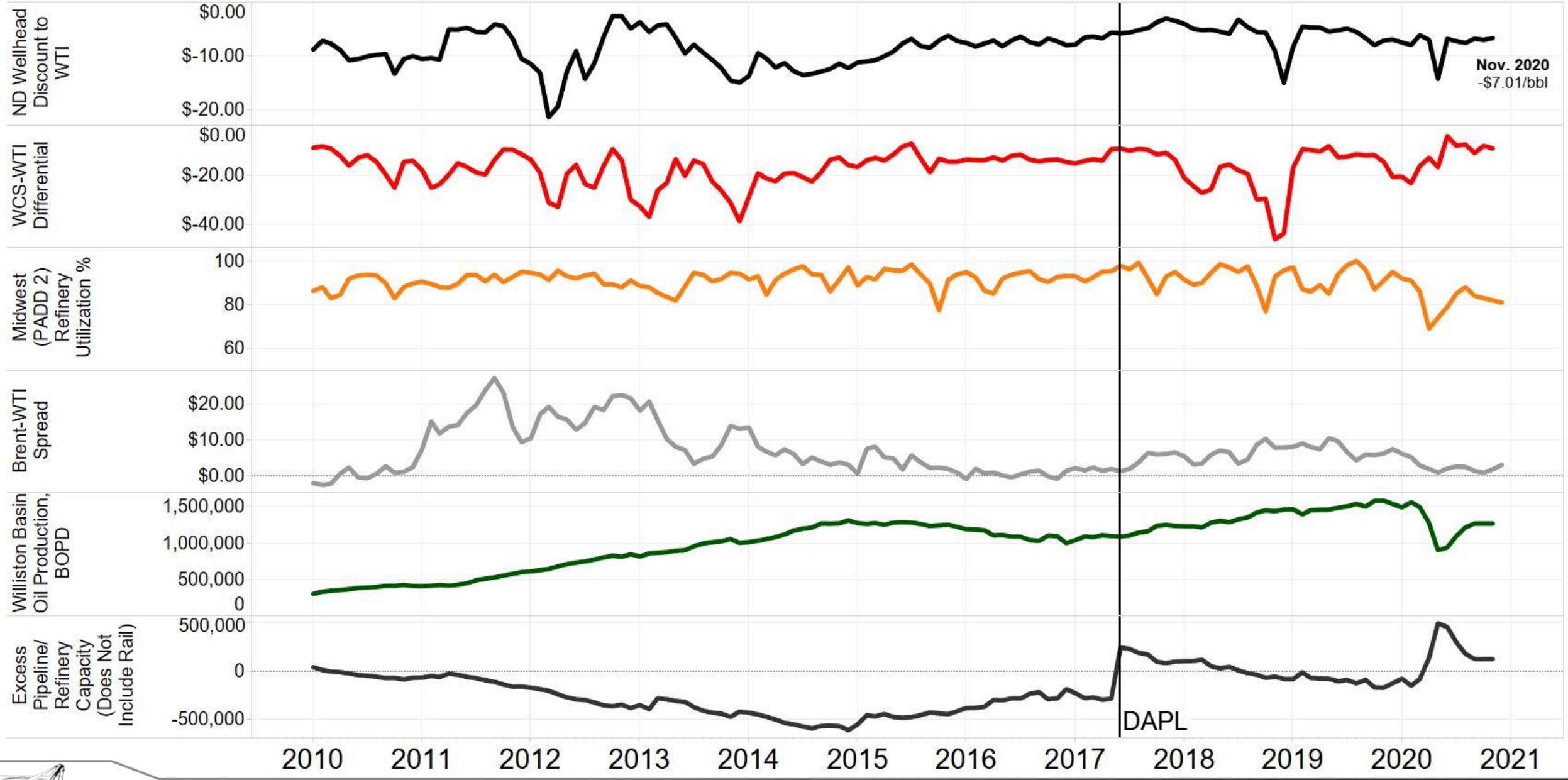
Crude Oil Prices – January 6, 2021



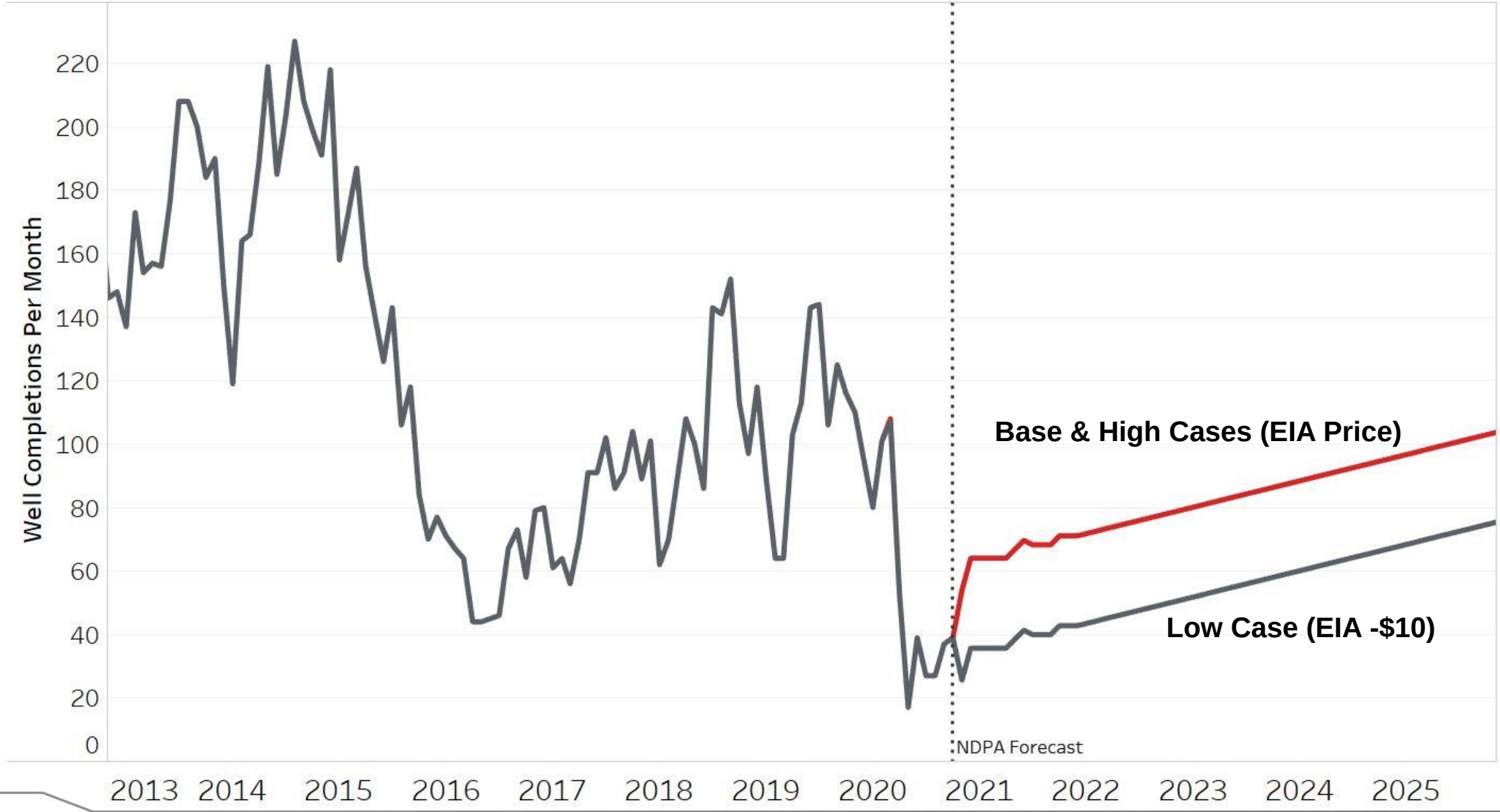
EIA Price Deck (Near Term)



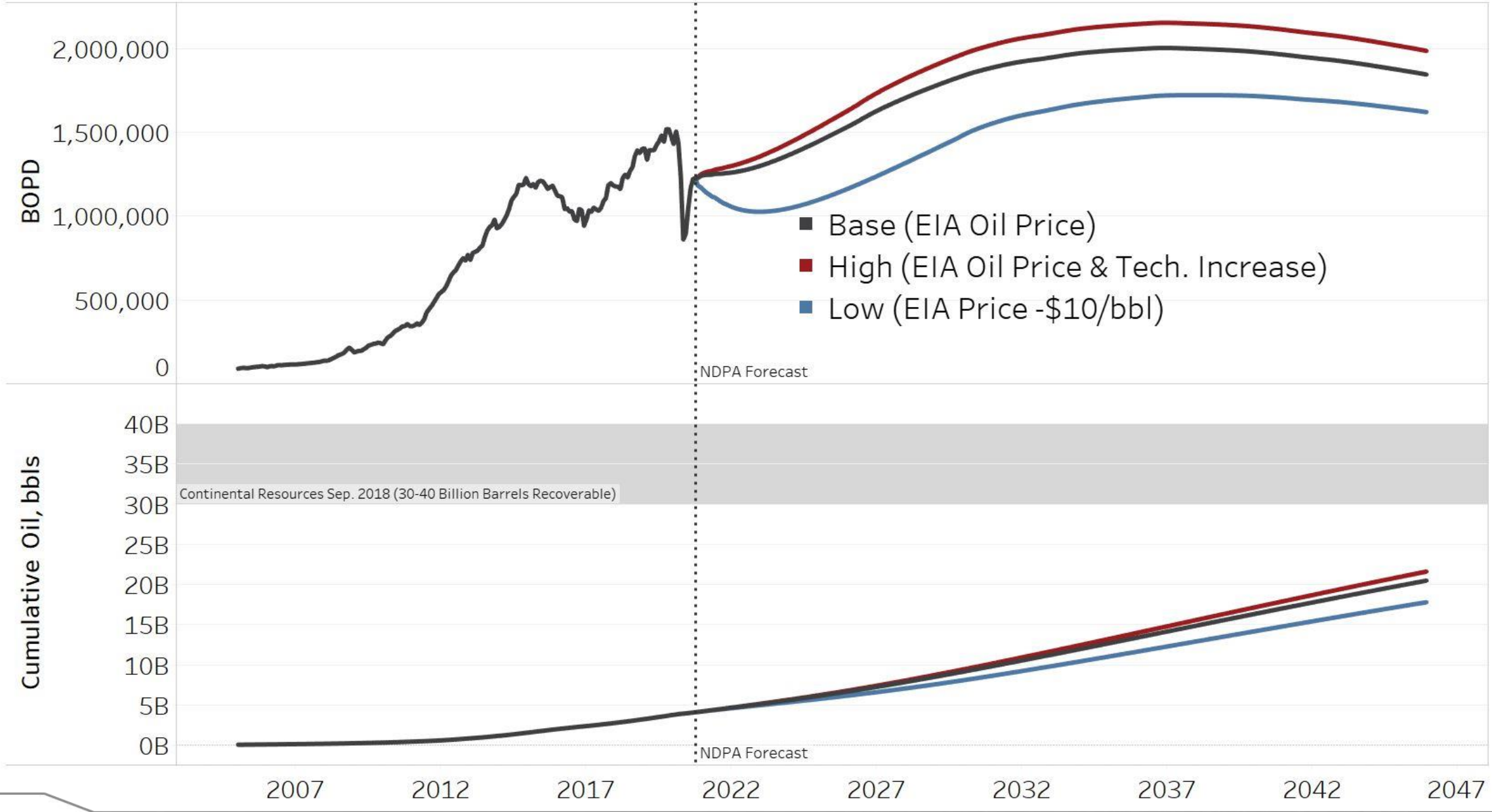
North Dakota Oil Pricing



ND Completions: EIA Price Deck (Near Term)

