

# 72nd Annual NDPGA Annual Meeting

**Justin J. Kringstad**

*Geological Engineer*

*Director*

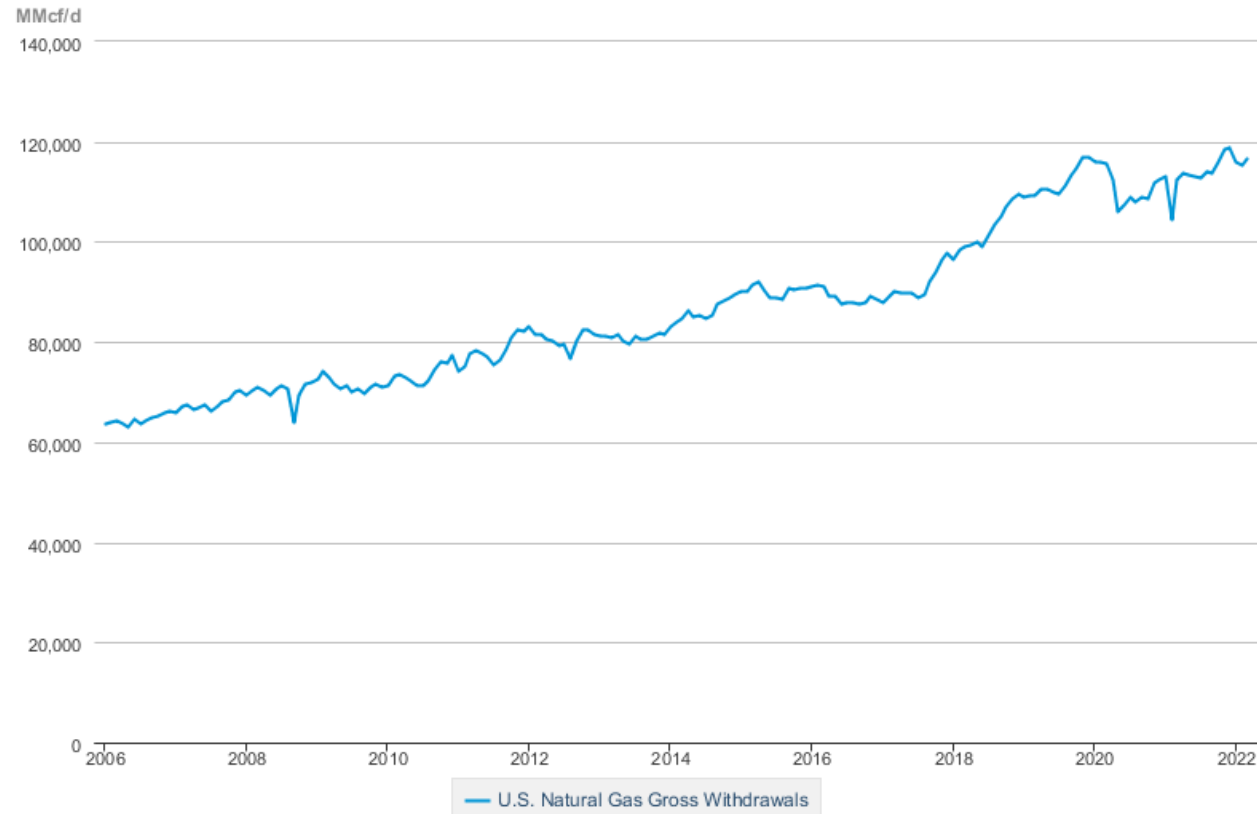
*North Dakota Pipeline Authority*



**June 22, 2022**

# North Dakota Natural Gas

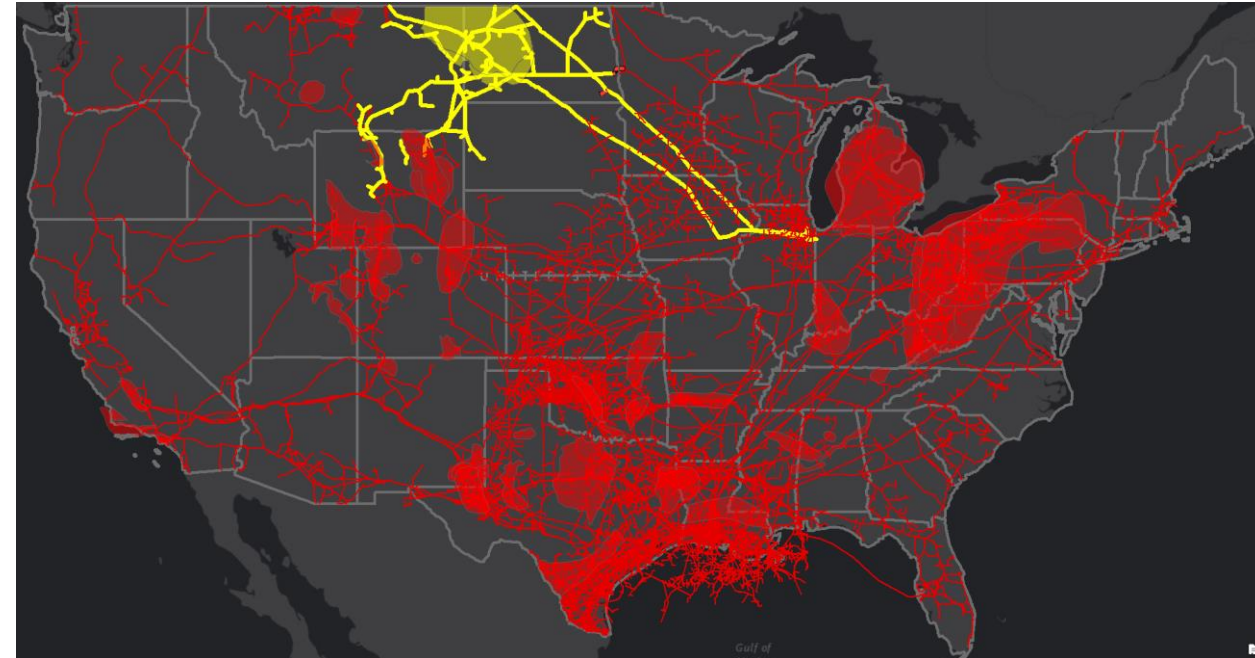
Natural Gas Gross Withdrawals and Production



eia Source: U.S. Energy Information Administration

## Natural Gas Stats

- 11<sup>th</sup> largest gas producing state
- ~2.5% of total US production
- Extremely high natural gas liquids (NGL) content in the Bakken gas stream. ~10-12+ gallons per thousand cubic of gas (GPM)



