

North Dakota Petroleum Council Annual Meeting

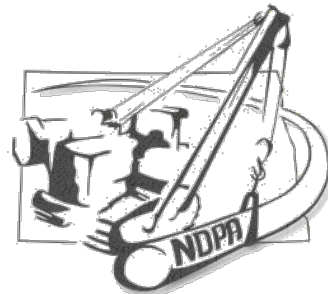
Justin J. Kringstad

Geological Engineer

Director

North Dakota Pipeline Authority

September 22, 2022



A Complete Gas Capture Solution



Production

- Technology
- Markets
- Forecasting



Gathering

- Capacity
- Connections
- Compression



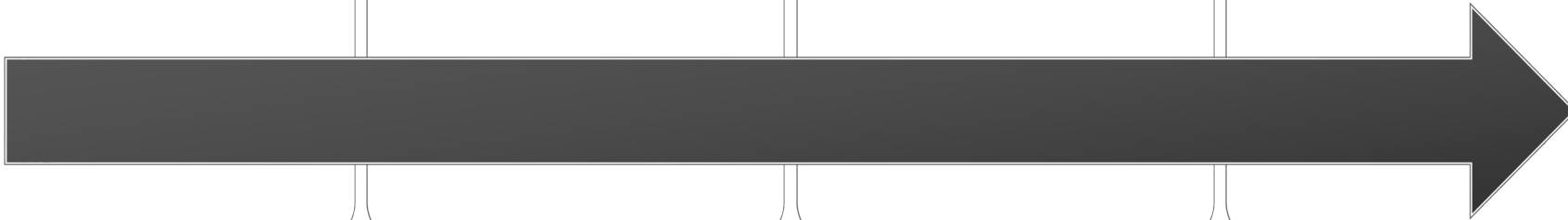
Processing

- Capacity
- Location
- Configuration



Transmission

- Dry Gas
- Natural Gas Liquids



Natural Gas Update



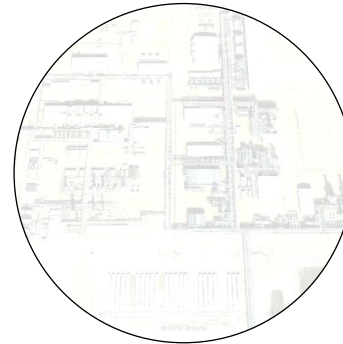
Production

- Technology
- Markets



Gathering

- Capacity
- Connections



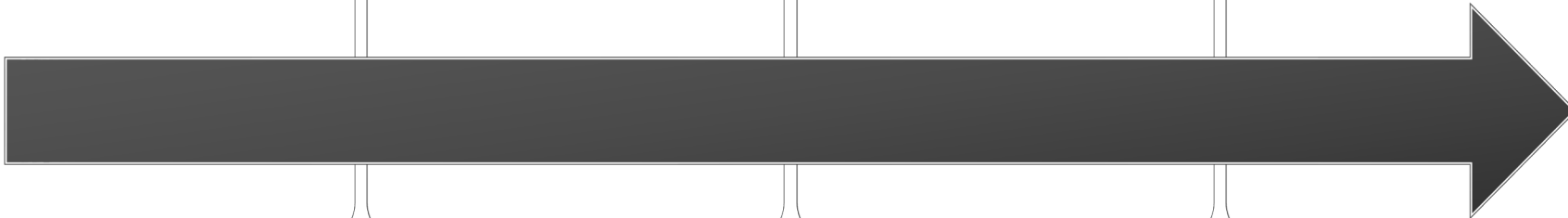
Processing

- Capacity
- Location

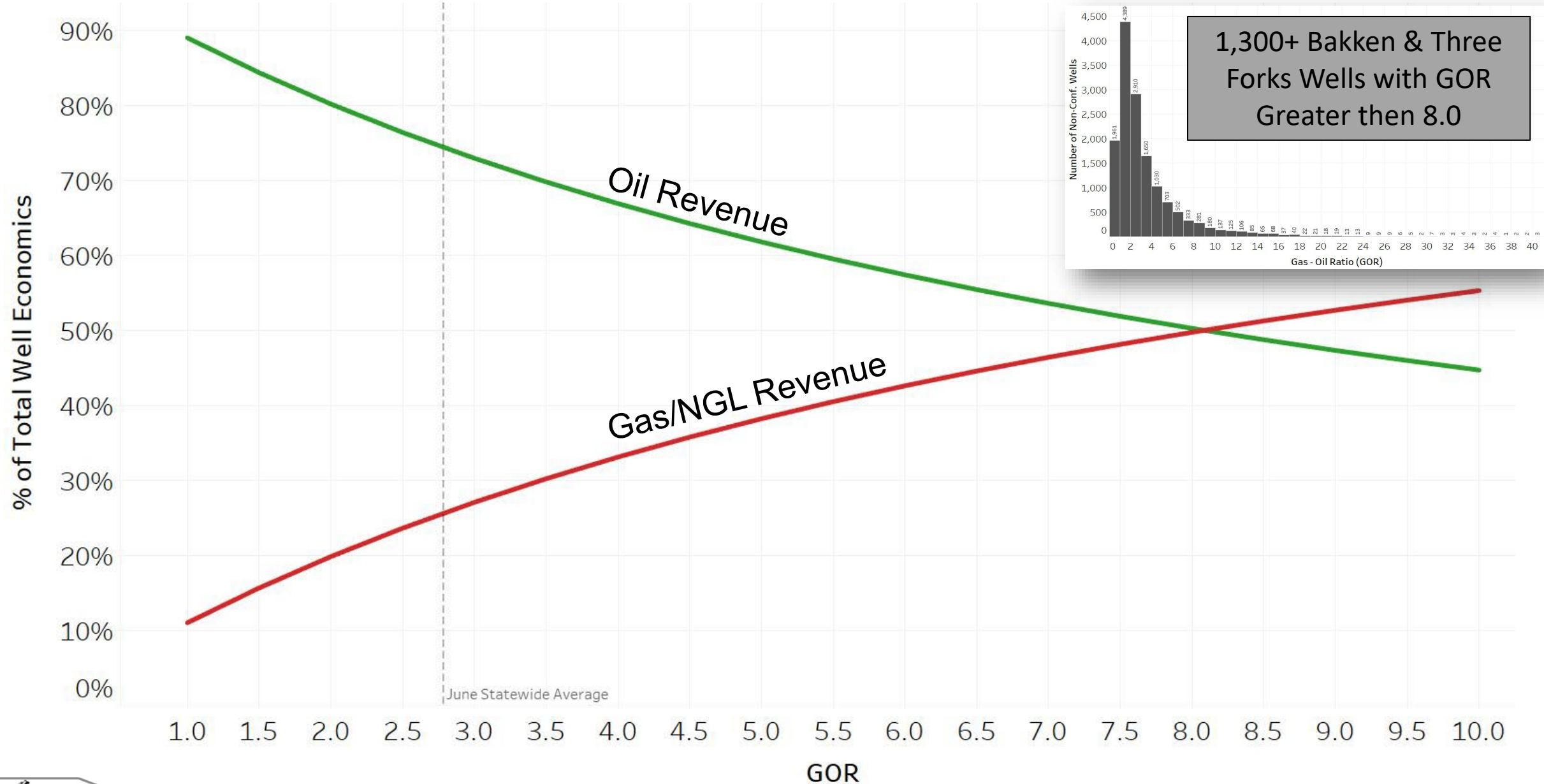


Transmission

- Dry Gas
- Natural Gas Liquids



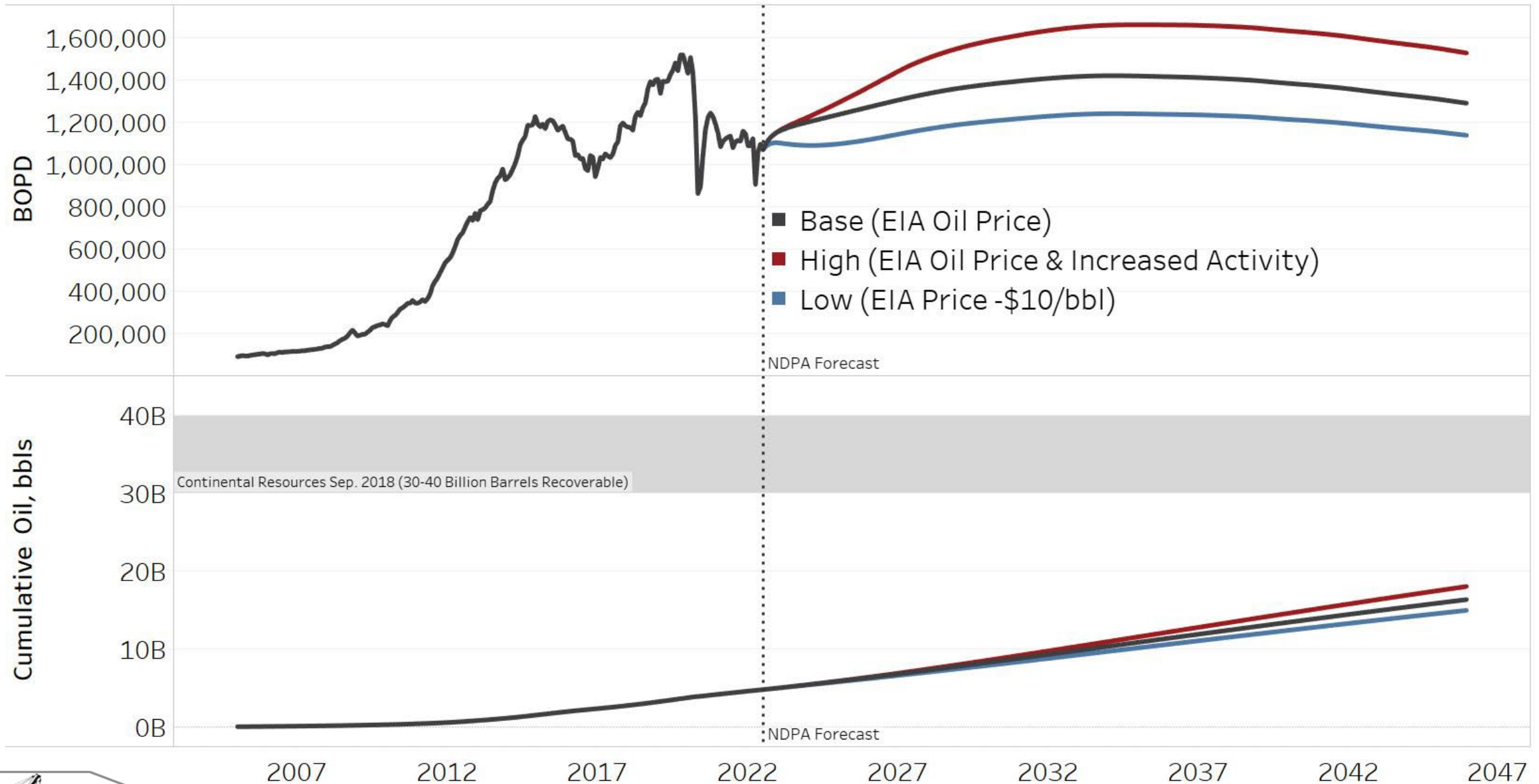
Current Bakken Wellhead Economics



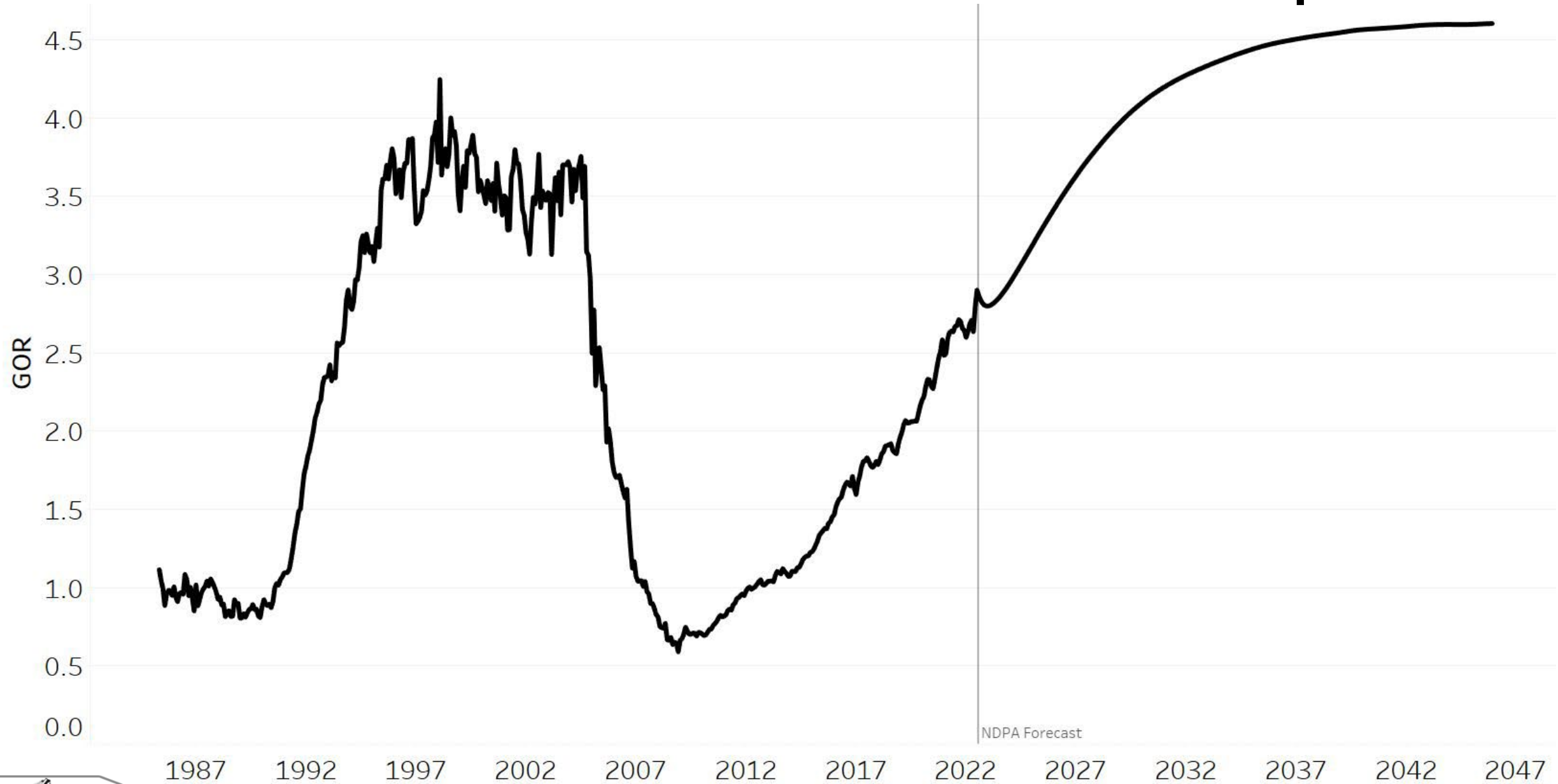
1,300+ Bakken & Three Forks Wells with GOR Greater than 8.0



ND Oil Production: EIA Price Deck



ND Gas Production: GOR Assumption

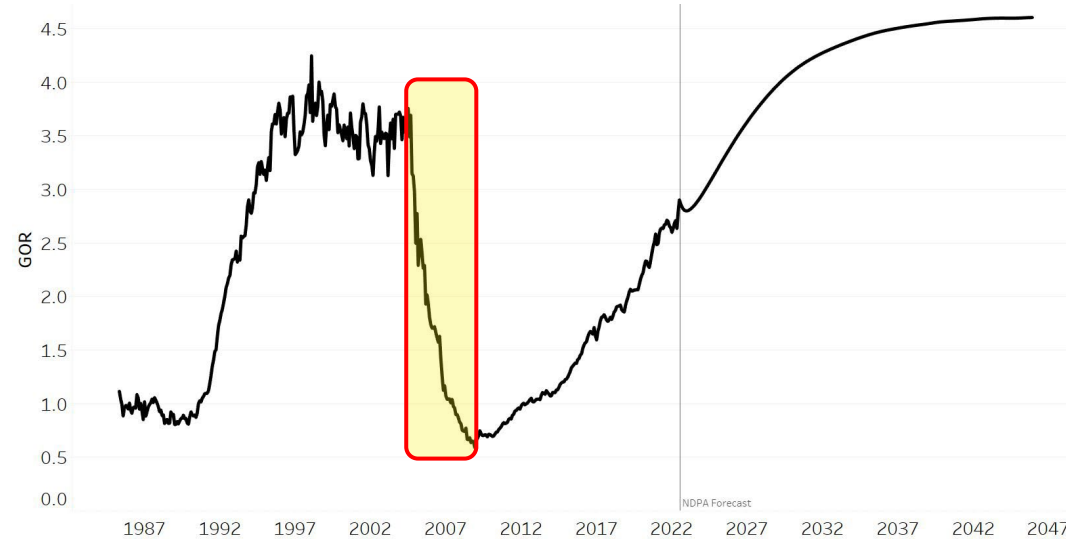
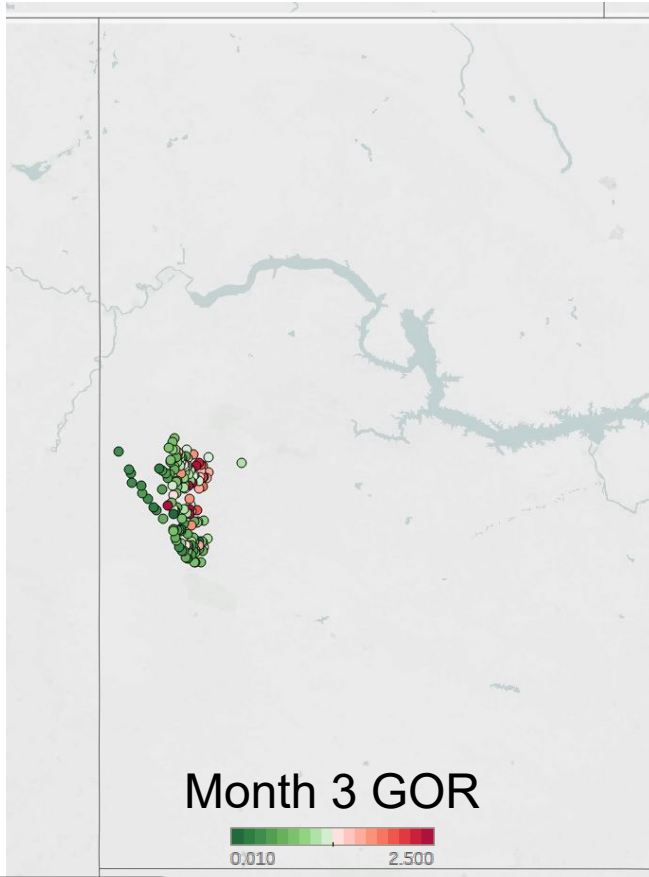


NDPA Forecast



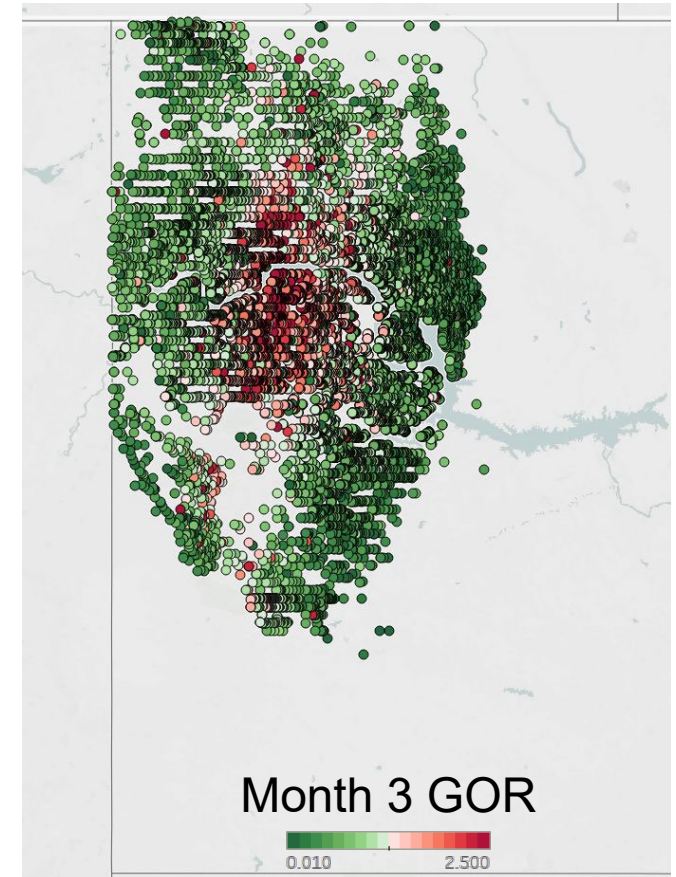
The GOR “Reset” and Forward Expectations

