Industrial Commission Update

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Geological Engineer
Director
North Dakota Pipeline Authority

April 17, 2018

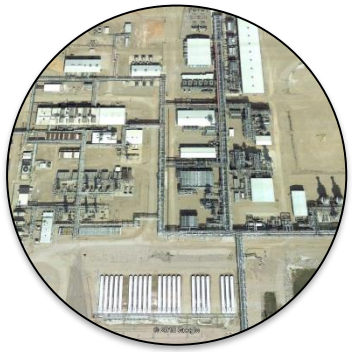
Natural Gas Capture

Production

- Technology
- Markets

Gathering

- Capacity
- Connections



Processing

- Capacity
- Location

Transmission

- Dry Gas
- Natural Gas Liquids

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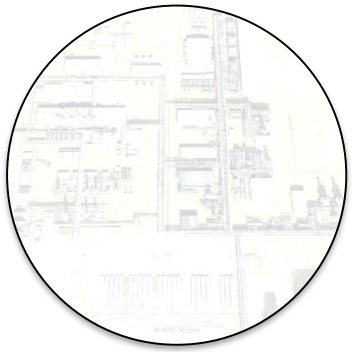

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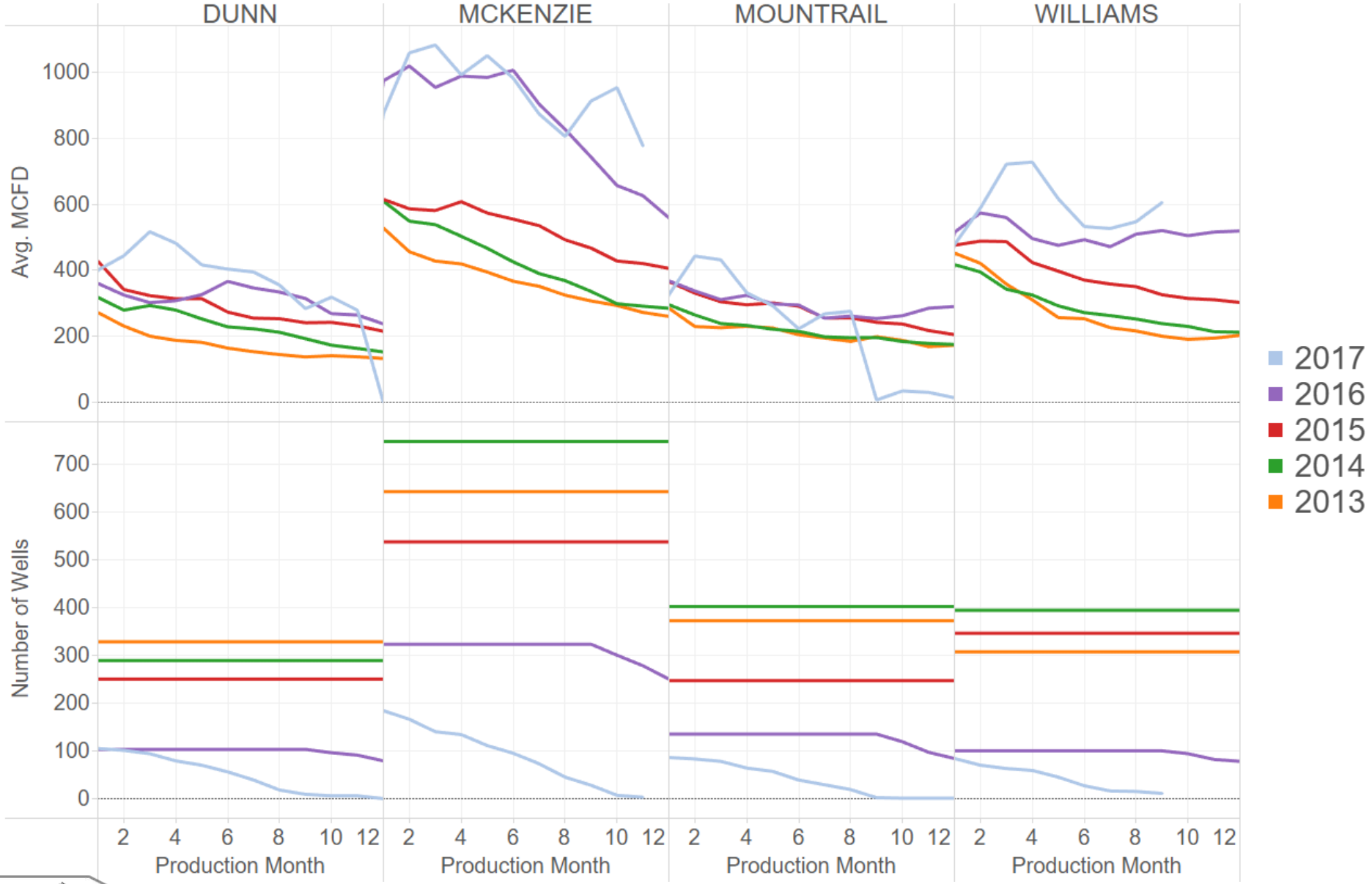
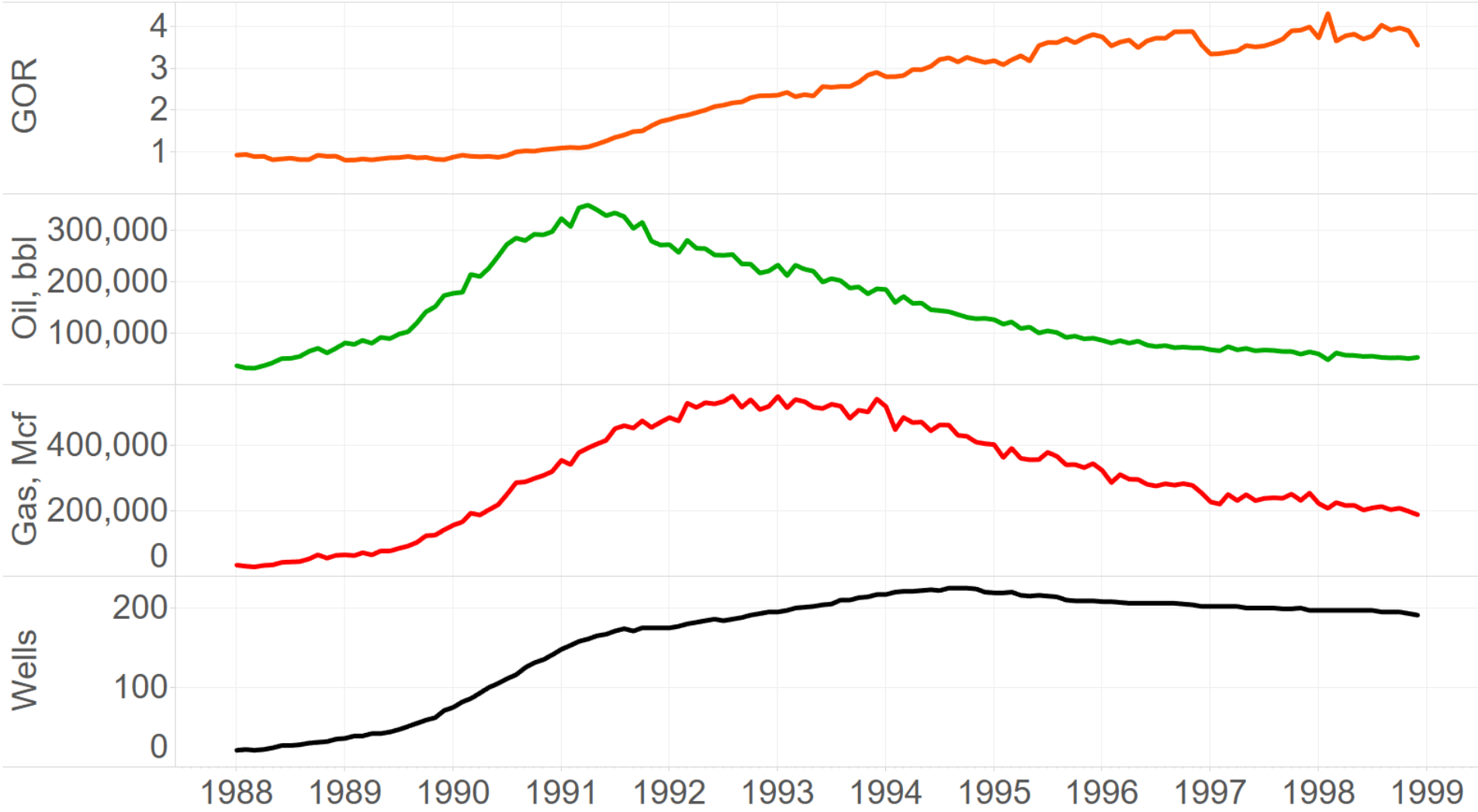
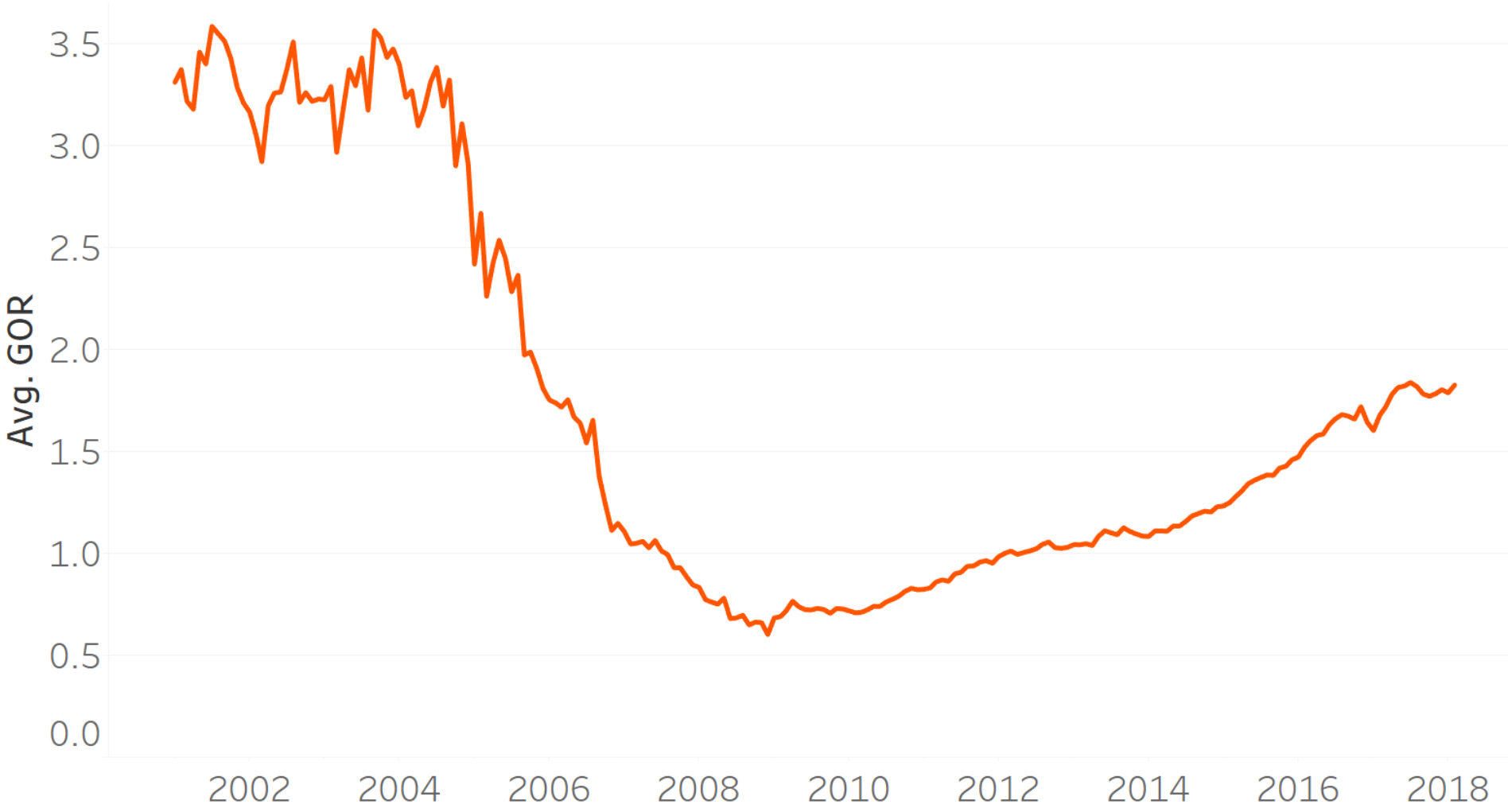
Bakken/Three Forks Well Performance