# A Complete Gas Capture Solution



## Production

- Technology
- Markets
- Forecasting



## Gathering

- Capacity
- Connections
- Compression



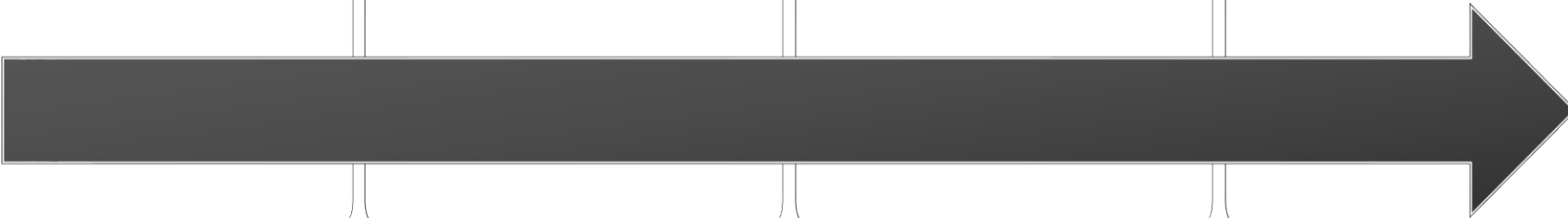
## Processing

- Capacity
- Location
- Configuration

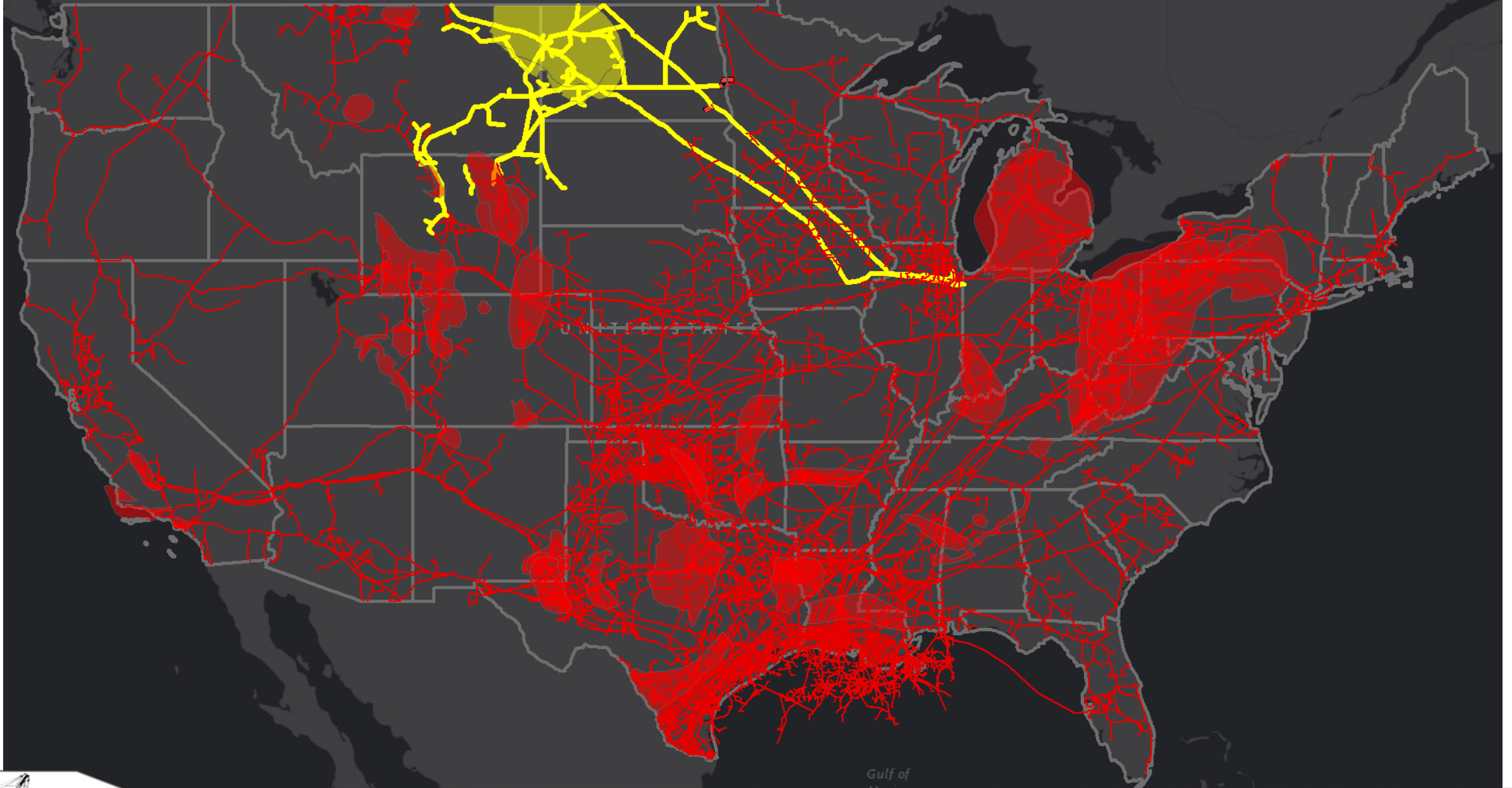


## Transmission

- Dry Gas
- Natural Gas Liquids

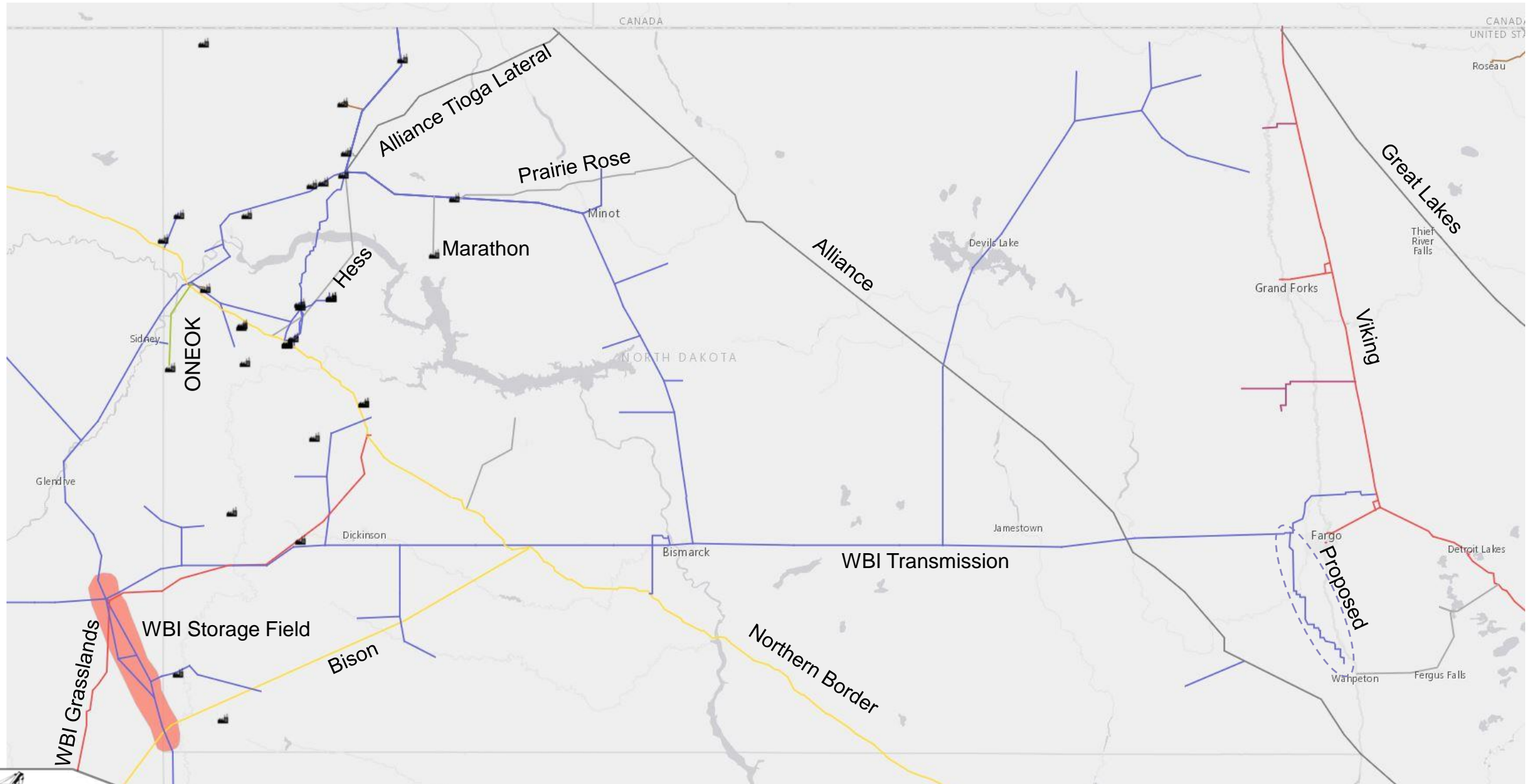


# Bakken Natural Gas Infrastructure

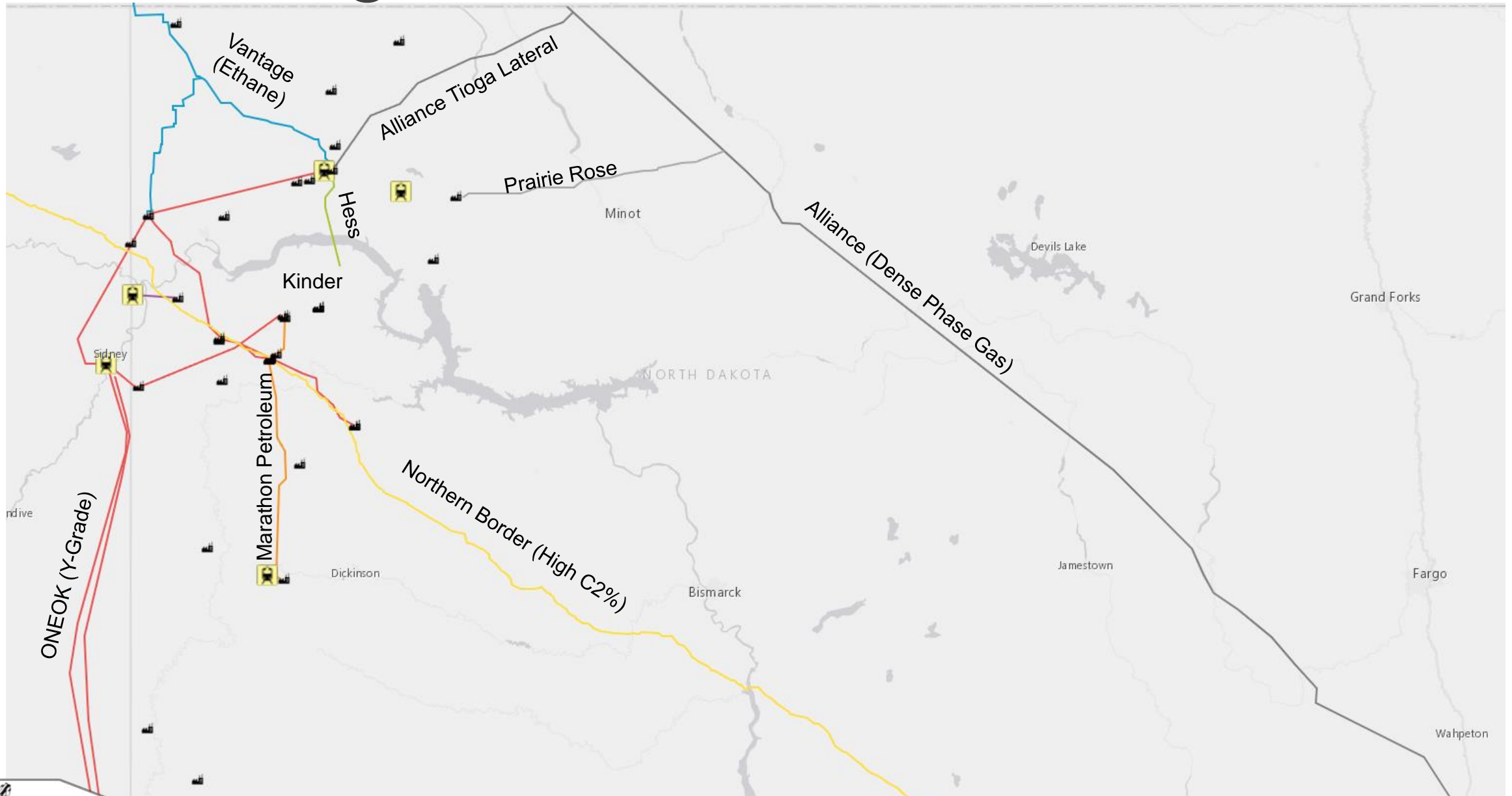




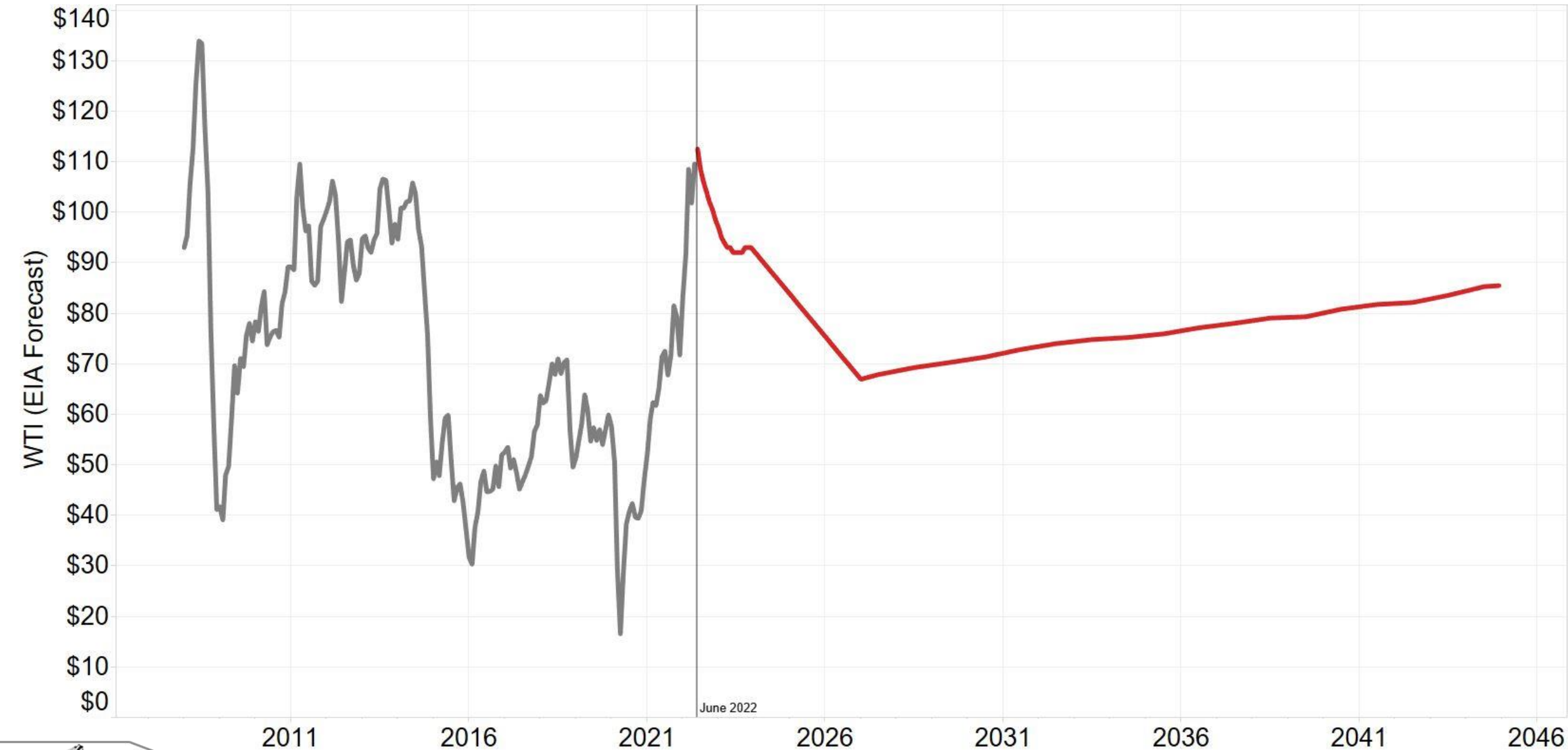
# Major Residue Gas Pipeline Infrastructure



# Regional NGL Infrastructure



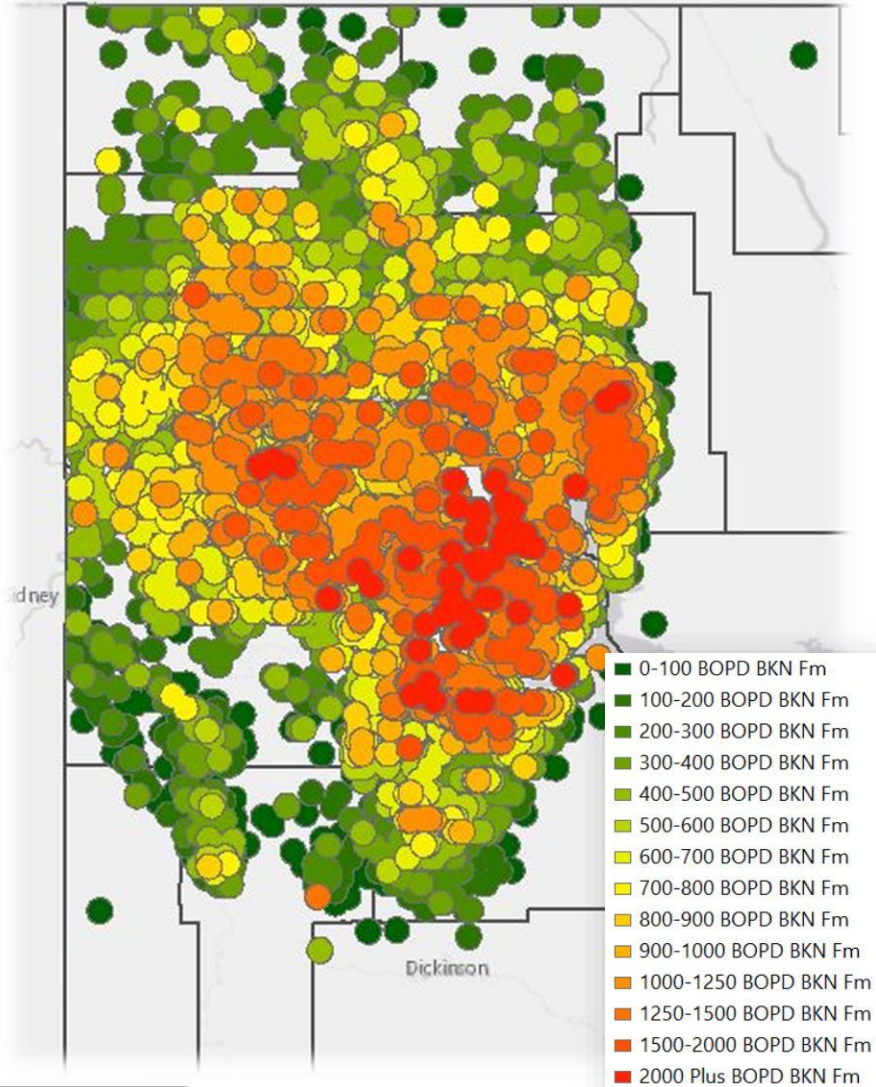
# EIA Oil Price Outlook\*



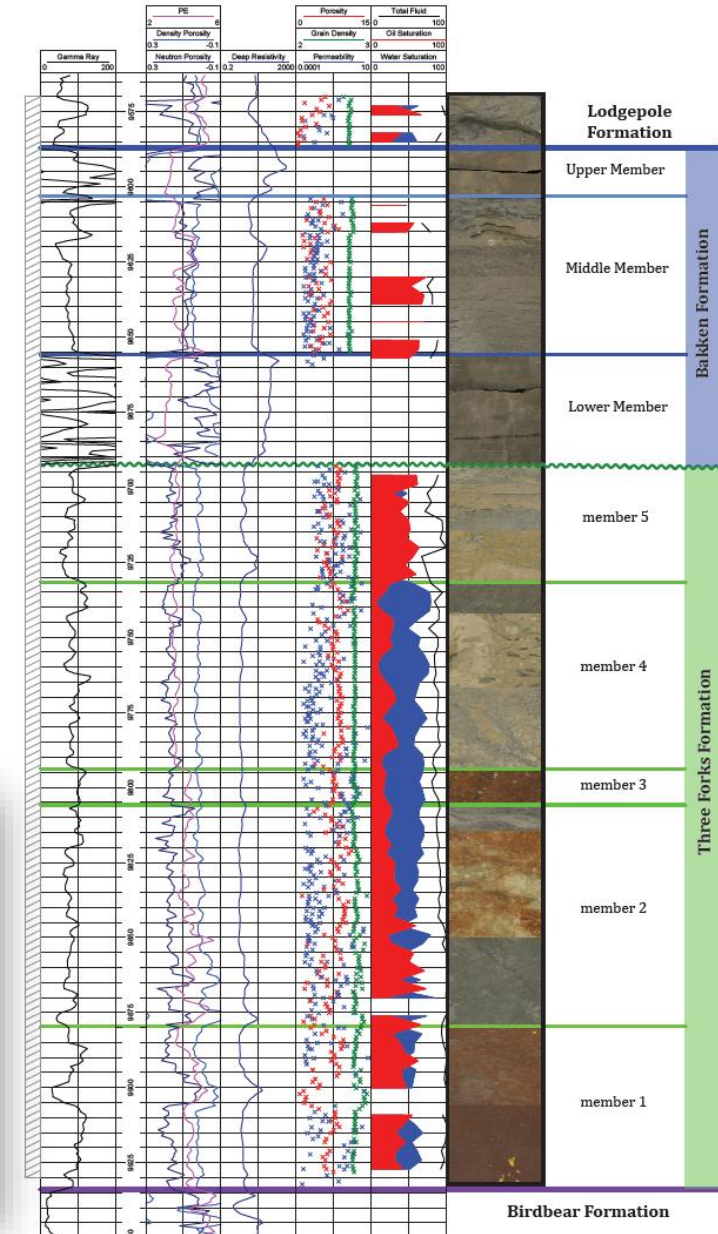
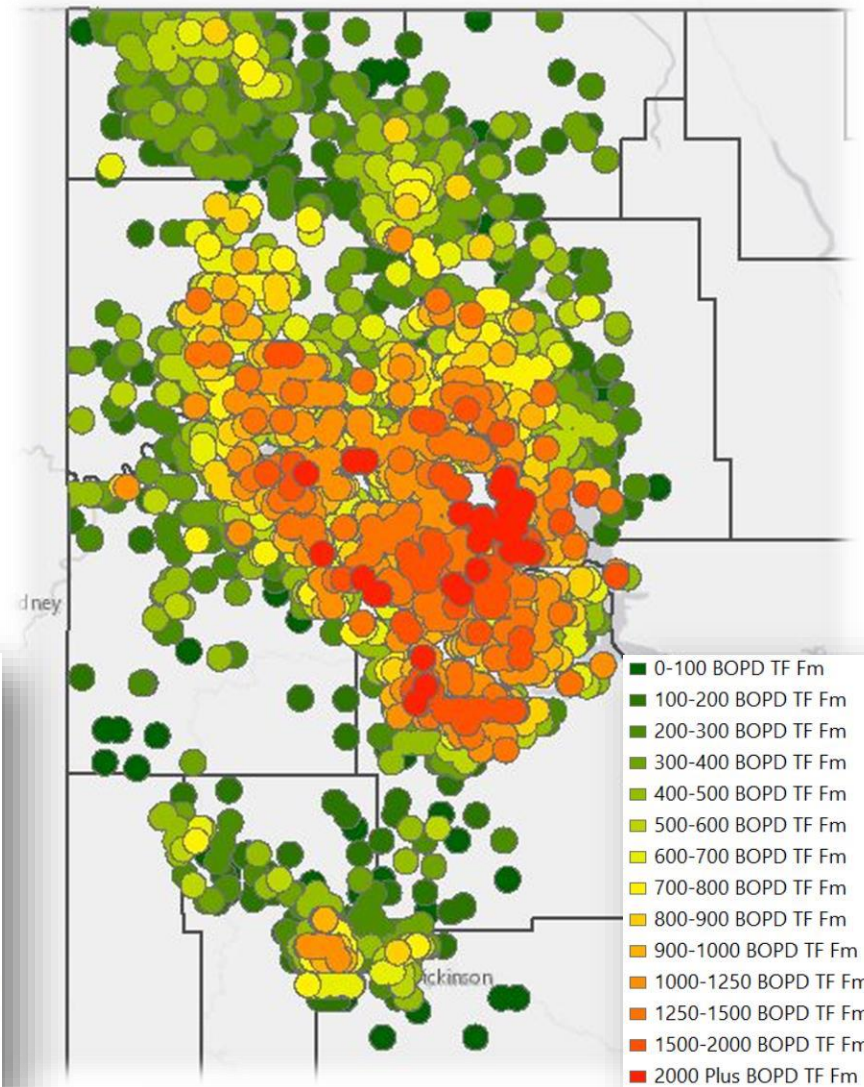


