

# NDPA Overview Slides

**Justin J Kringstad**

*Geological Engineer*

*Director*

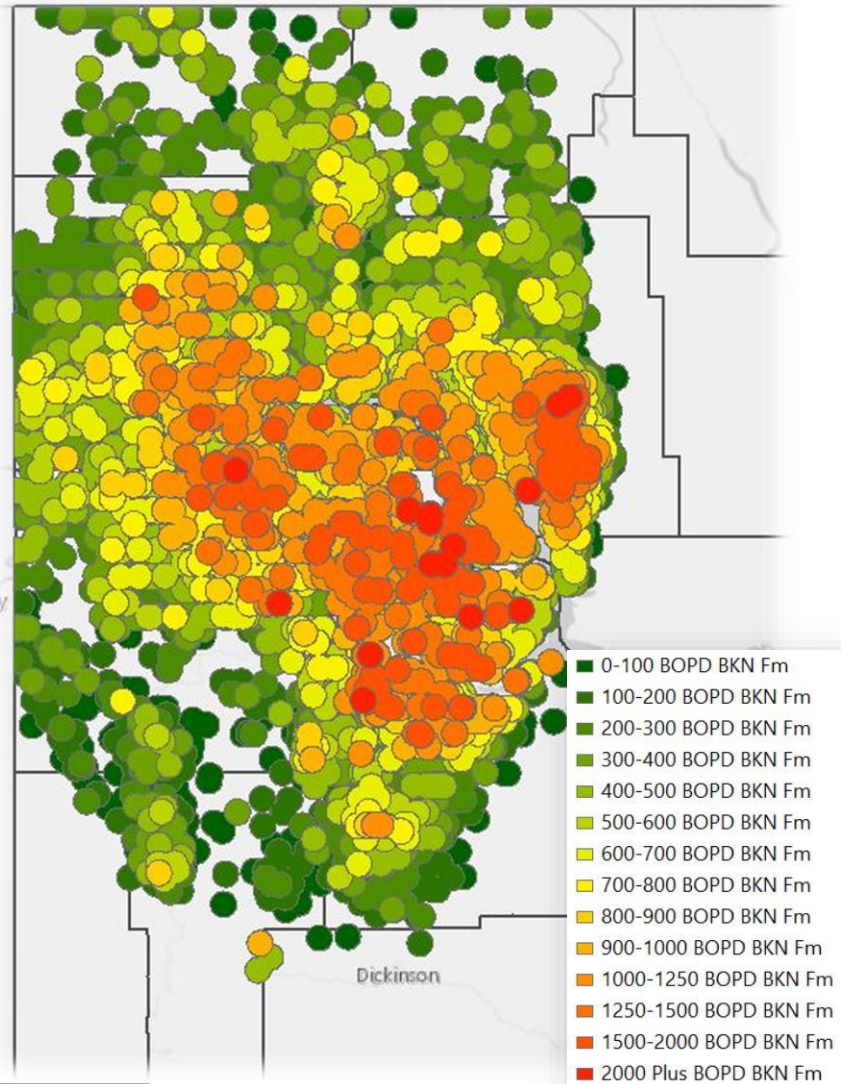
*North Dakota Pipeline Authority*



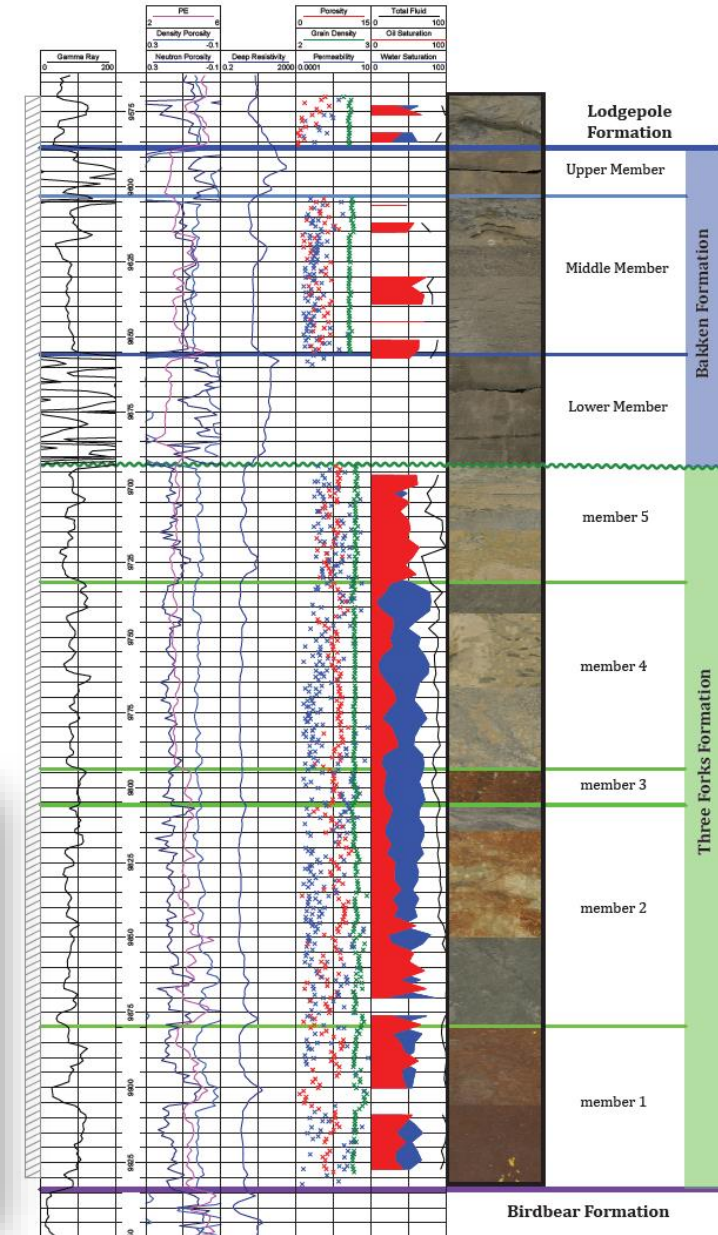
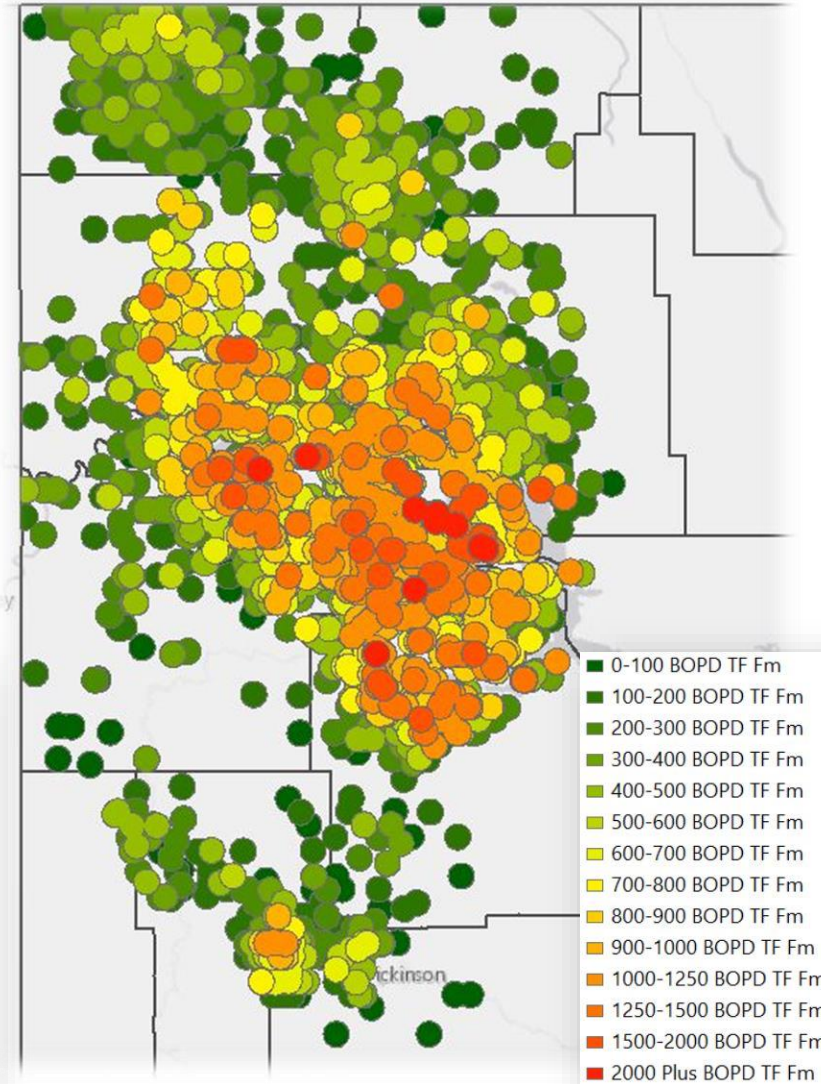
September 4, 2020

