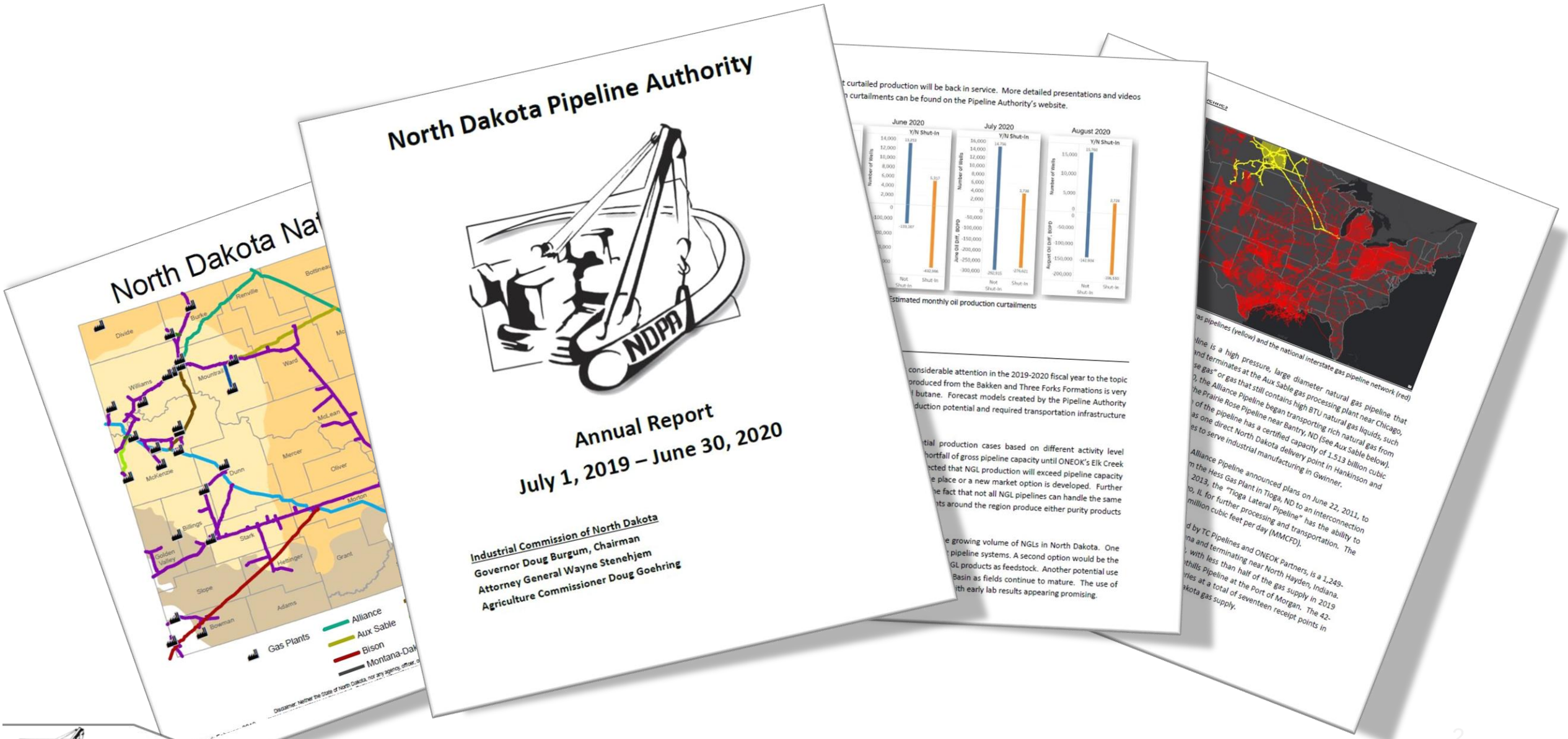
# House Appropriations
## Government Operations Division

**Justin J. Kringstad**
*Geological Engineer*
*Director*
*North Dakota Pipeline Authority*

**March 18, 2021**

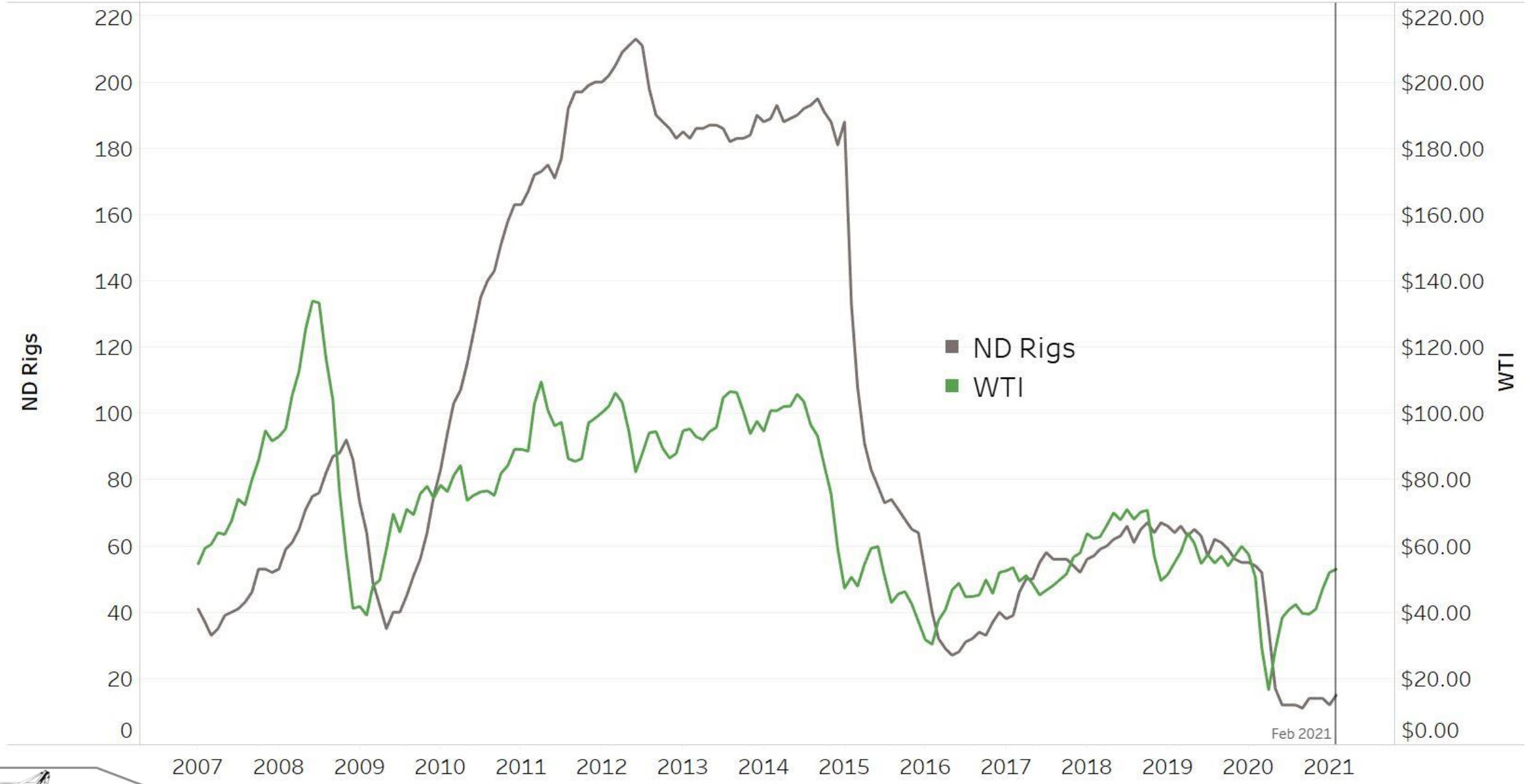
# 2019-2020 NDPA Annual Report



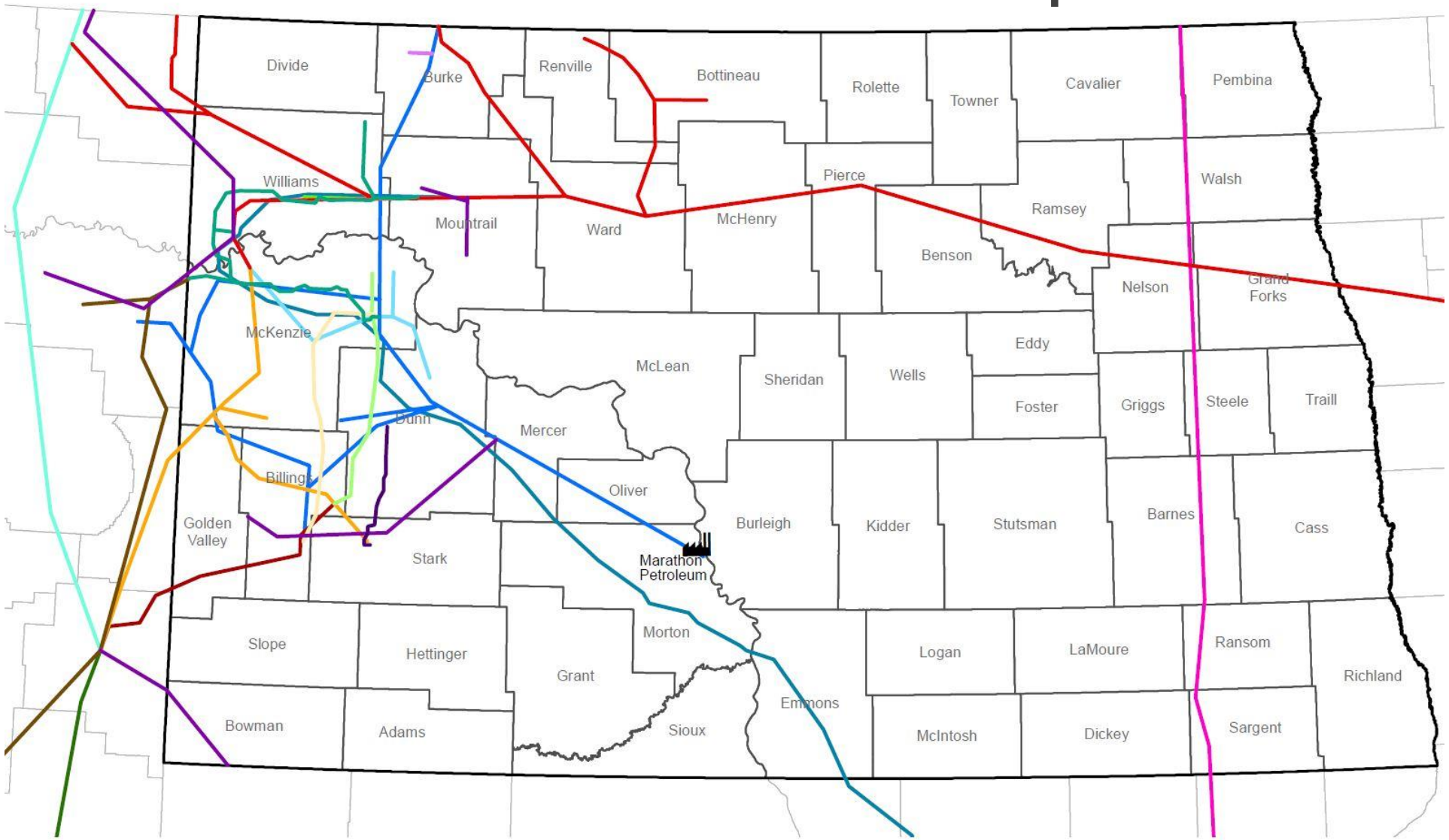
# Most Significant Events of the Past Year

- Demand/Price Collapse of 2020
- Dakota Access Pipeline Court Rulings
- Northern Border Pipeline BTU Tariff Filing
- Hydrogen Blending Opportunities in Existing Gas Pipelines
- Natural Gas Liquids Study
- Gas Capture at 94%

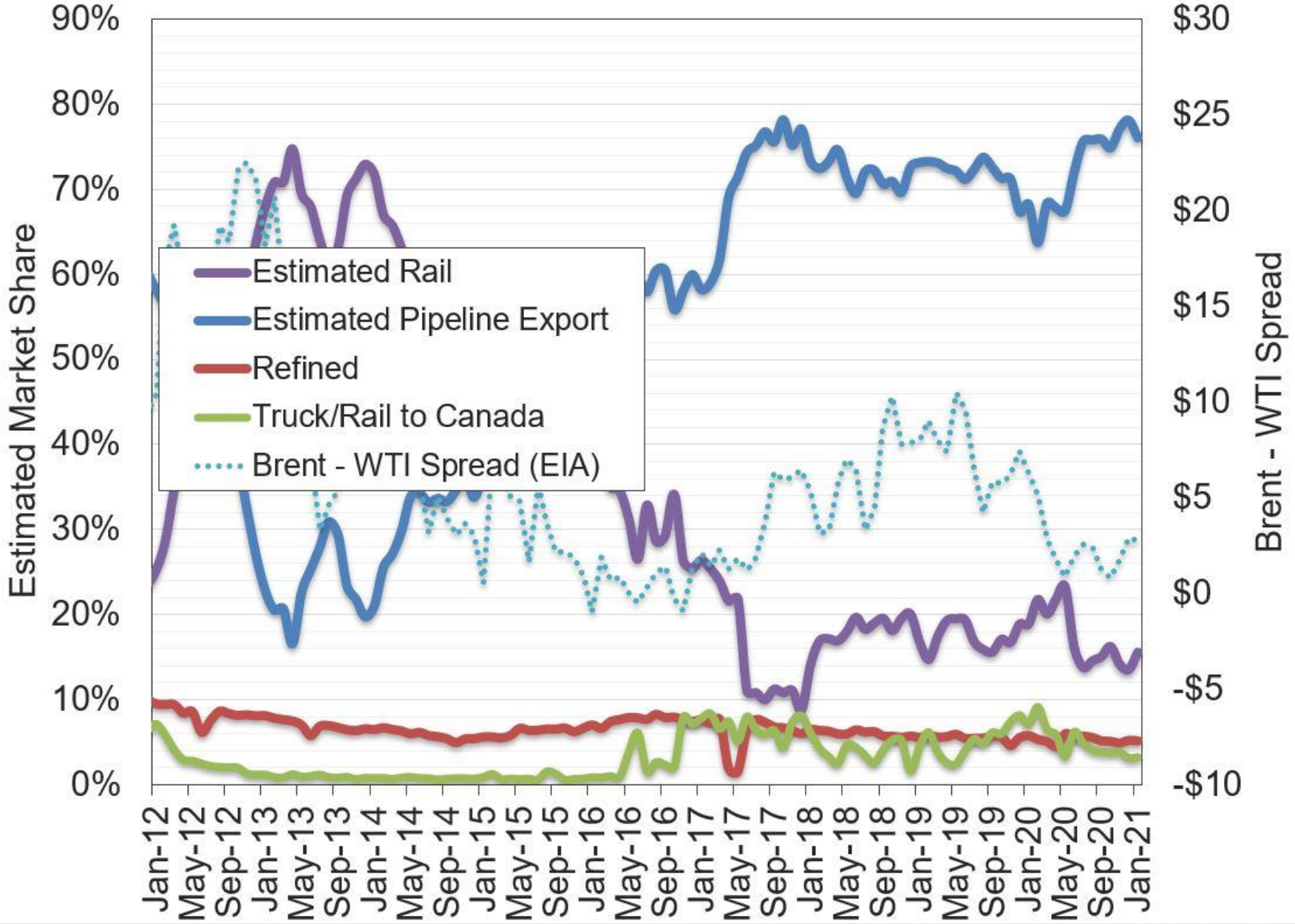
# North Dakota Drilling Activity History



# North Dakota Oil Transmission Pipelines

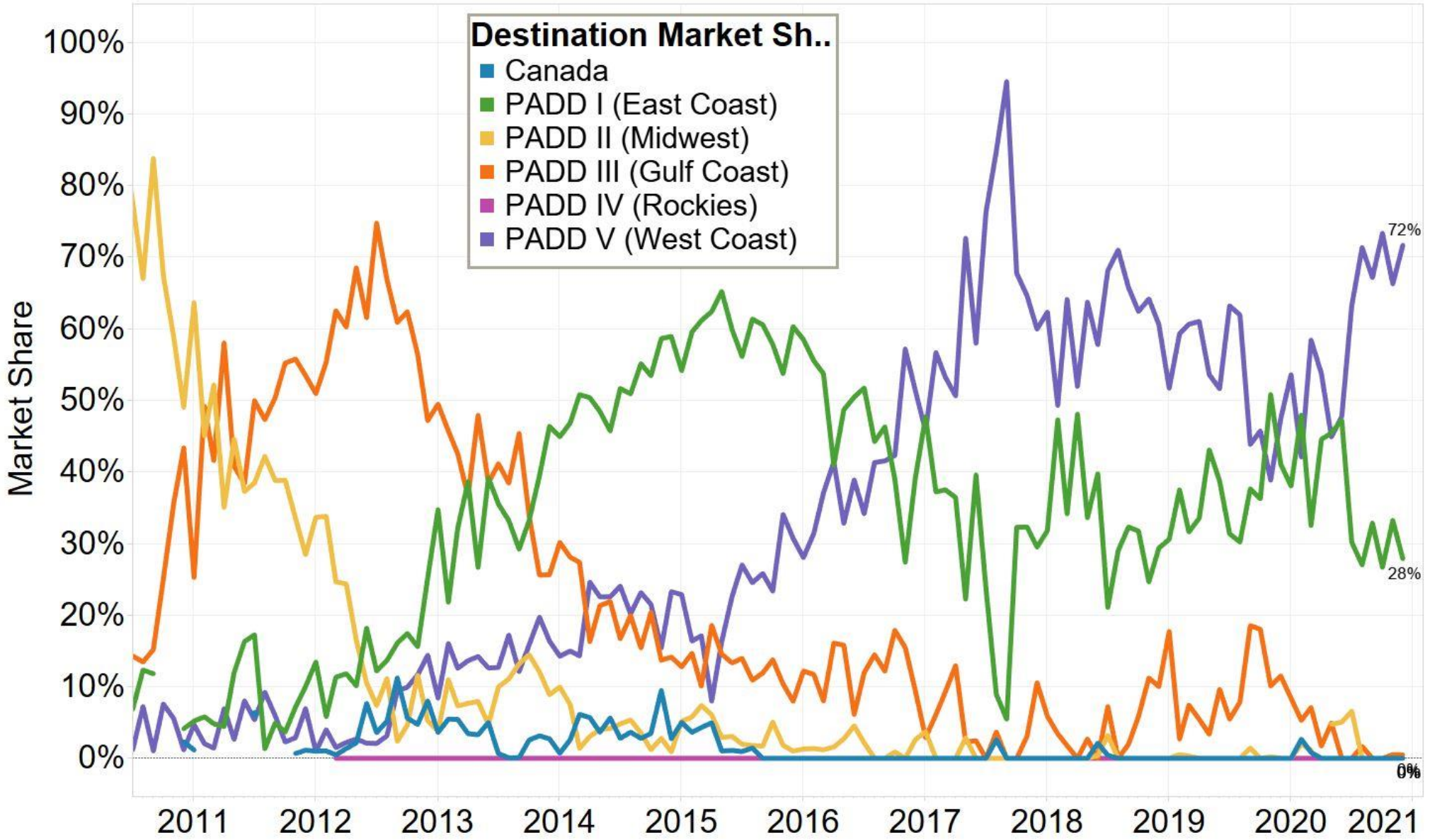


# Estimated Williston Basin Oil Transportation



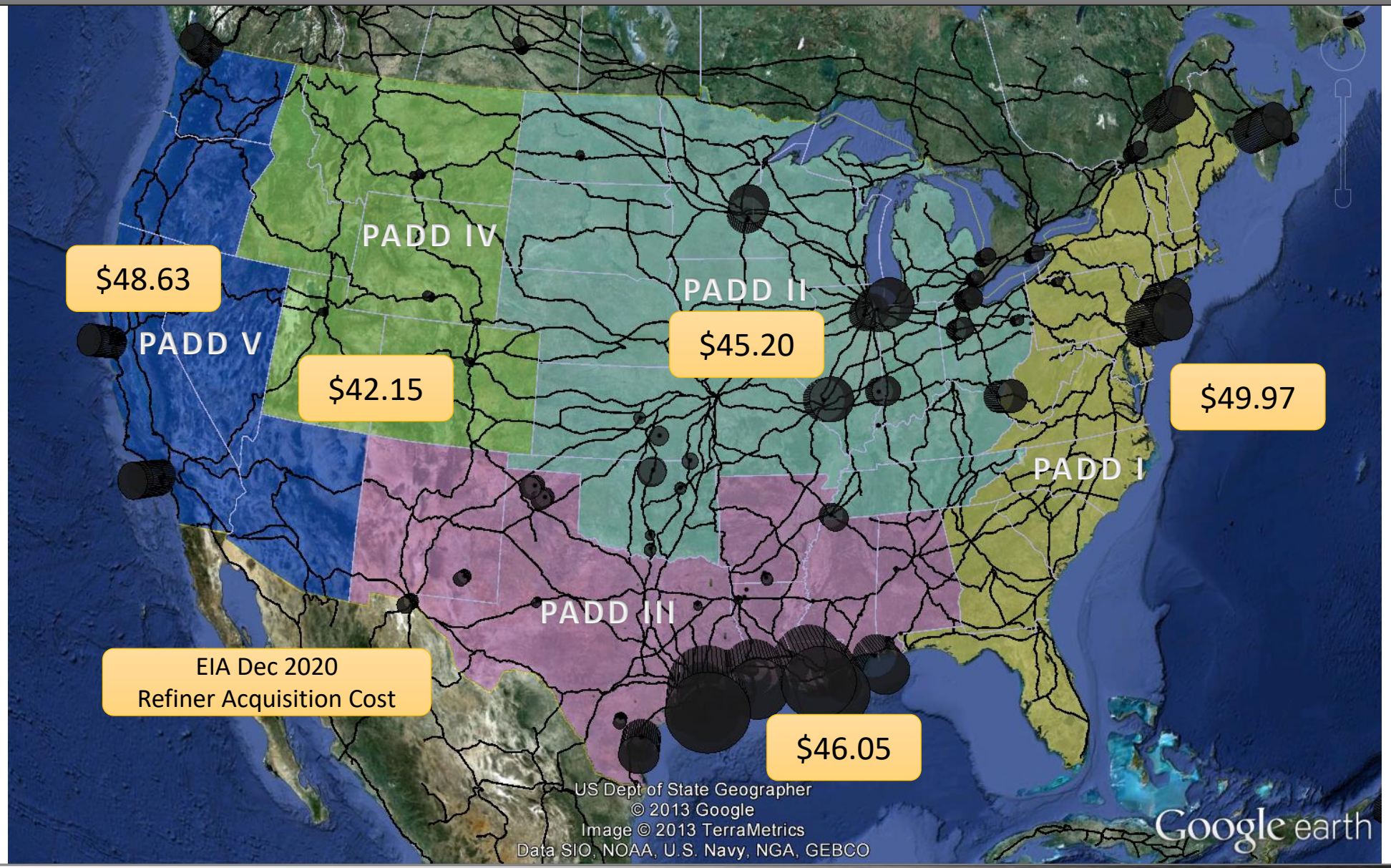
# Estimated ND Rail Export Volumes

# Rail Destinations Market Share (Dec 2020)

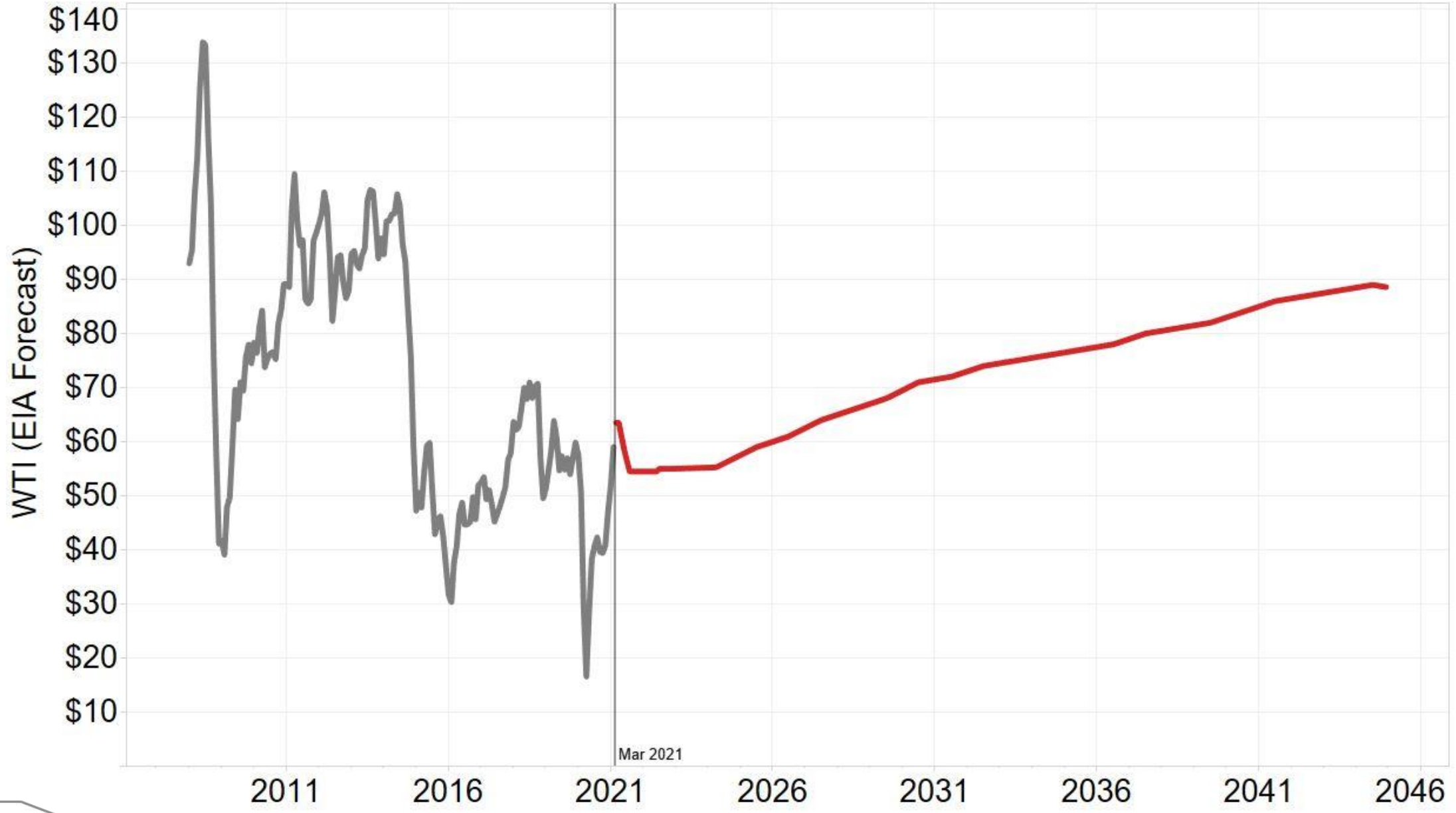



*Data for Rail Destination Market Share Provided by the US Energy Information Administration*