# Bakken & Three Forks Formations – Feb. 2022

Bakken Formation



Three Forks Formation

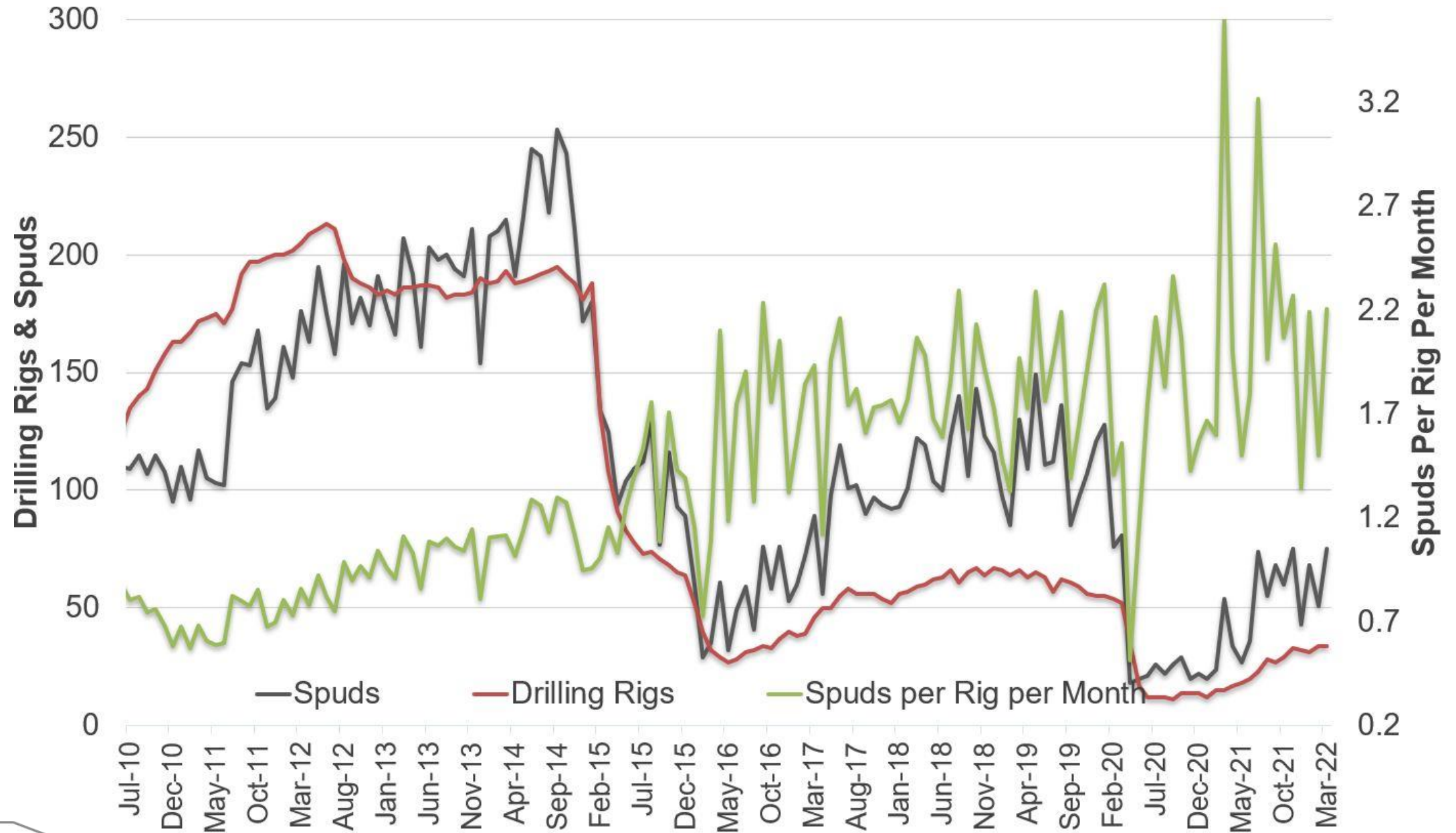




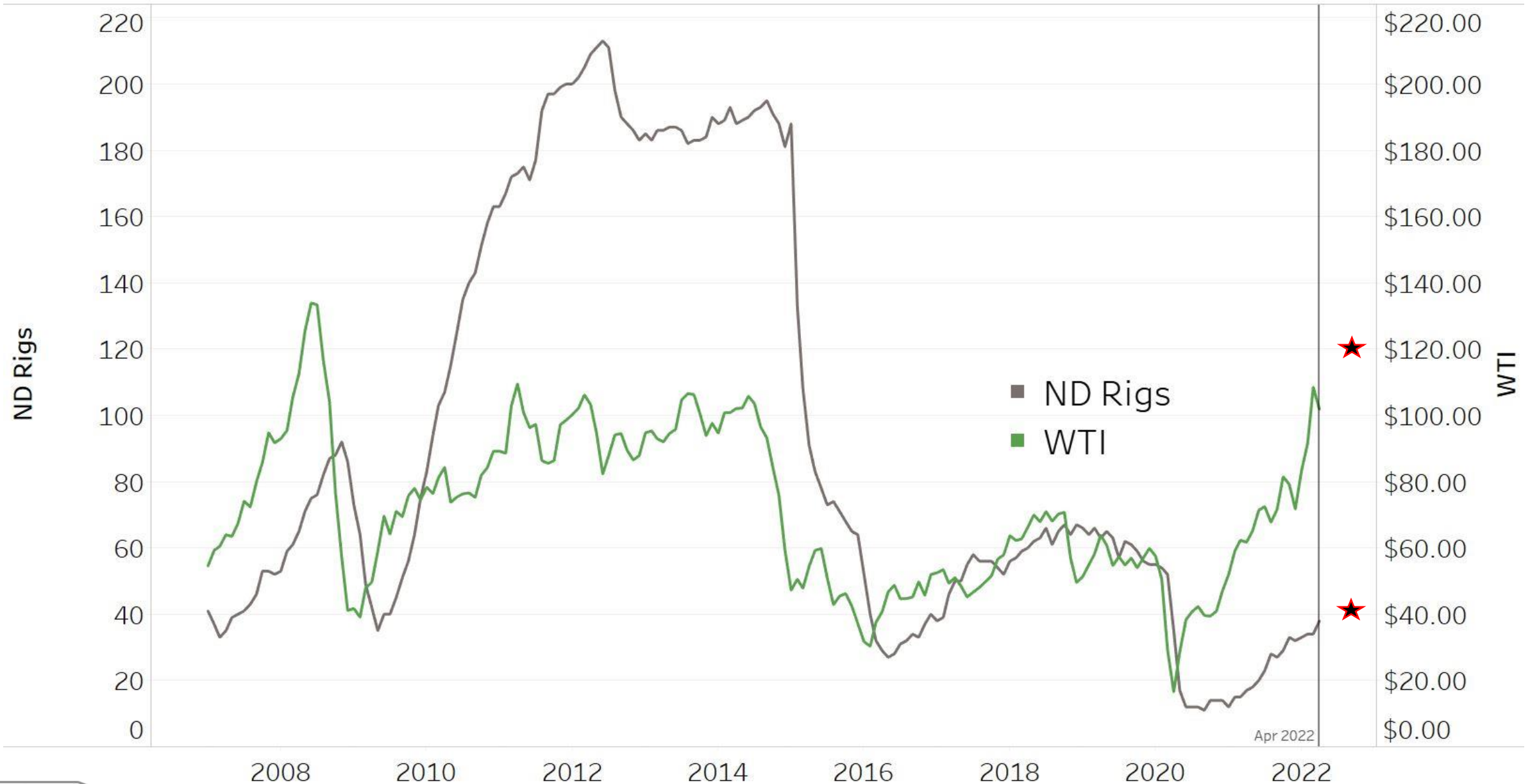
# North Dakota Drilling Rig Breakdown



# North Dakota Drilling Rig Efficiency

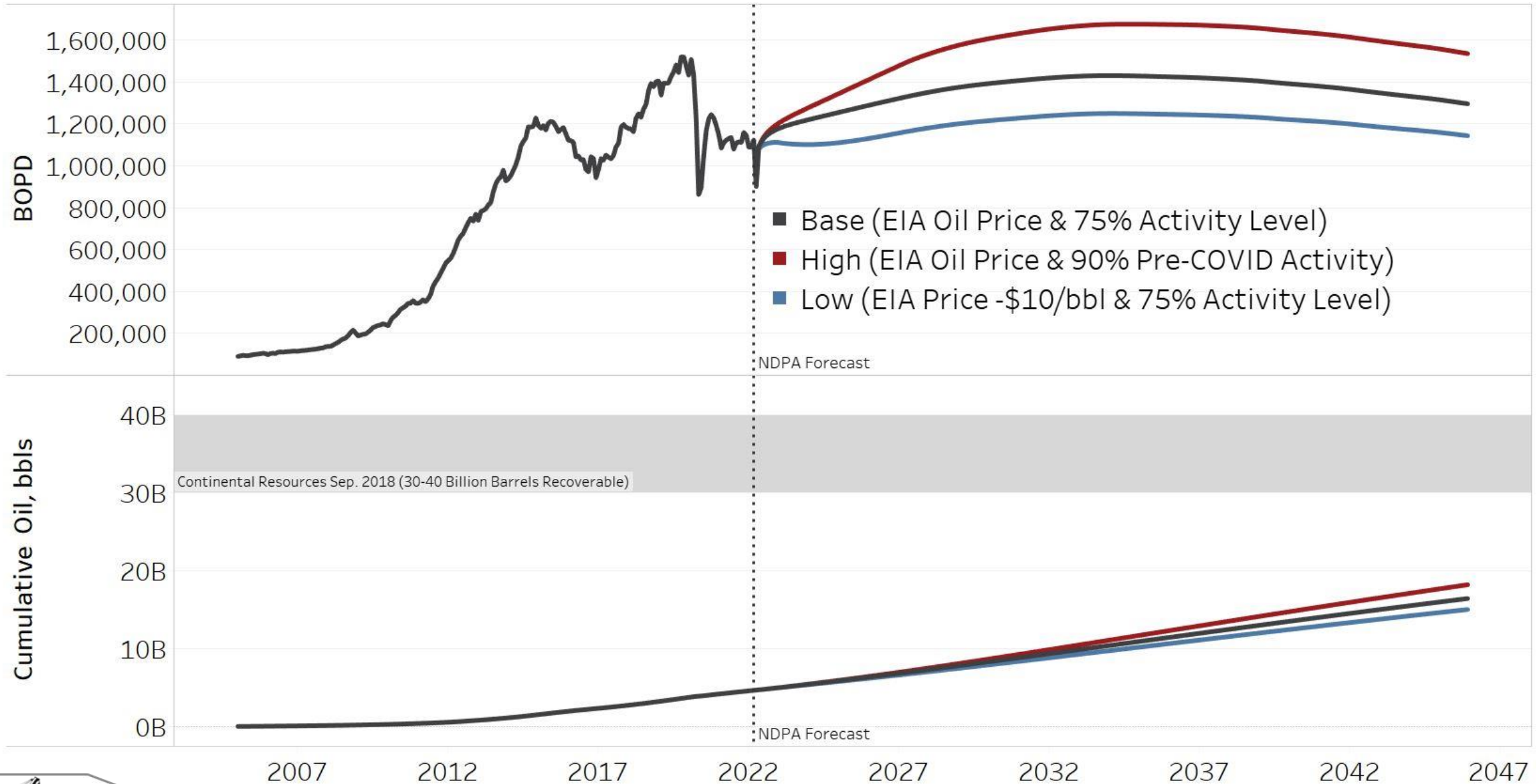


# North Dakota Drilling Activity History

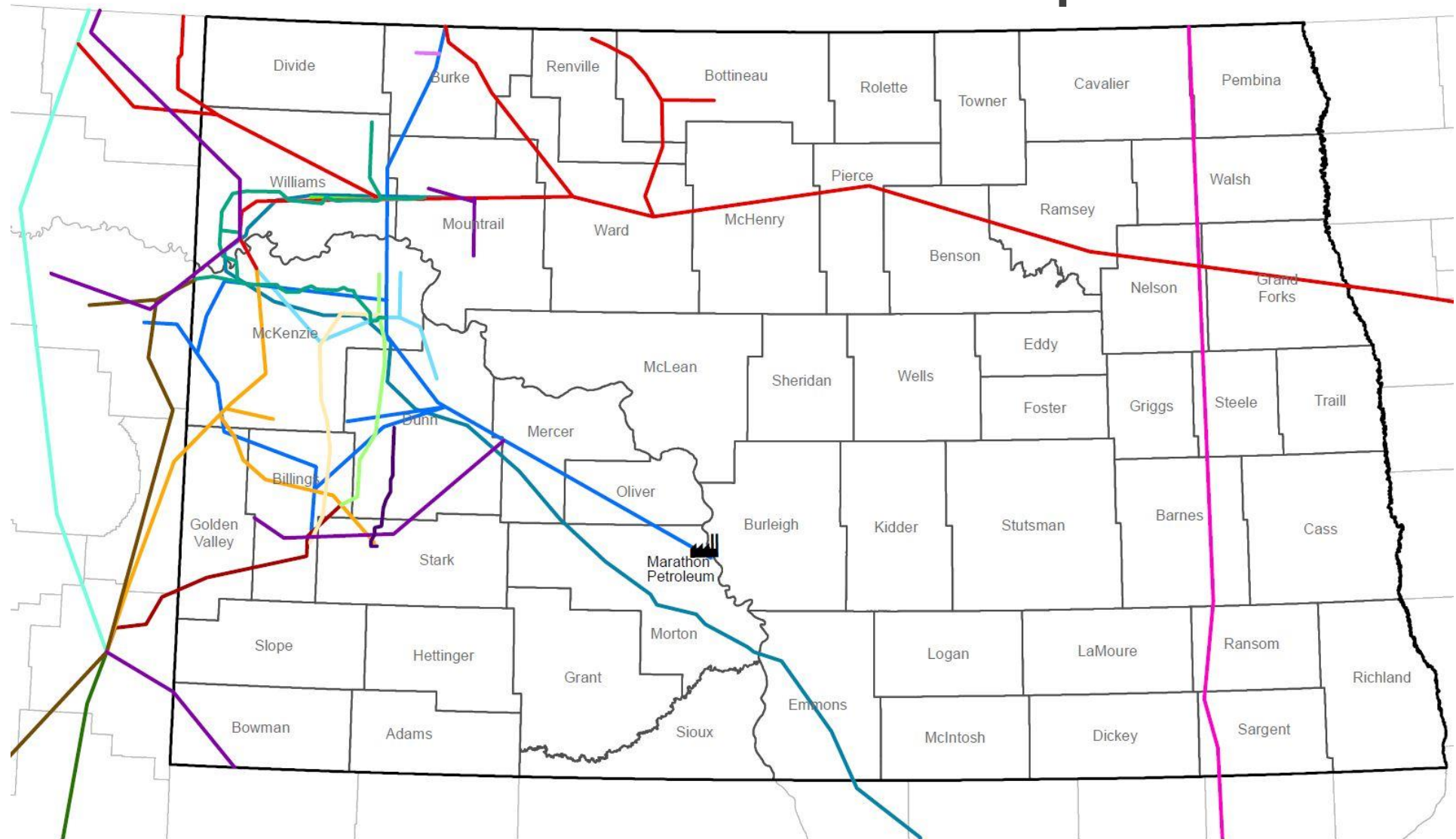




# ND Oil Production: EIA Price Deck



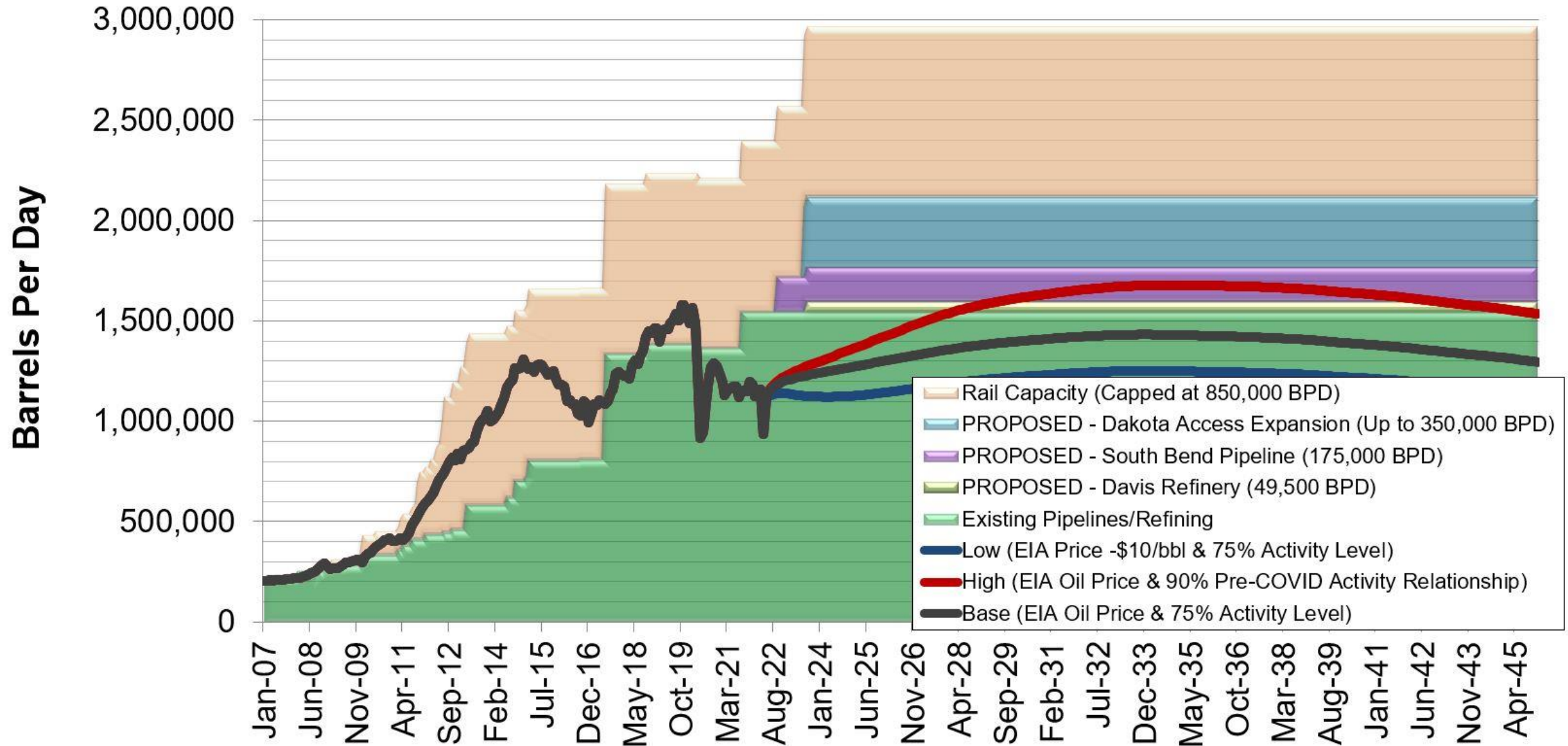
# North Dakota Oil Transmission Pipelines



- |                    |                 |               |            |                   |          |
|--------------------|-----------------|---------------|------------|-------------------|----------|
| Refinery           | Basin Transload | Butte         | Double H   | Hiland            | Bridger  |
| Bakken Oil Express | Belle Fourche   | Crestwood     | Enbridge   | Keystone Pipeline | Targa    |
| BakkenLink         | Bridger         | Dakota Access | Four Bears | Little Missouri   | Marathon |