# Bakken & Three Forks Formations

Bakken Formation

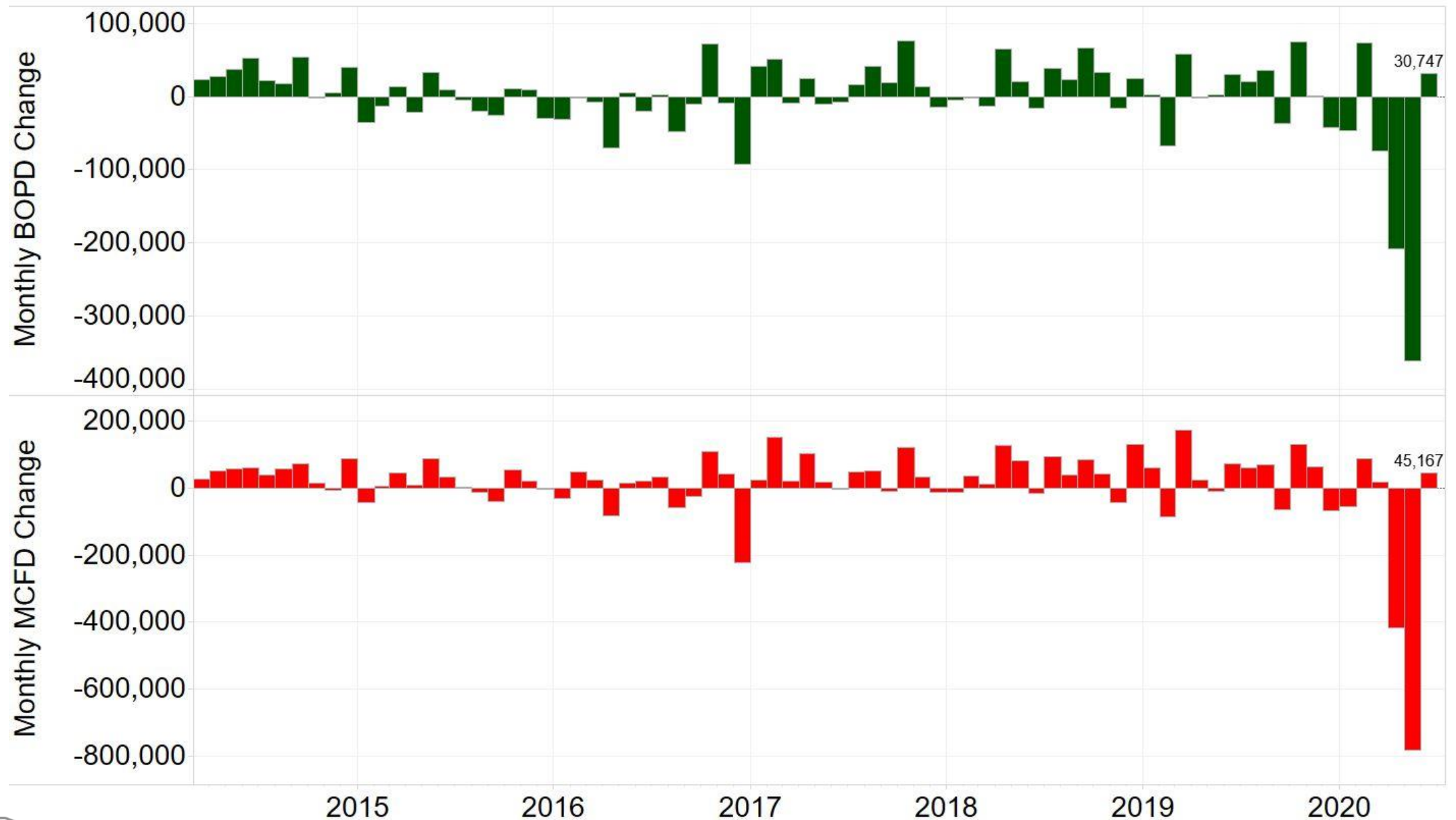


Three Forks Formation



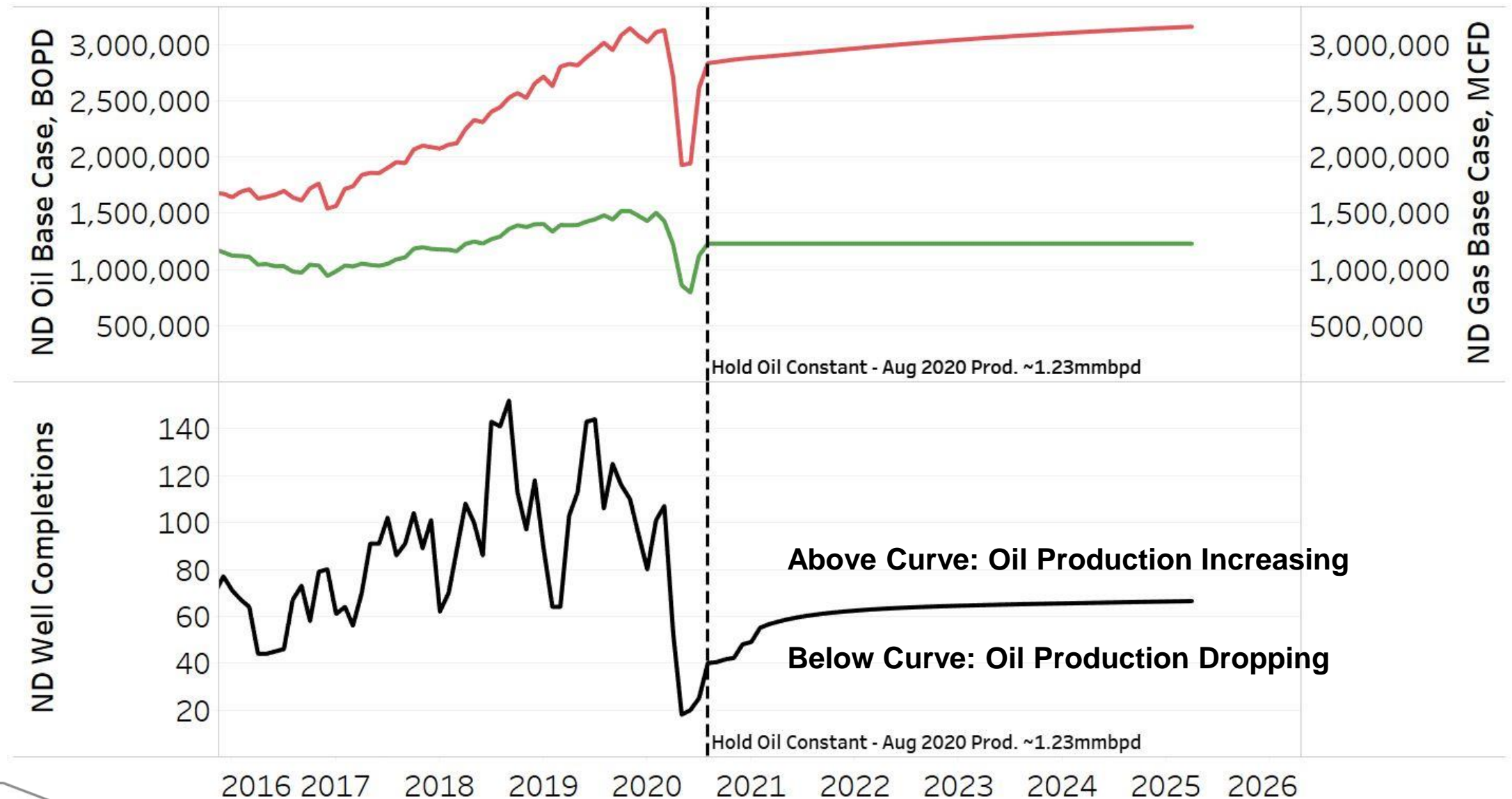