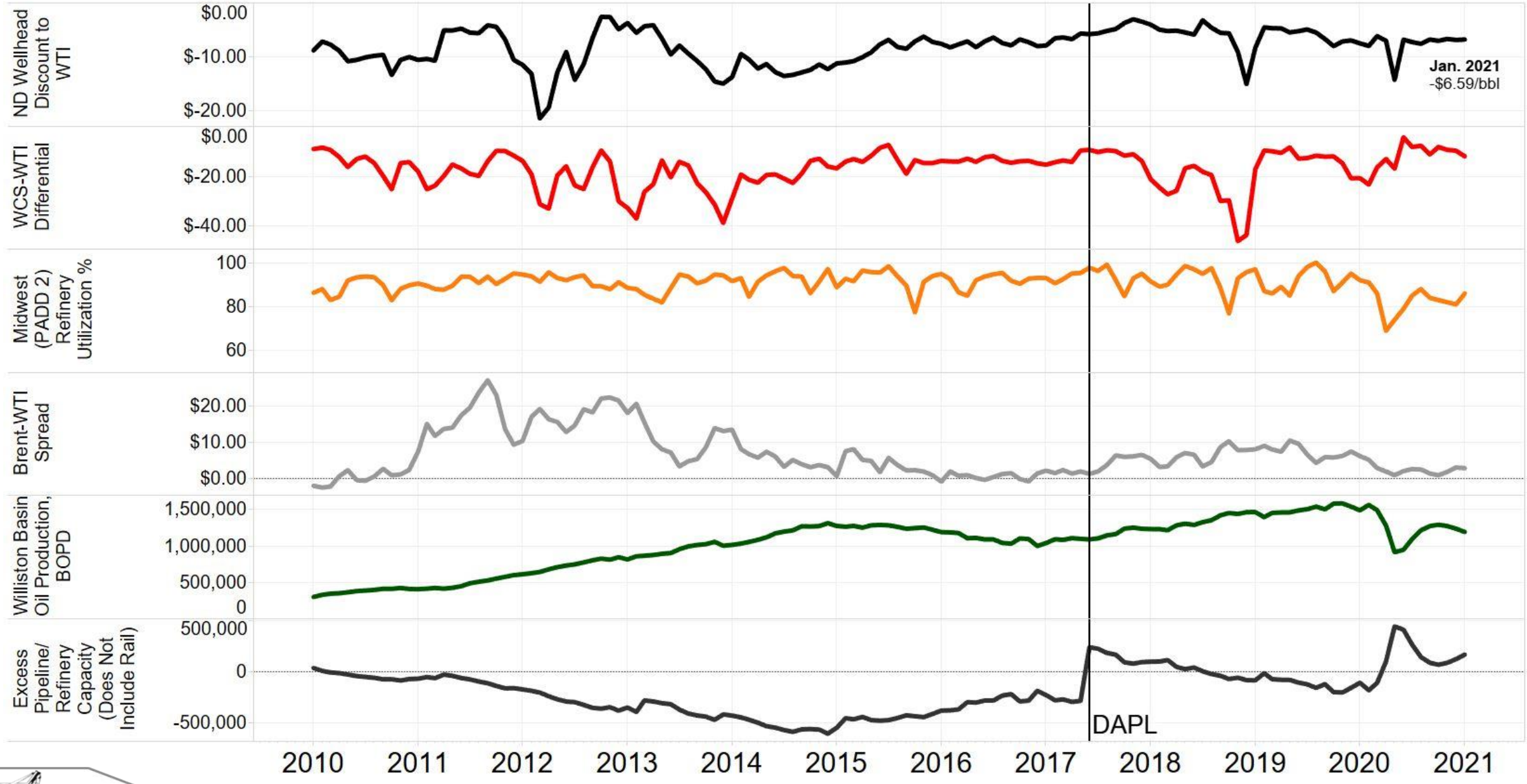
# Major Rail Lines and Refineries



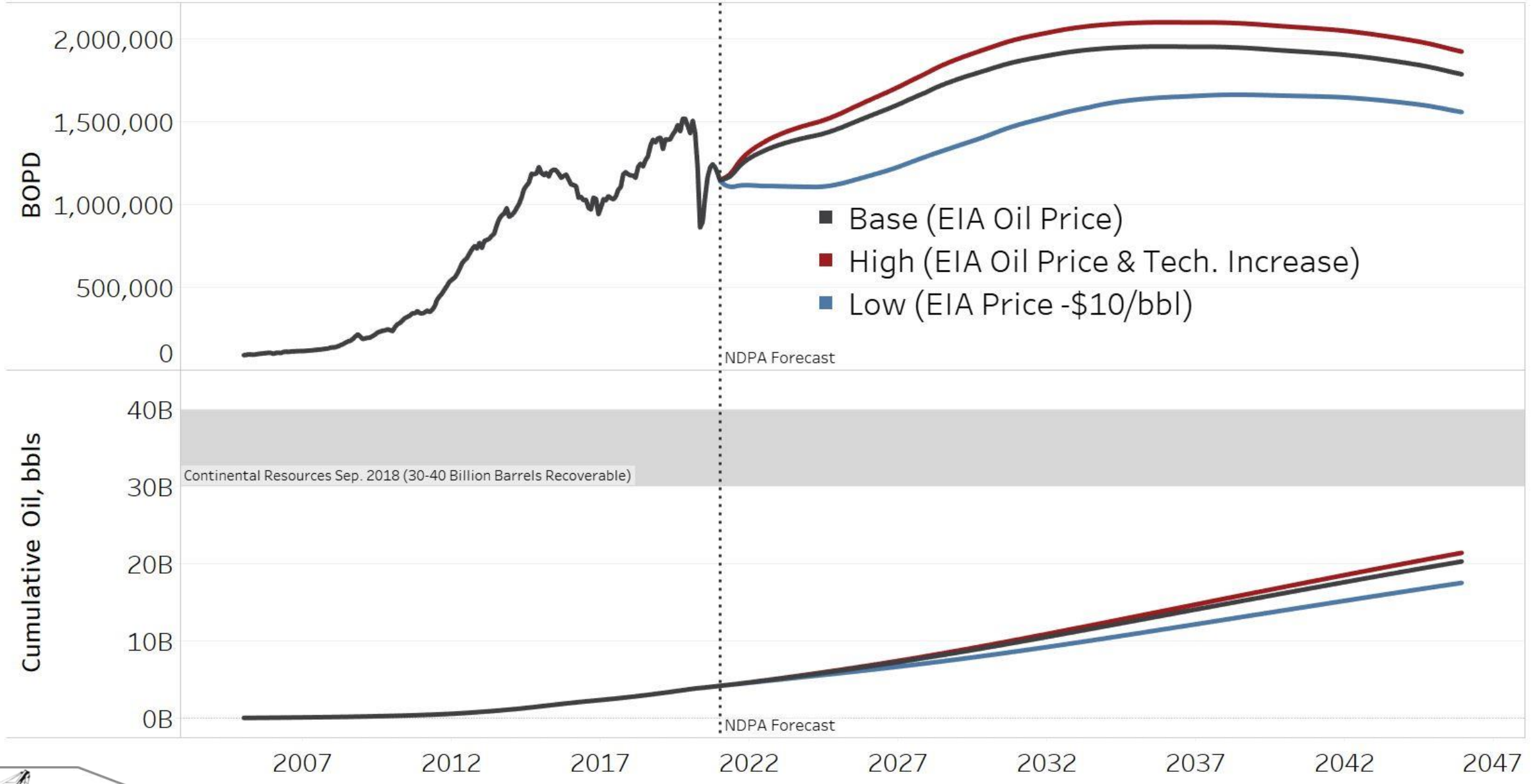
# EIA Oil Price Outlook



# North Dakota Oil Pricing

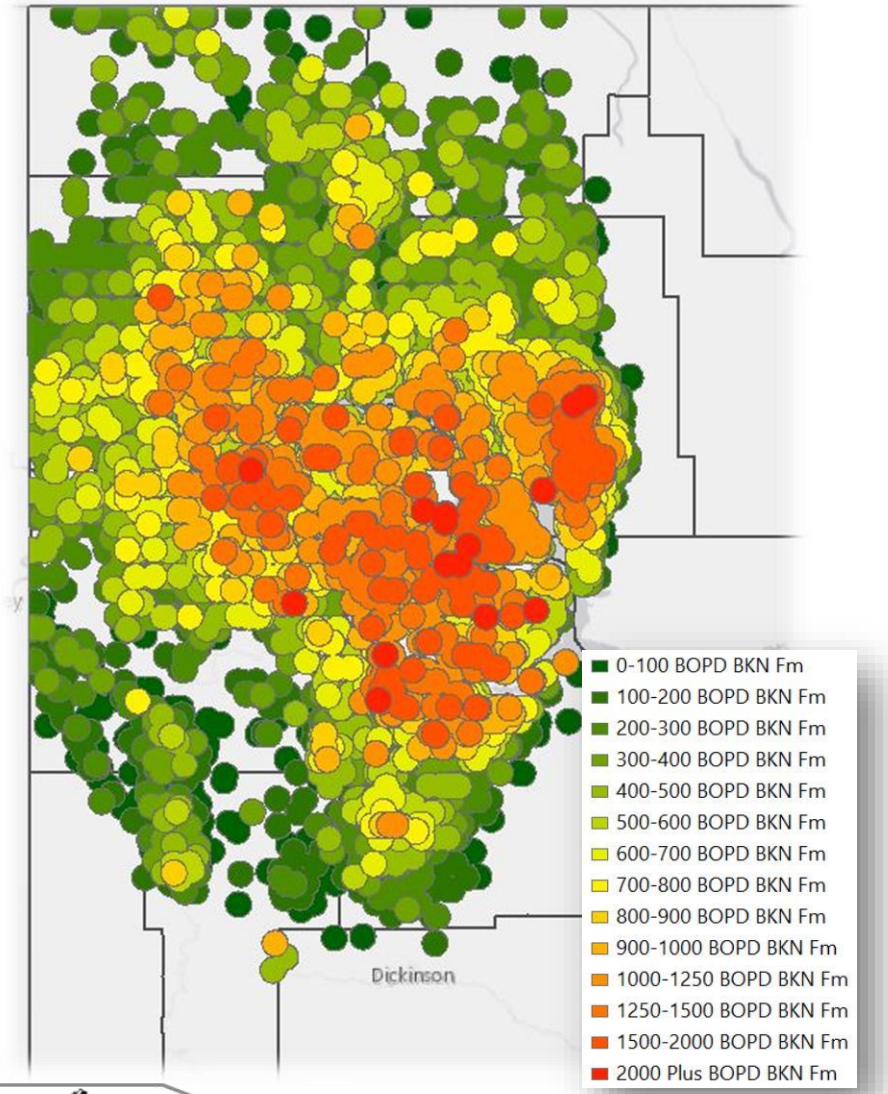


# ND Oil Production: EIA Price Deck

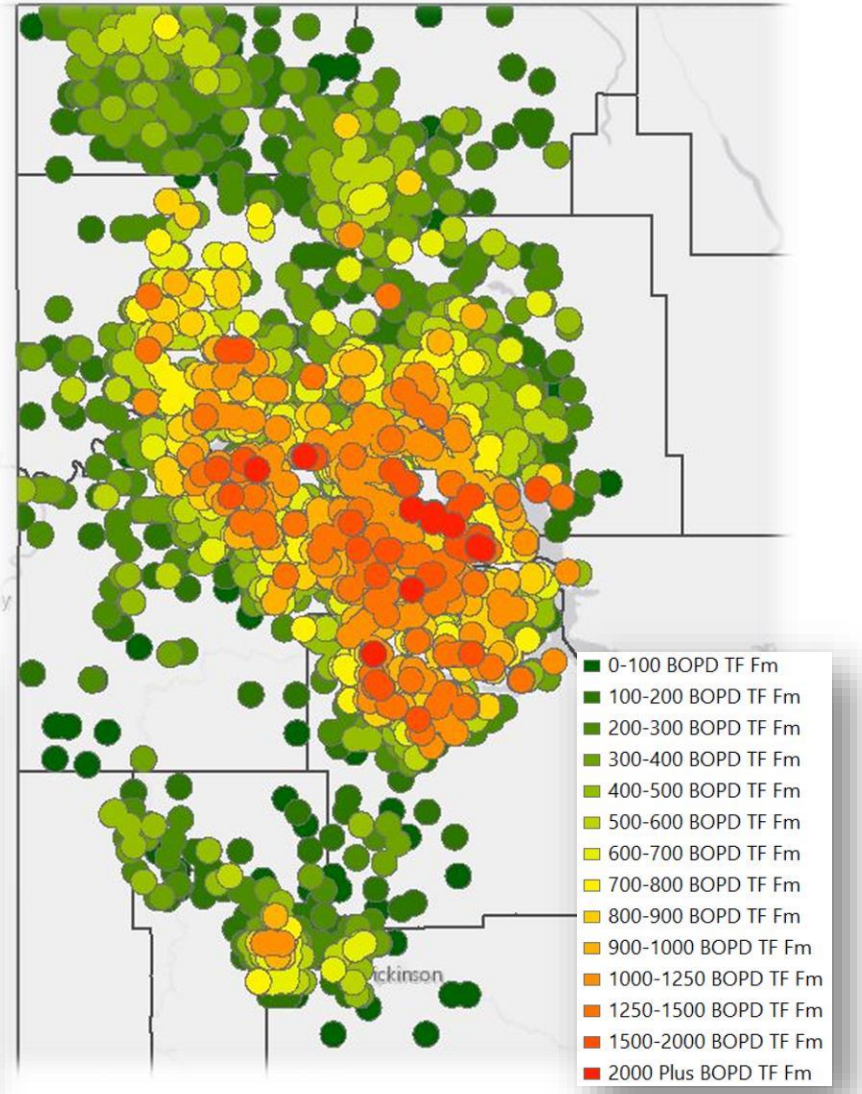


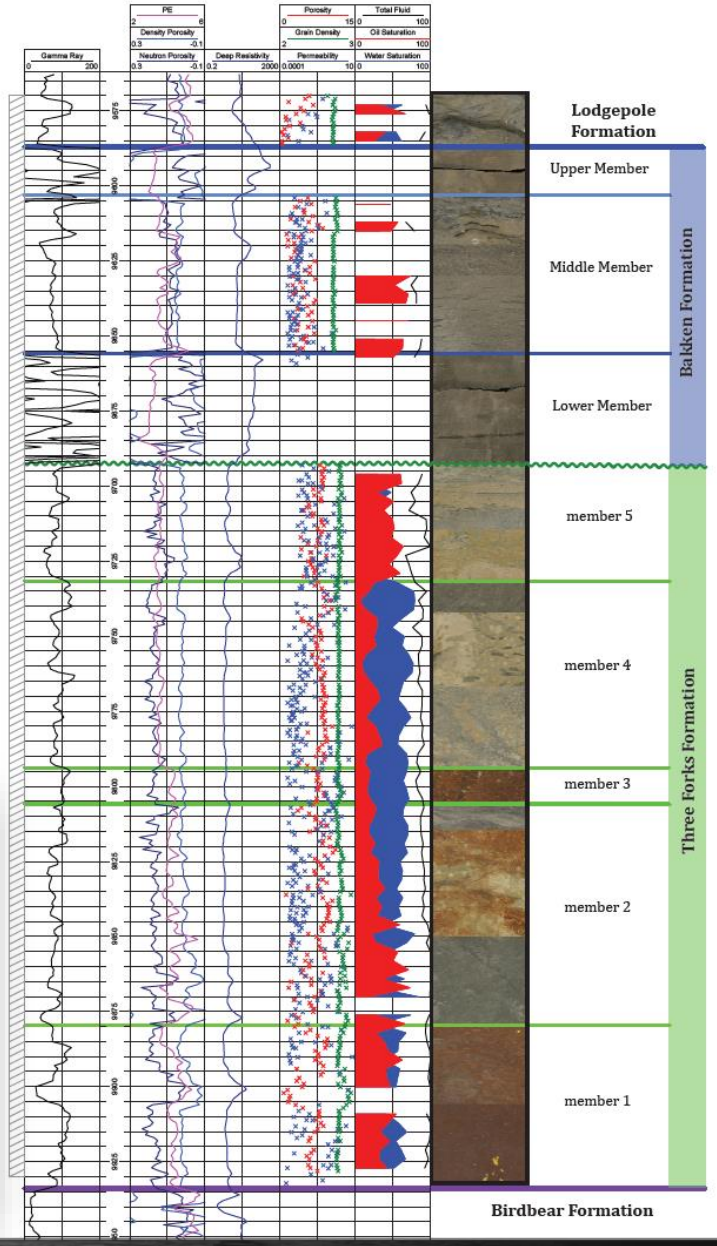
# Bakken & Three Forks Formations

Bakken Formation

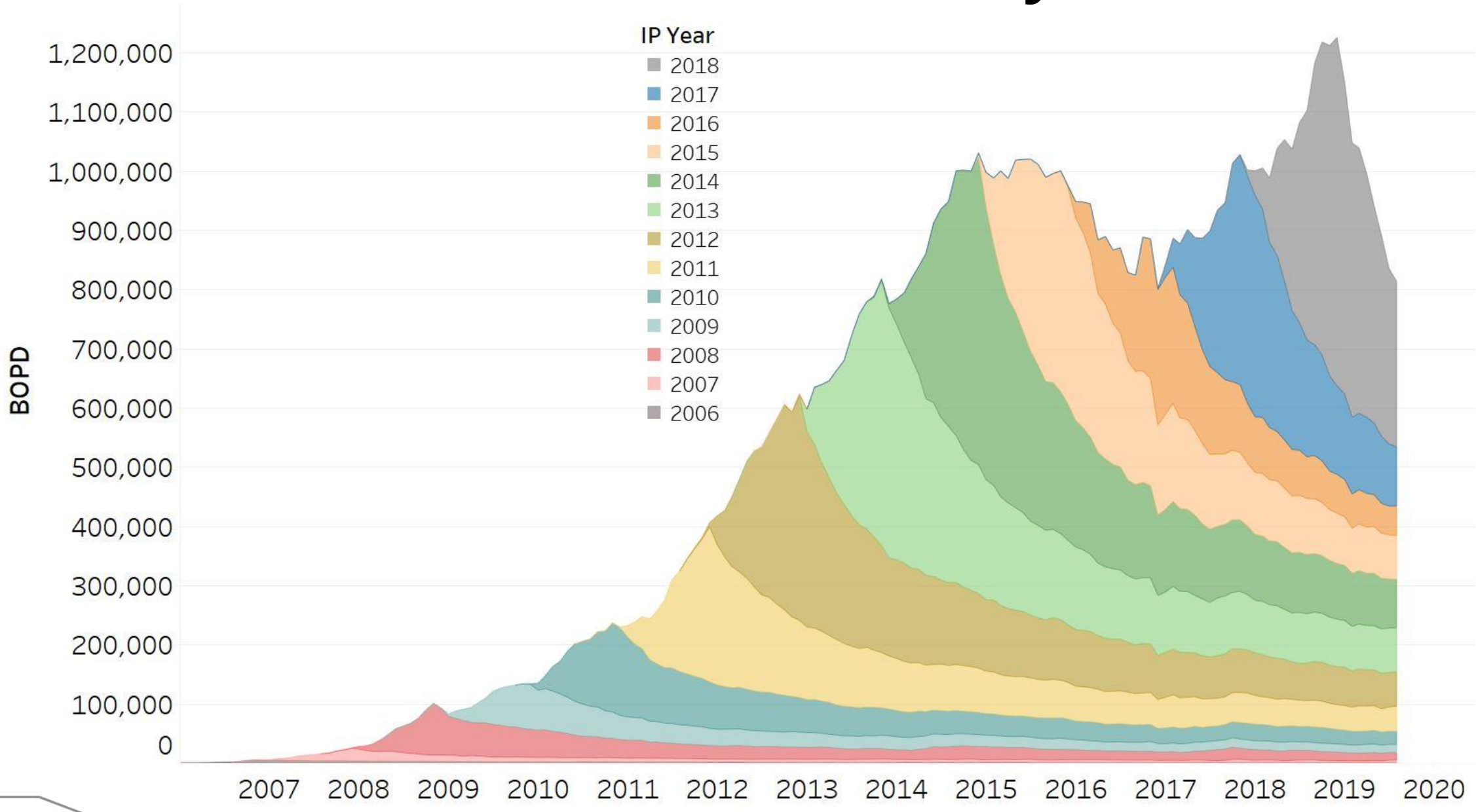



Three Forks Formation

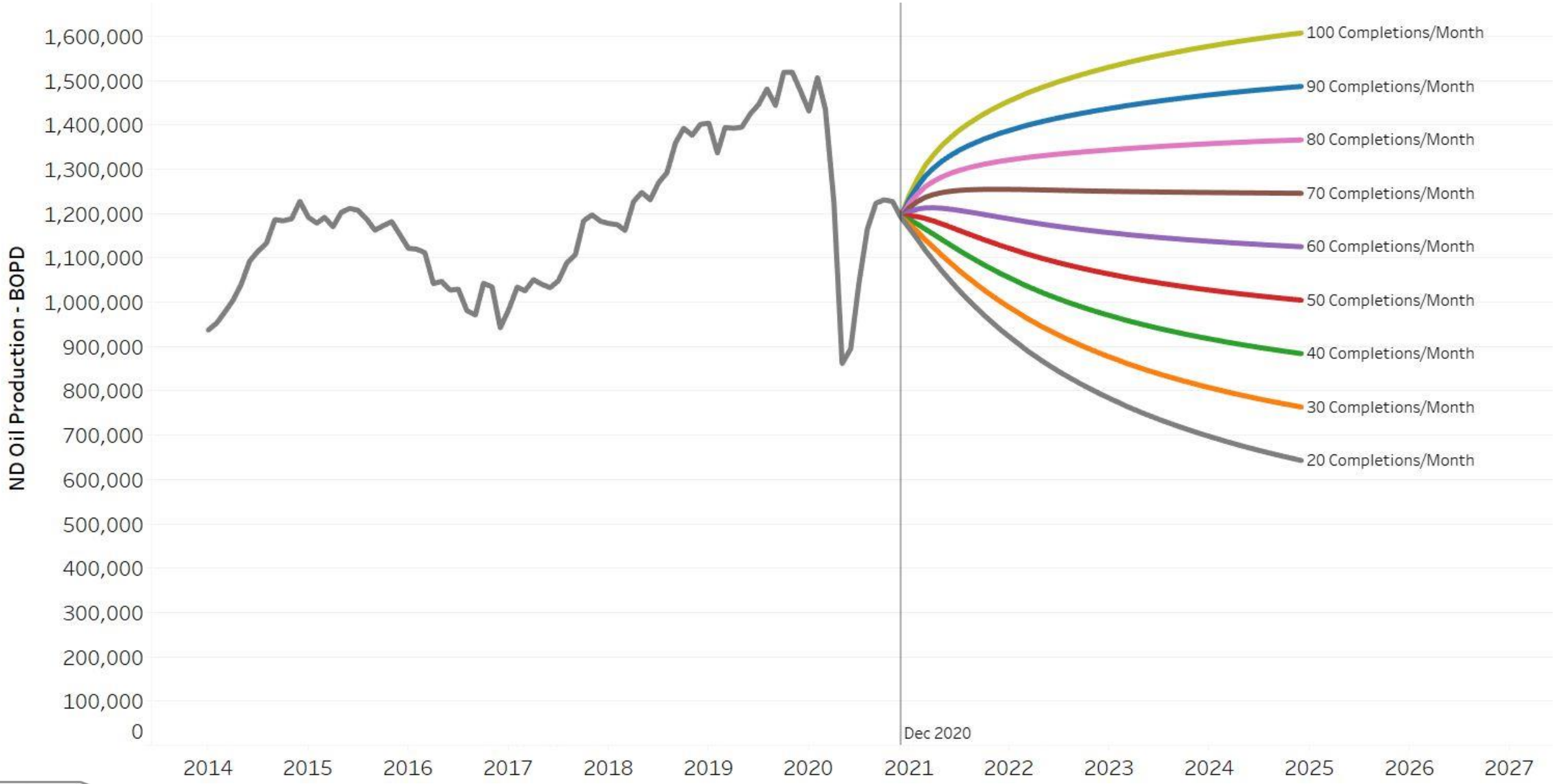


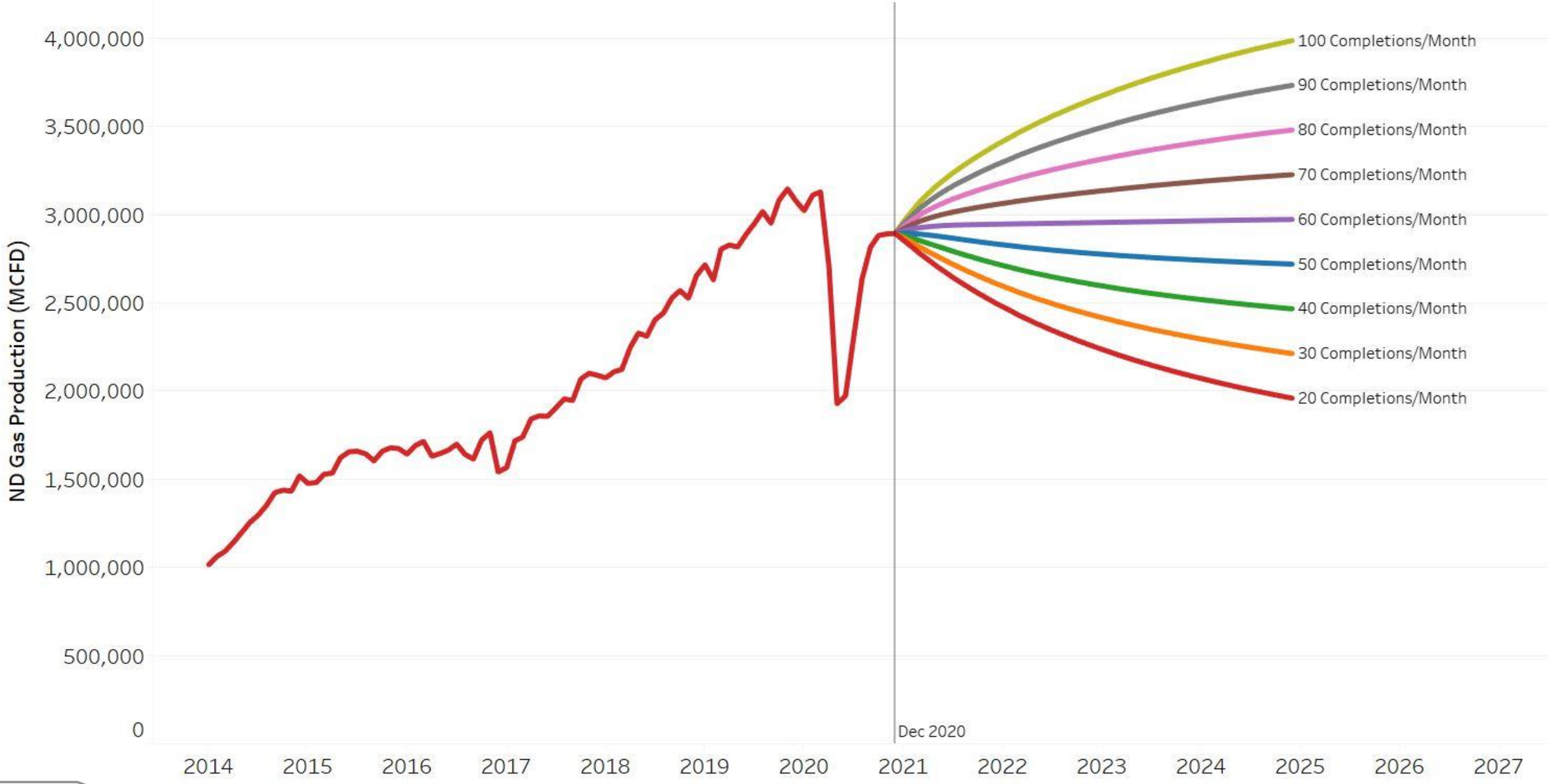
# Bakken Oil Production by IP Year



# Monthly Completion Scenarios - Oil



# Monthly Completion Scenarios - Gas



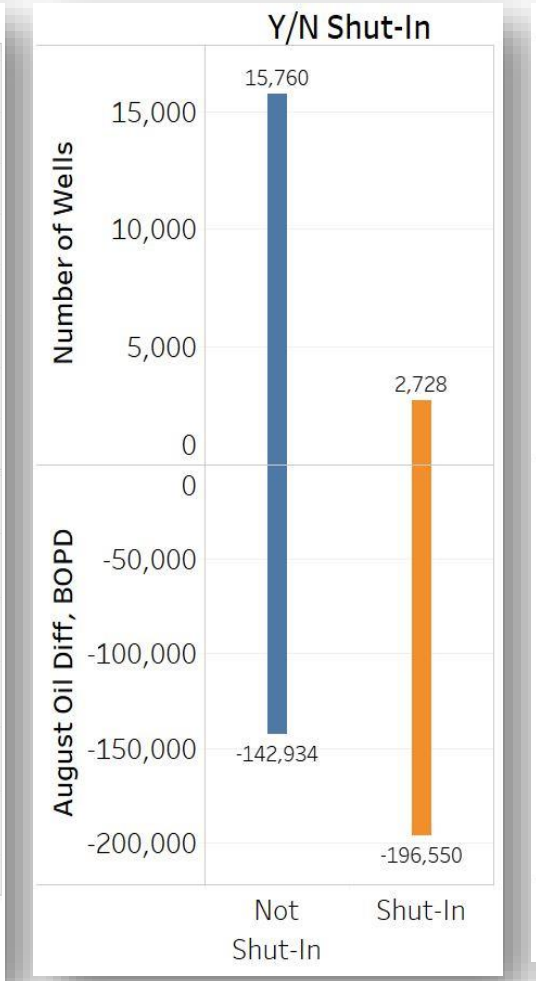
# May to September Shut-In Comparison

May 2020

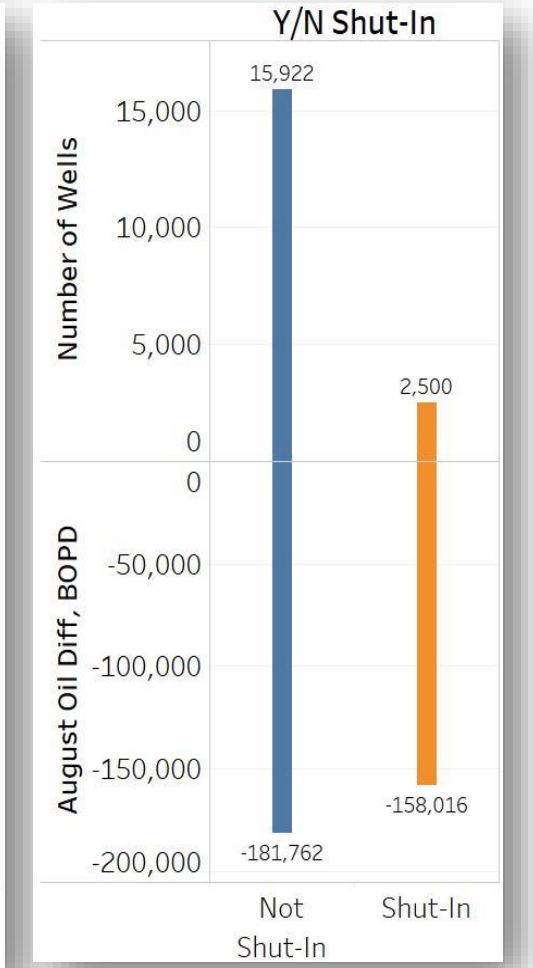

June 2020


July 2020

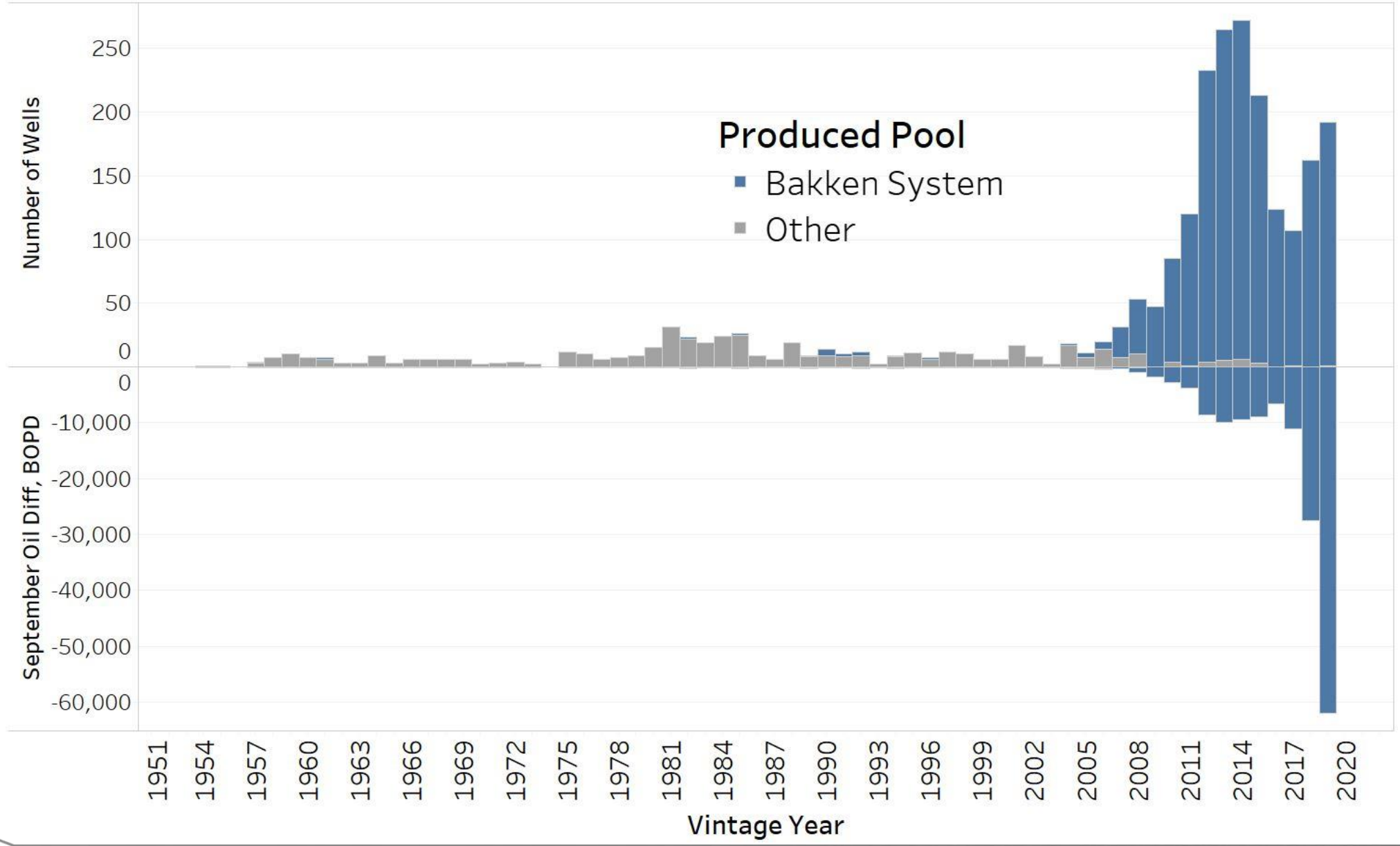

Aug. 2020




Sep. 2020

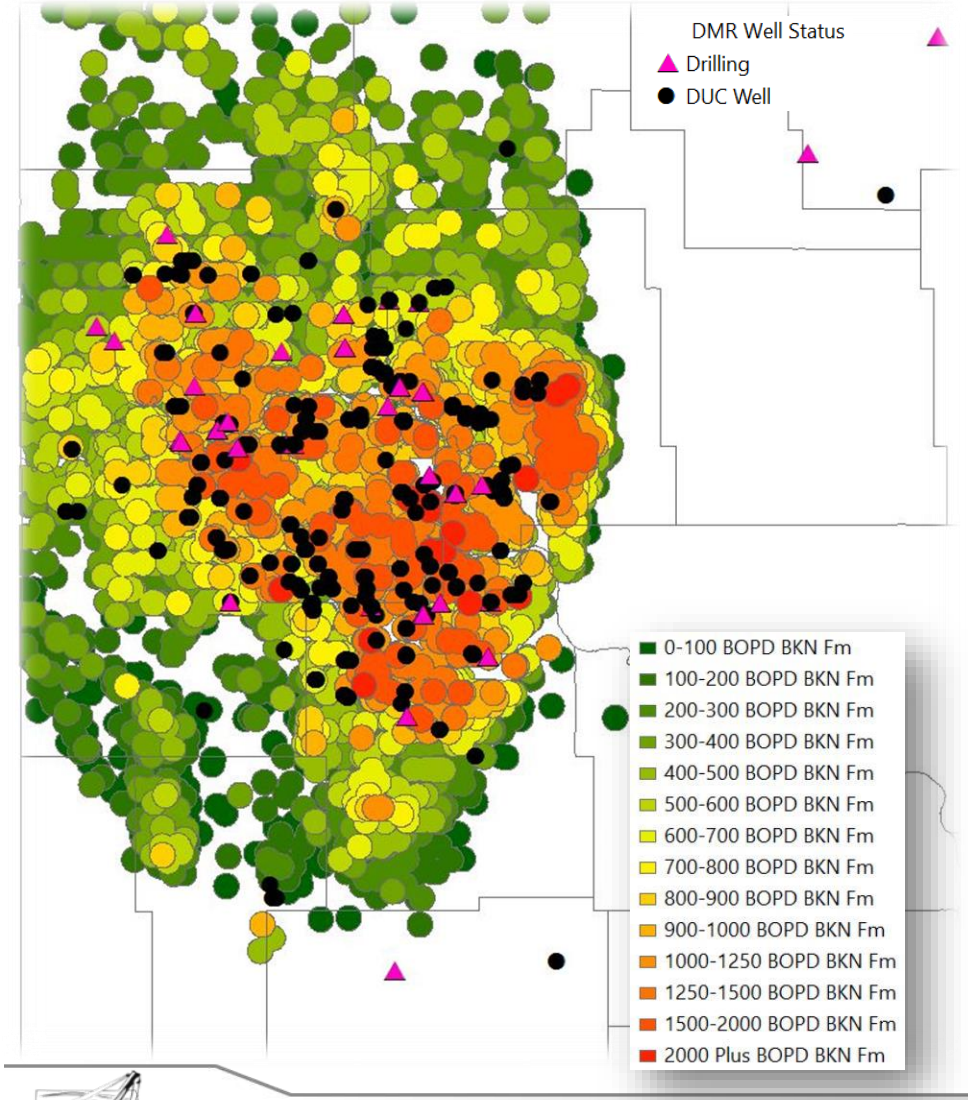


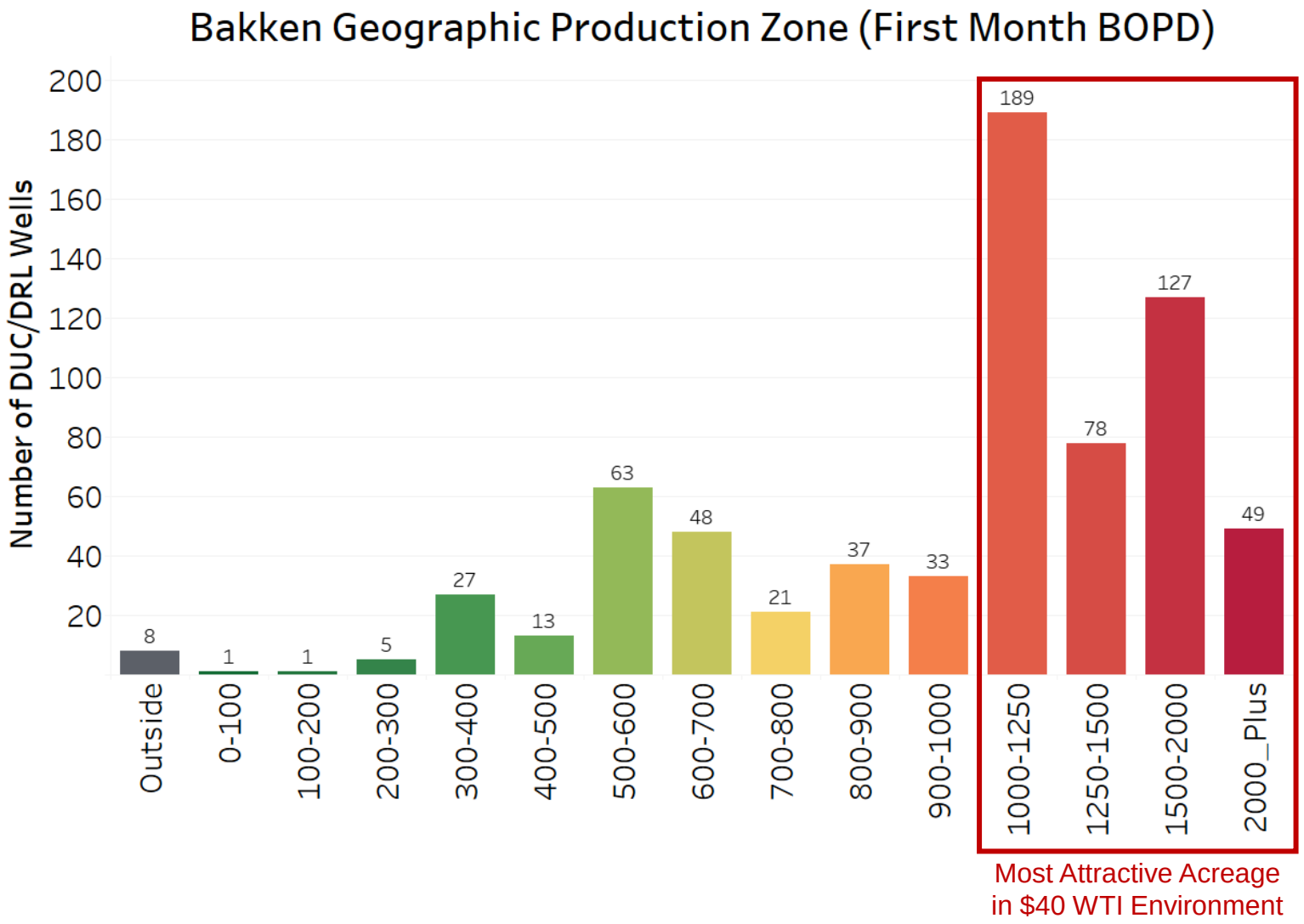
# Vintage Year of Shut-In Wells – September 2020