Bakken GOR settles around ~3.6 from 1990’s Bakken development in what is now considered “fringe” acreage

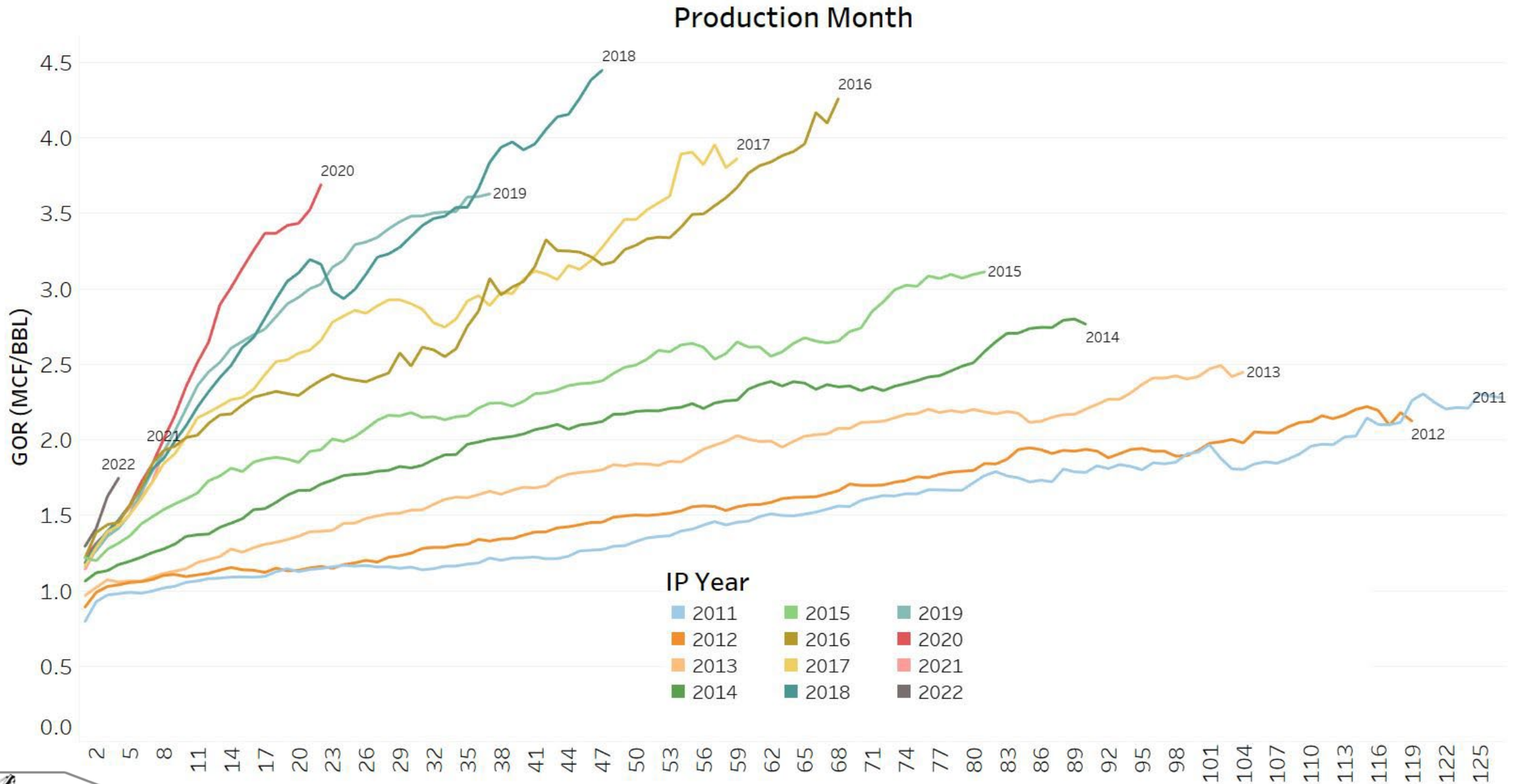


Mid-2000’s: Modern Bakken development begins and statewide average GOR is “reset” with large volumes of new gas production

Future GOR will be driven by widespread development including deeper/hotter acreage with higher initial and sustained reservoir GOR

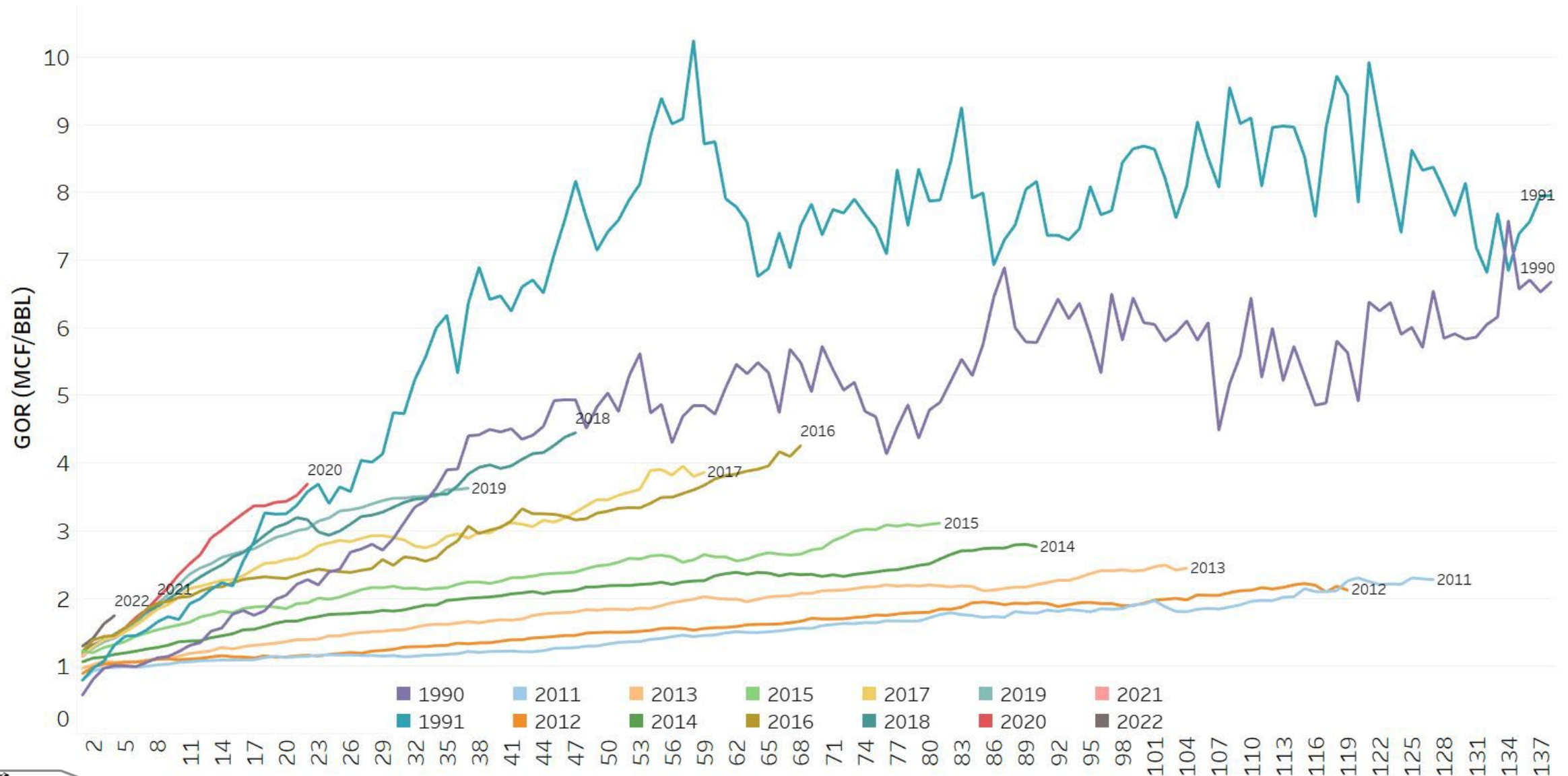


Statewide Bakken Gas/Oil Ratios

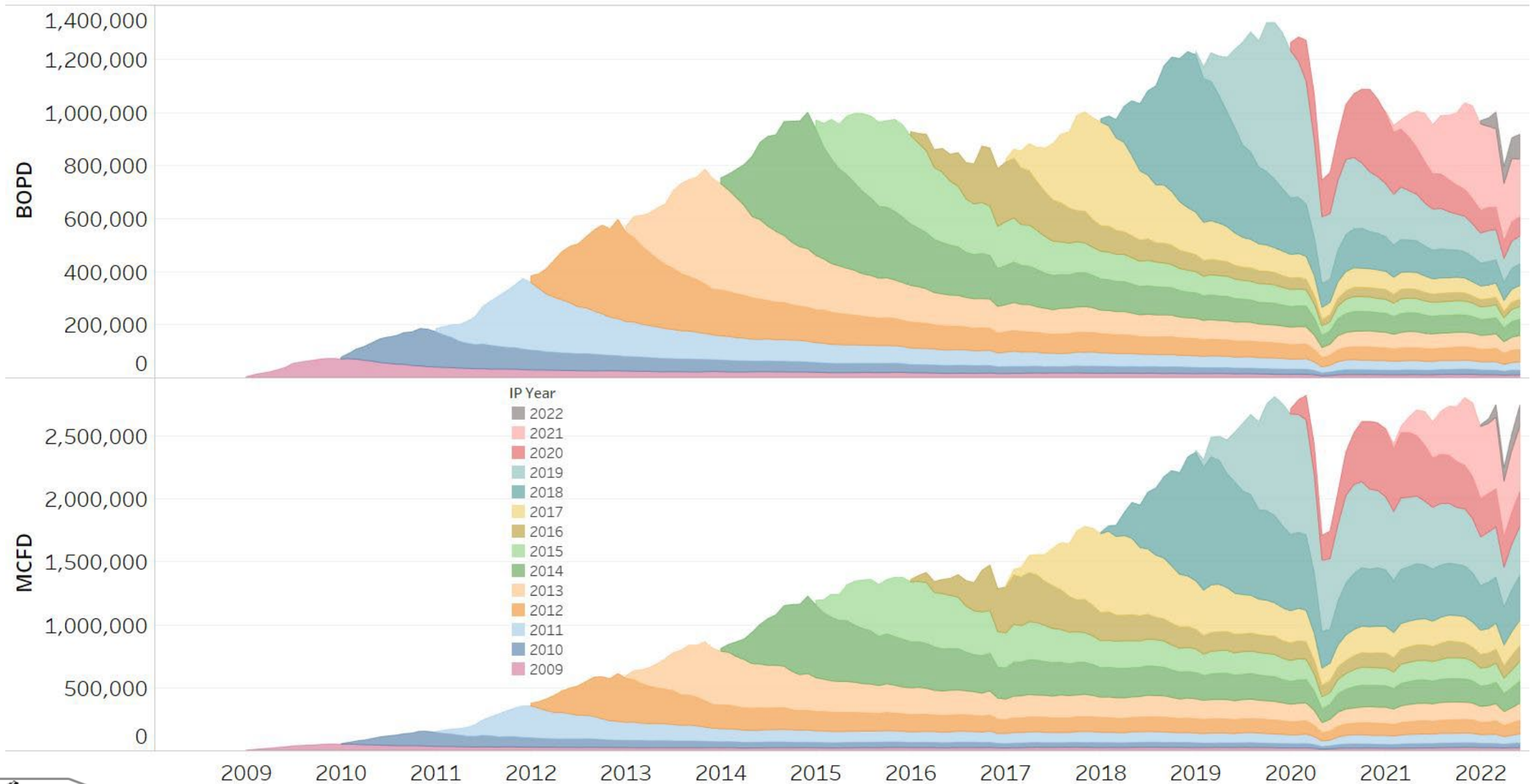


Statewide Bakken Gas/Oil Ratios

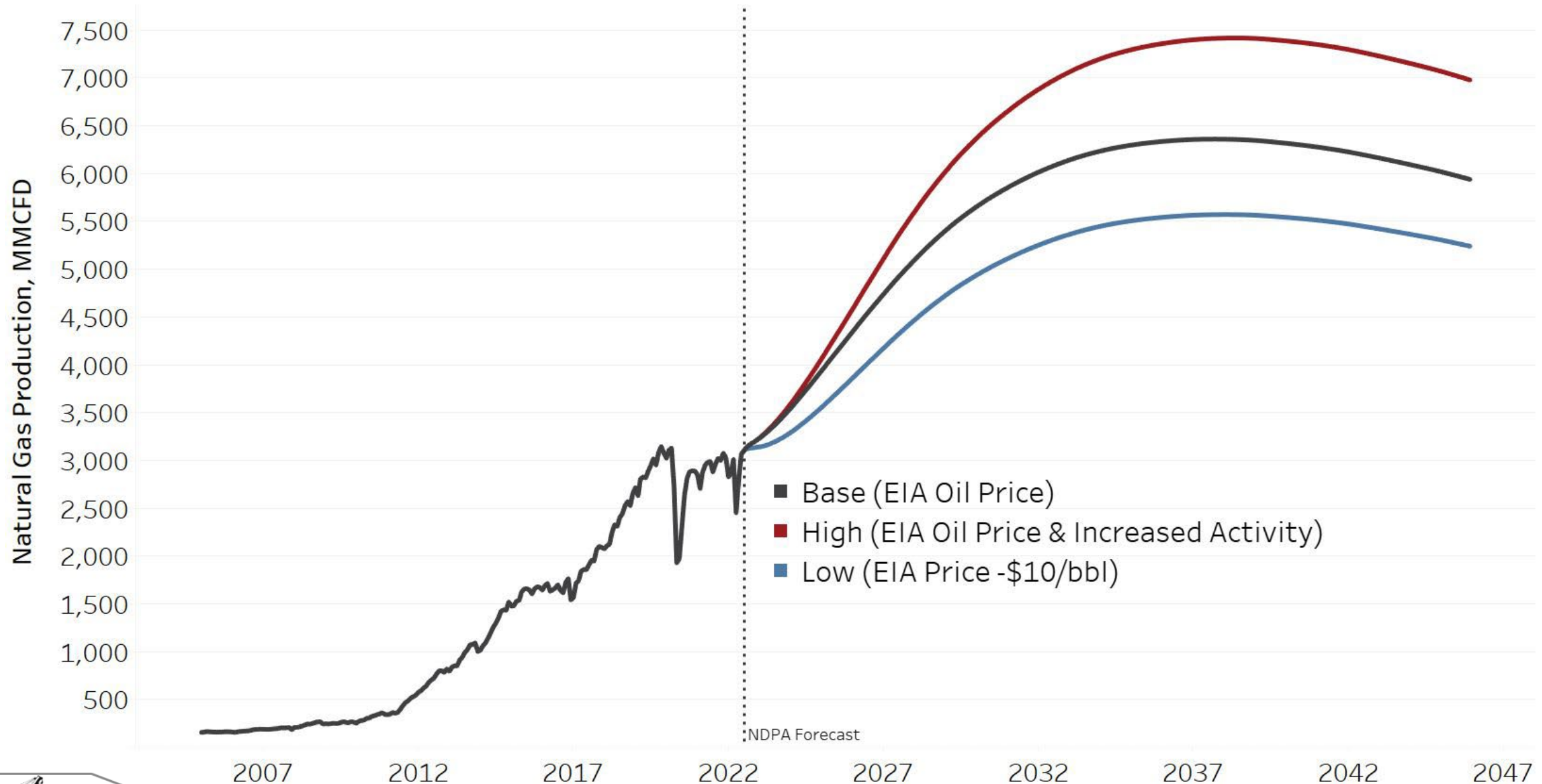
Production Month



Terminal Gas Decline(?)



ND Gas Production: EIA Price Deck



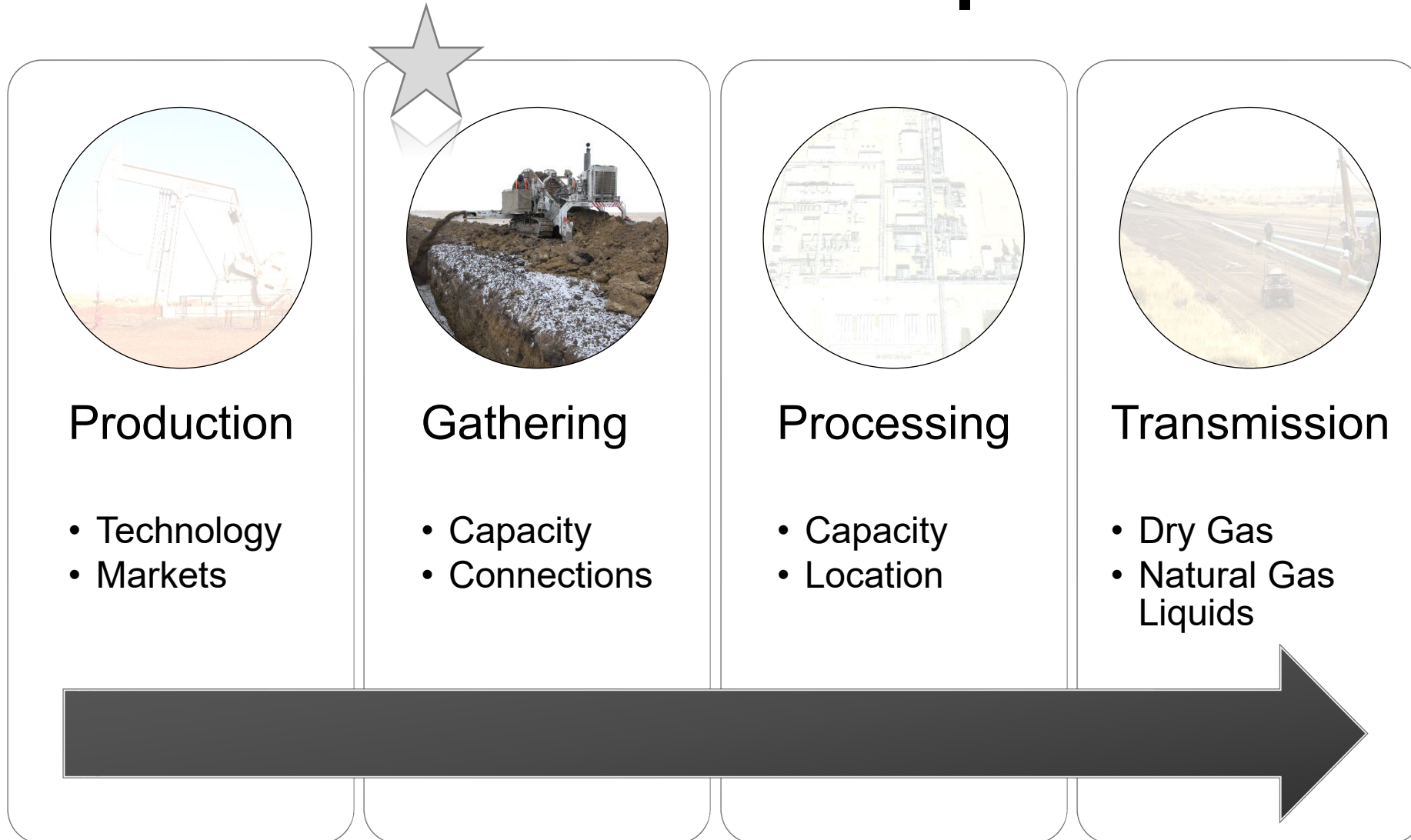
Yearly Production Change, %



What if Oil Production Growth is Flat?