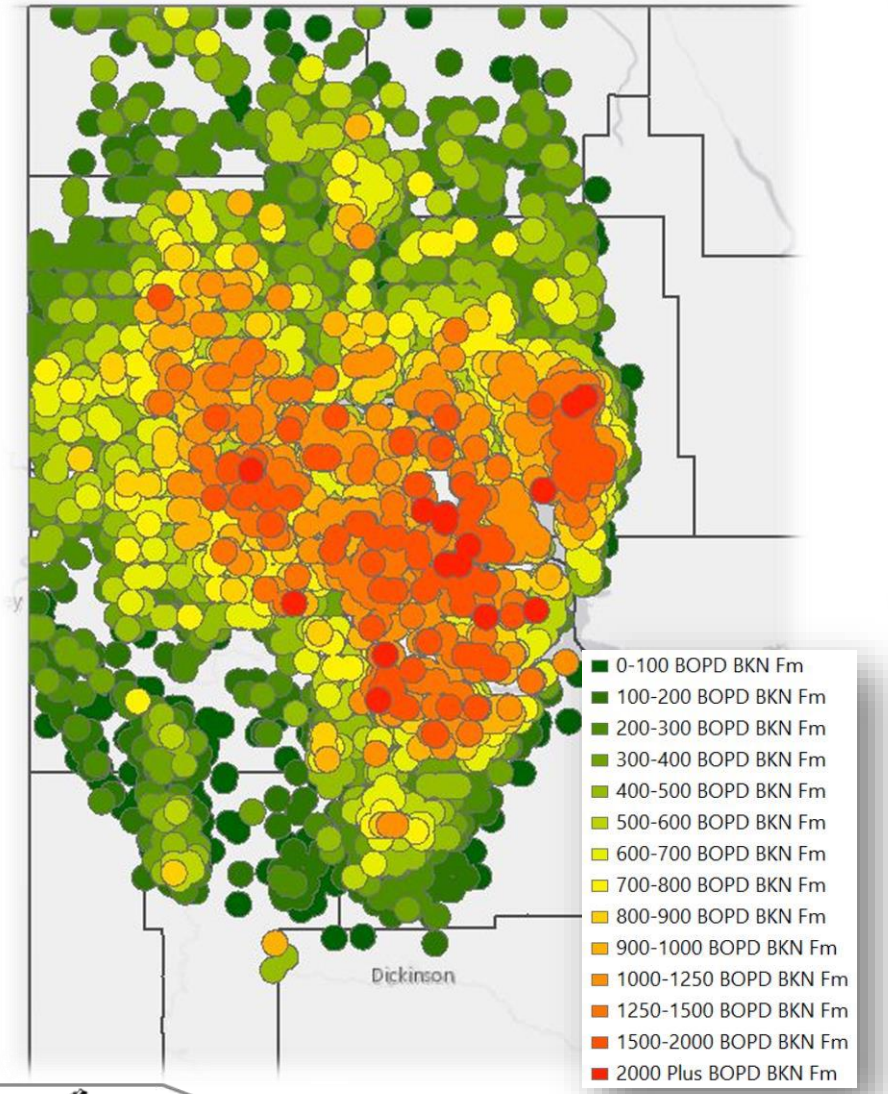


ND Oil Production: EIA Price Deck

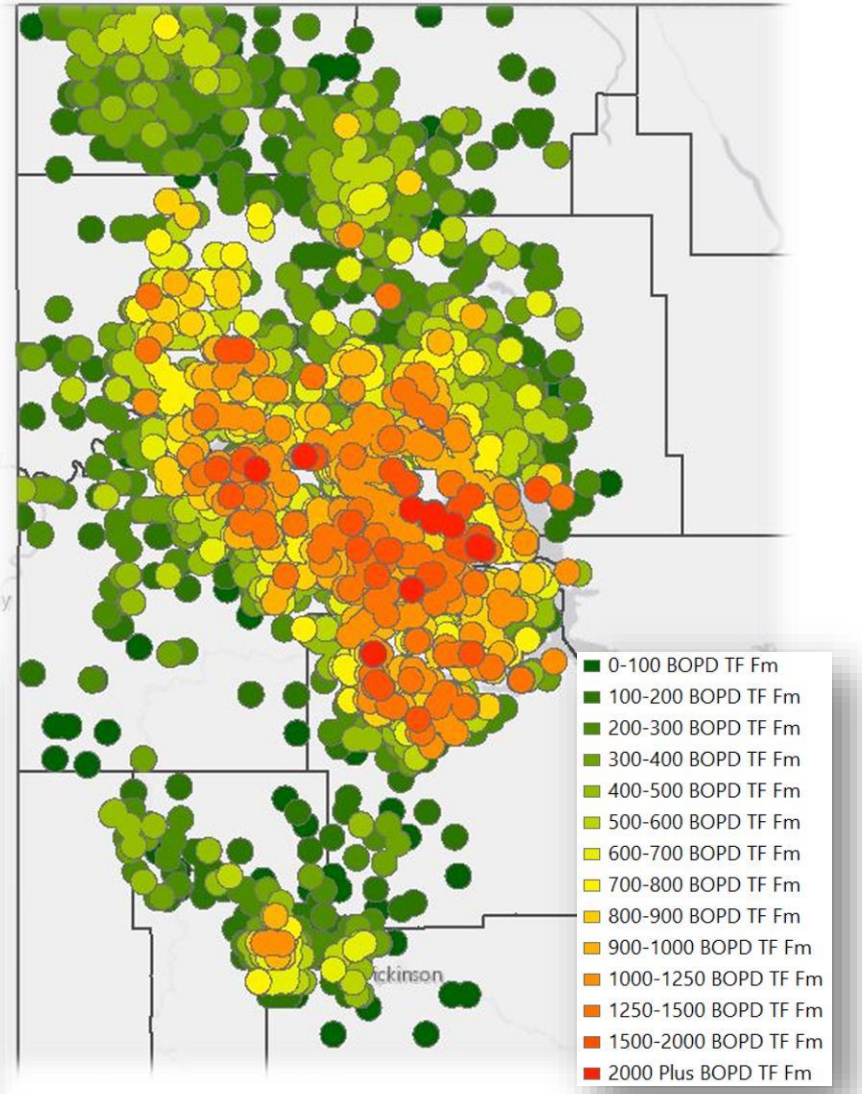


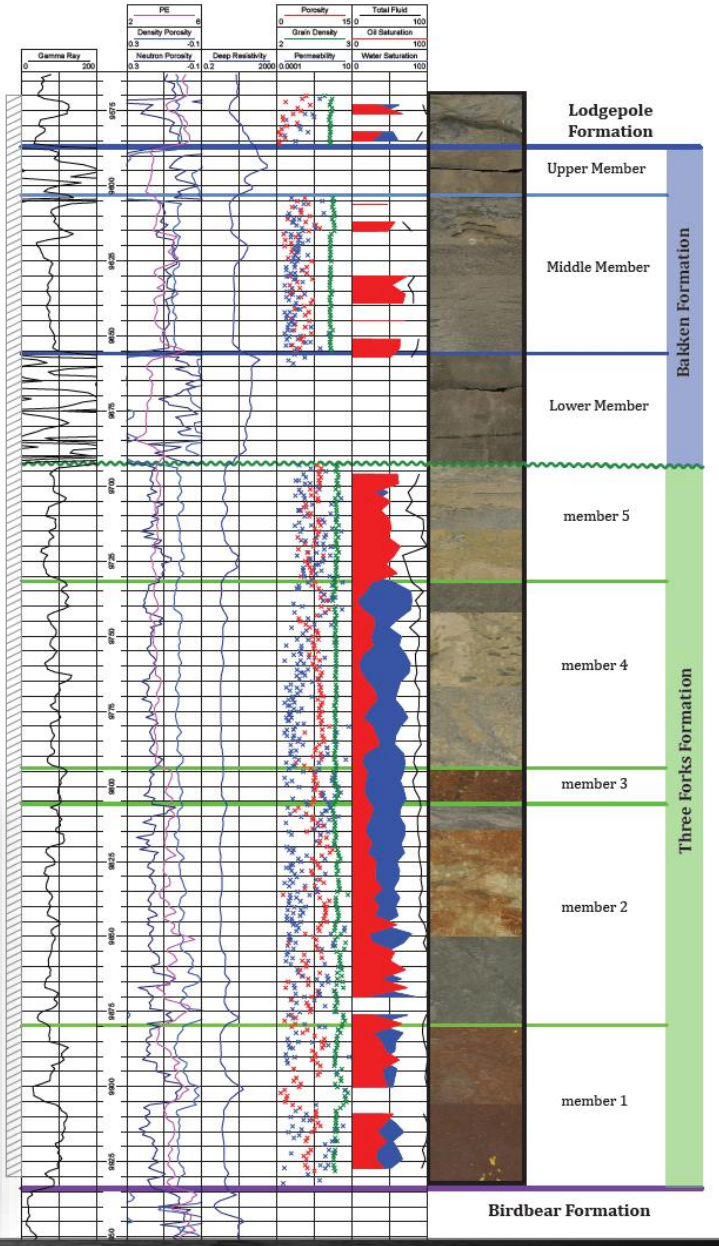
Bakken & Three Forks Formations

Bakken Formation

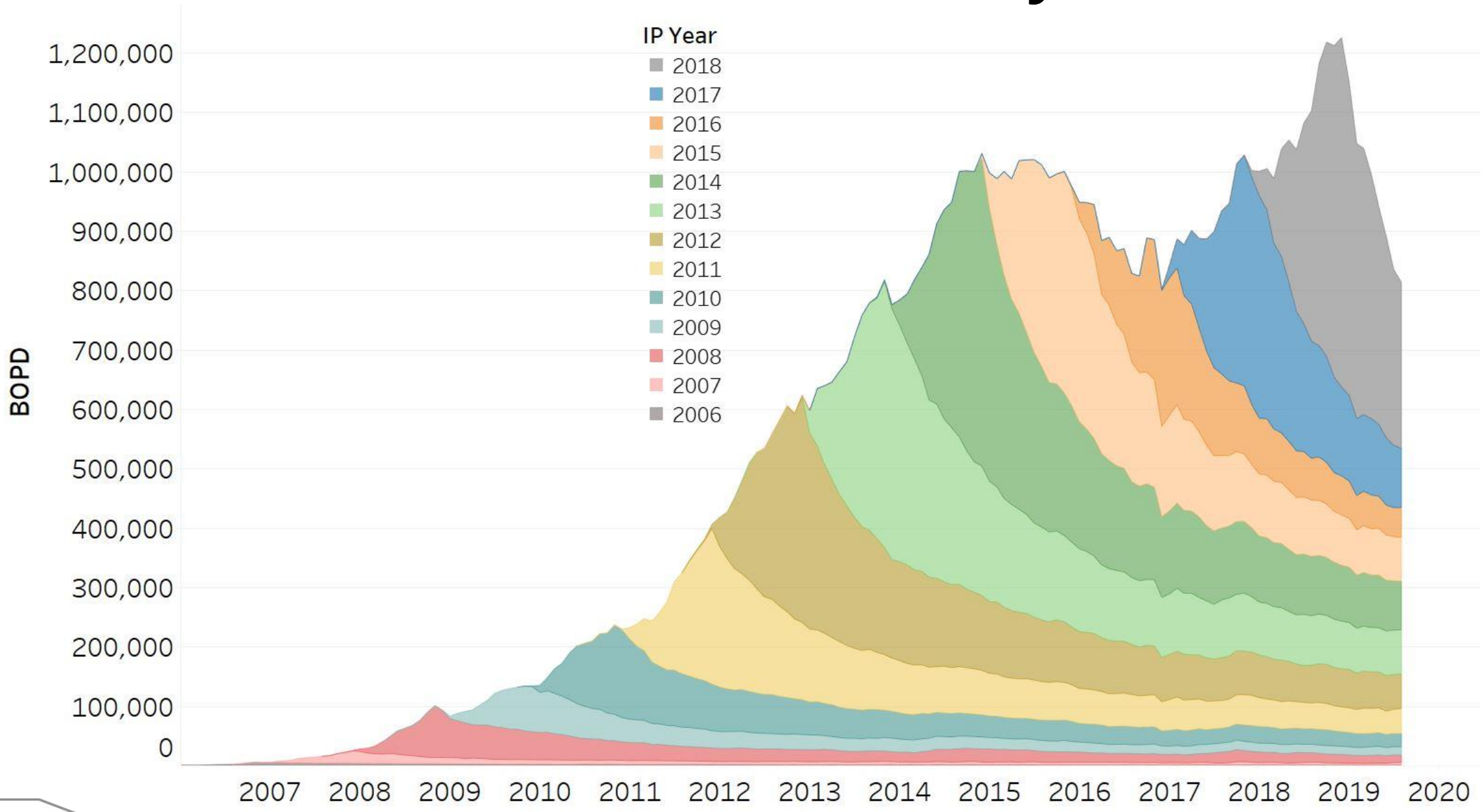


Three Forks Formation

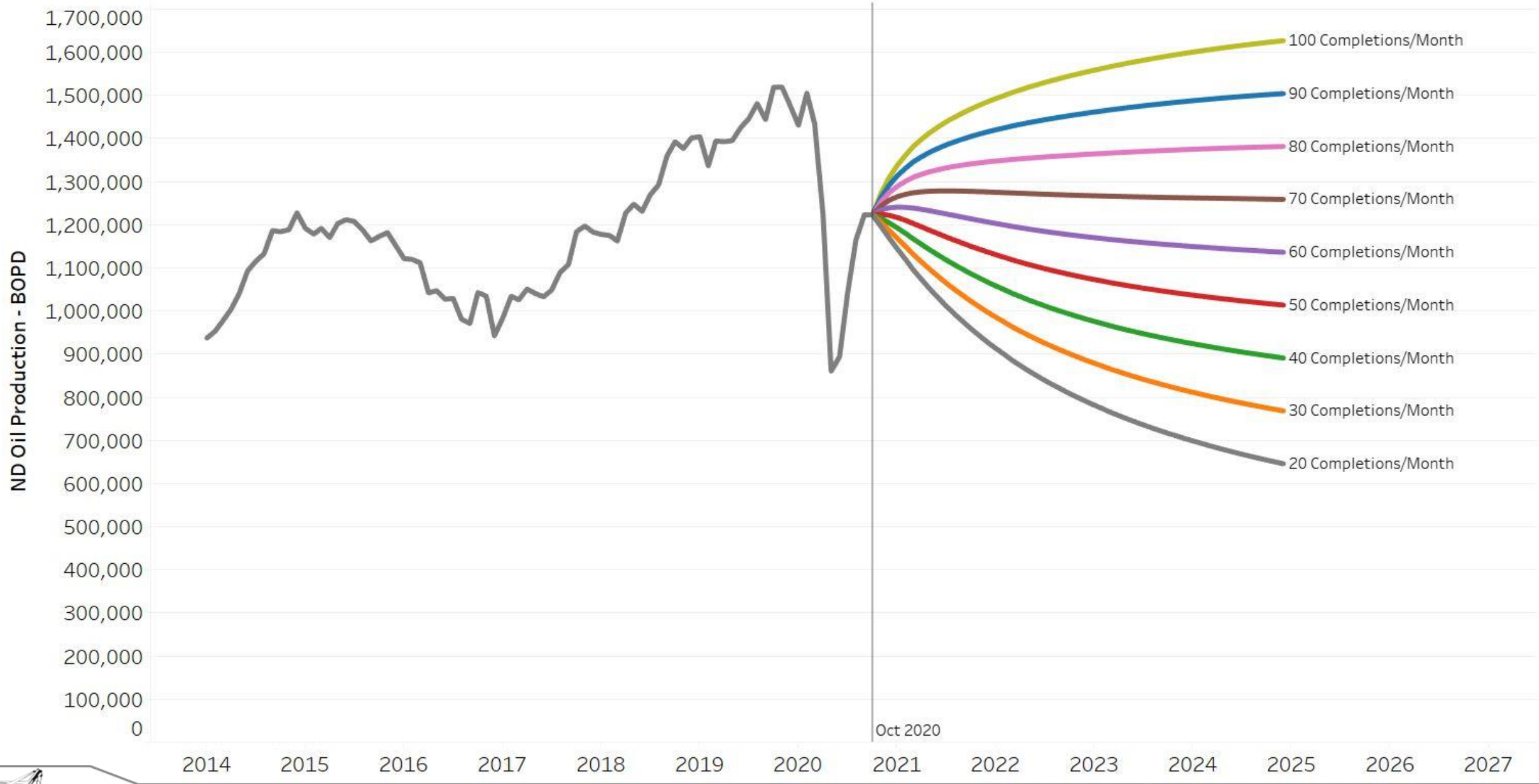




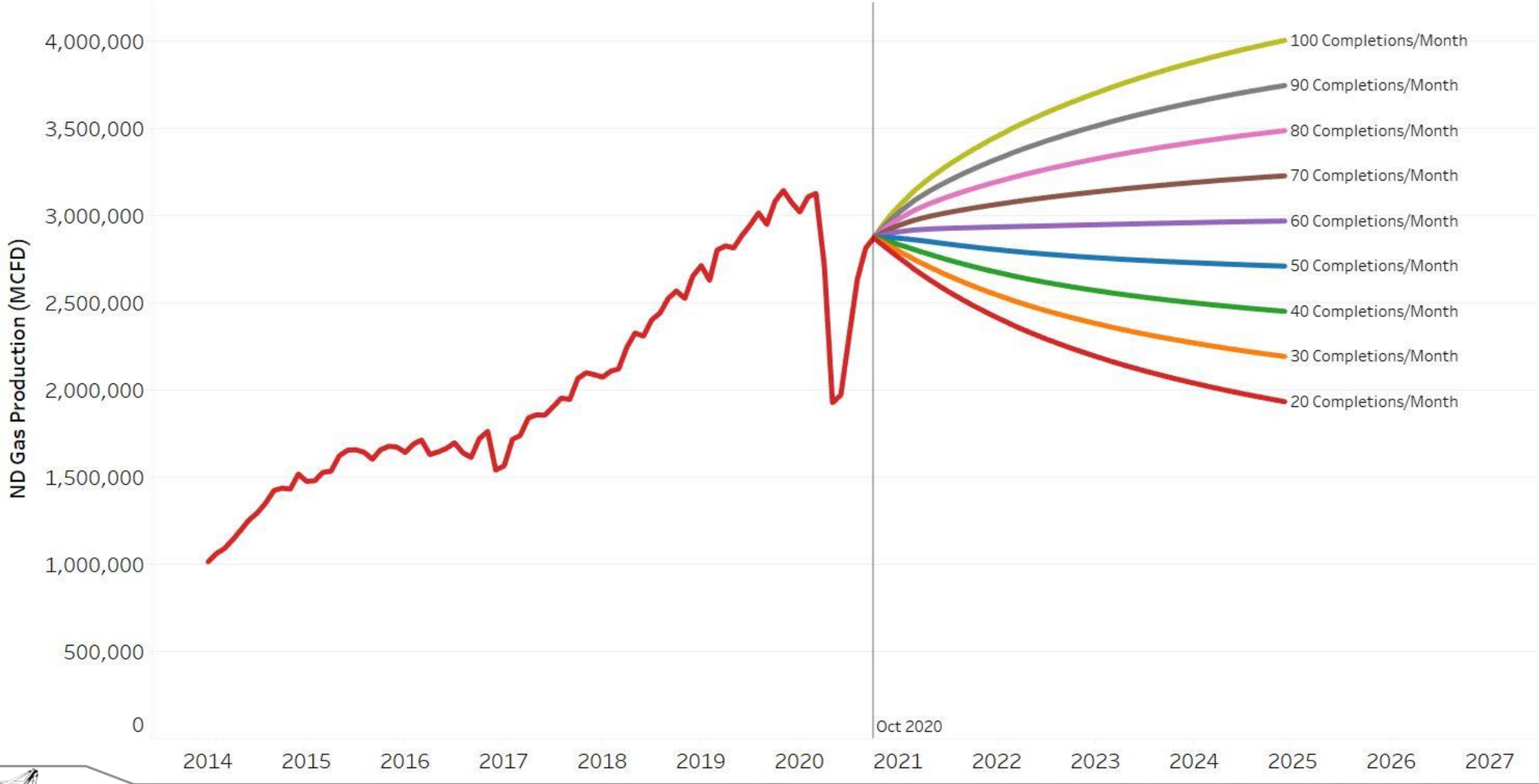
Bakken Oil Production by IP Year



Monthly Completion Scenarios - Oil

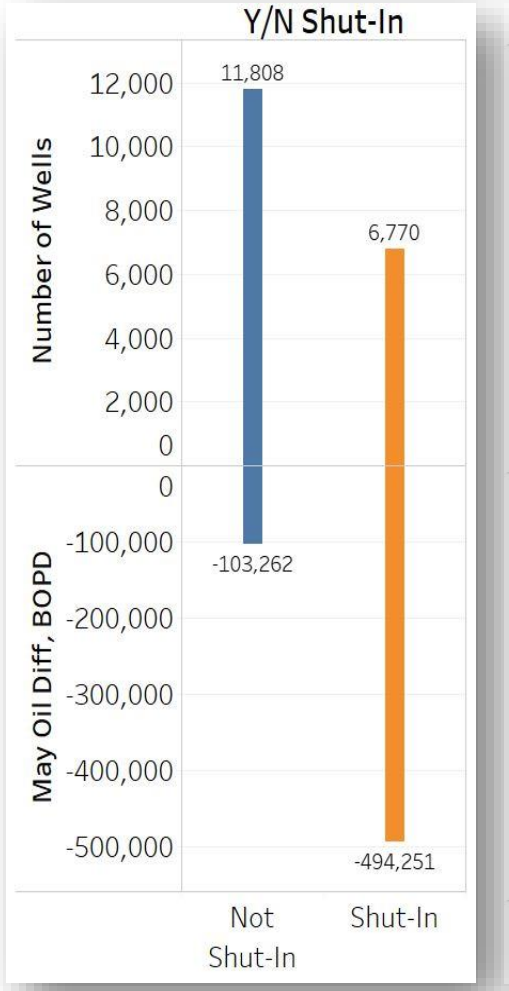


Monthly Completion Scenarios - Gas



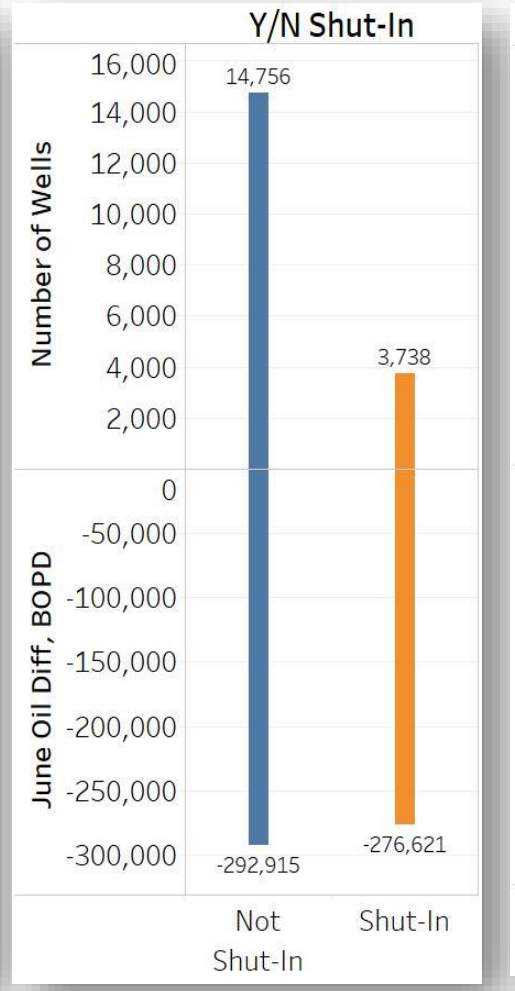
May to September Shut-In Comparison

May 2020

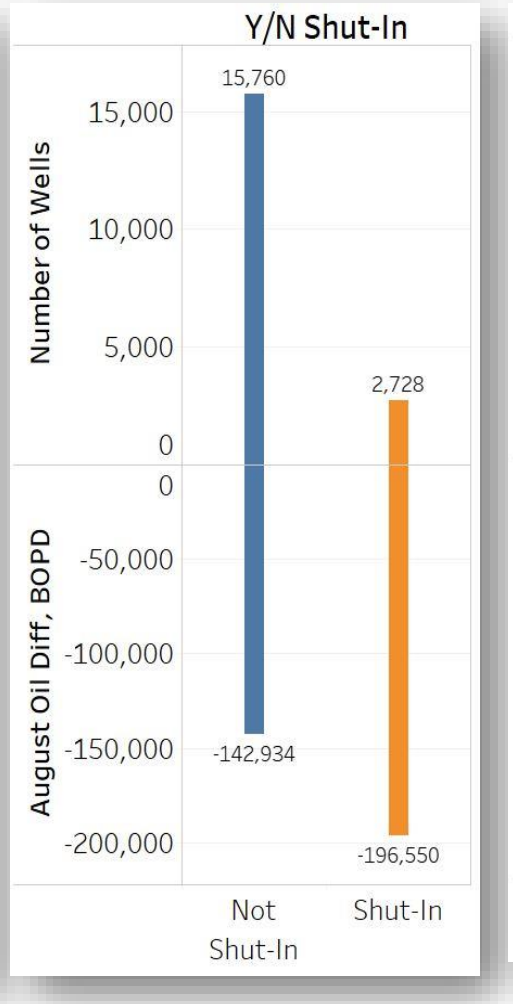


June 2020

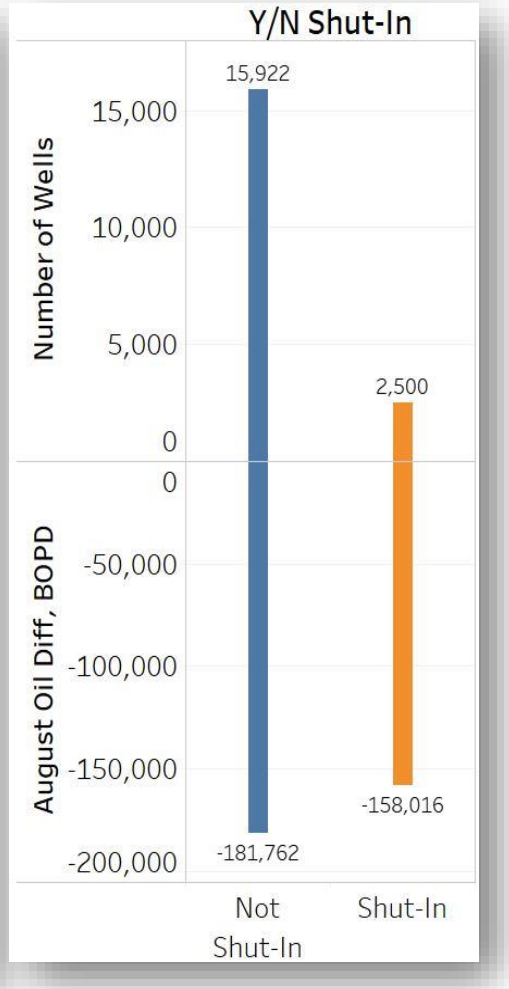
July 2020



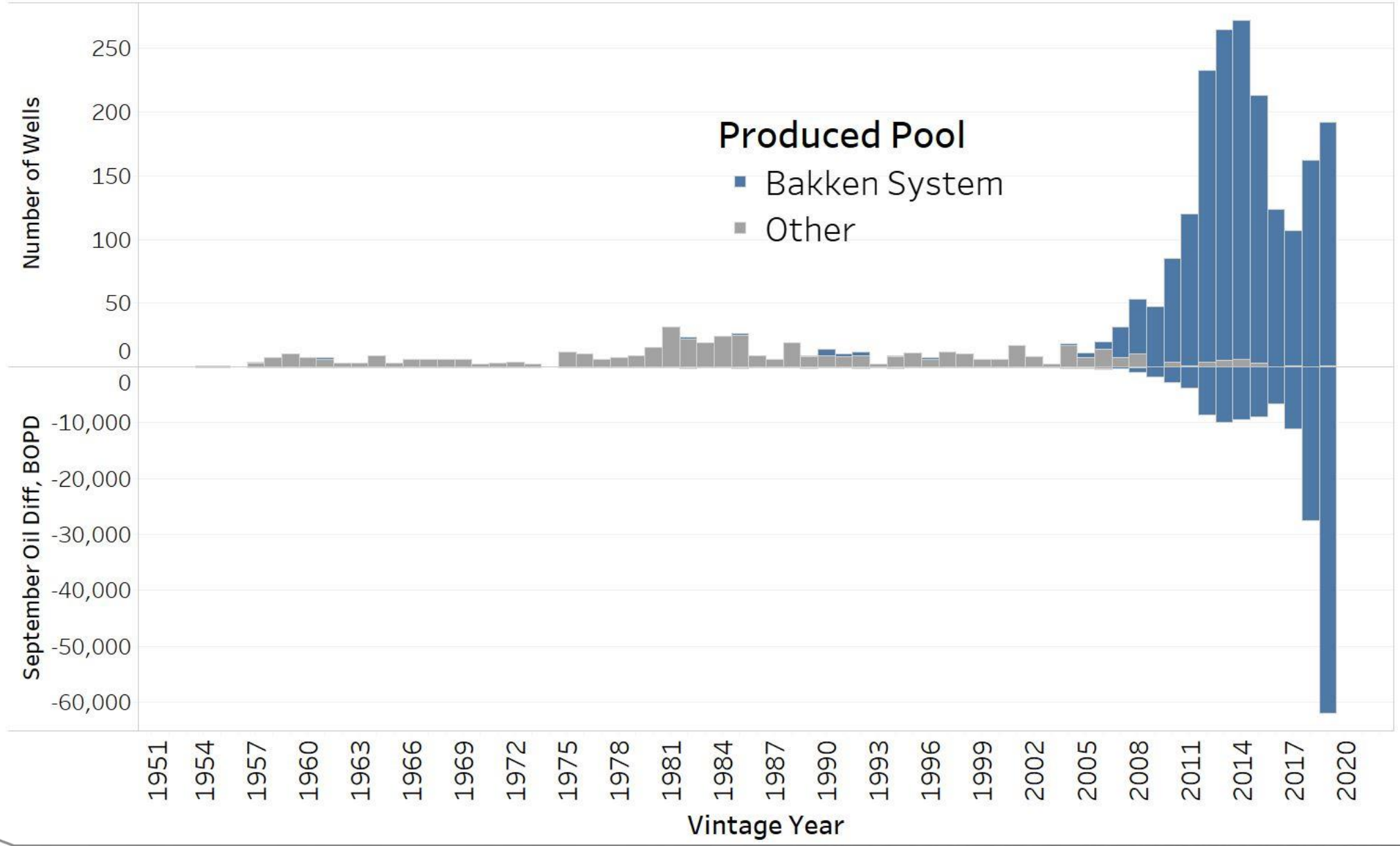
Aug. 2020



Sep. 2020

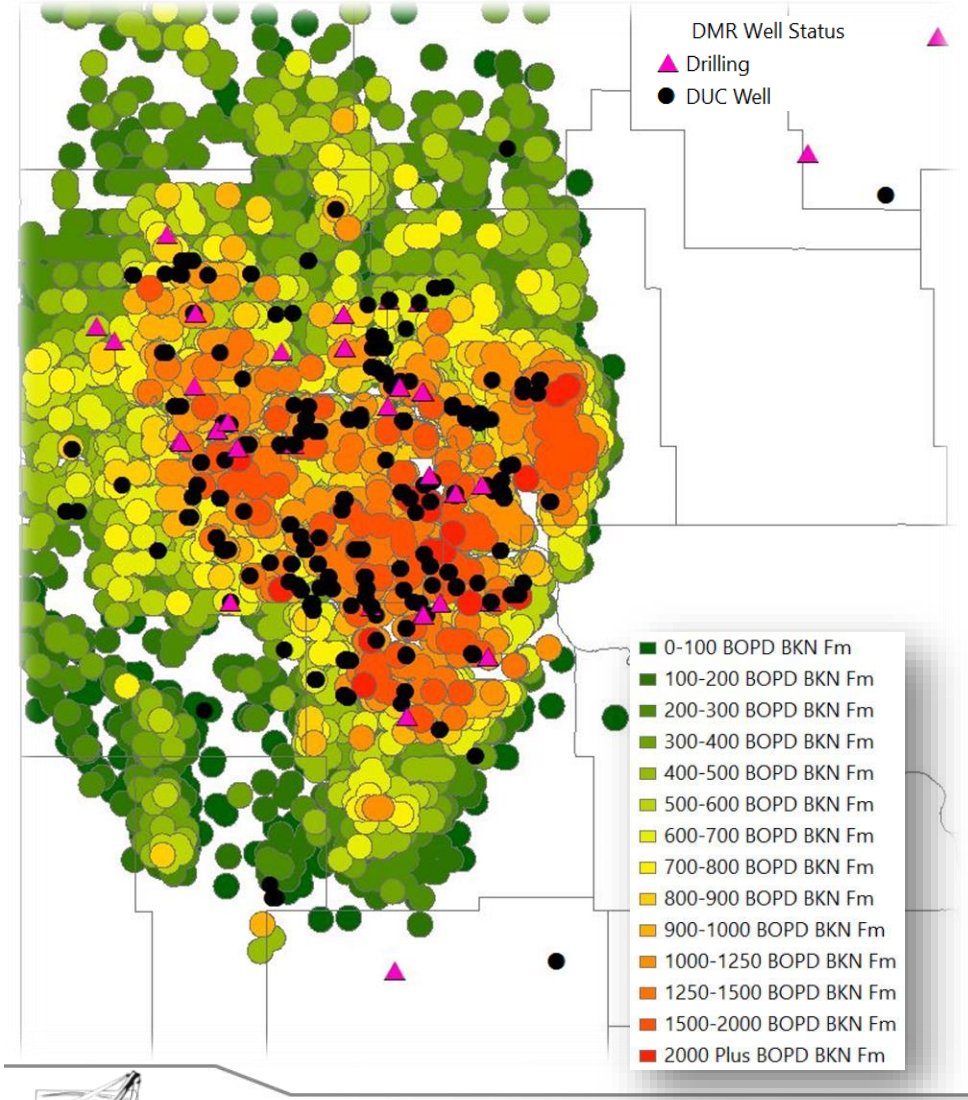


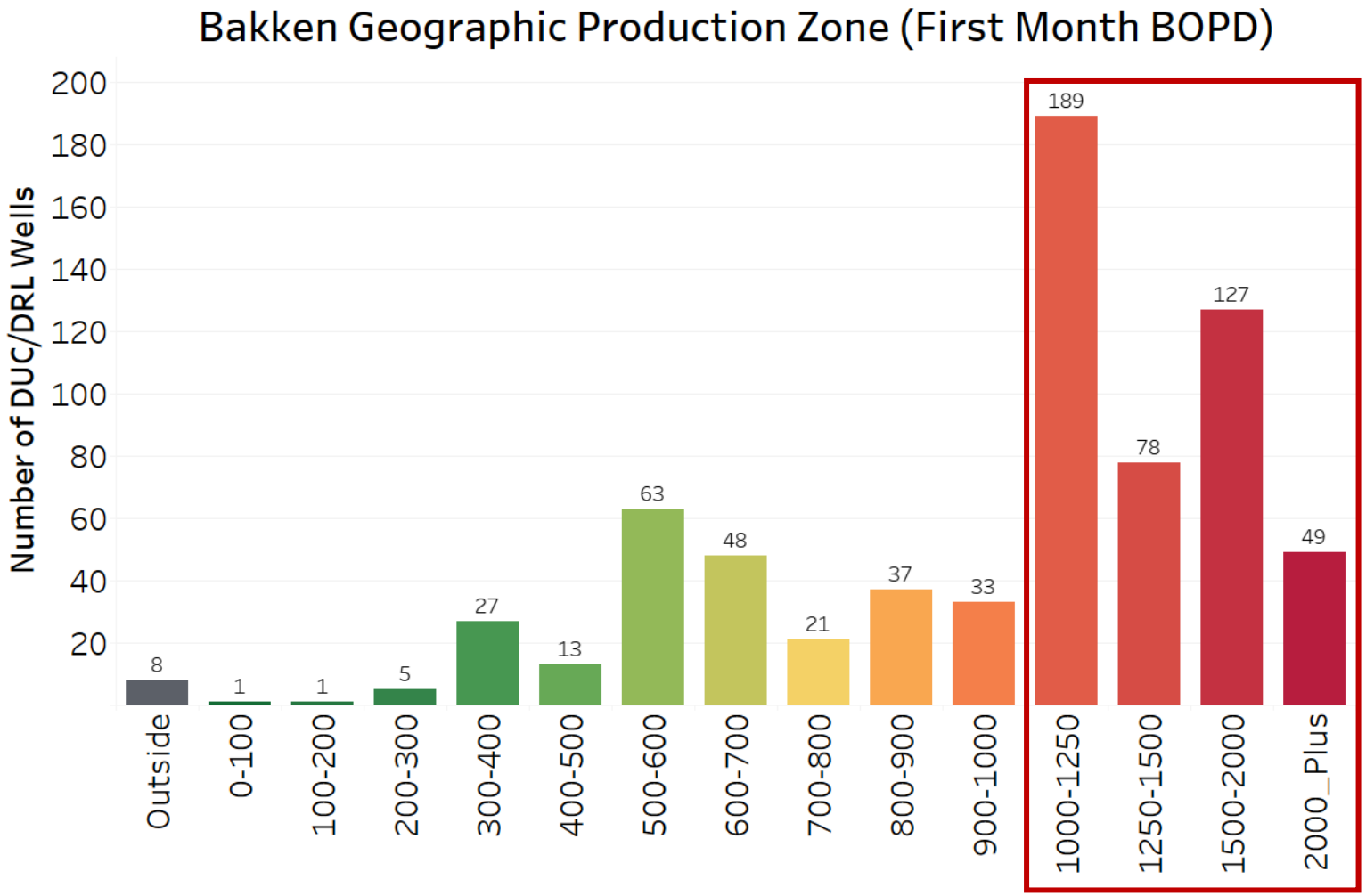