# North Dakota Wells Waiting on Completion – October 2020

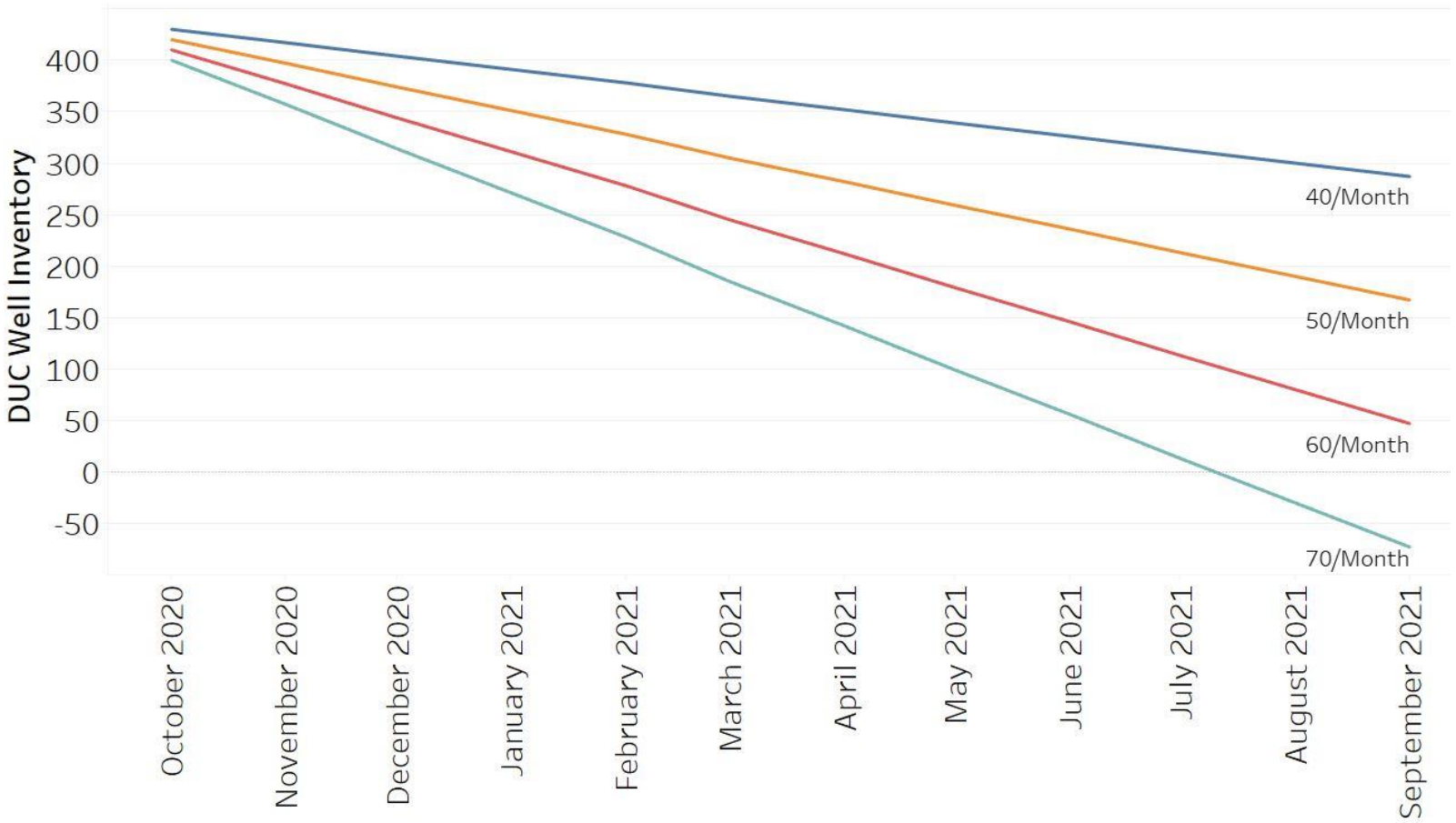
Bakken Formation

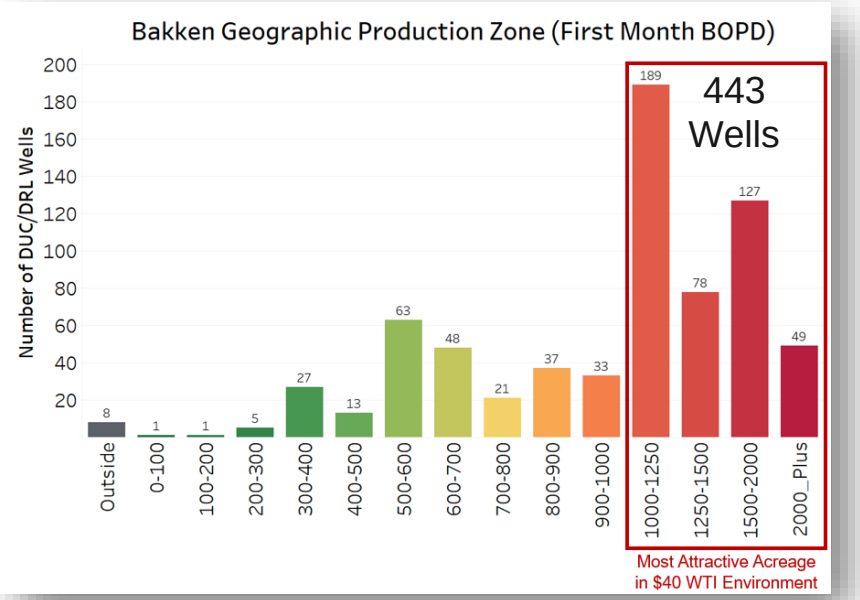


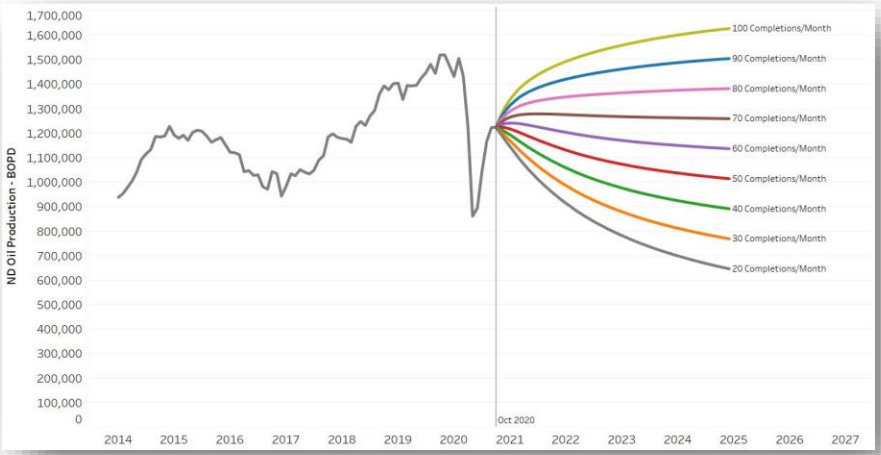




Most Attractive Acreage in $40 WTI Environment

# Completion Scenarios & DUC Inventory*

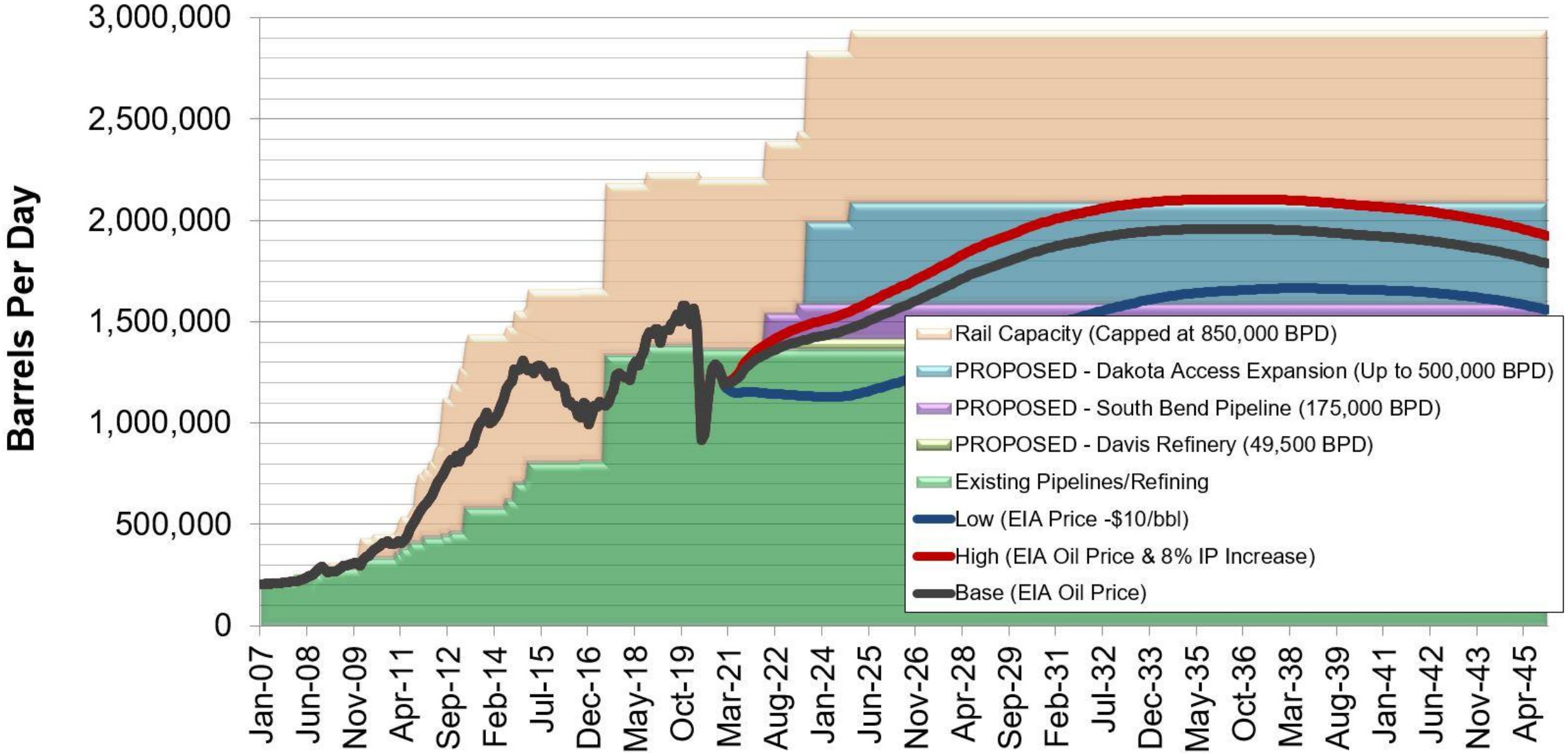


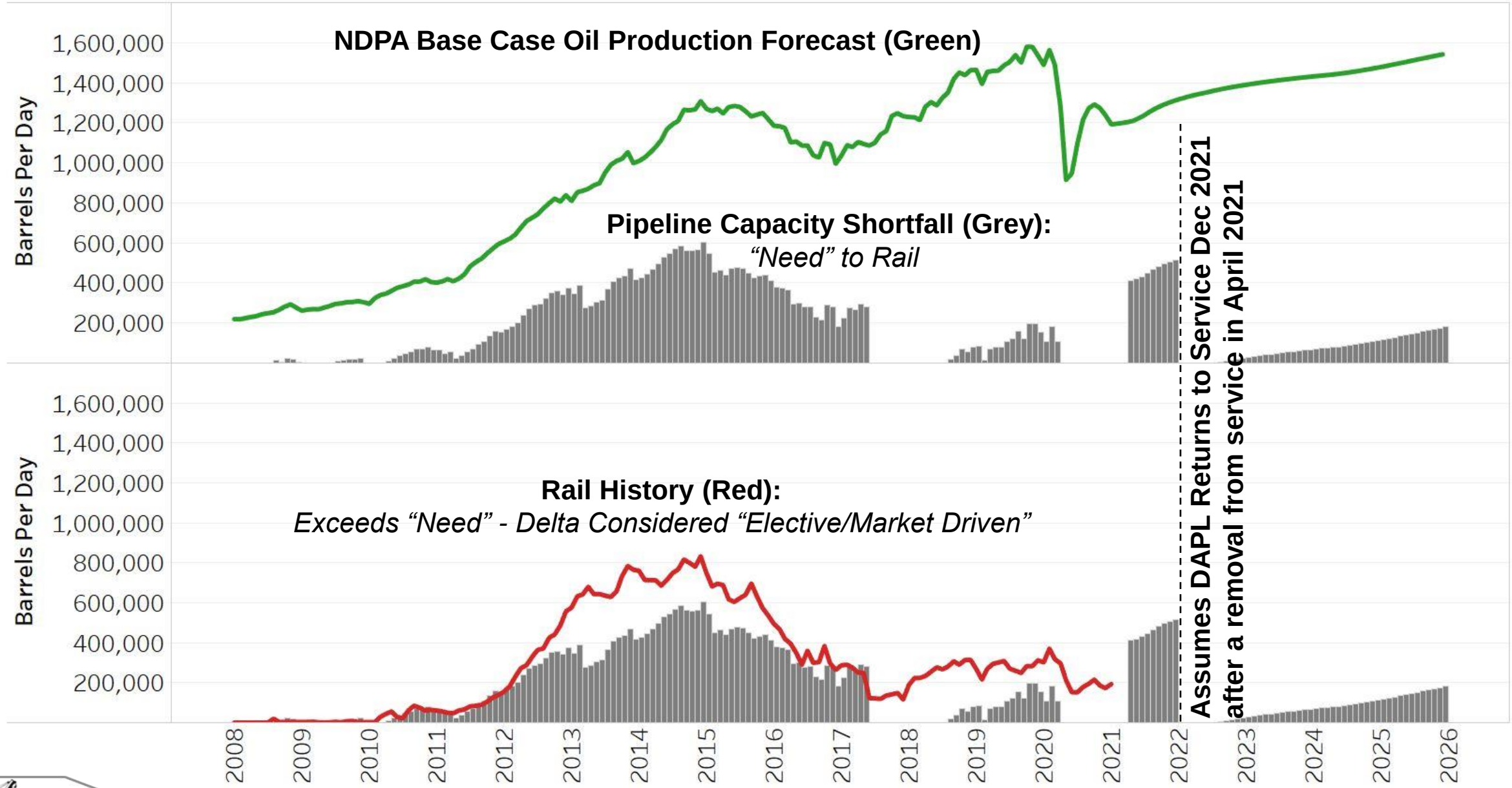




*Assumes 15 Rigs @ 1.8 New Wells Per Month

# Williston Basin Oil Production & Export Capacity, BOPD



# Rail Transport Outlook if DAPL is Shutdown



# Snapshot from DAPL Tariff

**DAKOTA ACCESS, LLC**
**JOINT PIPELINE TARIFF**
**In Connection With**
**Energy Transfer Crude Oil Company, LLC**

Applying On
**CRUDE PETROLEUM**
**FROM POINTS IN NORTH DAKOTA**
**TO POINTS IN TEXAS AND TENNESSEE**

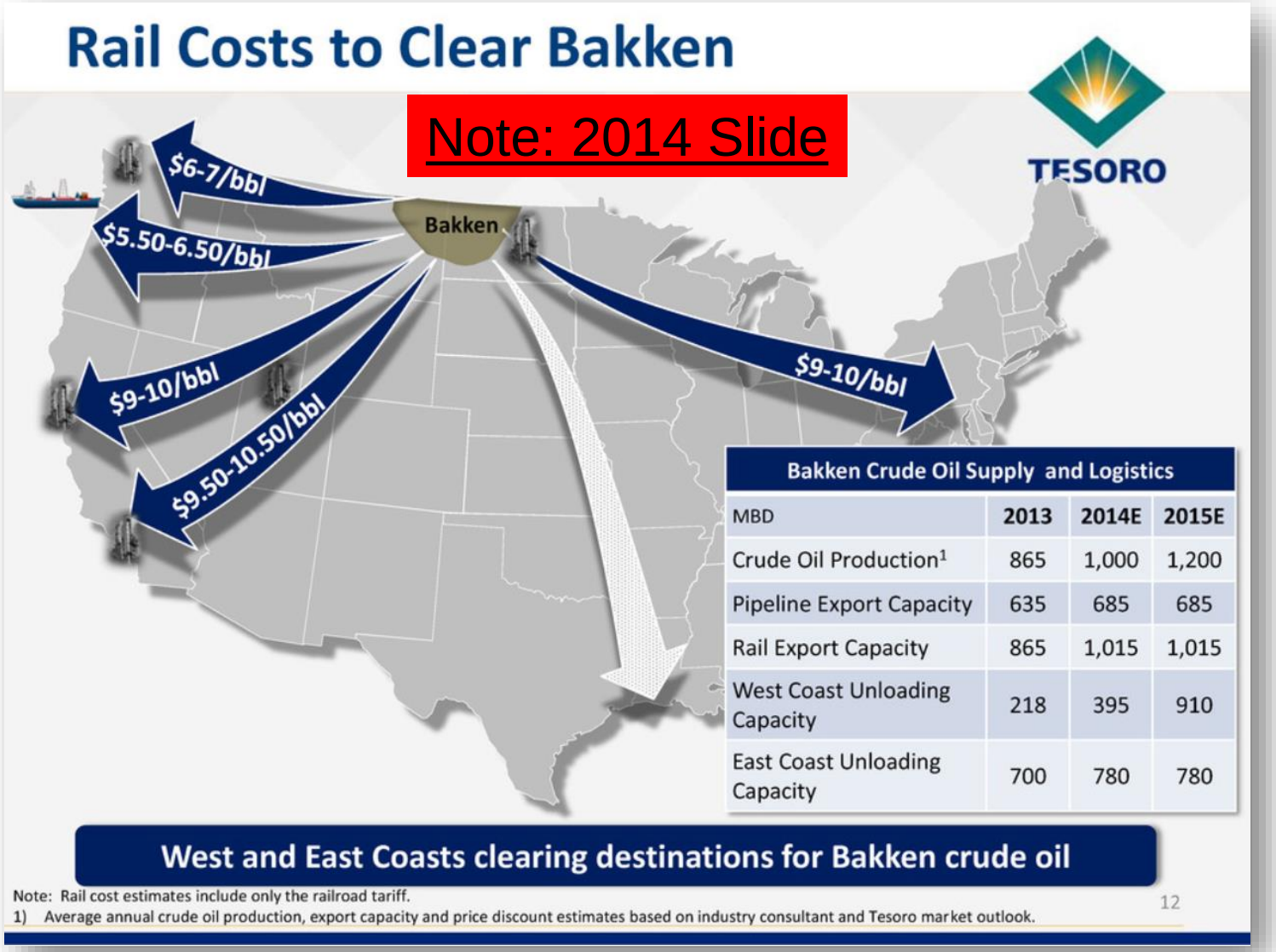
**TABLE OF RATES**
**ALL Rates in dollars per barrel of 42 US gallons**

| UNCOMMITTED RATES FOR BAKKEN CRUDE PETROLEUM | | |
|---|---|---|
| **From** | **To**<br>**Nederland, Jefferson County, Texas**<br>(SXL Nederland Terminal or P66 Nederland Terminal) | **To**<br>**Collierville, Tennessee**<br>(Valero Terminal) |
| An Origin Point that is an Eligible Bakken Origin Point* | $8.3492 | $8.3492 |

**Committed Rates for Bakken Crude Petroleum from a Committed Shipper's Selected Origin Point(s) that is an Eligible Bakken Origin Point* to Destination Point of NEDERLAND, Texas – SXL Nederland Terminal**

| | Term | |
|---|---|---|
| **Volume Commitment (bpd)^** | **7 Years** | **10 Years** |
| 3,500 – 29,999 | $7.0358** | $6.7652** |
| 30,000 – 49,999 | $6.7652** | $6.4946** |
| 50,000 – 69,999 | $6.4946** | $6.2240** |
| 70,000 – 89,999 | $6.4946** | $6.0616** |
| 90,000+ | $6.0616** | $5.9534** |

# Look at Key Rail Rates




Slide Source: SEC.GOV - 2014

## Additional Rail Related Expense Considerations:

- Loading
- Unloading
- Car Leasing
- Unit vs Manifest
- Volume Commitments

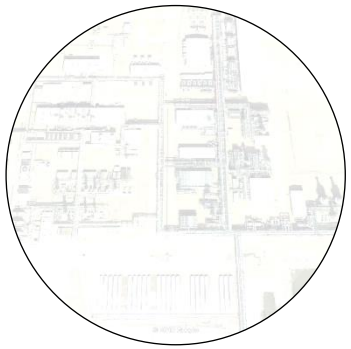
# Natural Gas Update

## Production

- Technology
- Markets

## Gathering

- Capacity
- Connections



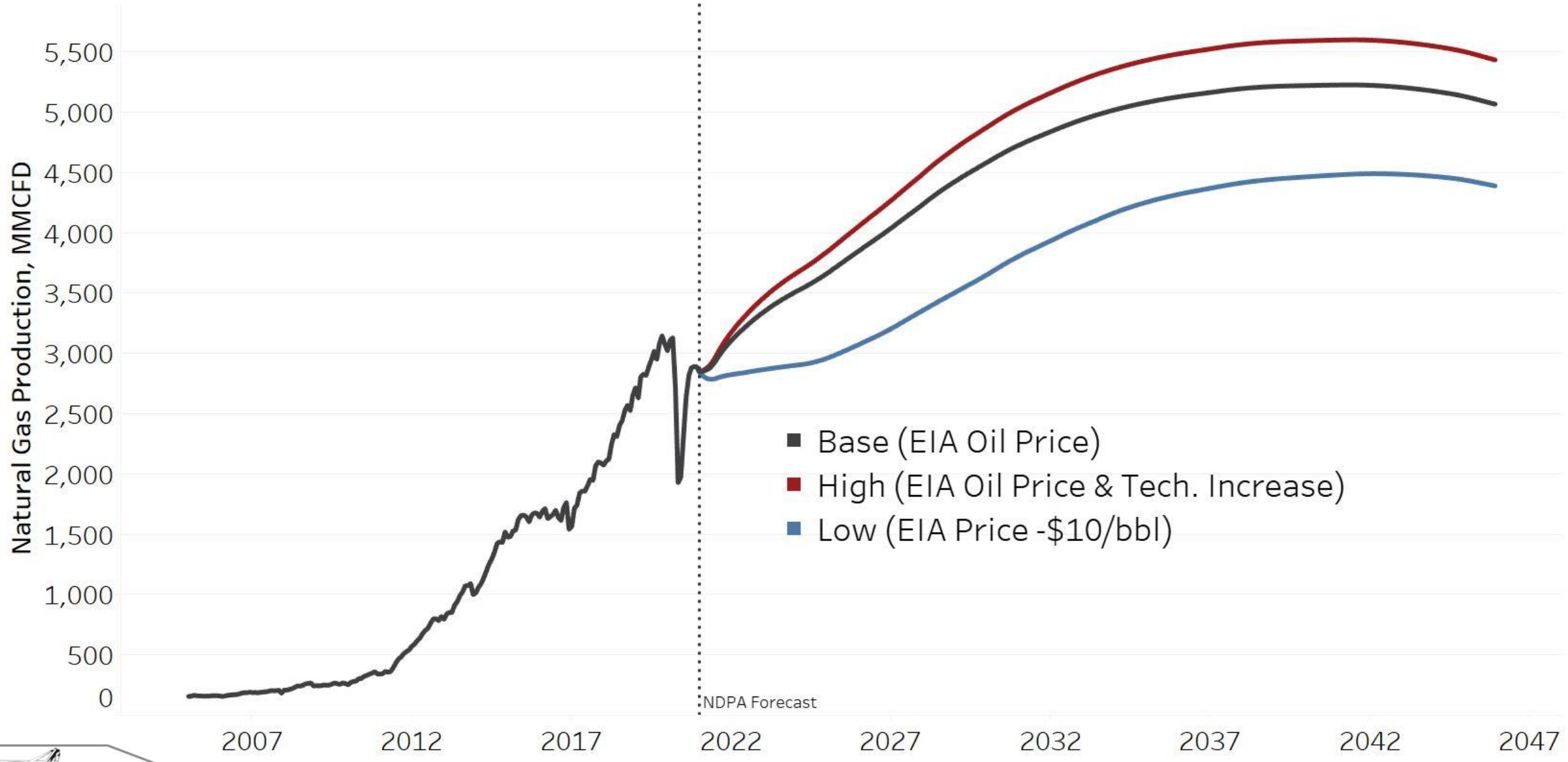
## Processing

- Capacity
- Location

## Transmission

- Dry Gas
- Natural Gas Liquids

# ND Gas Production: EIA Price Deck



# Natural Gas Update

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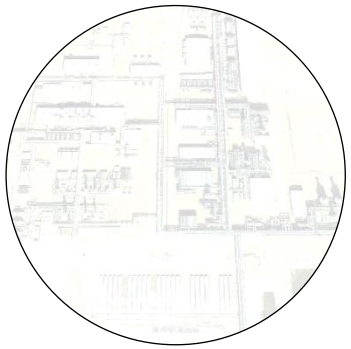