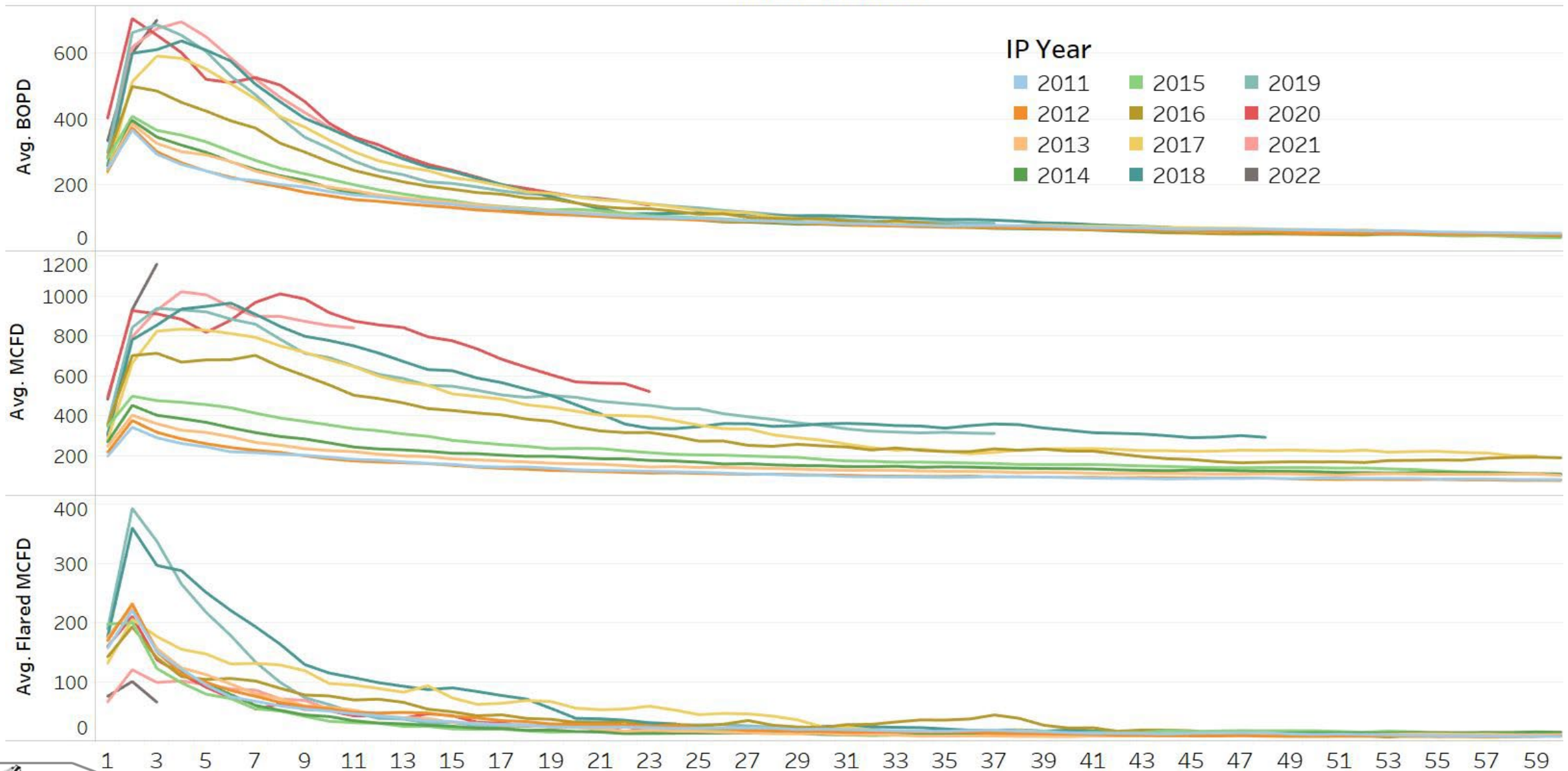


Natural Gas Update

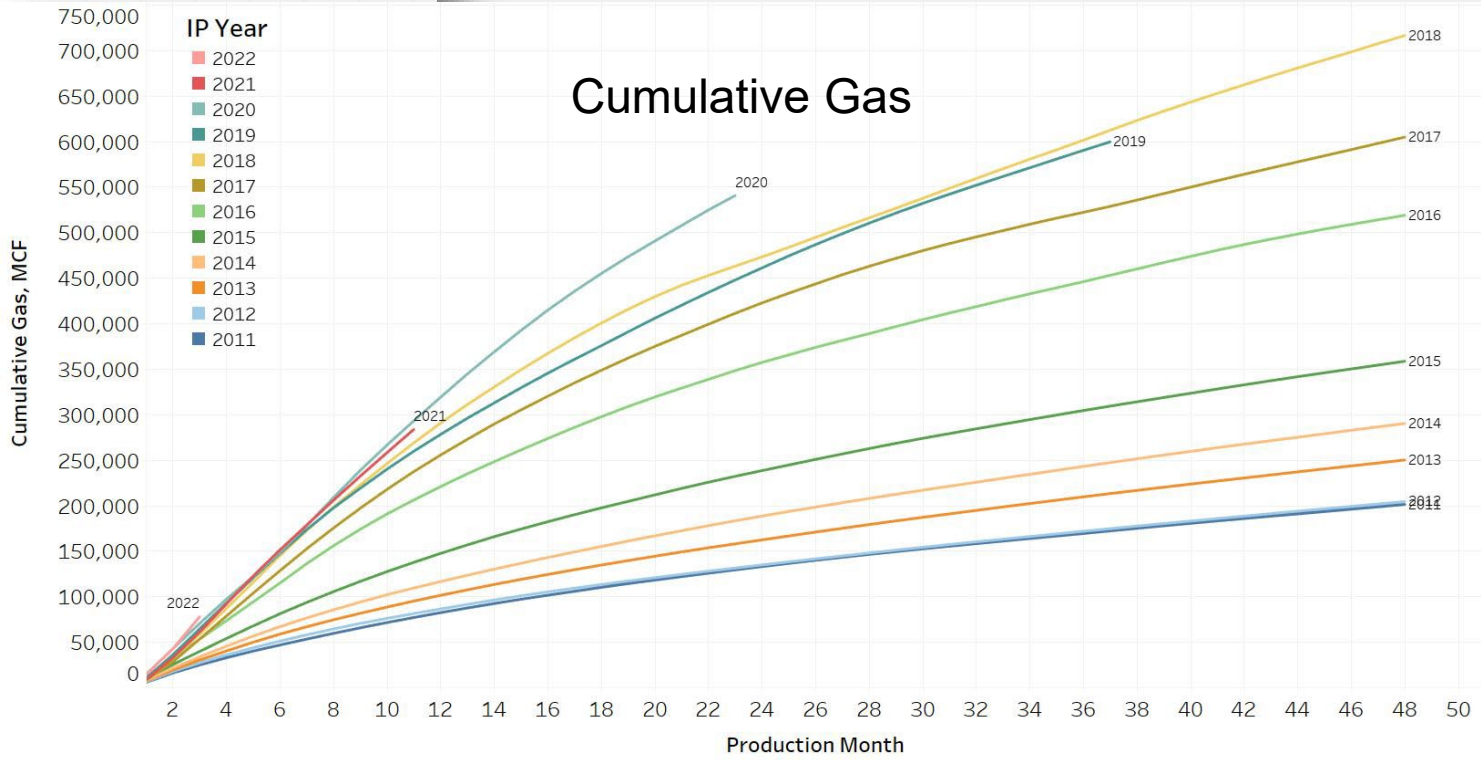
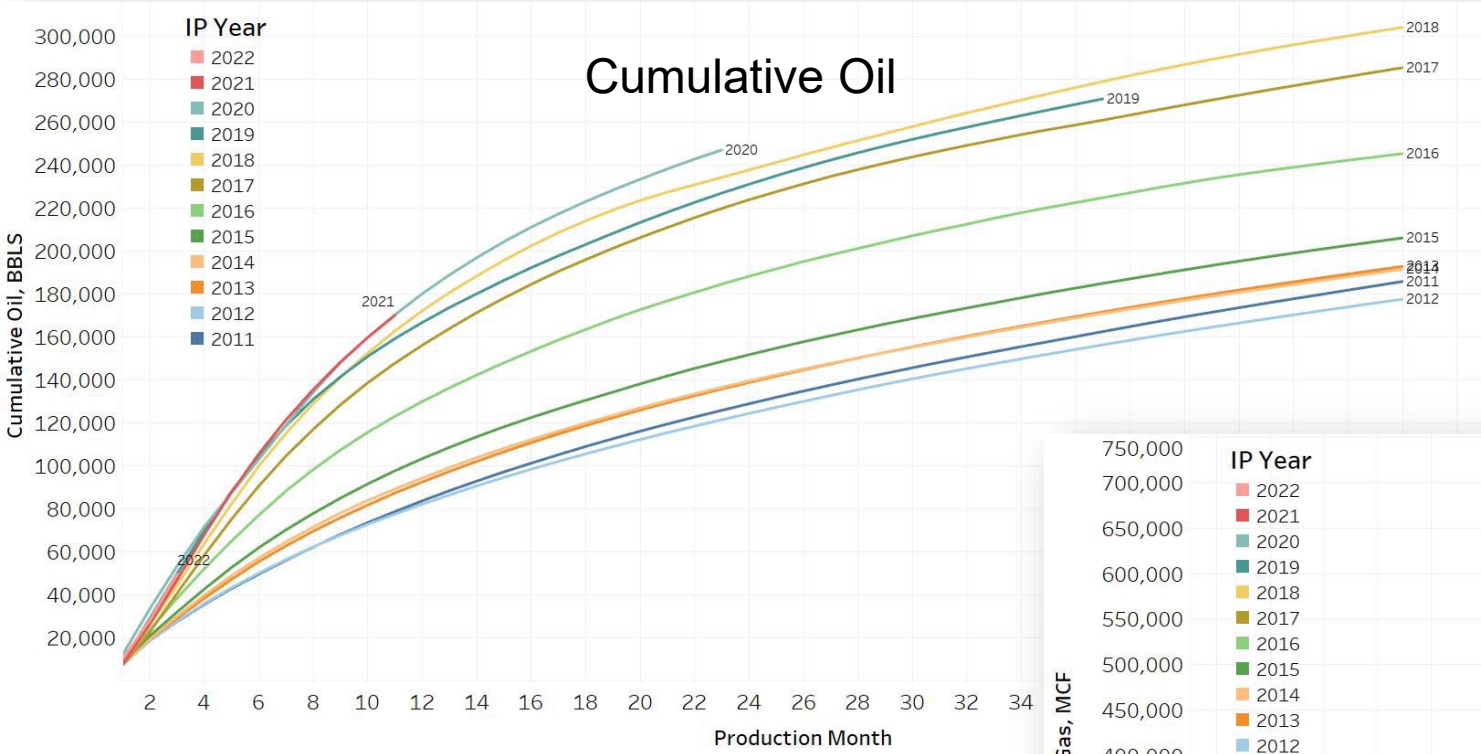