Vintage Year of Shut-In Wells – September 2020



North Dakota Wells Waiting on Completion – October 2020

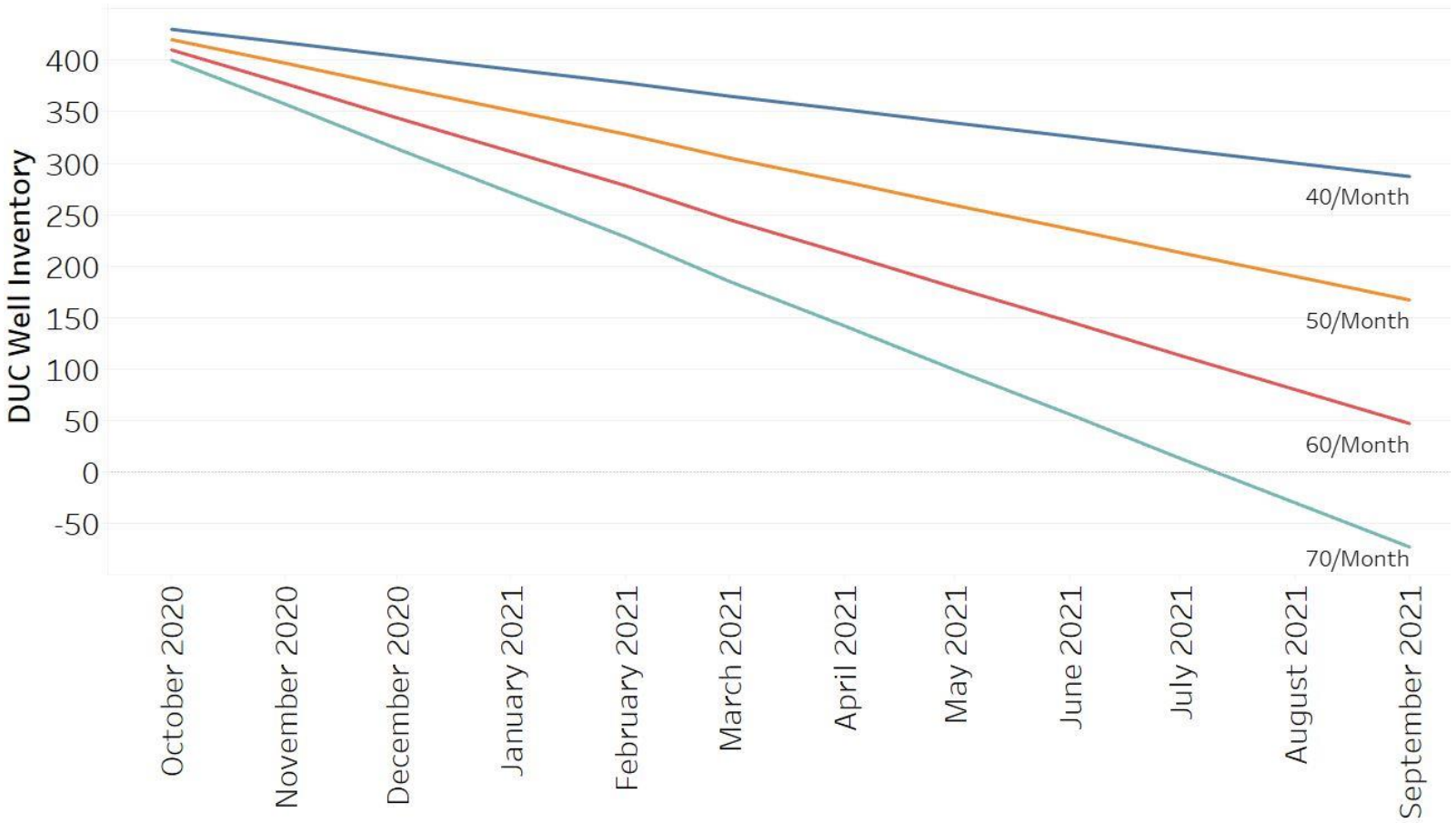
Bakken Formation

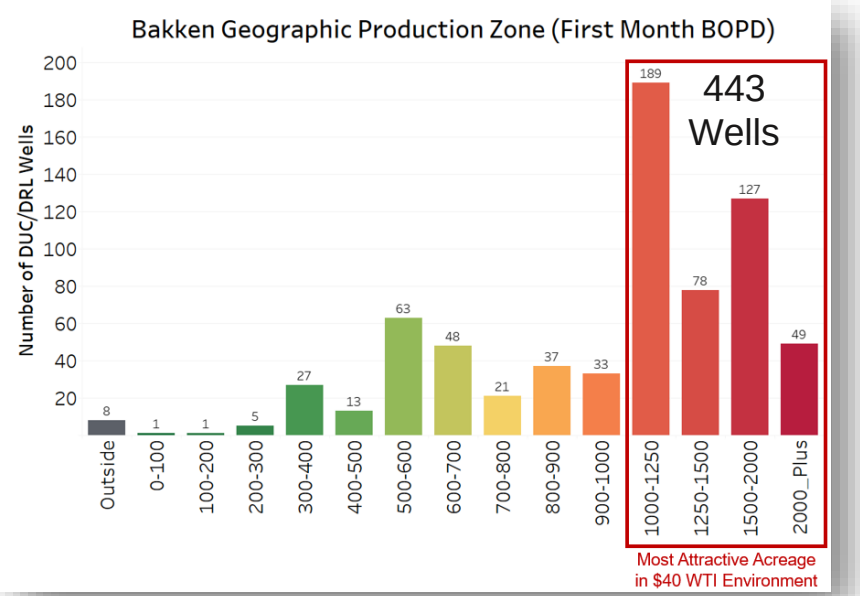


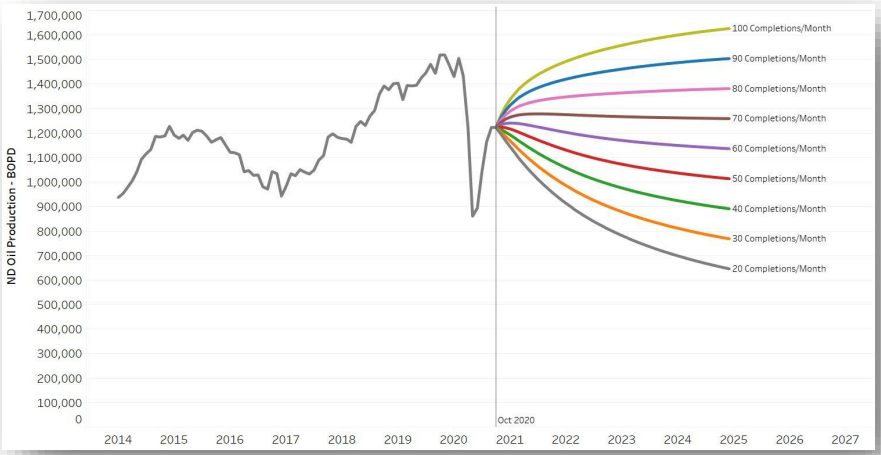


Most Attractive Acreage in $40 WTI Environment

Completion Scenarios & DUC Inventory*

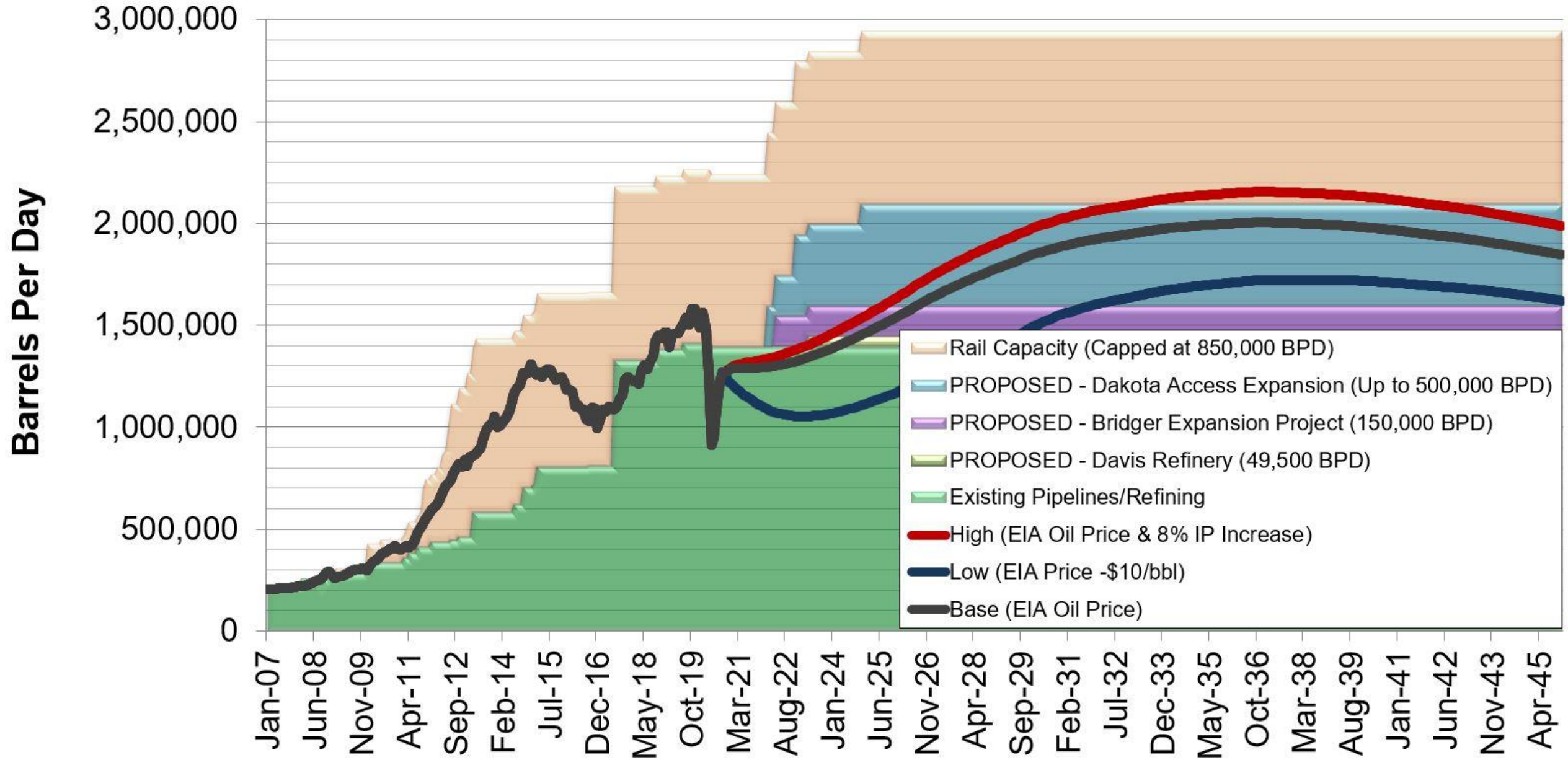






*Assumes 15 Rigs @ 1.8 New Wells Per Month

Williston Basin Oil Production & Export Capacity, BOPD



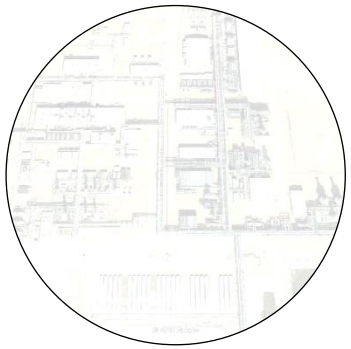
Natural Gas Update

Production

- Technology
- Markets

Gathering

- Capacity
- Connections



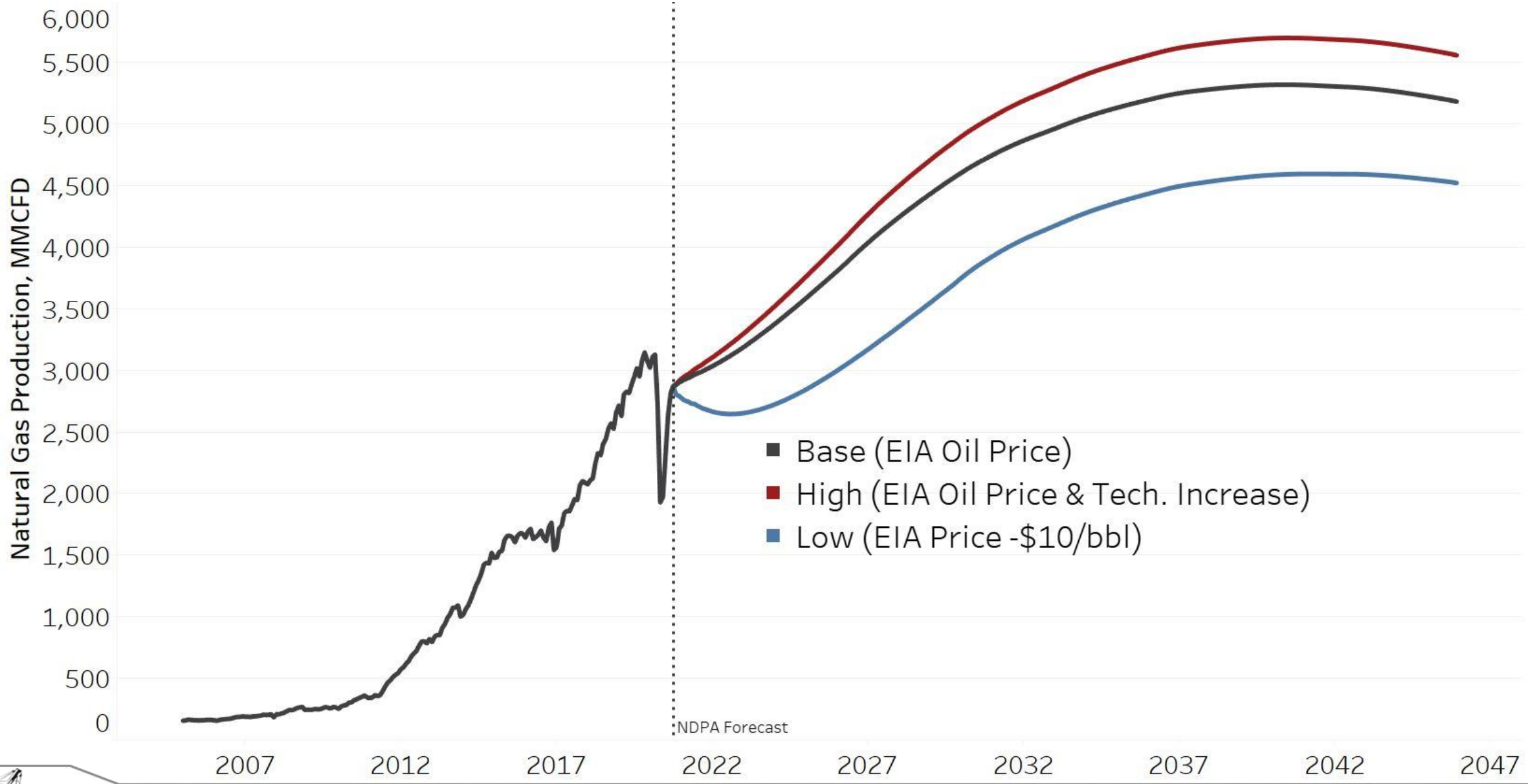
Processing

- Capacity
- Location

Transmission

- Dry Gas
- Natural Gas Liquids

ND Gas Production: EIA Price Deck



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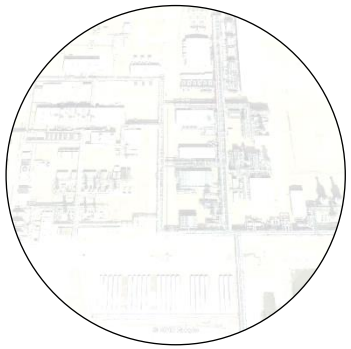