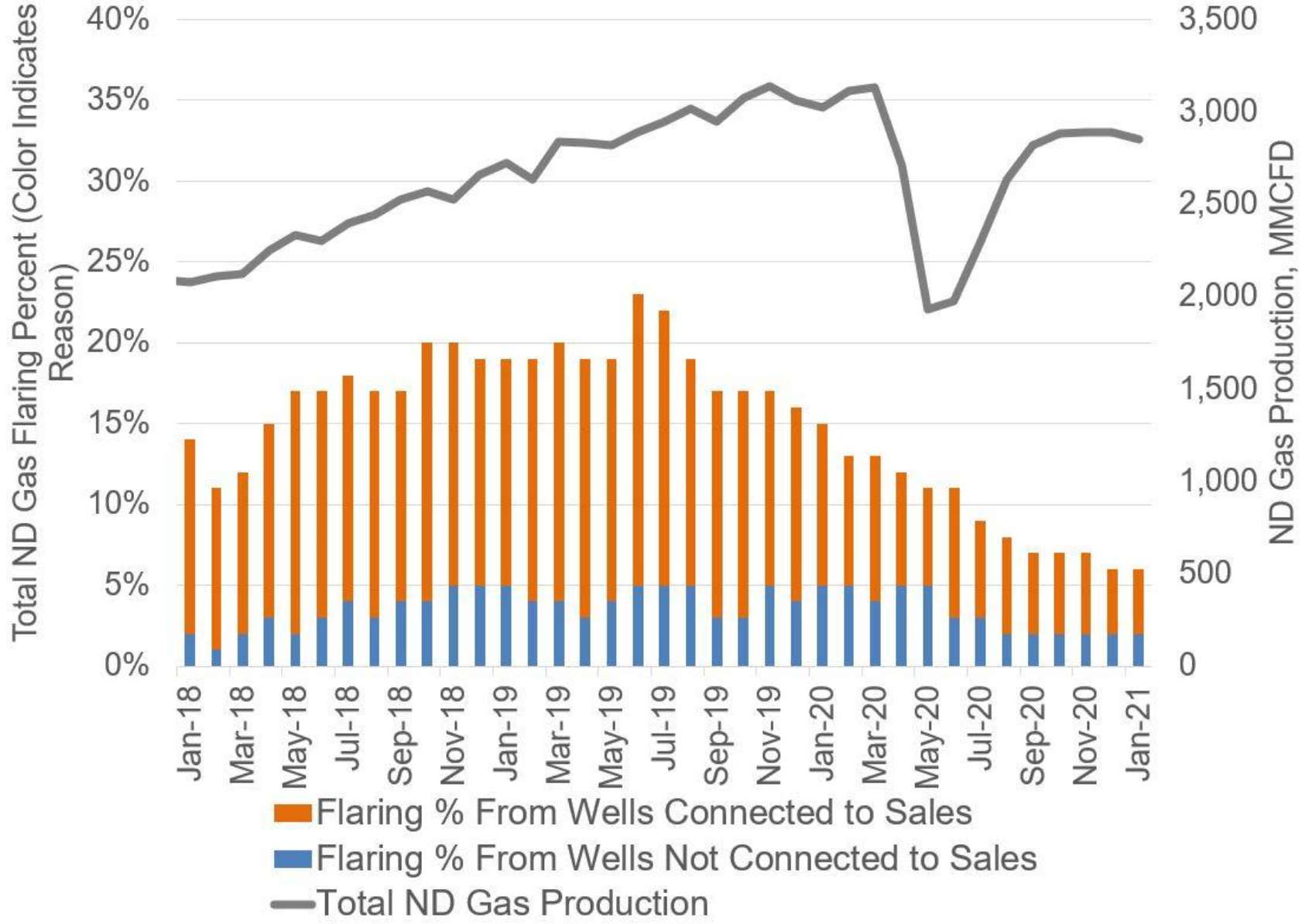
## Processing

- Capacity
- Location

## Transmission

- Dry Gas
- Natural Gas Liquids

# Solving the Flaring Challenge



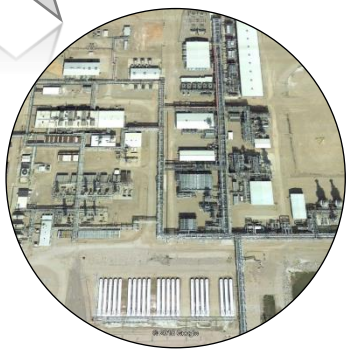
# Natural Gas Update

## Production

- Technology
- Markets

## Gathering

- Capacity
- Connections



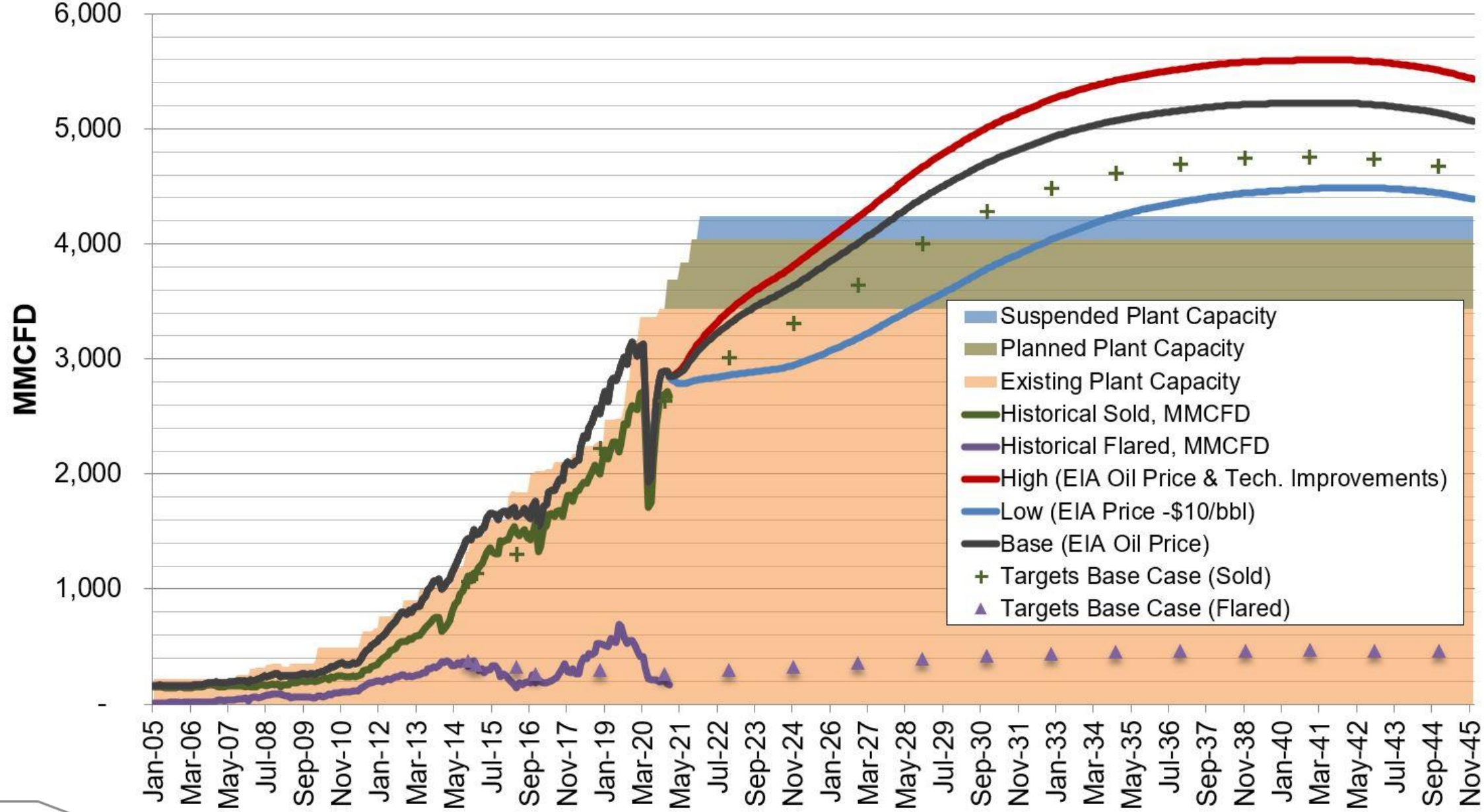
## Processing

- Capacity
- Location

## Transmission

- Dry Gas
- Natural Gas Liquids

# Solving the Flaring Challenge



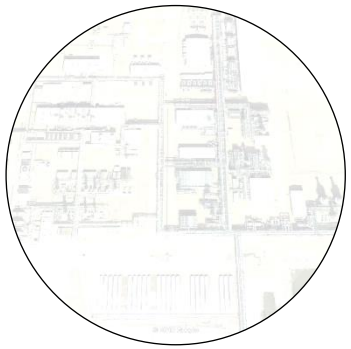
# Natural Gas Update

## Production

- Technology
- Markets

## Gathering

- Capacity
- Connections



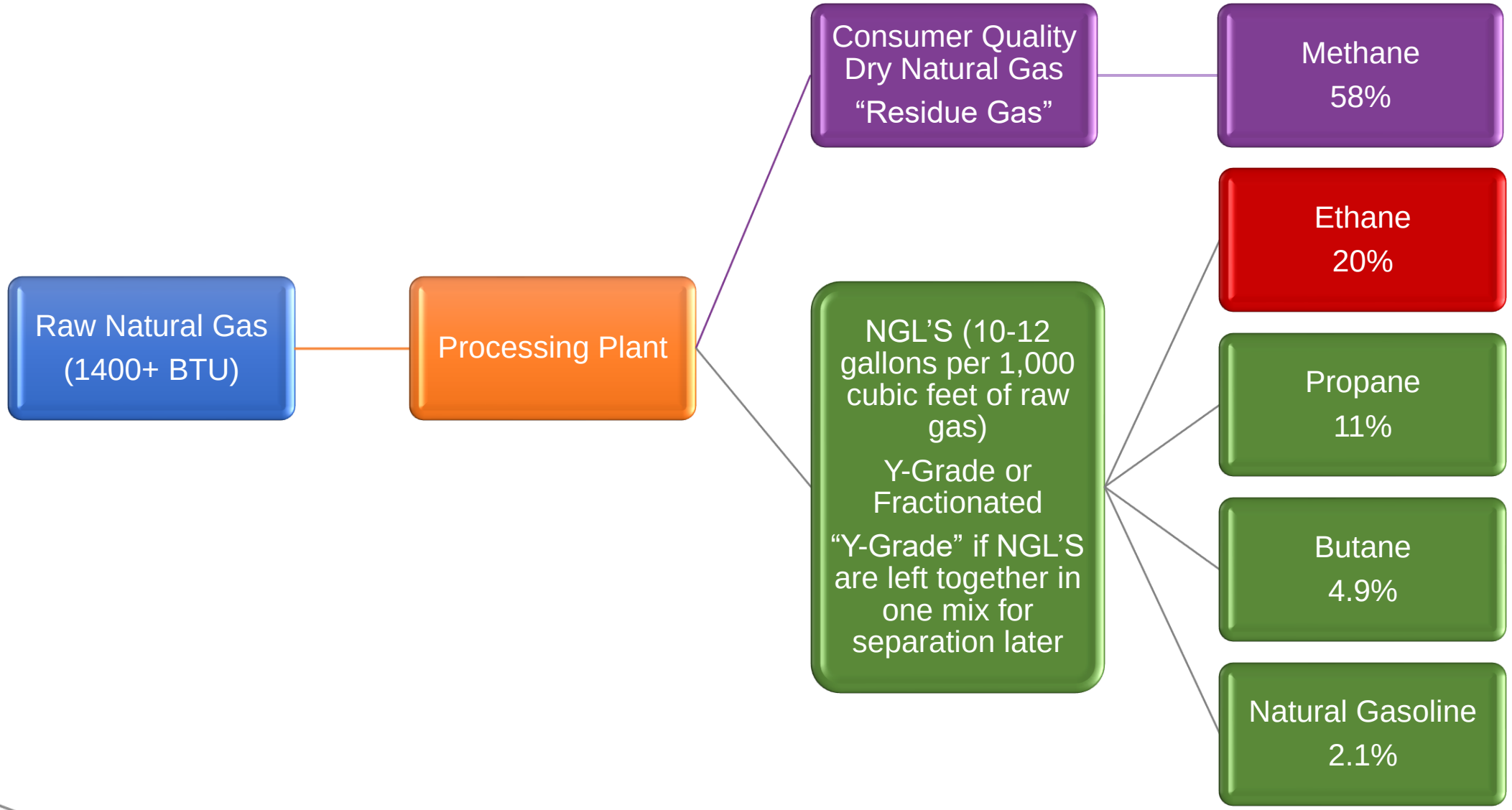
## Processing

- Capacity
- Location

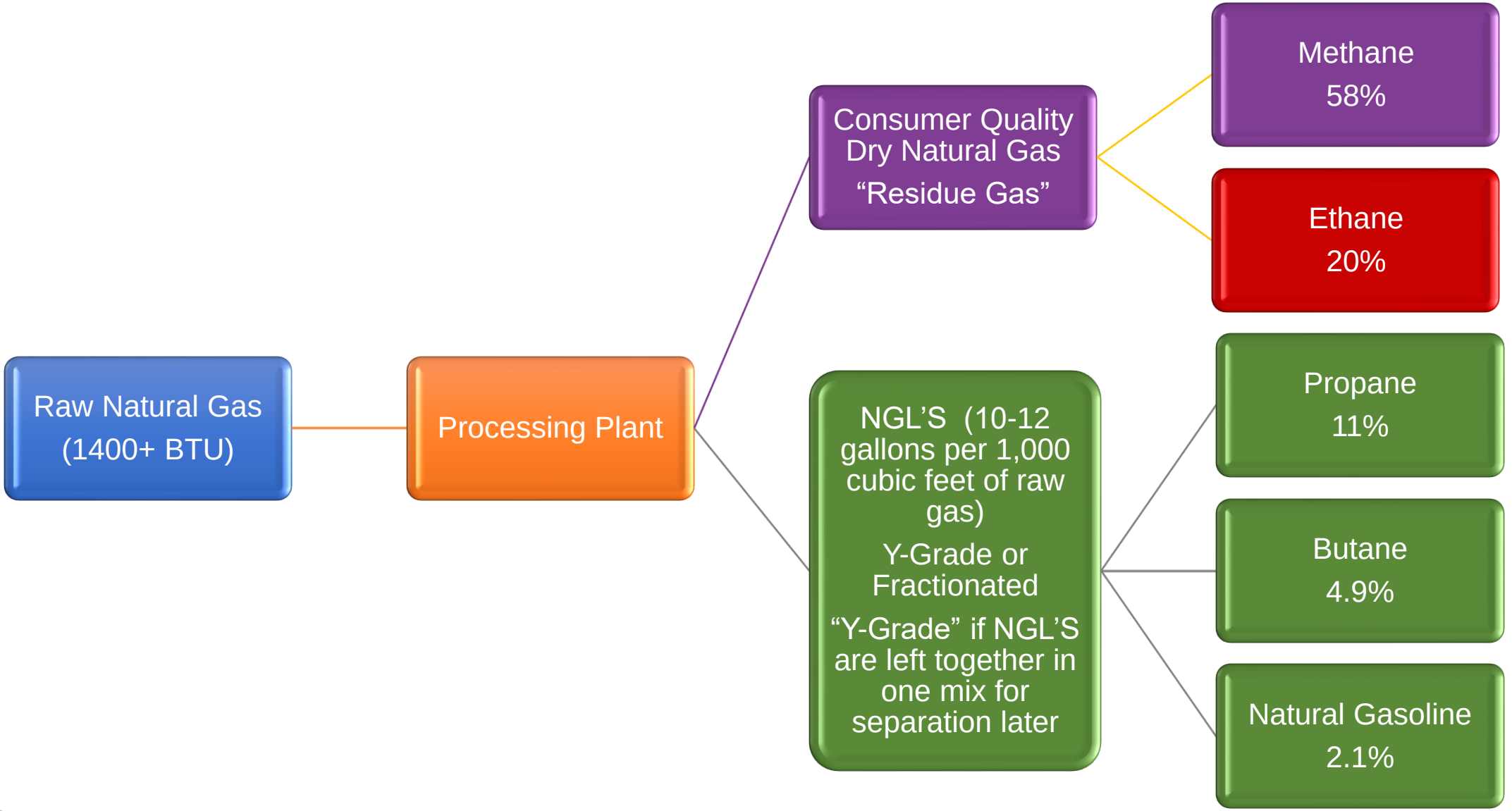
## Transmission

- Dry Gas
- Natural Gas Liquids

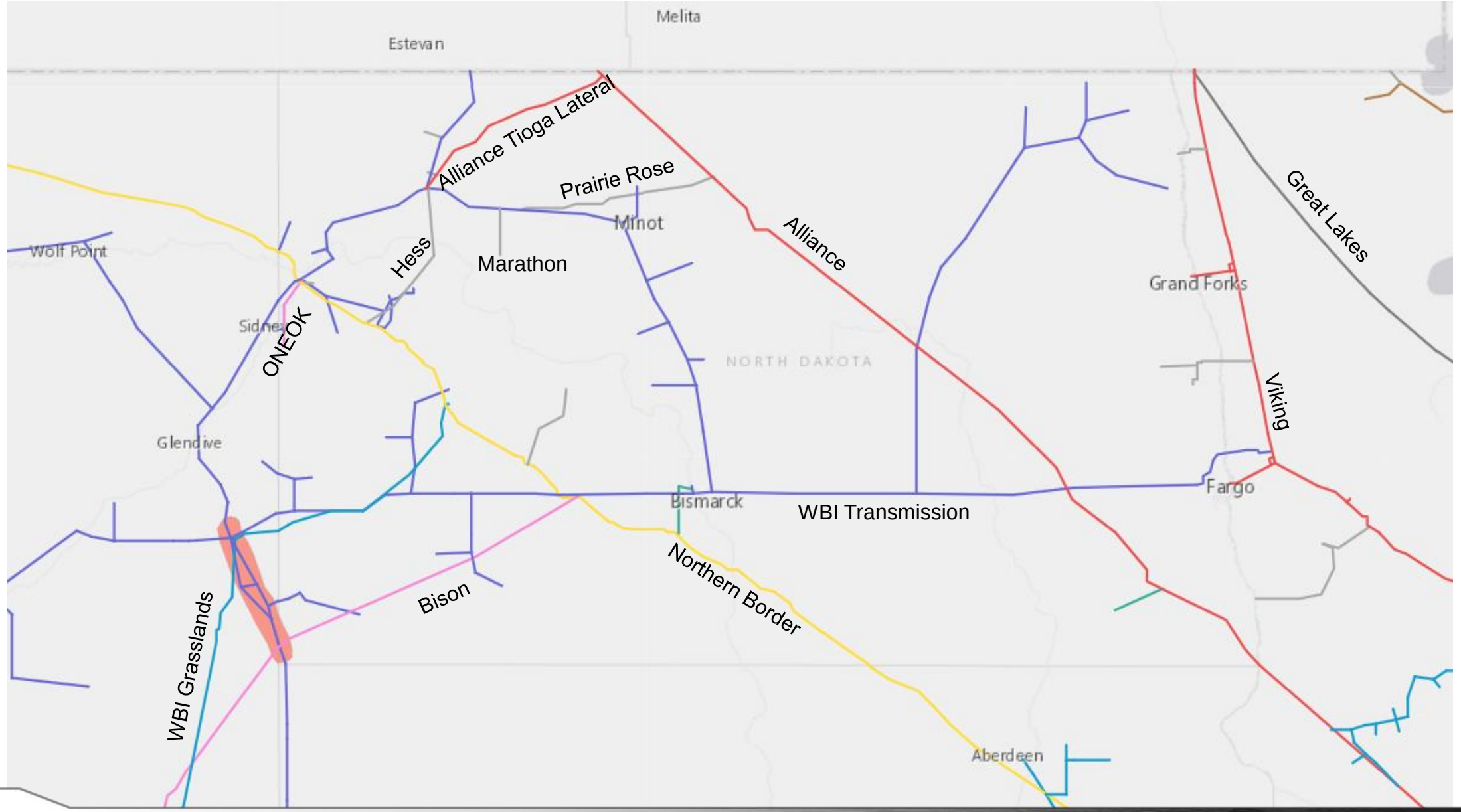
# Natural Gas Processing – “Ethane Capture”



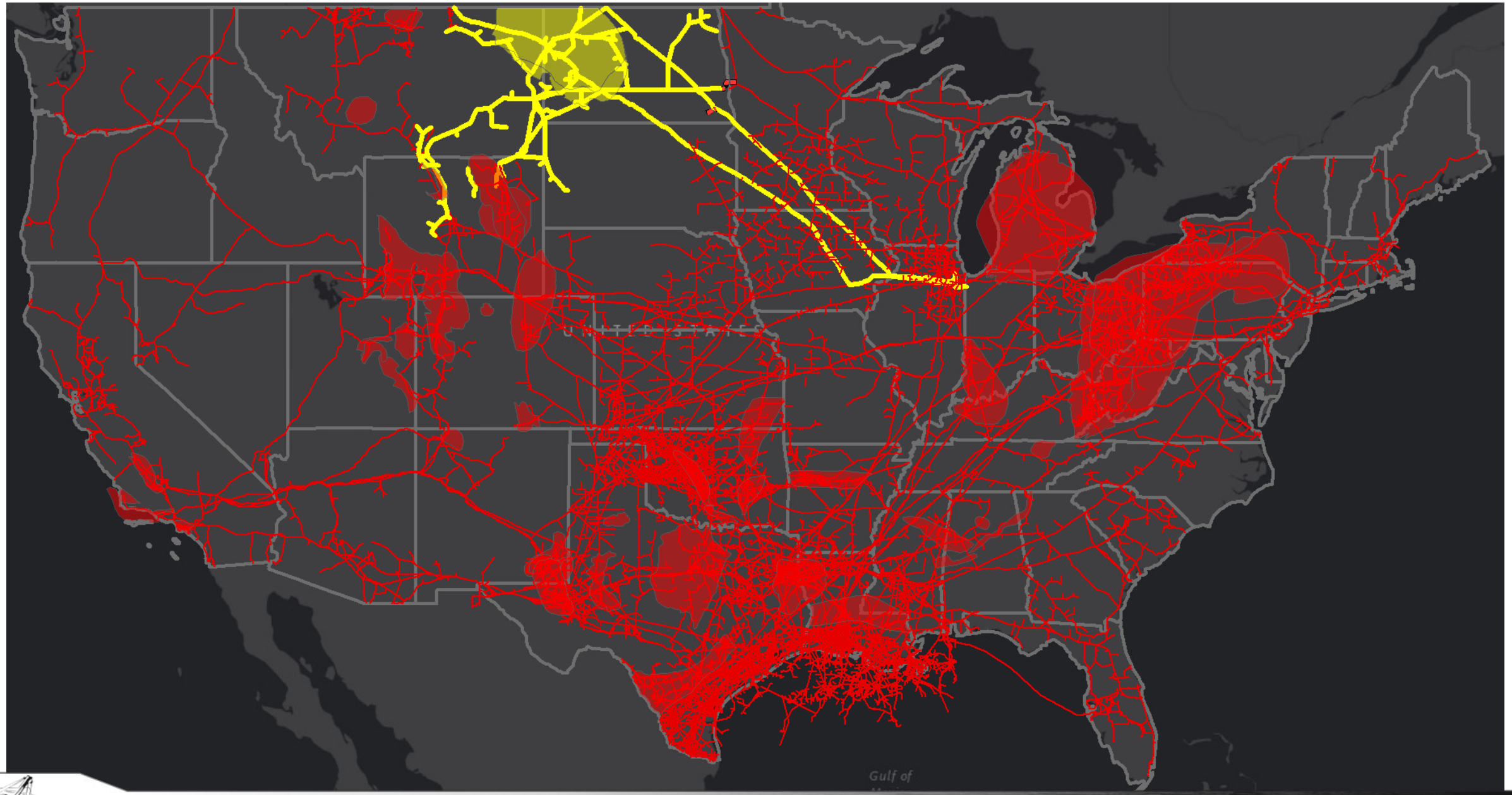
# Natural Gas Processing – “Ethane Rejection”