Shifting Early Production Strategies

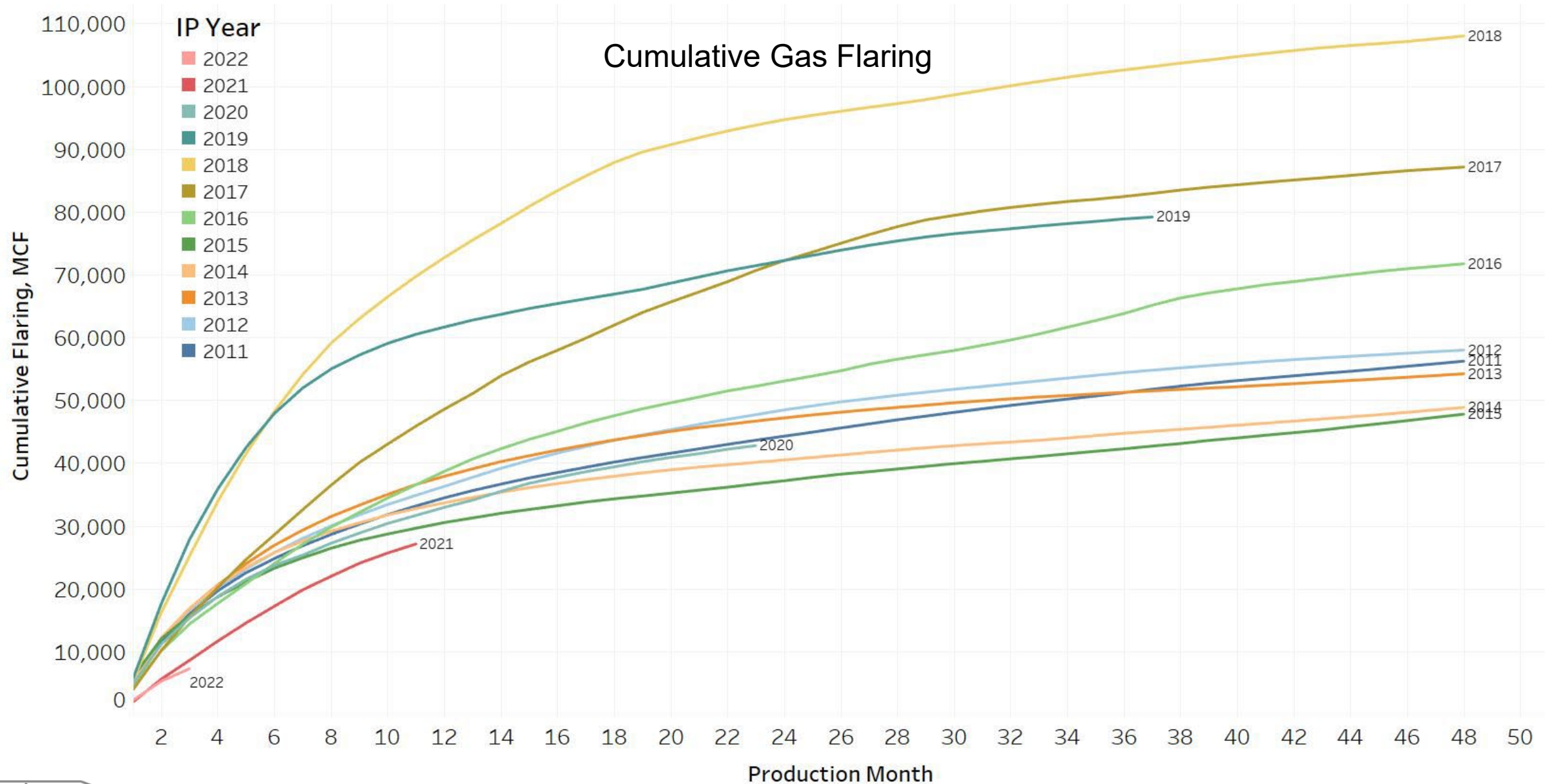
Production Month



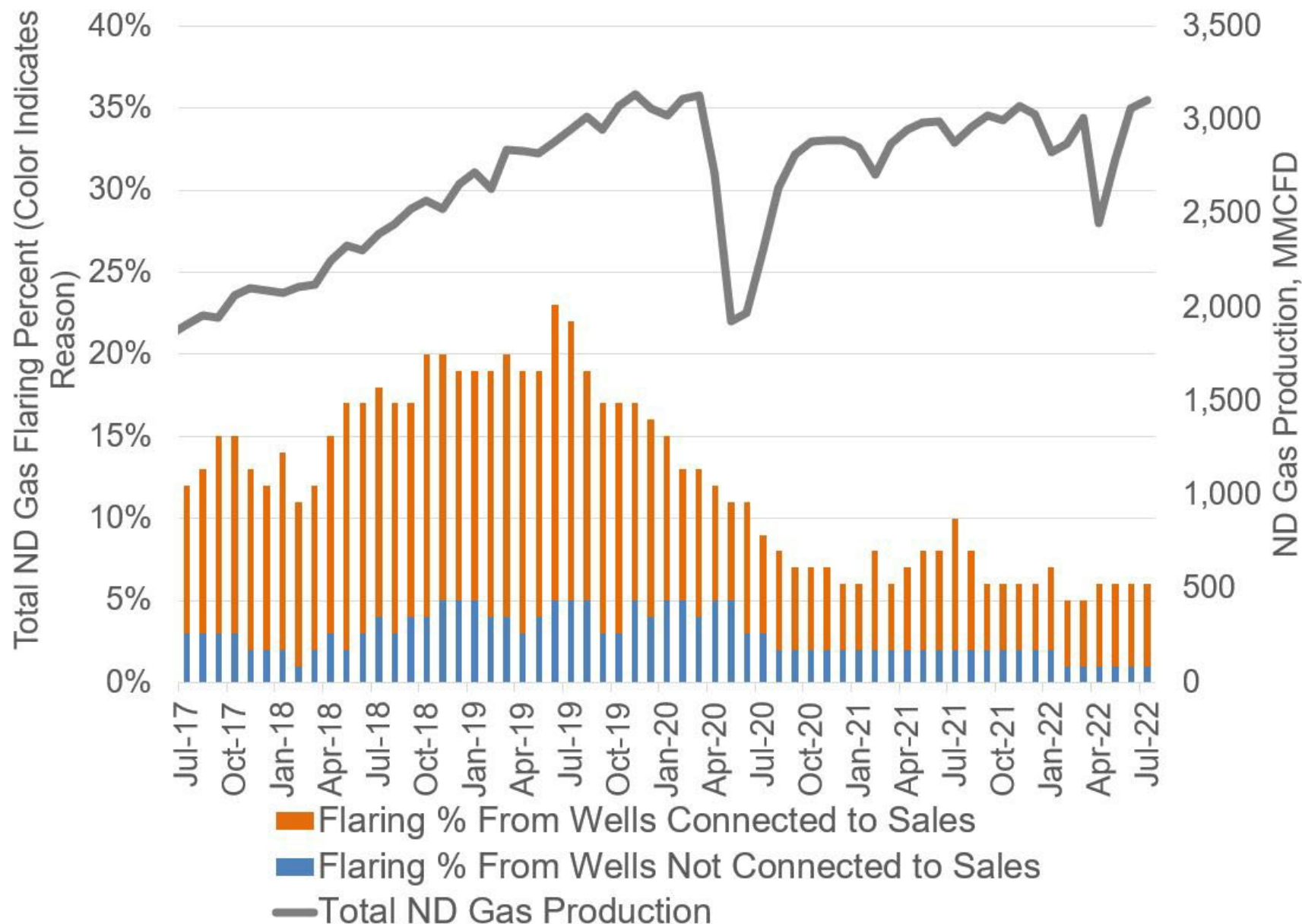
Shifting Early Production Strategies



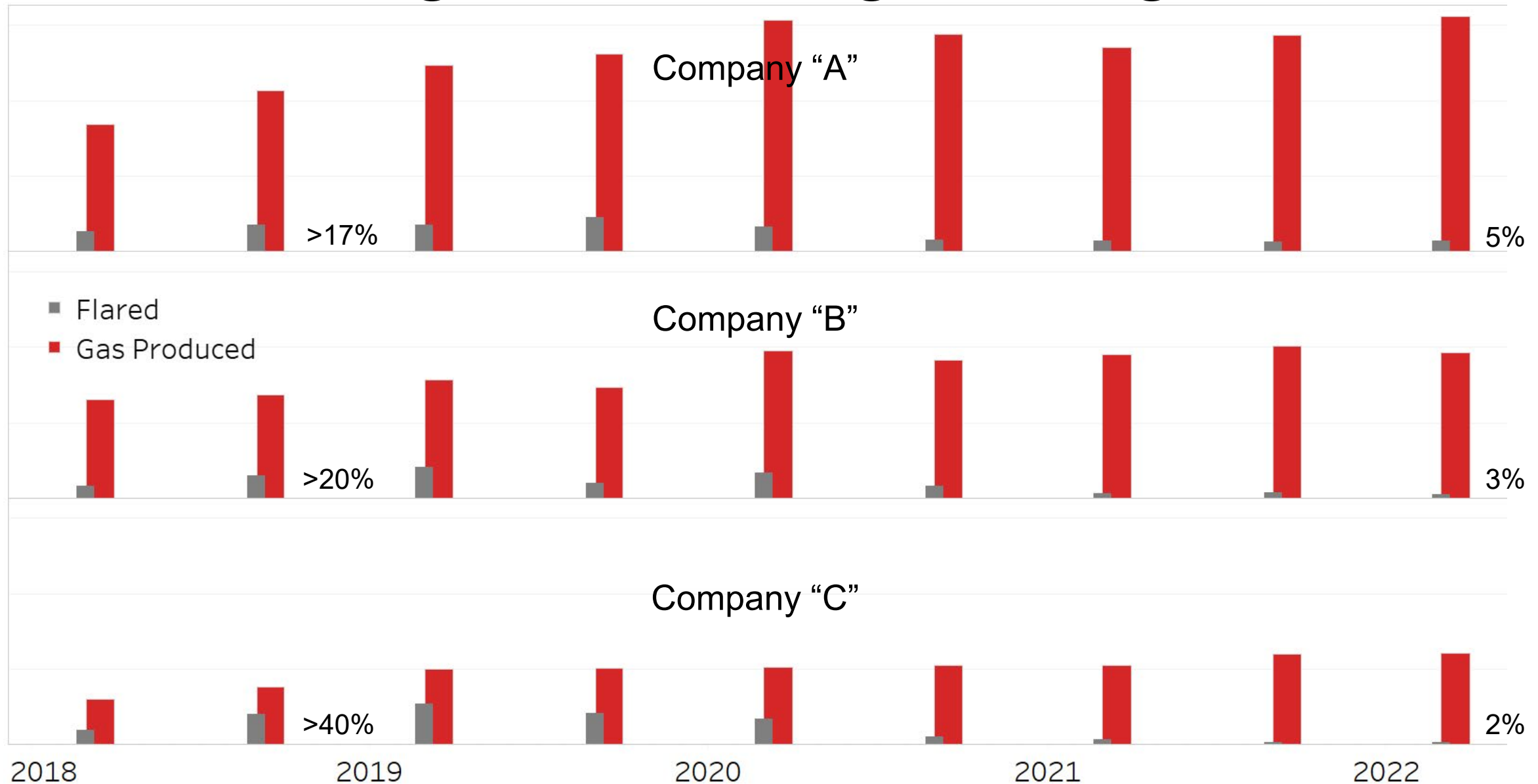
Shifting Early Production Strategies



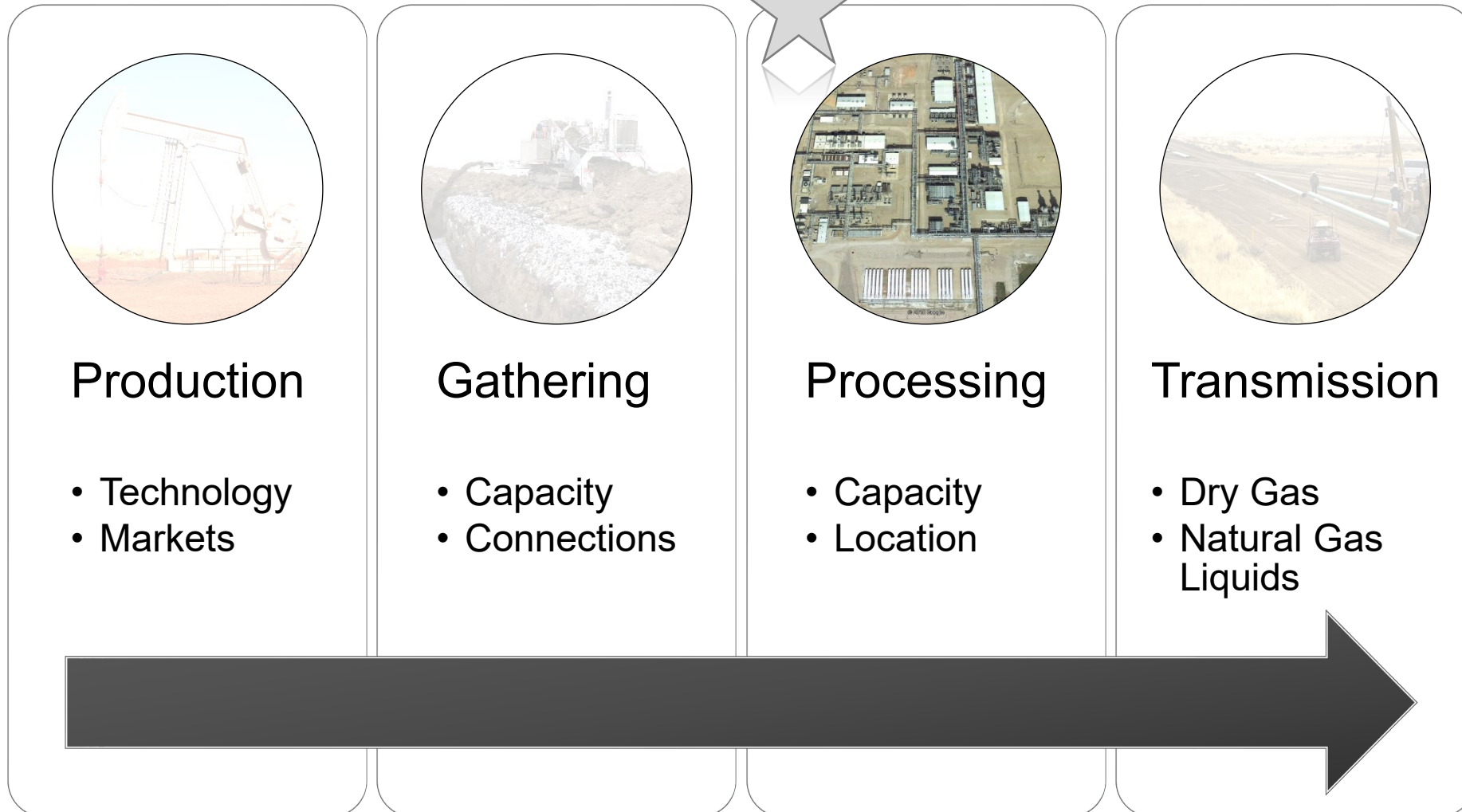
Solving the Flaring Challenge



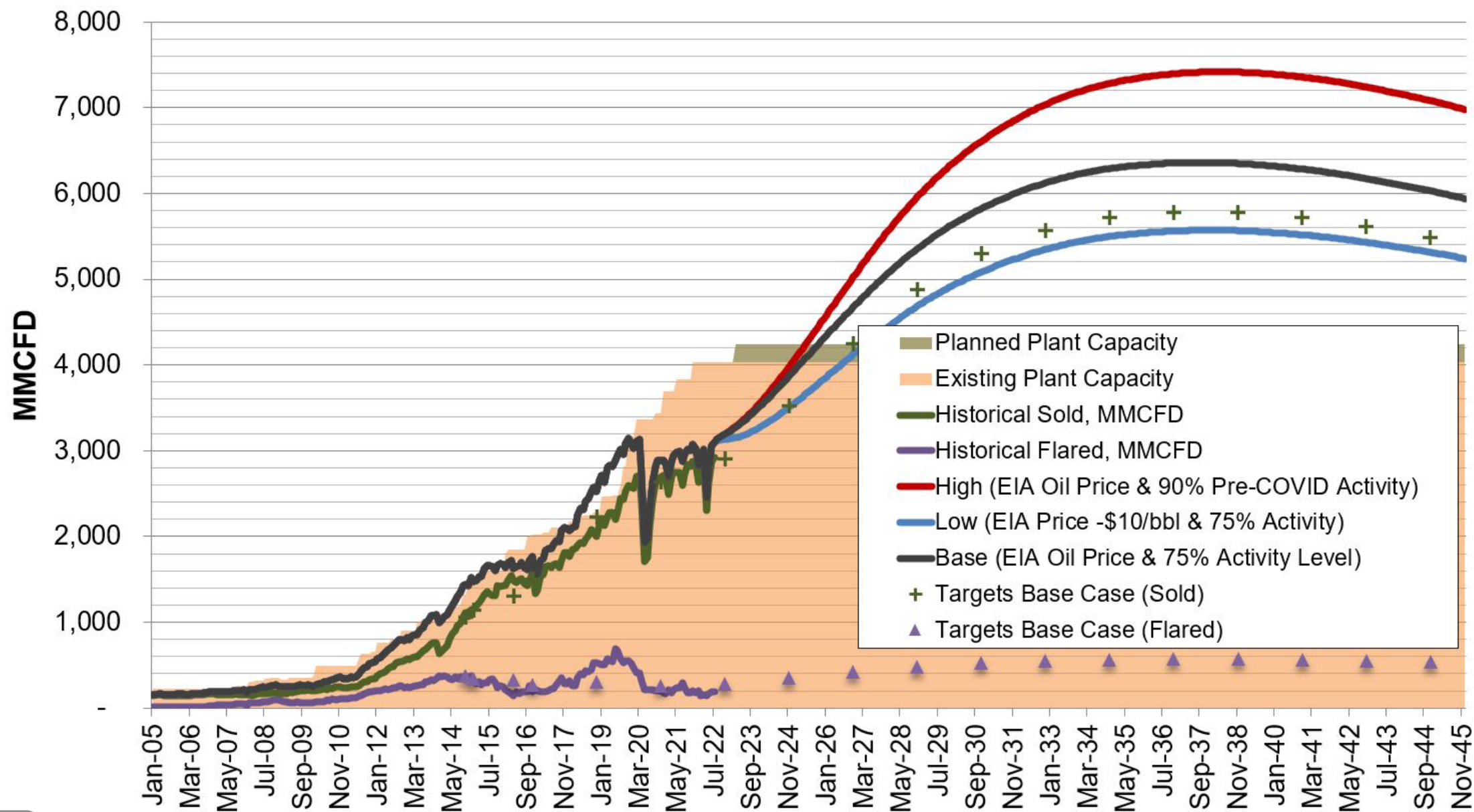
ESG Targets Pushing Flaring Down



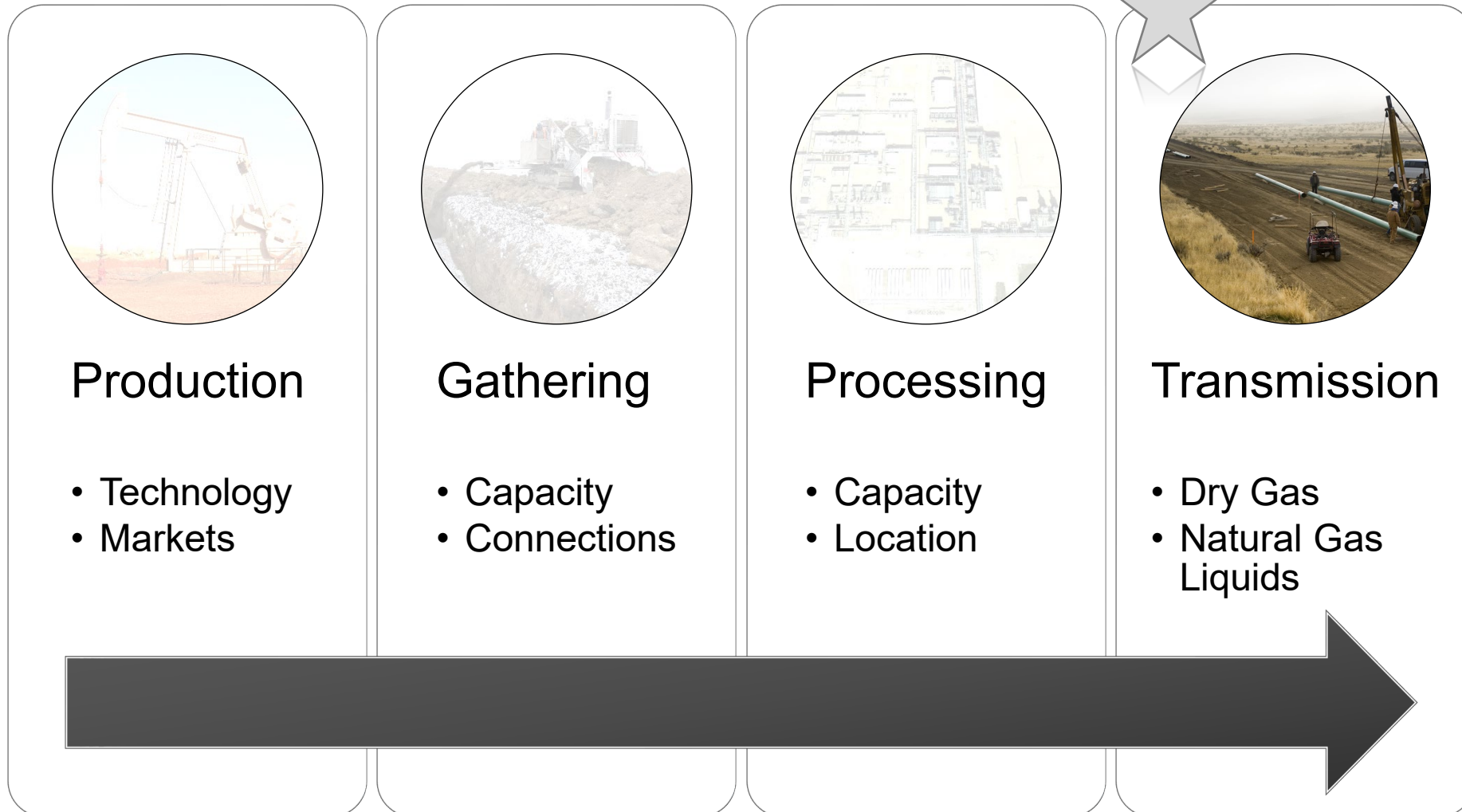
Natural Gas Update



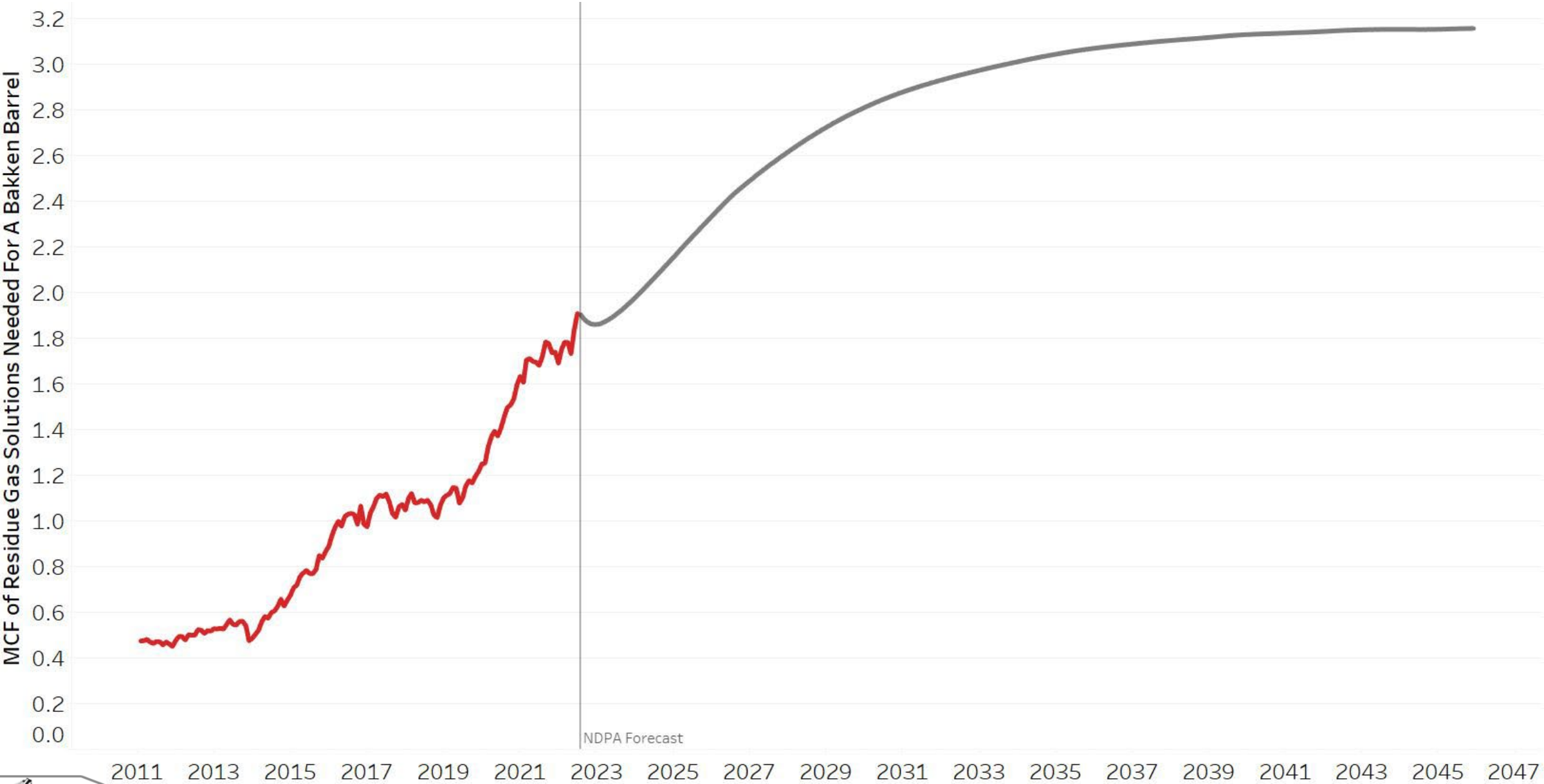
Solving the Flaring Challenge



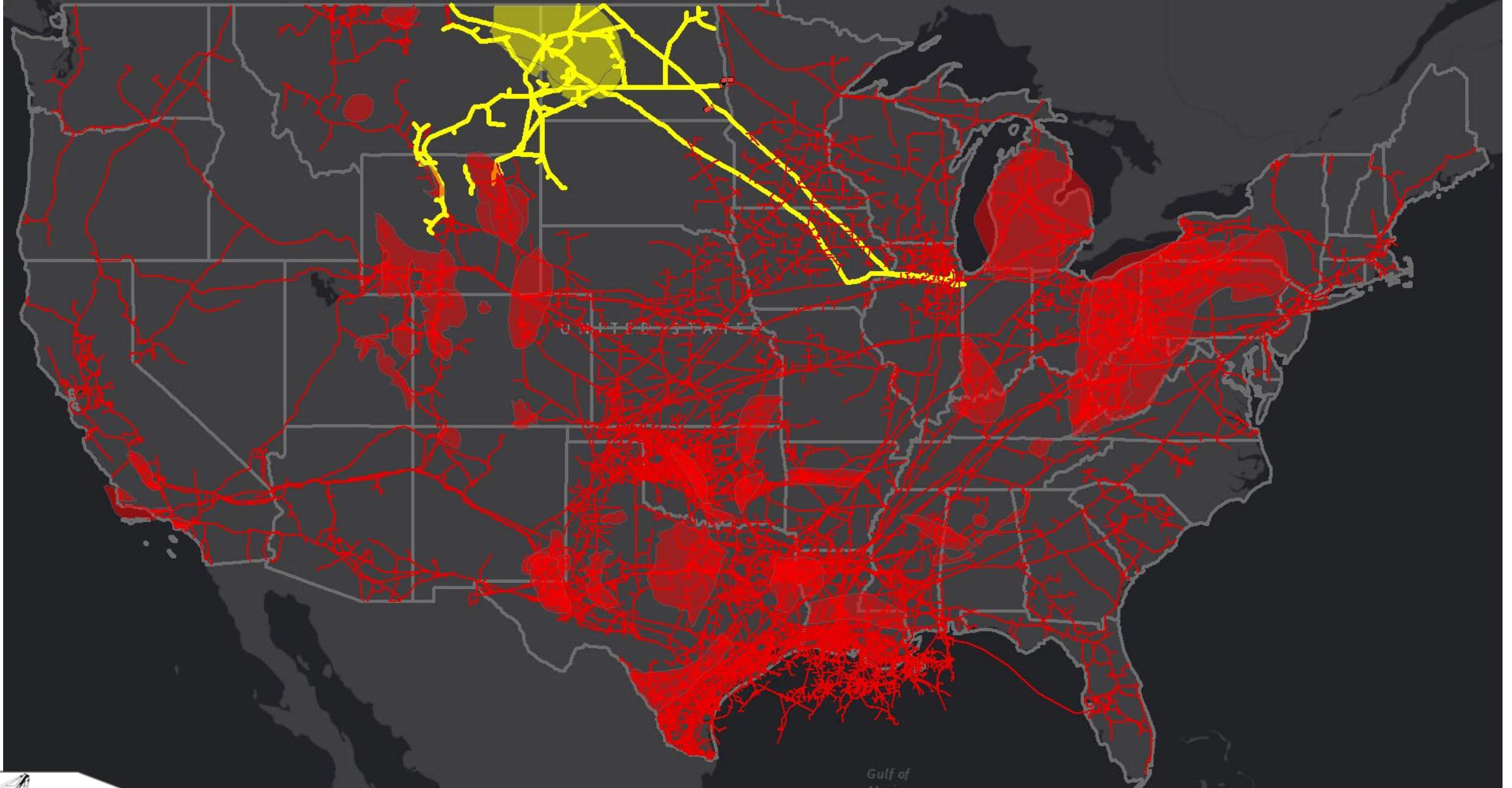
Natural Gas Update



The Importance of Residue Gas Solutions Continues to Increase



Bakken Natural Gas Infrastructure



Driving Forces for New Gas Pipelines



Supply Push



Demand Pull



System Reliability



Who Signs Up For Capacity?