# Monthly Oil & Gas Production Change

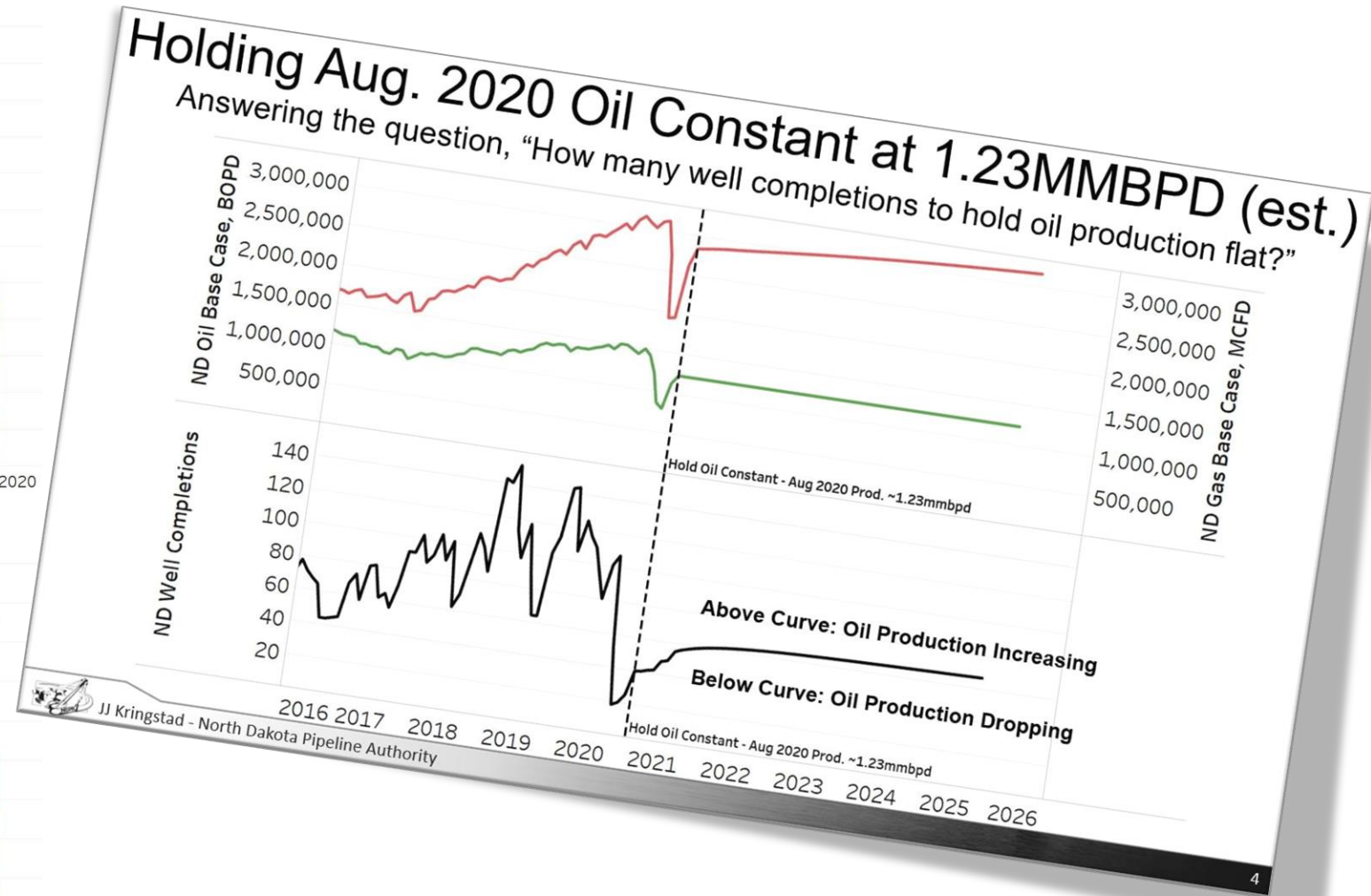
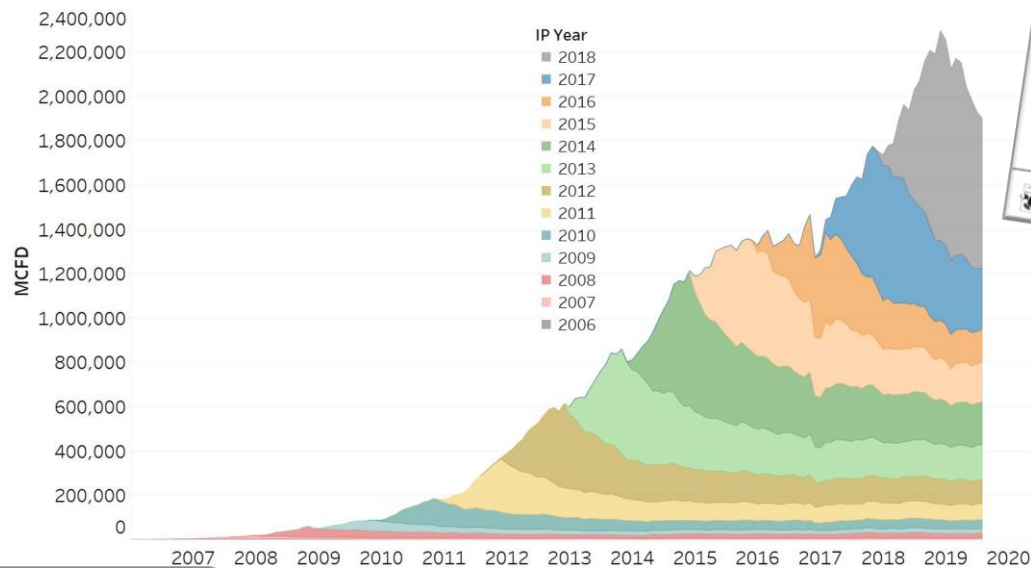
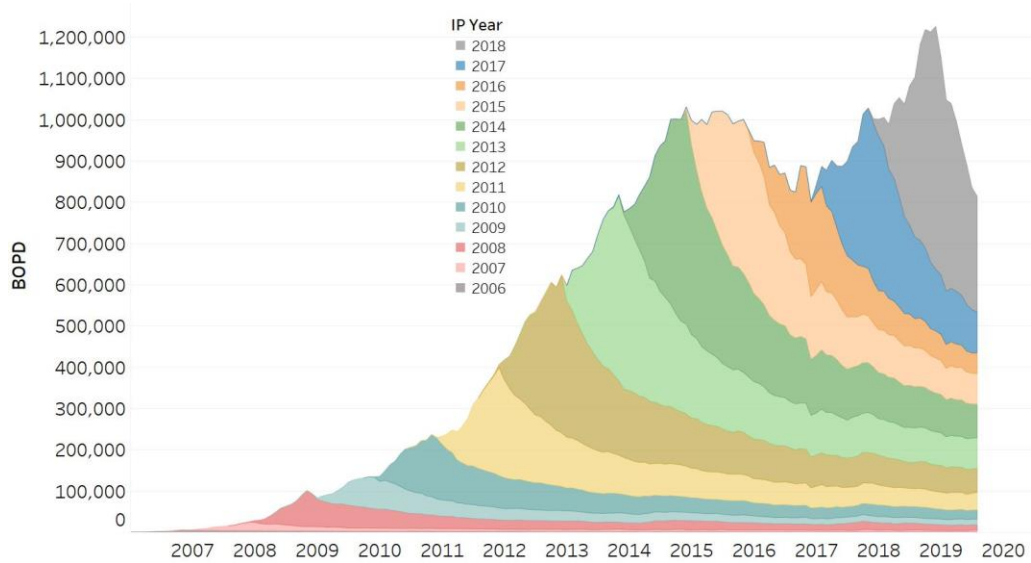