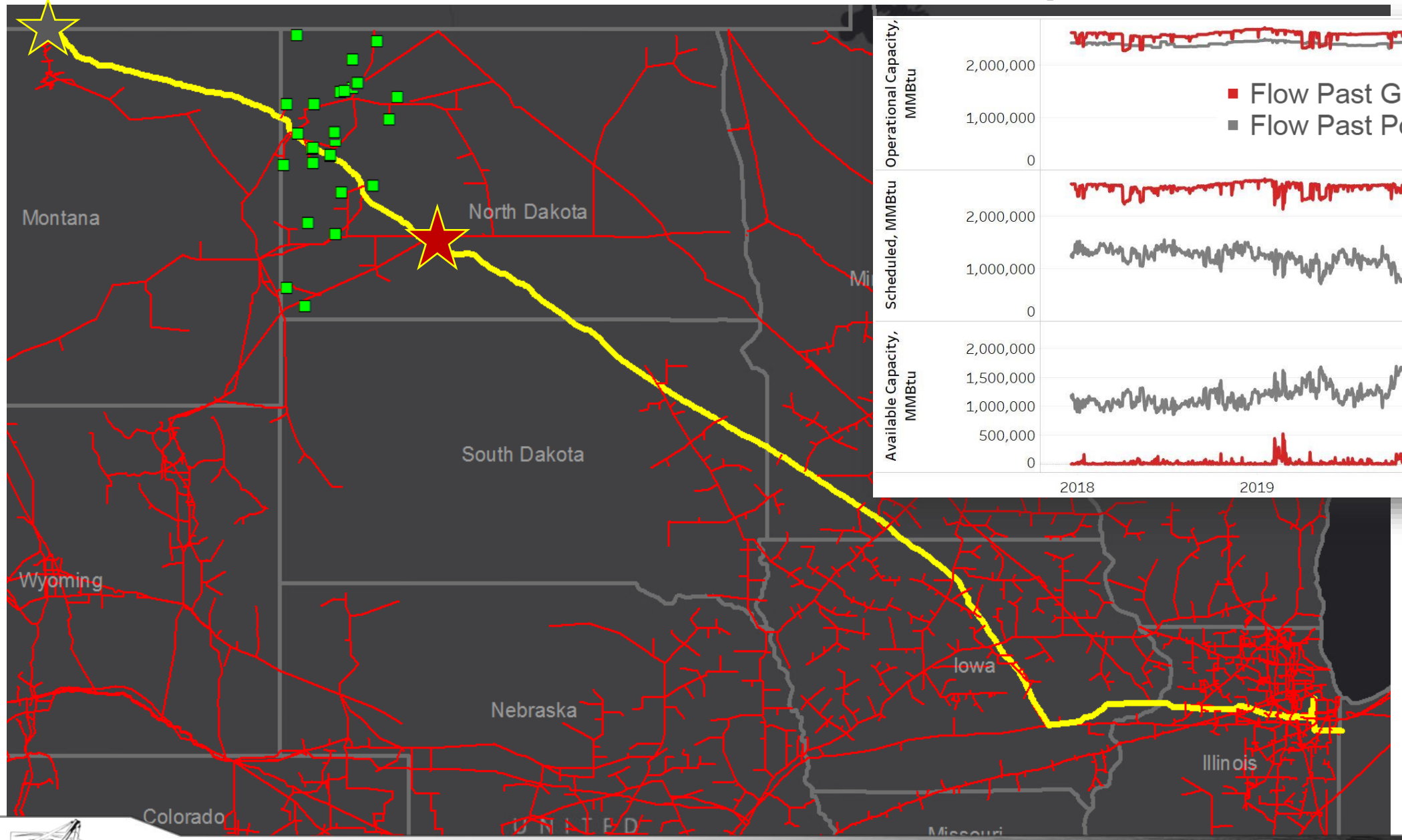
# Major Gas Pipeline Infrastructure



# Bakken Natural Gas Infrastructure



# Northern Border Pipeline



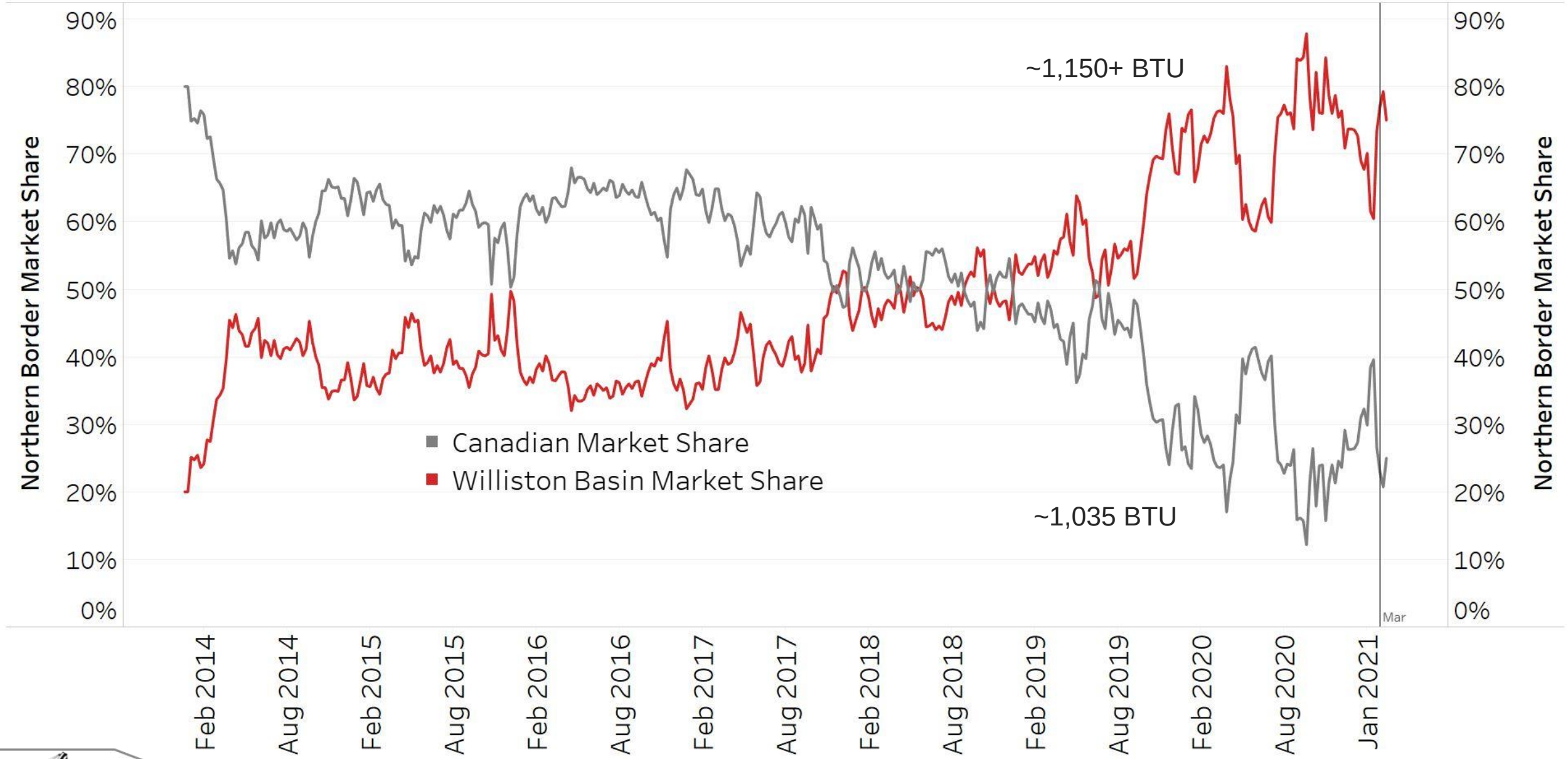




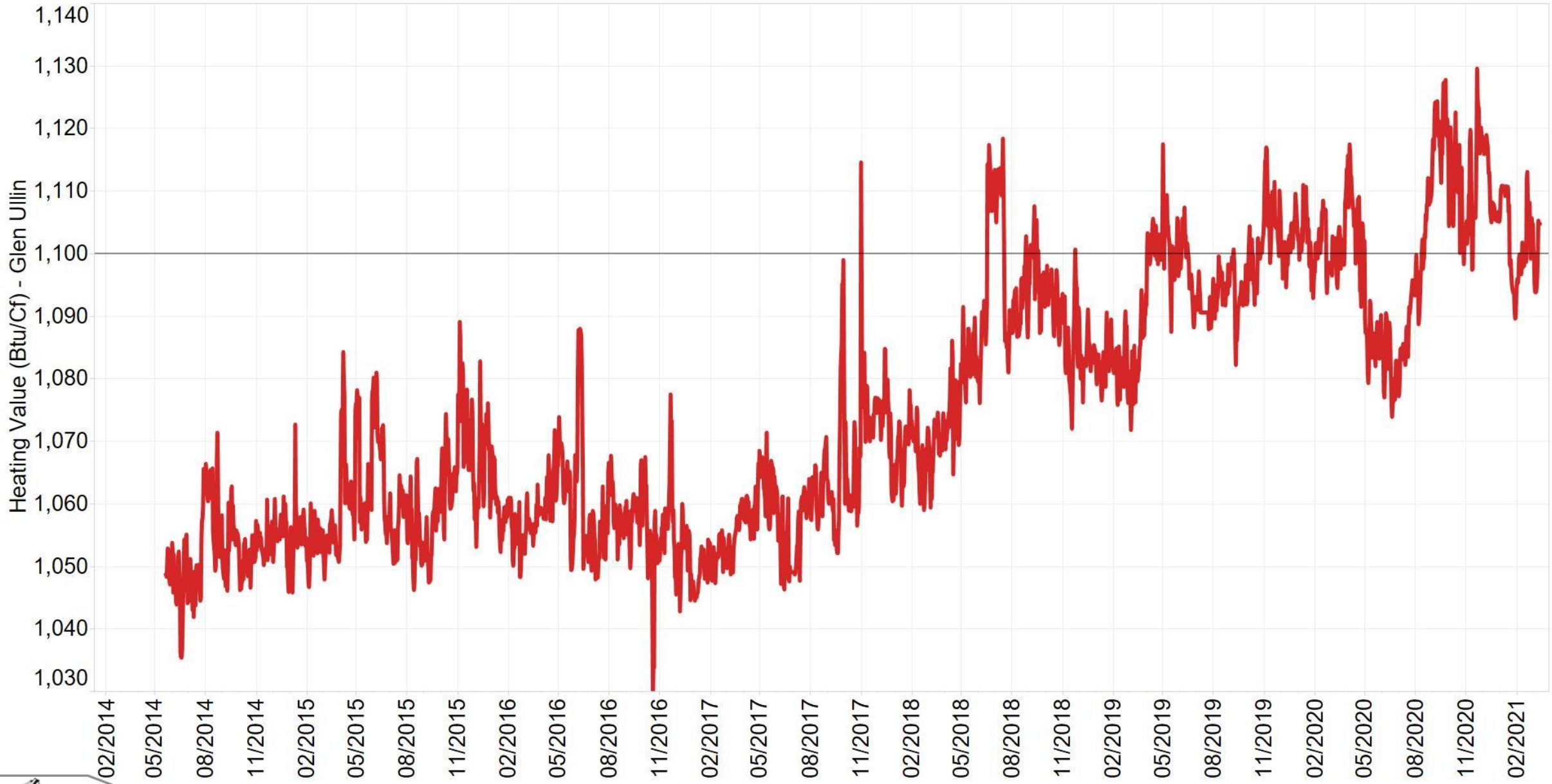


*Data Source: Northern Border

# Northern Border Pipeline Market Share



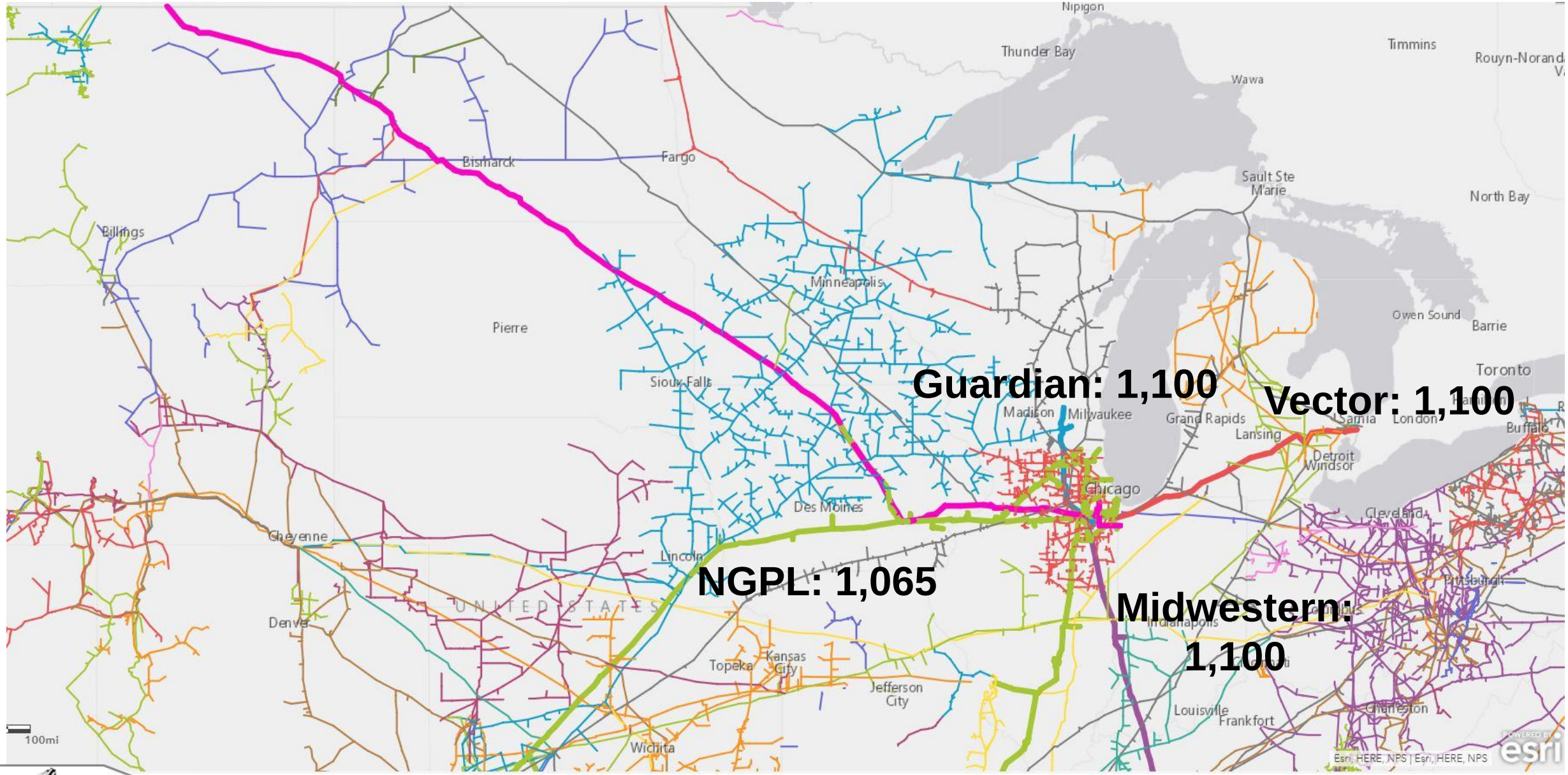
# Northern Border BTU at Glen Ullin, ND



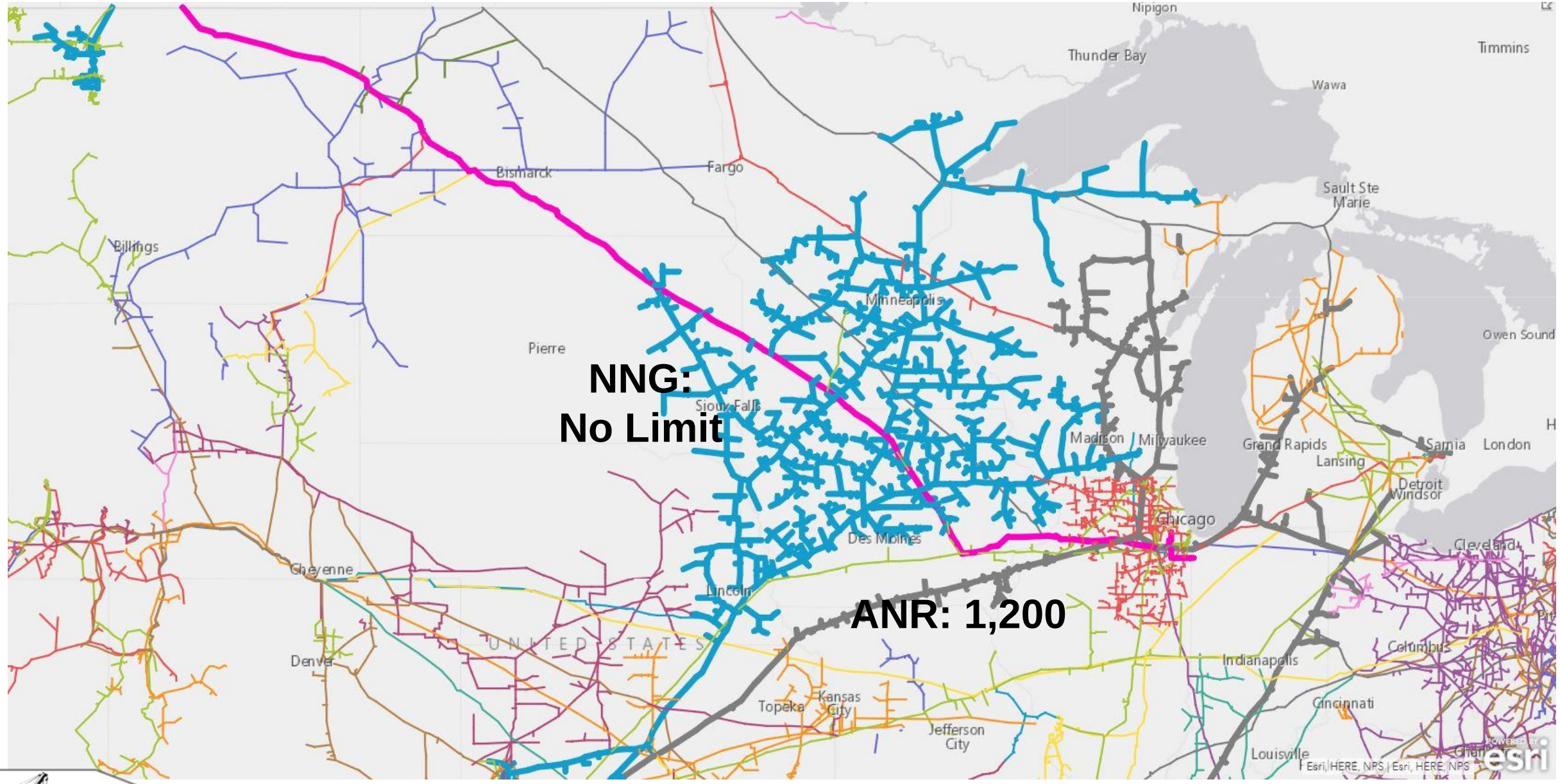



*Data Source: Northern Border

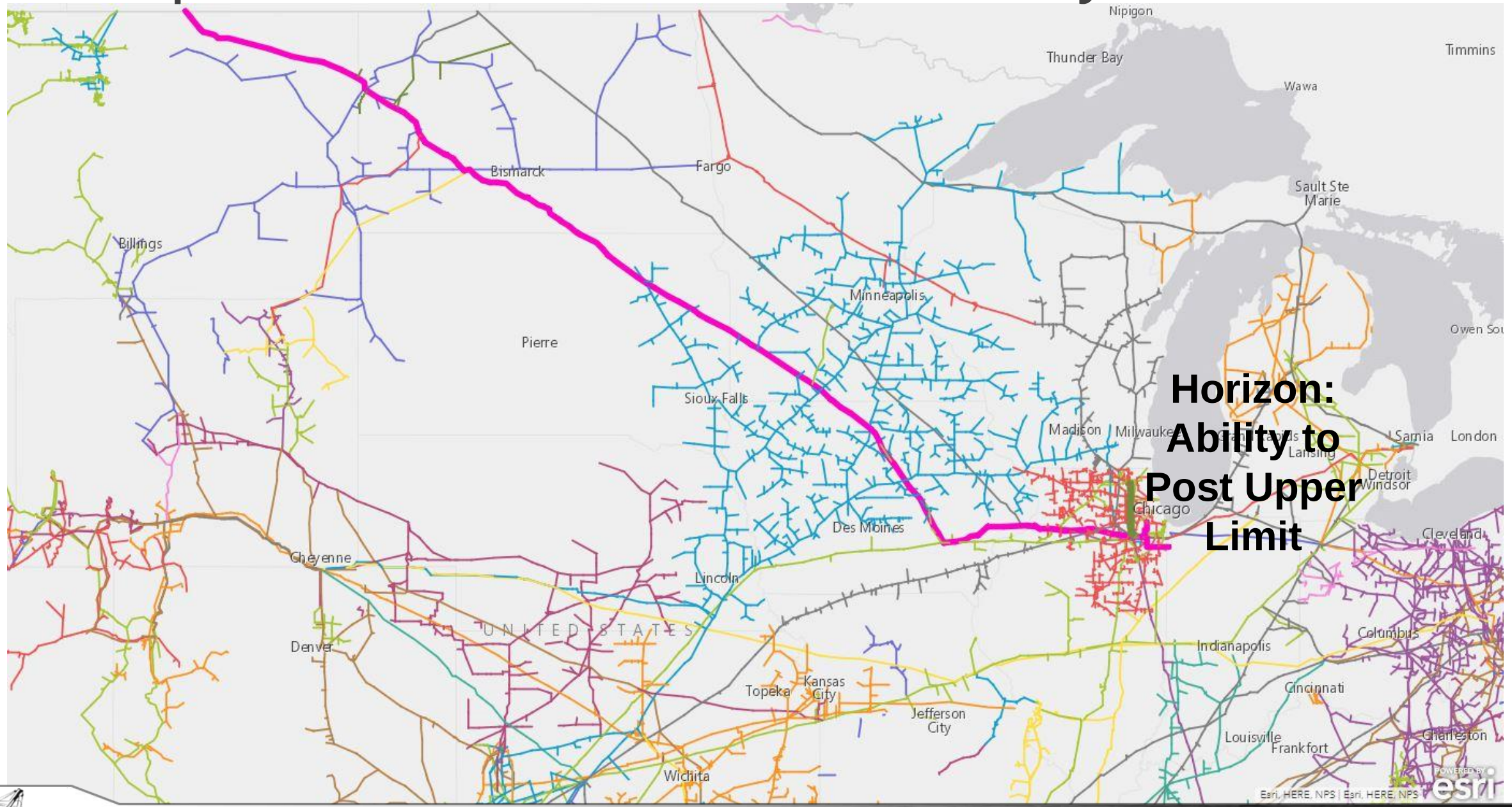