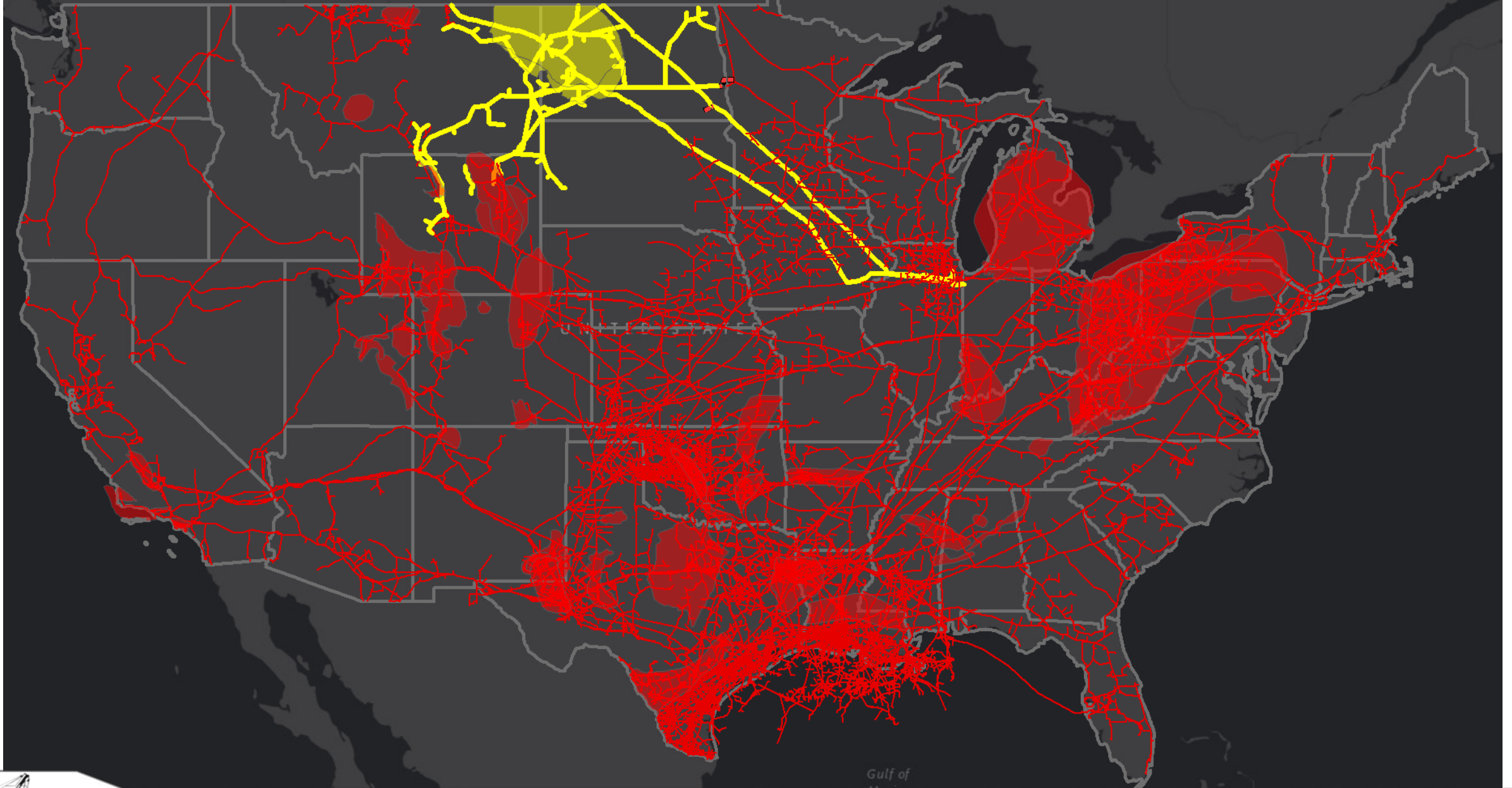


# Williston Basin Oil Production & Export Capacity, BOPD





# Bakken Natural Gas Infrastructure



# Natural Gas Update



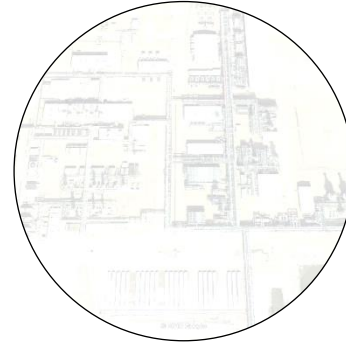
## Production

- Technology
- Markets



## Gathering

- Capacity
- Connections



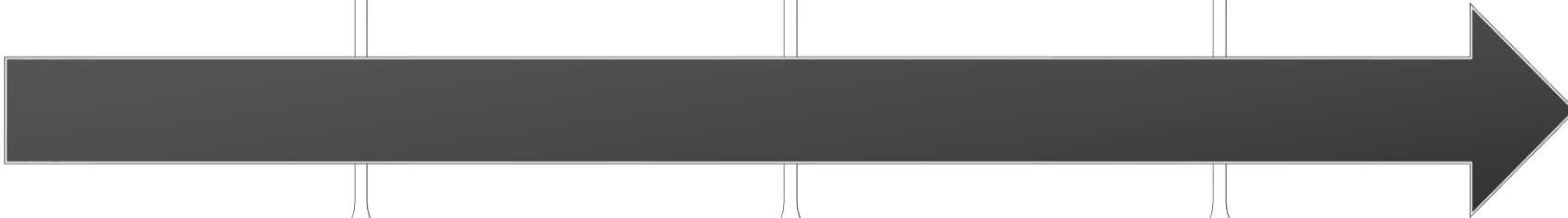
## Processing

- Capacity
- Location

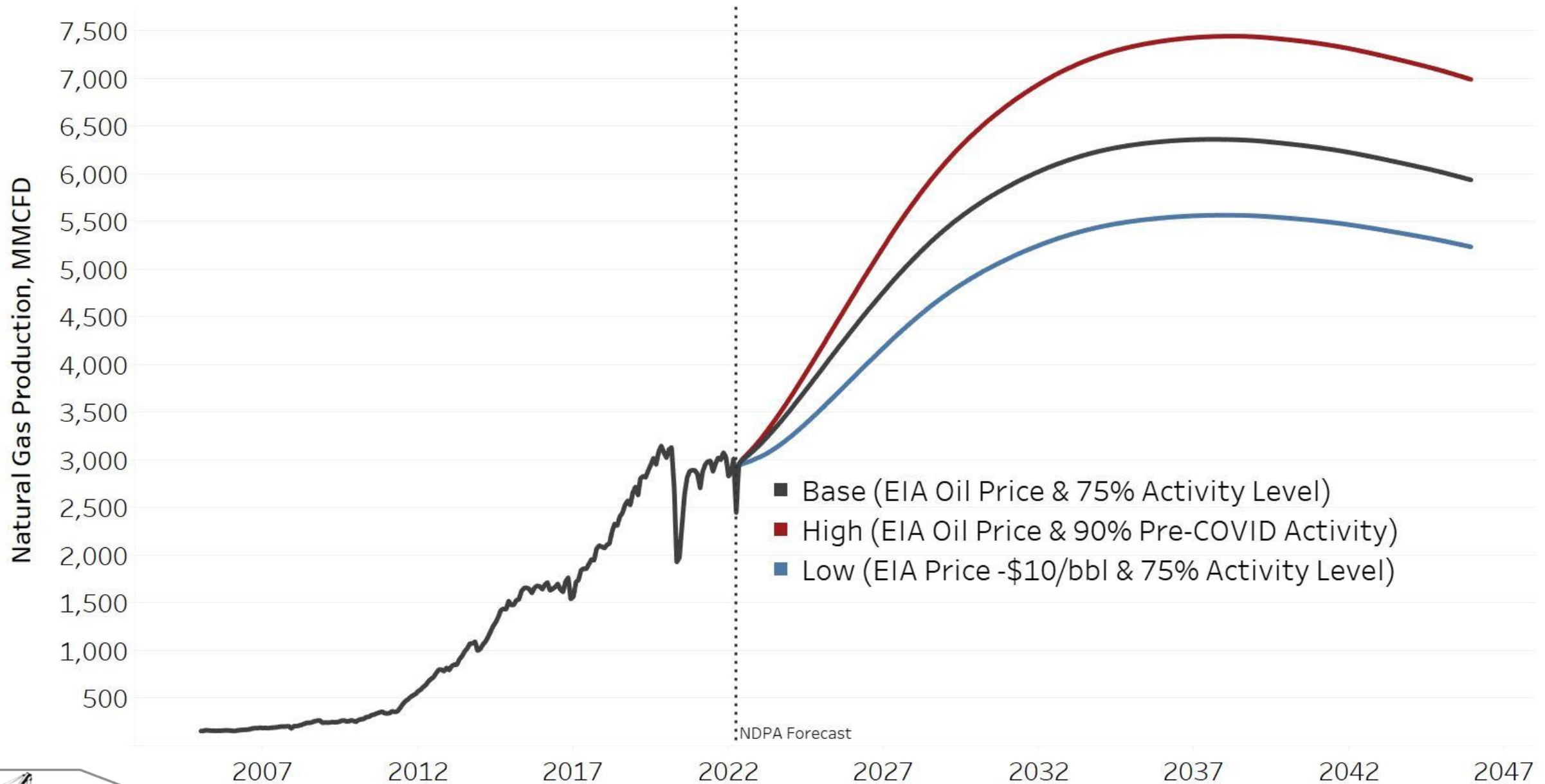


## Transmission

- Dry Gas
- Natural Gas Liquids

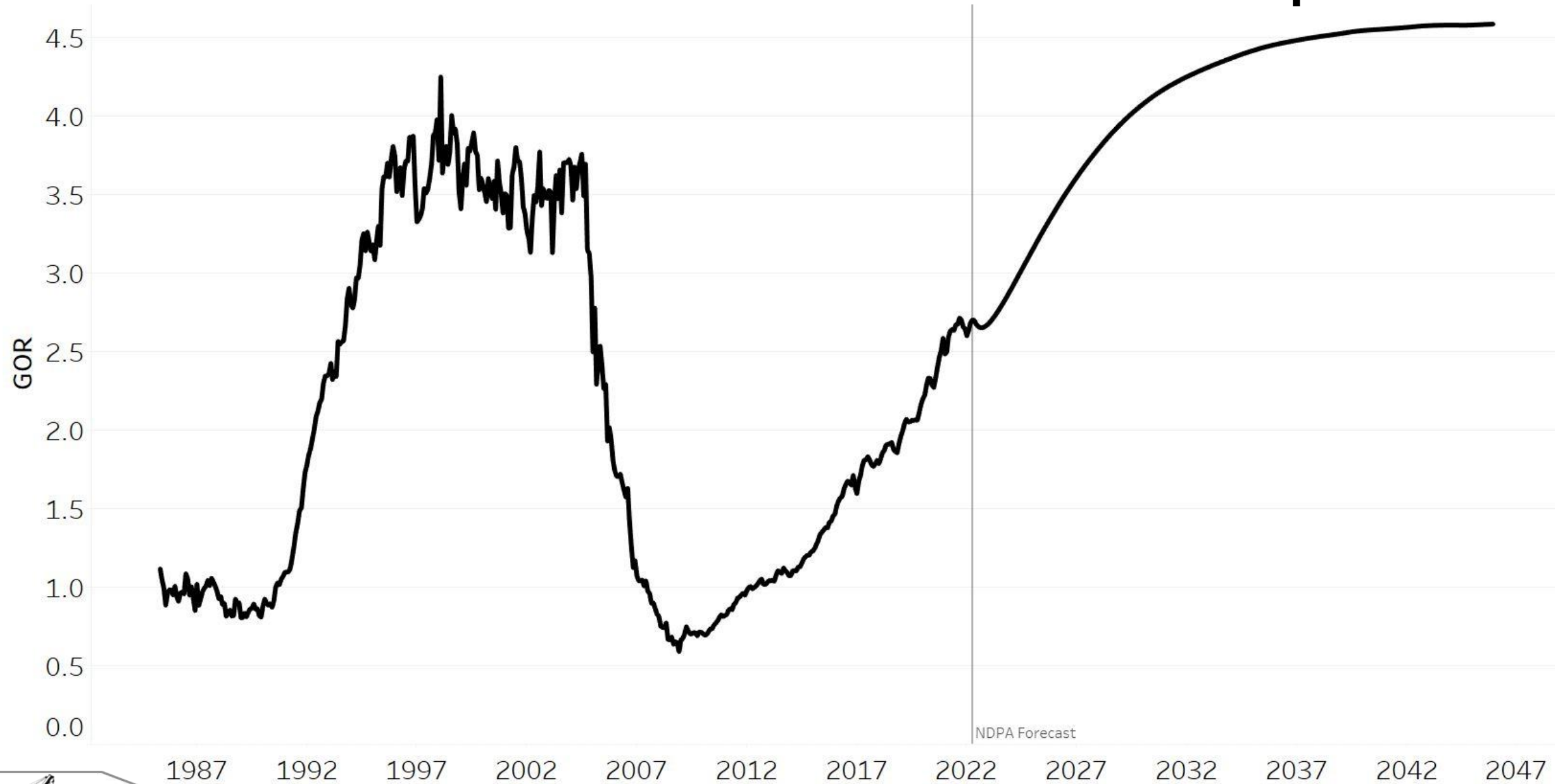


# ND Gas Production: EIA Price Deck





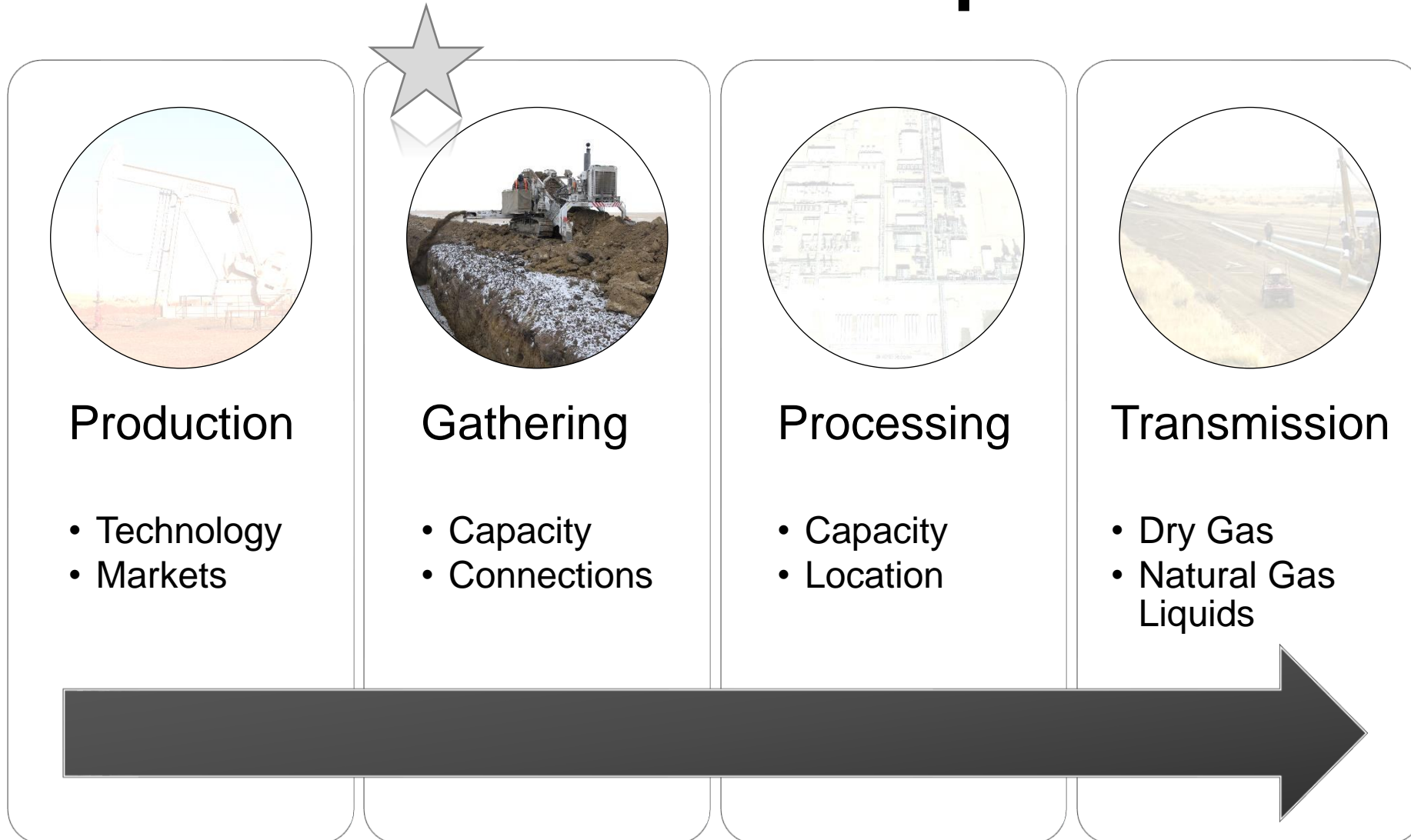
# ND Gas Production: GOR Assumption



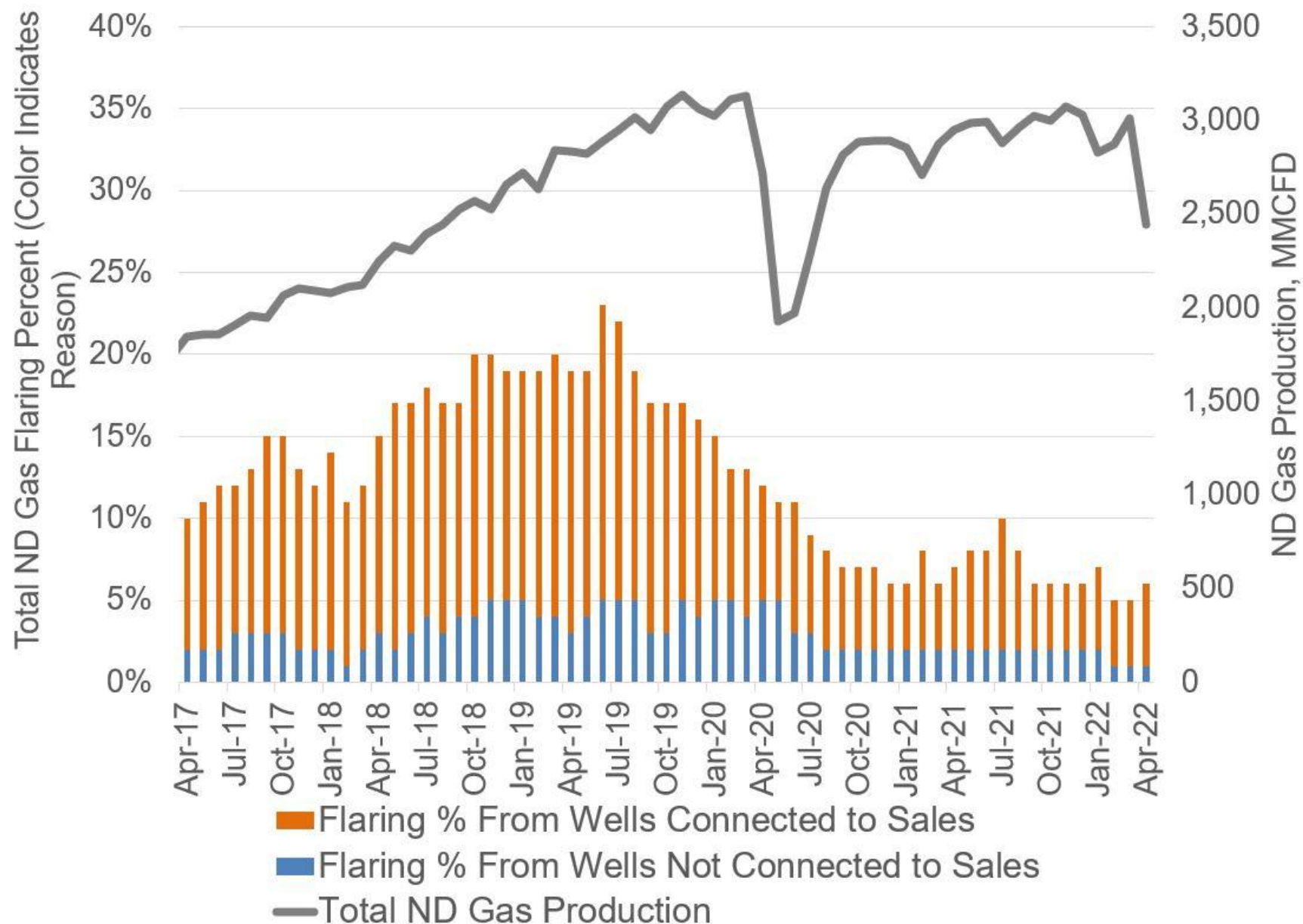