Processing

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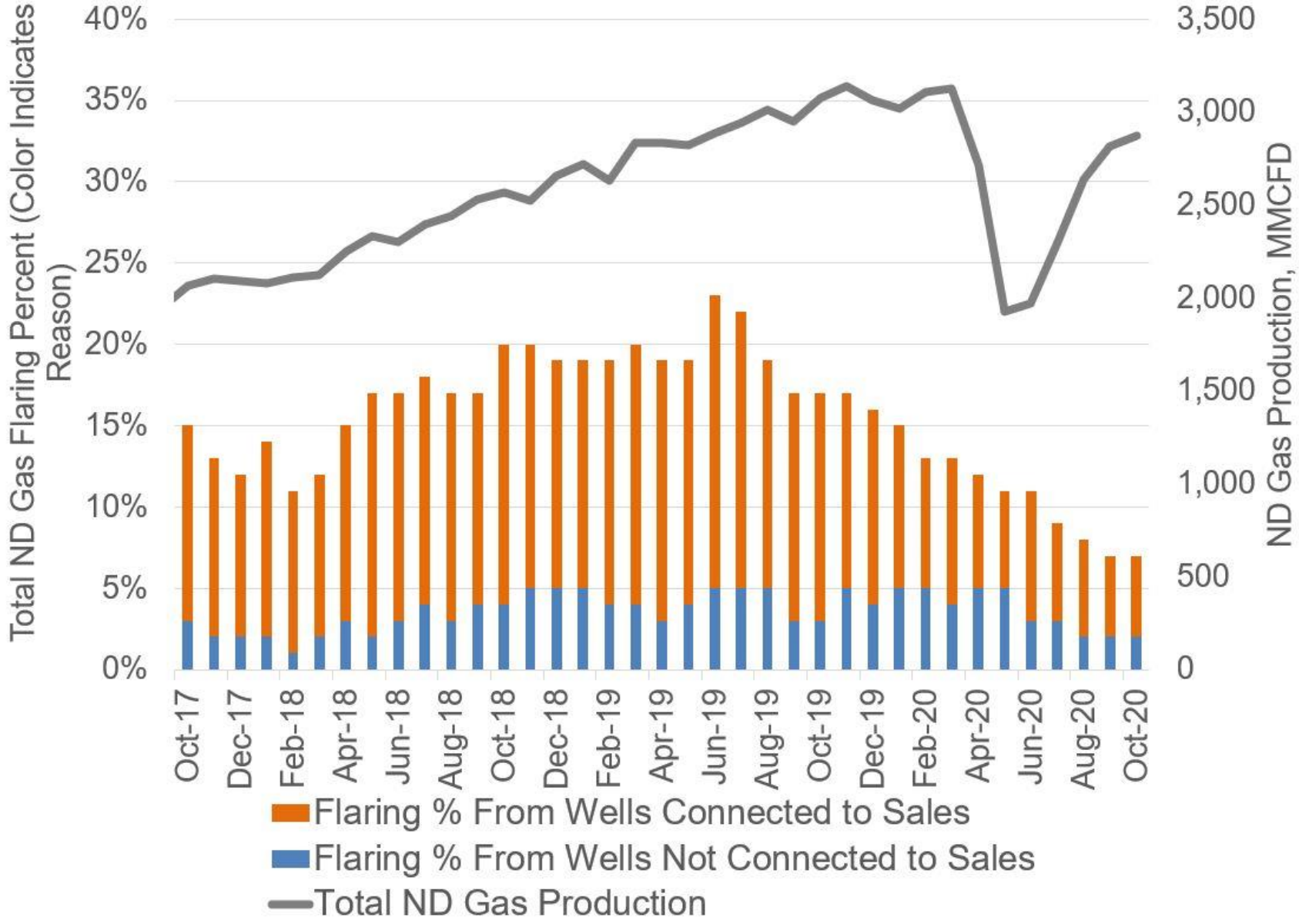
Solving the Flaring Challenge



Natural Gas Update

Production

- Technology
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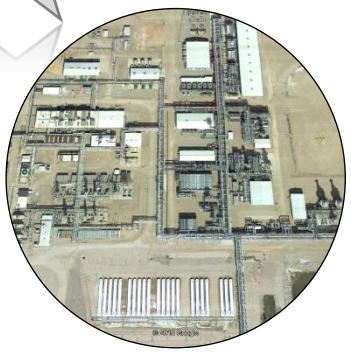

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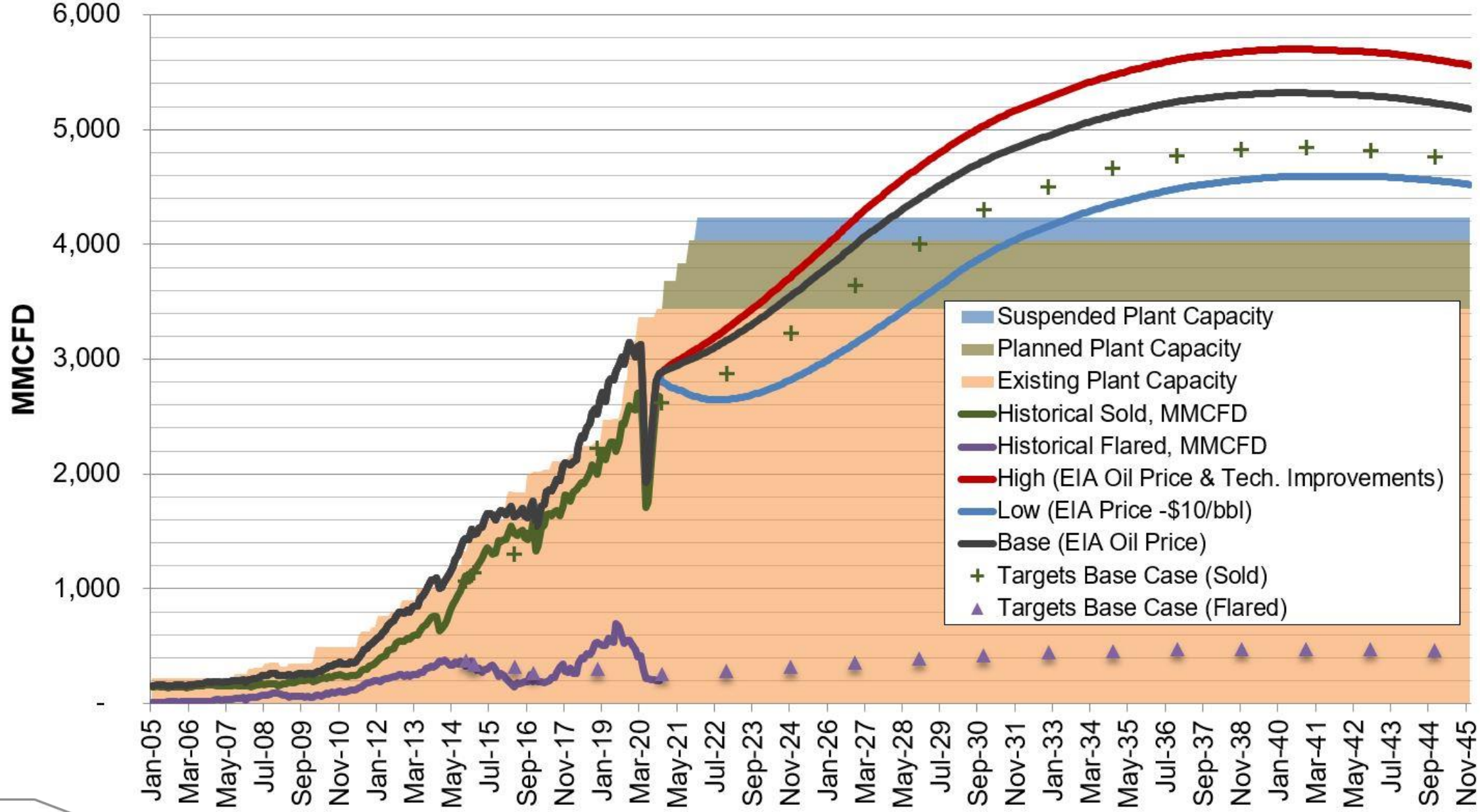

Natural Gas Update

Production

- Technology
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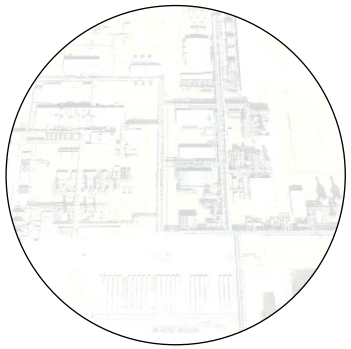

Processing

- Capacity
- Location

Transmission

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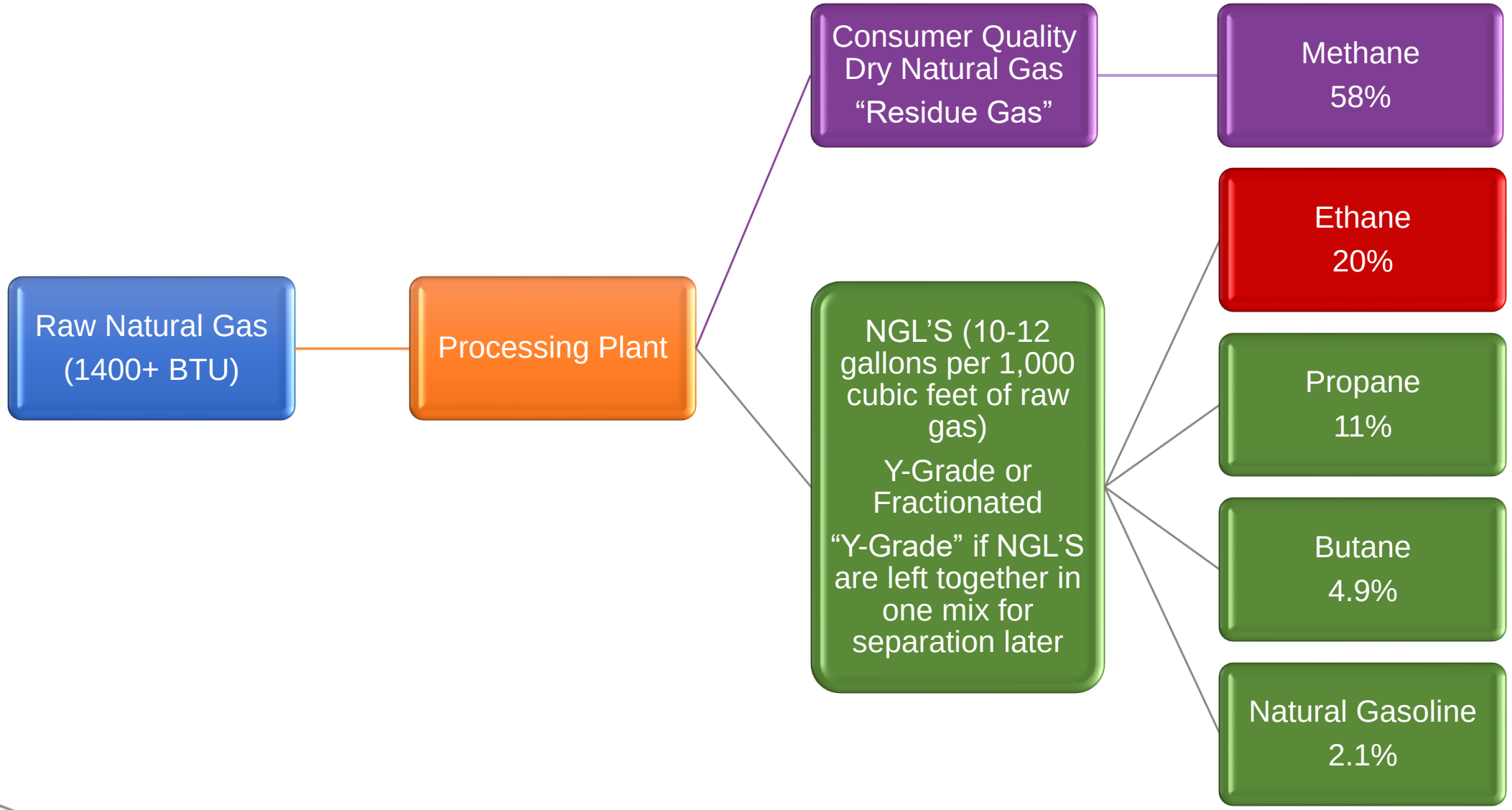
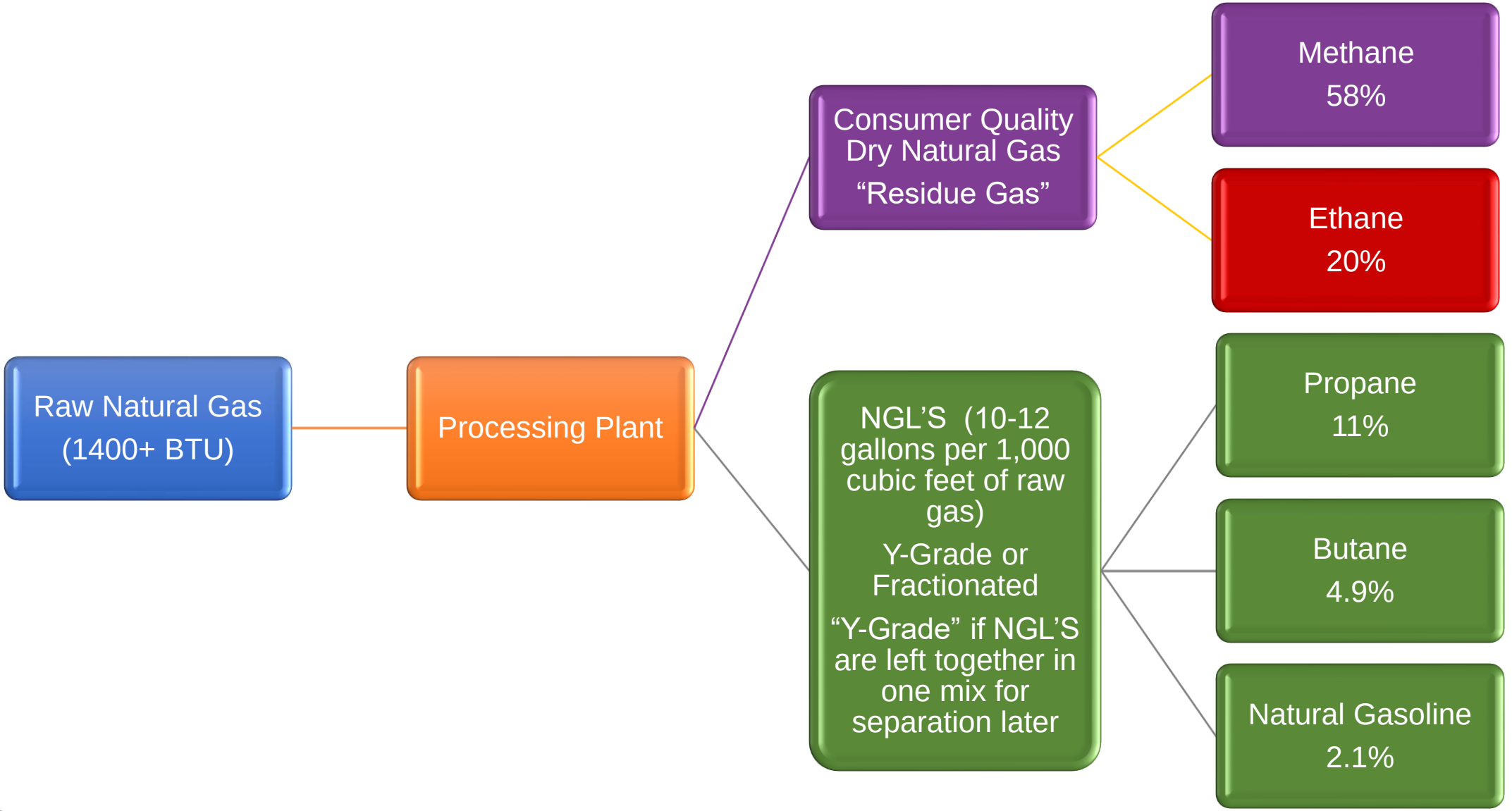
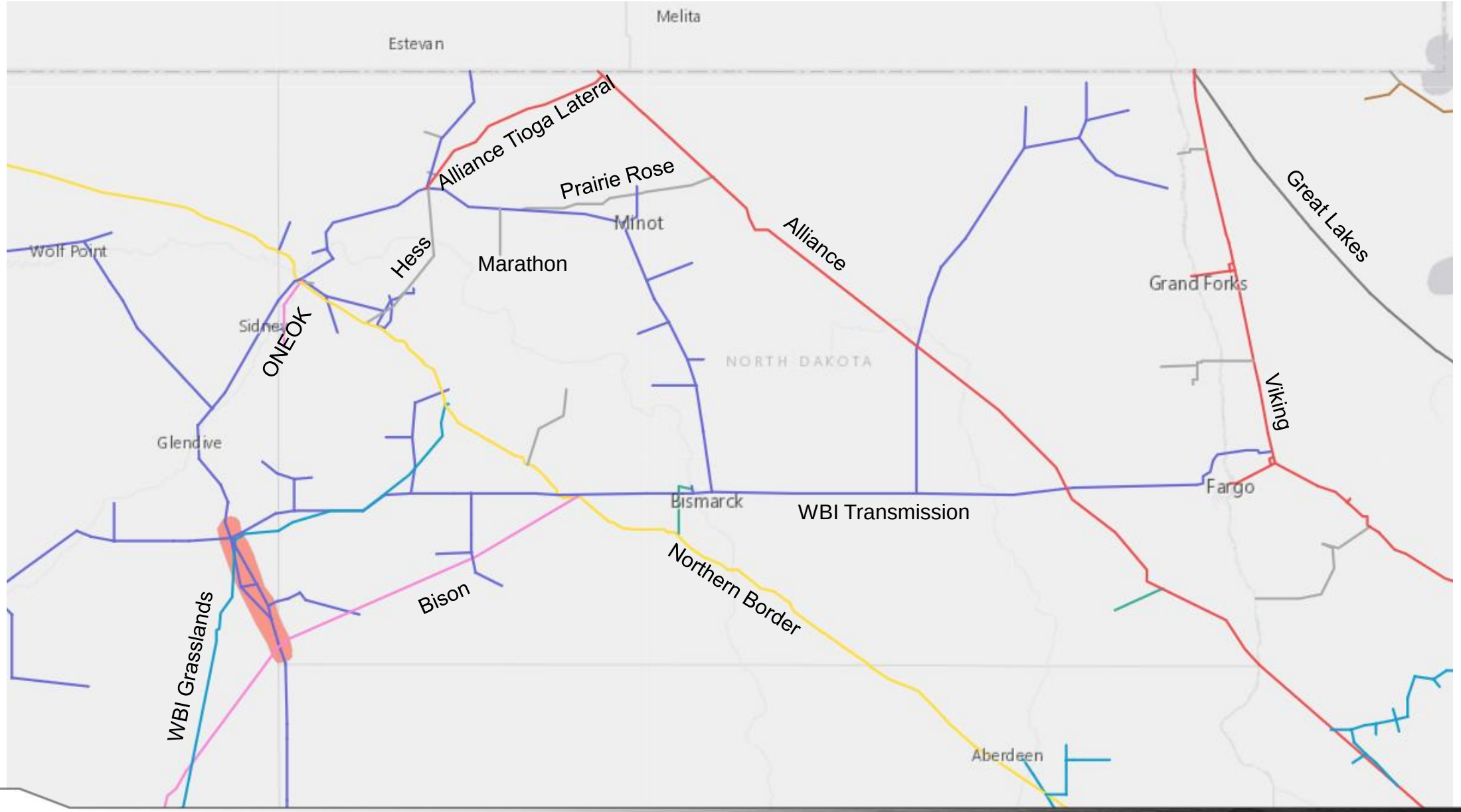
Natural Gas Processing – “Ethane Capture”



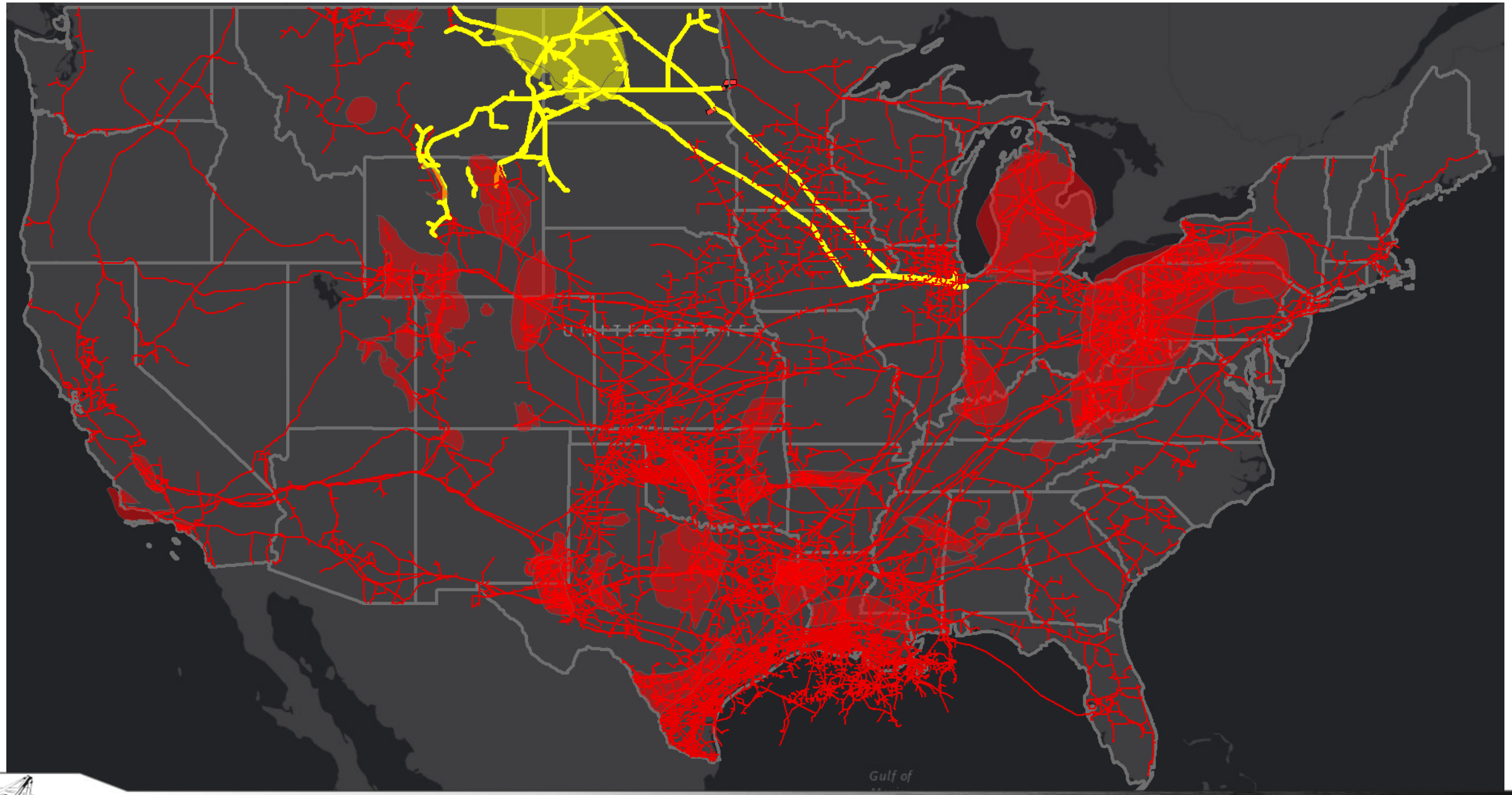
Natural Gas Processing – “Ethane Rejection”