# Holding Aug. 2020 Oil Constant at 1.23MMBPD (est.)

Answering the question, “How many well completions to hold oil production flat?”

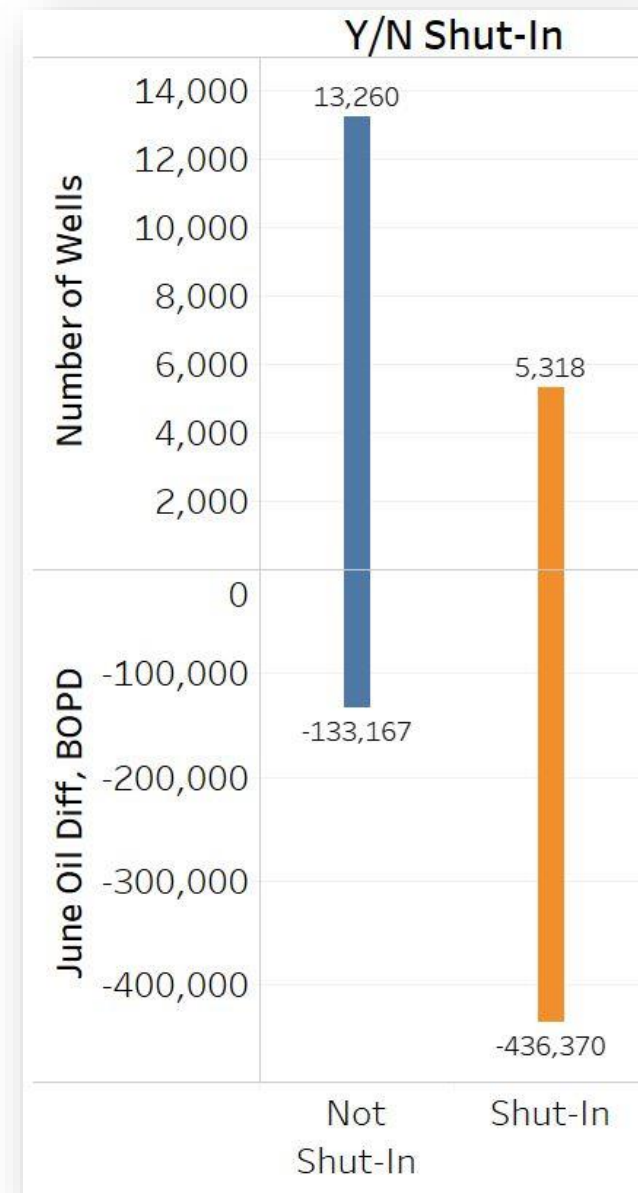
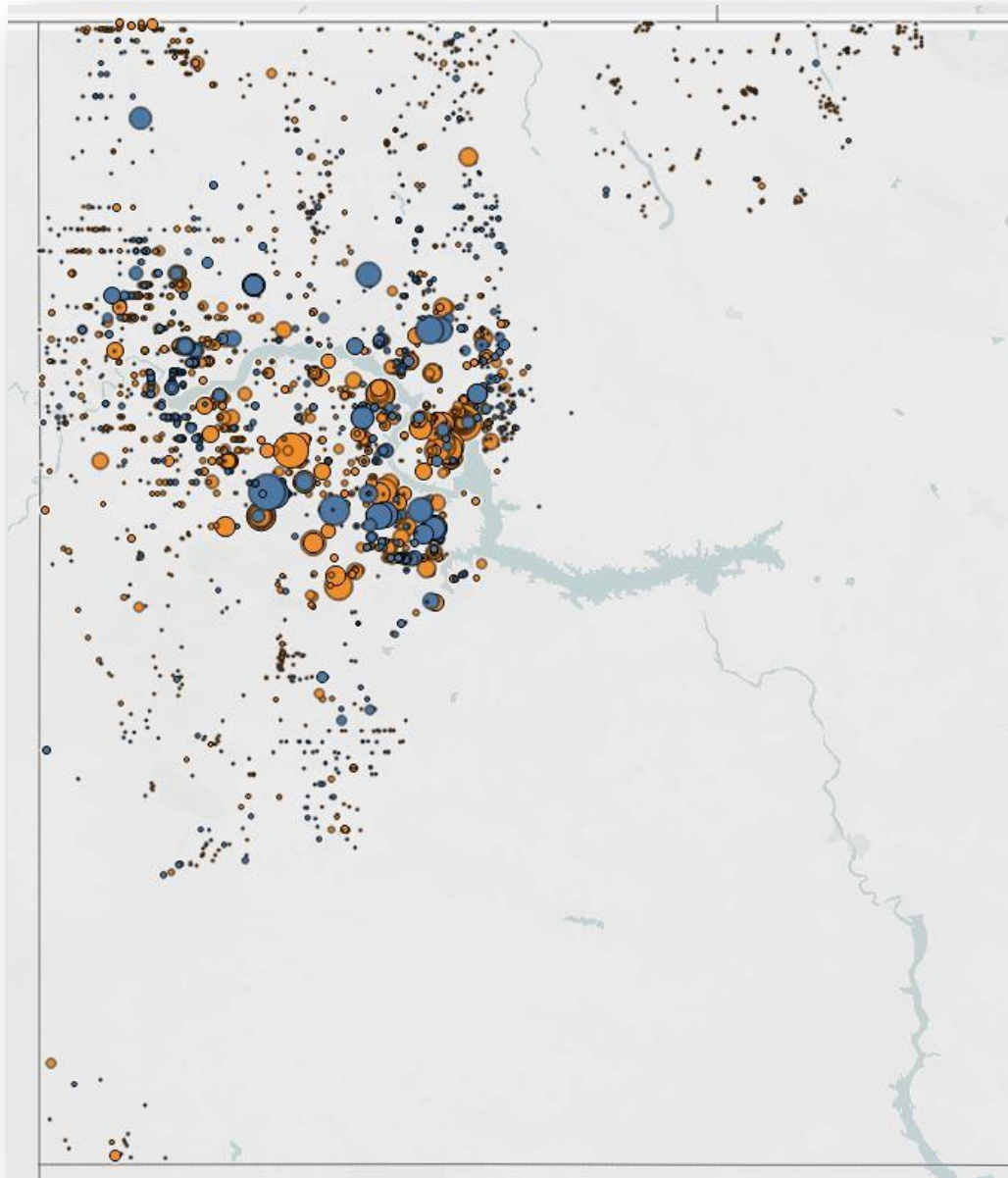