NDPA Forecast



# Natural Gas Update

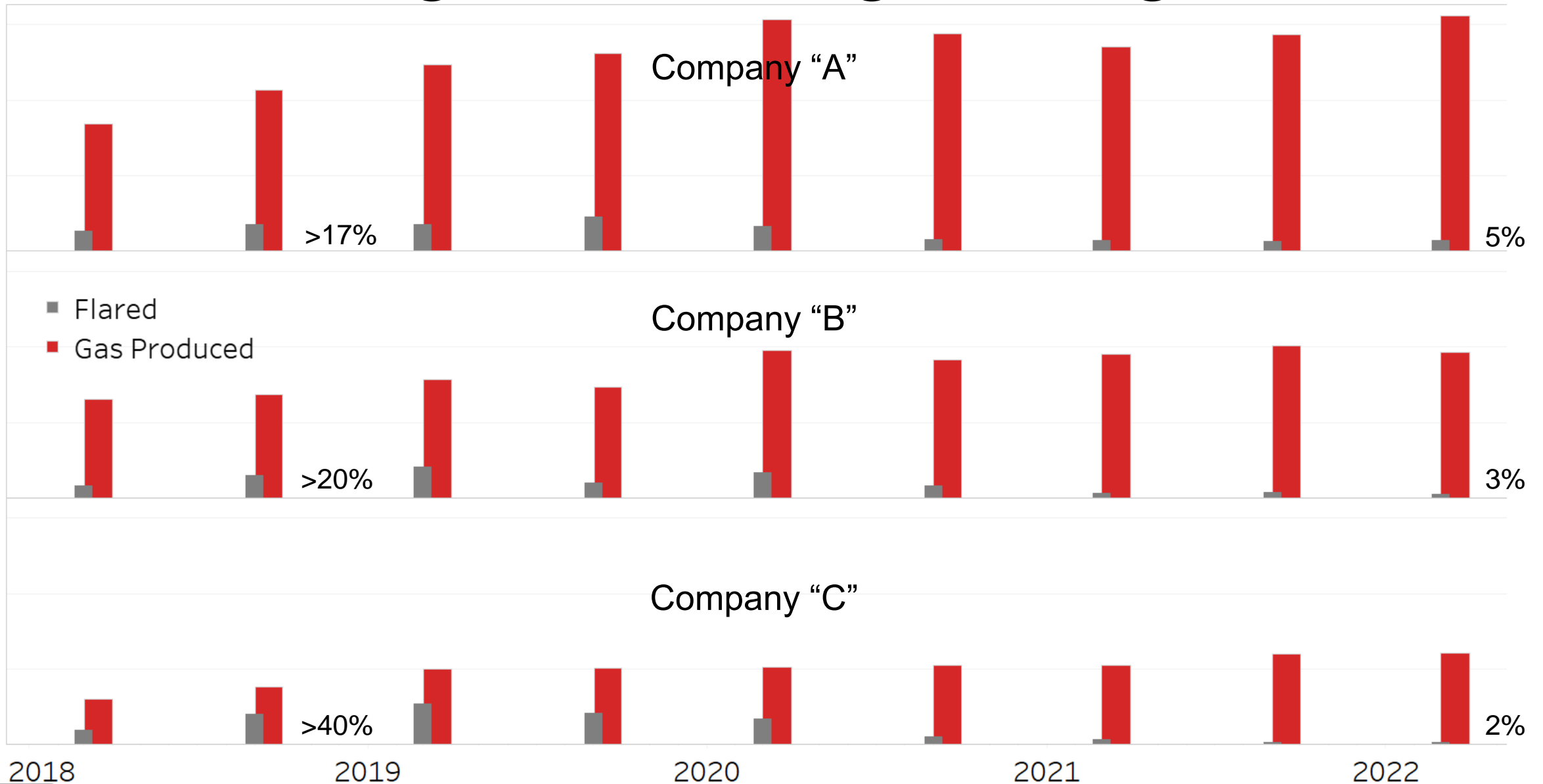


# Solving the Flaring Challenge

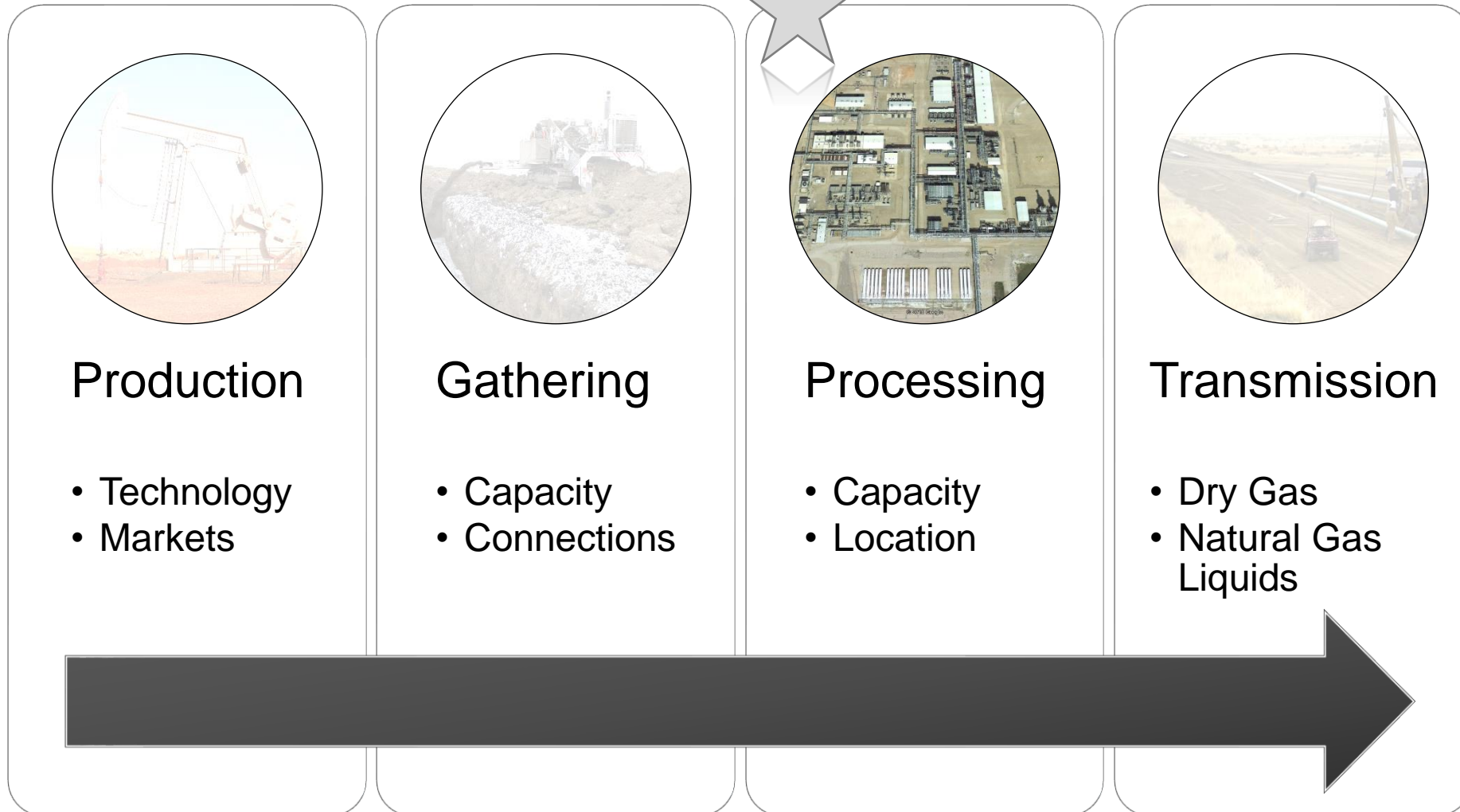




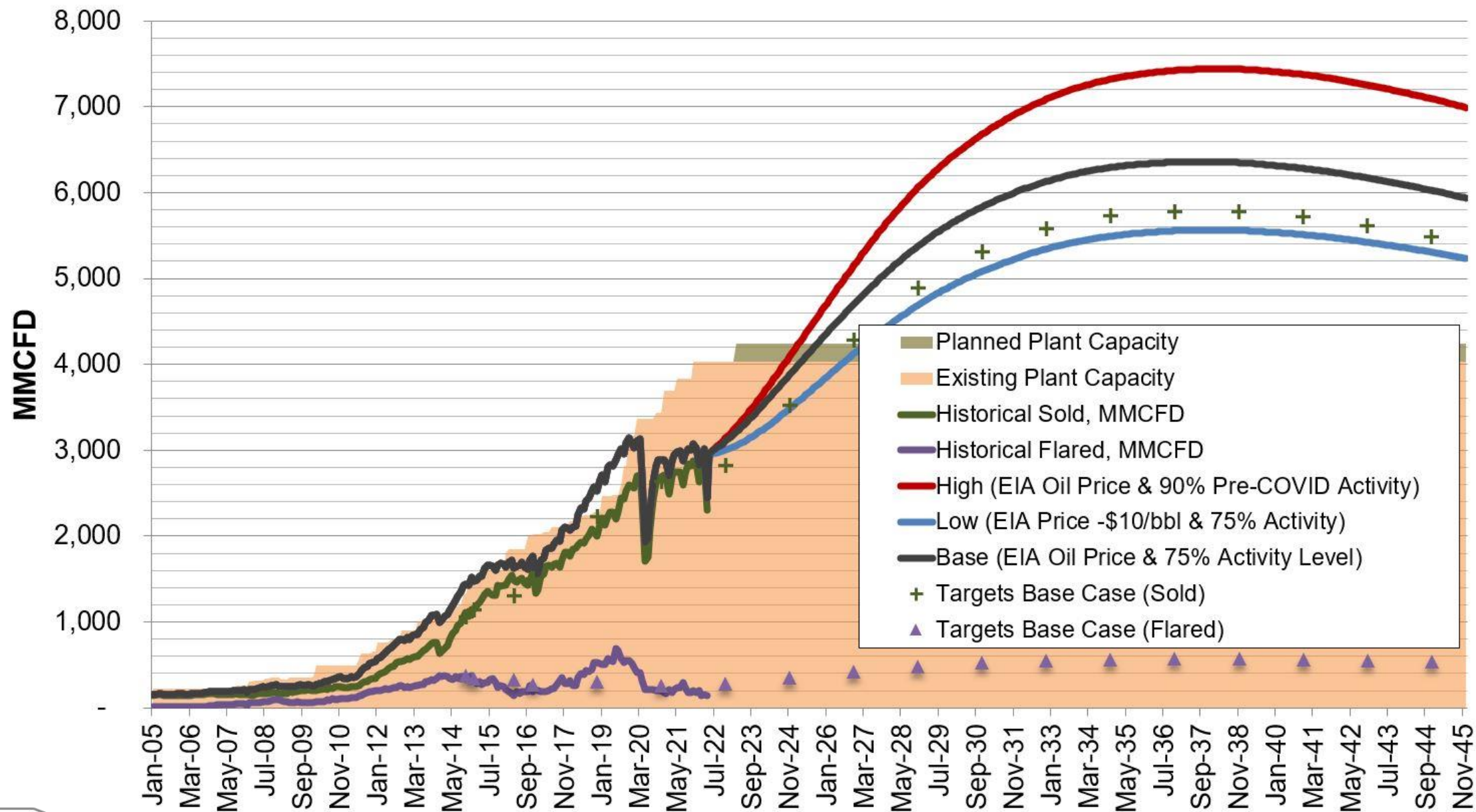
# ESG Targets Pushing Flaring Down



# Natural Gas Update

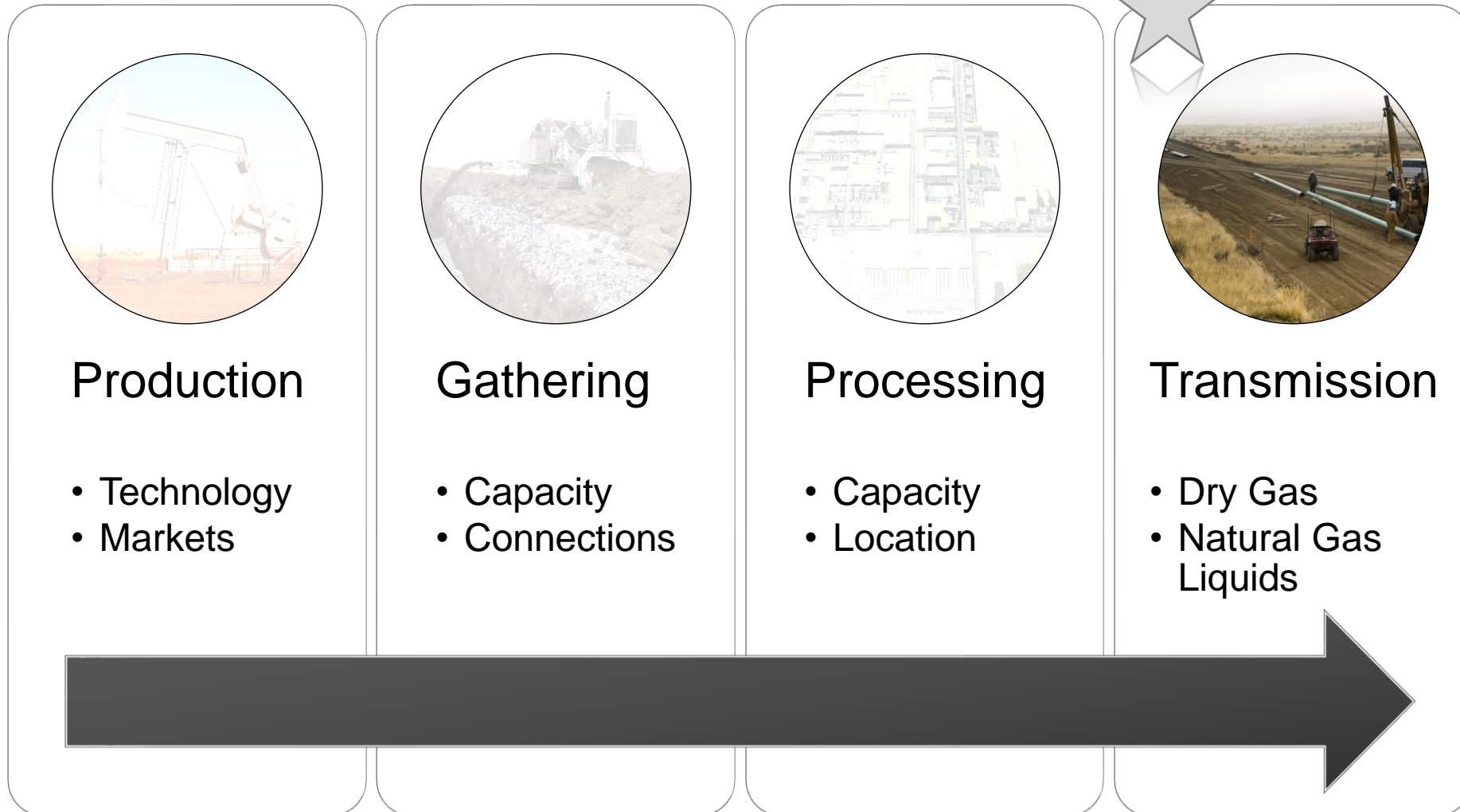


# Solving the Flaring Challenge

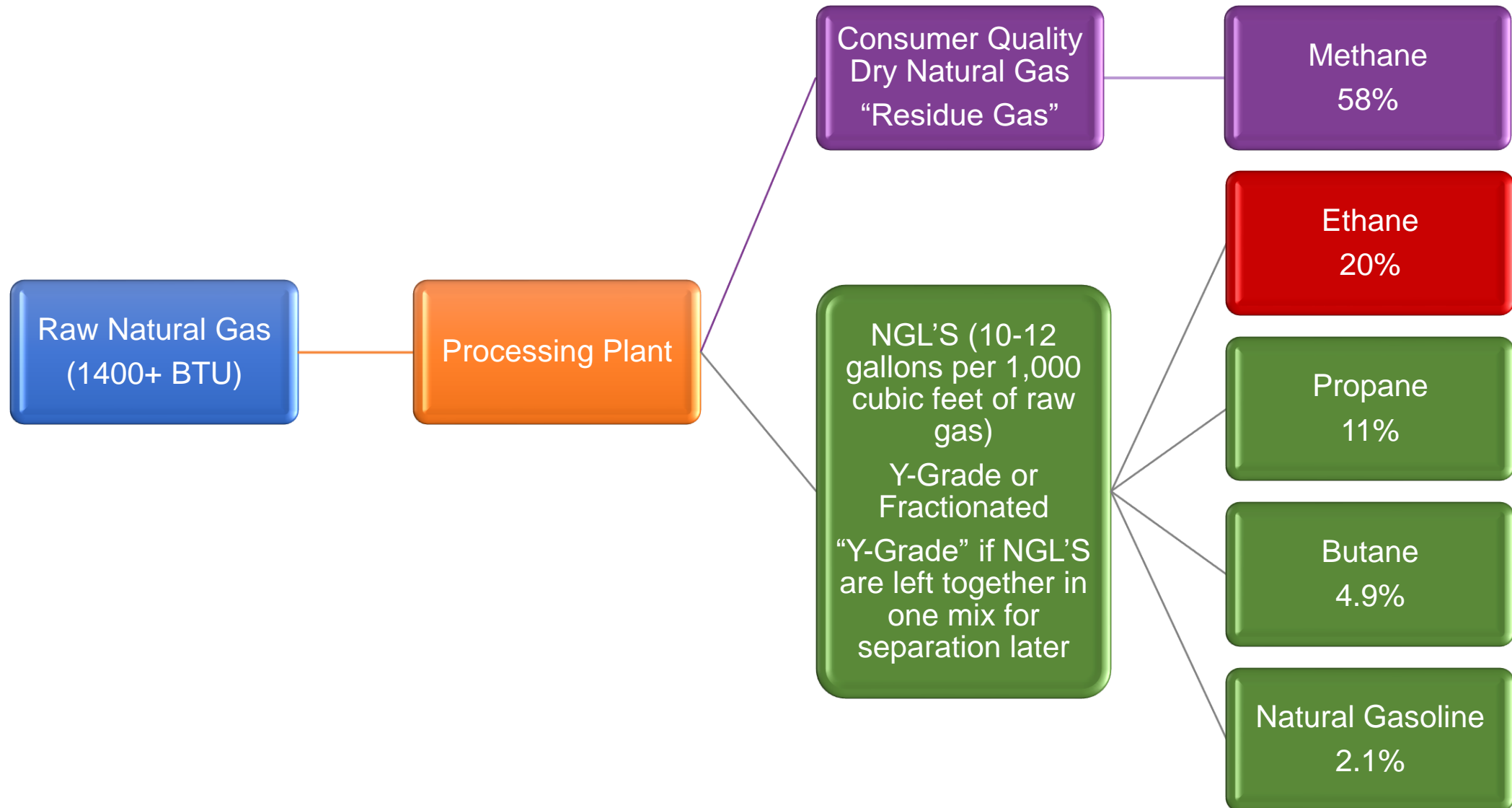




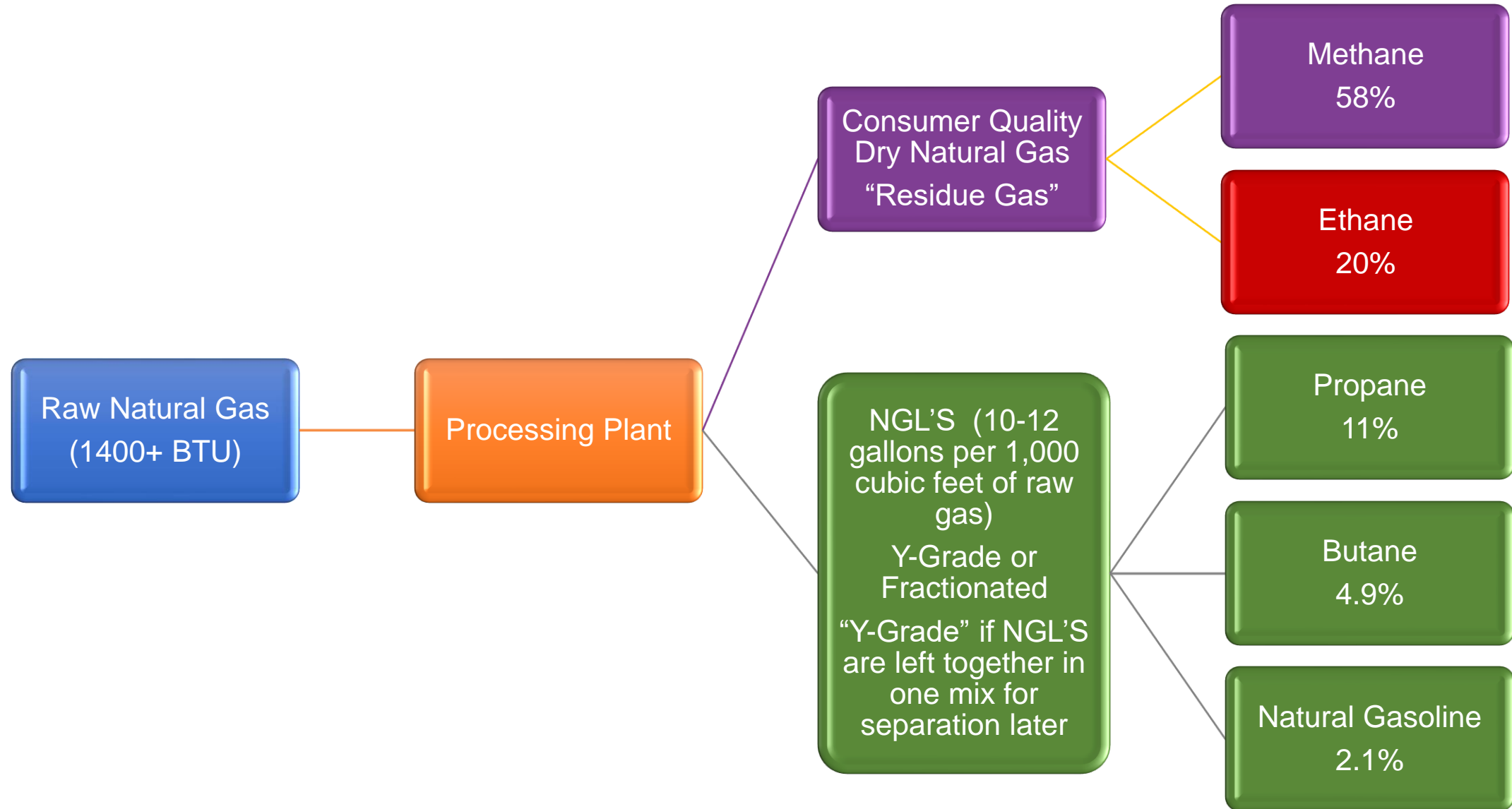
# Natural Gas Update



# Natural Gas Processing – “Ethane Capture”

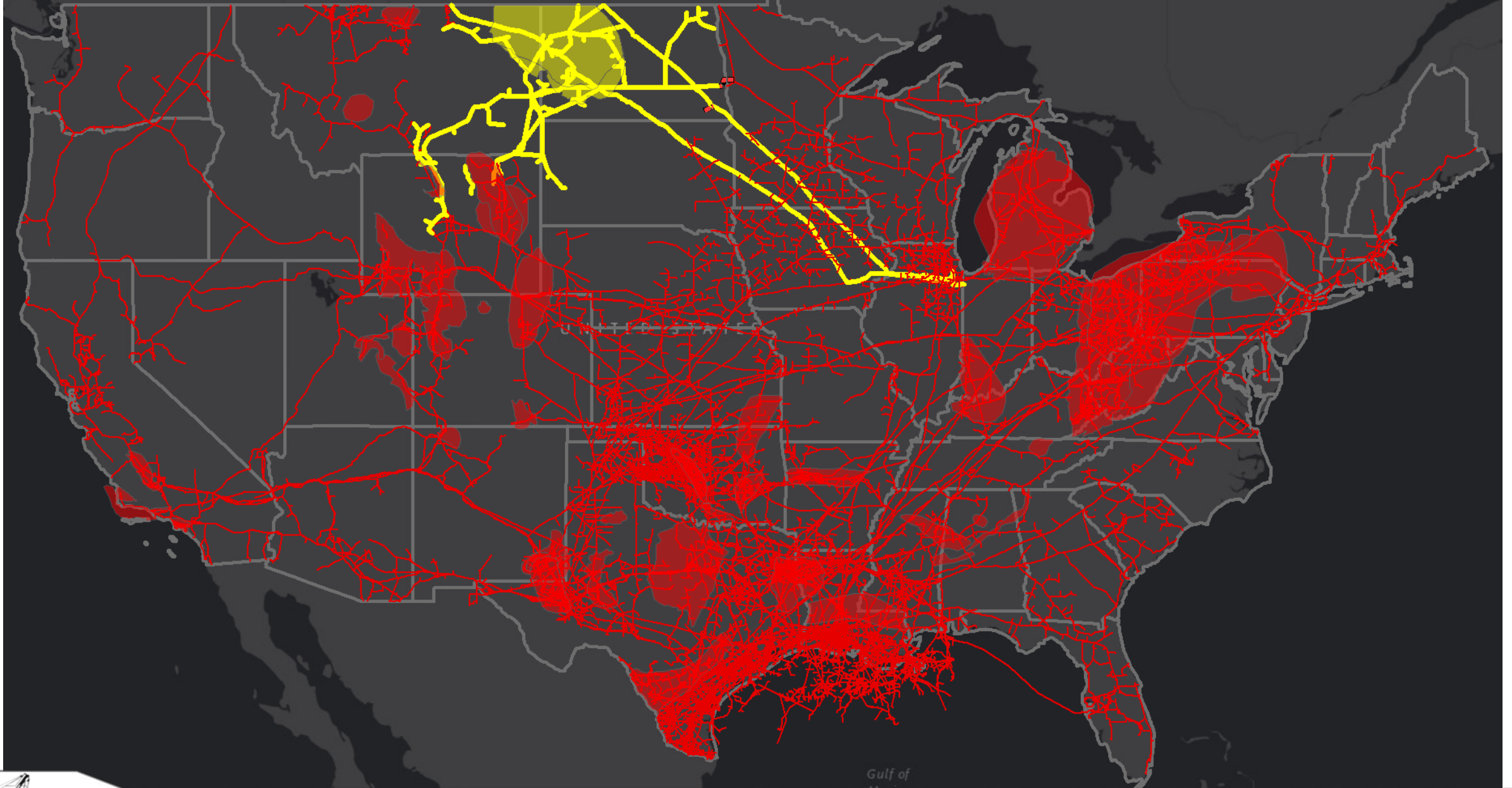


# Natural Gas Processing – “Ethane Rejection”

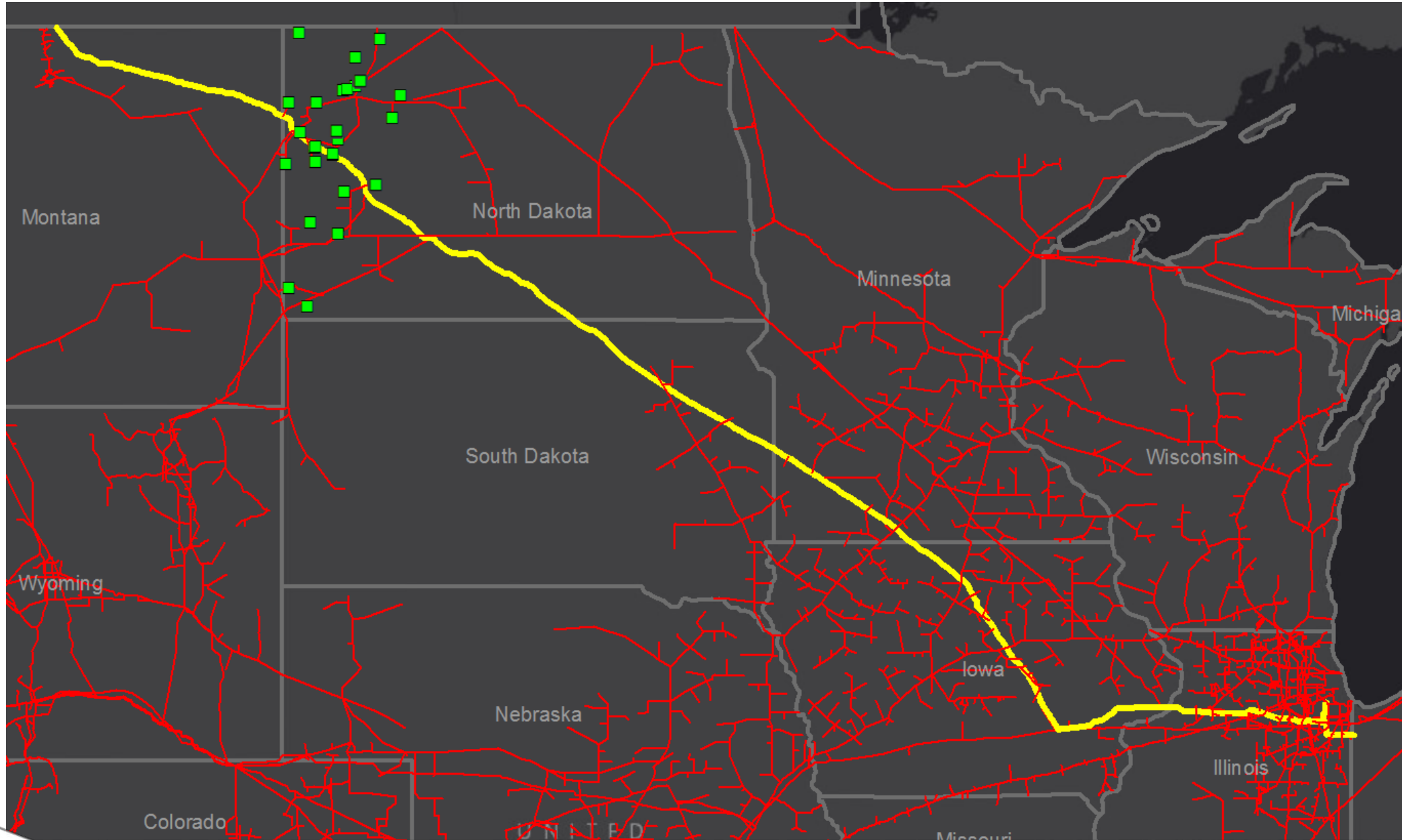