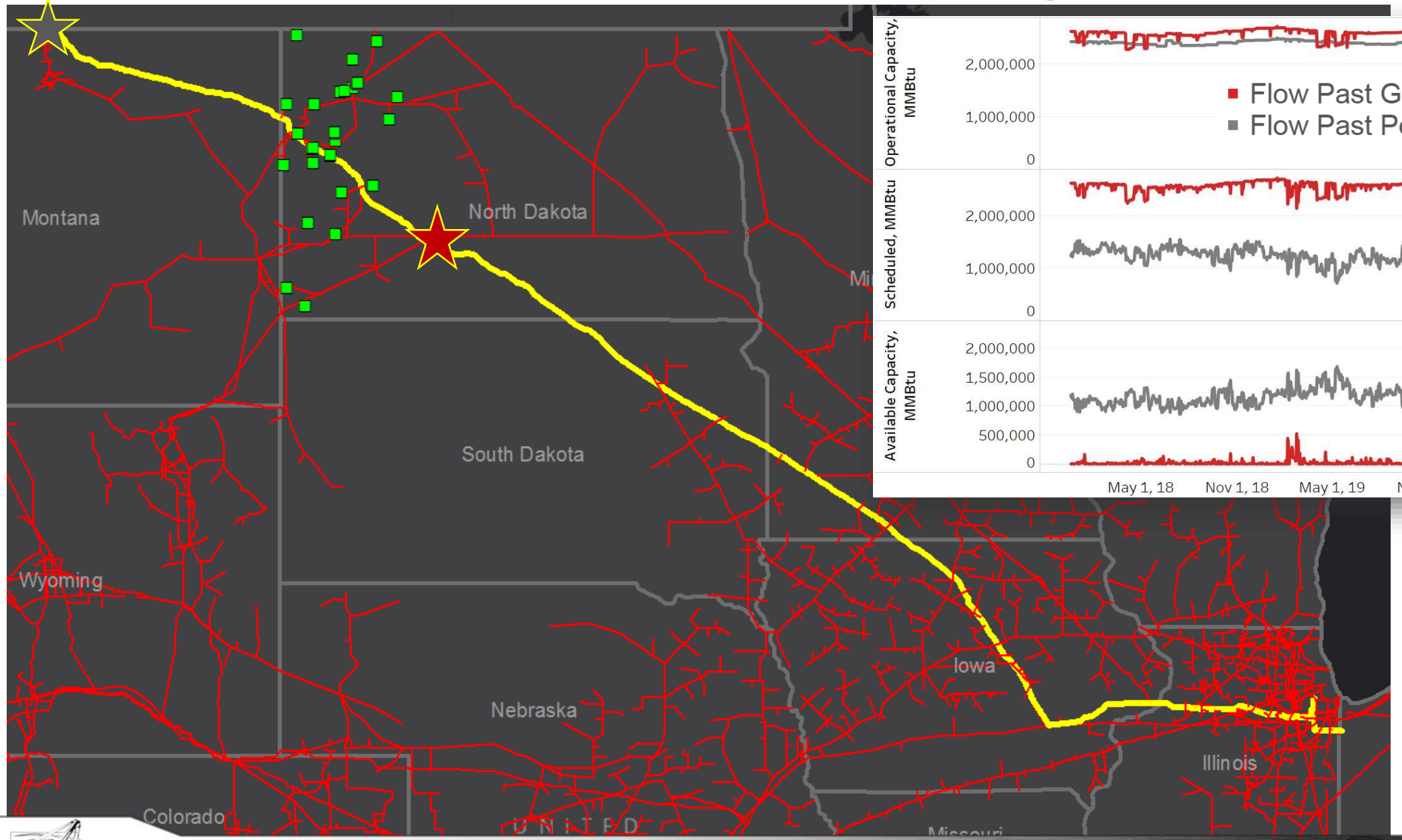
Major Gas Pipeline Infrastructure

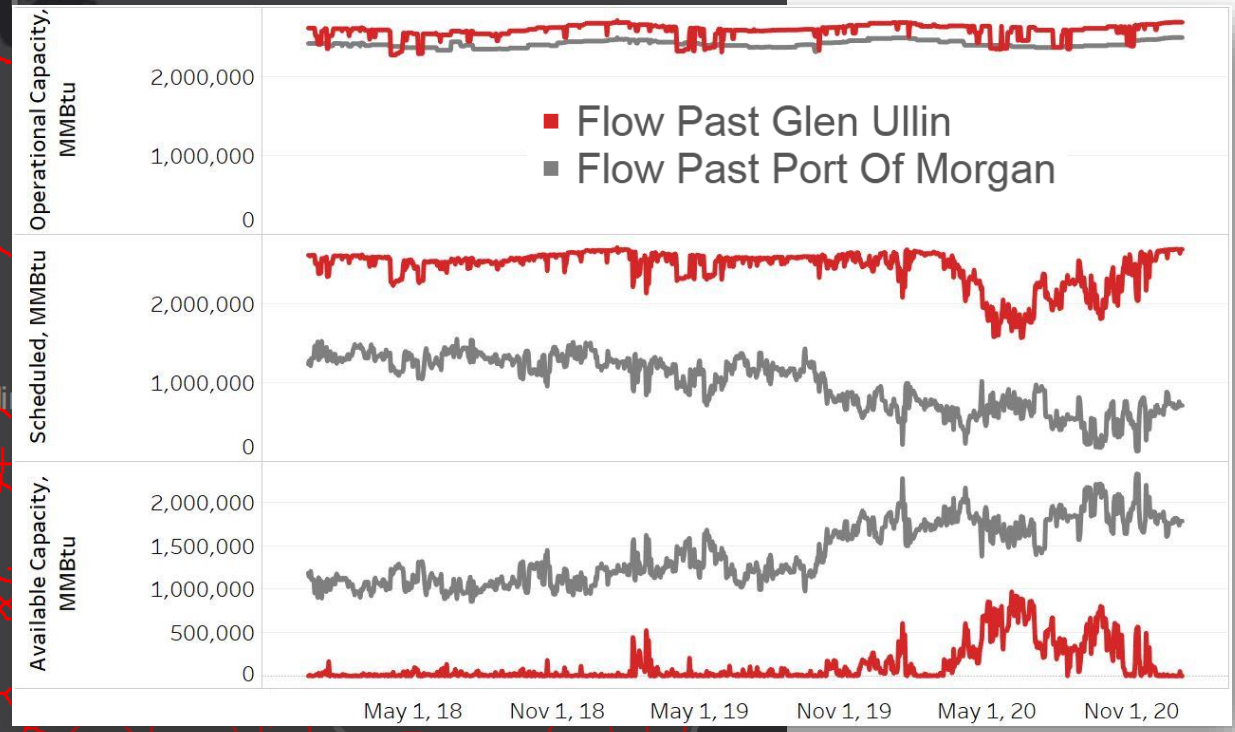


Bakken Natural Gas Infrastructure



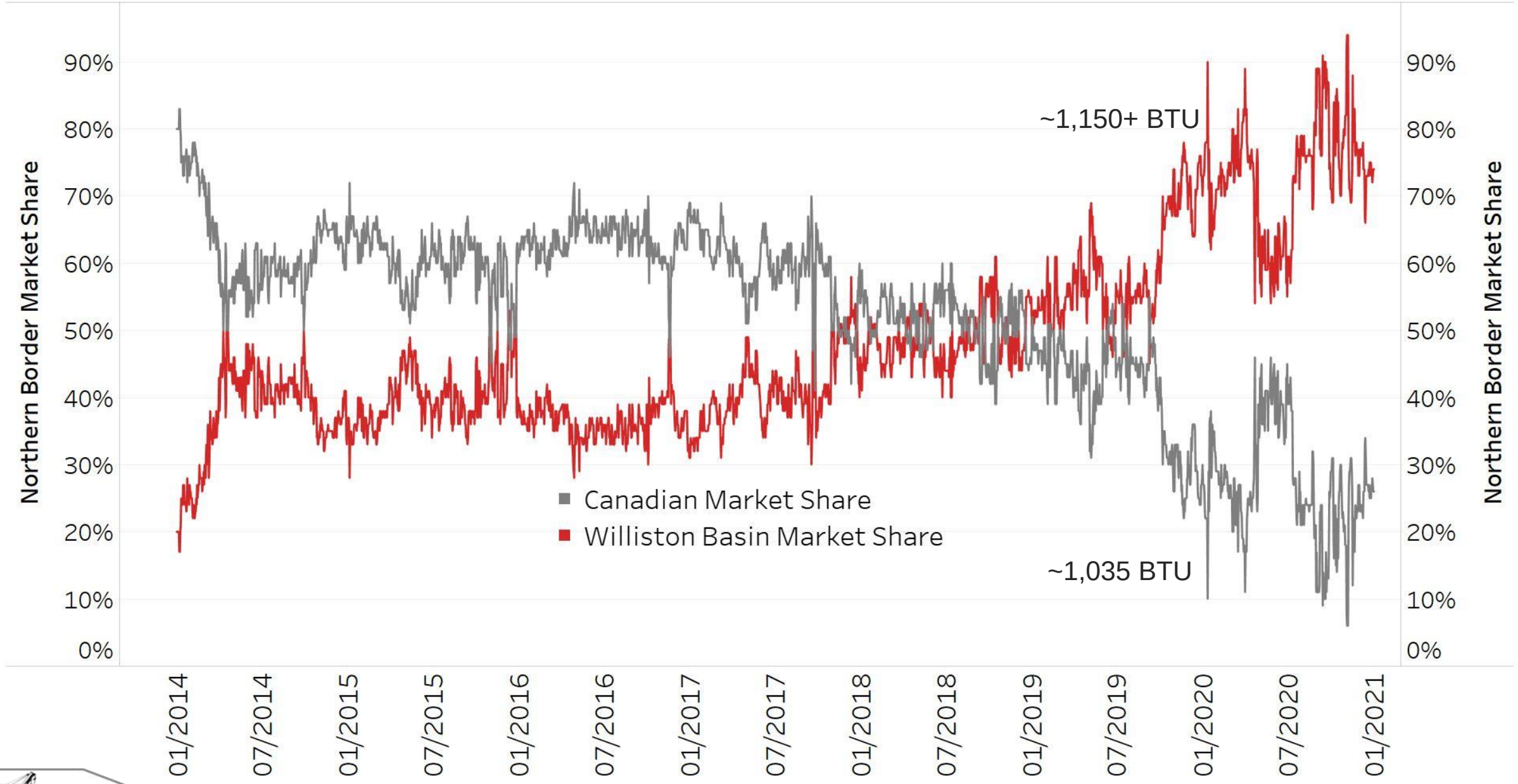
Northern Border Pipeline



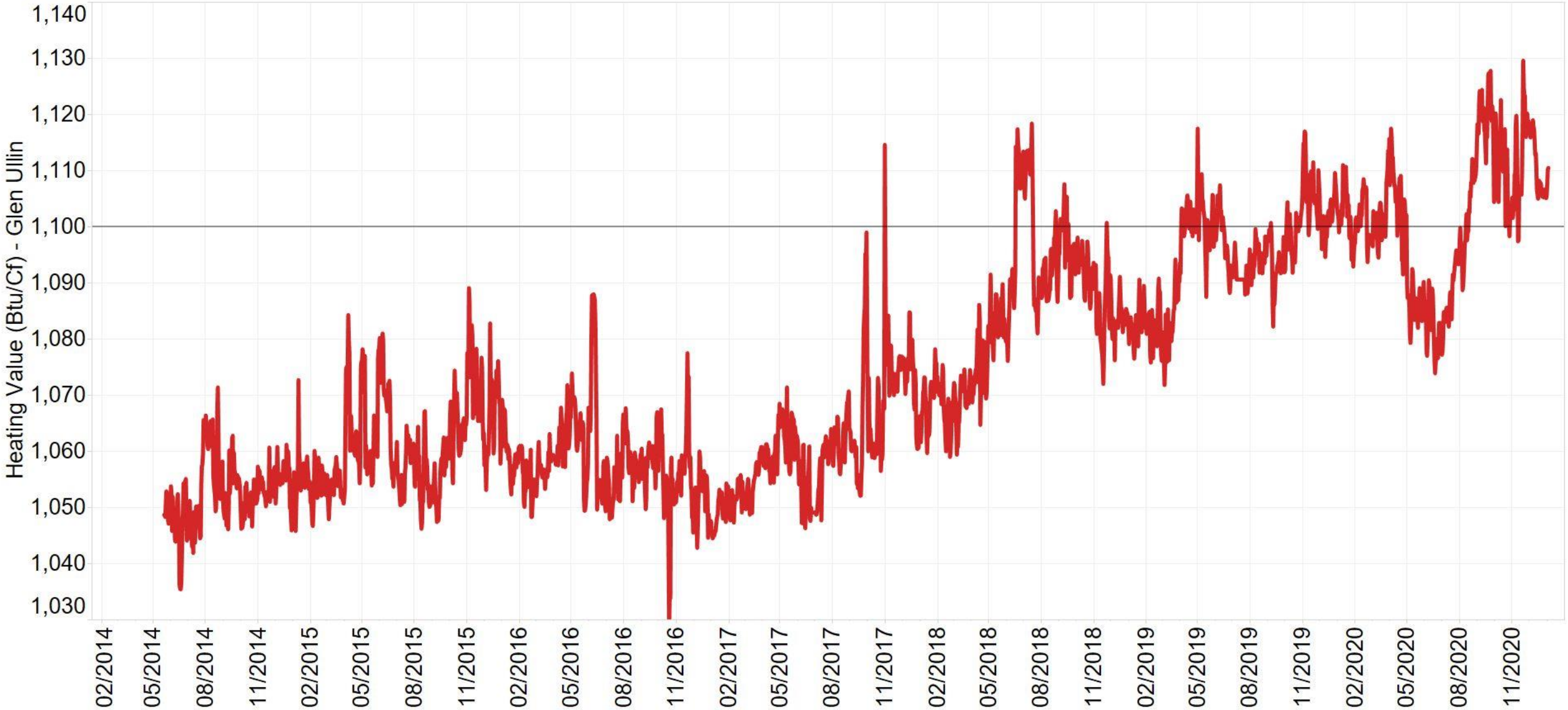


*Data Source: Northern Border

Northern Border Pipeline Market Share

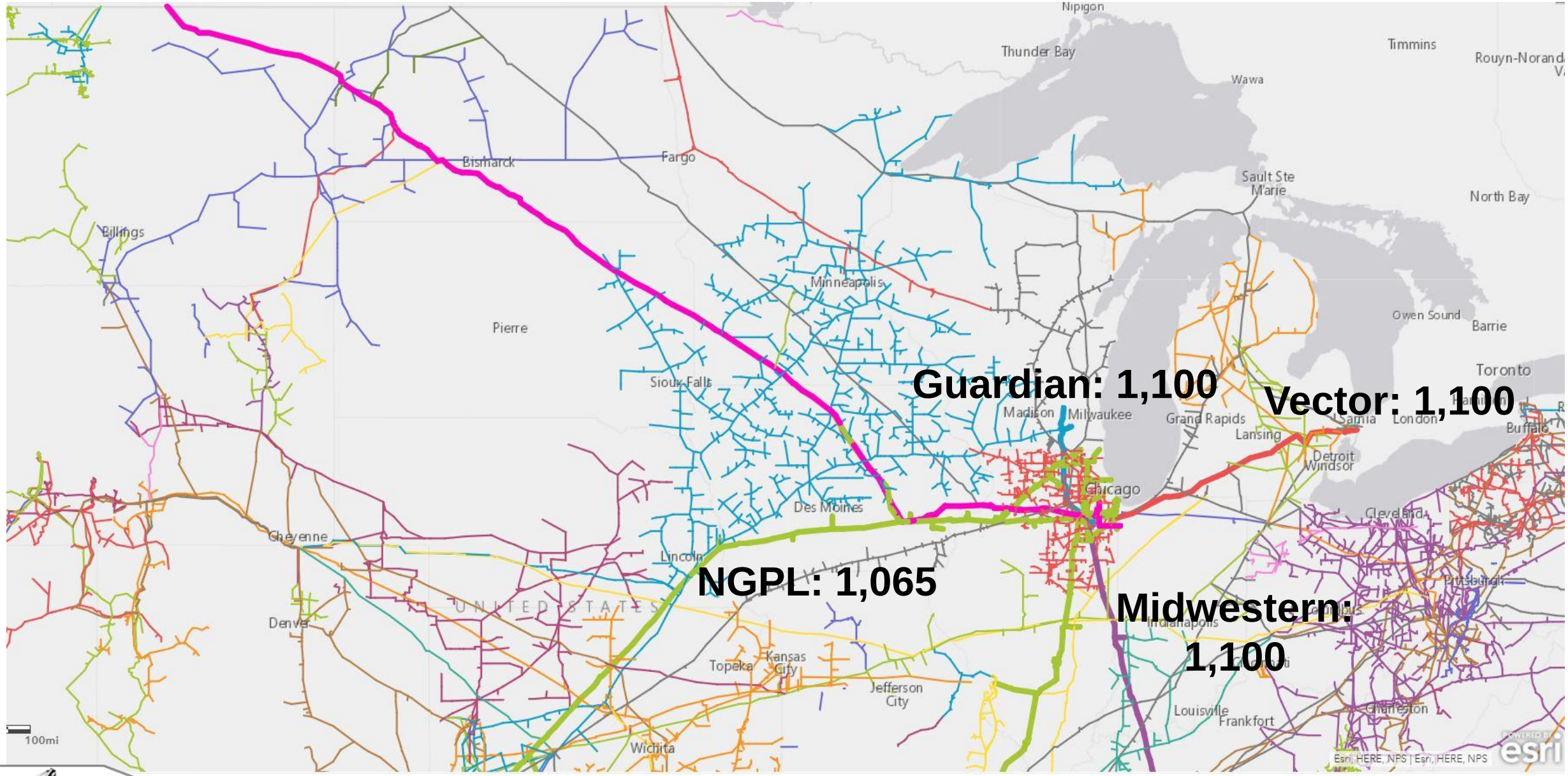


Northern Border BTU at Glen Ullin, ND

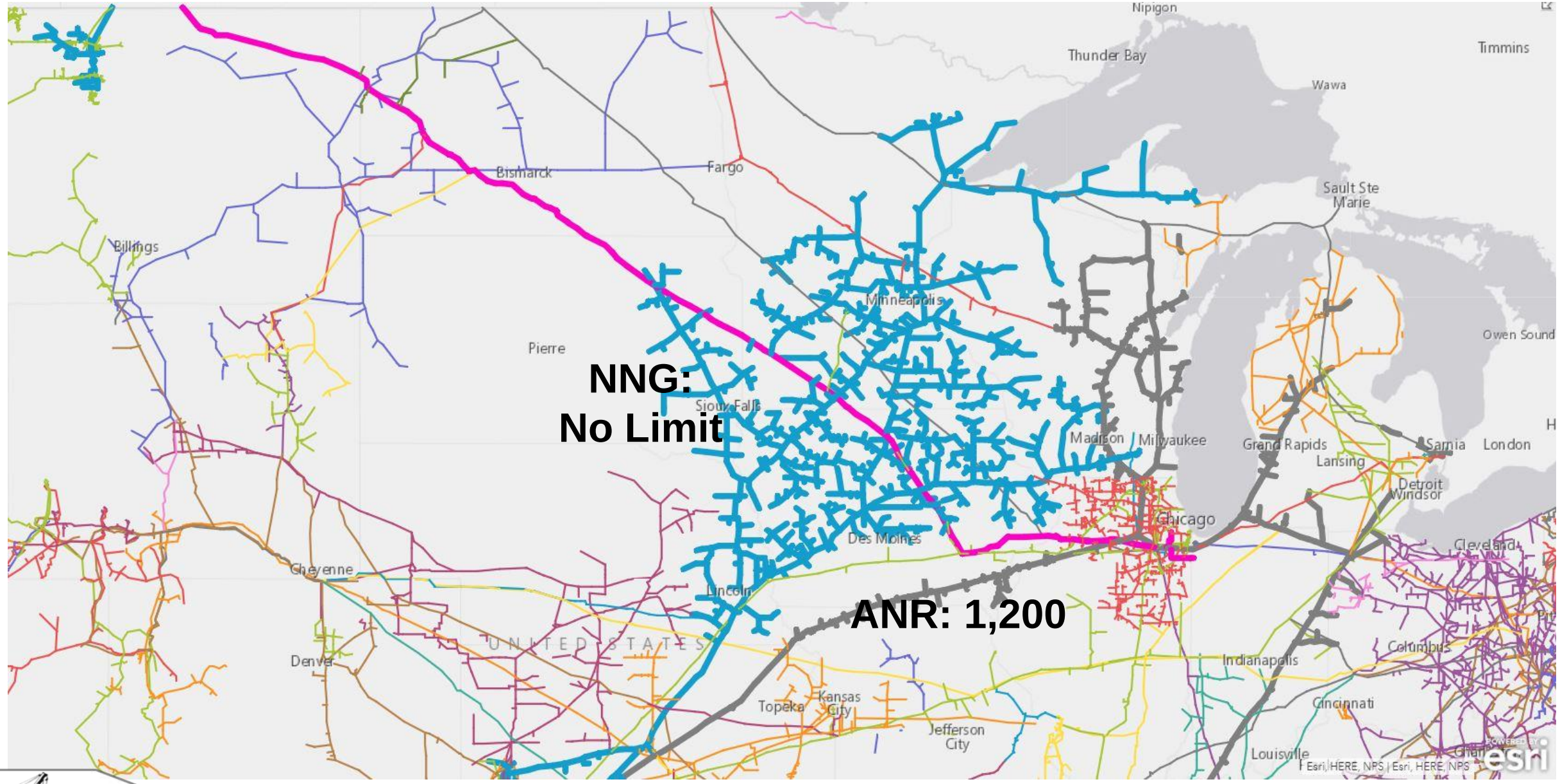


*Data Source: Northern Border

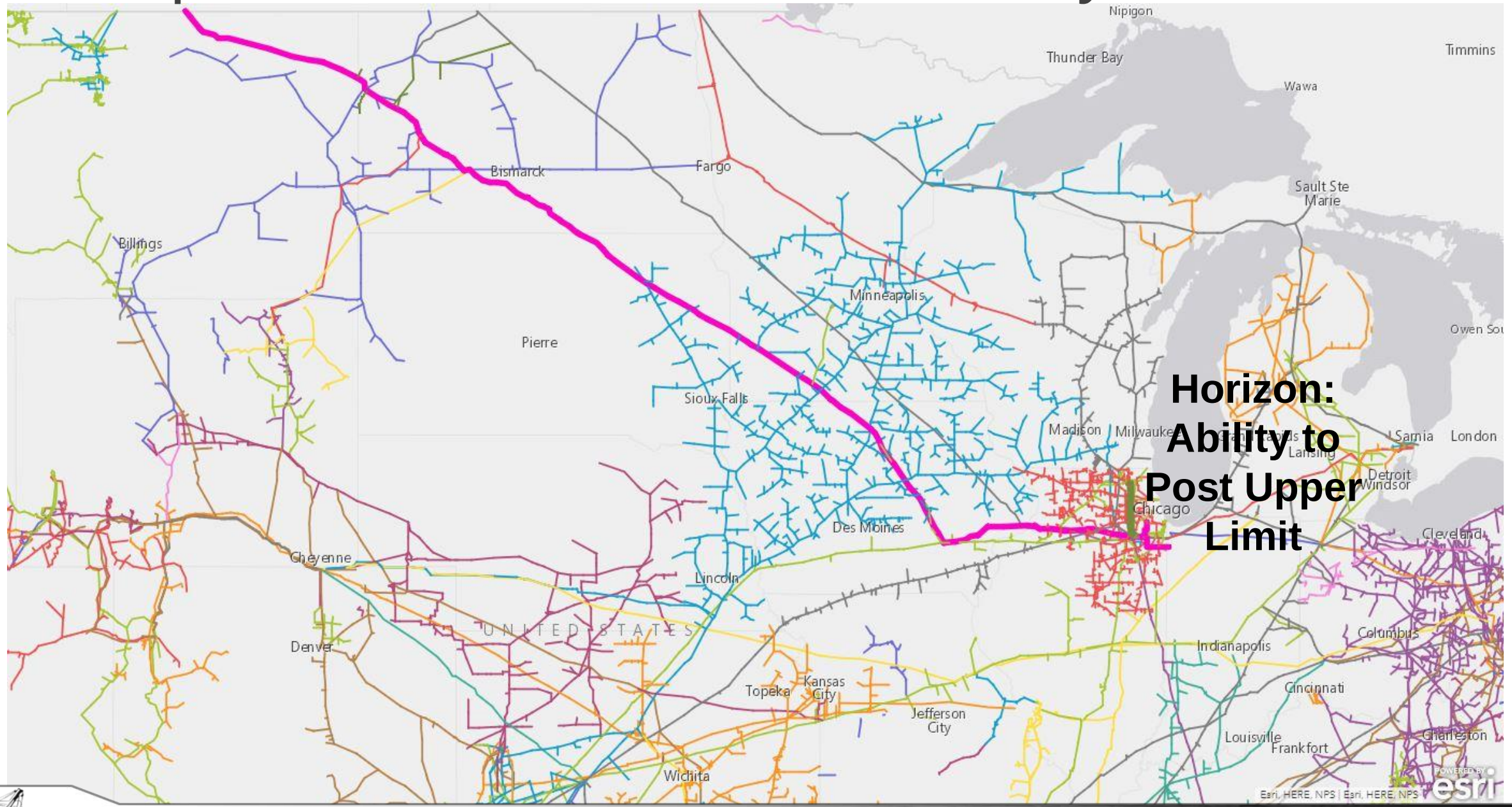
NB Pipeline Interconnects With Known BTU Limits