# Base Decline Challenges



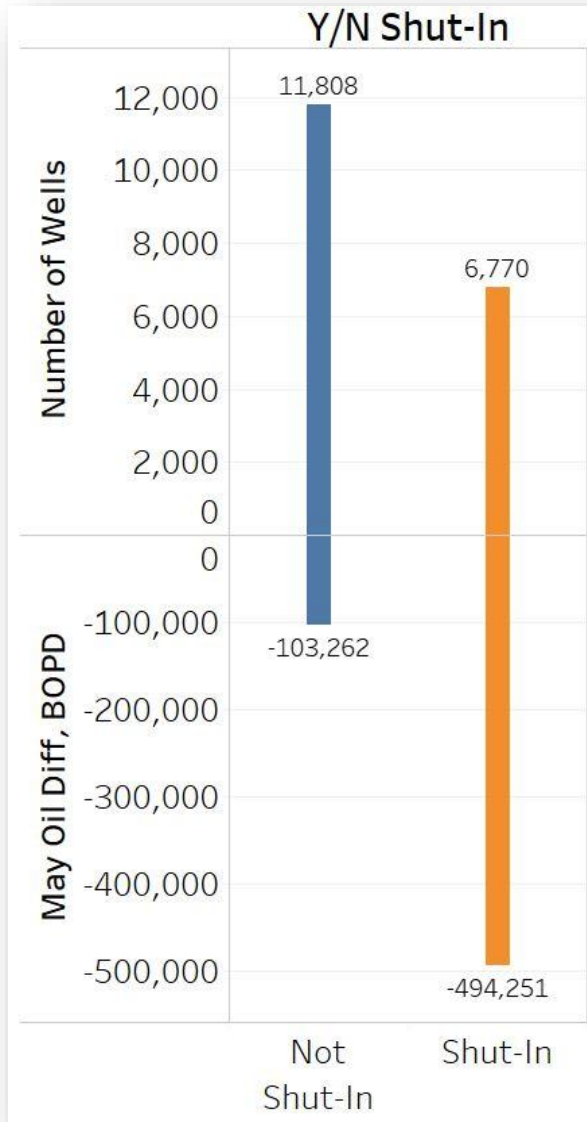


# March to June 75+% M-O-M Oil Drop

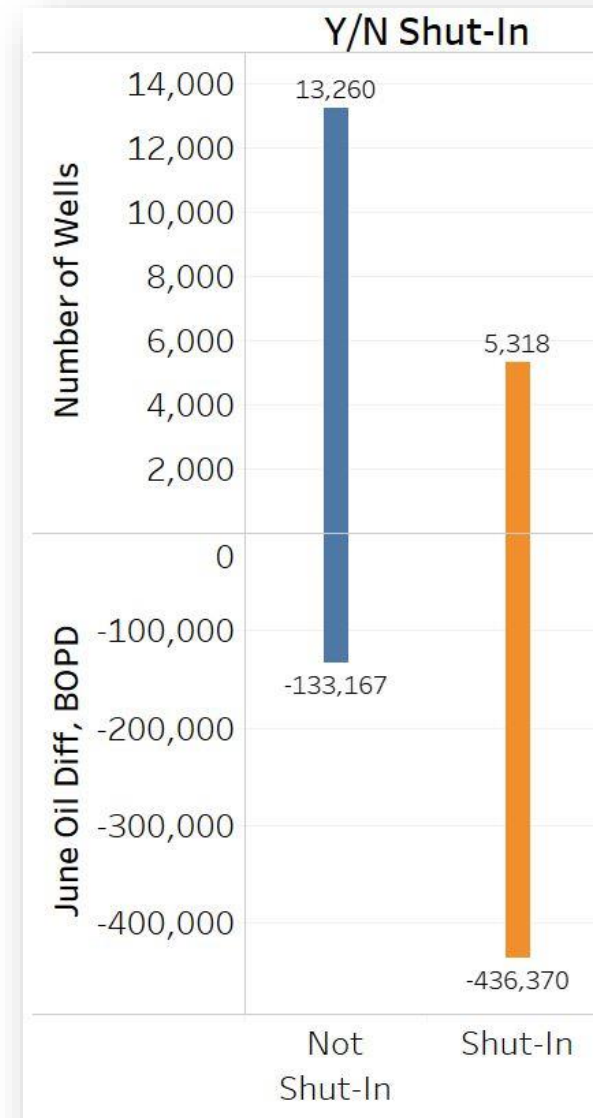