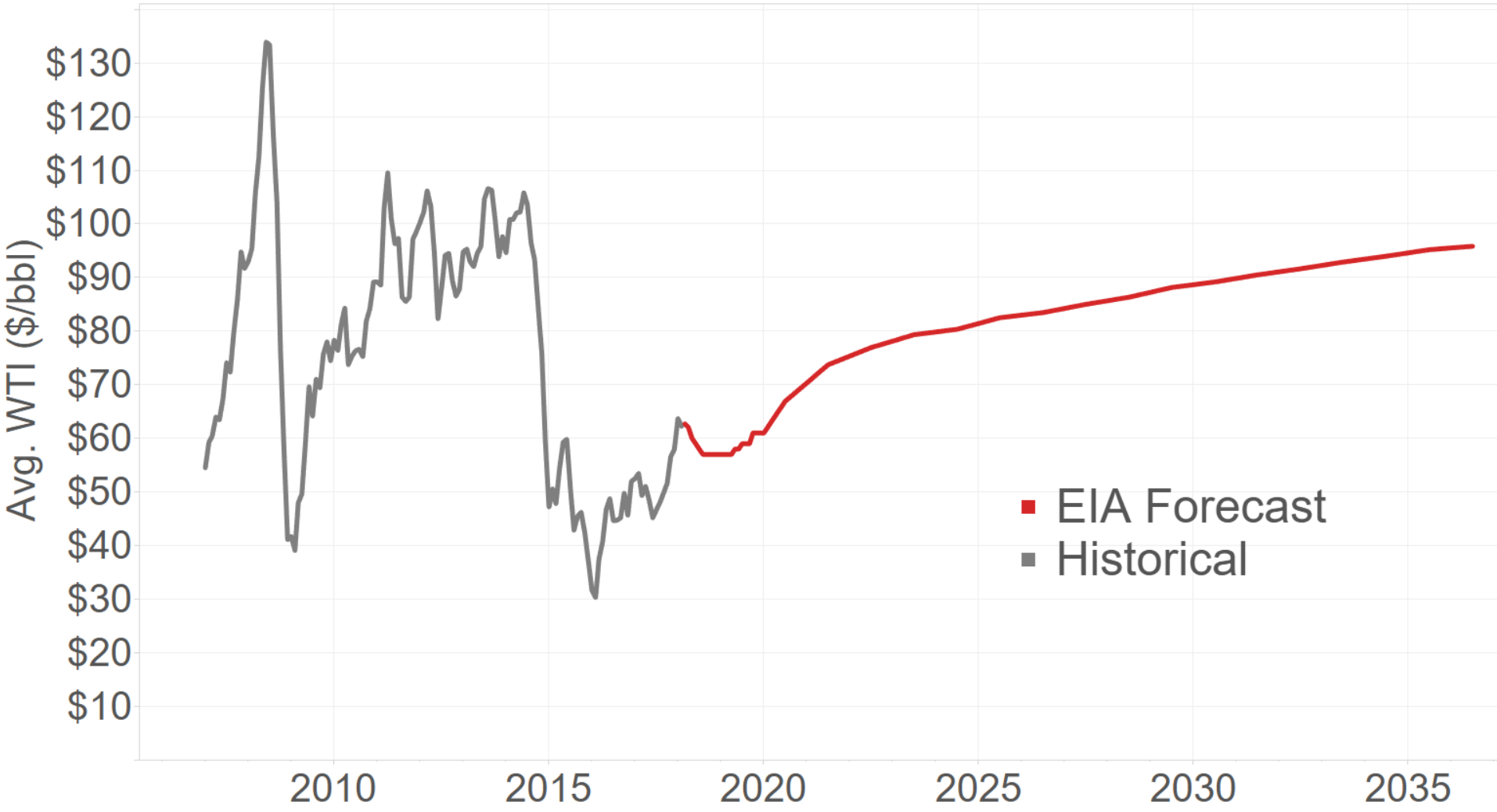
Historic Bakken/Three Forks GOR



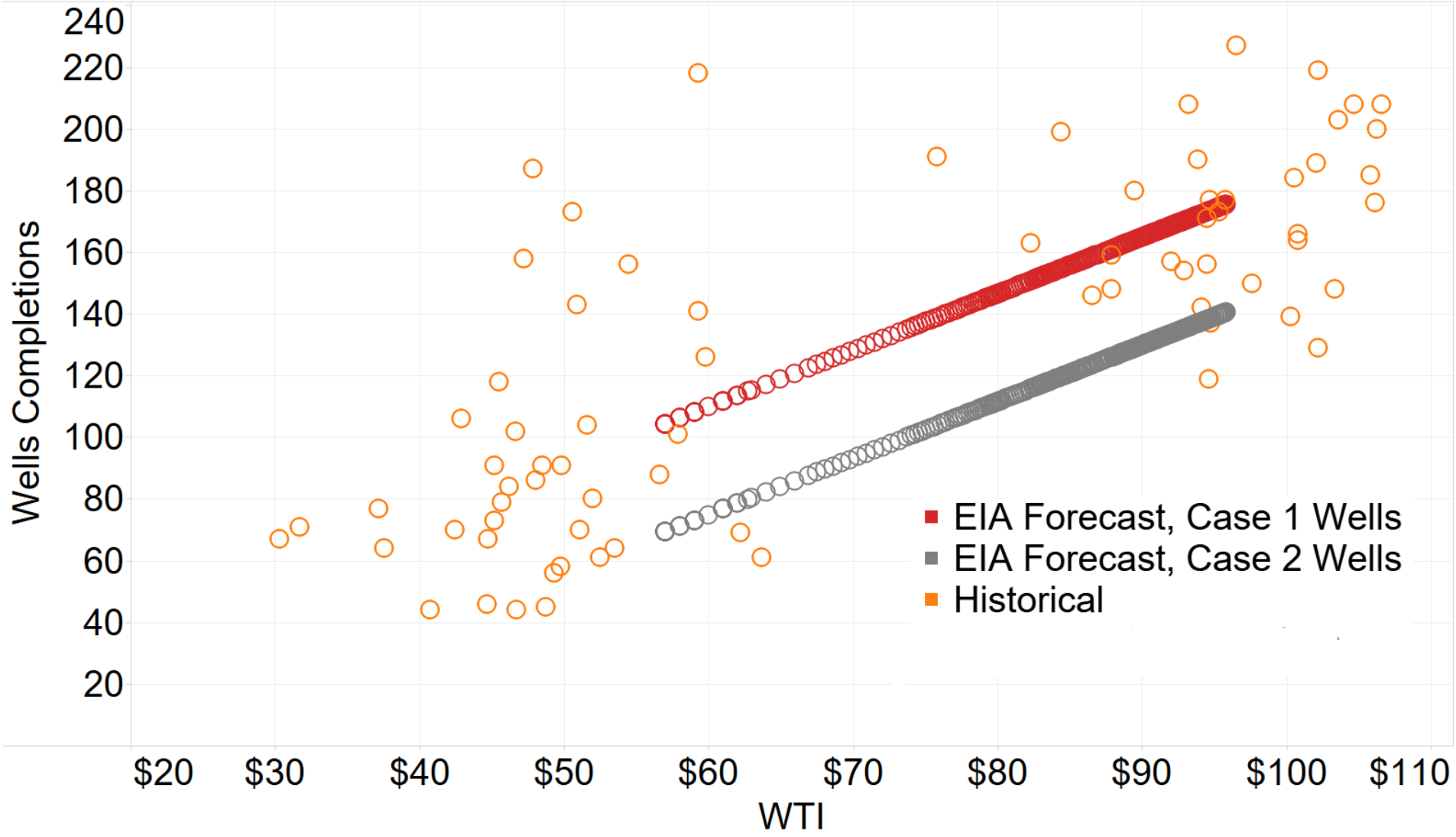
Statewide Bakken/Three Forks GOR



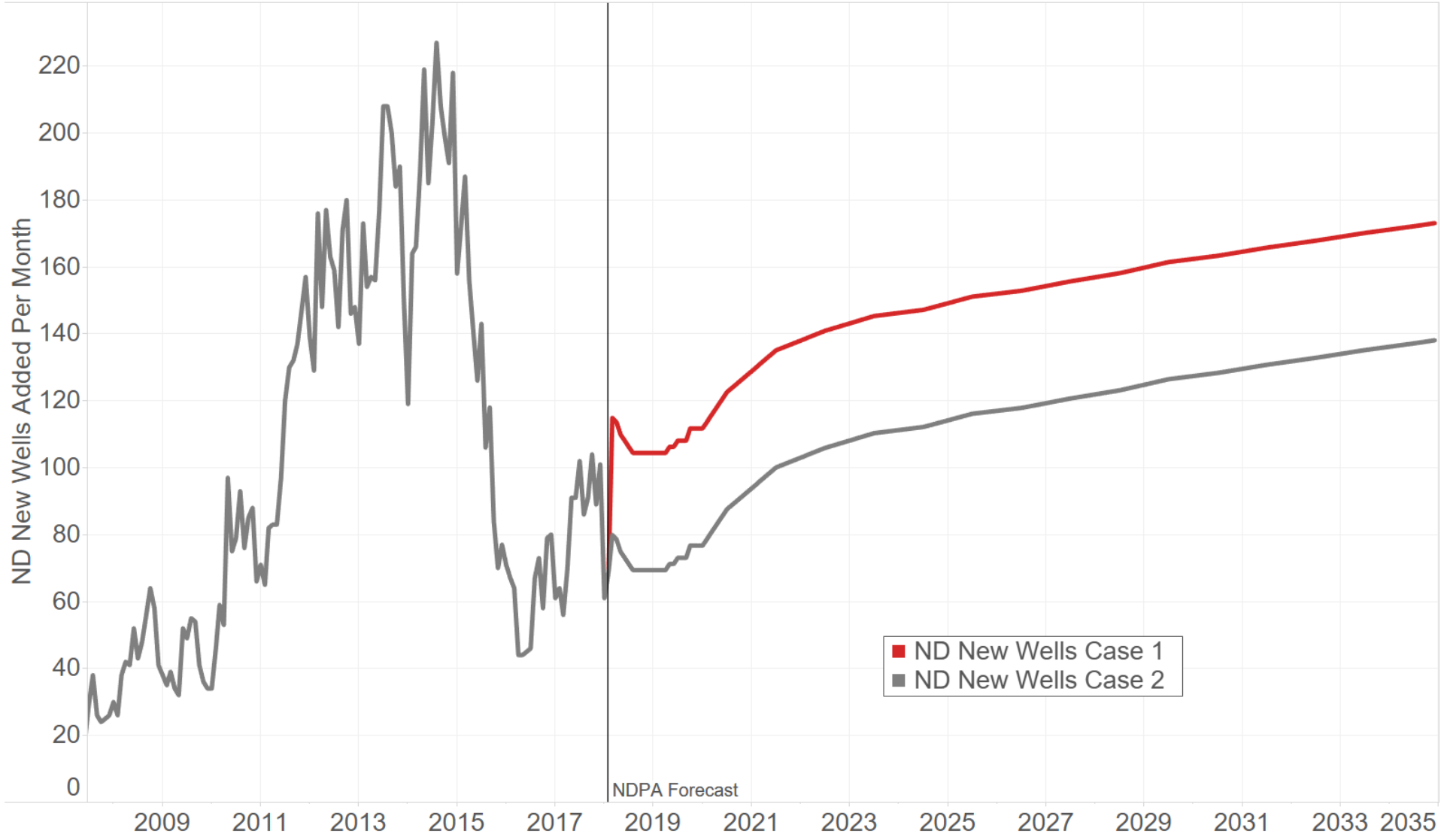
DOE-EIA Forecasted Oil Price



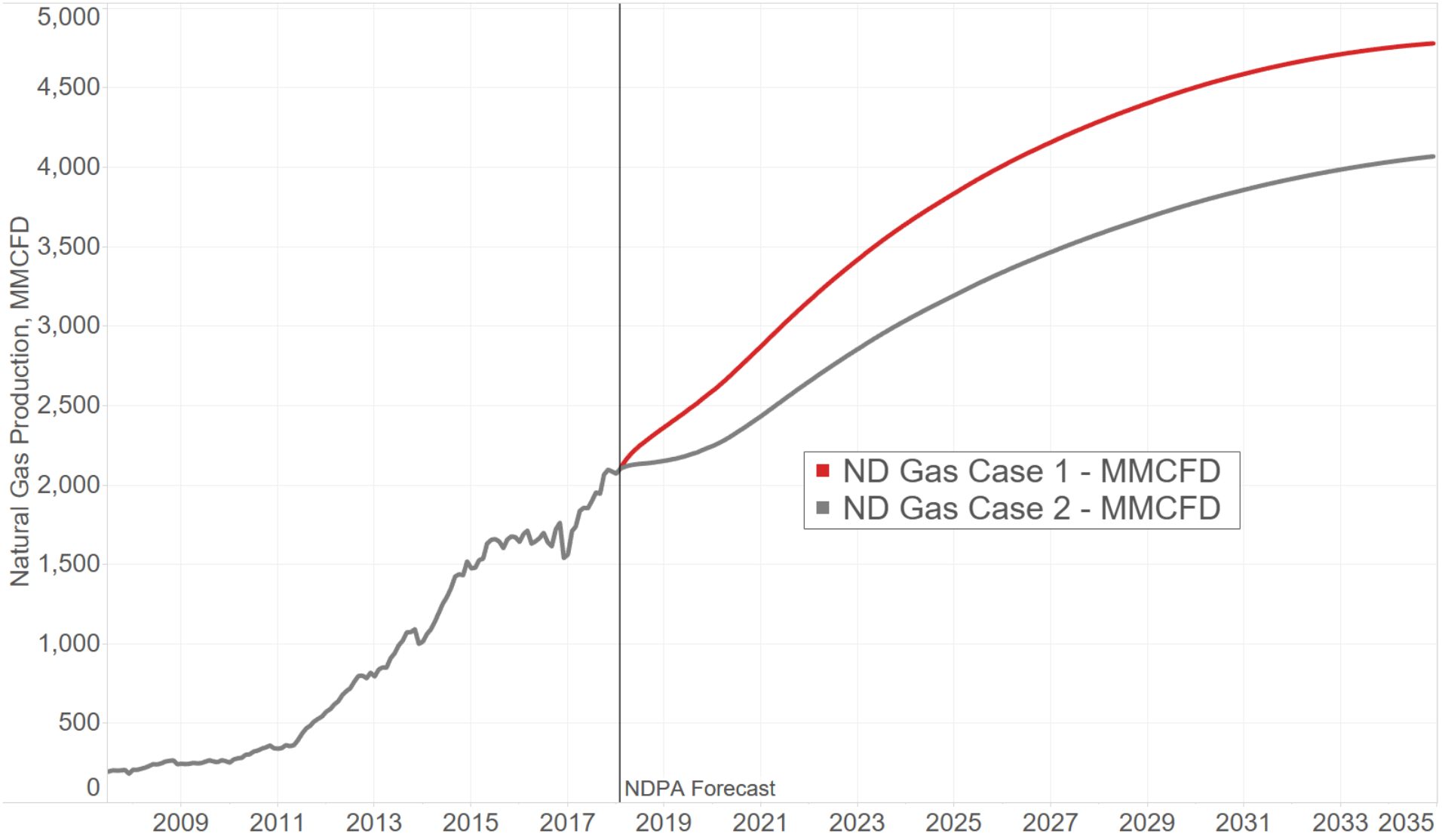
Forecasting Activity vs. Price



North Dakota Forecast Activity Assumptions



NDPA ND Gas Production Forecast



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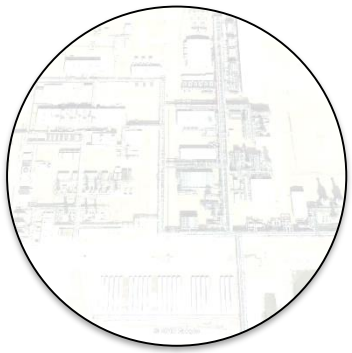