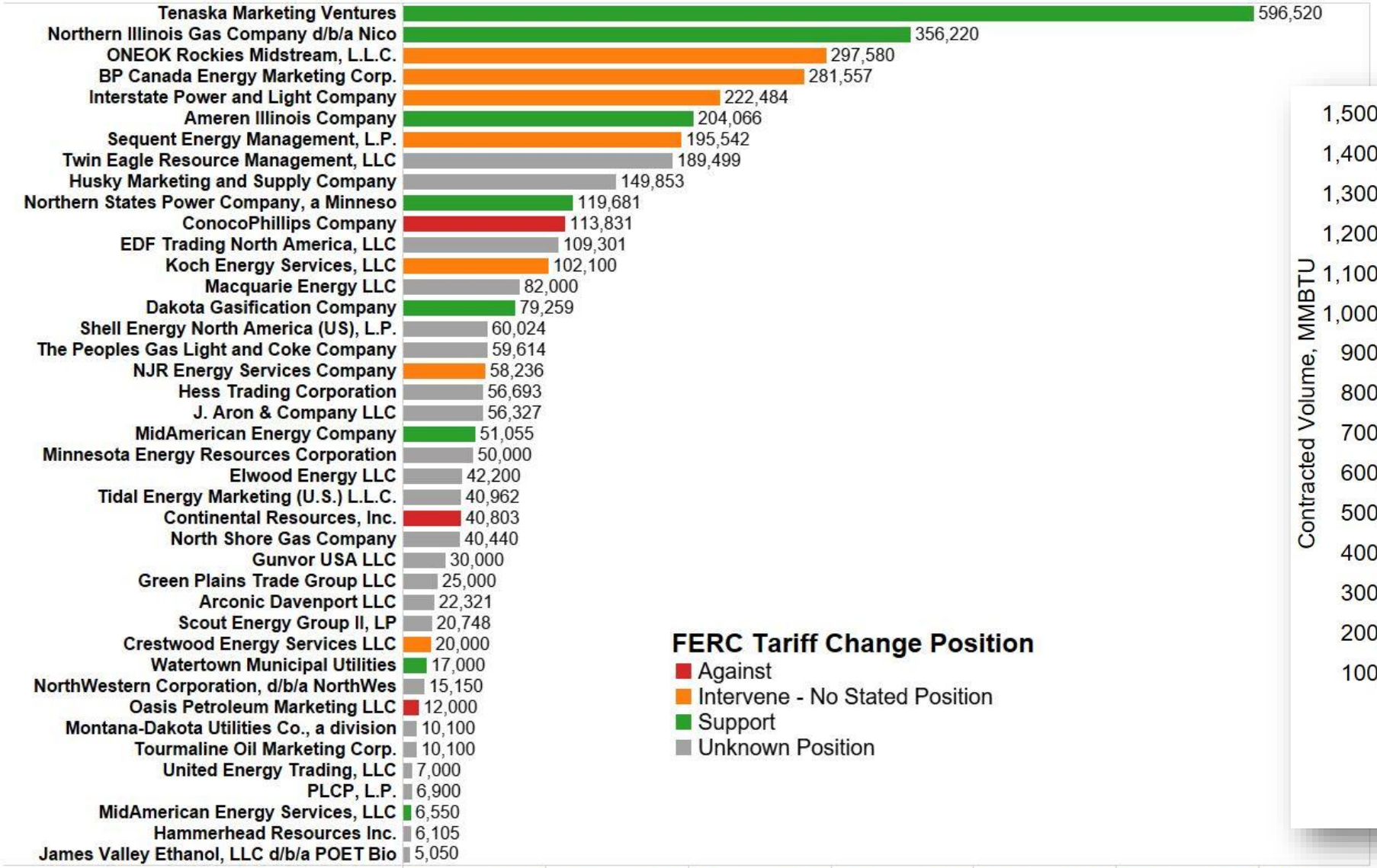
NB Pipeline Interconnects With BTU Limits > 1,100

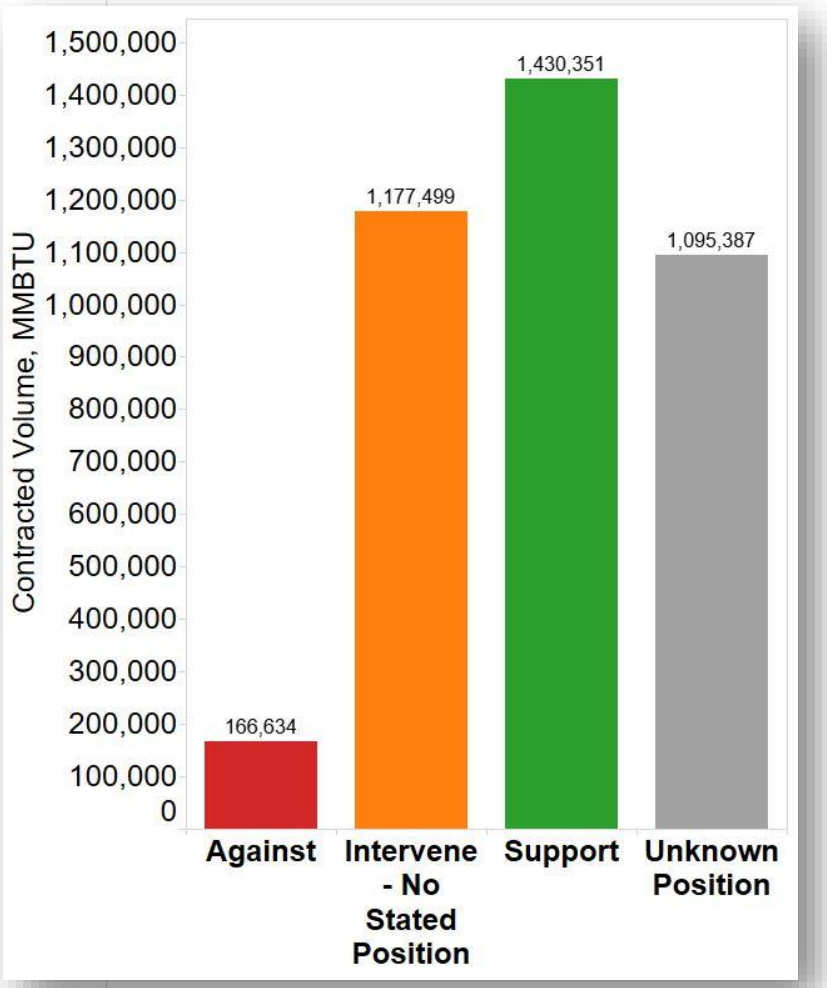


NB Pipeline Interconnects With Ability to Add Limits

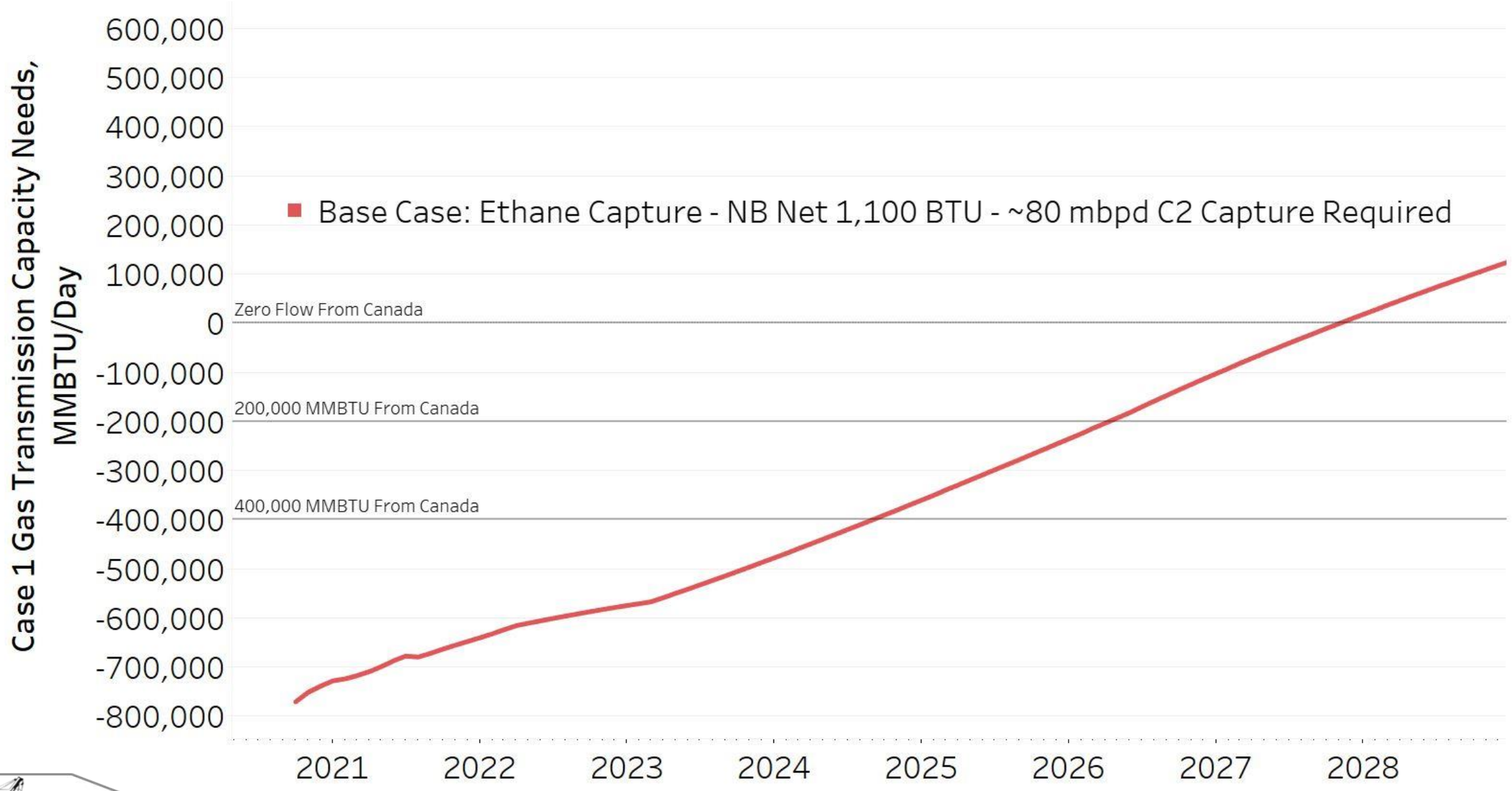


Northern Border Shipper FERC Positions*



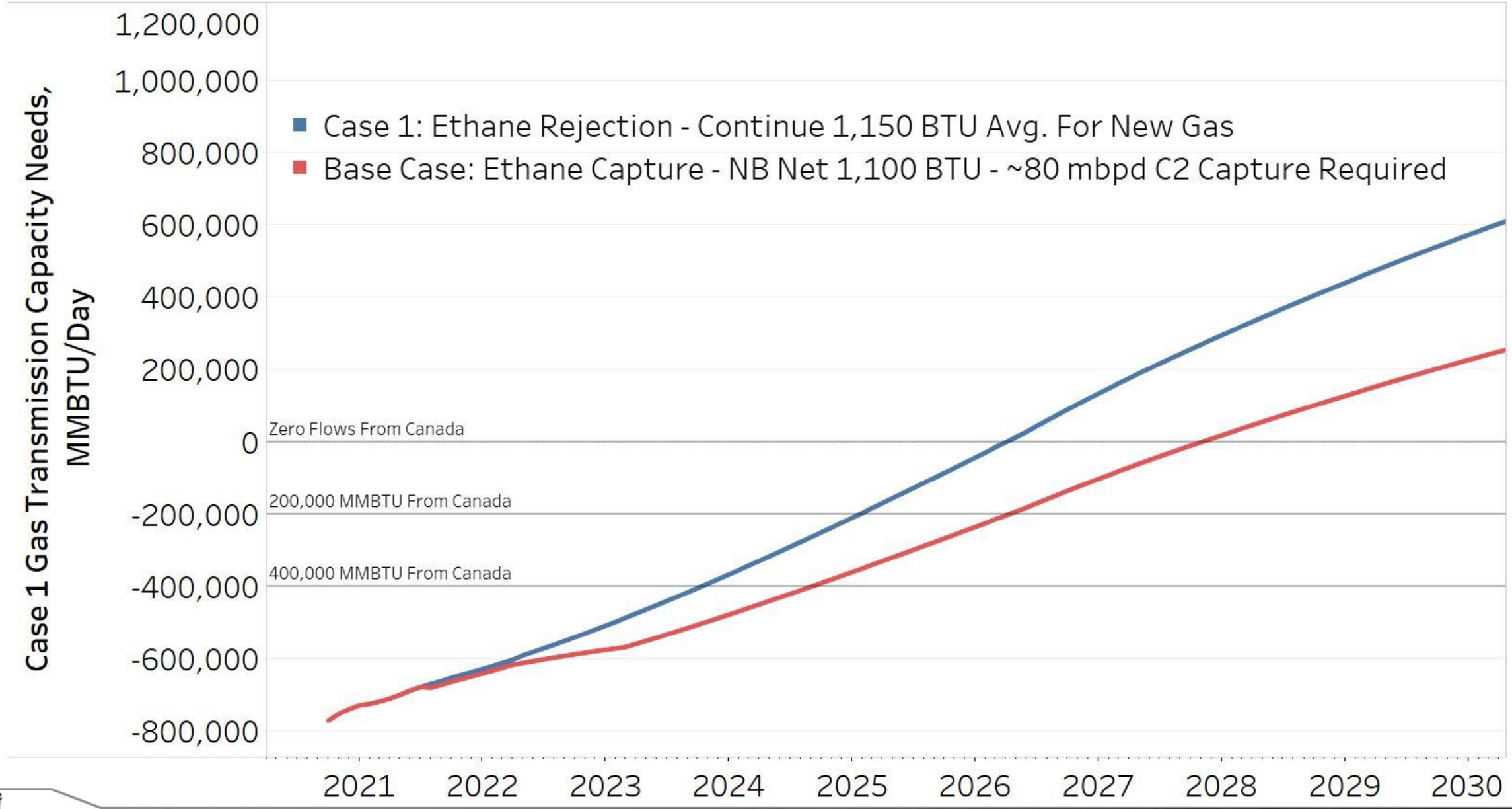


Northern Border – BTU Calculations*



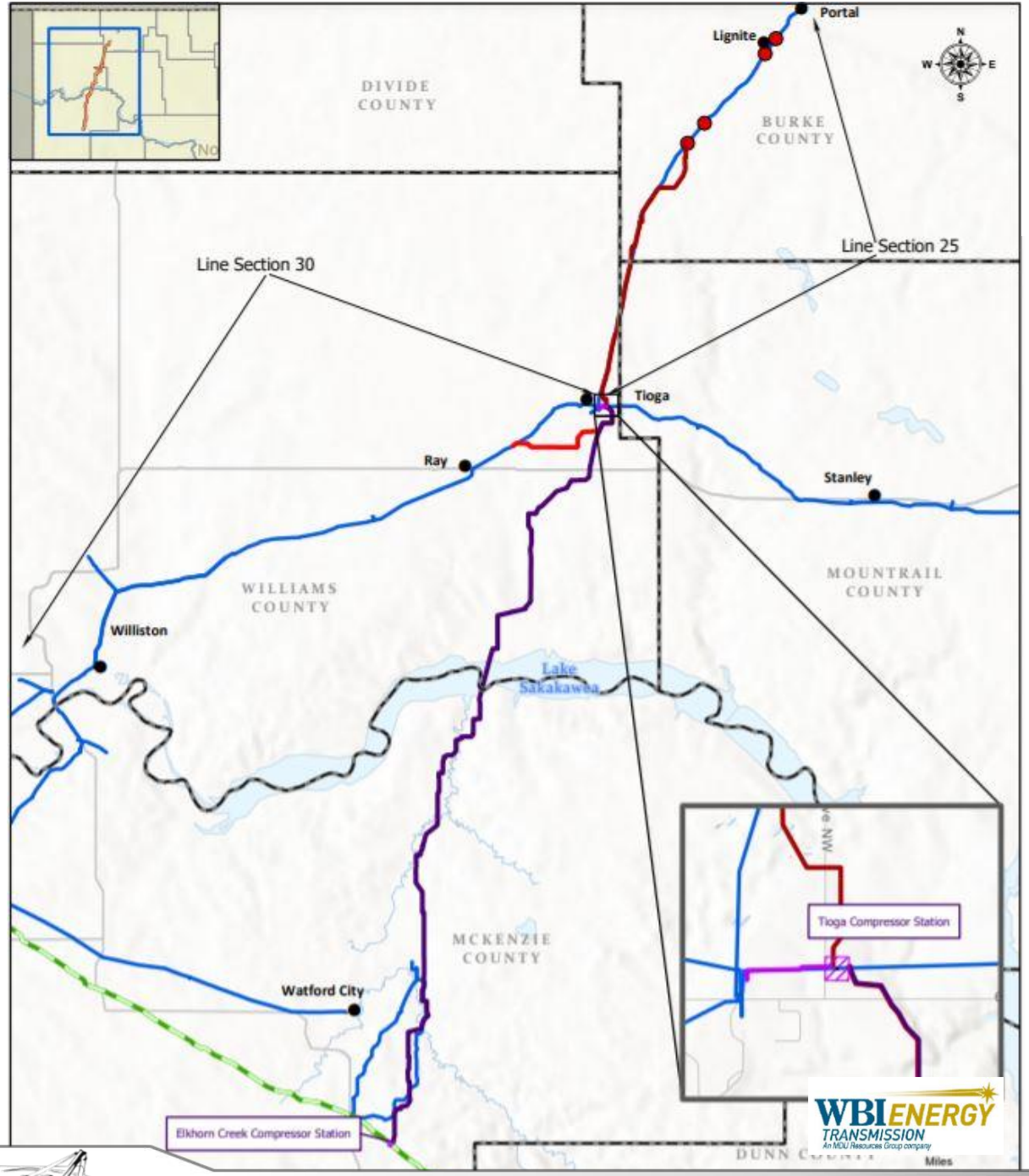
*Includes Updated Tariff Timeline to 1,100