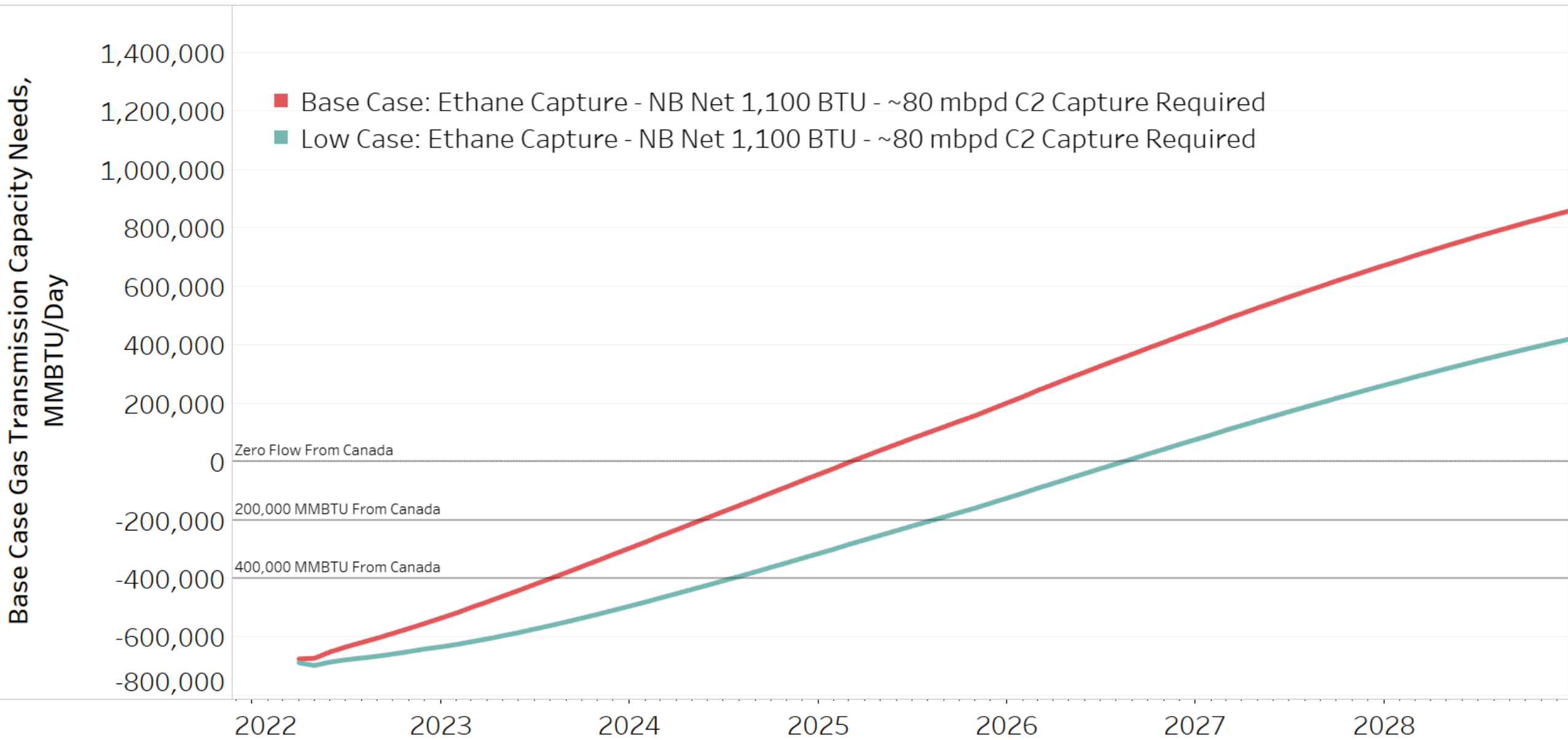
# Bakken Natural Gas Infrastructure



# Northern Border Pipeline

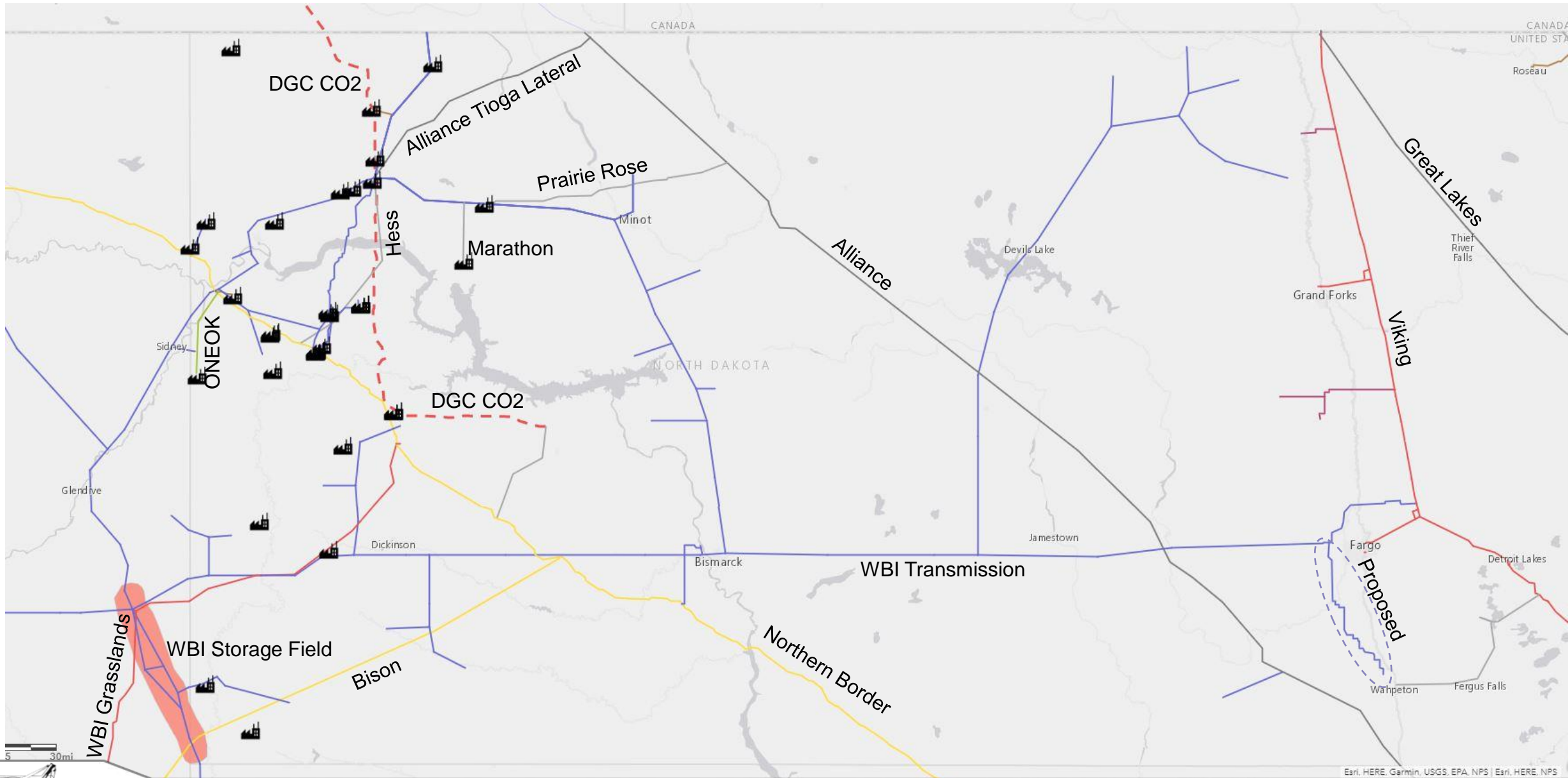


# Northern Border – BTU Calculations\*





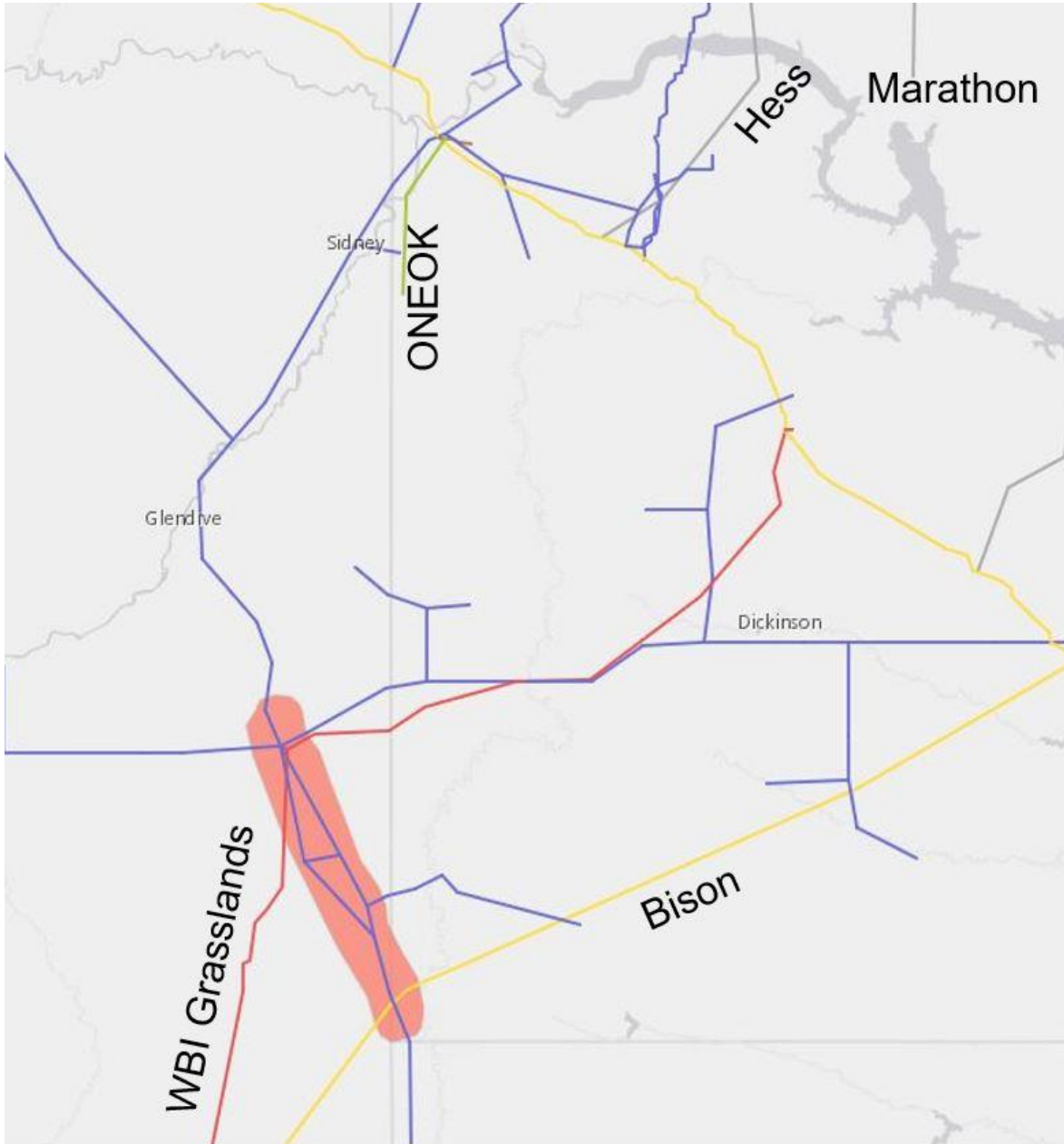
# Major Residue Gas Pipeline Infrastructure



# WBI Energy – Proposed Grasslands South Project

## Project Highlights

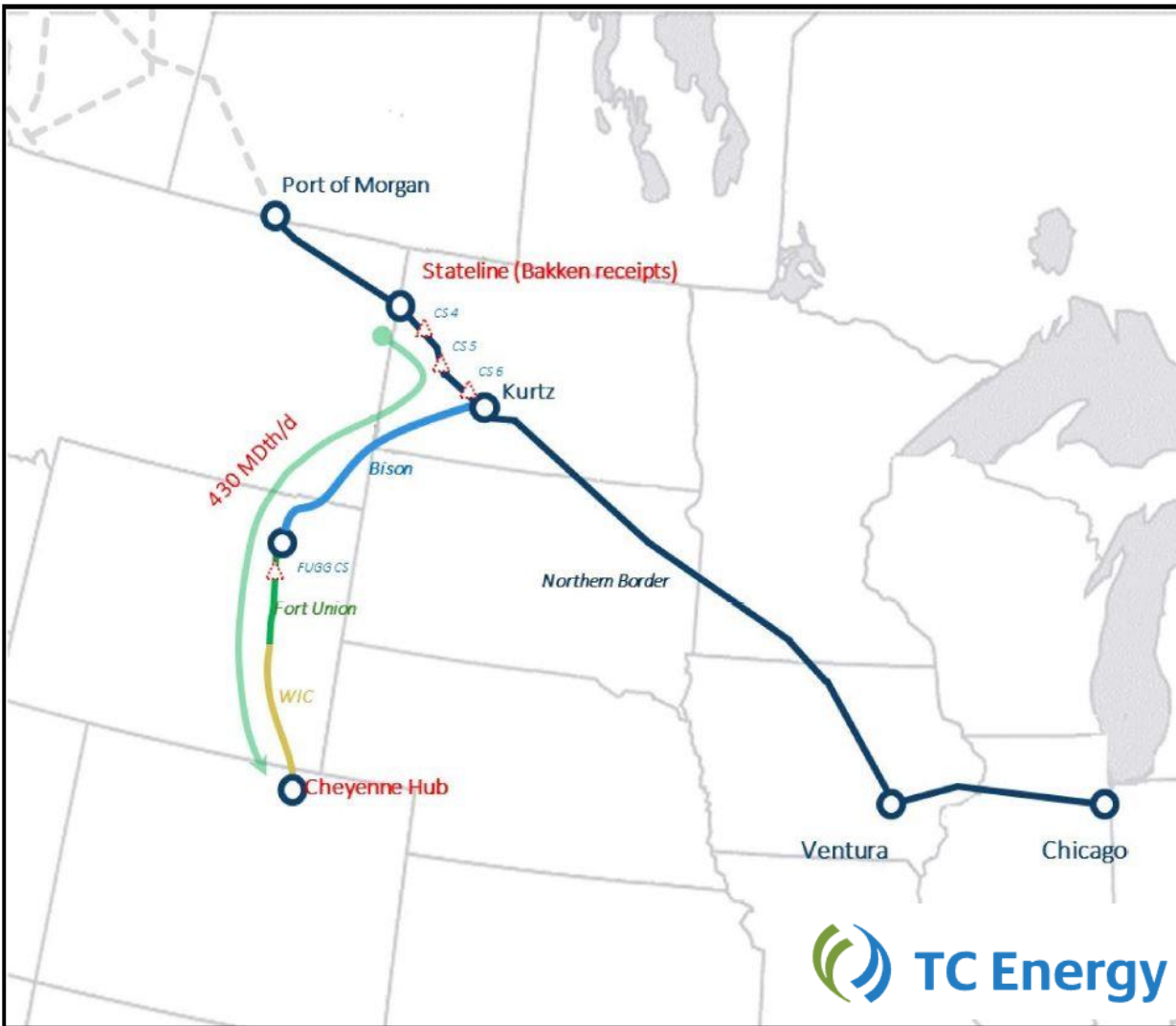
- Binding open season Jan 10 – Feb 25, 2022
- Repurpose Grasslands Pipeline (16")
- Proposed Capacity 94,000 Dth/Day
- Access to Baker storage field
- Q3 2023 proposed completion
- Seeking commitments 10yrs or Longer