# NB Pipeline Interconnects With Known BTU Limits



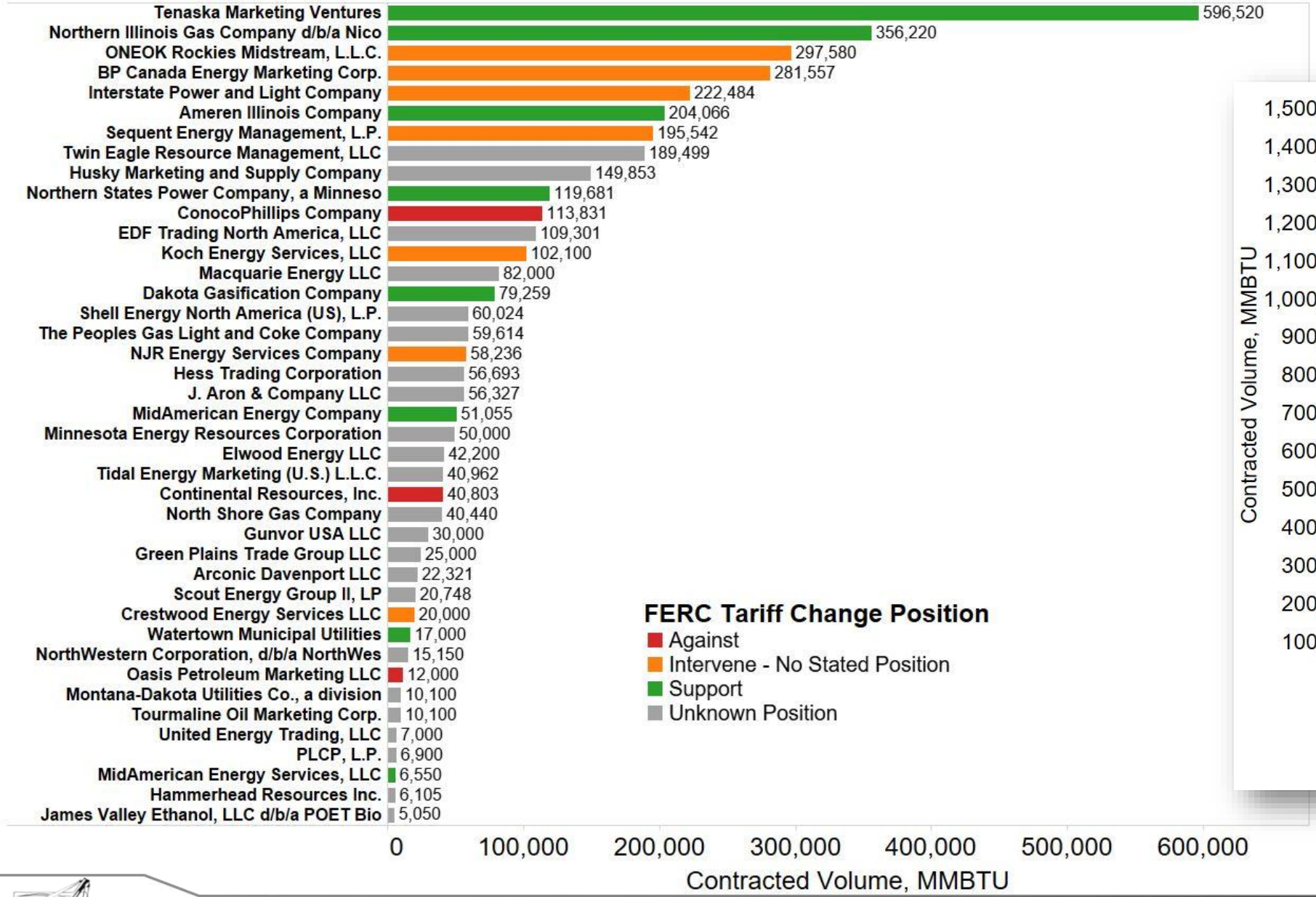
# NB Pipeline Interconnects With BTU Limits > 1,100

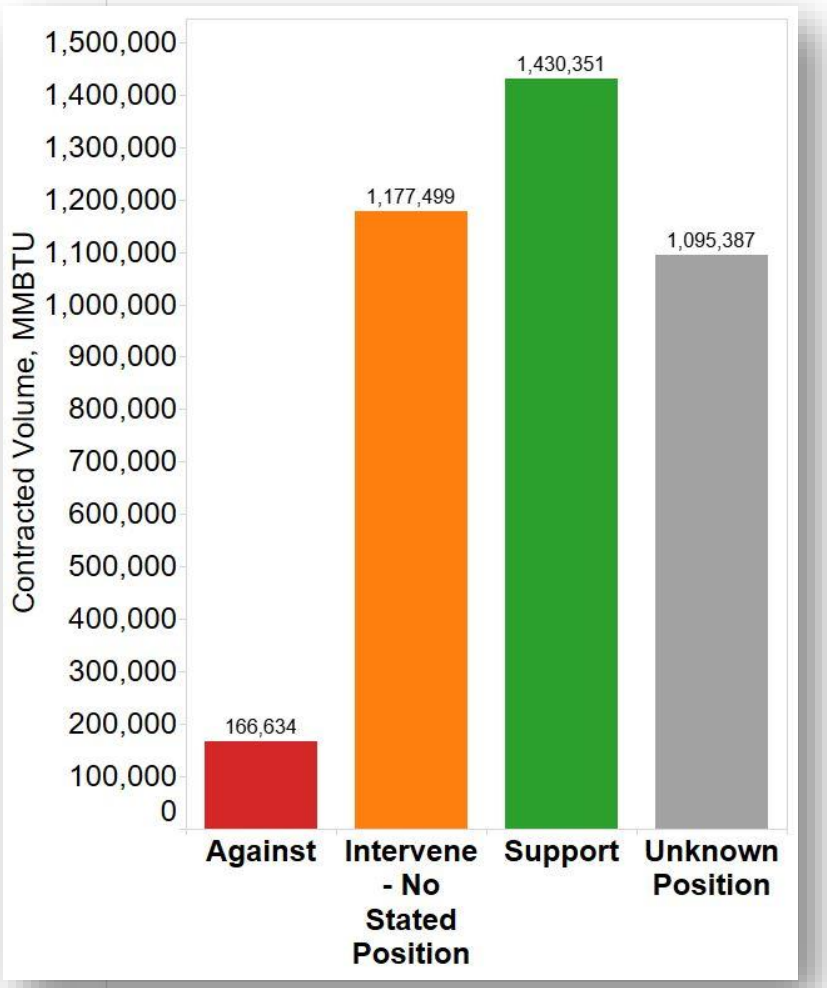


# NB Pipeline Interconnects With Ability to Add Limits

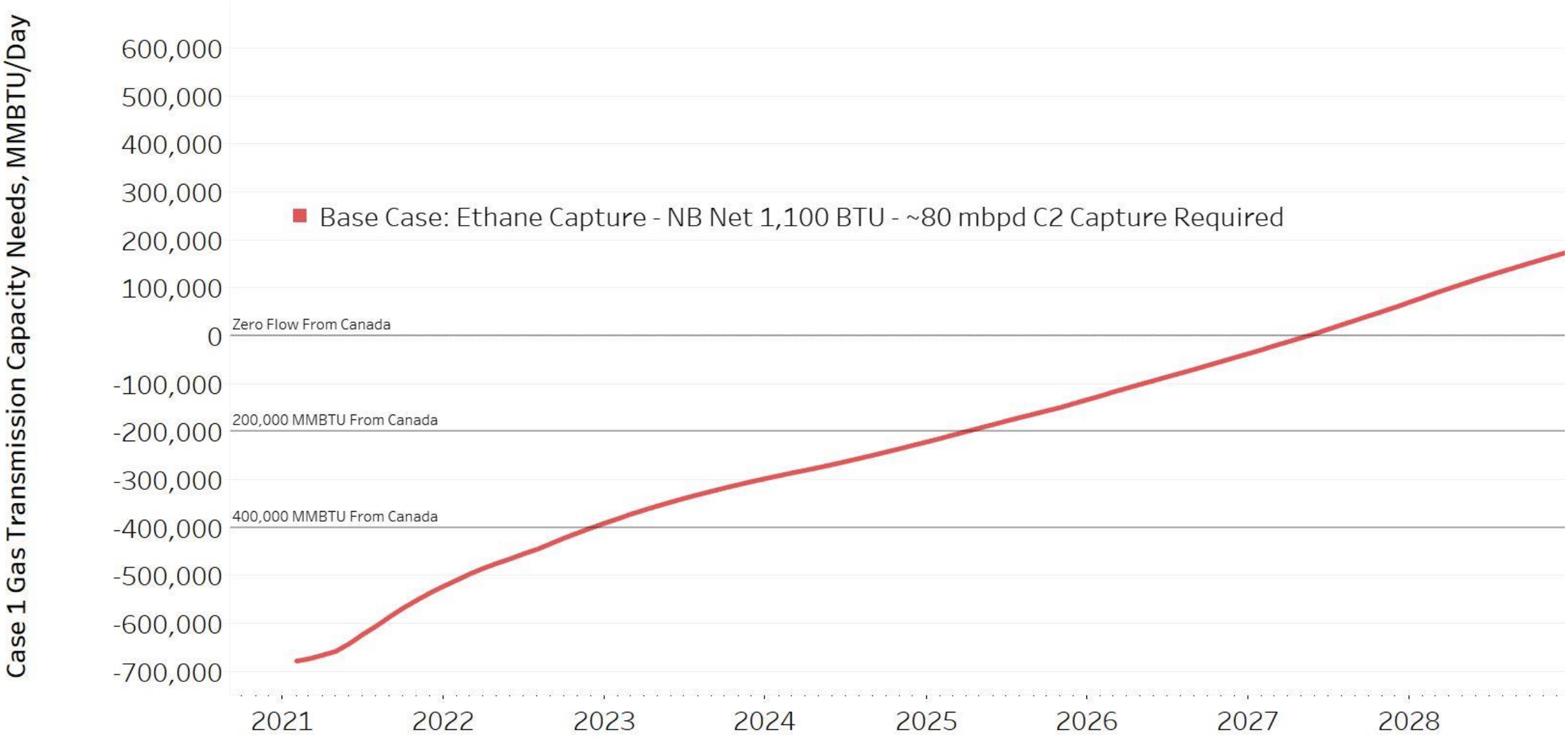


# Northern Border Shipper FERC Positions*

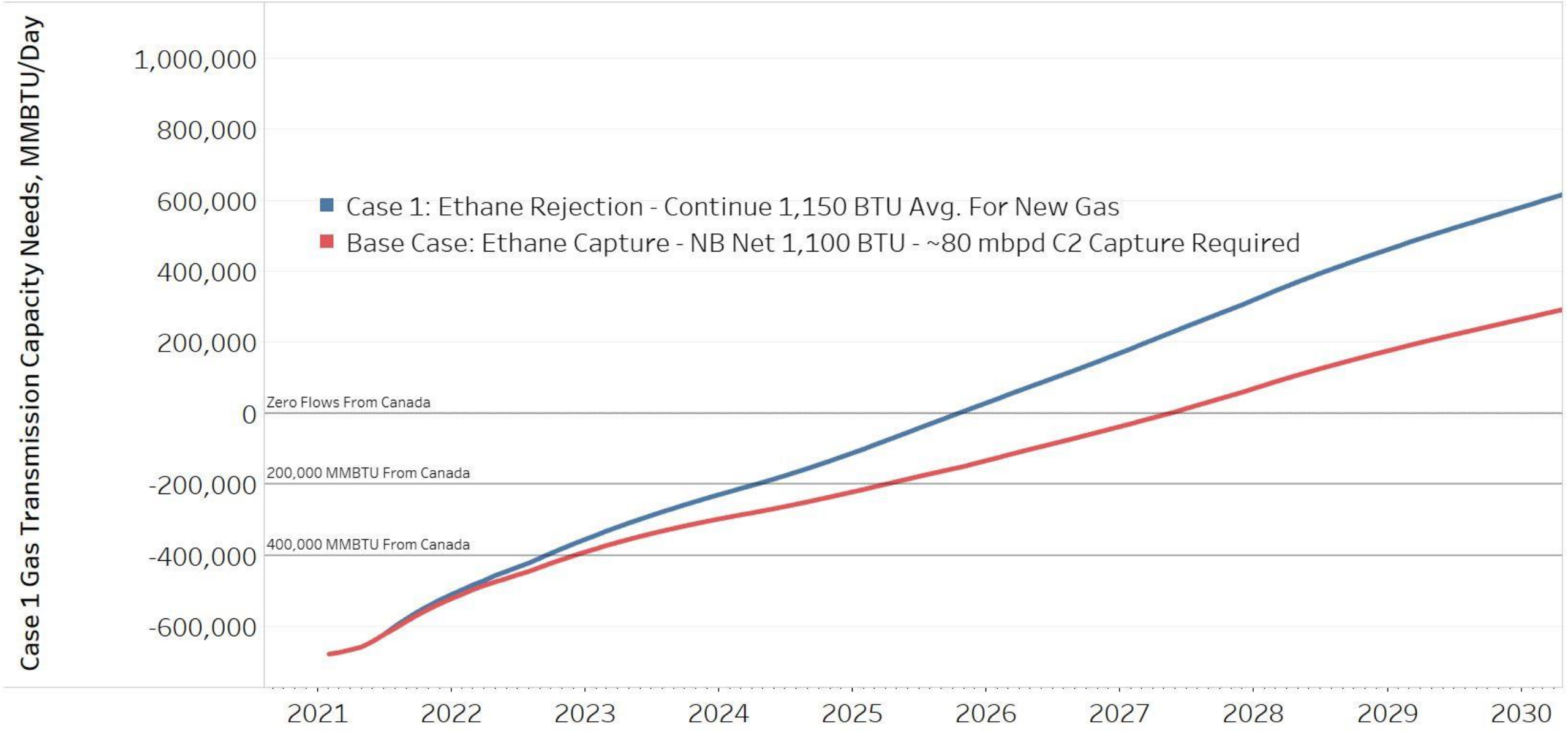


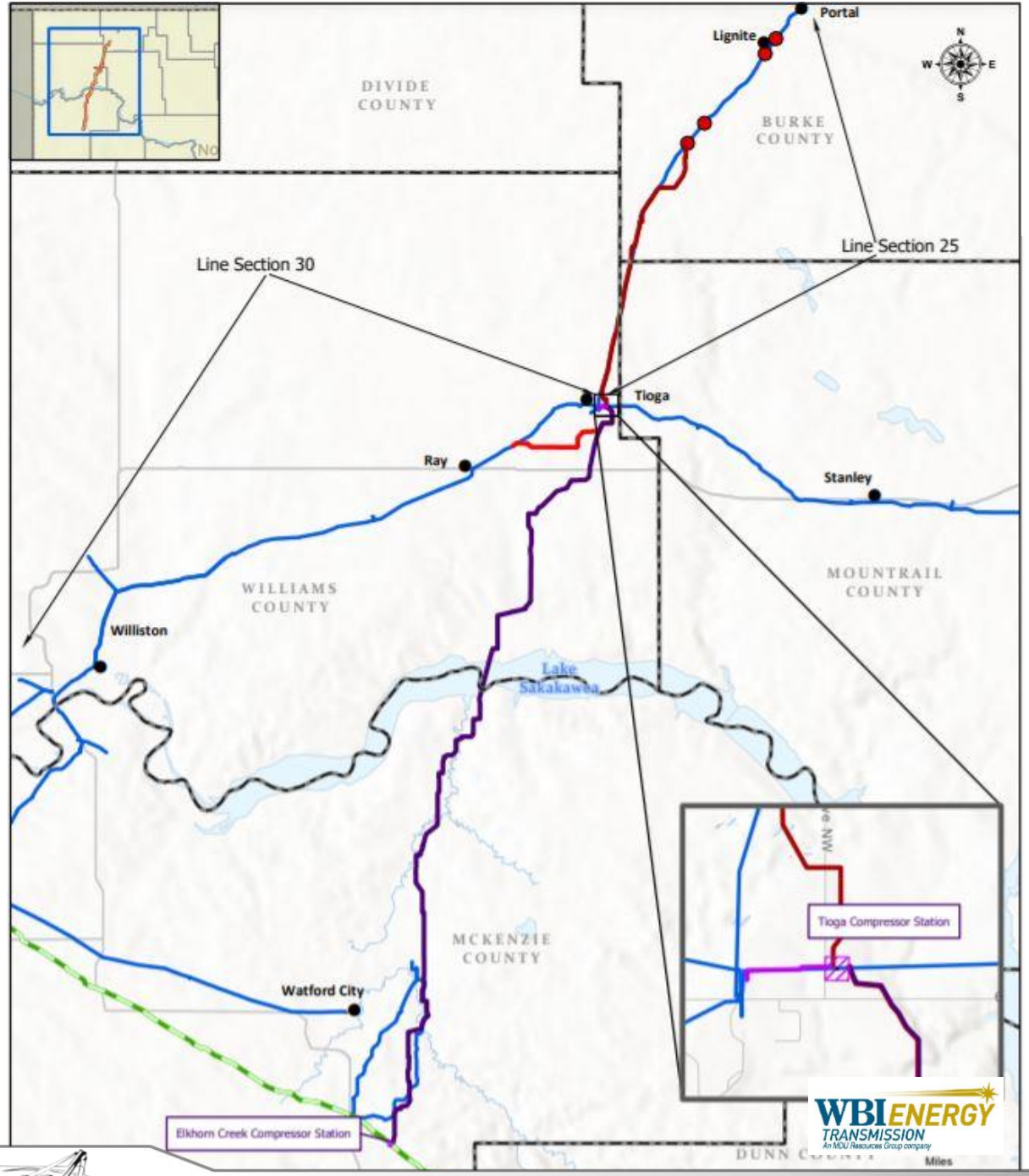
# Northern Border – BTU Calculations*



# Northern Border – BTU Calculations*



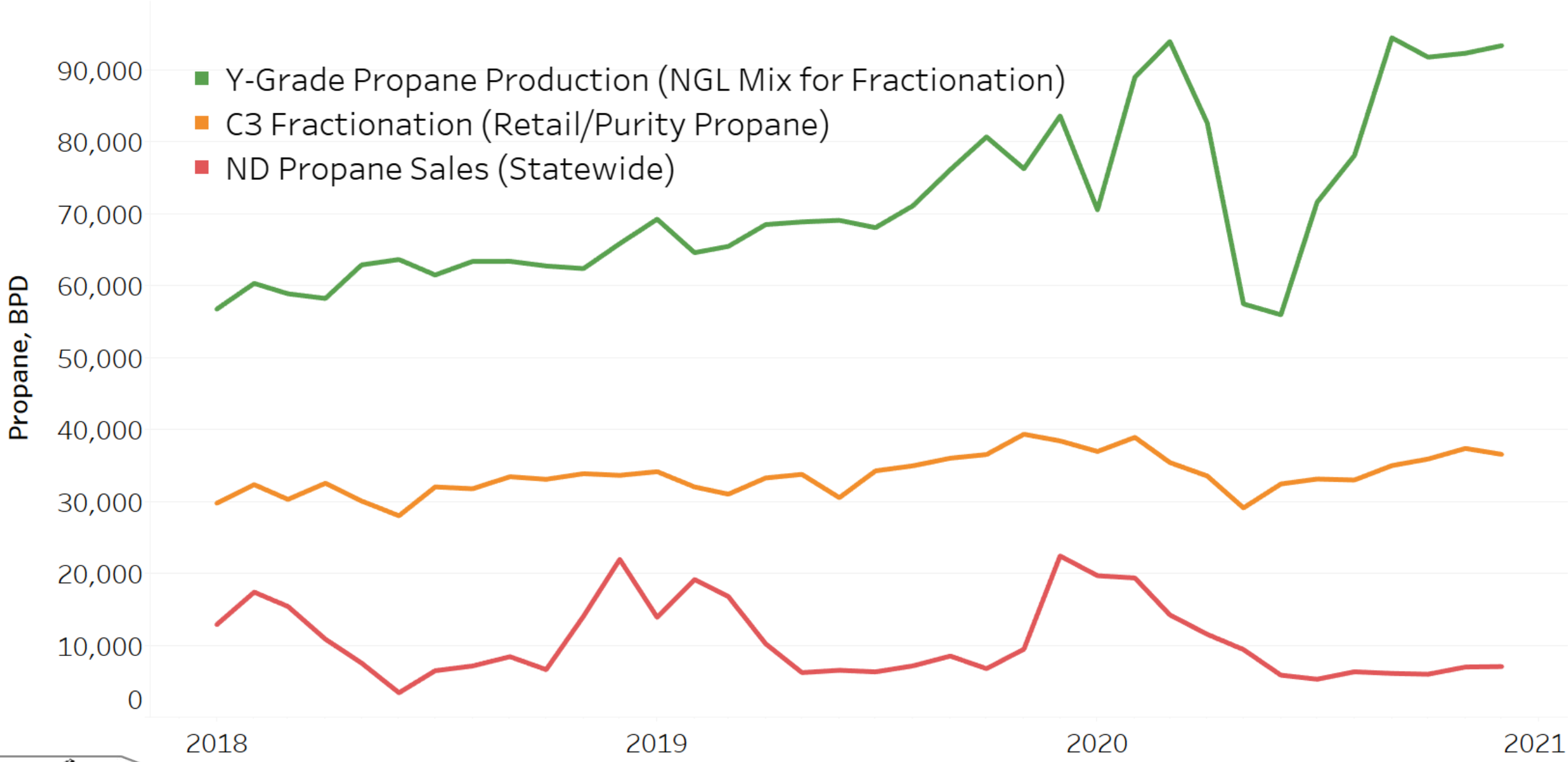
# WBI Energy – North Bakken Expansion Project