Northern Border – BTU Calculations*



*Includes Updated Tariff Timeline to 1,100

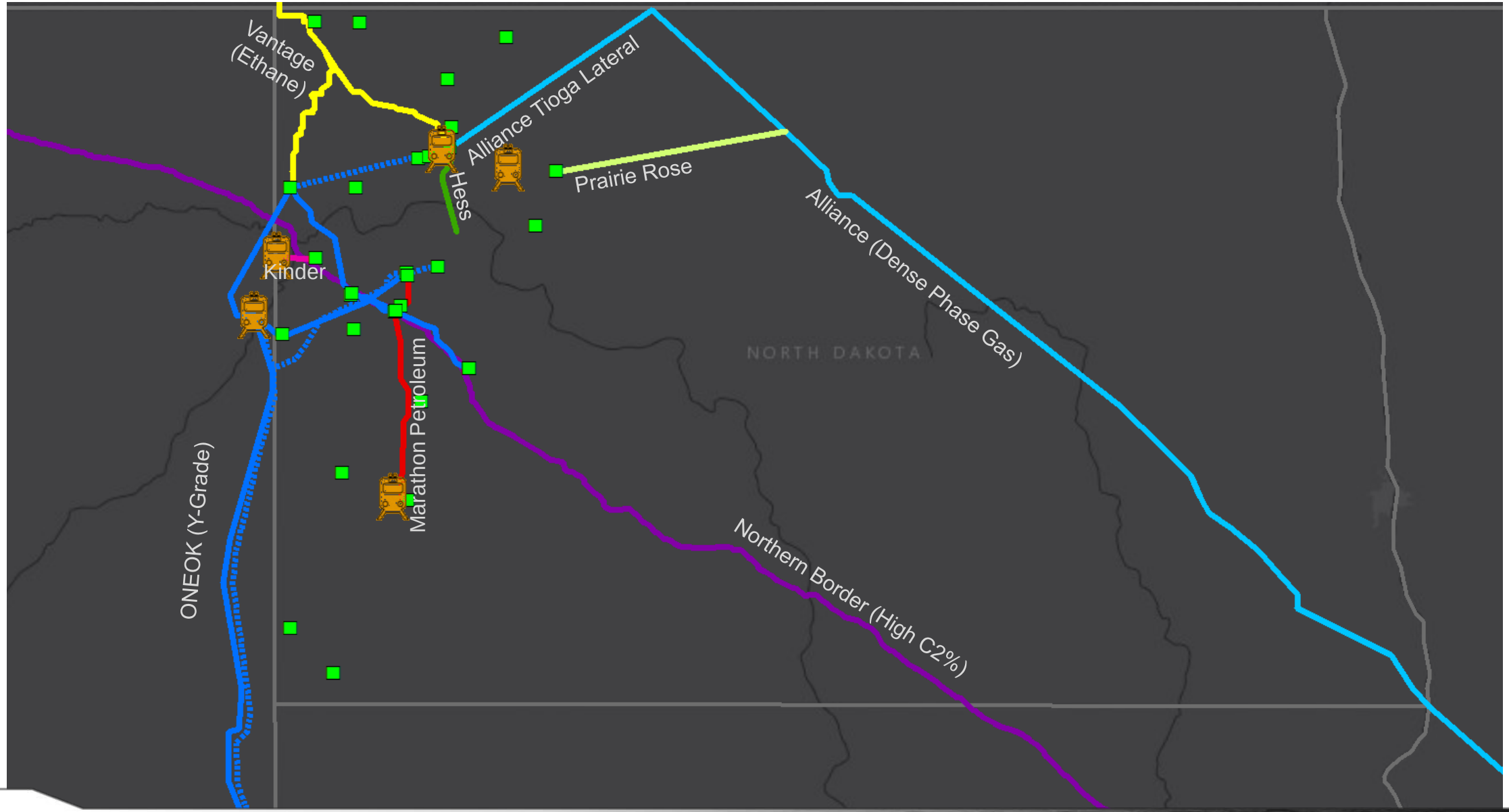
WBI Energy – North Bakken Expansion Project



Project Highlights

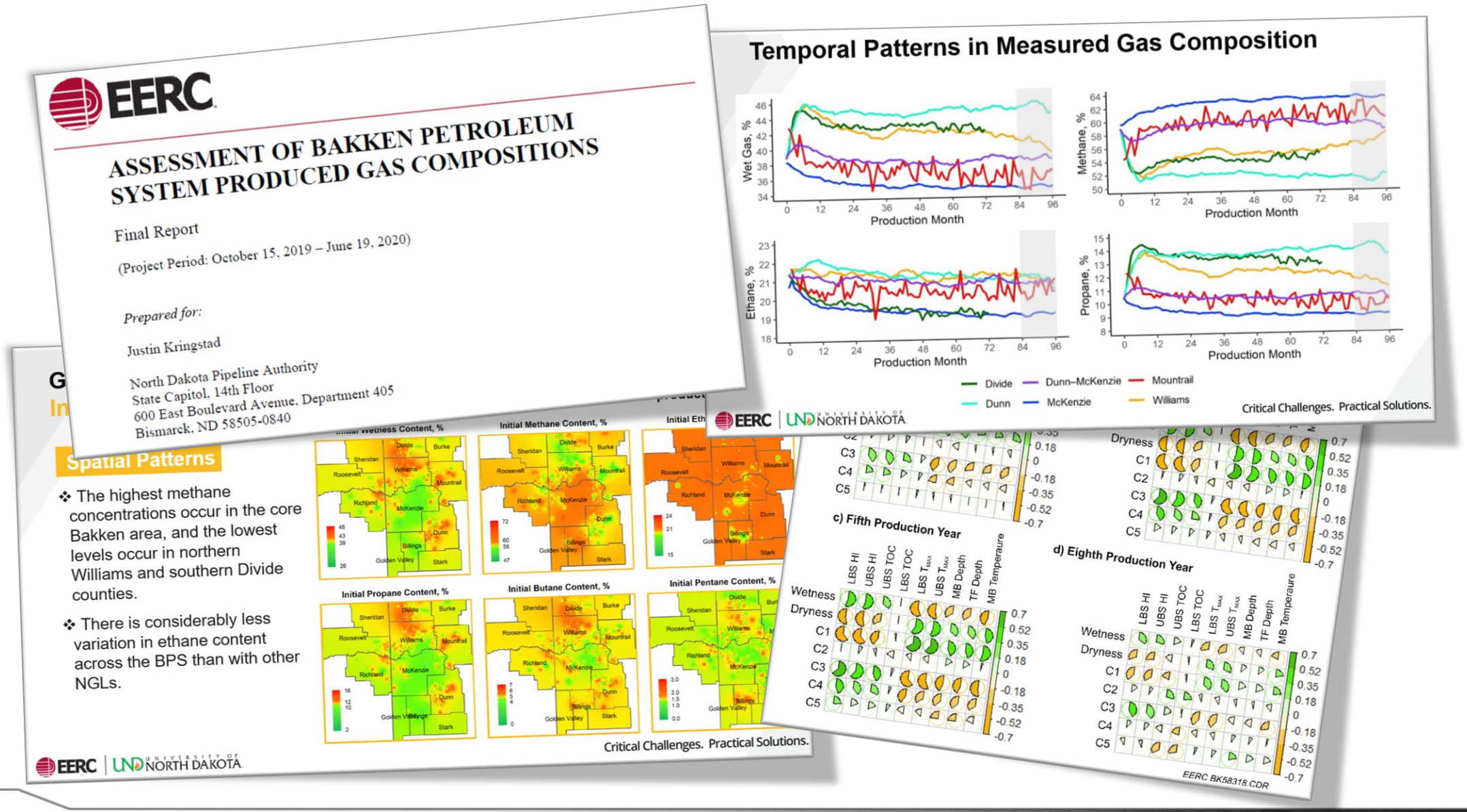
- ~60 Miles - 24” Pipeline
- ~30 Miles - 12” Pipeline
- $220+ Million
- Preliminary Capacity 250,000 MCFD
- Expandable to 375,000 MCFD
- Q4 2021 Proposed Completion
- Residue Gas Service From North of Lake Sakakawea to Northern Border Pipeline in McKenzie County

Regional NGL Infrastructure



Bakken & Three Forks Natural Gas Liquids Chemistry

NGL Chemistry Study - 2020



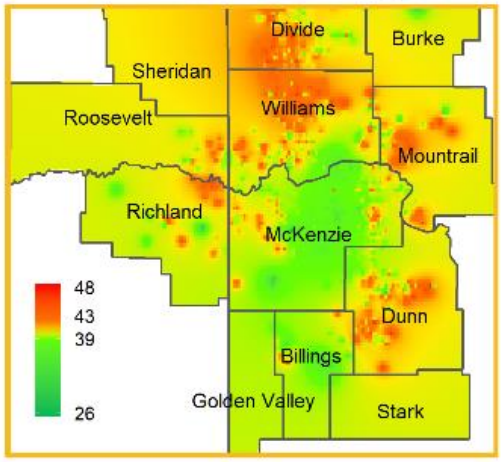
Gas Compositions During Initial Well Production

Spatial Patterns

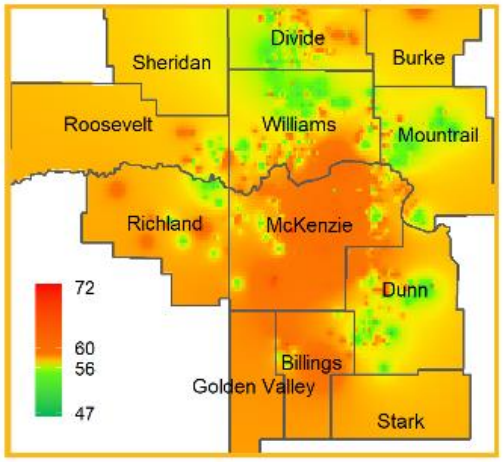
- The highest methane concentrations occur in the core Bakken area, and the lowest levels occur in northern Williams and southern Divide counties.
- There is considerably less variation in ethane content across the BPS than with other NGLs.

Spatial distribution of methane, ethane, propane and wetness levels (mol %) during the initial stages of well production

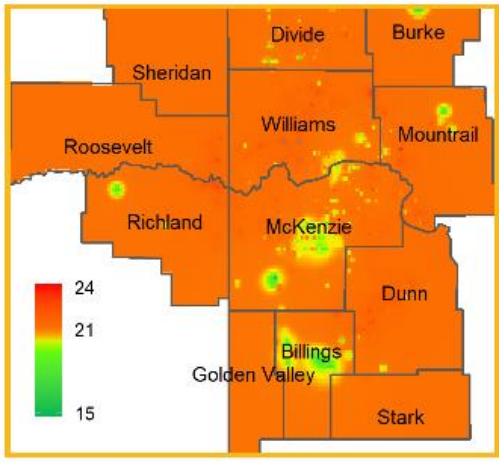
Initial Wetness Content, %



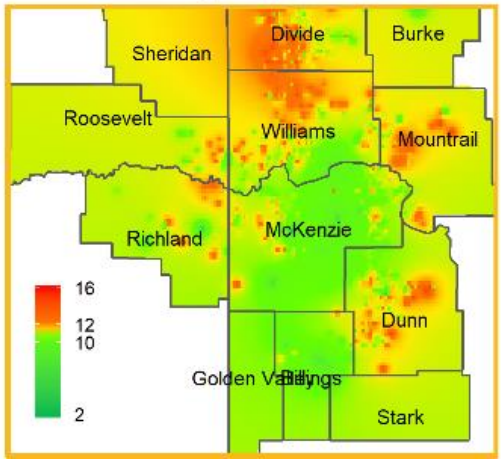
Initial Methane Content, %



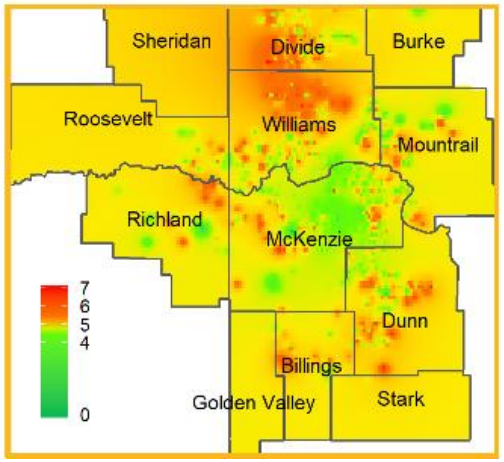
Initial Ethane Content, %



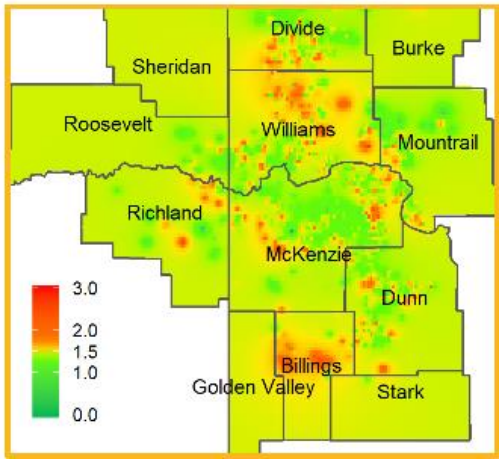
Initial Propane Content, %



Initial Butane Content, %

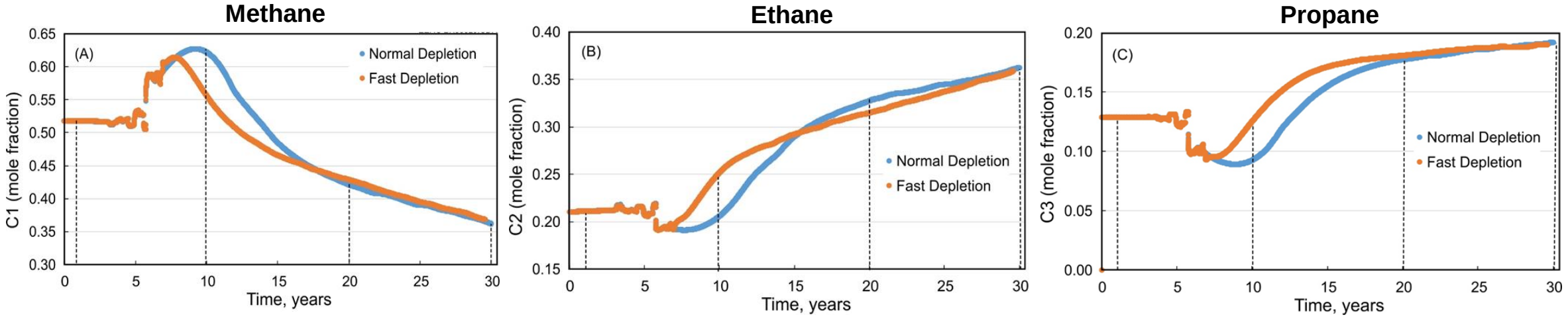


Initial Pentane Content, %

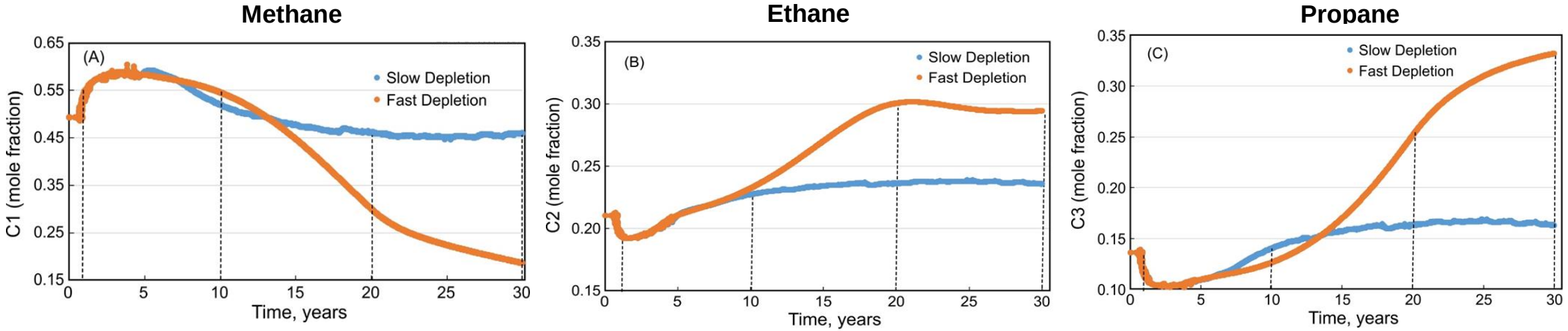


Predicted Gas Composition Change: Primary Production

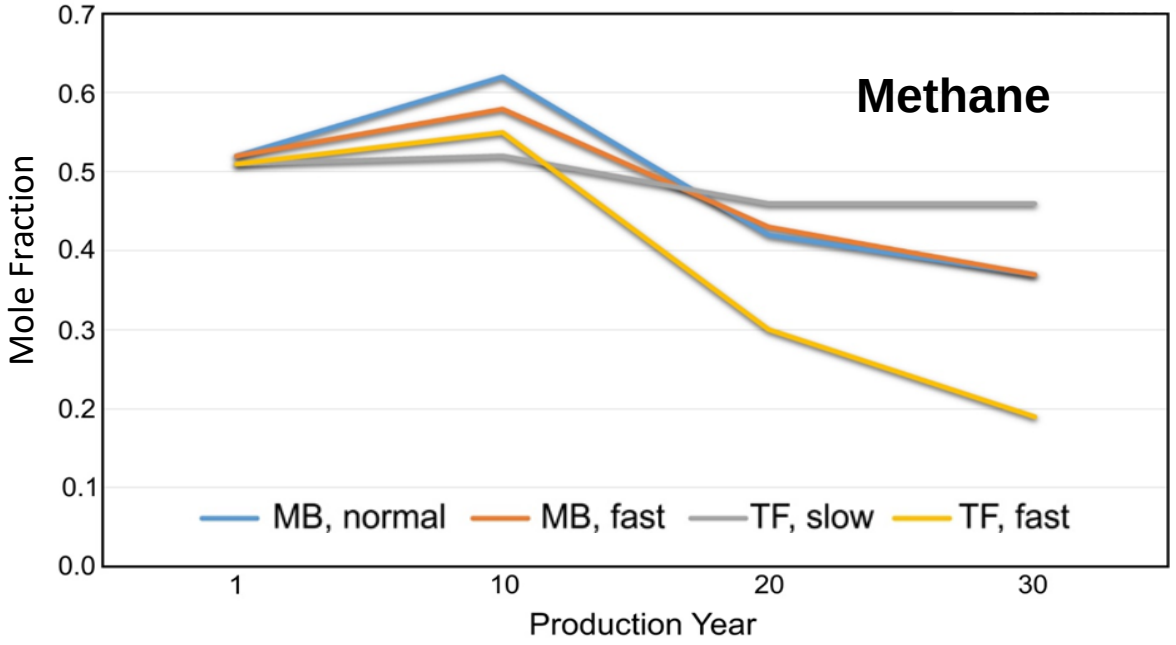
Gas composition change in the MB well over 30 years of normal and fast pressure depletion

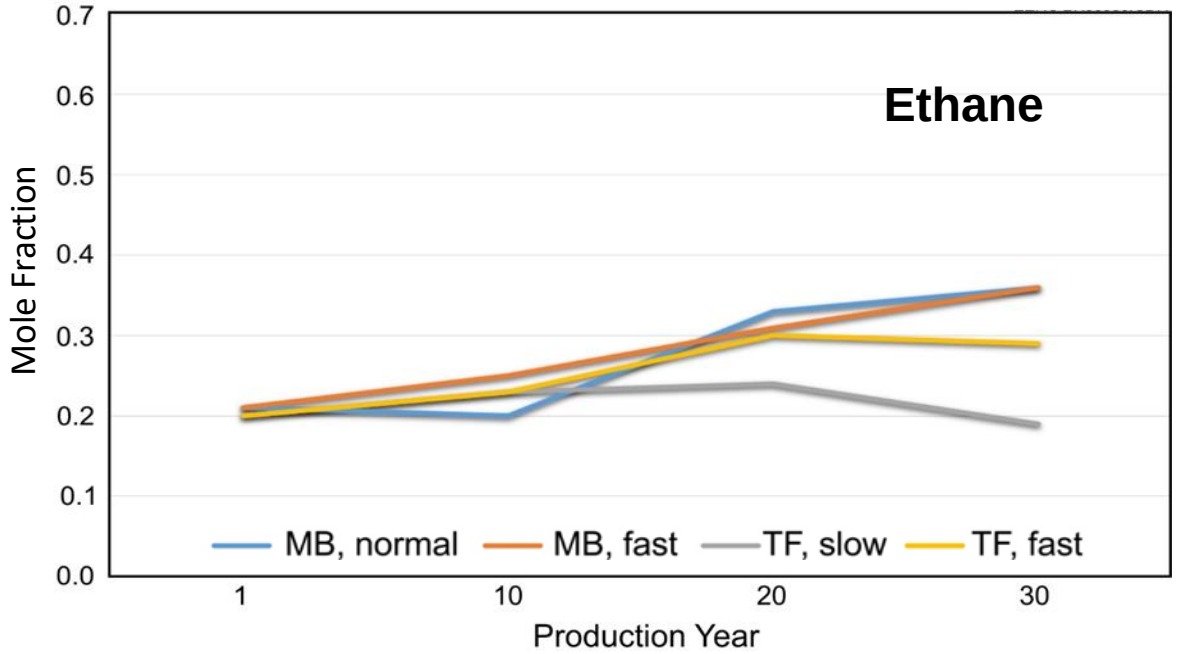


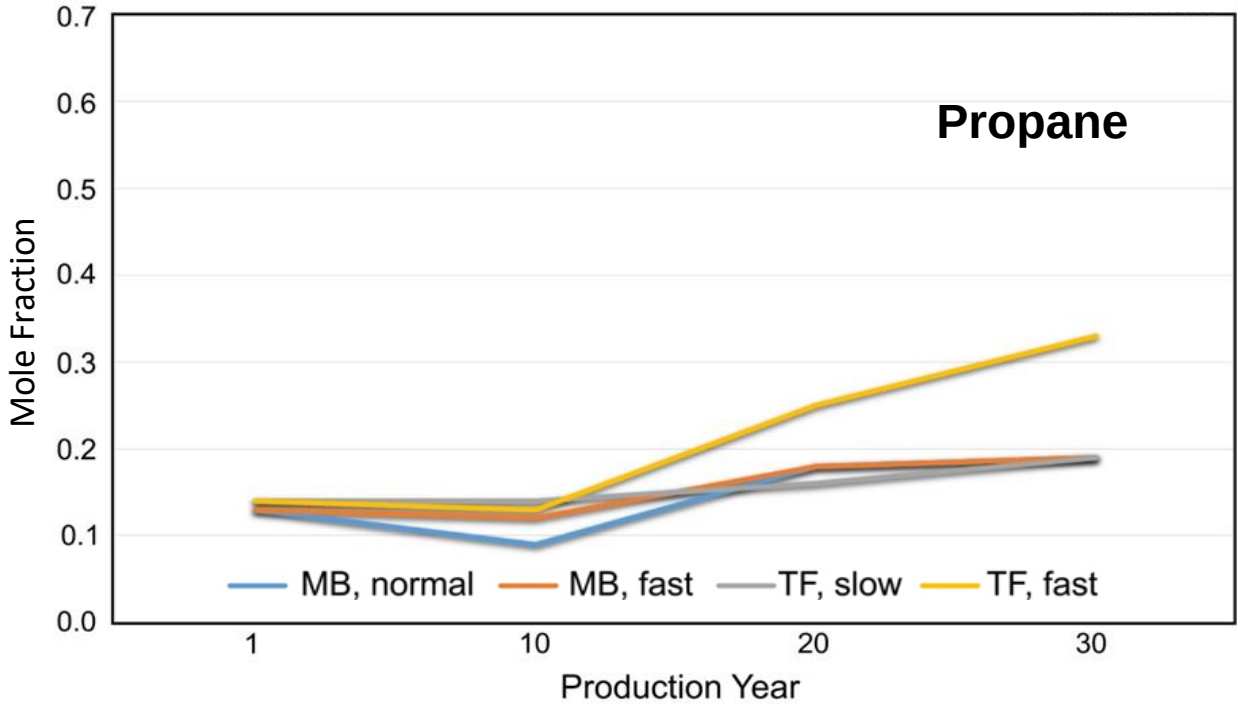
Gas composition change in the TF well over 30 years of slow and fast pressure depletion