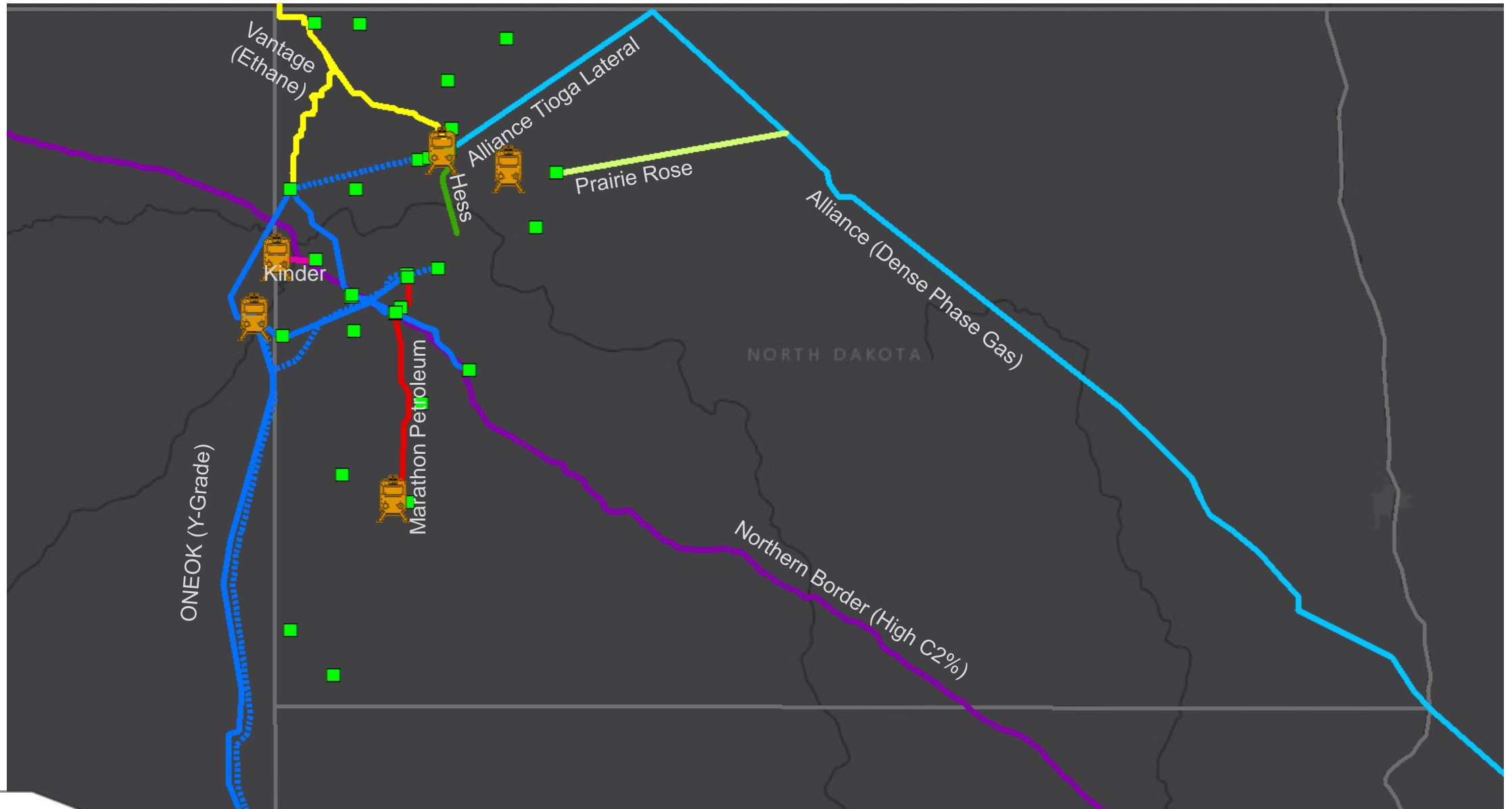
# TC Energy – Proposed Bison Xpress Project

## Project Highlights

- Non-binding open season April 4 - May 6, 2022
- Three compressor upgrades in North Dakota
- Reverse the idle Bison Pipeline (30" – 302 Mile)
- Proposed capacity 430,000 Dth/Day
- Q1 2026 proposed completion
- Fort Union Gas Gathering and Wyoming Interstate Company provide further transport to Cheyenne hub.
- Seeking commitments 10yrs or Longer



# Regional NGL Infrastructure





# NGL Chemistry Study - 2020



## ASSESSMENT OF BAKKEN PETROLEUM SYSTEM PRODUCED GAS COMPOSITIONS

Final Report

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

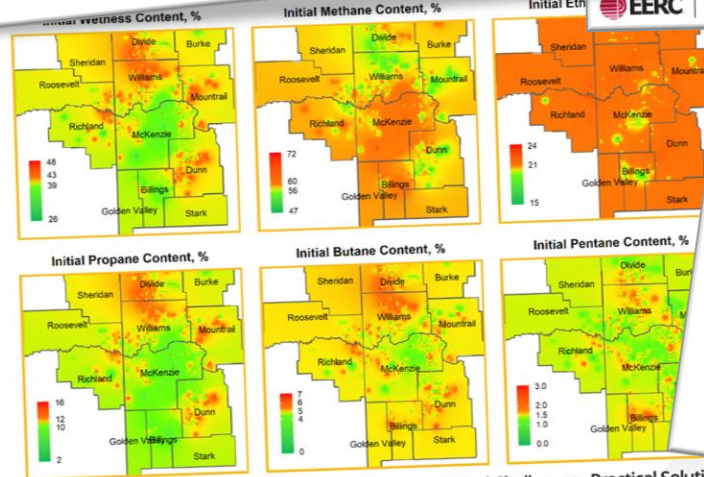
Prepared for:

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

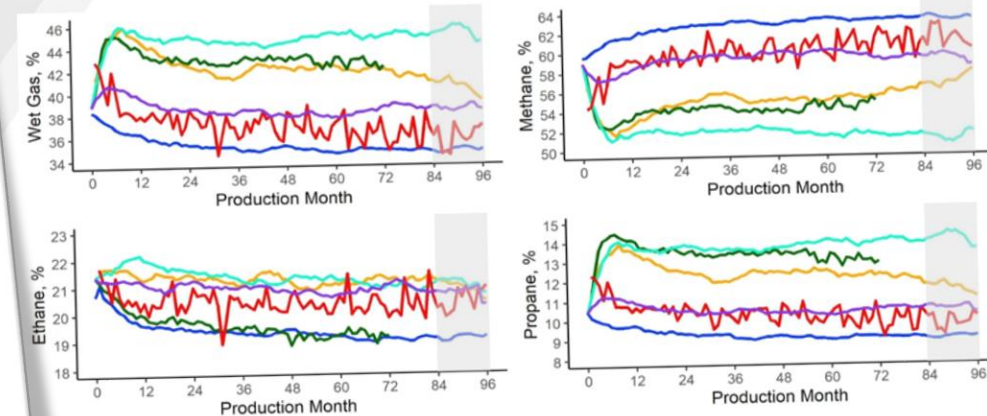
### Spatial Patterns

- ❖ 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.



Critical Challenges. Practical Solutions.

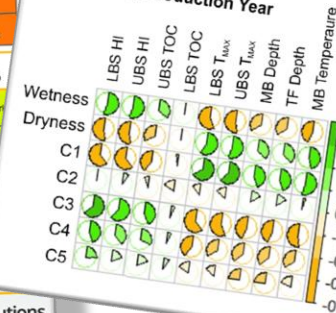
### Temporal Patterns in Measured Gas Composition



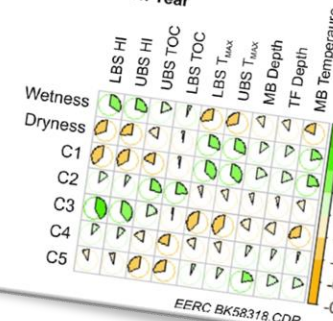
— Divide — Dunn-McKenzie — Mountrail  
— Dunn — McKenzie — Williams

Critical Challenges. Practical Solutions.

c) Fifth Production Year



d) Eighth Production Year



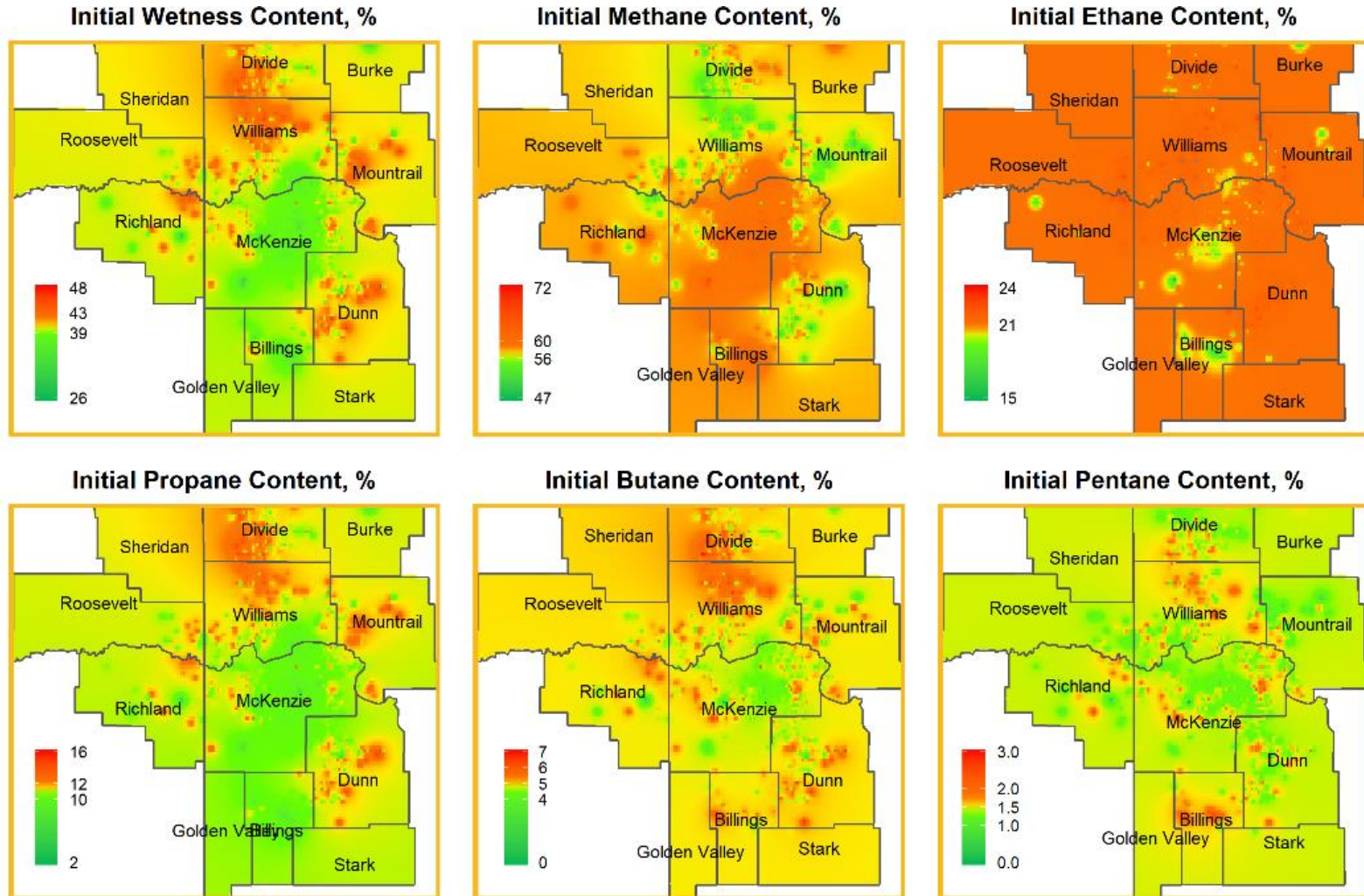
EERC BK58318.CDR

# Gas Compositions During Initial Well Production

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

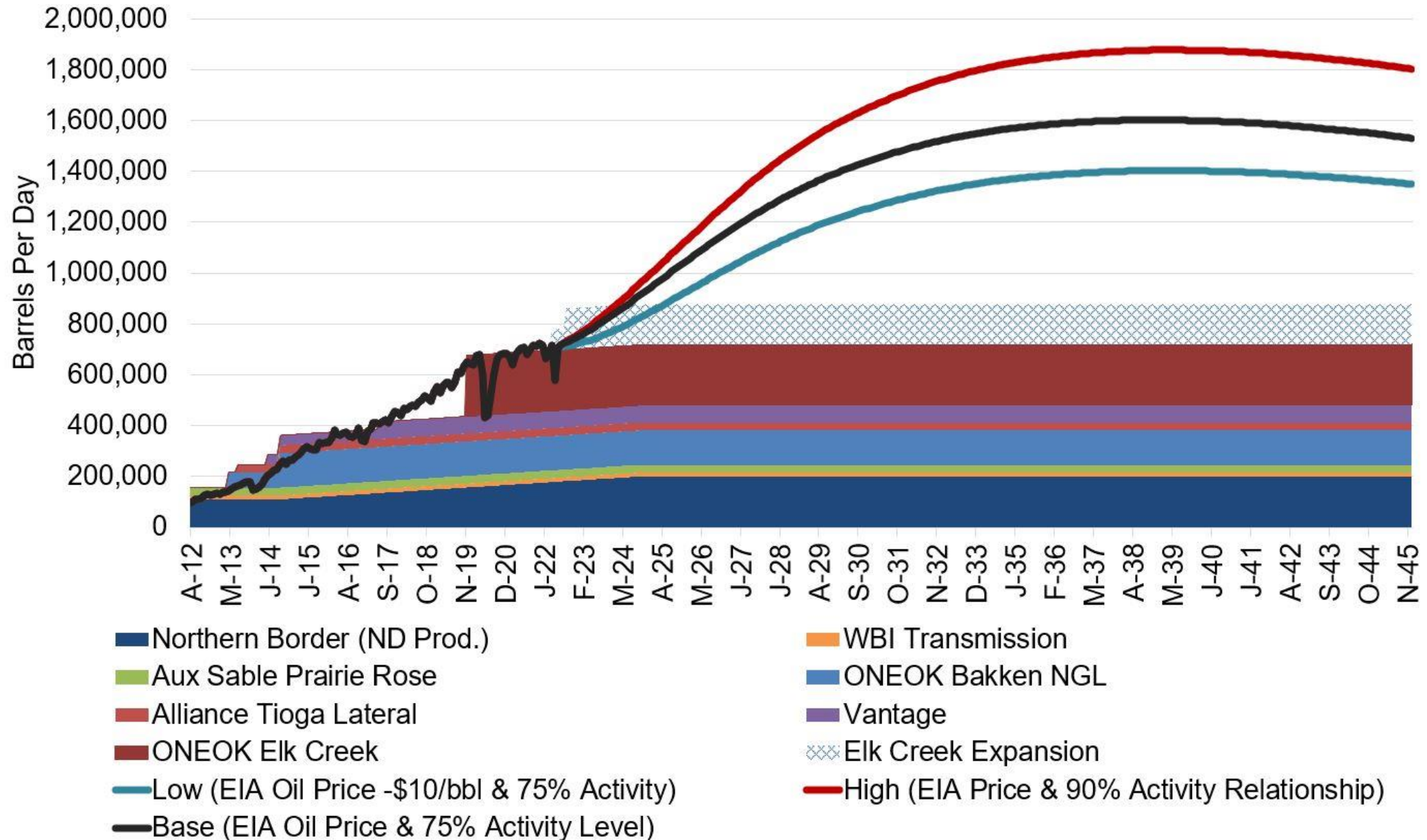
## Spatial Patterns

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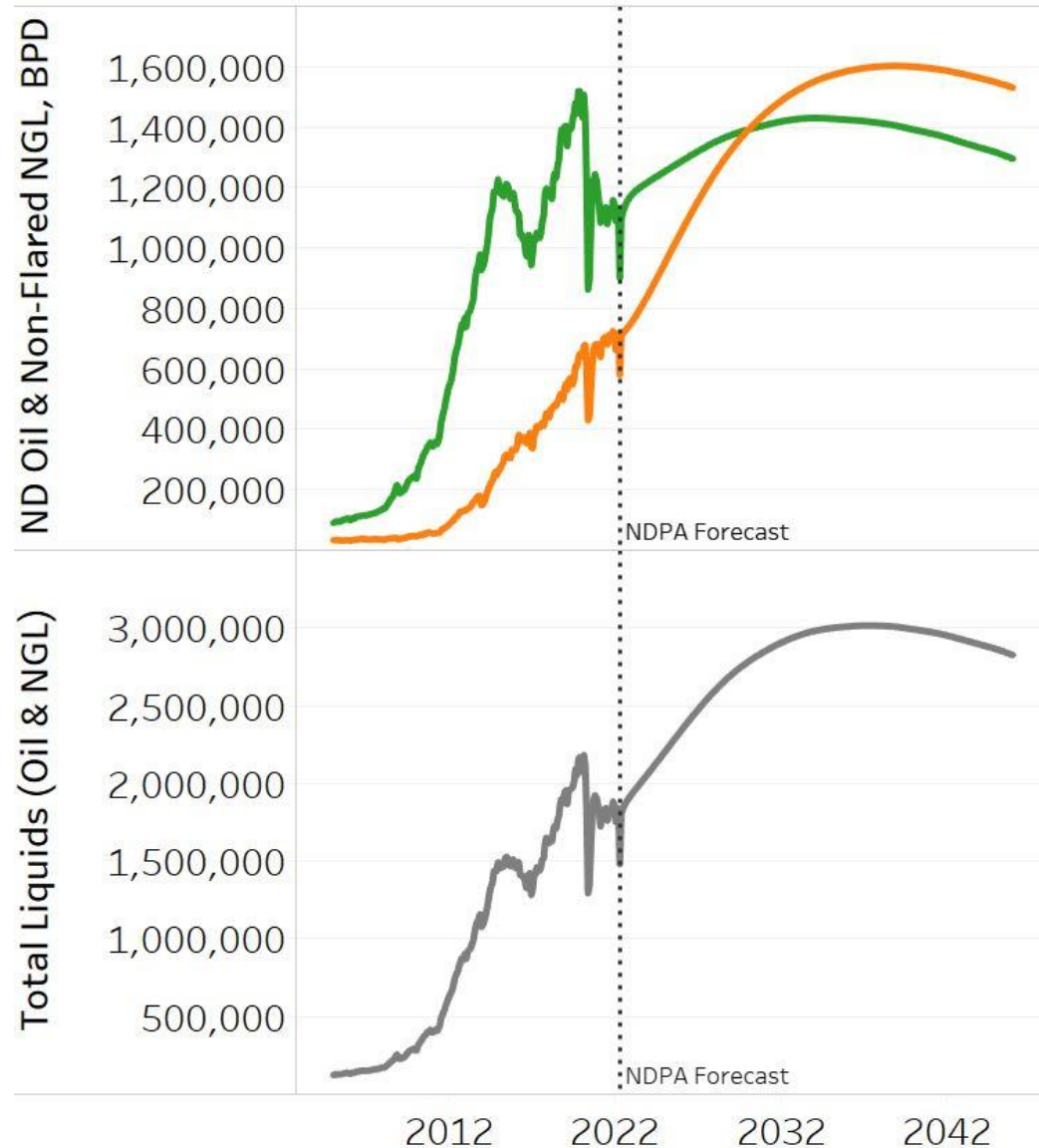