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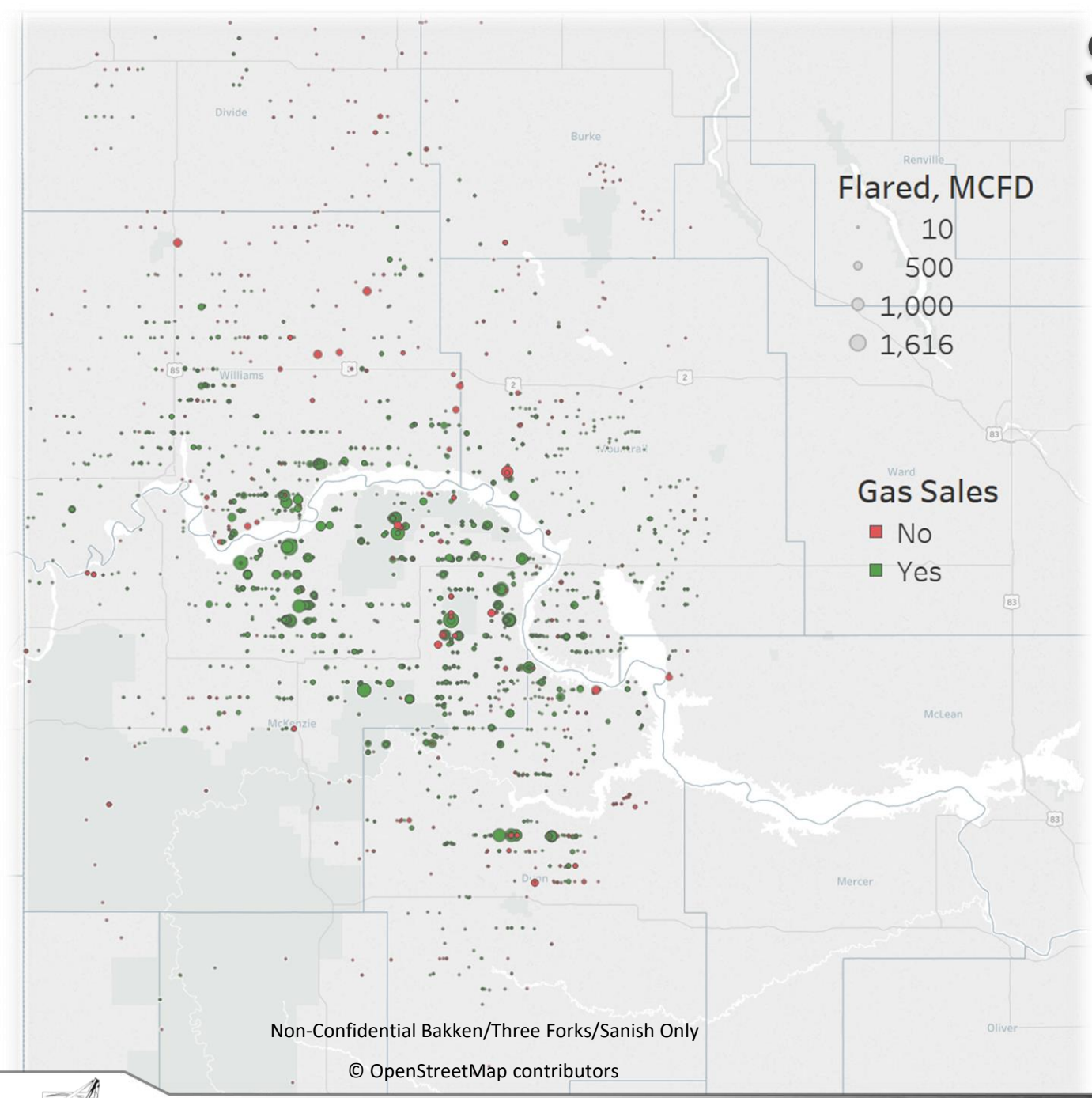
Solving the Flaring Challenge

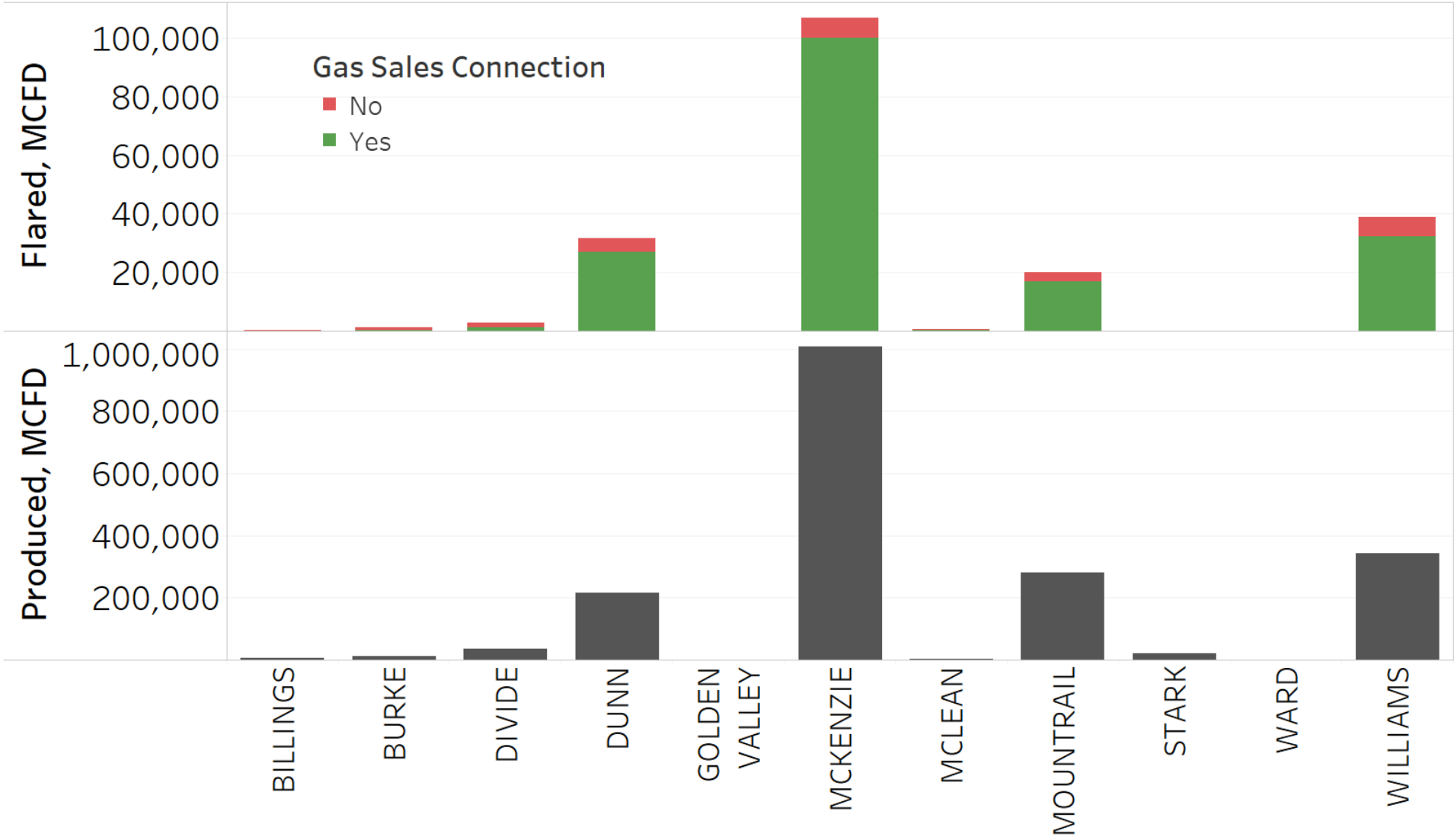
February 2018

(Wells Flaring 10+mcfd)



Solving the Flaring Challenge

*February 2018**



*Non-Confidential Bakken/Three Forks/Sanish Only

Solving the Flaring Challenge

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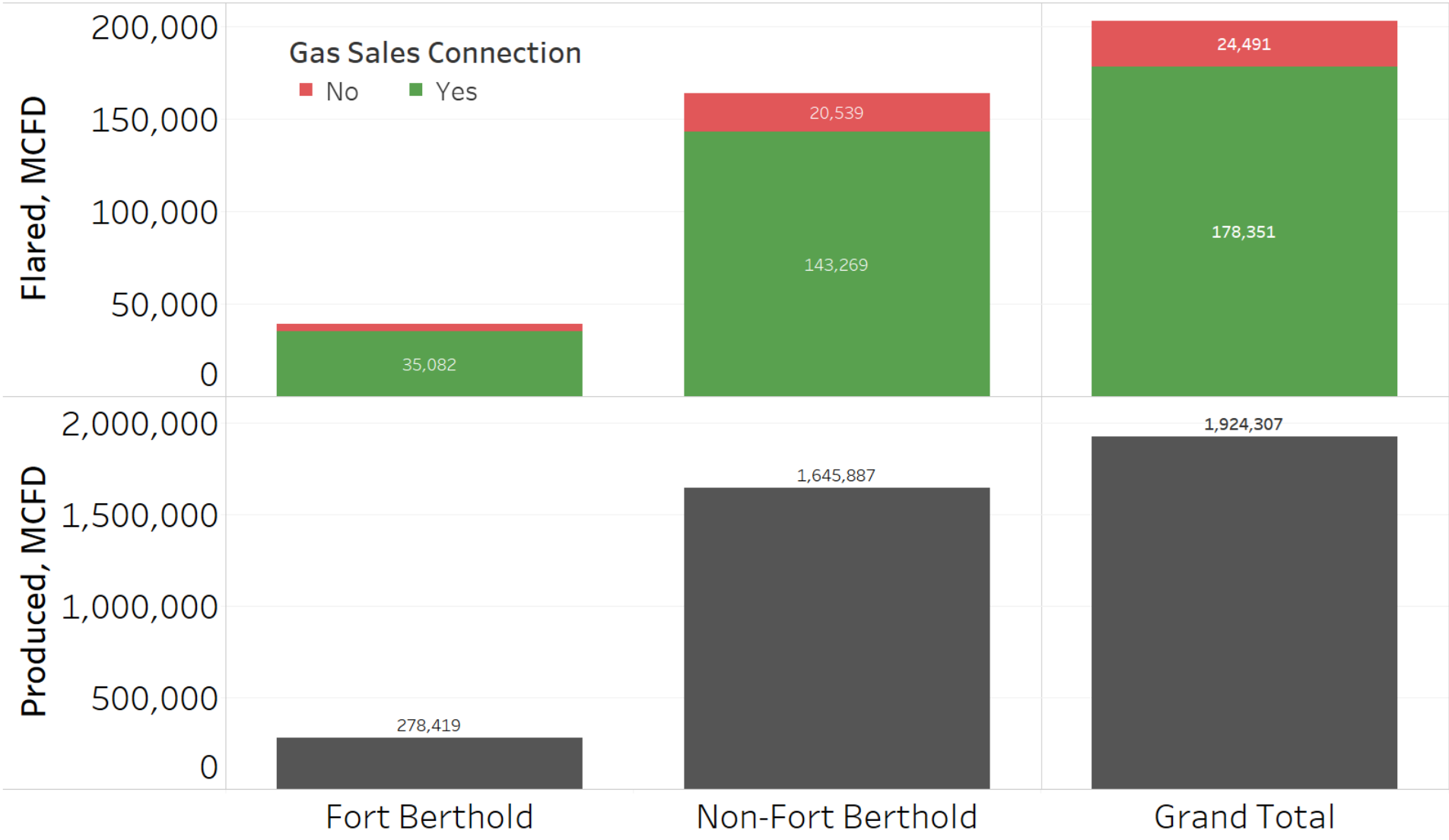

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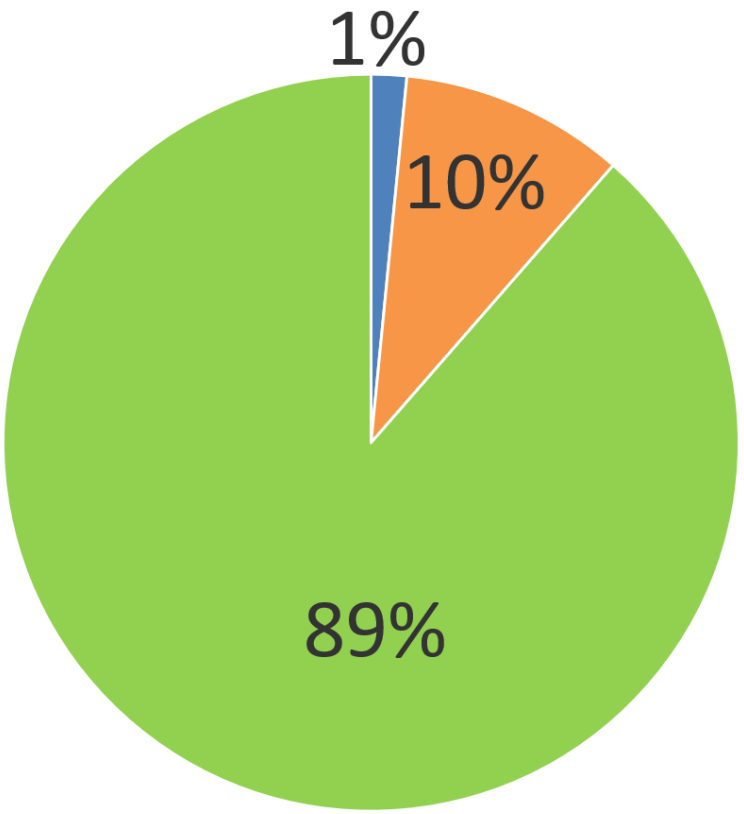


Statewide

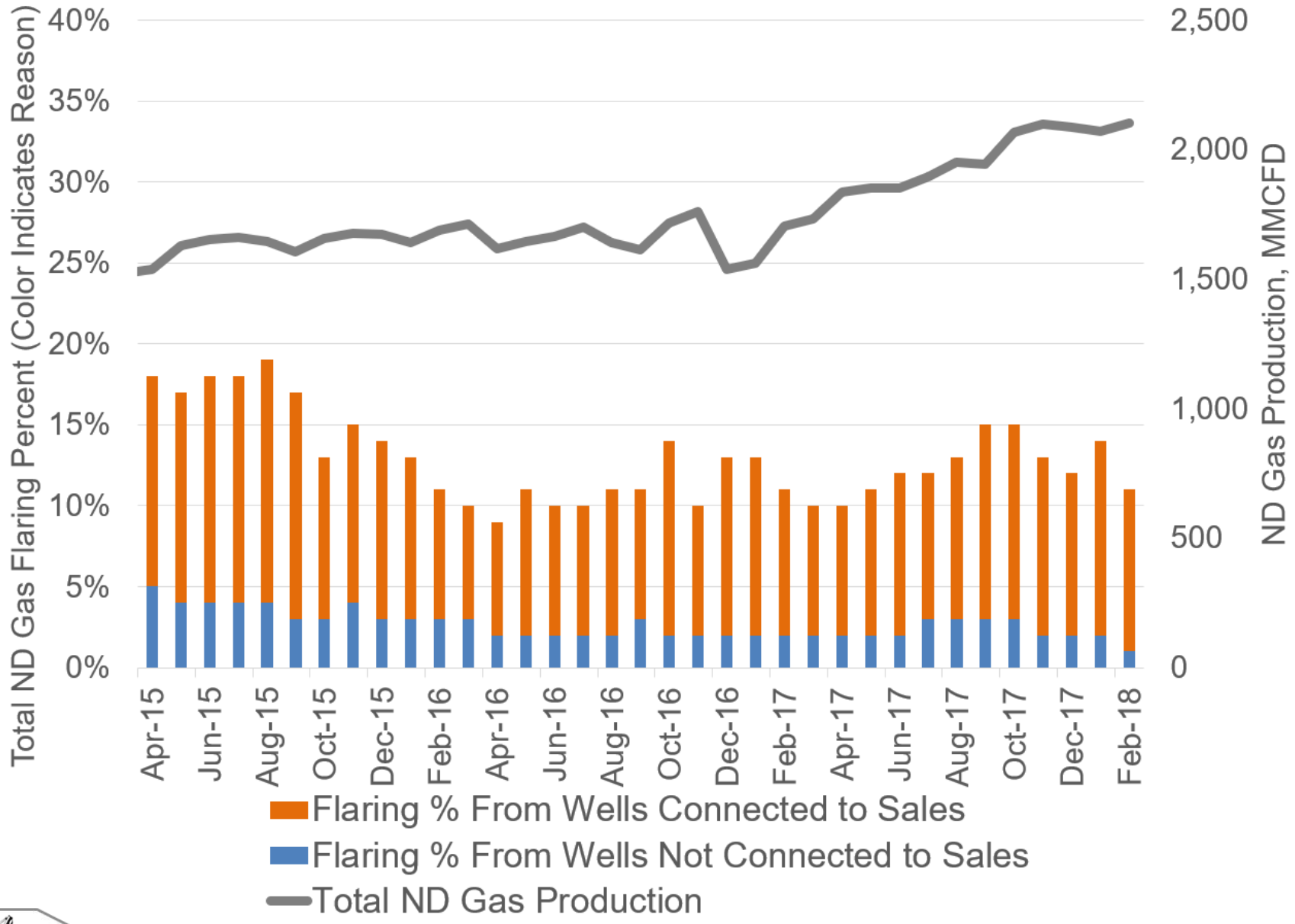
GREEN – % of gas captured and sold
Blue – % flared from zero sales wells
Orange – % flared from wells with at least one mcf sold.