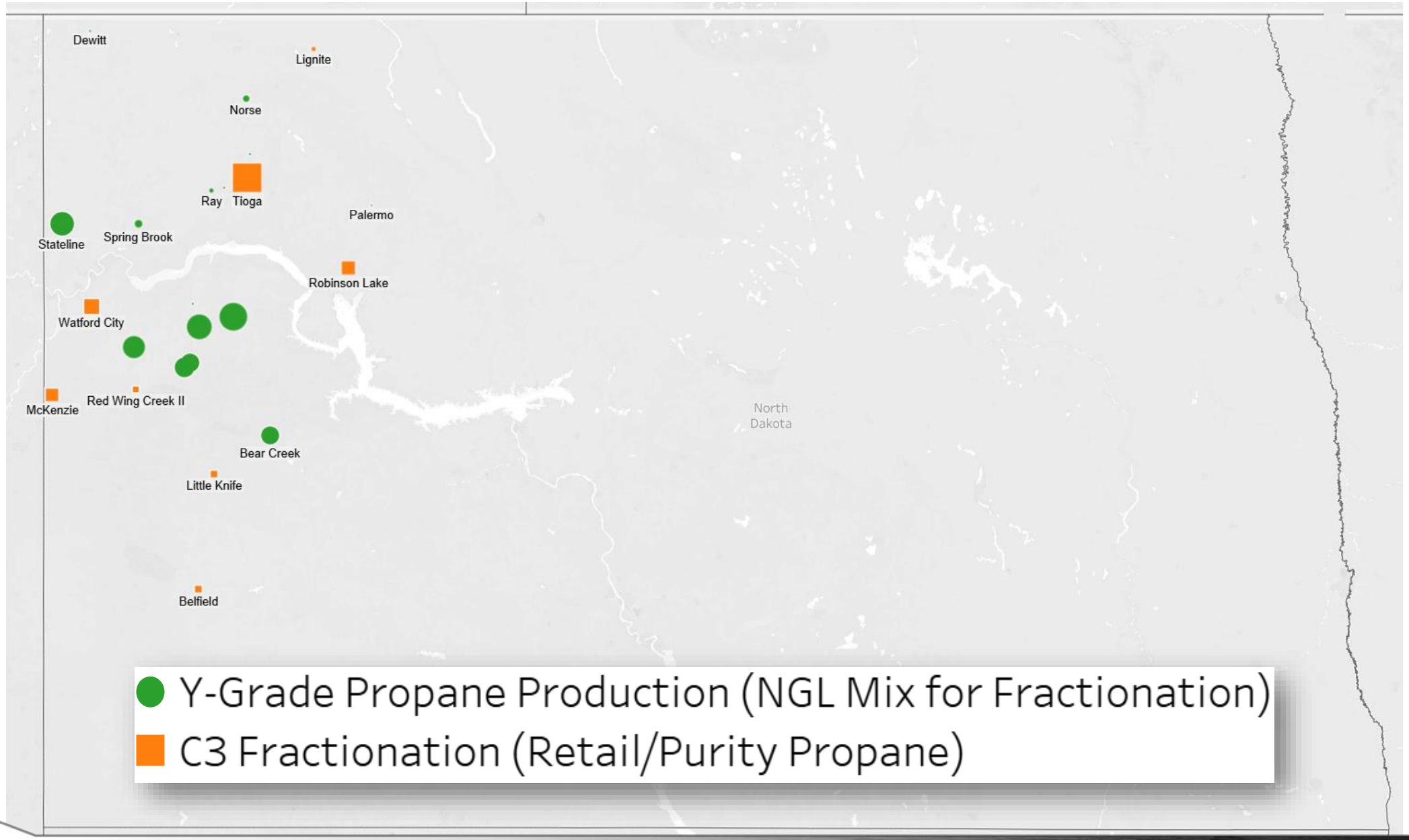

**Project Highlights**

- ~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

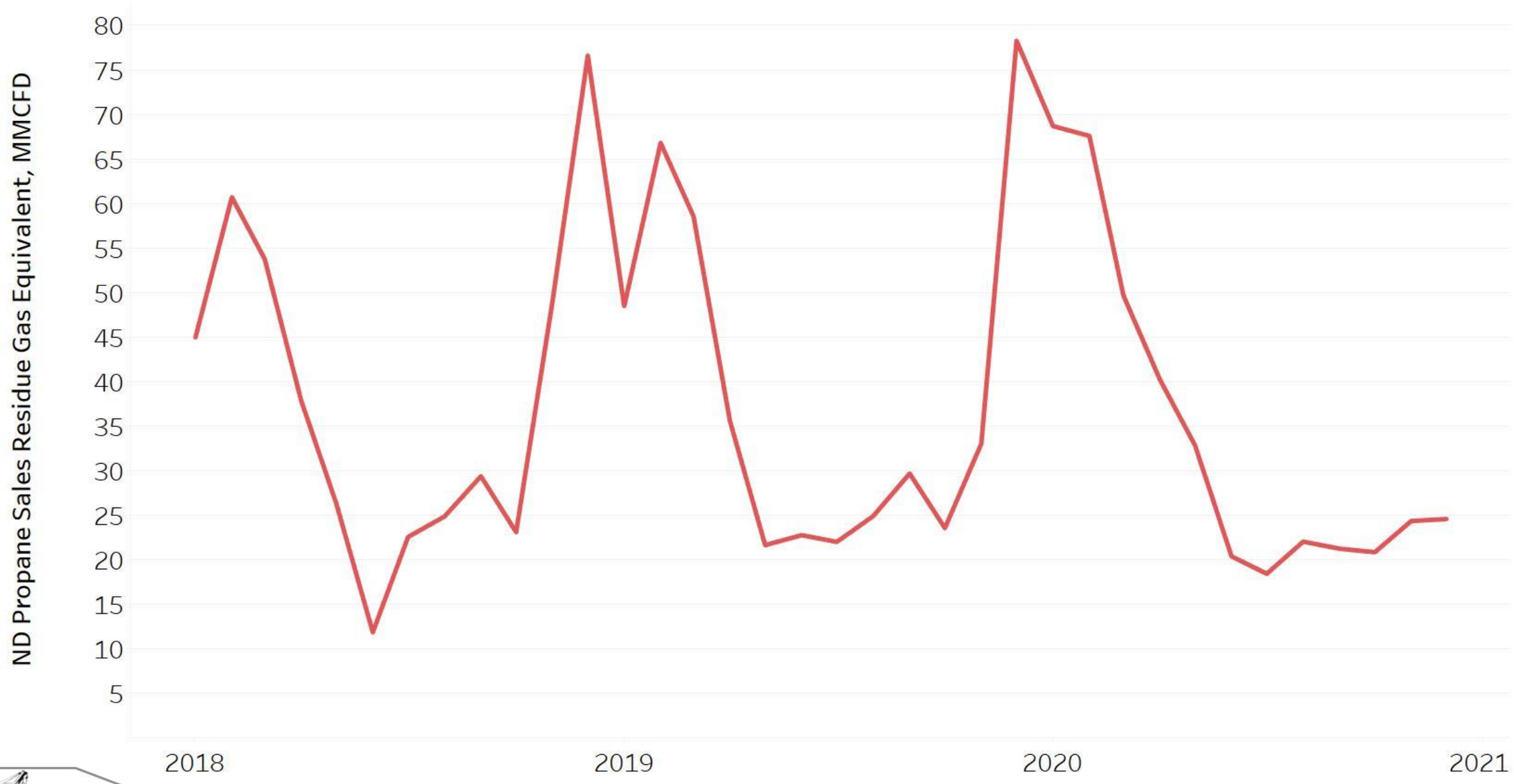
# North Dakota Propane Production & Sales



# North Dakota Gas Plants Propane Output



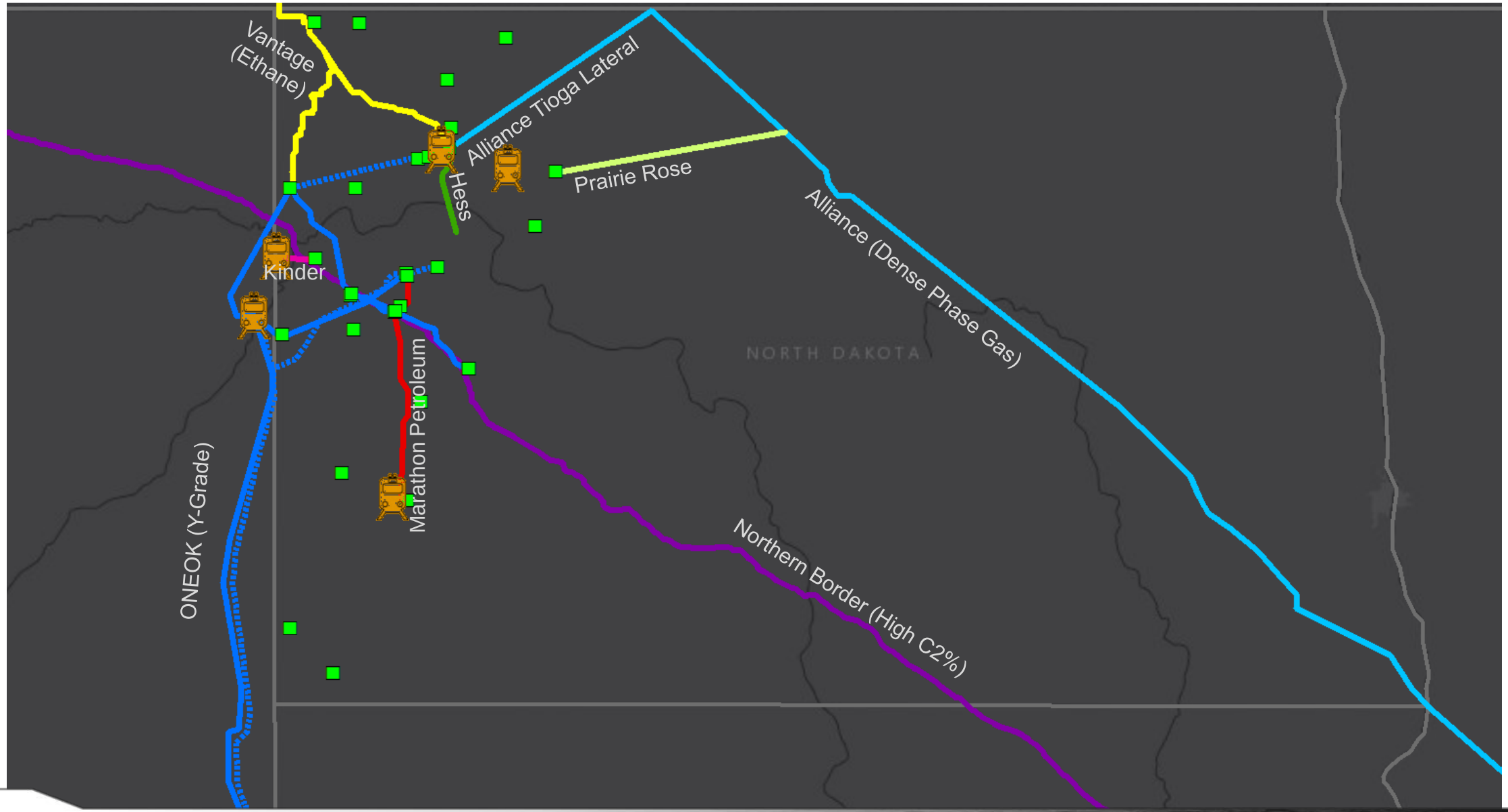
# North Dakota Propane Sales Residue Gas Equivalent*






*Assumes 1,100 BTU/SCF

# Regional NGL Infrastructure



# Bakken & Three Forks Natural Gas Liquids Chemistry

# NGL Chemistry Study - 2020

EERC

**ASSESSMENT OF BAKKEN PETROLEUM SYSTEM PRODUCED GAS COMPOSITIONS**

Final Report

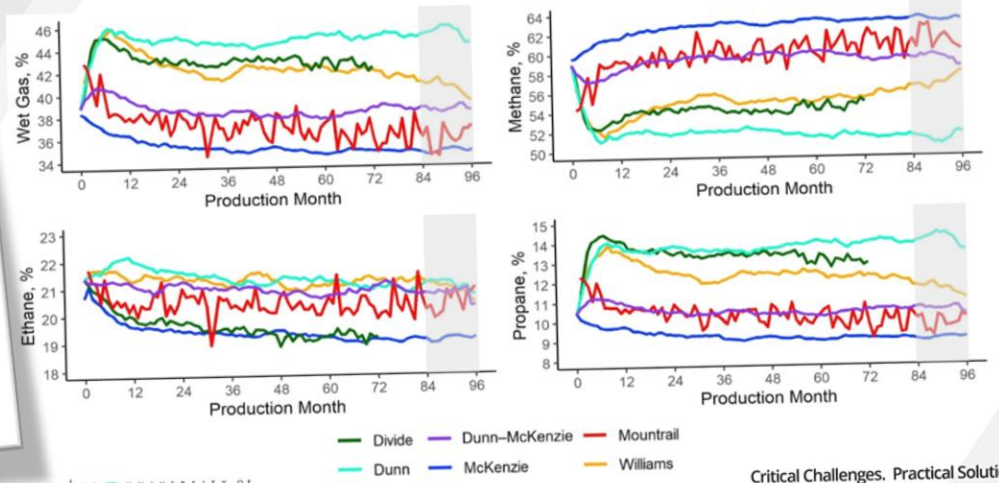
(Project Period: October 15, 2019 – June 19, 2020)

*Prepared for:*

Justin Kringstad

North Dakota Pipeline Authority
State Capitol, 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

**Temporal Patterns in Measured Gas Composition**

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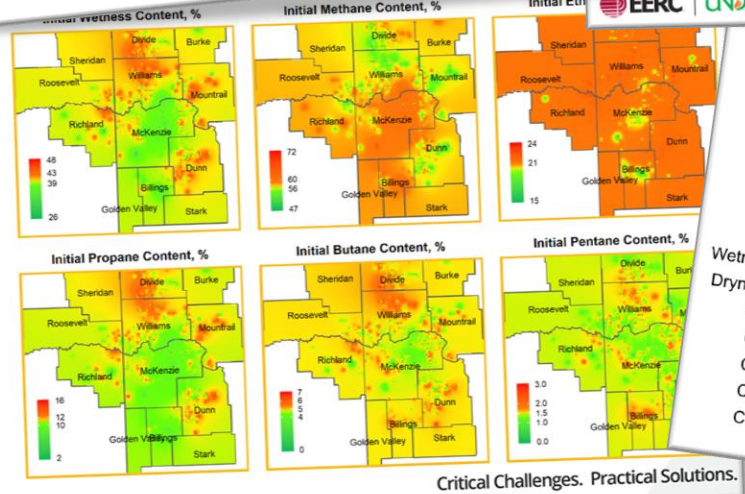
Critical Challenges. Practical Solutions.

**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.

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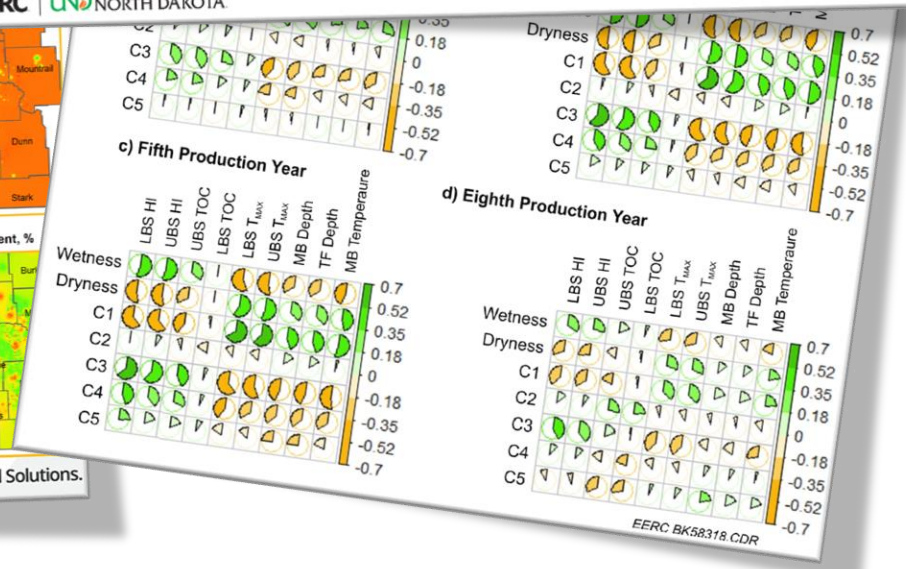
Critical Challenges. Practical Solutions.



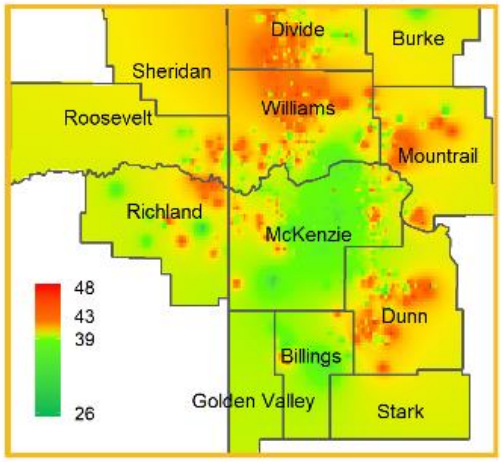
# Gas Compositions During Initial Well Production

## Spatial Patterns

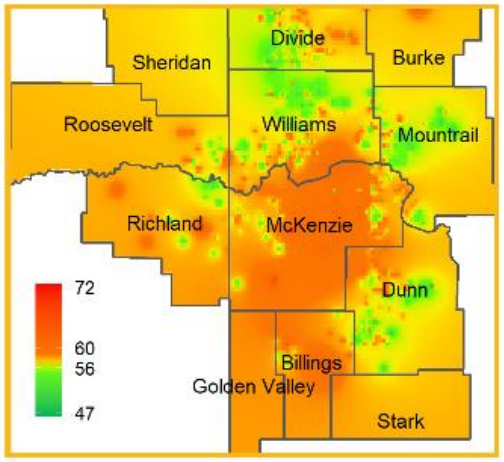
- The highest methane concentrations occur in the core Bakken area, and the lowest levels occur in northern Williams and southern Divide counties.
- There is considerably less variation in ethane content across the BPS than with other NGLs.

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

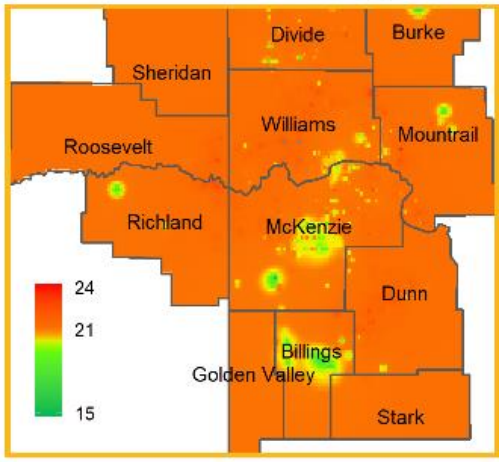
Initial Wetness Content, %



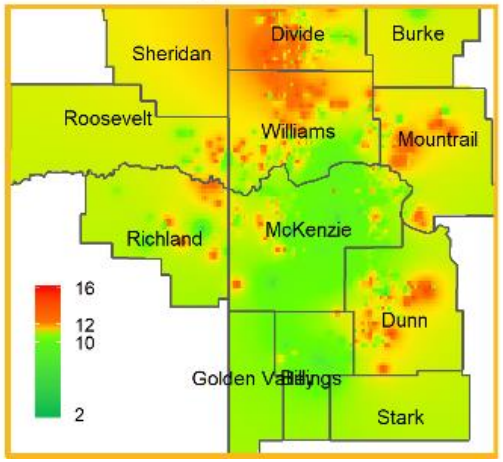

Initial Methane Content, %



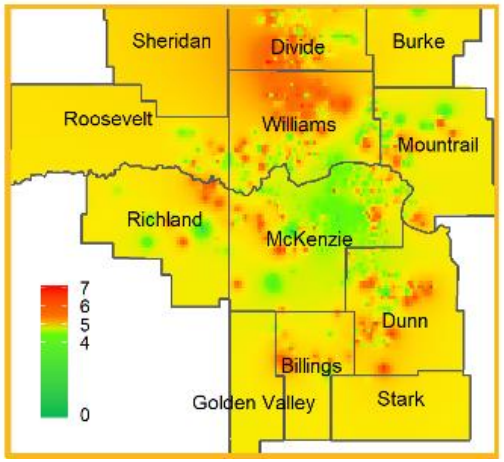

Initial Ethane Content, %



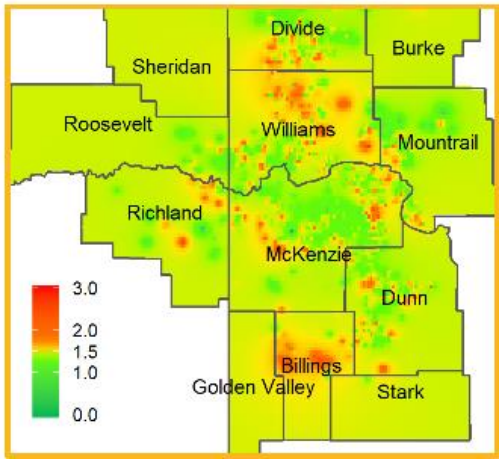

Initial Propane Content, %




Initial Butane Content, %

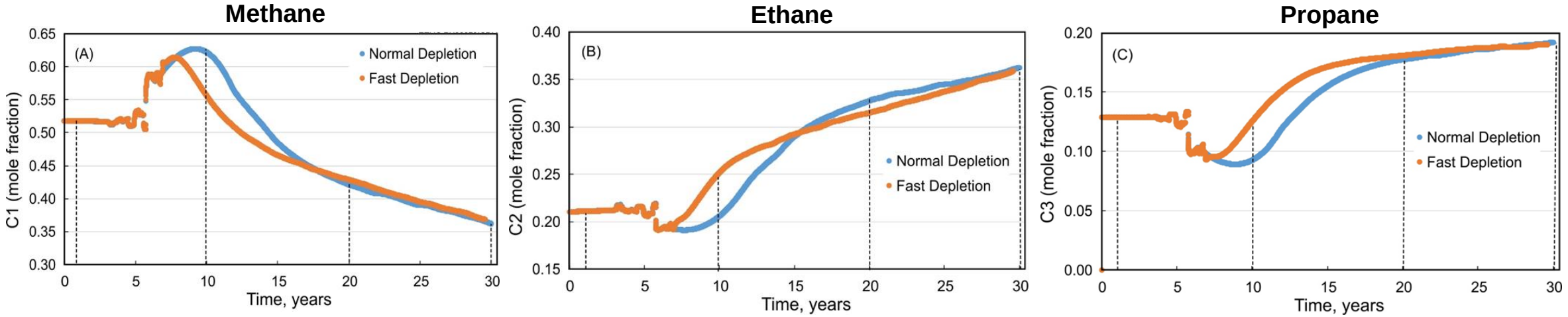



Initial Pentane Content, %

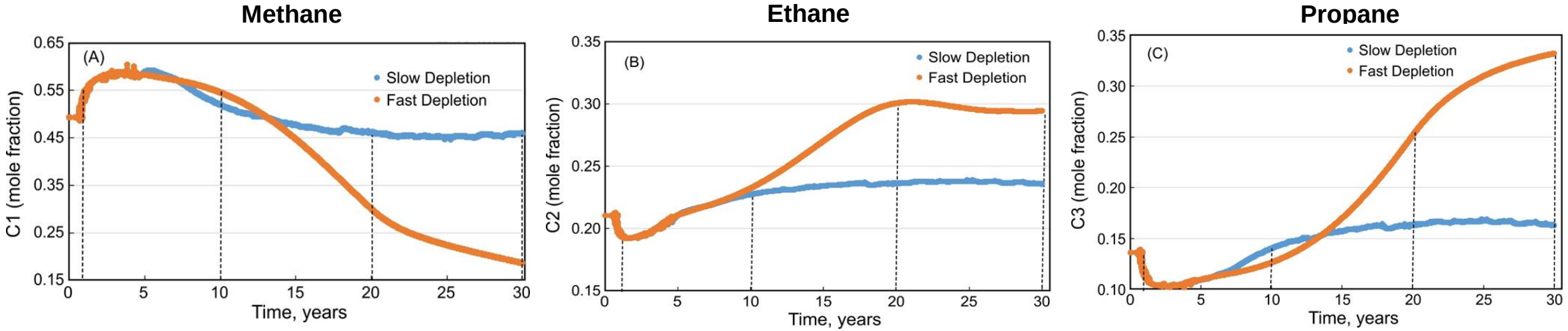


# Predicted Gas Composition Change: Primary Production

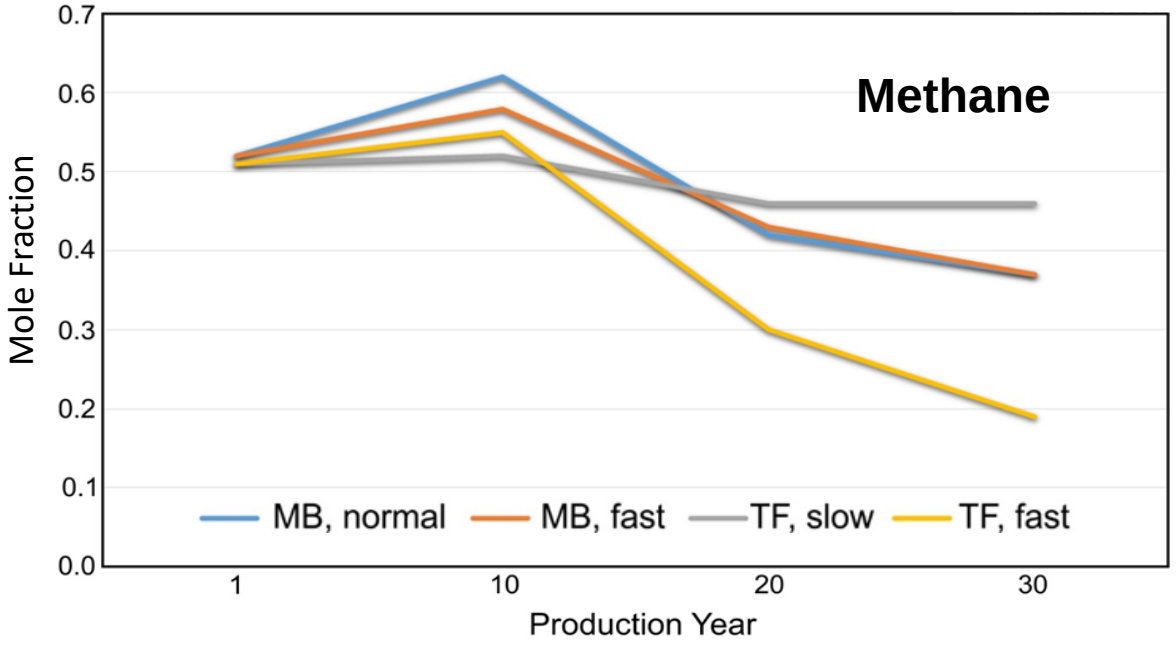
## Gas composition change in the MB well over 30 years of normal and fast pressure depletion