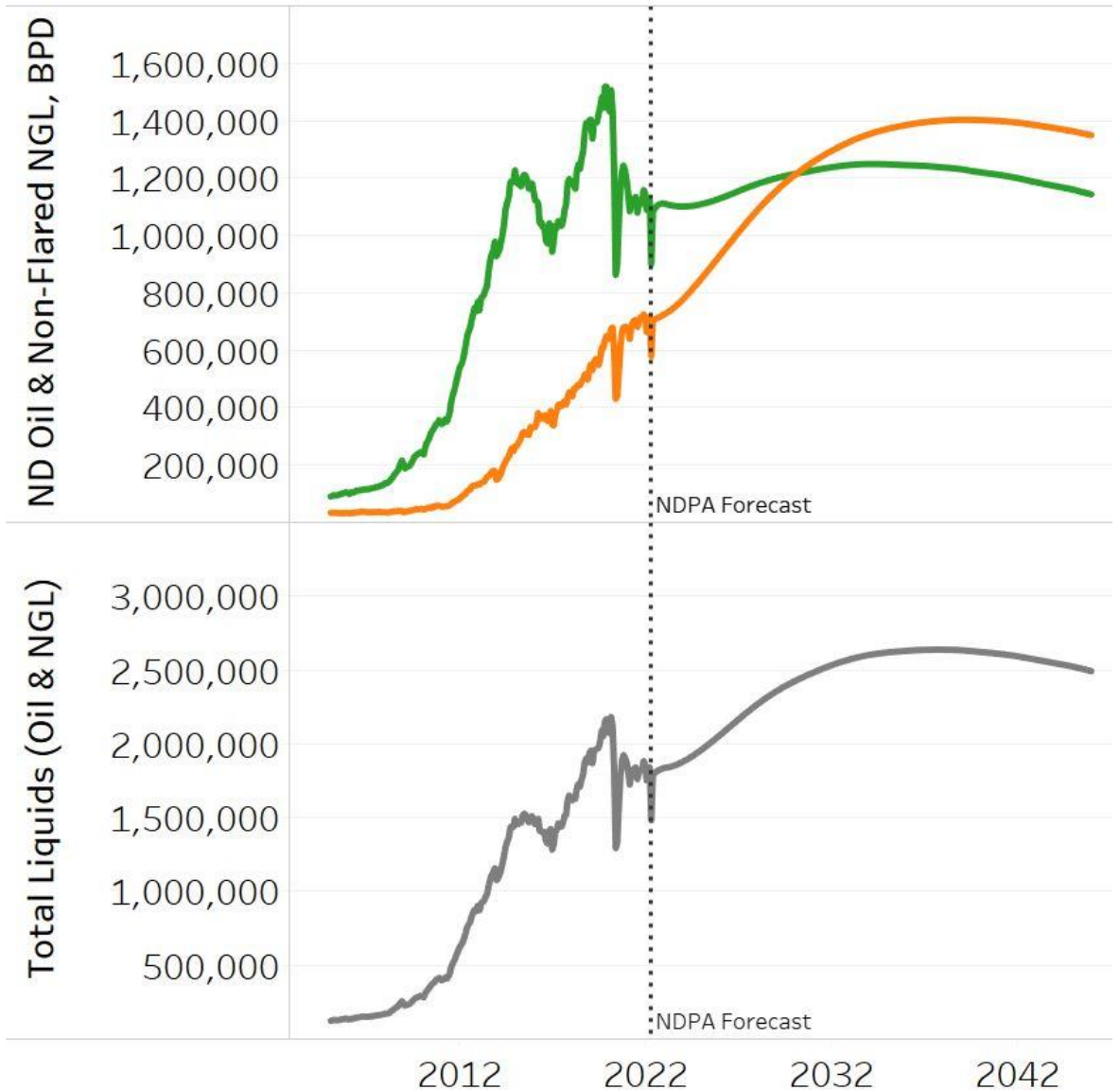
# NGL Pipeline Takeaway Options



# Total Liquids Production (Oil & Non-flared NGL)



Base Case



Low Case

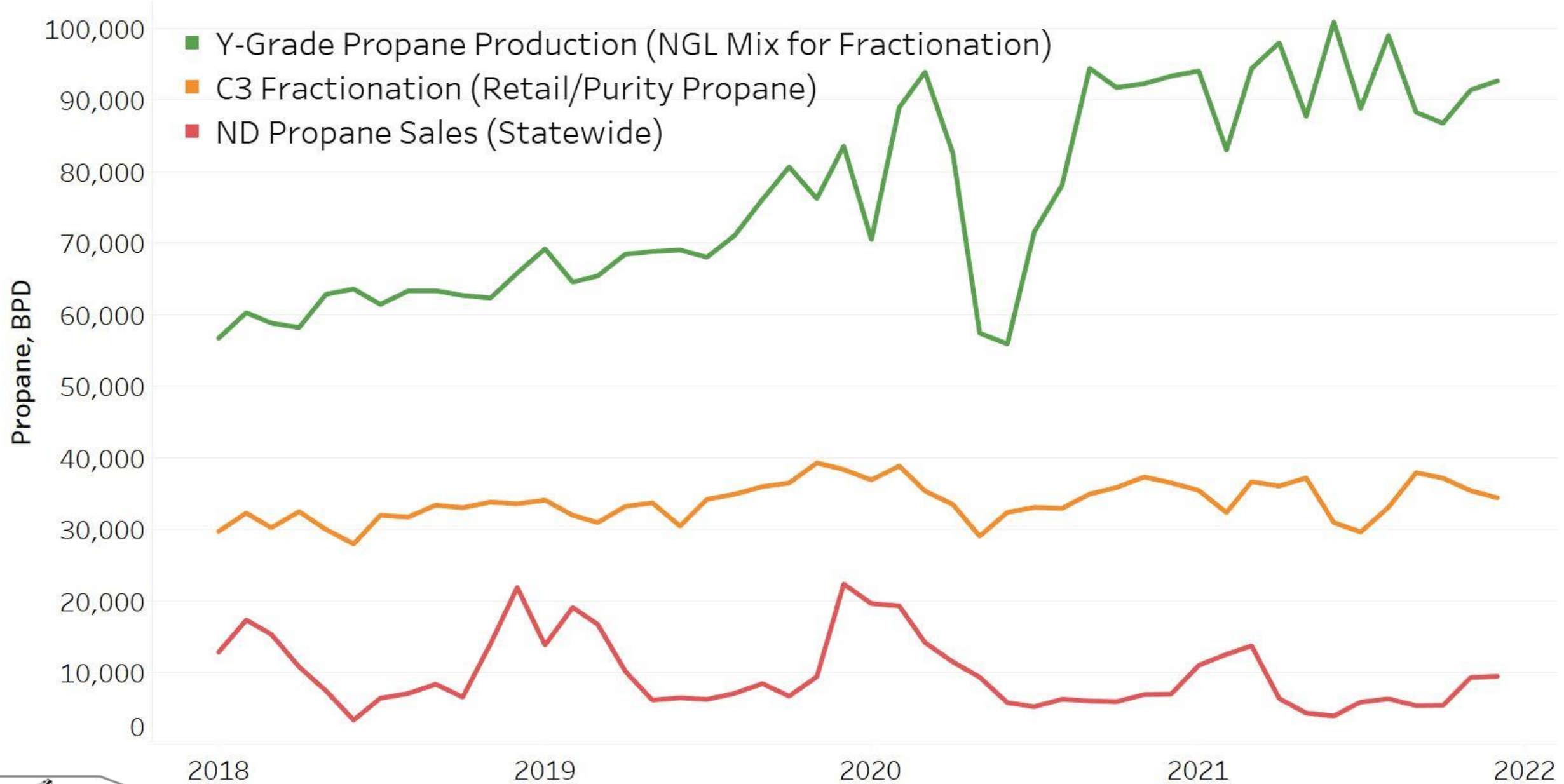




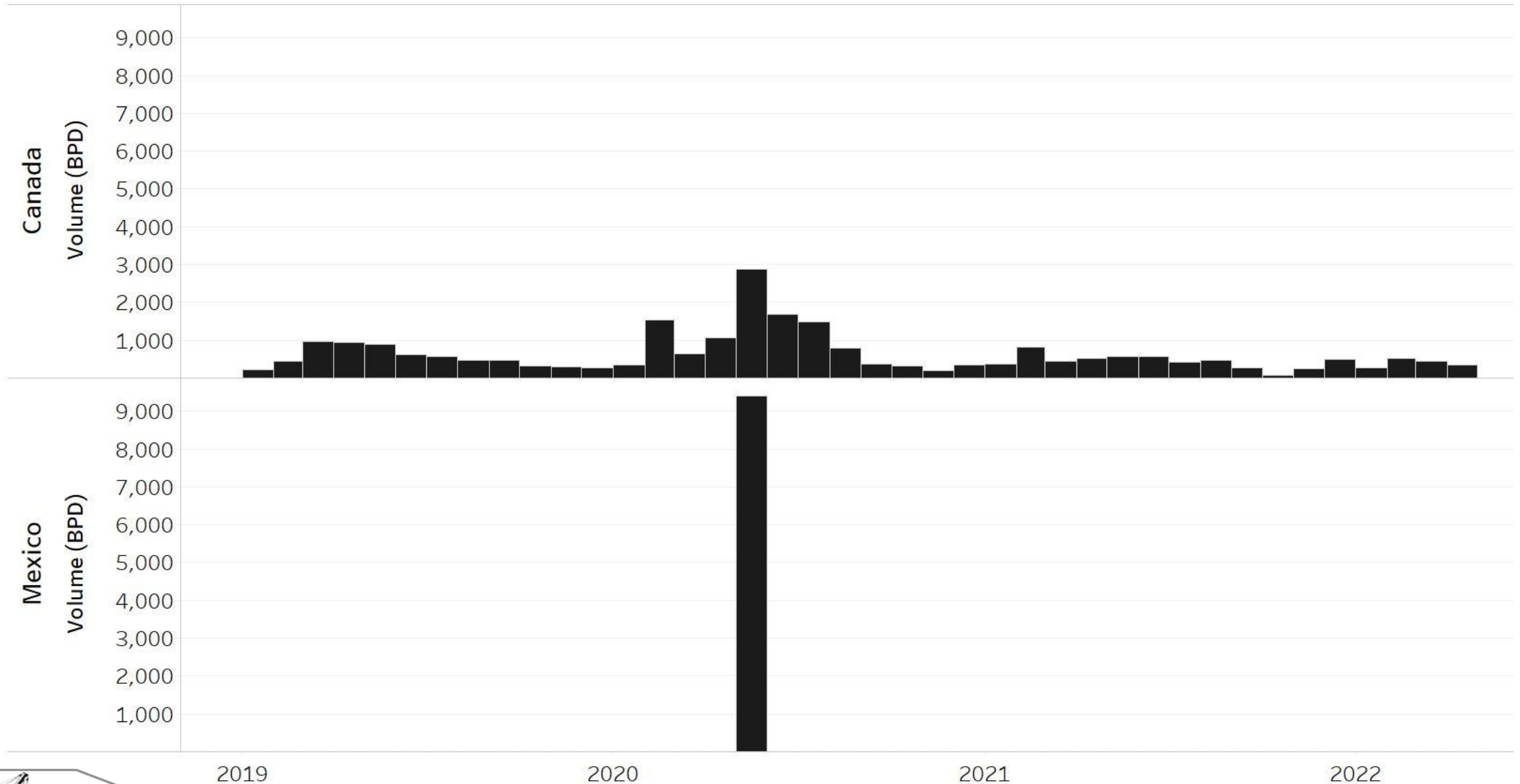
# North Dakota Gas Plants Propane Output



# North Dakota Propane Production & Sales



# North Dakota Average Daily Propane Exports\*

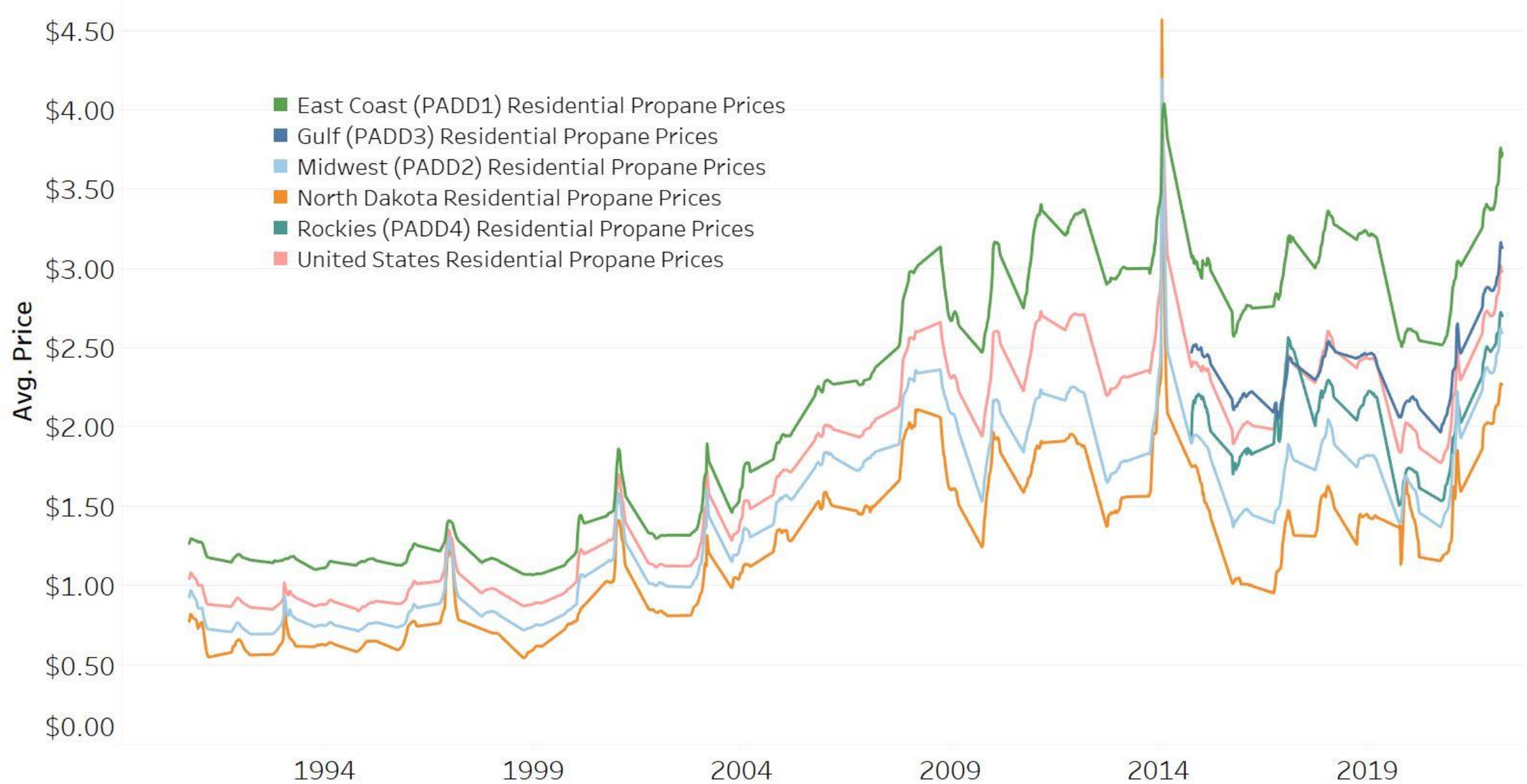


# North Dakota Propane Sales Residue Gas Equivalent\*

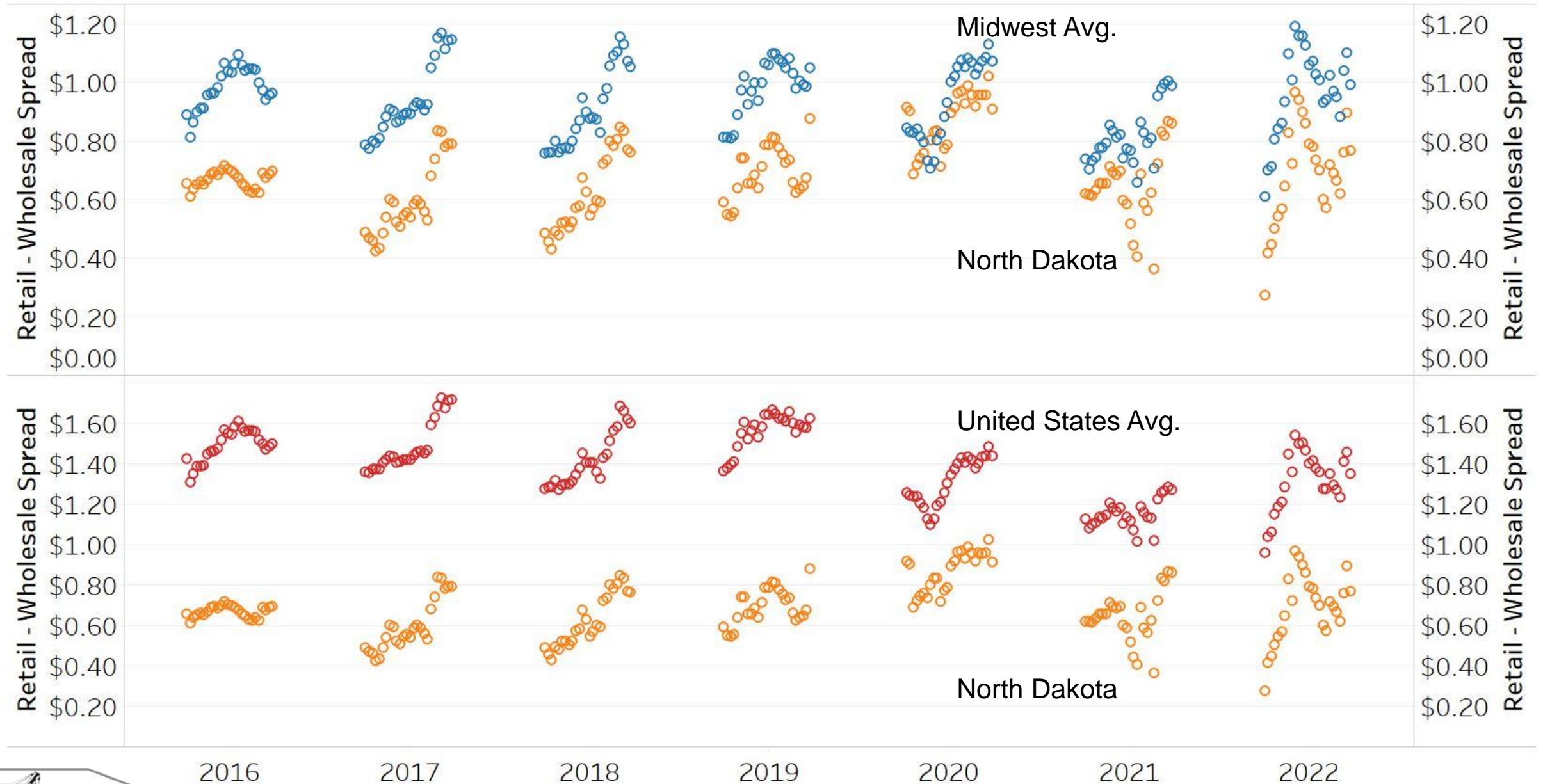




# Residential Propane Prices Around the U.S.\*



# Residential – Wholesale Propane Price Spreads\*



# Contact Information

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**Know what's below.  
Call before you dig.**

Websites:

[www.pipeline.nd.gov](http://www.pipeline.nd.gov)  
[www.northdakotapipelines.com](http://www.northdakotapipelines.com)