Simple Terms

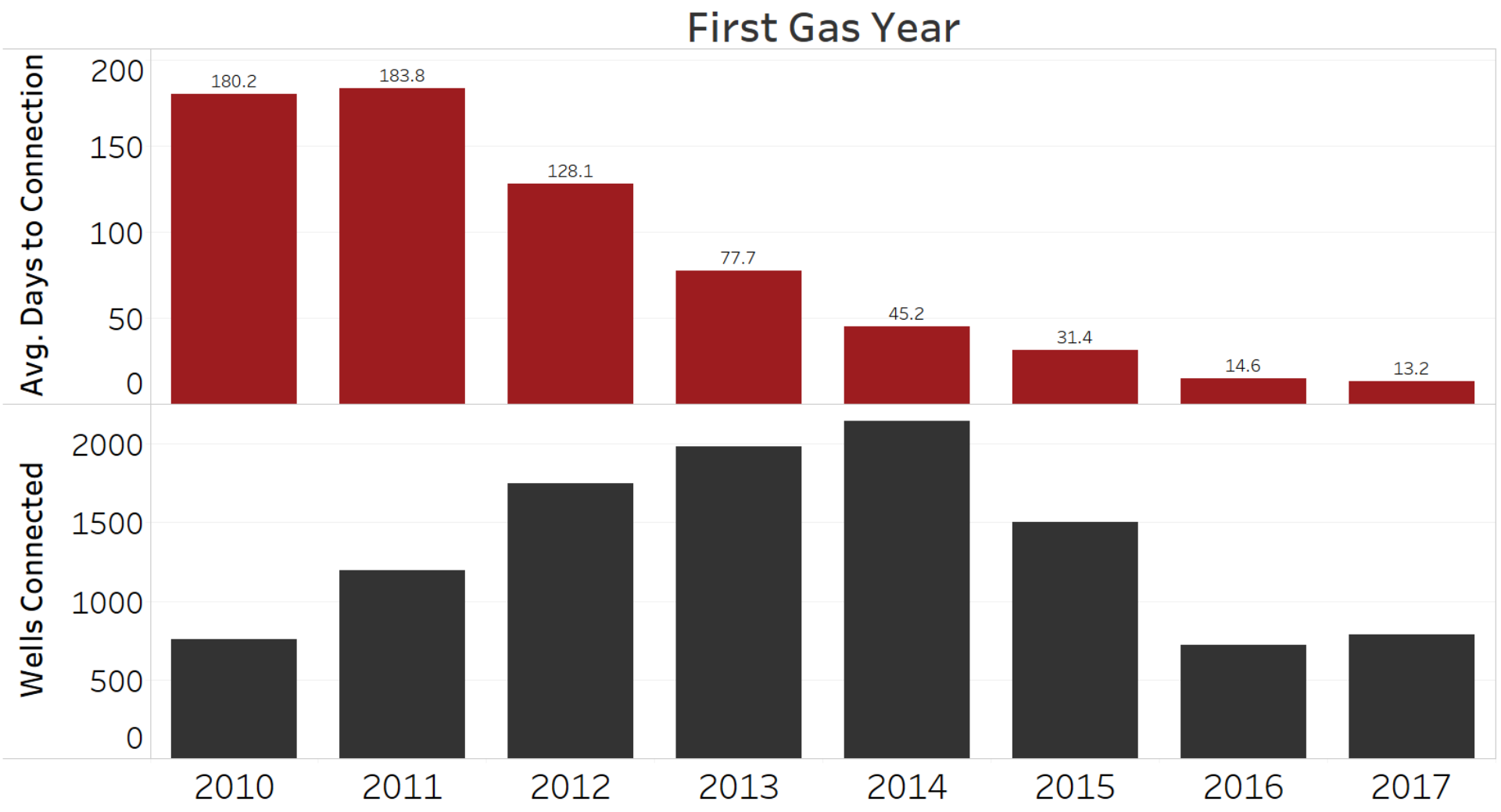
Blue – Lack of pipelines
Orange – Challenges on existing infrastructure

Feb 2018 Data – Non-Confidential Wells

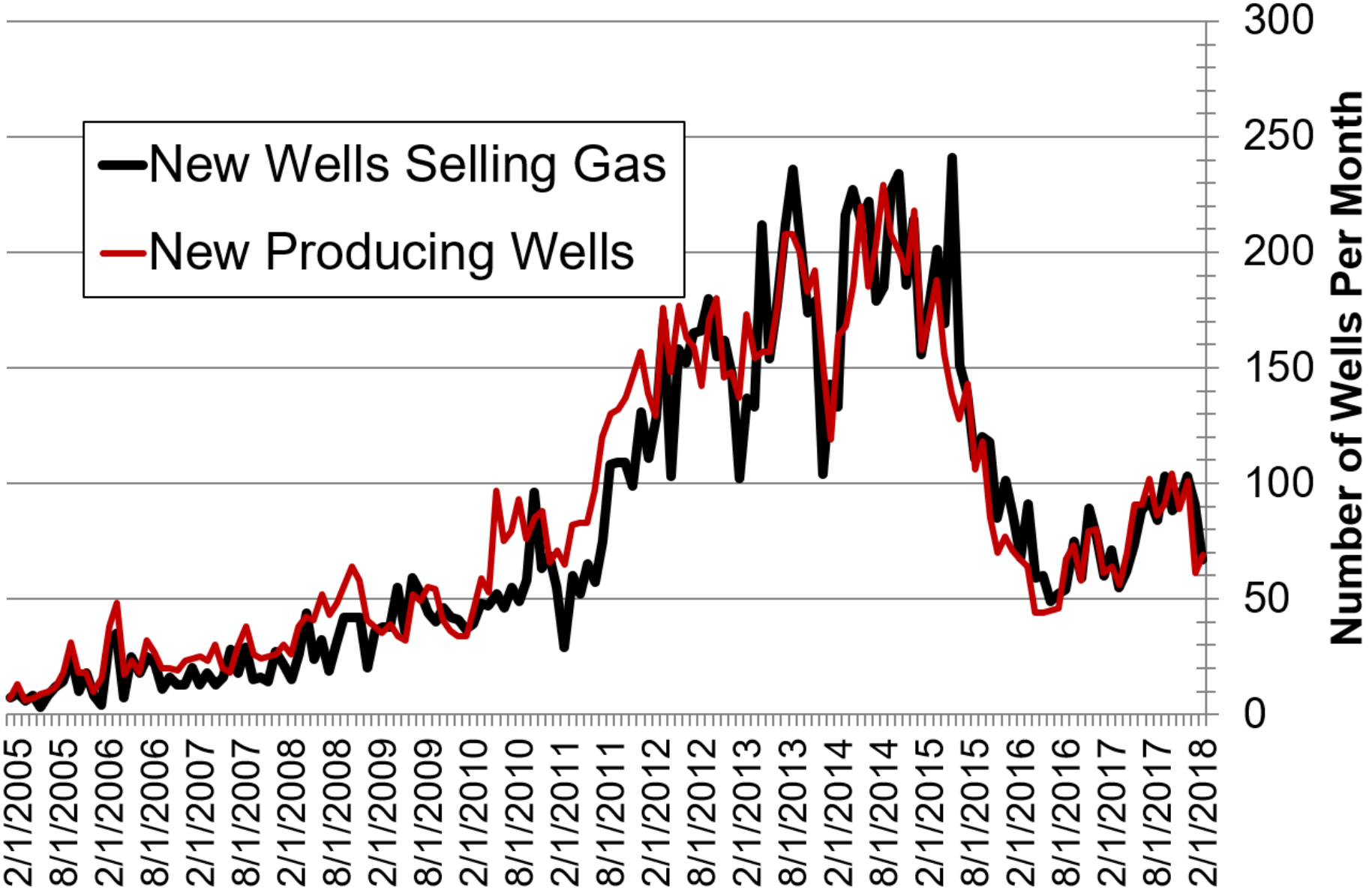
Solving the Flaring Challenge



Days to Connect to Gas Gathering



Solving the Flaring Challenge



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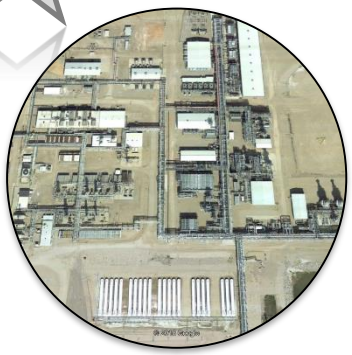