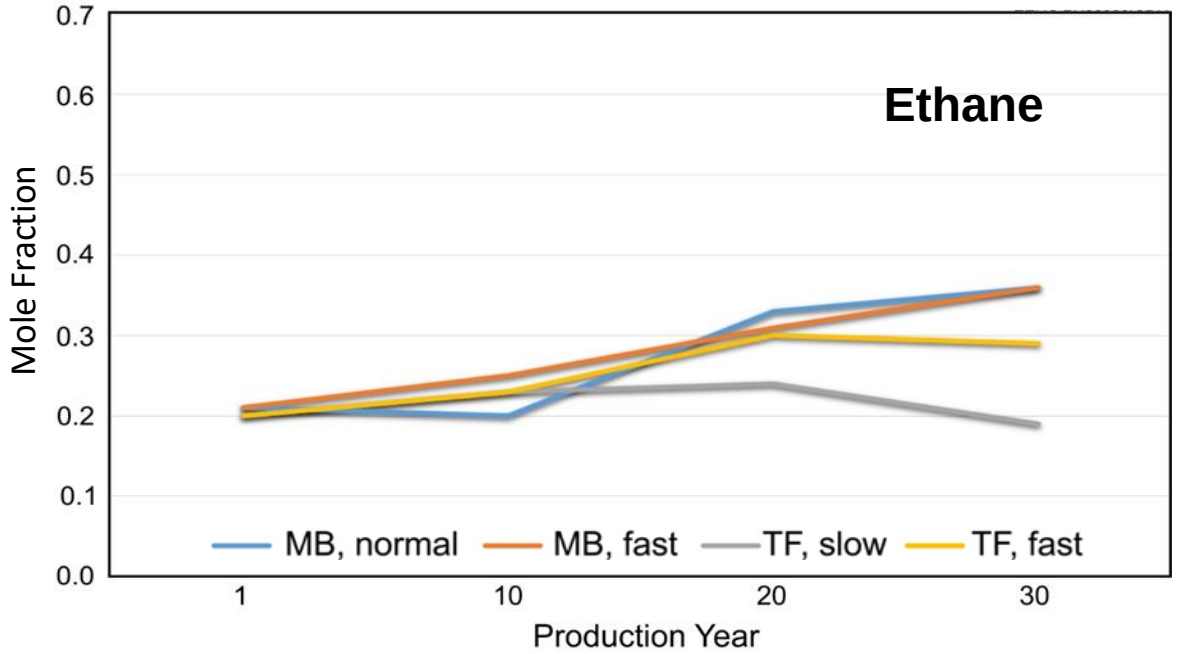


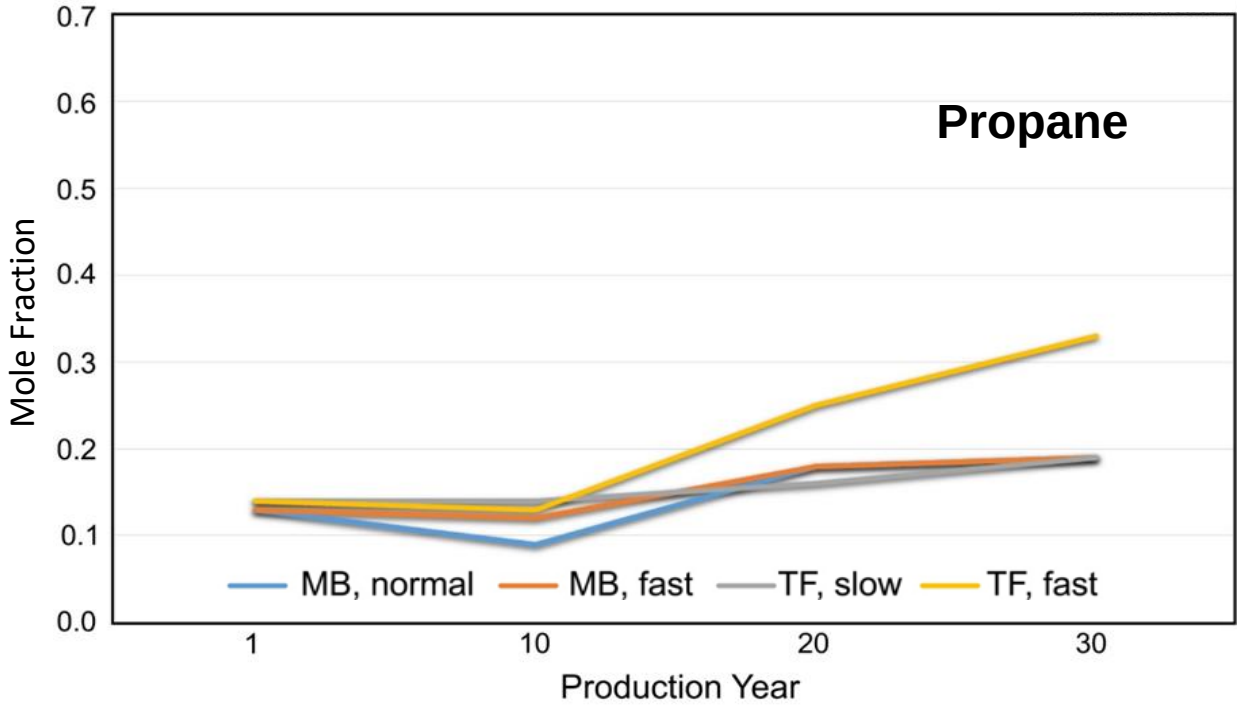

## Gas composition change in the TF well over 30 years of slow and fast pressure depletion



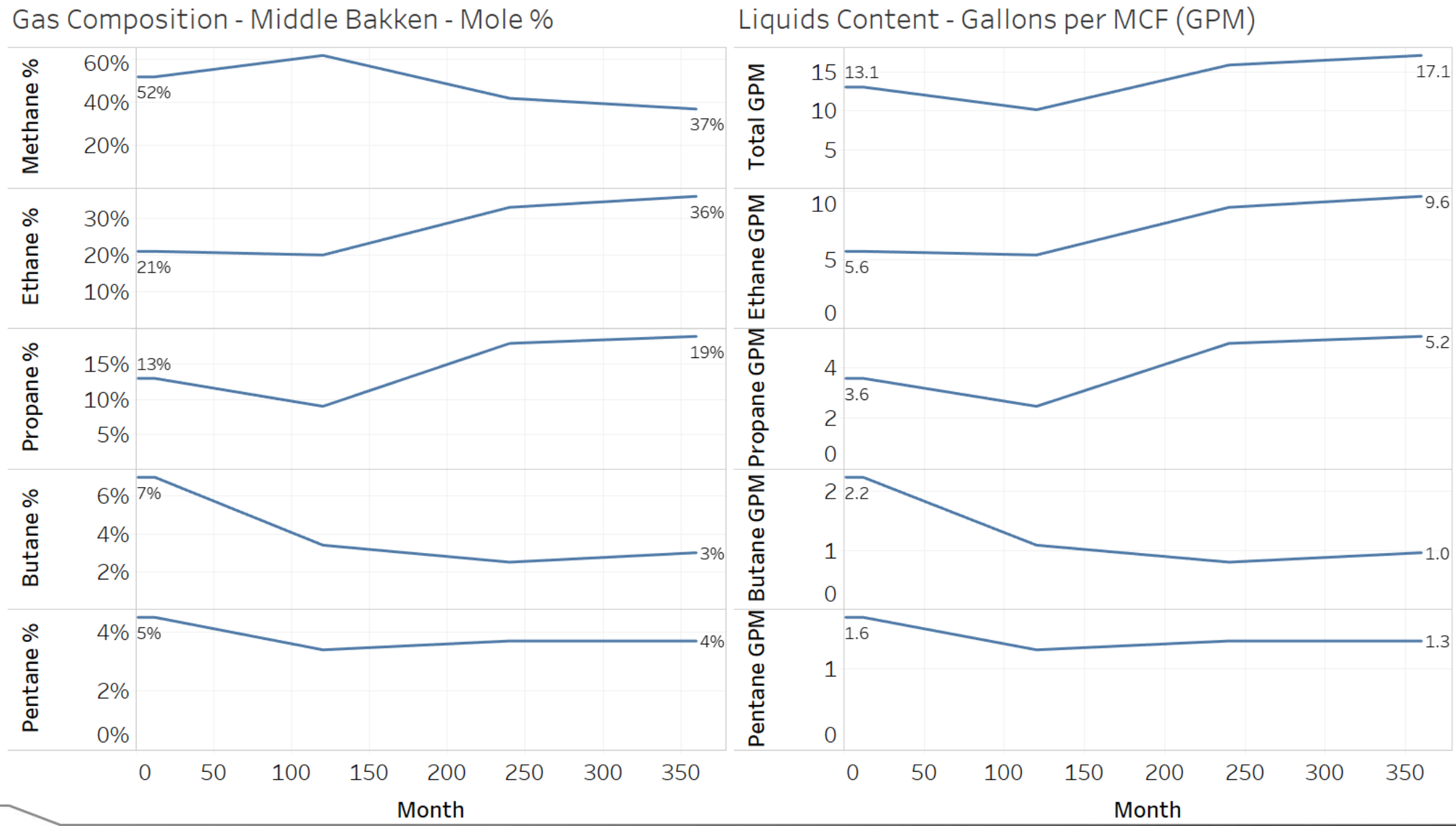
# Forecast of Future Gas Compositions



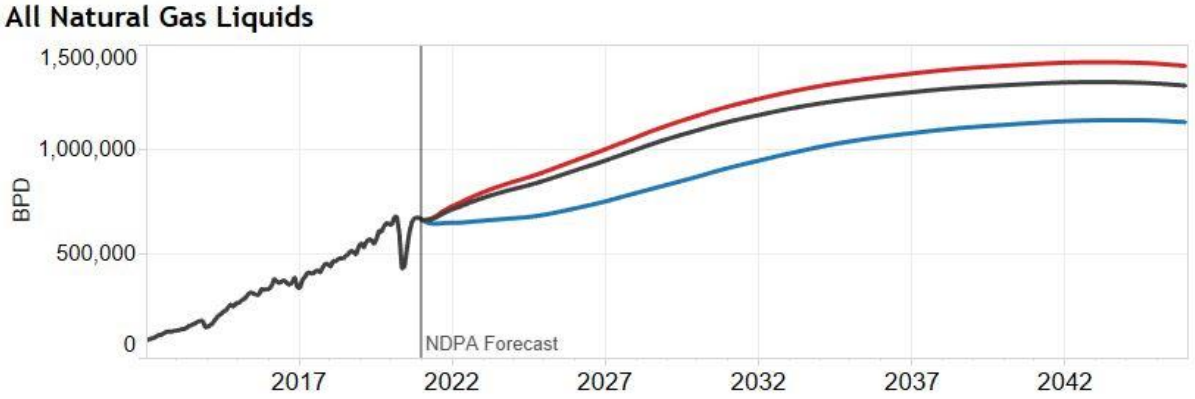



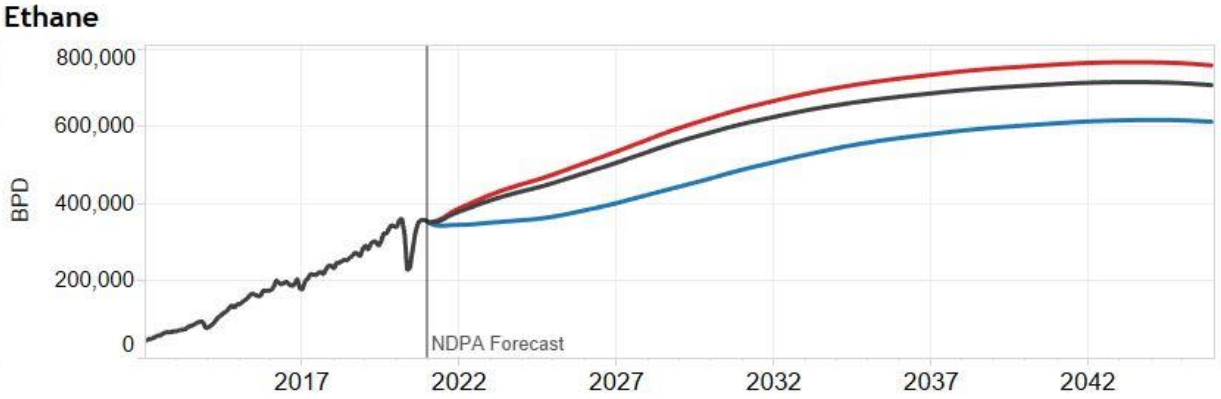



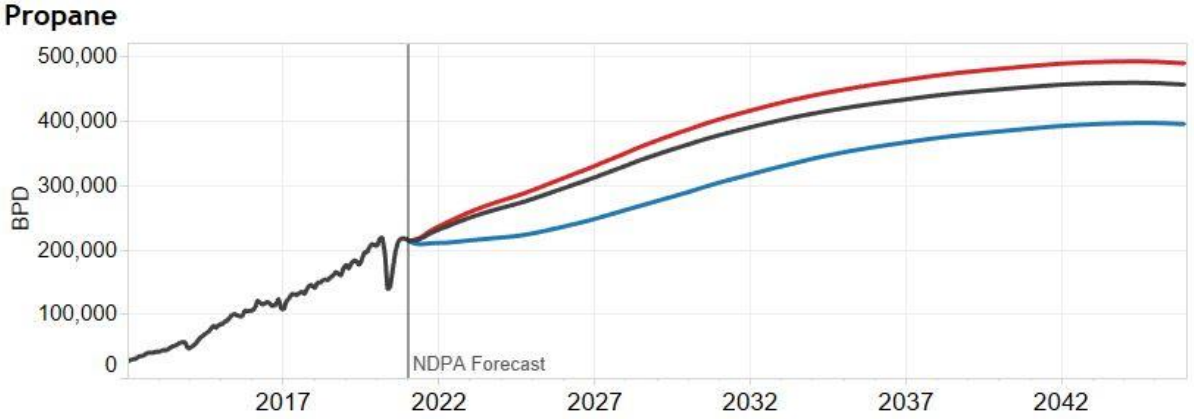
# Overview of NGL Chemistry Study – Middle Bakken

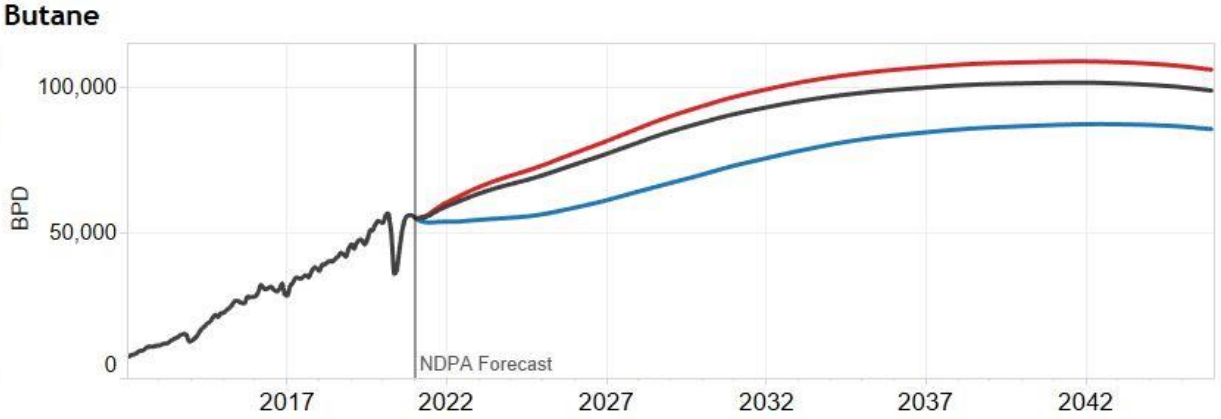


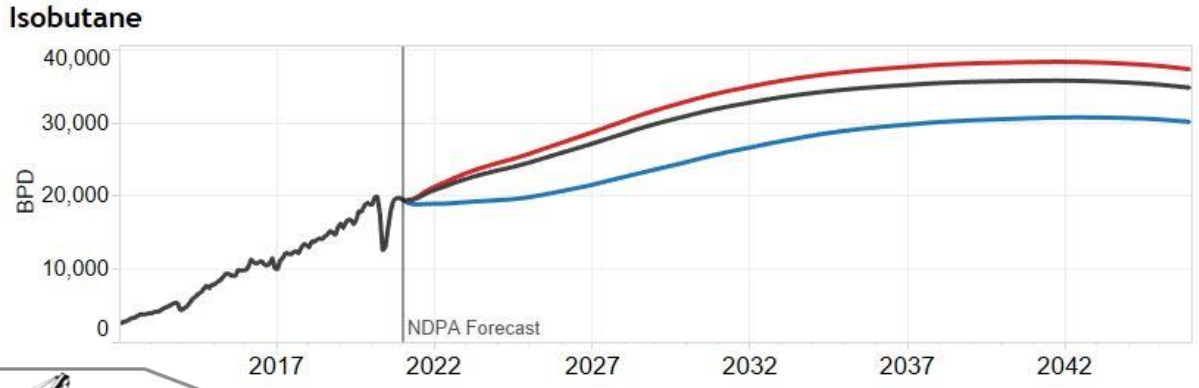
# North Dakota Captured* NGL's

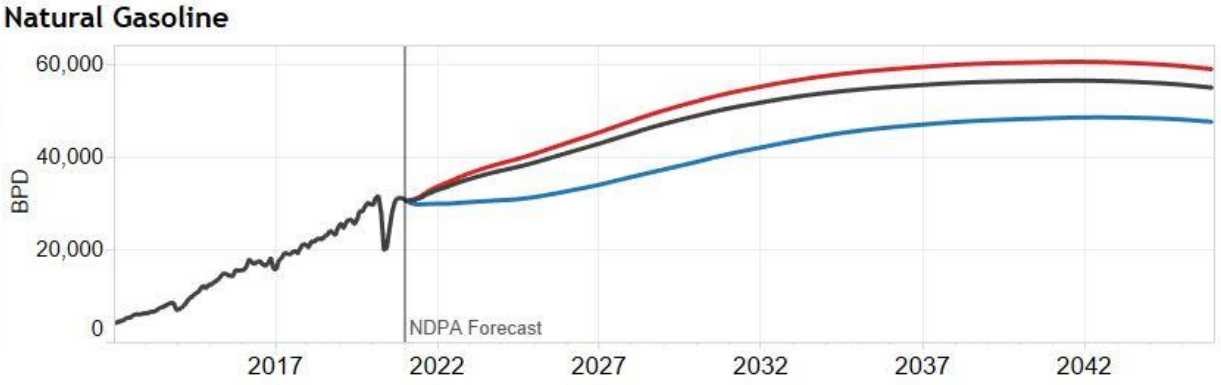


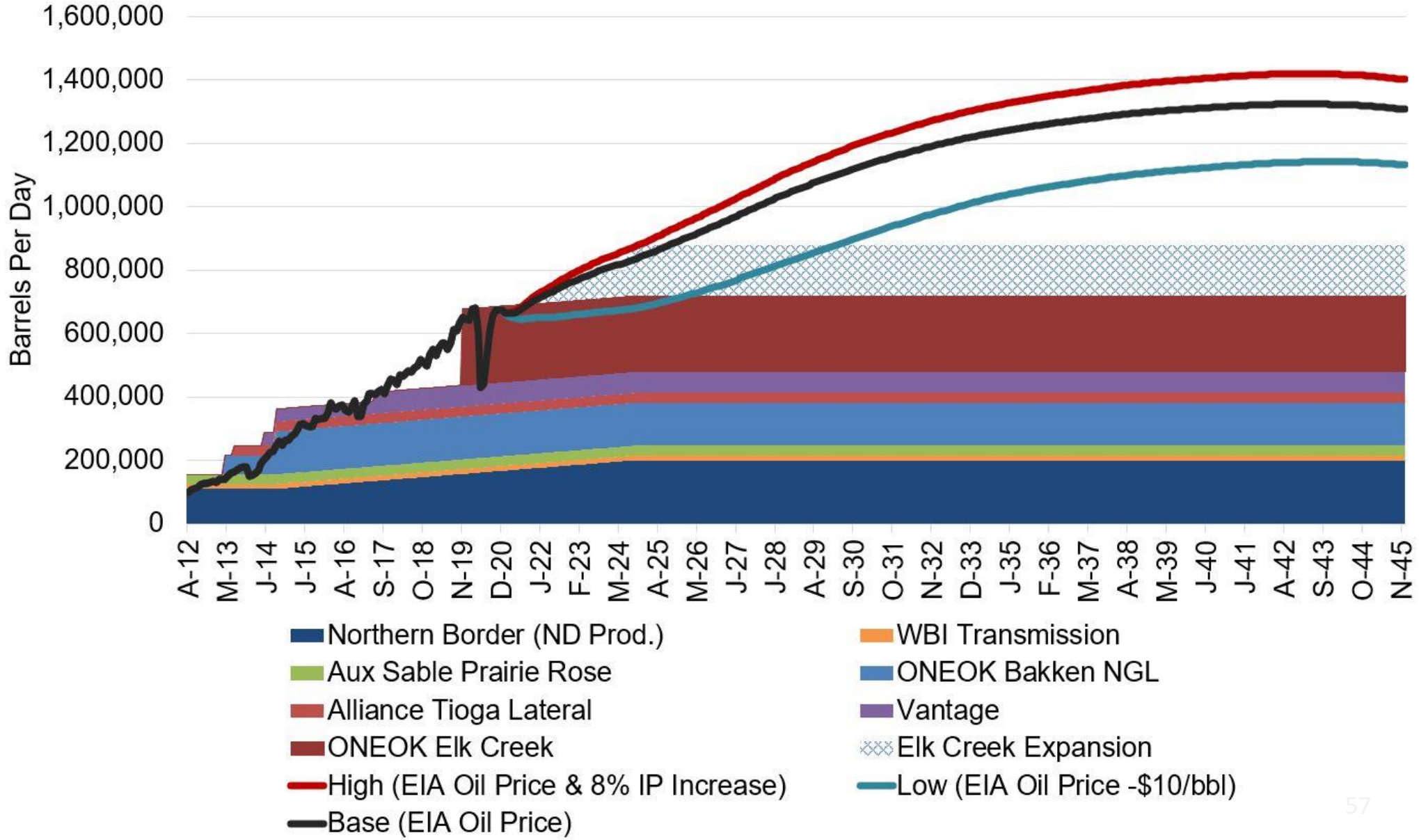



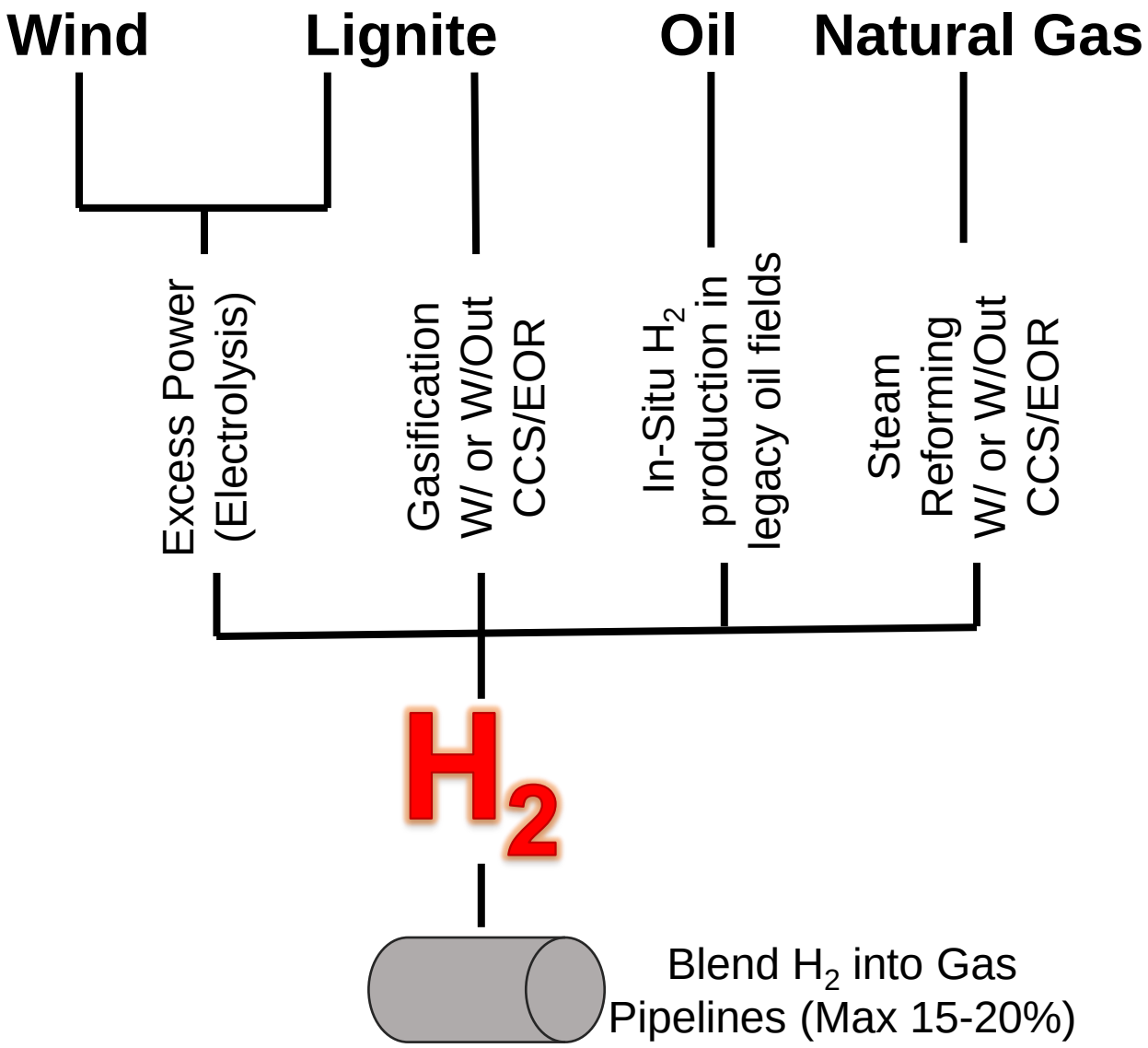



# NGL Pipeline Takeaway Options



# 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?

# Contact Information

Justin J. Kringstad, Director
North Dakota Pipeline Authority

600 E. Boulevard Ave. Dept. 405
Bismarck, ND 58505-0840

Phone: (701)220-6227
Fax: (701)328-2820
E-mail: jjkringstad@ndpipelines.com

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