# May & June Comparison

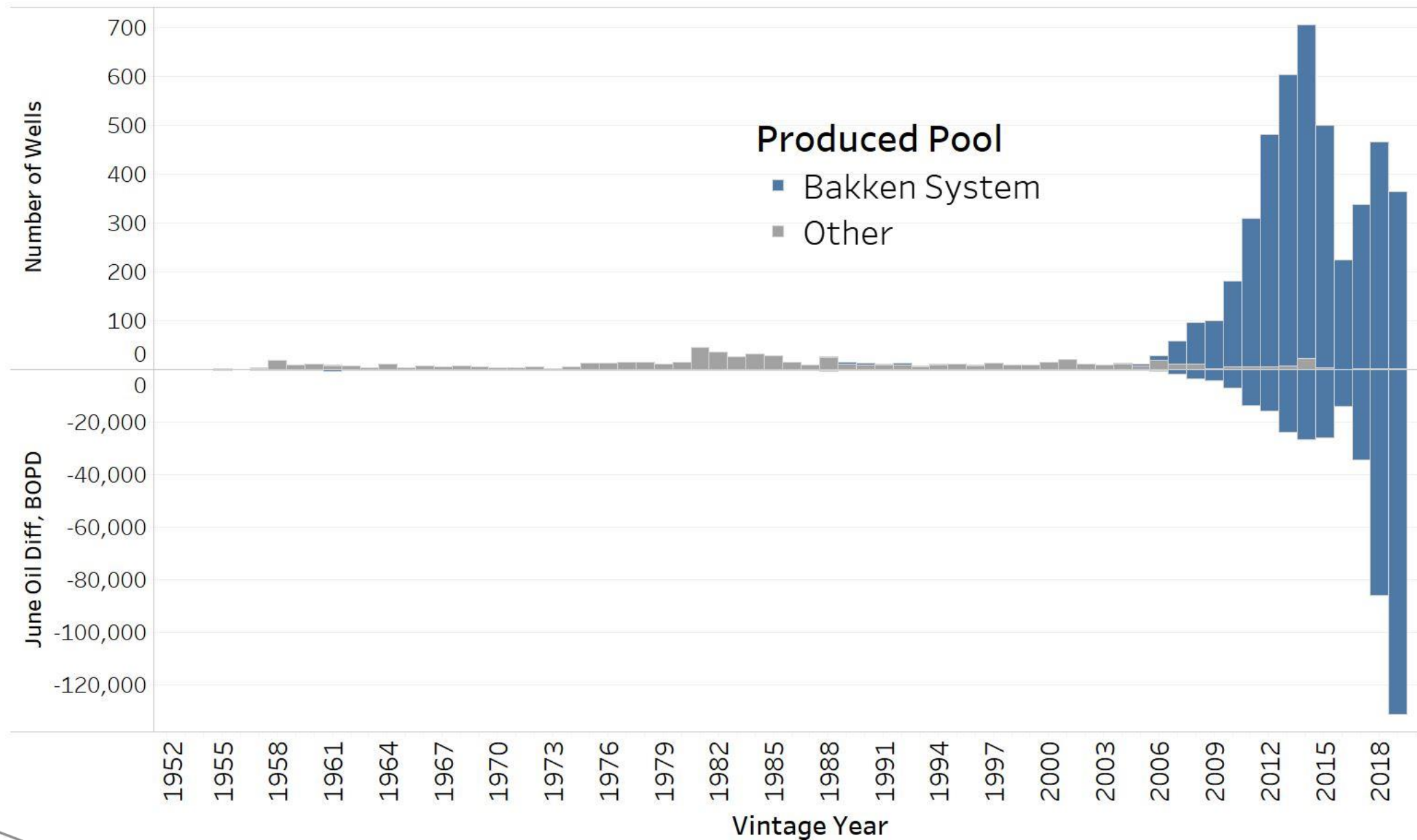
May 2020



June 2020

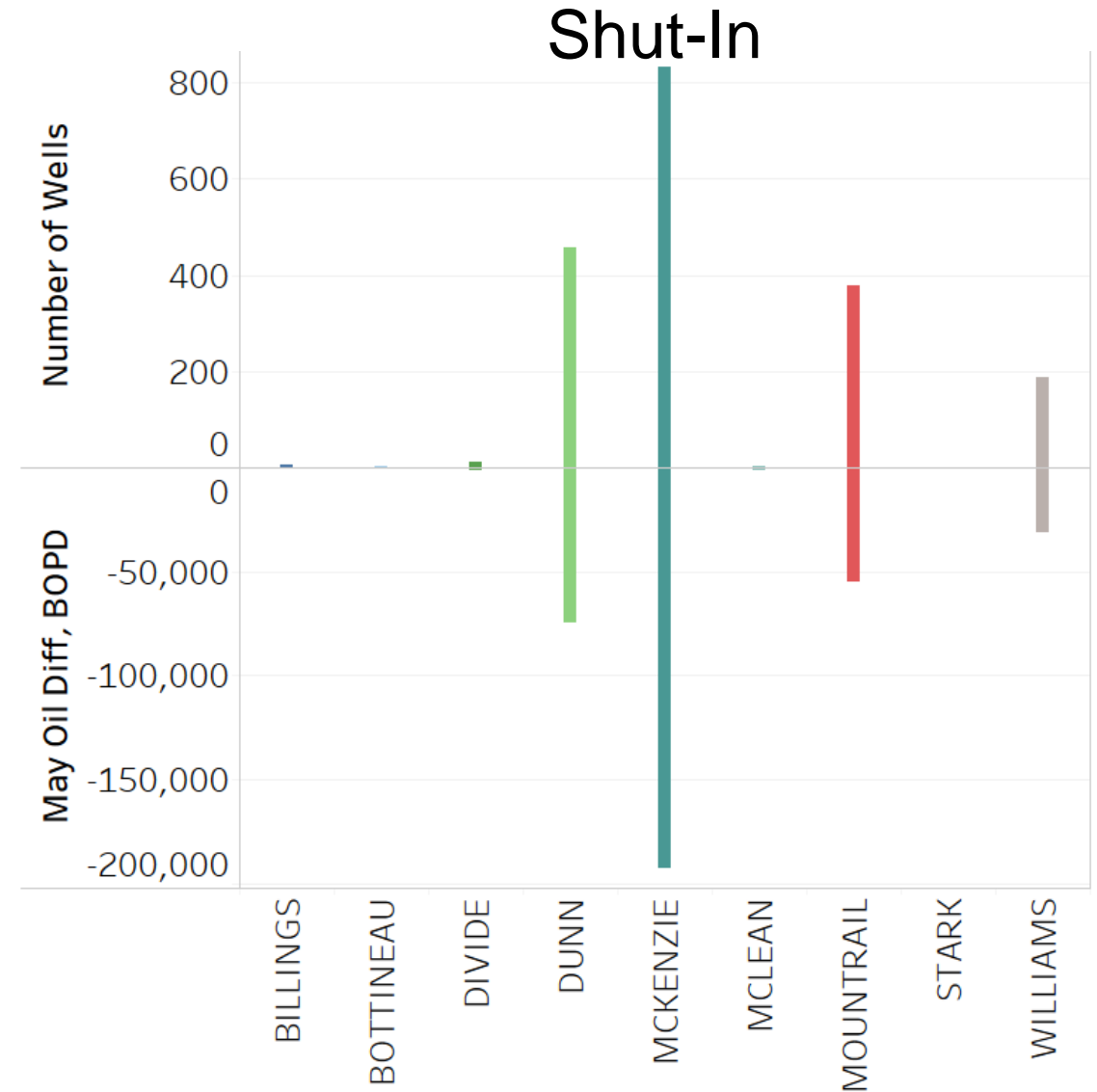
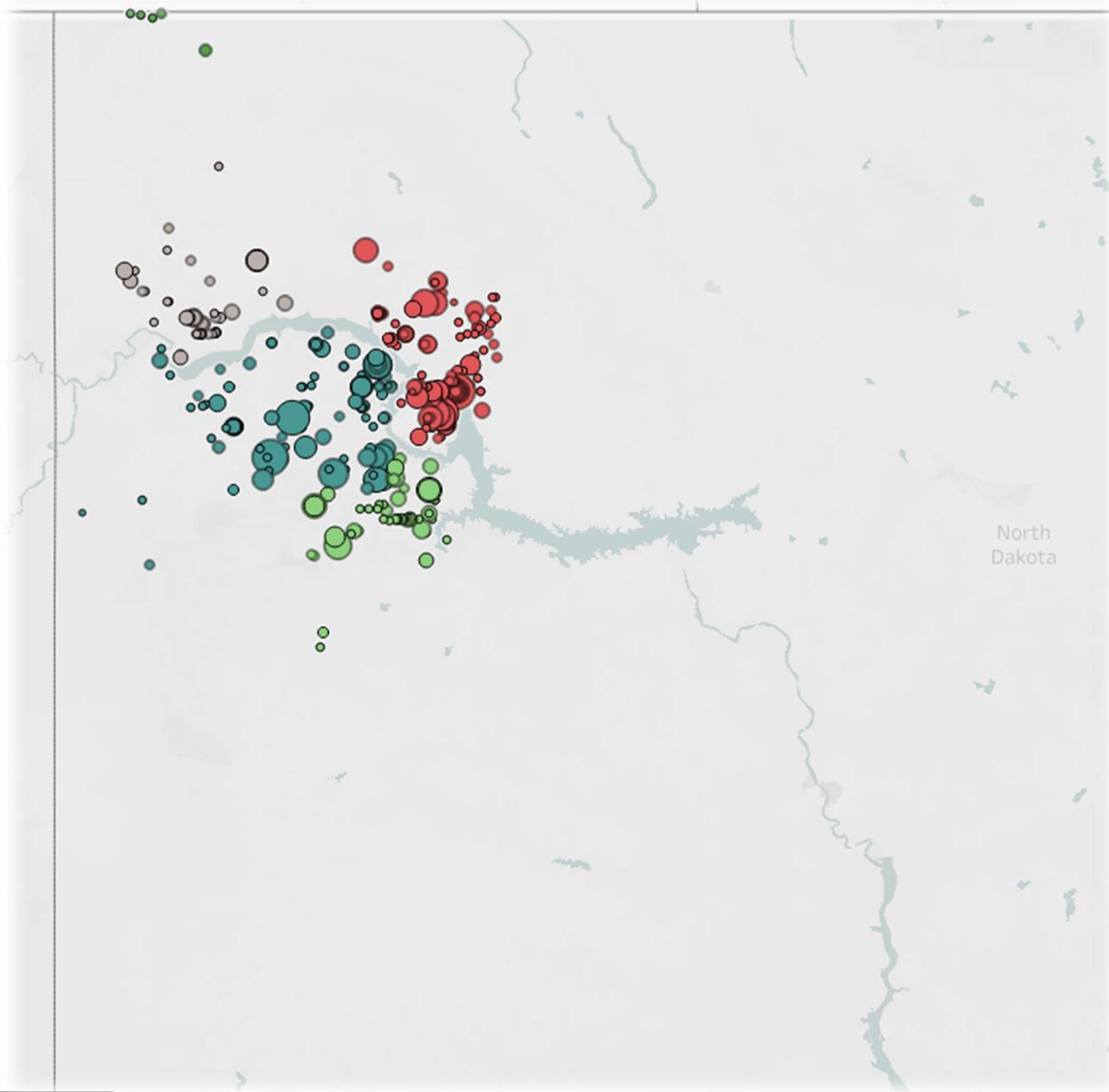