Processing

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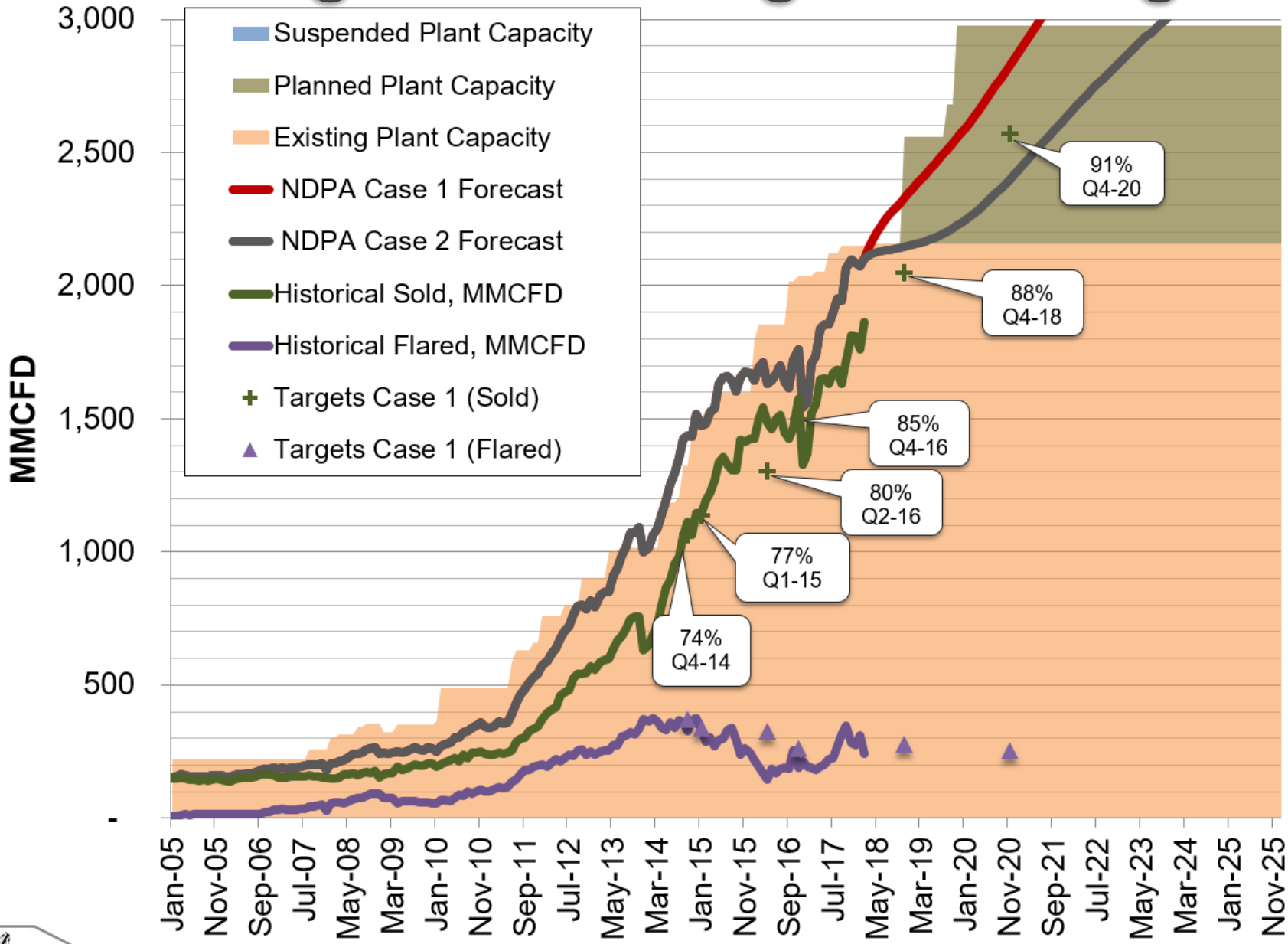
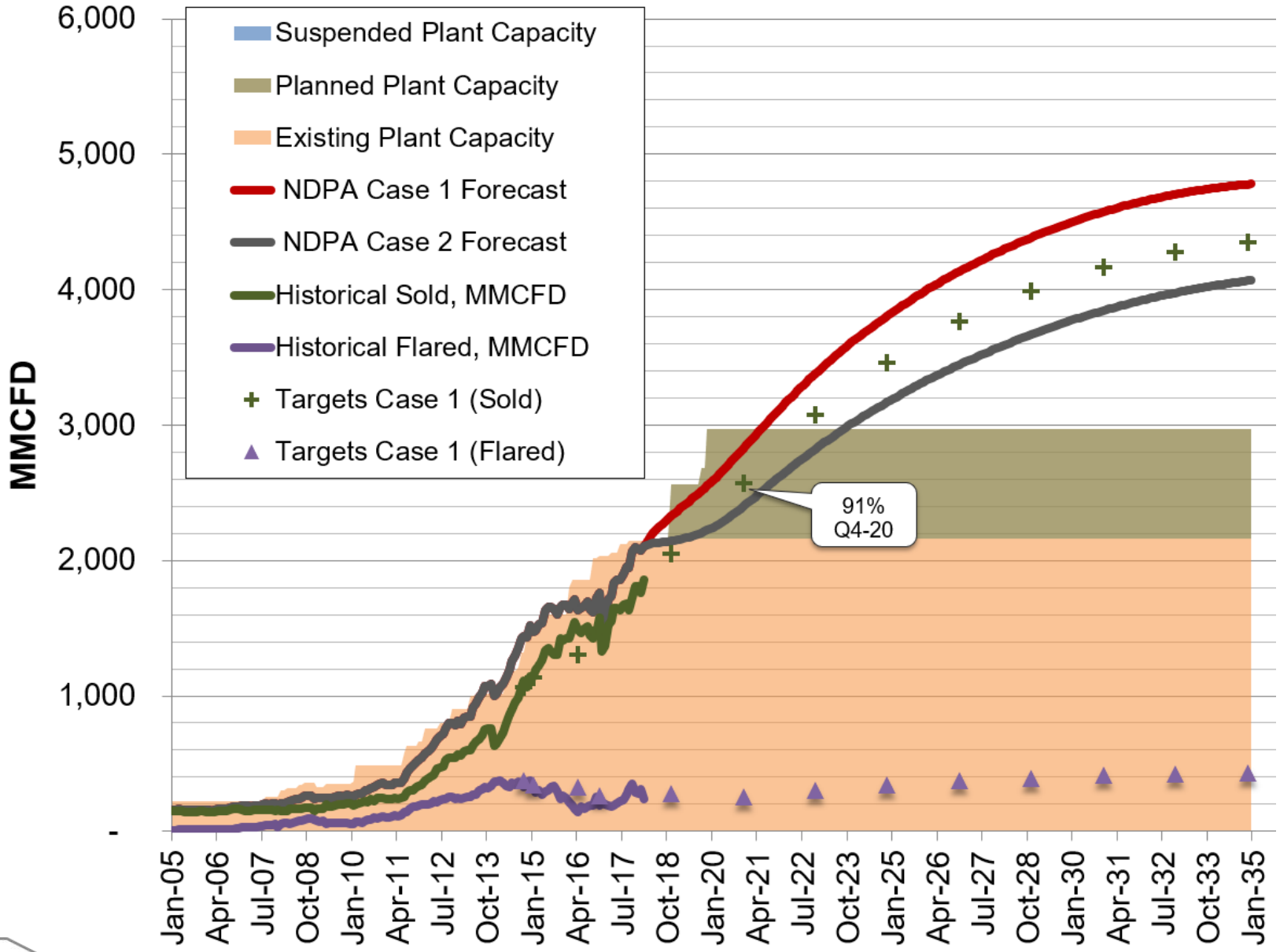
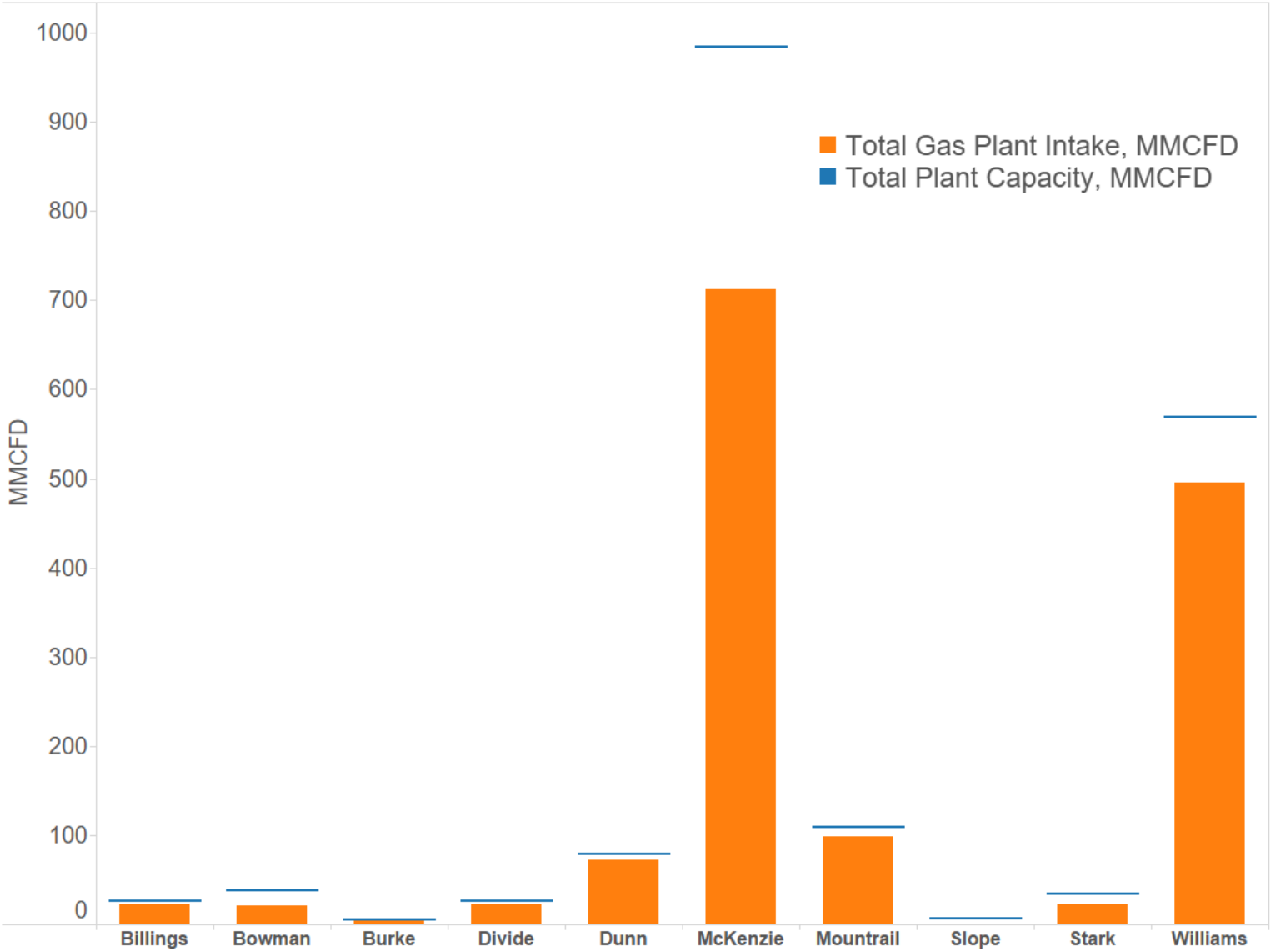
Solving the Flaring Challenge



Solving the Flaring Challenge



Gas Plant Intake & Capacity



Due to incomplete filing data, September 2017 data used in the chart

Natural Gas Capture

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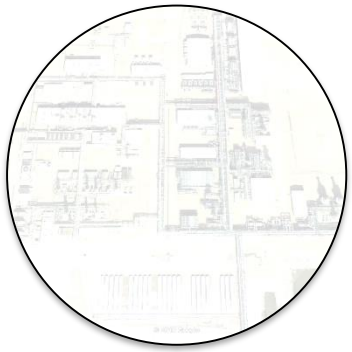

Processing

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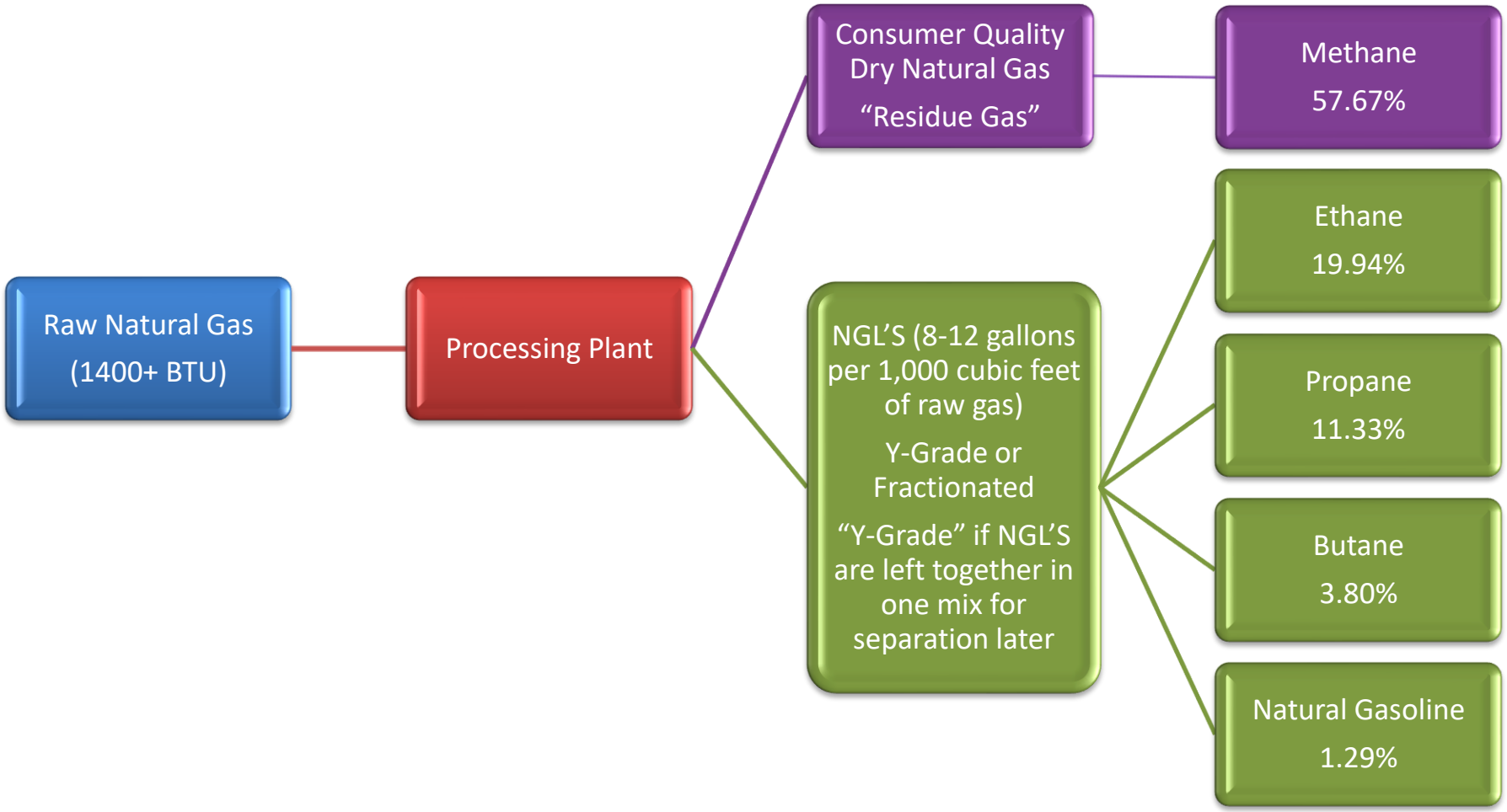
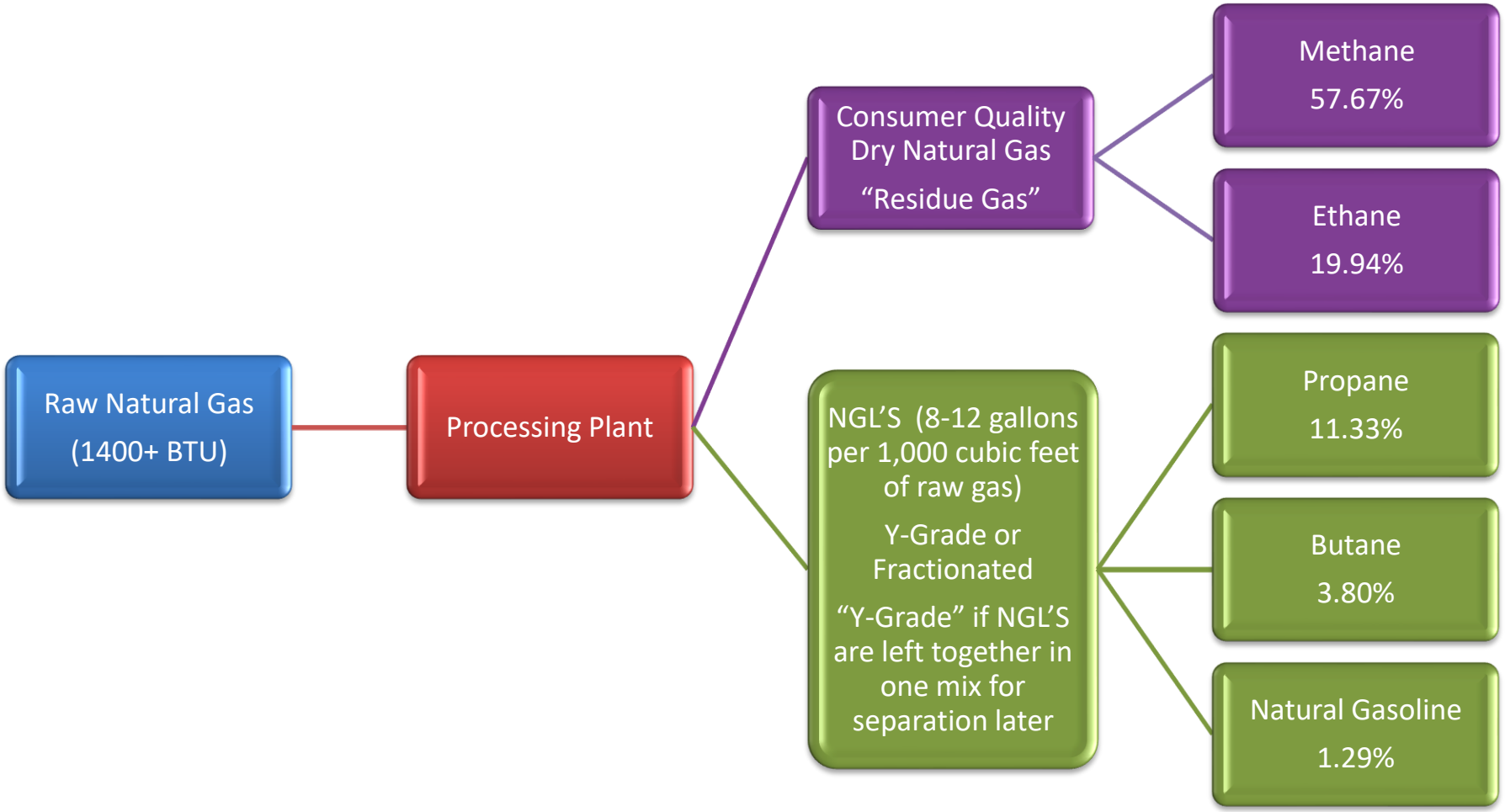
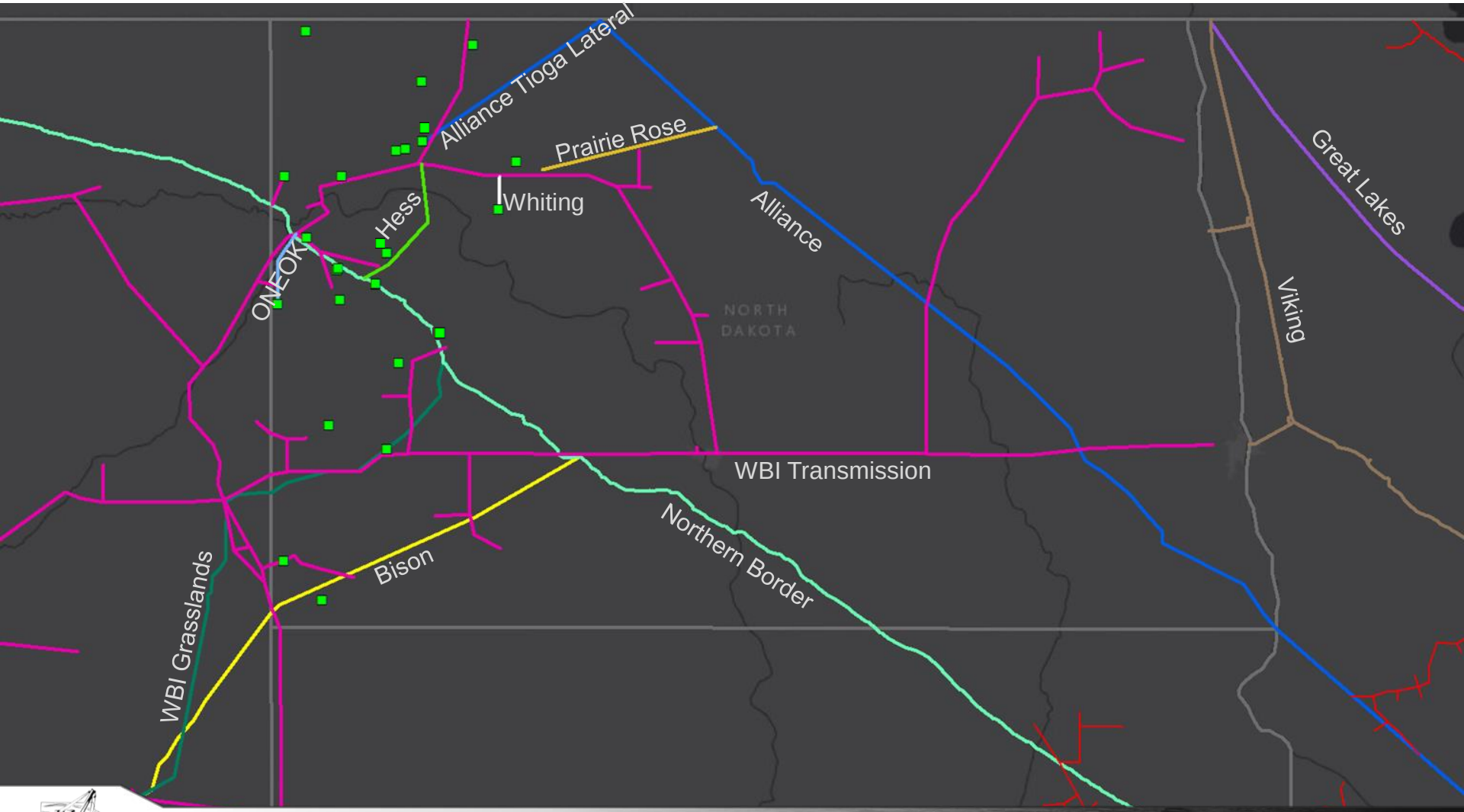
Natural Gas Processing – "Ethane Capture"