Shippers



Producers



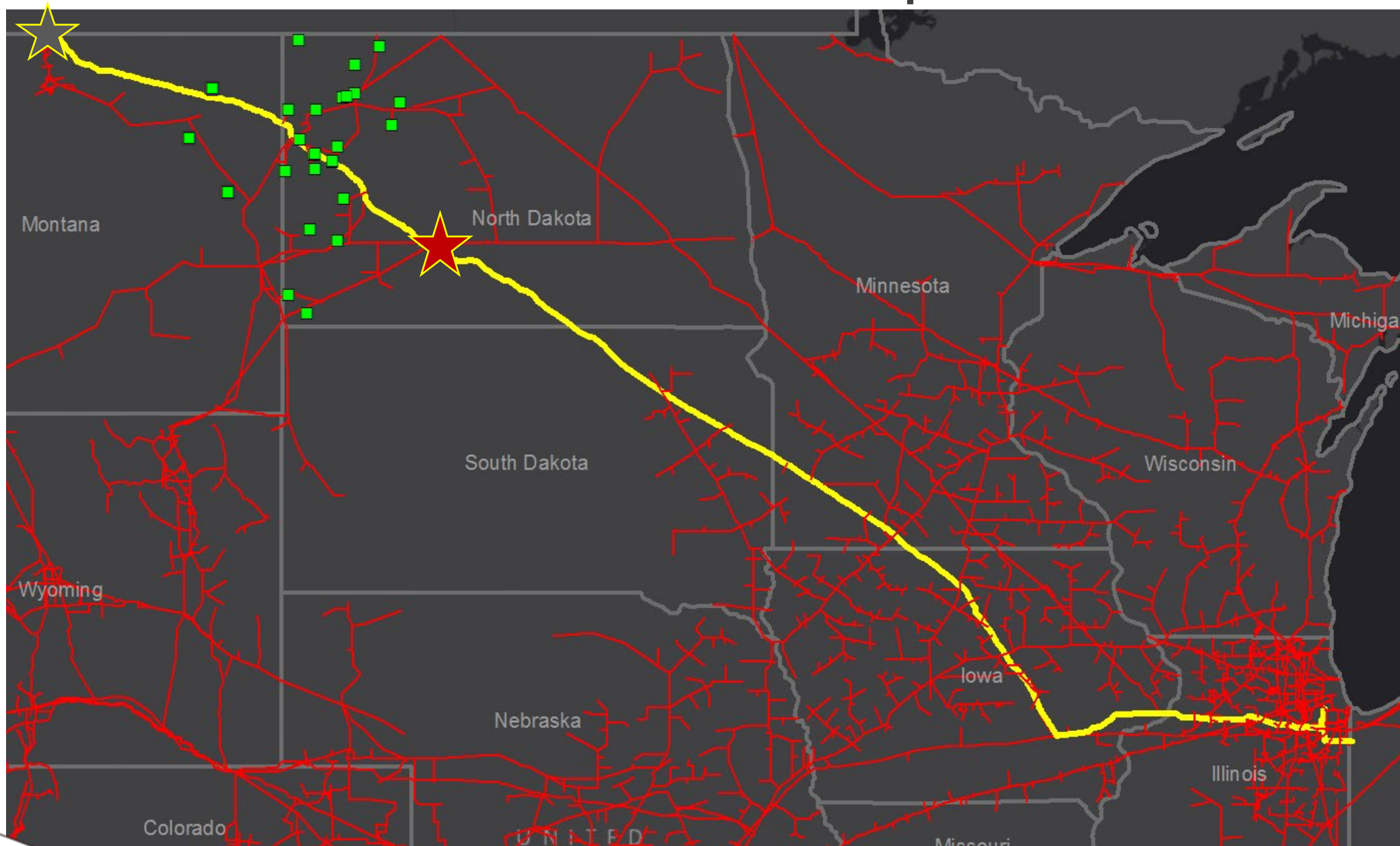
Marketing Firms



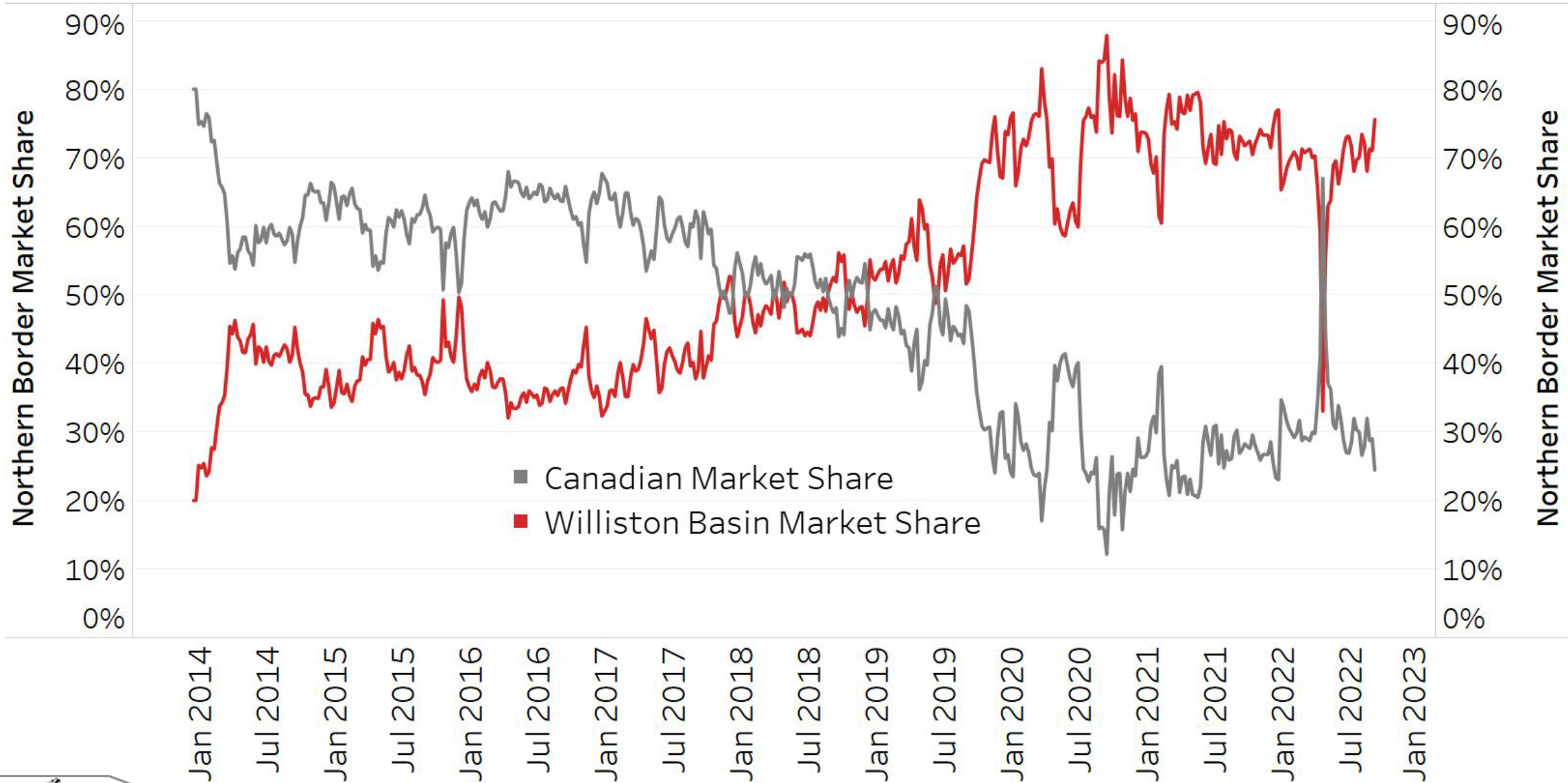
Consumers/LDC



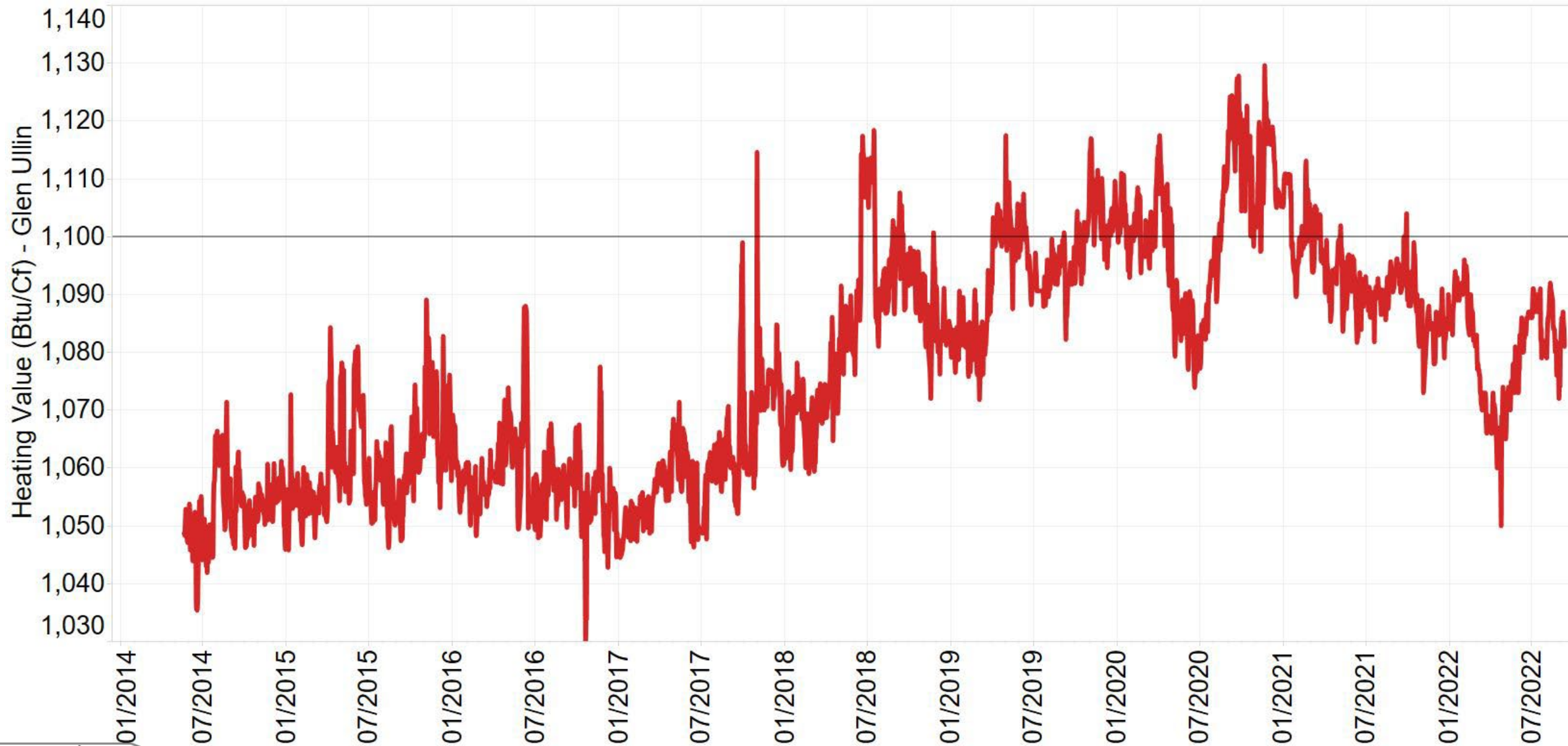
Northern Border Pipeline



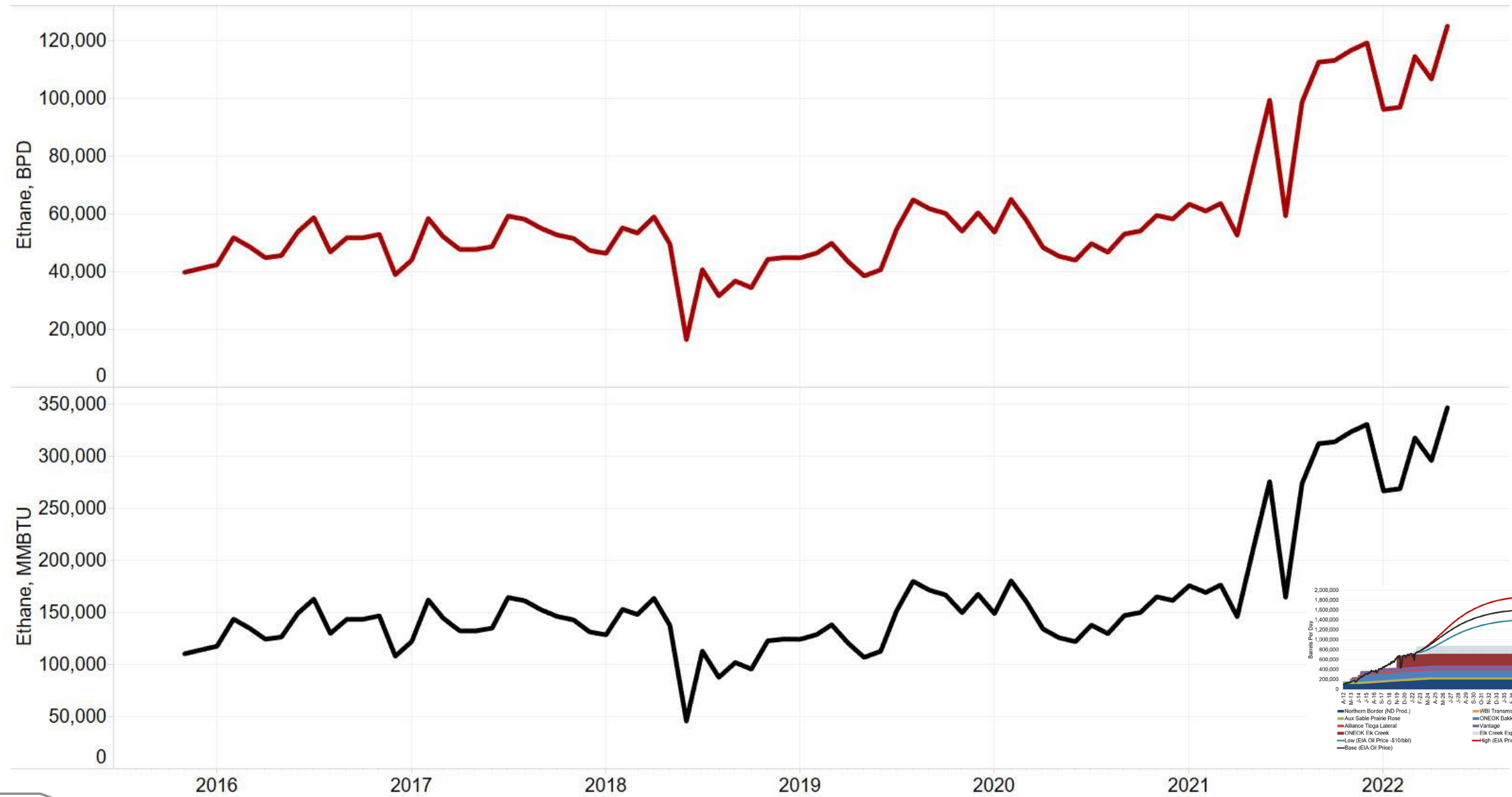
Northern Border Pipeline Market Share



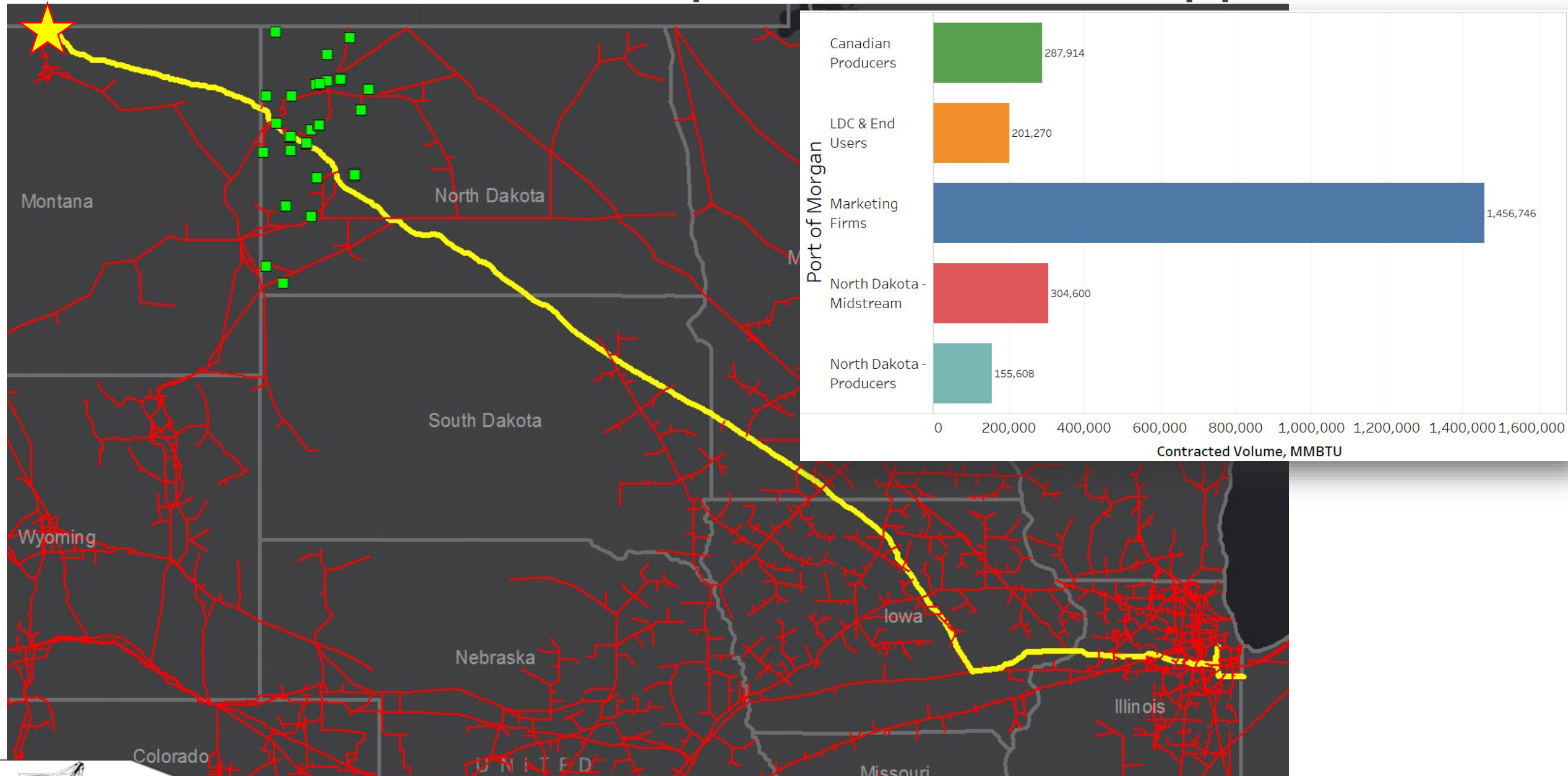
Northern Border BTU at Glen Ullin, ND



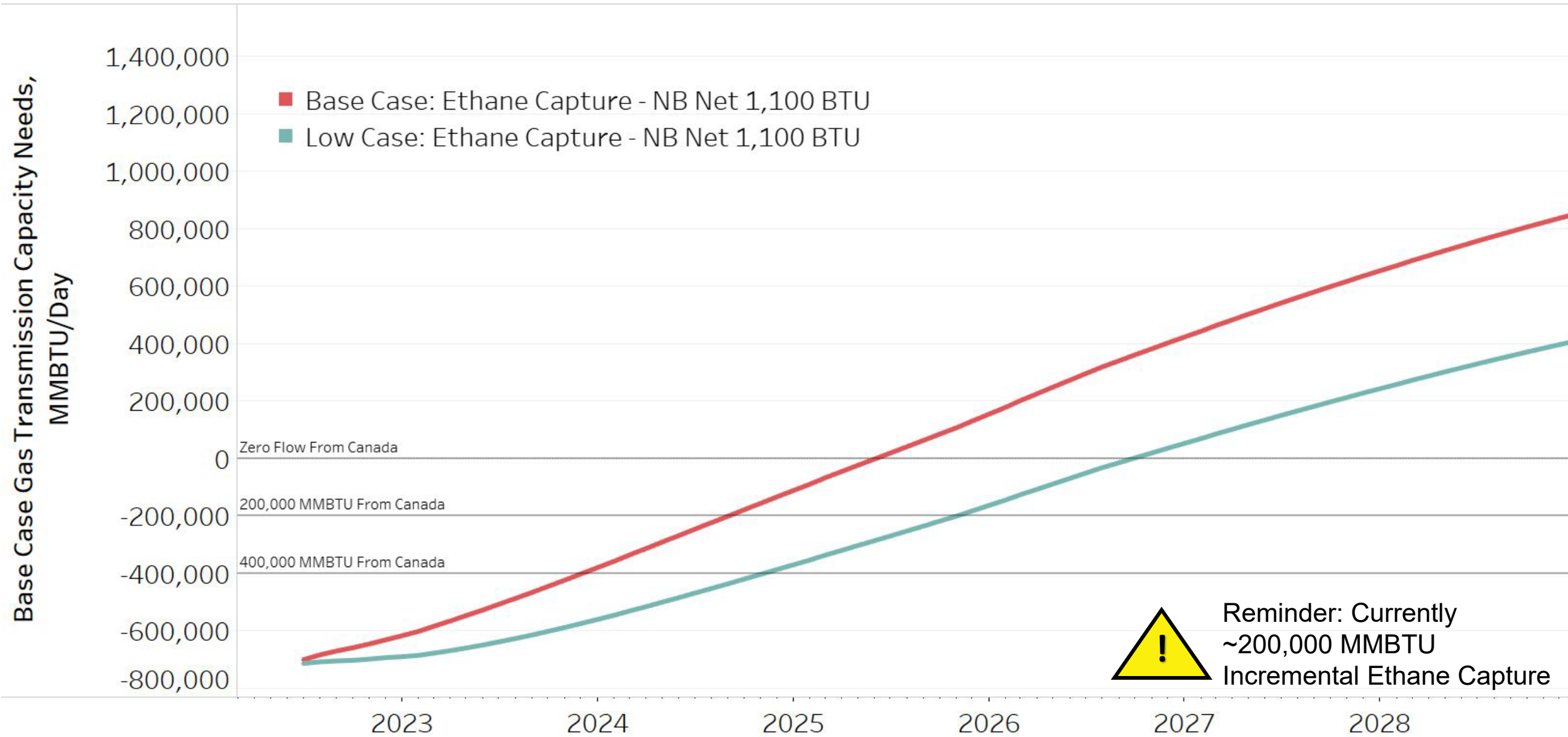
ND Ethane Capture Driving Down NB BTU & Market Share