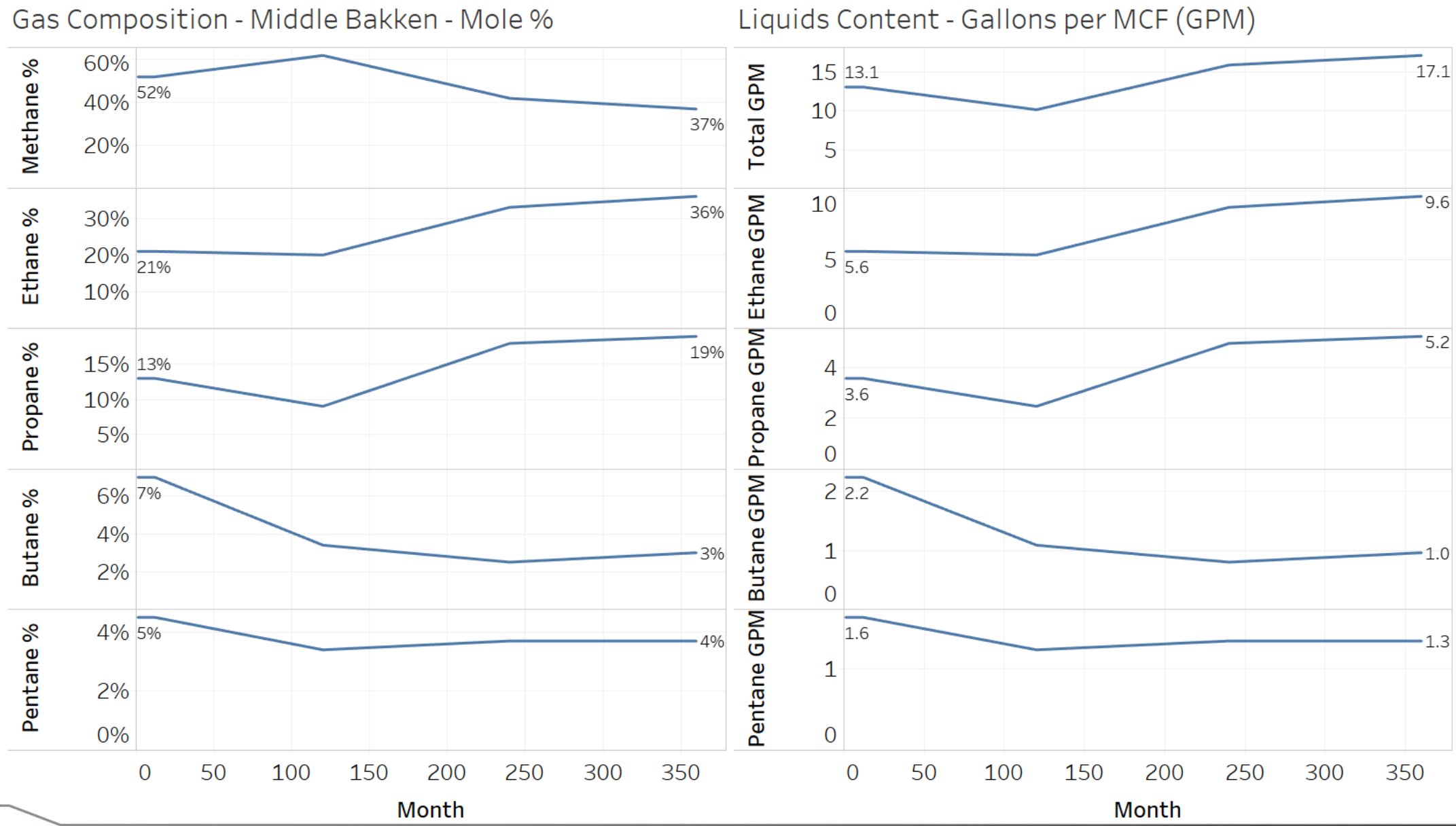
Forecast of Future Gas Compositions



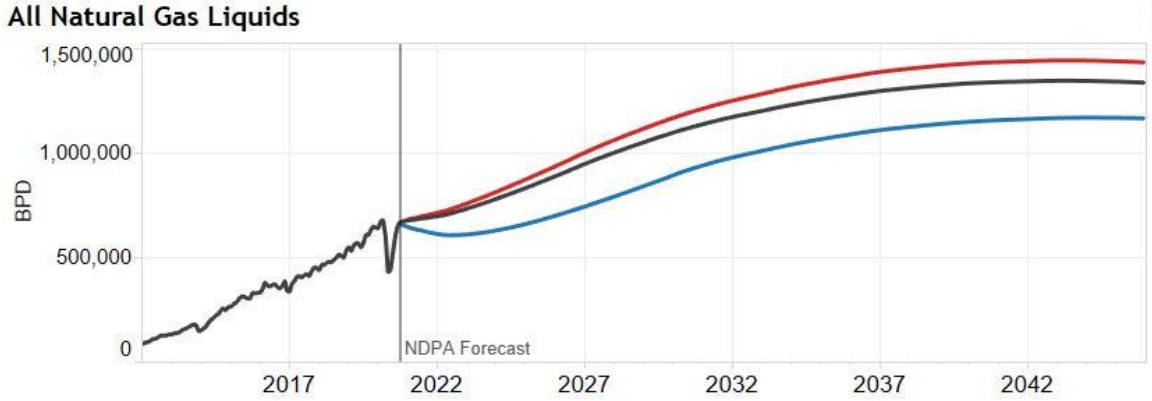


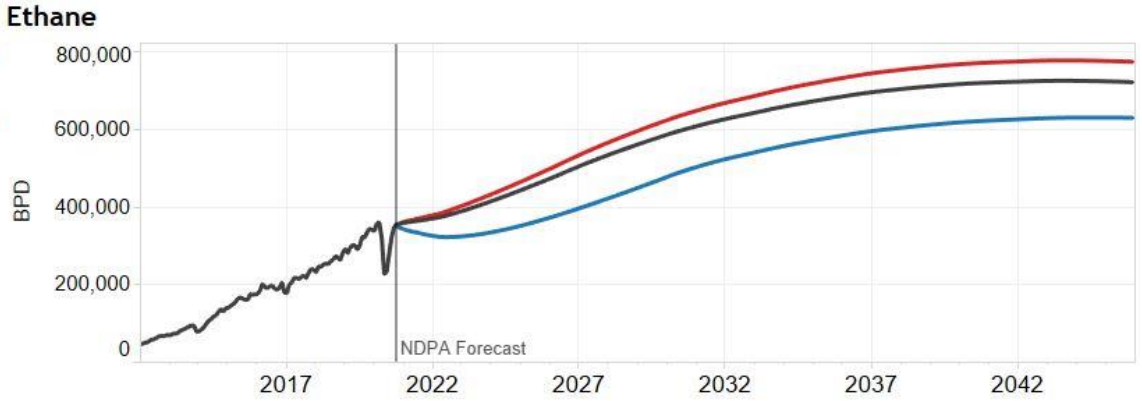


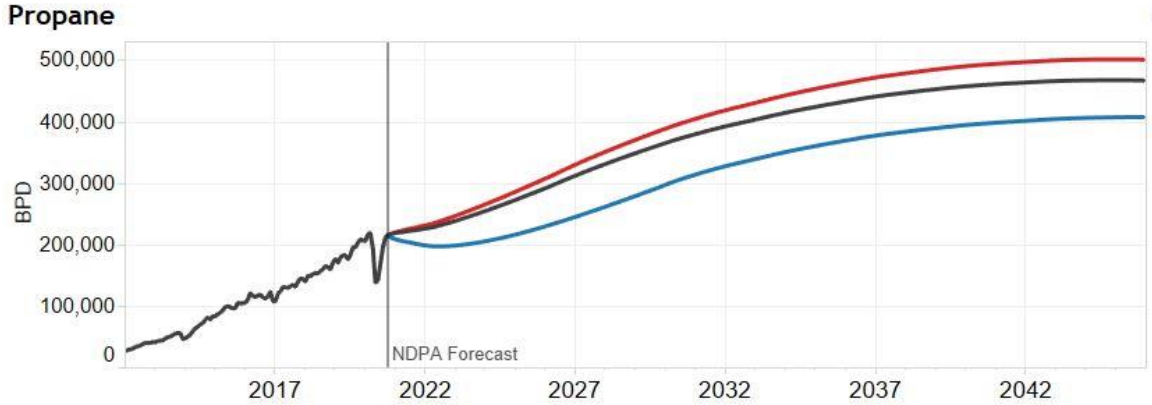
Overview of NGL Chemistry Study – Middle Bakken

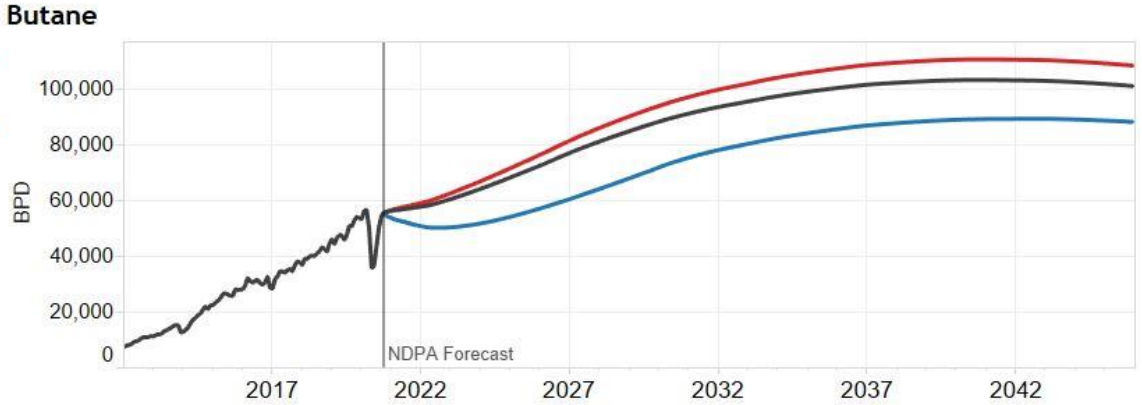


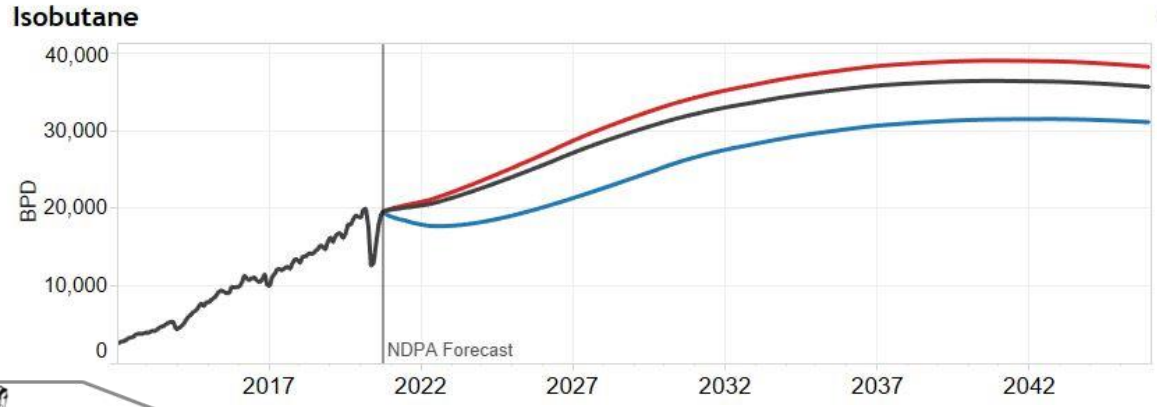
North Dakota Captured* NGL's

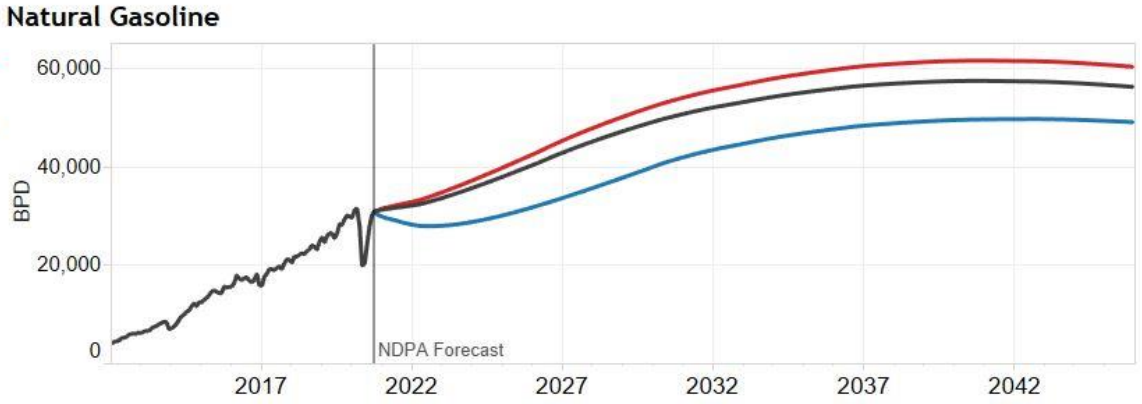




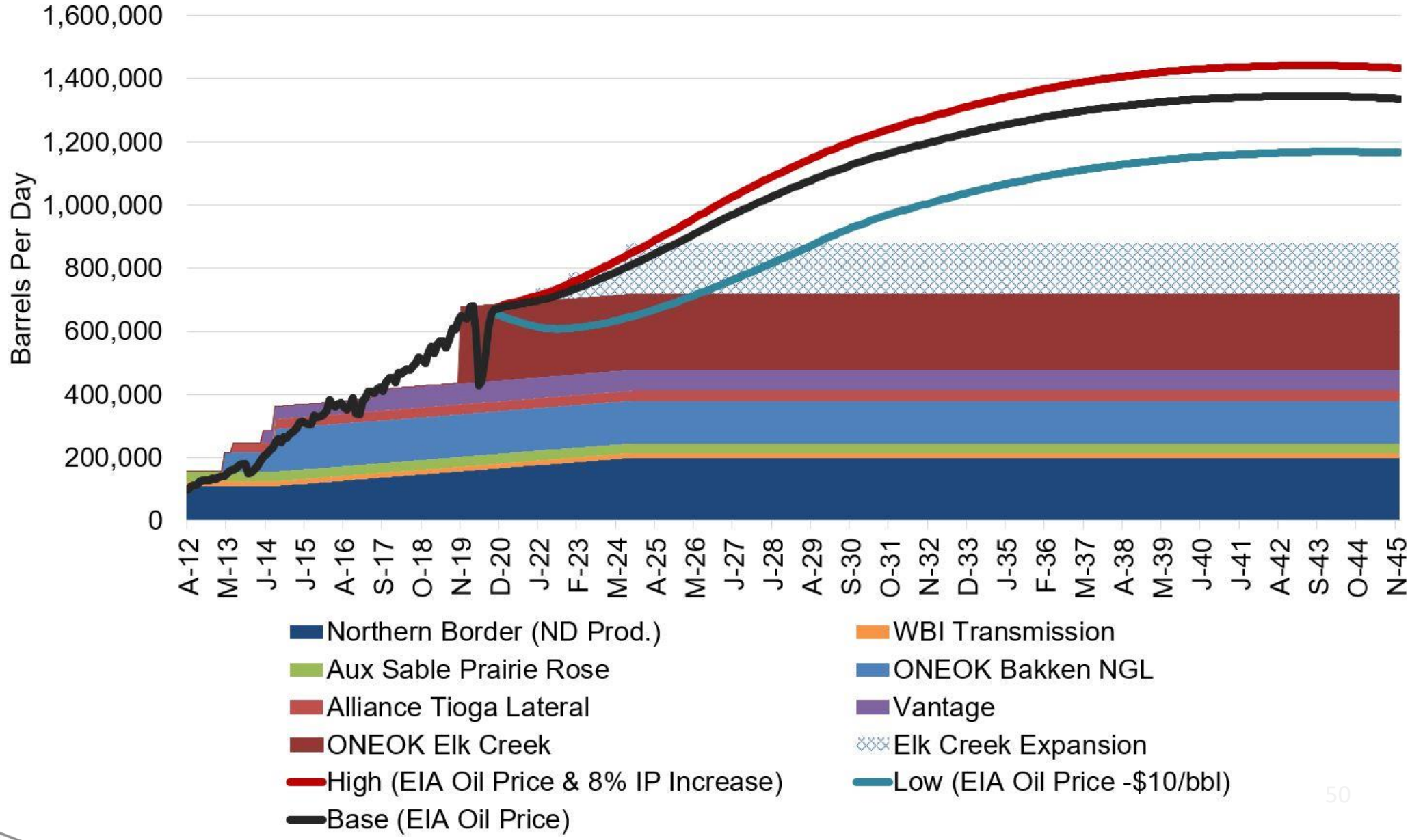




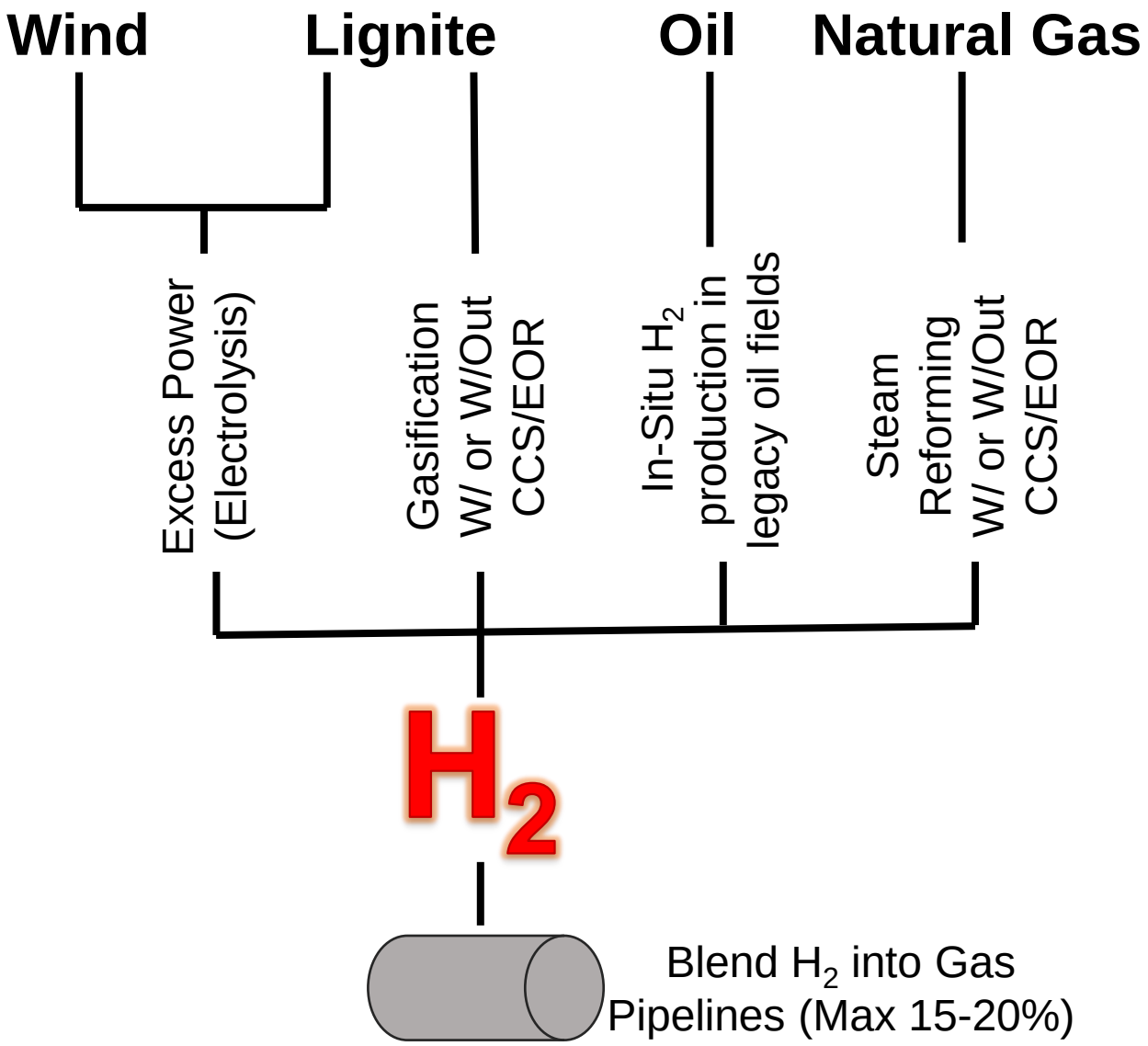




NGL Pipeline Takeaway Options



Exploring Hydrogen Solutions



Electric Generation

- Large and Immediate Market for Excess Power in Regional Pipelines
- Excess Electrons Sold for H_2 BTU Value in Gas Markets
- Gas Pipelines Could Support Intermittent Deliveries
- Gasification Options for Lignite

Gas Pipelines & Petroleum

- Lowers Pipeline BTU
- Possible Support for Expansion Efforts
- Gas Marketing Advantages with Renewable or Carbon-Free Sources of H_2
- In-situ H_2 production in legacy fields
- Natural Gas Steam Reforming W/CCS or EOR Options

North Dakota

- Grows the "Energy Pie"
- Supports Current and Future Jobs
- First Step in Hydrogen Bridge for New Industries (Petchem, Fertilizer, Renewable Natural Gas, vehicles, etc.)
- ESG Benefits?

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