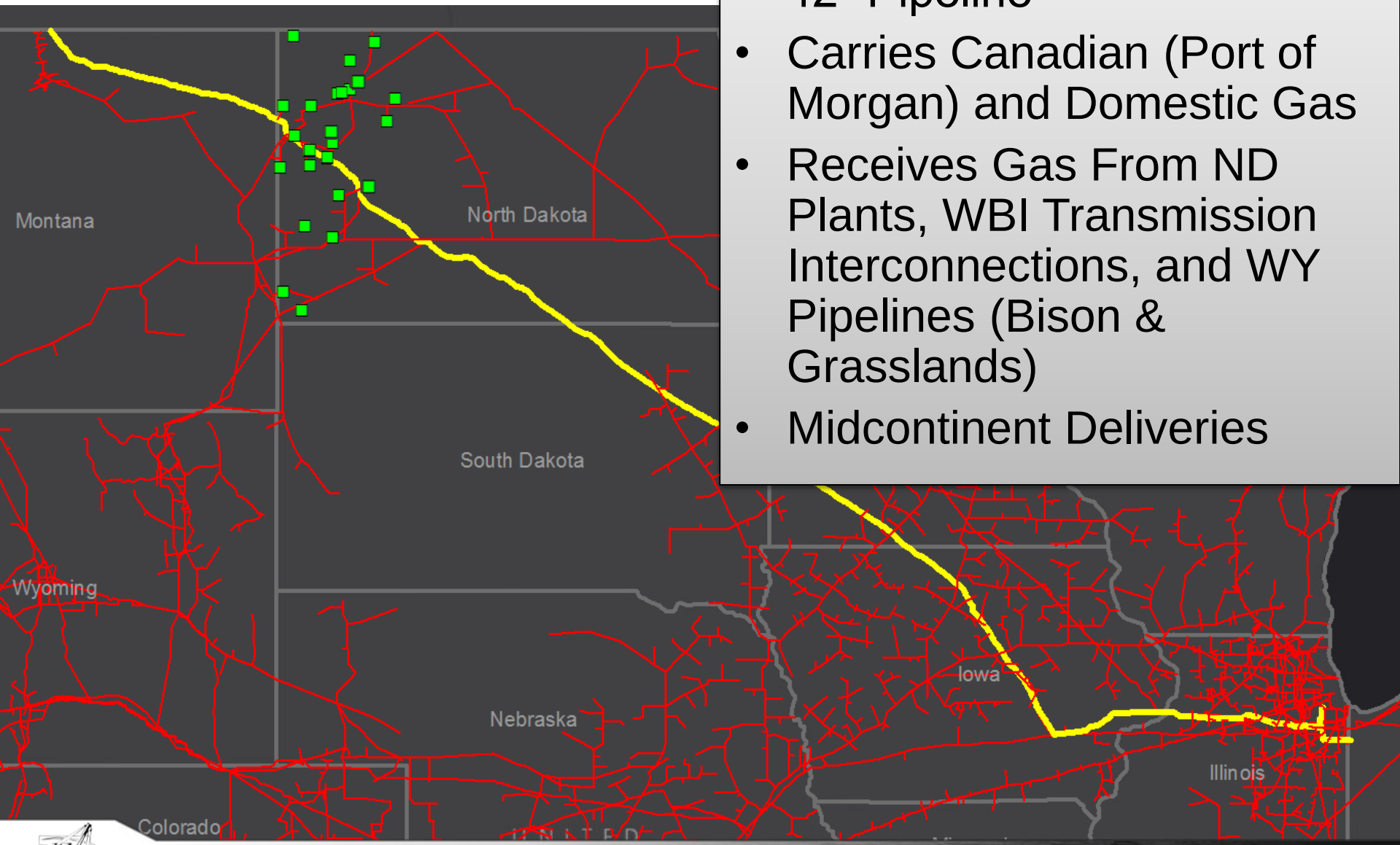
Natural Gas Processing – “Ethane Rejection”



Major Gas Pipeline and Processing Infrastructure

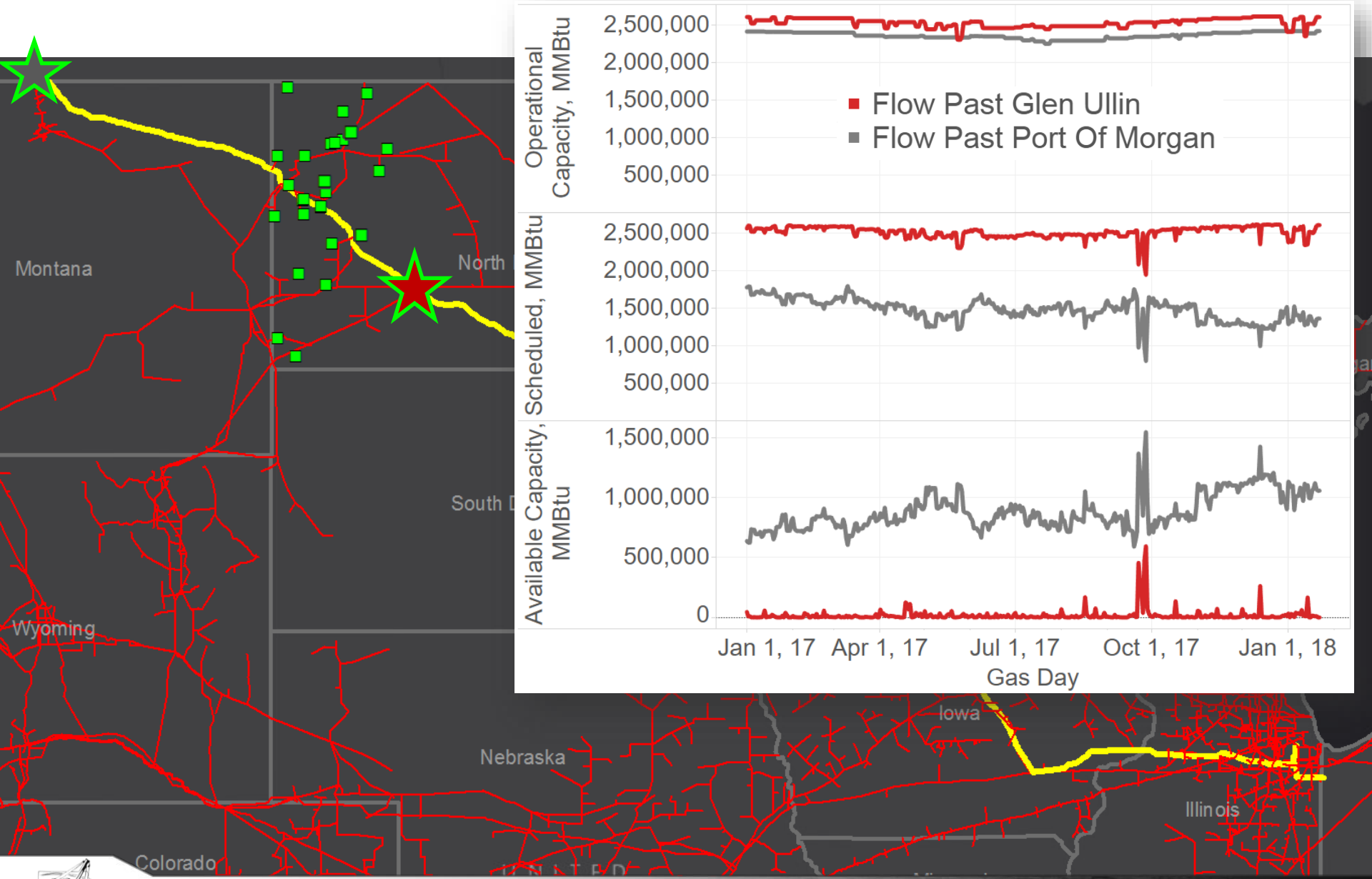


Northern Border Pipeline



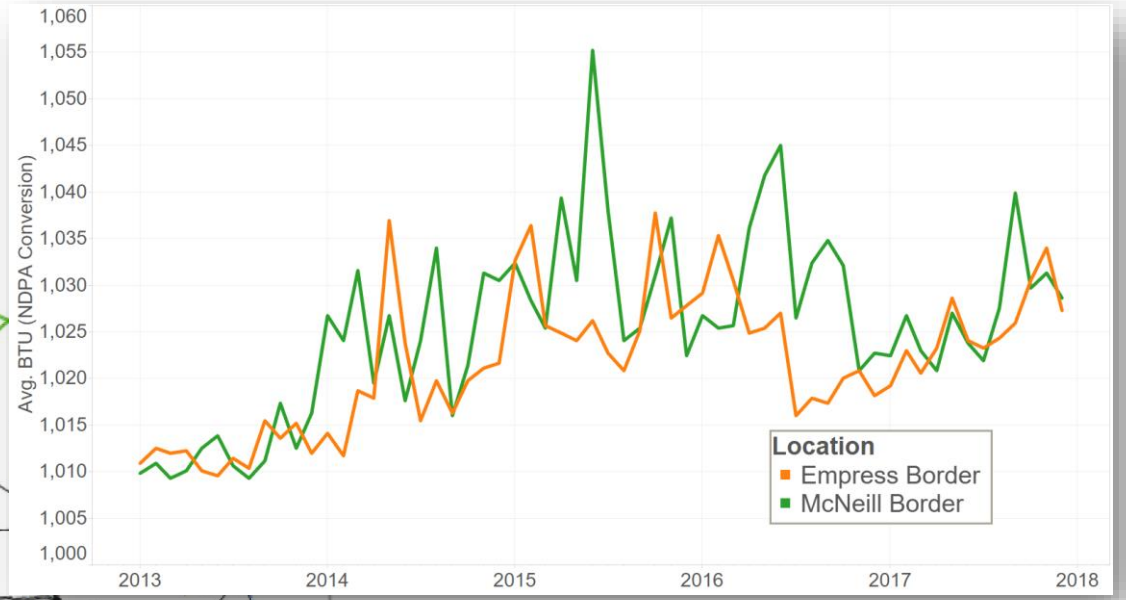
- 42” Pipeline
- Carries Canadian (Port of Morgan) and Domestic Gas
- Receives Gas From ND Plants, WBI Transmission Interconnections, and WY Pipelines (Bison & Grasslands)
- Midcontinent Deliveries