Northern Border Pipeline P.O.M. Shipper Mix



Residue Gas Pipeline Capacity Needs



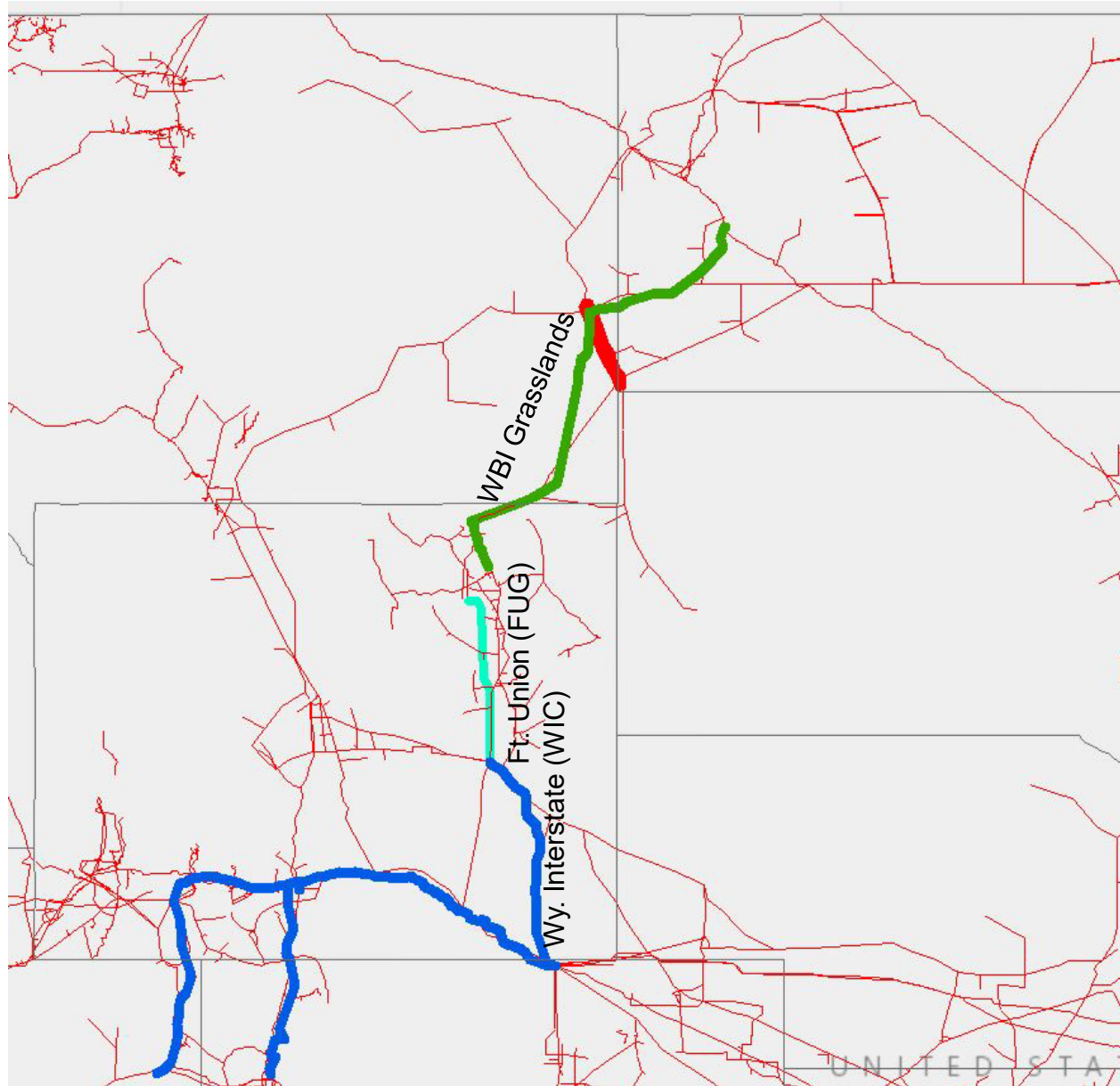
WBI Energy – Grasslands South Project

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
- Fort Union Gas Gathering and Wyoming Interstate Company provide further transport to Cheyenne hub.

Proposed Tariff Rates

- WBI \$0.32356/Dth + Fuel/Elec to WIC/FUG Interconnect
- FUG/WIC to Cheyenne \$0.2899/Dth + Fuel/Elec



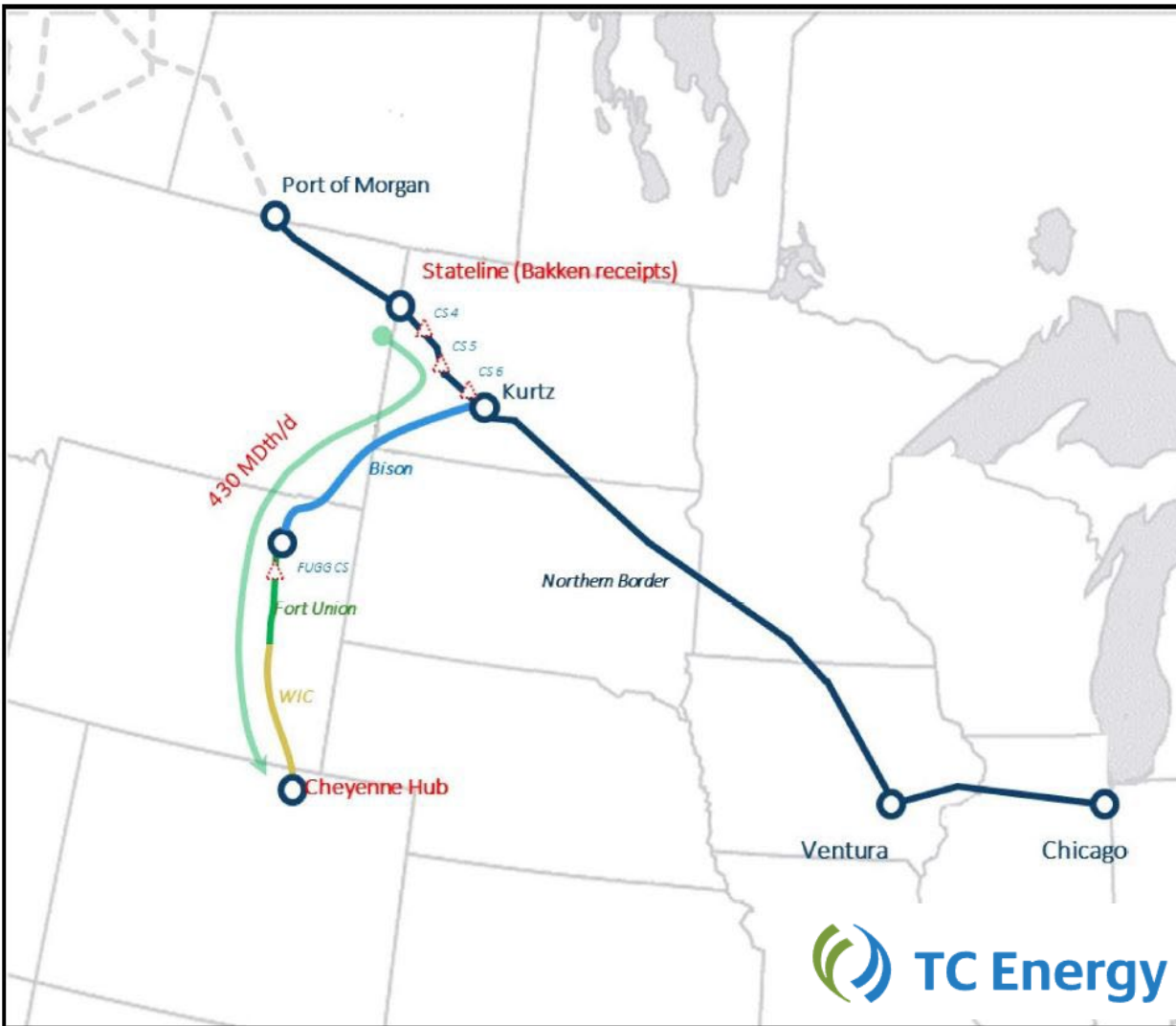
TC Energy – Proposed Bison XPress Project

Project Highlights

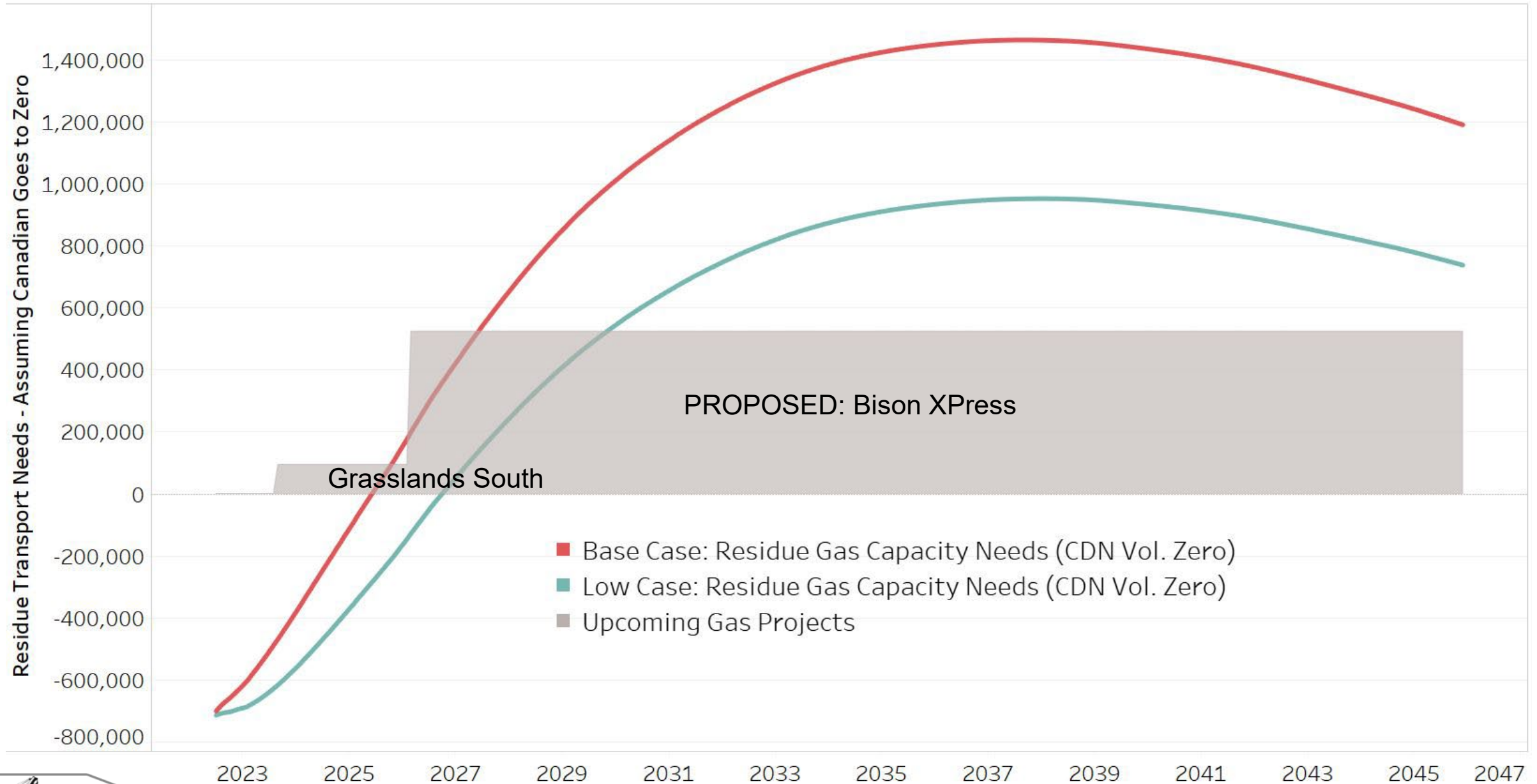
- Non-binding open season April 4 - May 6, 2022
- Three compressor upgrades in North Dakota
- Reverse the idle Bison Pipeline (30" – 302 Mile)
- Proposed capacity 430,000 Dth/Day
- Q1 2026 targeted in-service date
- Fort Union Gas Gathering and Wyoming Interstate Company provide further transport to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

Proposed Tariff Rates

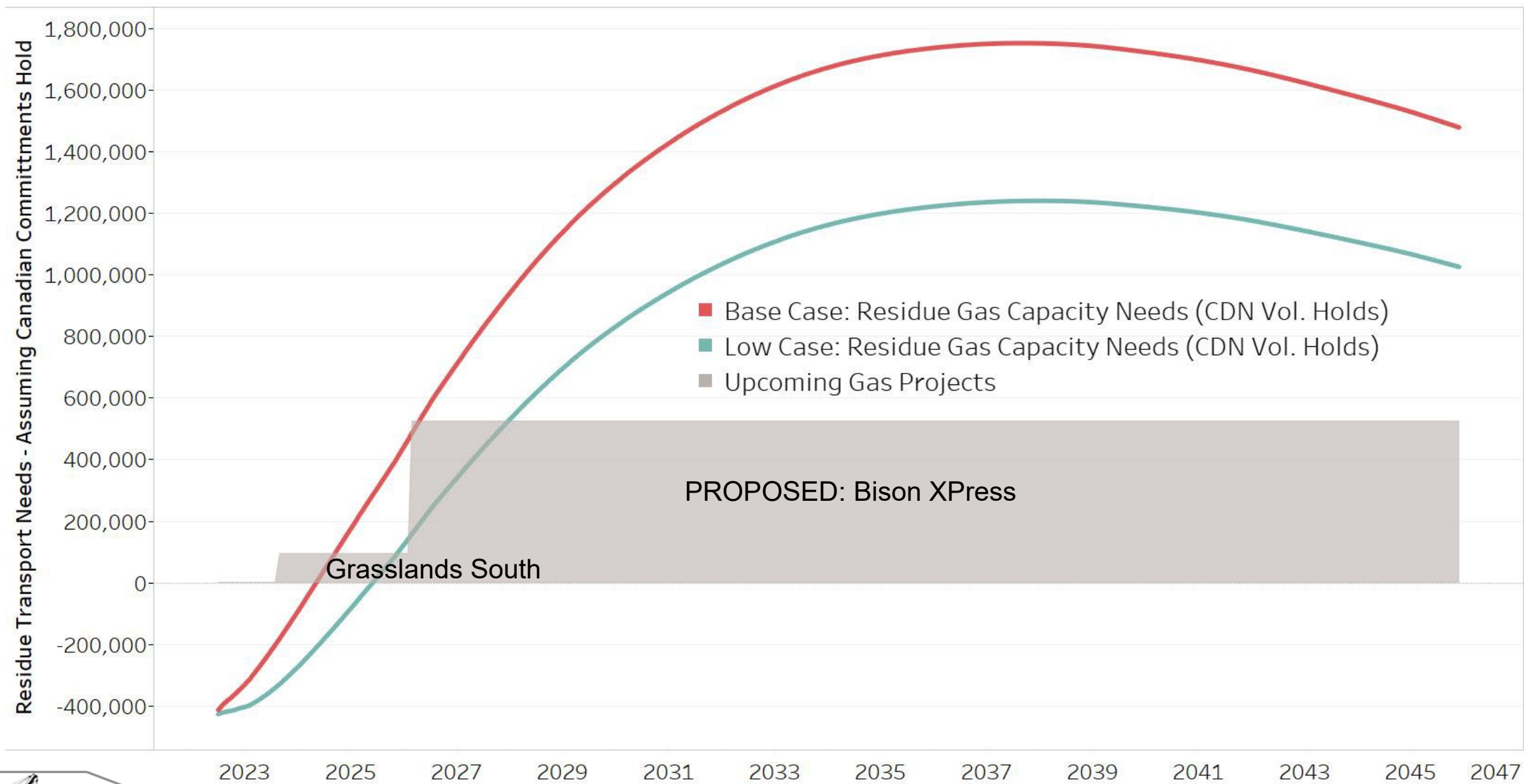
- NBPL/Bison \$0.45/Dth + Fuel/Elec to WIC/FUG Interconnect
- WIC/FUG to Cheyenne \$0.30/Dth + Fuel/Elec
- Anchor Shipper Minimum: 50,000 Dth/Day



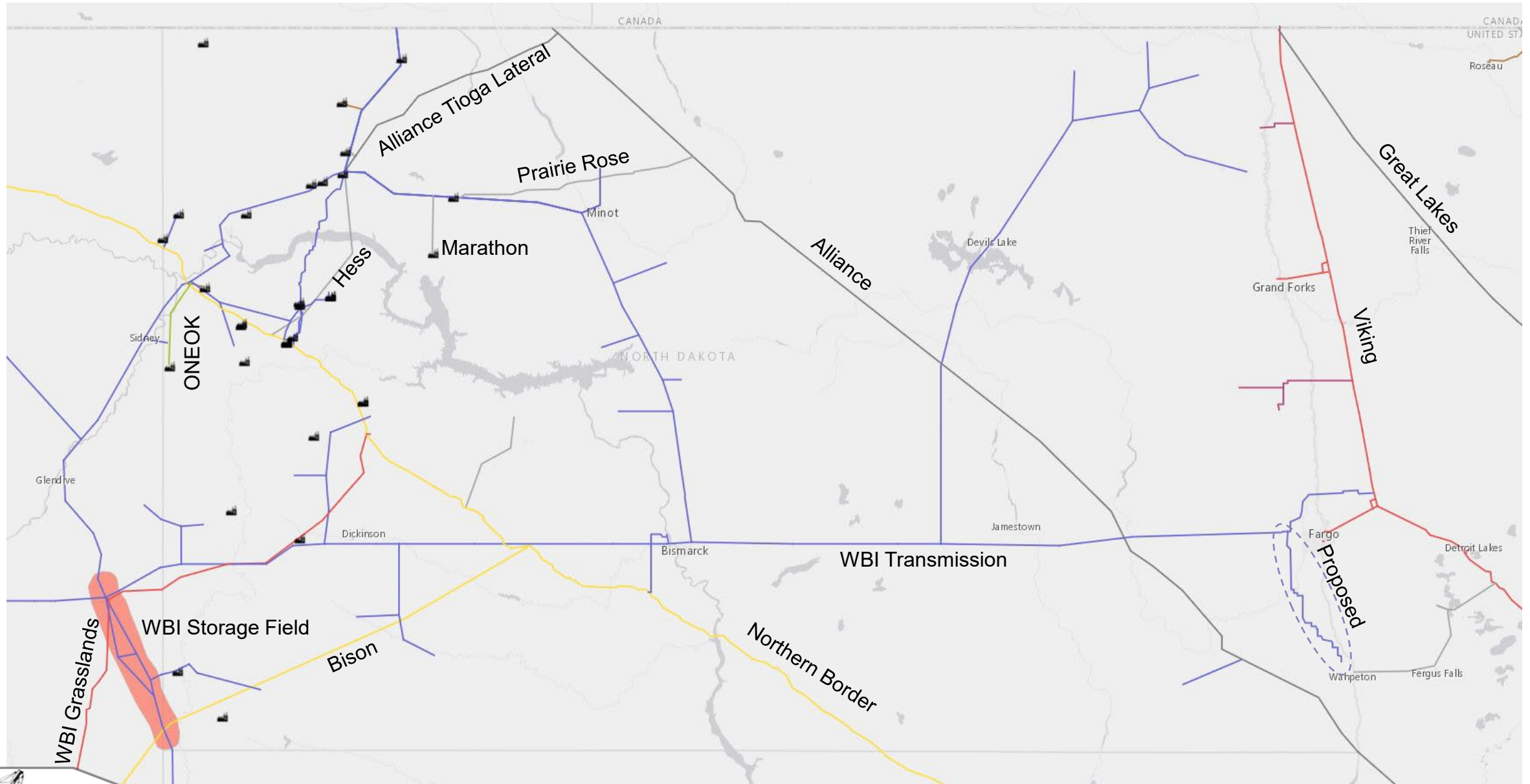
Residue Capacity Needs : **ZERO CANADIAN**