# Vintage Year of Shut-In Wells – June 2020

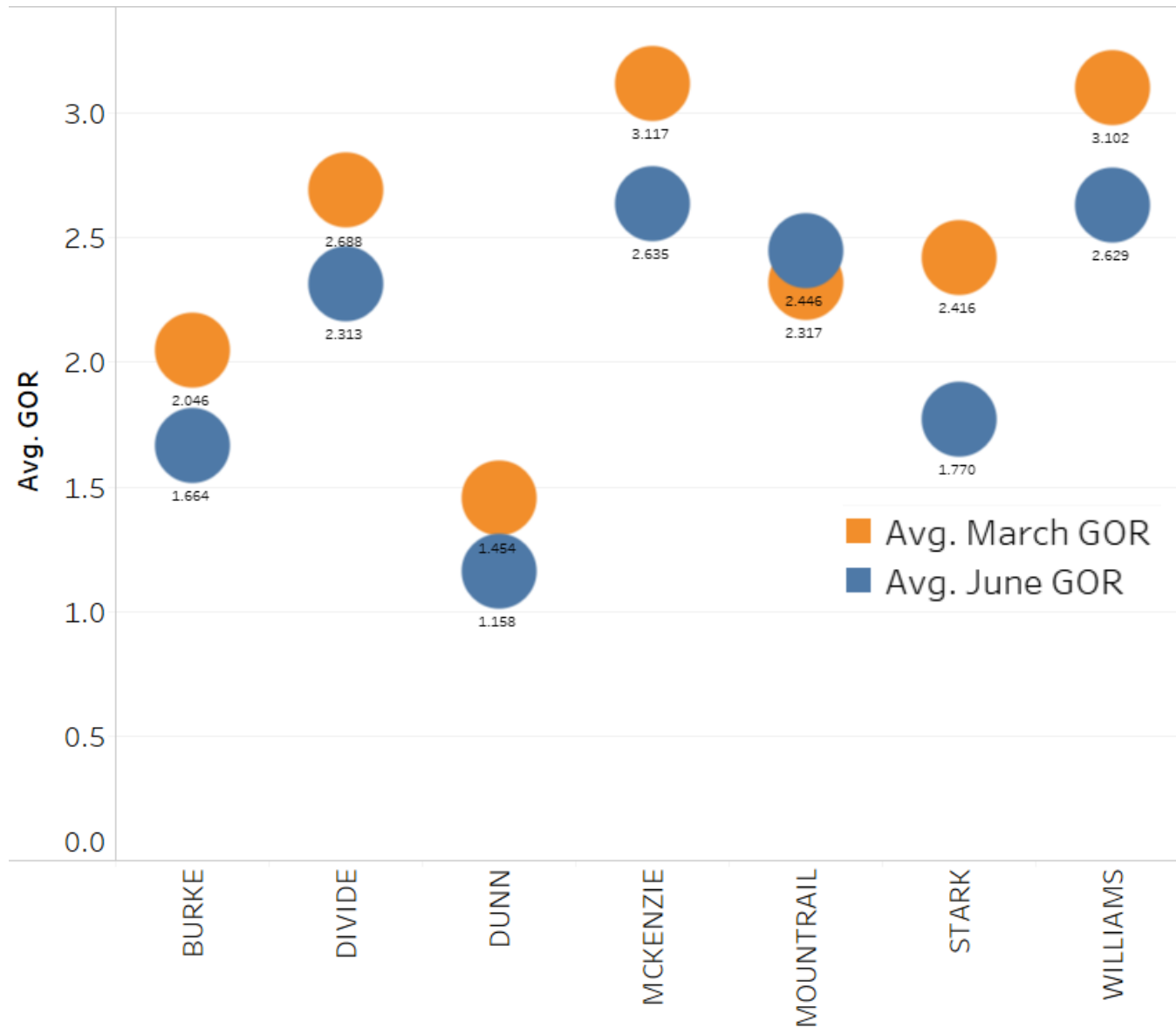




# Wells Most Likely to Return Quickly? (May)



# GOR Decrease From Returning Curtailed Wells



## Well Selection Criteria

Production Days in May: 0-1 Days