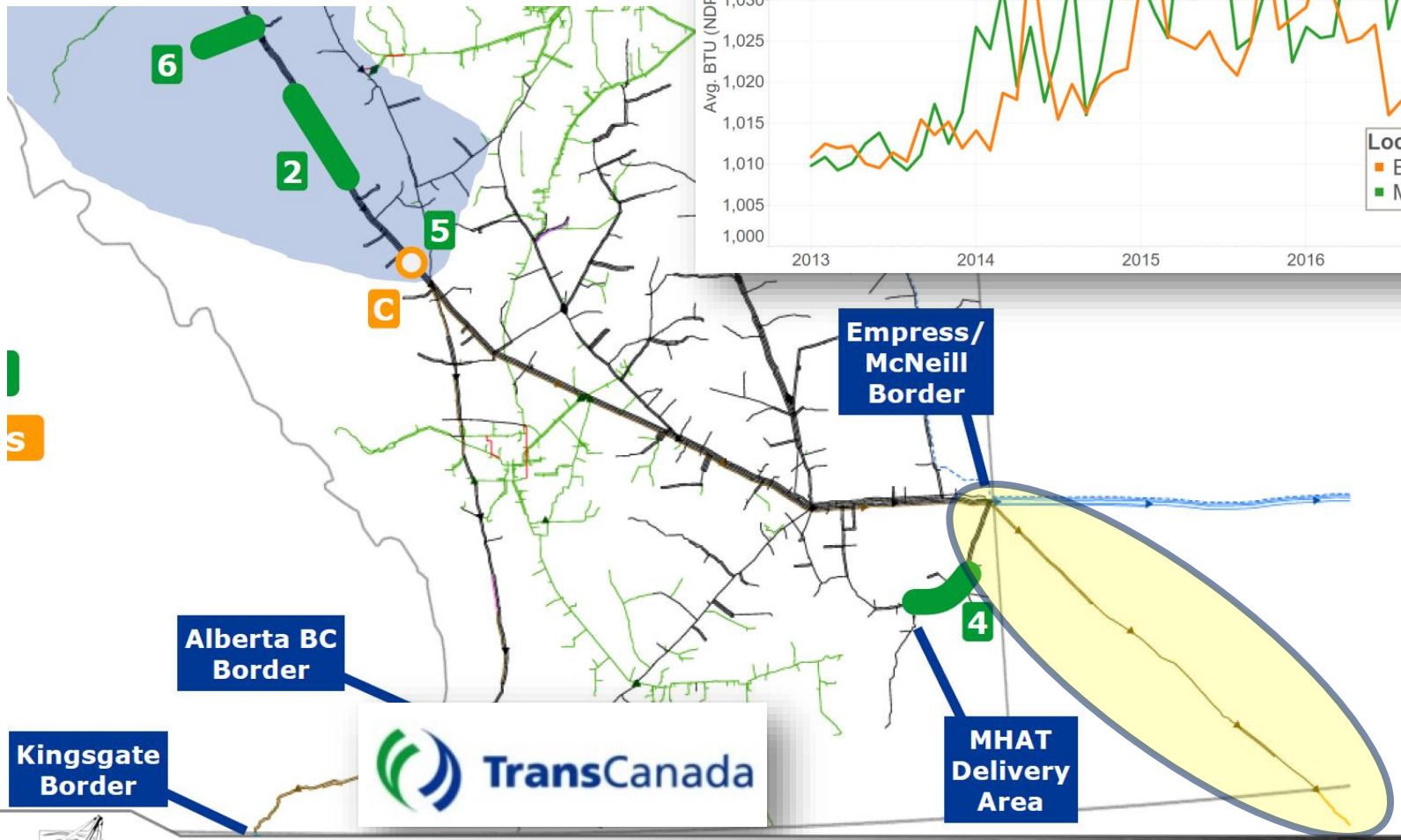
Northern Border Pipeline



*Data Source: Northern Border IPS

Foothills Pipeline

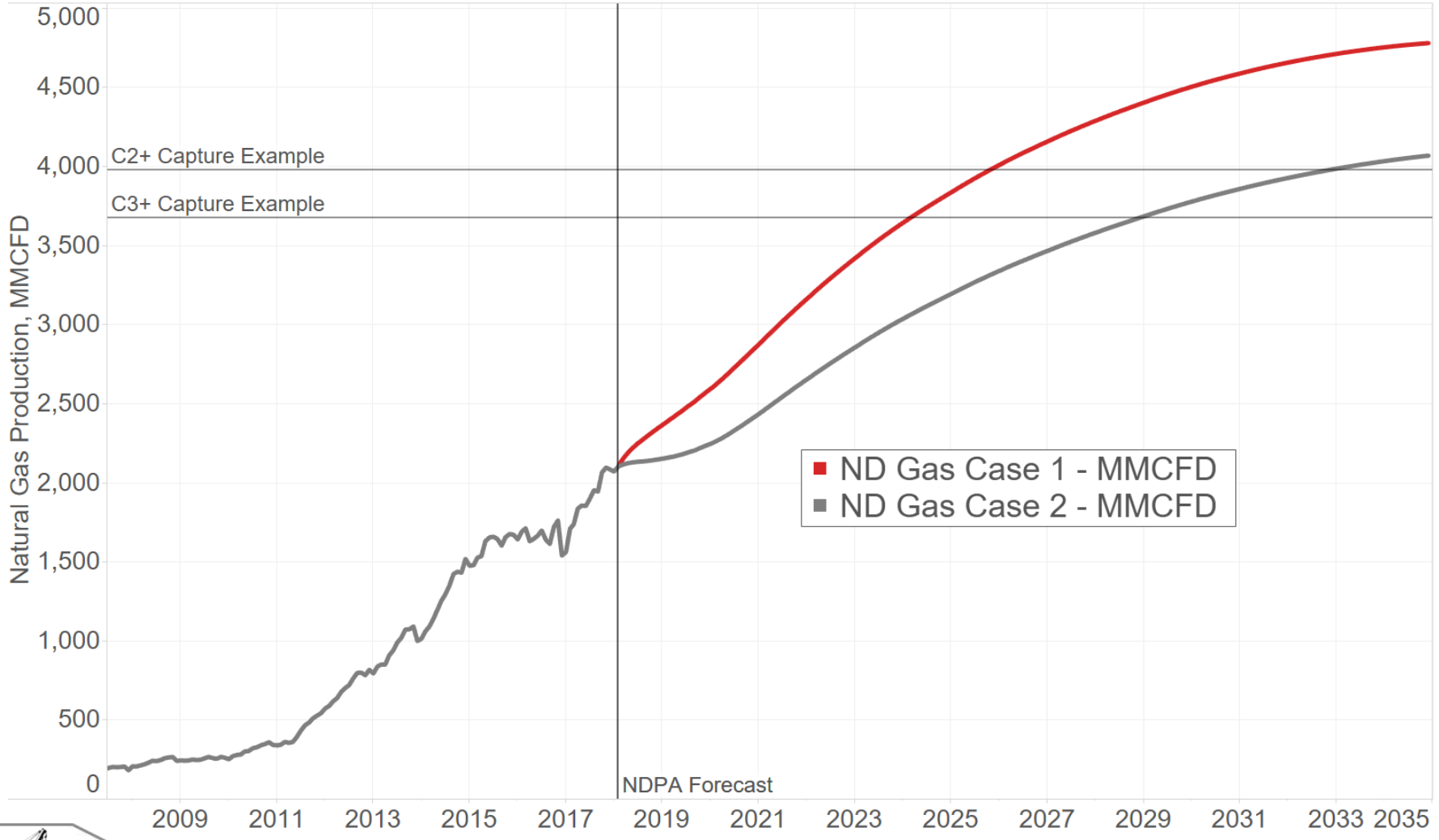




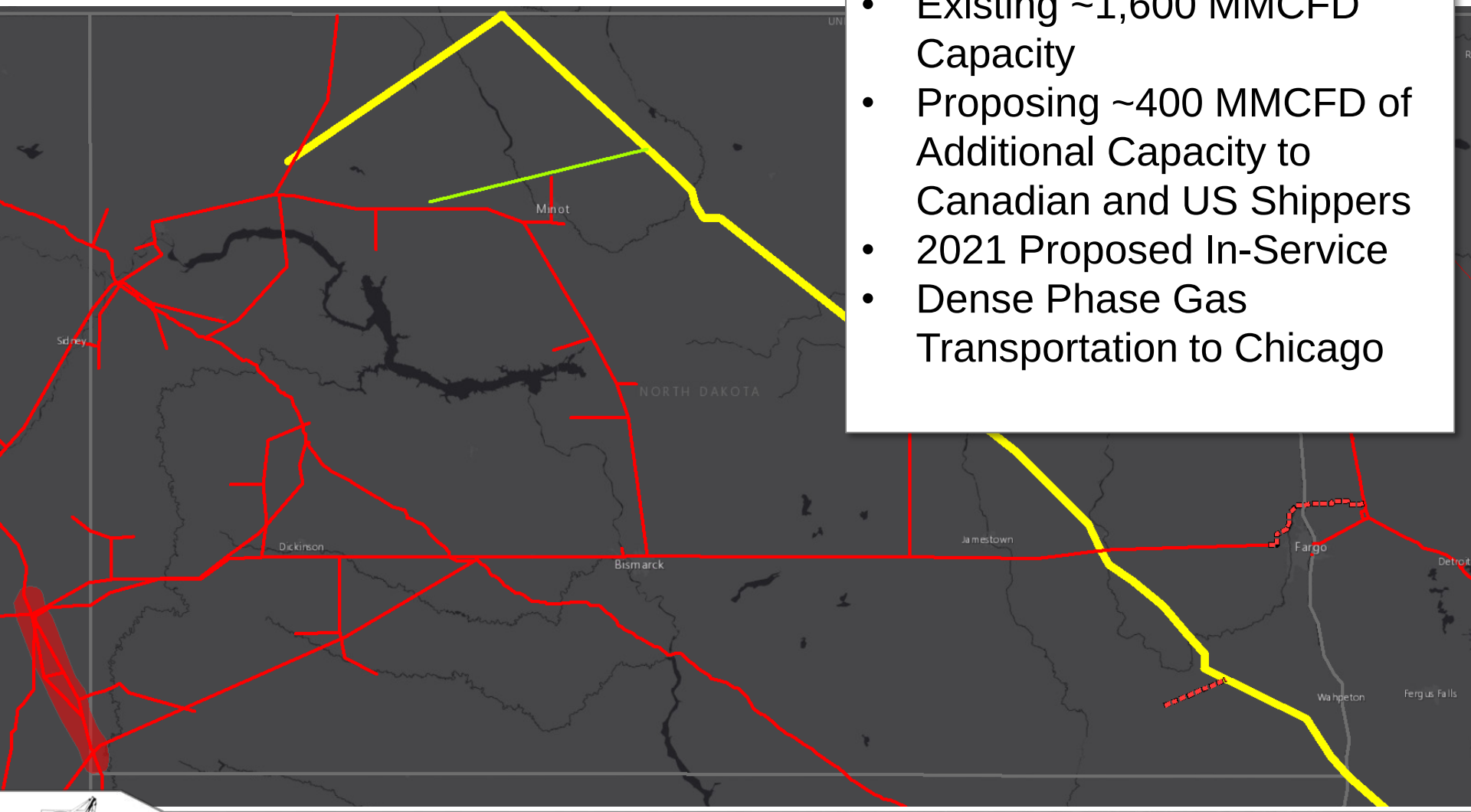
Map & Raw Data Source: TransCanada

Simplified Example NB Calculations

Conclusion: **IF** no other gas export options open and all other deliveries on other pipelines stay static, ND gas production could increase 1.58-1.88 BCFD (from Nov-17) before Northern Border is 100% Bakken production. BTU management becomes increasingly important for Bakken residue gas.