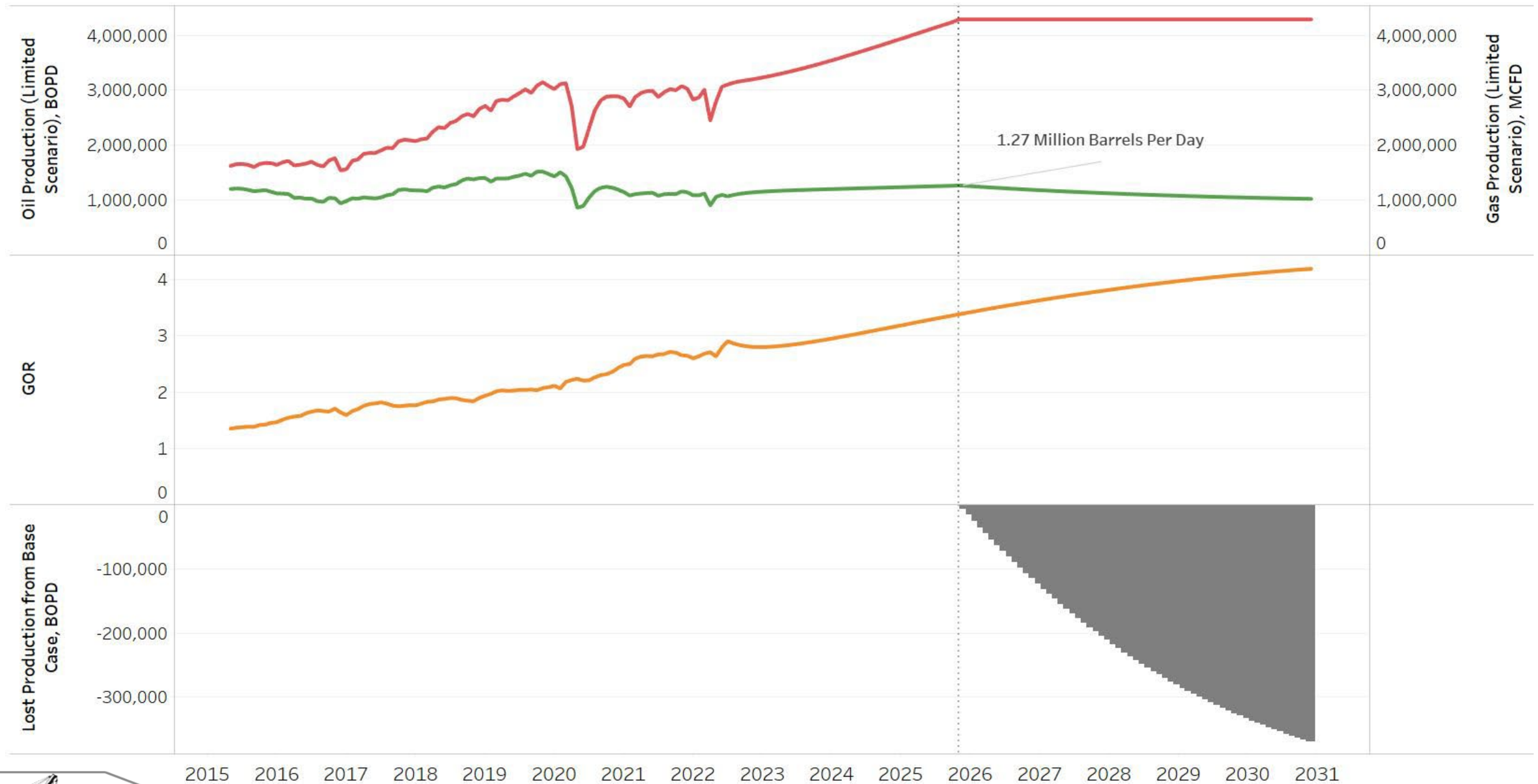
Residue Capacity Needs: ~288,000 MMBTU CDN



Major Residue Gas Pipeline Infrastructure



Gas Limitations Would Force Oil Production Down As GOR Rises



Value of a Dekatherm (MMBTU)

Key Assumptions

- Current North Dakota GOR = 2.79
- Gas Plant Shrink = 30% (NGL removal)
- Residue Gas BTU ~ 1,140
- Flaring ~6%
- ND Tax Rate 9.5% (without price trigger)
- ND Wellhead Oil Price \$80

Resulting Oil and Natural Gas Tax Value

- 1 MCF plant tailgate = 1.14 Dekatherms
- 1 MCF plant tailgate = 1.43 MCF plant inlet
- 1 MCF plant tailgate = 0.54 Barrels in the field (assuming flaring rate of 6%)
- 0.54 Barrels = \$4.14 in state oil tax revenue
- 1 MCF plant tailgate = 1.14 Dekatherms = \$4.14 + ~\$0.13 in natural gas tax revenue
- 1 Dekatherm = \$3.63 in oil tax revenue + ~\$0.11 in natural gas tax revenue
- **1 Dekatherm = \$3.74 in combined oil and natural gas taxes to the State of North Dakota**



Pipeline Authority Tools

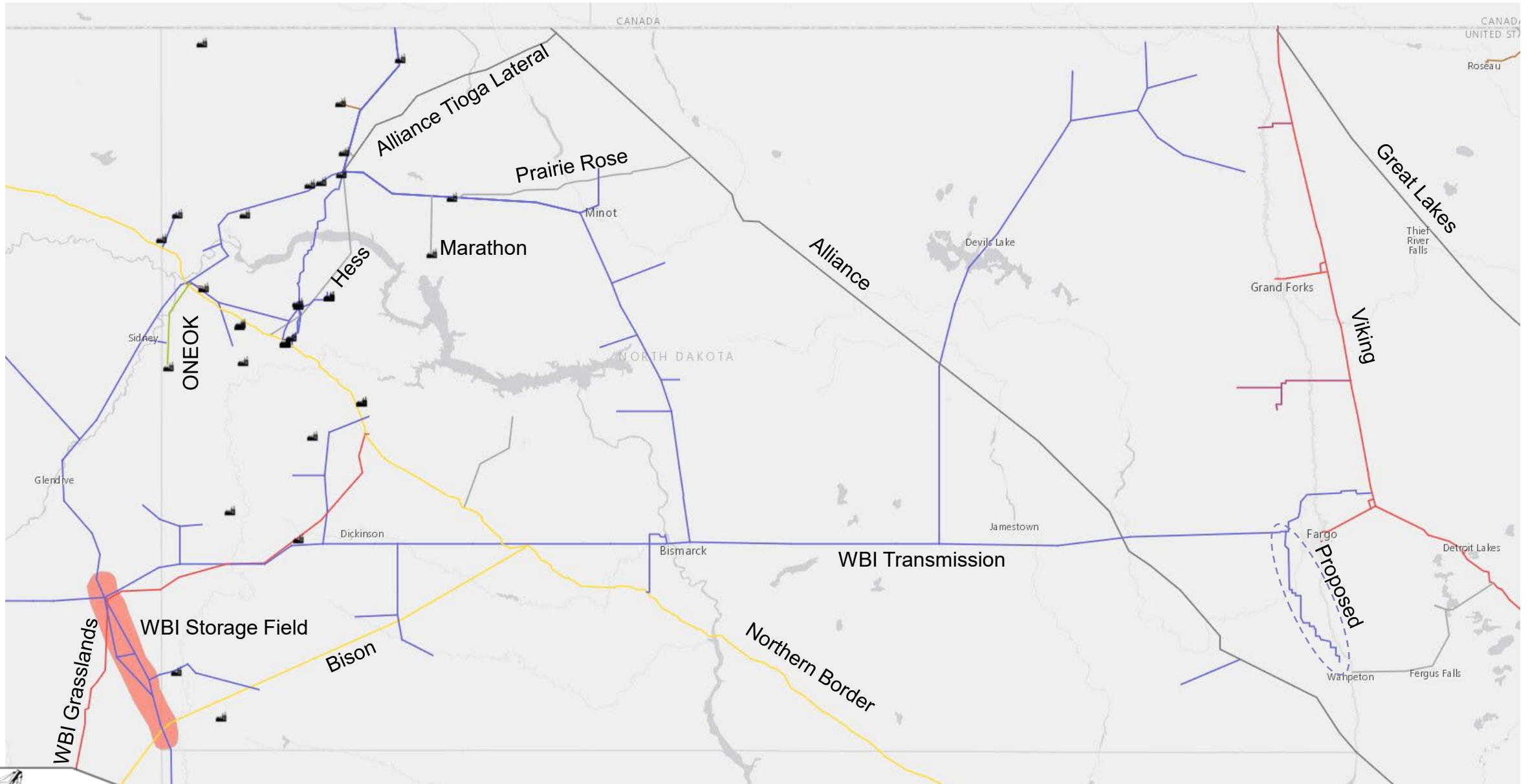
54-17.7-04. Powers.

The authority has all powers necessary to carry out the purposes of this chapter, including the power to:

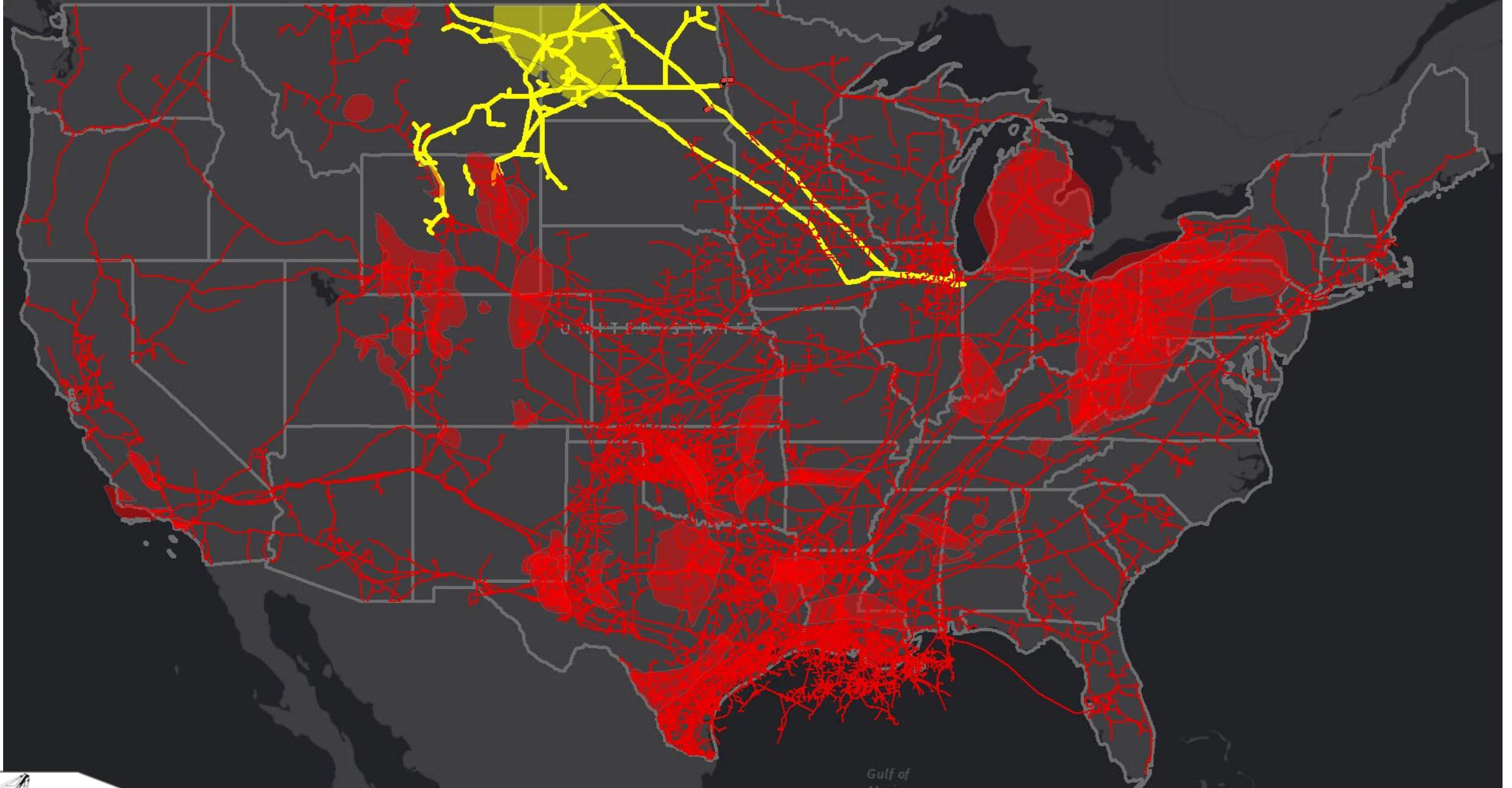
1. Make grants or loans and to provide other forms of financial assistance as necessary or appropriate for the purposes of this chapter.
2. Make and execute contracts and all other instruments necessary or convenient for the performance of the authority's powers and functions.
3. Acquire, purchase, hold, use, lease, license, sell, transfer, and dispose of an undivided or other interest in or the right to capacity in any pipeline system or systems, including interconnection of pipeline systems, within or without the state of North Dakota in order to facilitate the production, transportation, distribution, or delivery of energy-related commodities produced in North Dakota as a purchaser of last resort. The obligation of the state may not exceed ten percent of the pipeline authority's acquisition or purchase of a right to capacity in any pipeline system or systems, or interconnection of pipeline systems, and the state's obligation is limited to the funding available from the oil and gas research fund.
4. Borrow money and issue evidences of indebtedness as provided in this chapter.



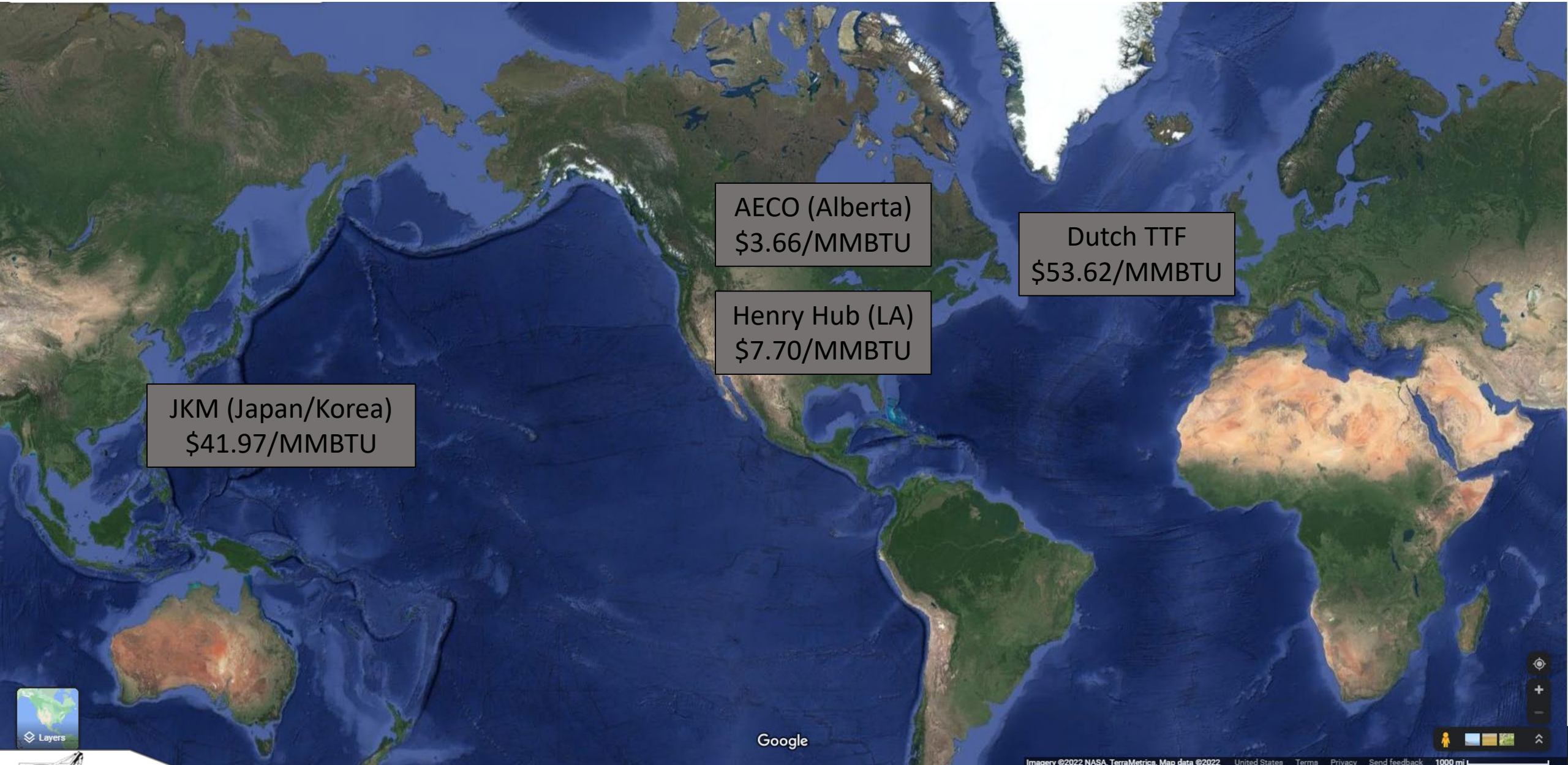
Natural Gas Pipeline Grant Program



Bakken Natural Gas Infrastructure



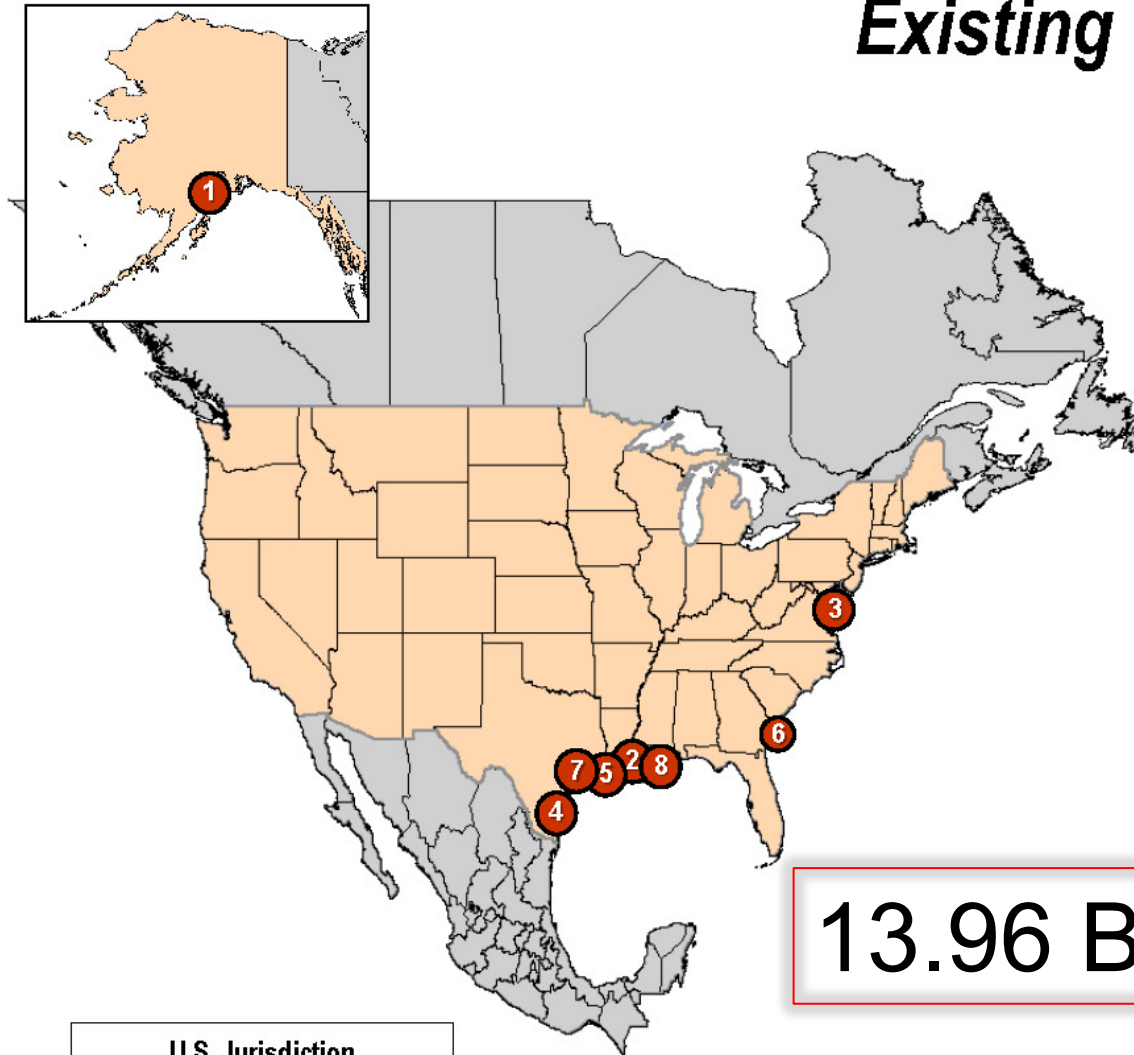
Global Natural Gas Prices





North American LNG Export Terminals

Existing



Export Terminals

UNITED STATES

1. Kenai, AK: 0.20 Bcfd (Trans-Foreland)
2. Sabine, LA: 4.55 Bcfd (Cheniere/Sabine Pass LNG – Trains 1-6)
3. Cove Point, MD: 0.82 Bcfd (Dominion–Cove Point LNG)
4. Corpus Christi, TX: 2.40 Bcfd (Cheniere – Corpus Christi LNG Trains 1-3)
5. Hackberry, LA: 2.15 Bcfd (Semptra–Cameron LNG, Trains 1-3)
6. Elba Island, GA: 0.35 Bcd (Southern LNG Company Units 1-10)
7. Freeport, TX: 2.38 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Trains 1-3)
8. Cameron Parish, LA: 1.11 Bcfd (Venture Global Calcasieu Pass Units 1-6)