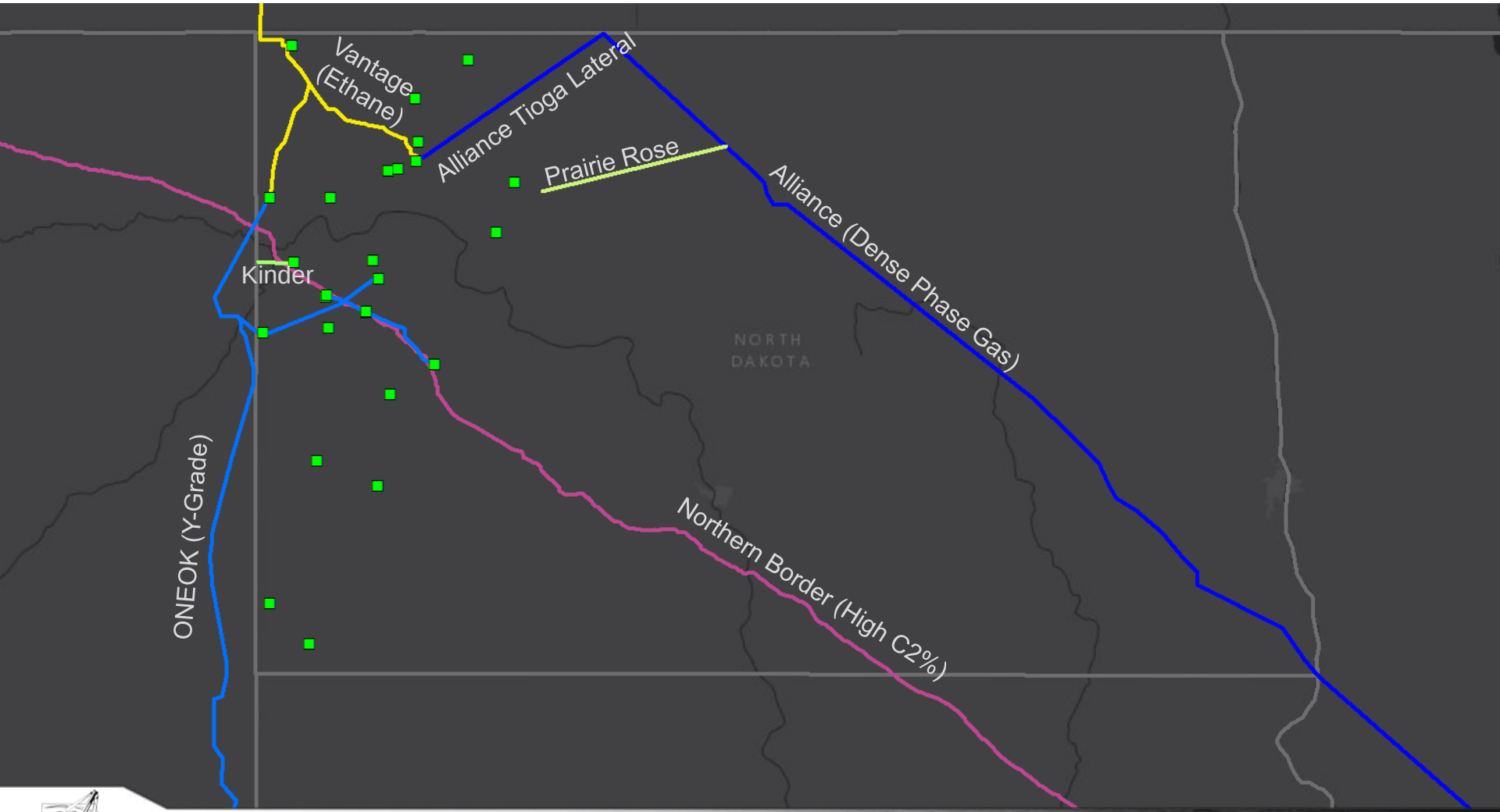
Alliance Pipeline Open Season



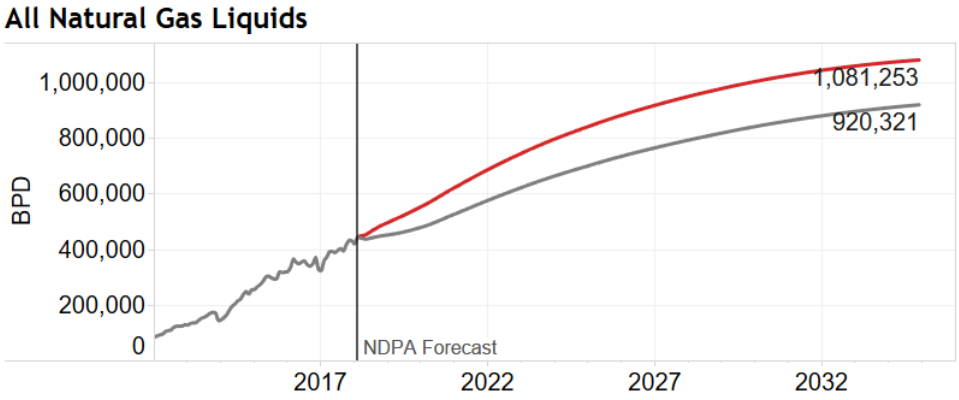
Project Highlights

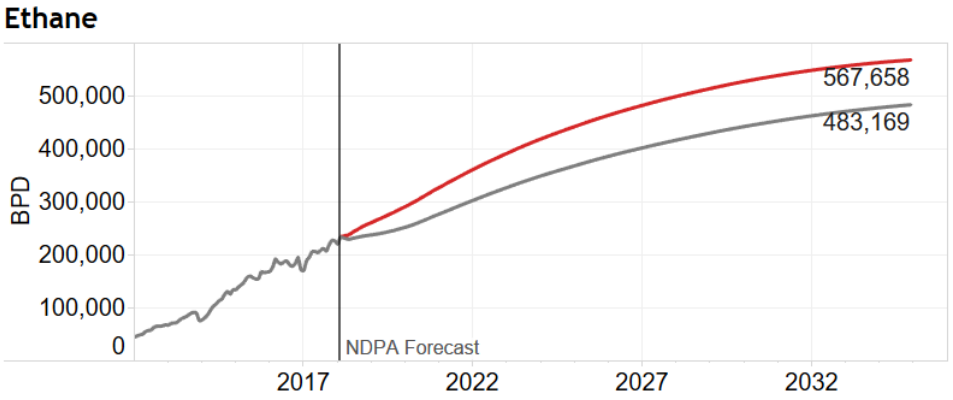
- Existing 36” Pipeline
- Existing ~1,600 MMCFD Capacity
- Proposing ~400 MMCFD of Additional Capacity to Canadian and US Shippers
- 2021 Proposed In-Service
- Dense Phase Gas Transportation to Chicago

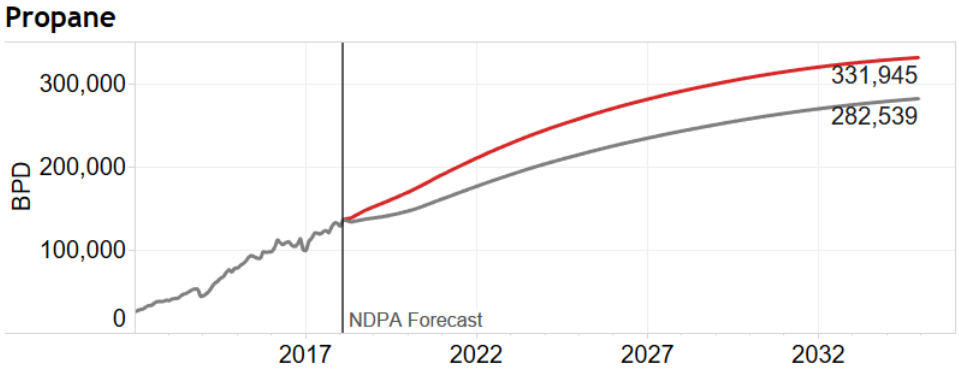
Major NGL Pipeline and Processing Infrastructure

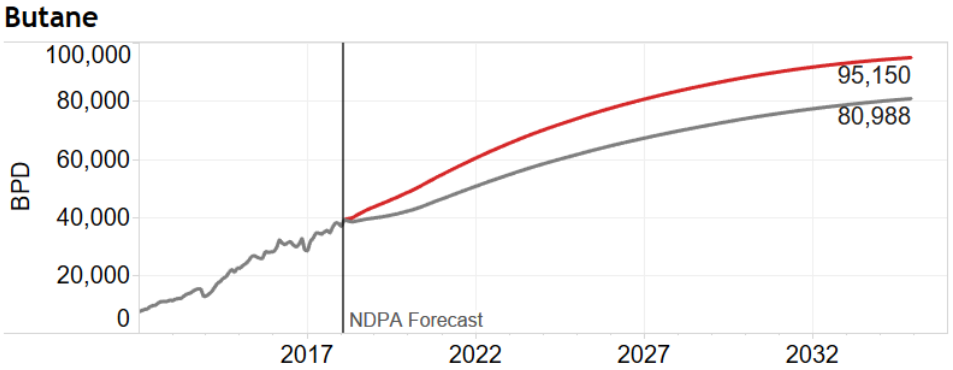


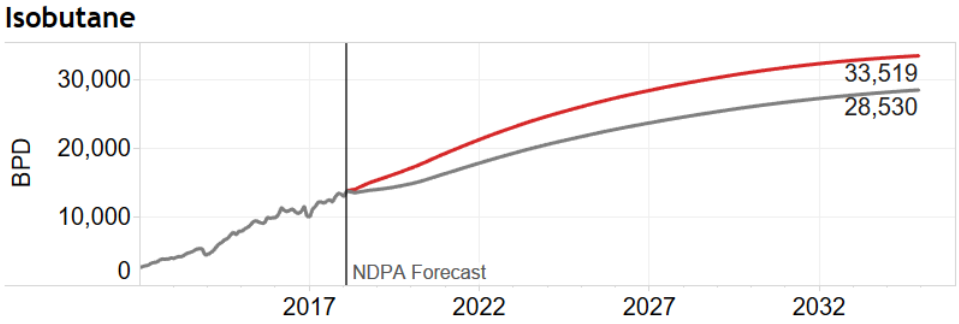
North Dakota Captured* NGL's

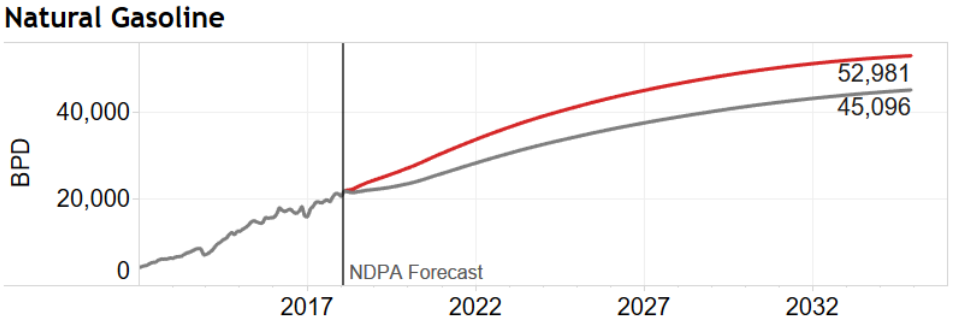






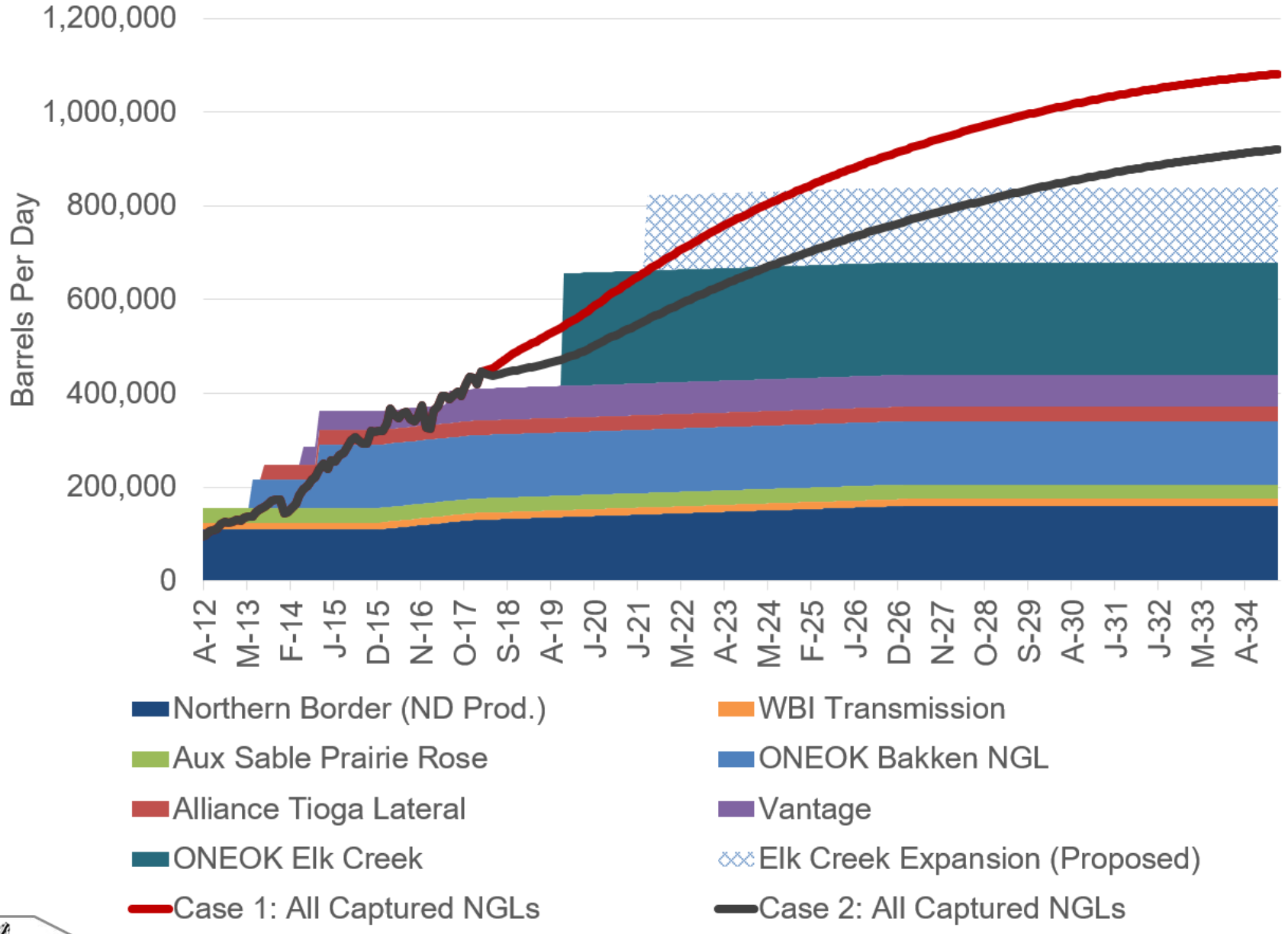




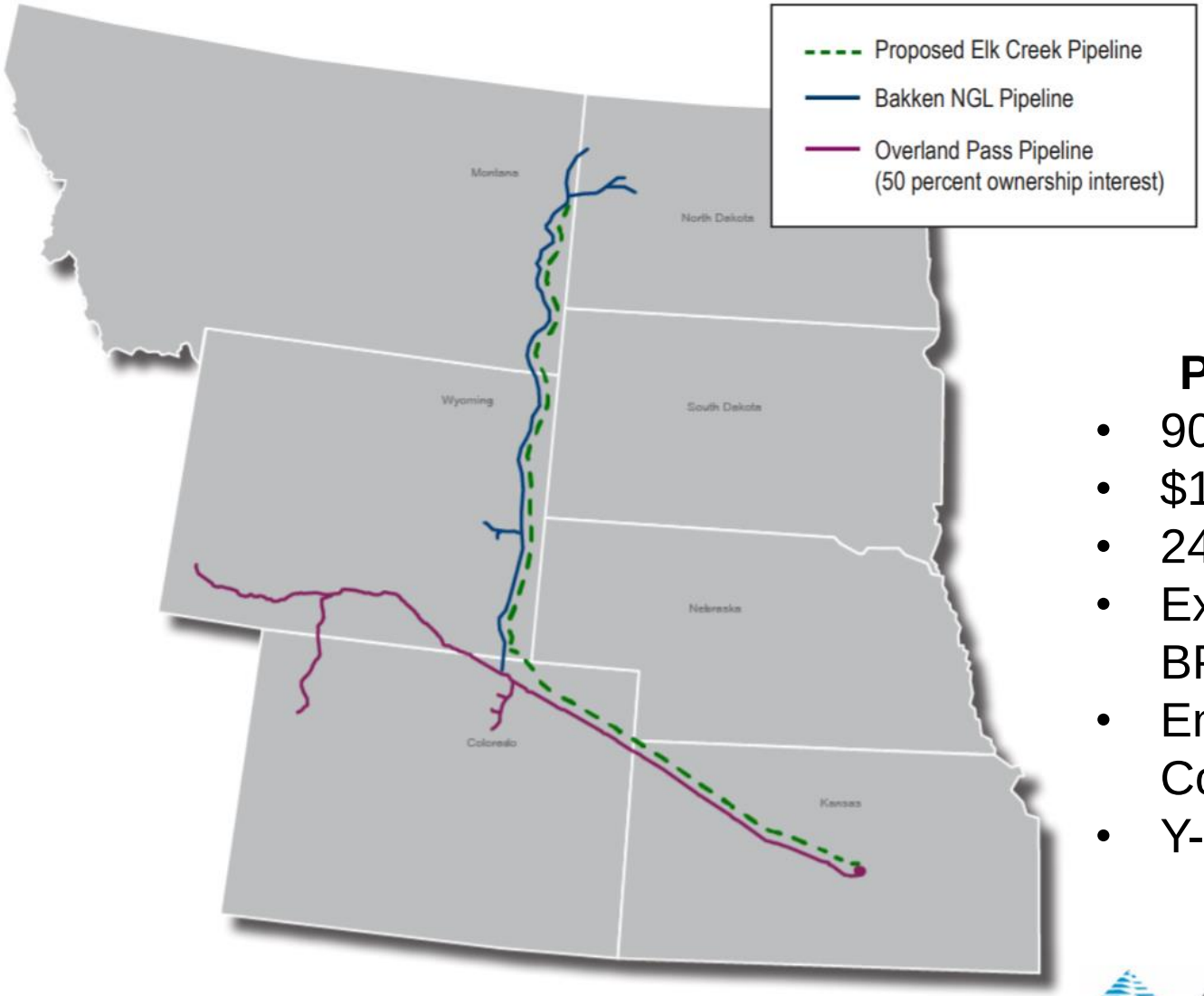


**Non-flared NGL's & Assumes 10 GPM*

NGL Pipeline Takeaway Options



ONEOK Elk Creek NGL Pipeline



Project Highlights

- 900 Miles - 20” Pipeline
- $1.4 Billion
- 240,000 BPD Capacity
- Expandable to 400,000 BPD
- End of 2019 Proposed Completion
- Y-Grade Transportation

ONEOK

Contact Information

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