13.96 Bcfd Existing

U.S. Jurisdiction

- FERC
- MARAD / U.S. Coast Guard

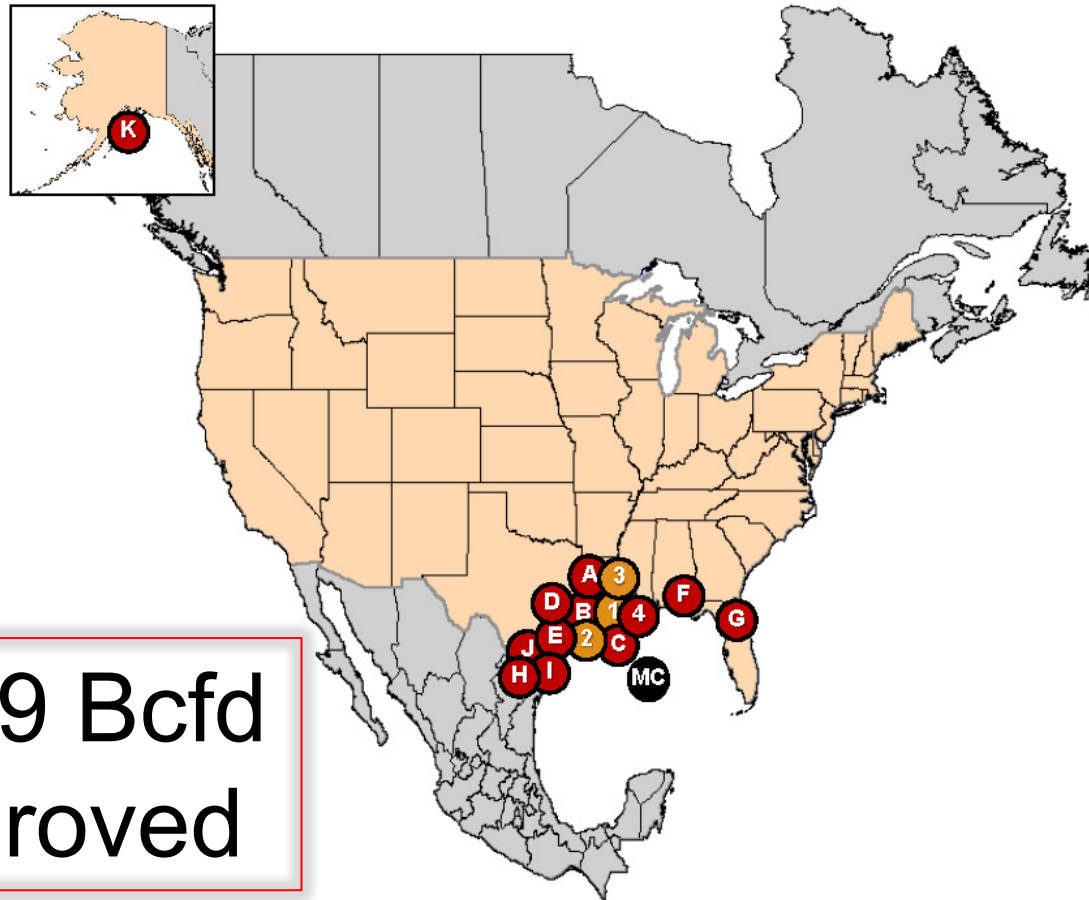
As of August 16, 2022

No updates since previous issuance



North American LNG Export Terminals

Approved, Not Yet Built



U.S. Jurisdiction & Status

- FERC - Approved, Under Construction
- FERC - Approved, Not Under Construction
- MARAD / U.S. Coast Guard

Export Terminals

UNITED STATES

FERC – APPROVED, UNDER CONSTRUCTION

1. Cameron Parish, LA: 0.55 Bcfd (Venture Global Calcasieu Pass Units 7-9) (CP15-550)
2. Sabine Pass, TX: 2.57 Bcfd (ExxonMobil – Golden Pass) (CP14-517, CP20-459)
3. Plaquemines Parish, LA: 3.40 Bcfd (Venture Global Plaquemines) (CP17-66)
4. Calcasieu Parish, LA: 3.81 Bcfd (Driftwood LNG) (CP17-117)

FERC – APPROVED, NOT UNDER CONSTRUCTION

- A. Lake Charles, LA: 2.27 Bcfd (Lake Charles LNG) (CP14-120)
- B. Lake Charles, LA: 1.19 Bcfd (Magnolia LNG) (CP14-347)
- C. Hackberry, LA: 1.41 Bcfd (Semptra - Cameron LNG Trains 4 & 5) (CP15-560)
- D. Port Arthur, TX: 1.86 Bcfd (Semptra - Port Arthur LNG Trains 1 & 2) (CP17-20)
- E. Freeport, TX: 0.74 Bcfd (Freeport LNG Dev Train 4) (CP17-470)
- F. Pascagoula, MS: 1.50 Bcfd (Gulf LNG Liquefaction) (CP15-521)
- G. Jacksonville, FL: 0.13 Bcfd (Eagle LNG Partners) (CP17-41)
- H. Brownsville, TX: 0.55 Bcfd (Texas LNG Brownsville) (CP16-116)
- I. Brownsville, TX: 3.6 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
- J. Corpus Christi, TX: 1.58 Bcfd (Cheniere Corpus Christi Stage III) (CP18-512)
- K. Nikiski, AK: 2.63 Bcfd (Alaska Gasline) (CP17-178)

MARAD/USCG – APPROVED, NOT UNDER CONSTRUCTION

- MC. Gulf of Mexico: 1.8 Bcfd (Delfin LNG)

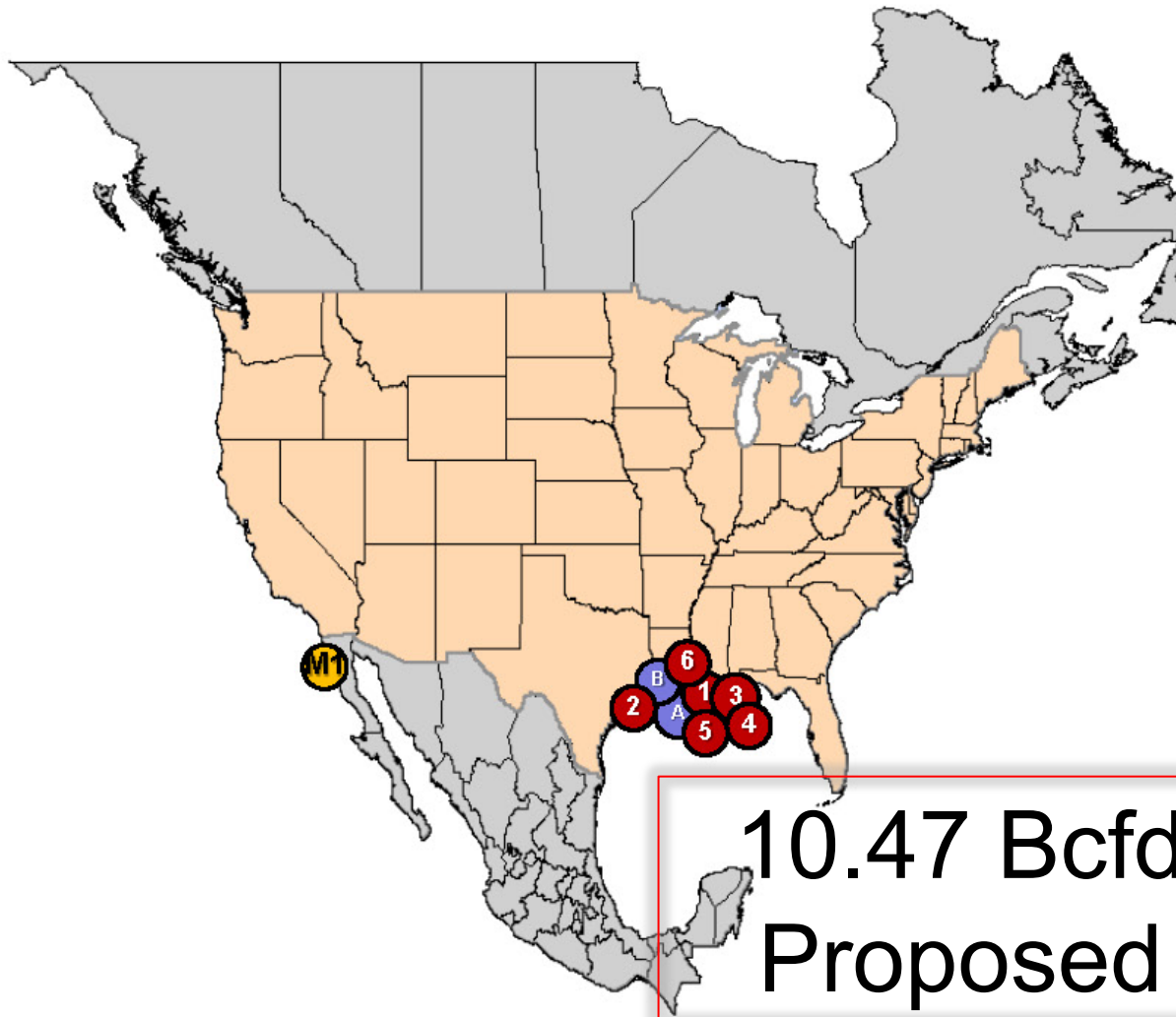
CANADA - LNG IMPORT AND PROPOSED EXPORT FACILITIES

<https://www.nrcan.gc.ca/energy/natural-gas/5683>

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No updates since previous issuance



North American LNG Export Terminals *Proposed*



UNITED STATES

PROPOSED TO FERC

Pending Applications:

1. Cameron Parish, LA: 1.18 Bcfd (Commonwealth, LNG) (CP19-502)
2. Port Arthur, TX: 1.86 Bcfd (Sempra - Port Arthur LNG Trains 3 & 4) (CP20-55)
3. Cameron Parish, LA: 3.96 Bcfd (Venture Global CP2 Blocks 1-18) (CP22-21)
4. Cameron Parish, LA: .06 Bcfd (Venture Global Calcasieu Pass) (CP22-25)
5. Hackberry, LA: -0.45 Bcfd (Sempra - Cameron LNG Vacate T5 & modify T4) (CP22-41)
6. Plaquemines Parish, LA: 0.45 Bcfd (Venture Global Plaquemines) (CP22-92)

Projects in Pre-filing:

- A. LaFourche Parish, LA: 0.65 Bcfd (Port Fourchon LNG) (PF17-9)
- B. Plaquemines Parish, LA: 2.76 Bcfd (Delta LNG - Venture Global) (PF19-4)

CANADA

For Canadian LNG Import and Proposed Export Facilities:

<https://www.nrcan.gc.ca/energy/natural-gas/5683>

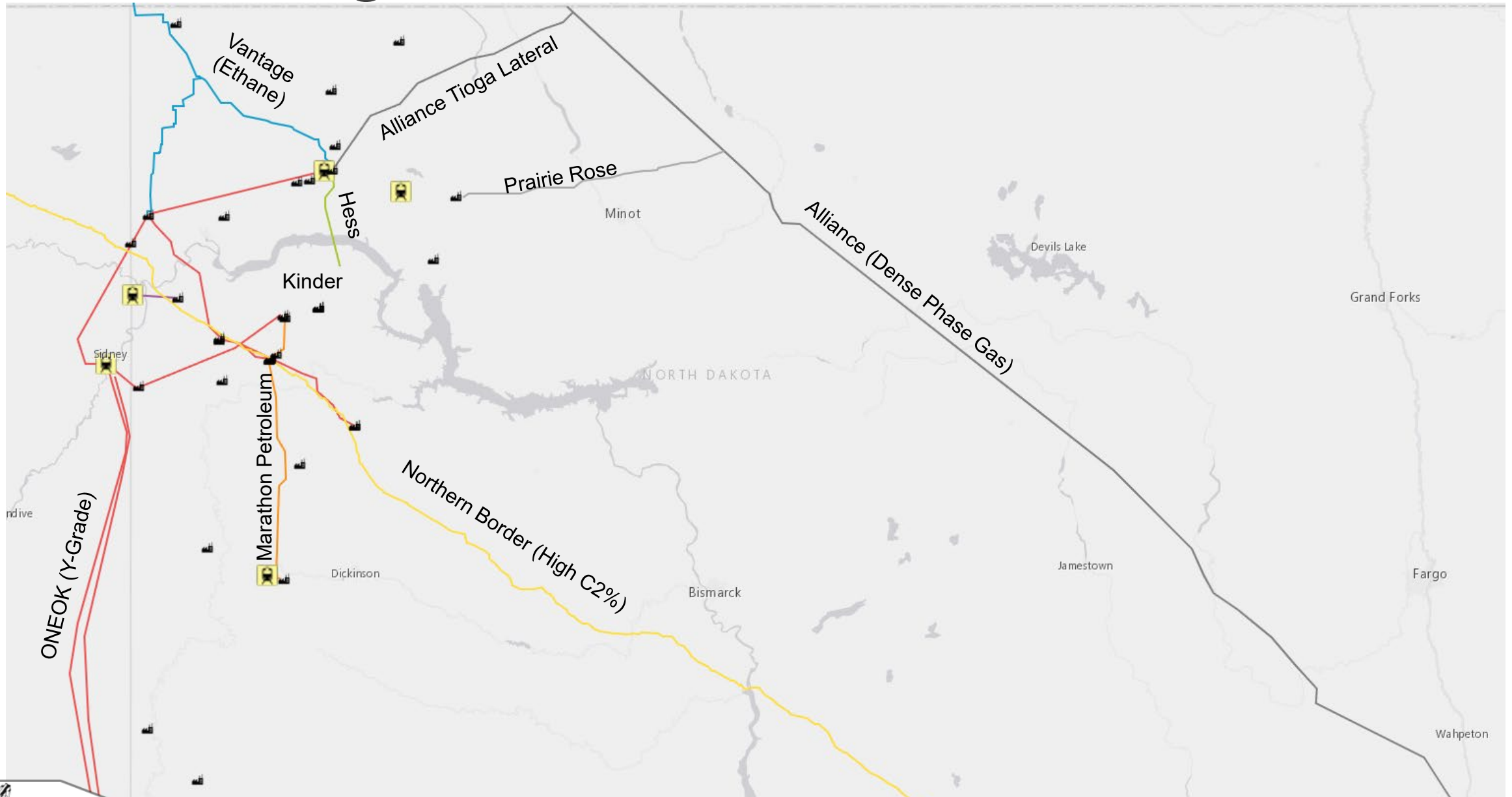
MEXICO (Projects in advanced planning/development stages)

- M1. Baja California, MX: 0.4 Bcfd (Sempra – Energia Costa Azul Phase 1)

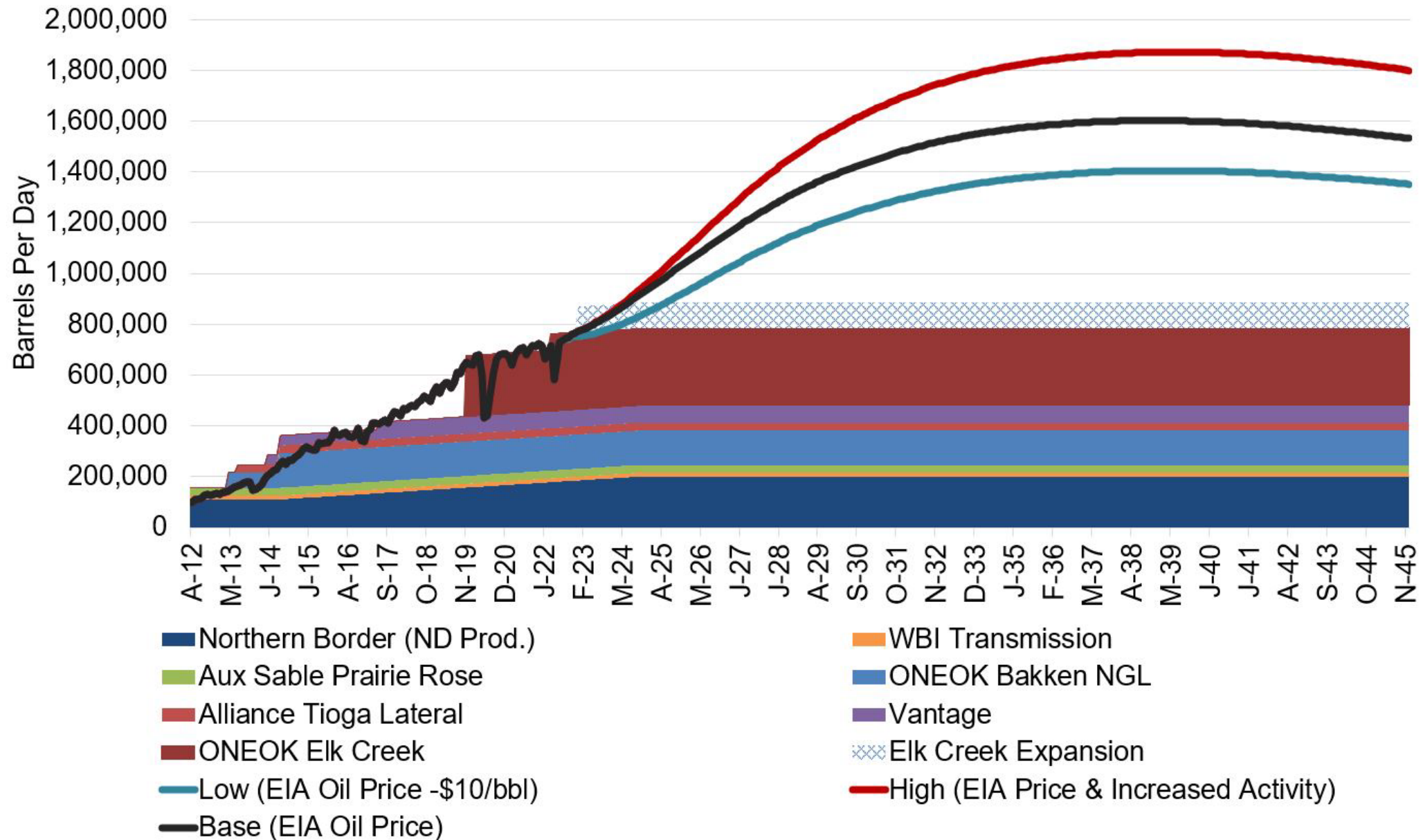
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Regional NGL Infrastructure



NGL Pipeline Takeaway Options



Contact Information

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

Websites:

www.pipeline.nd.gov
www.northdakotapipelines.com