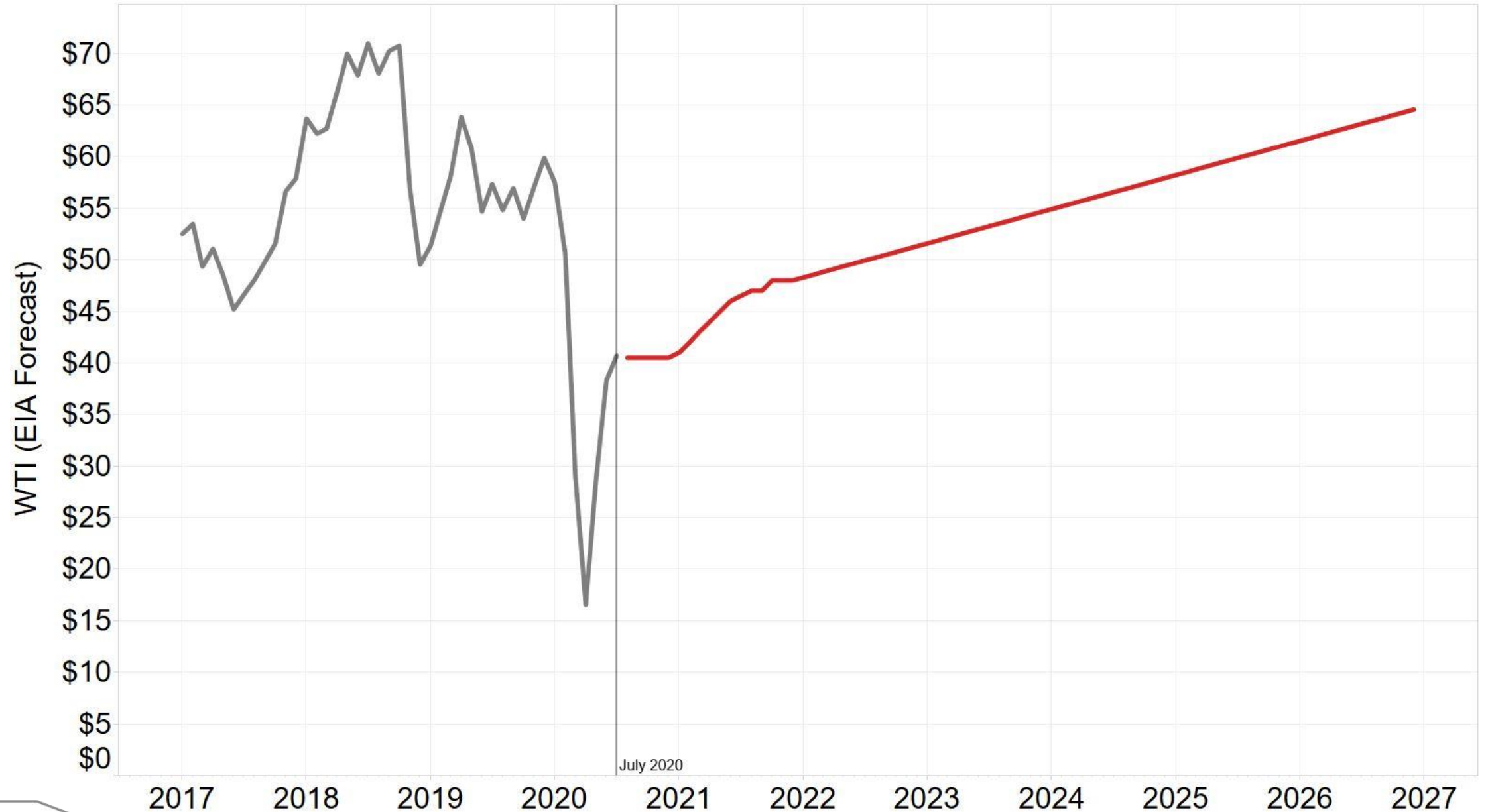
March Oil Production: >1 BOPD

June Oil Production: >1 BOPD

Pool: Bakken/Three Forks/Sanish

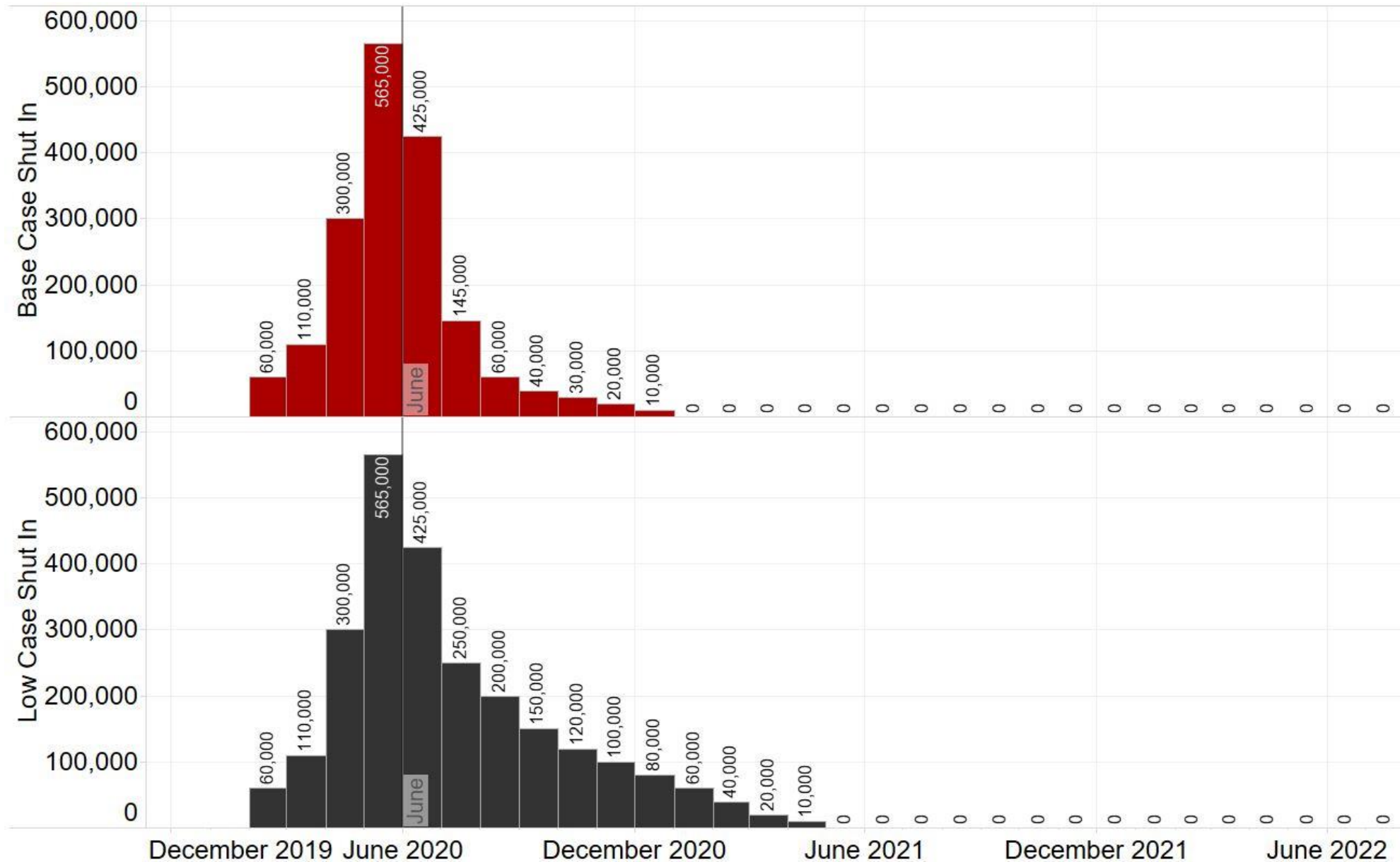


# EIA Price Deck (Near Term)

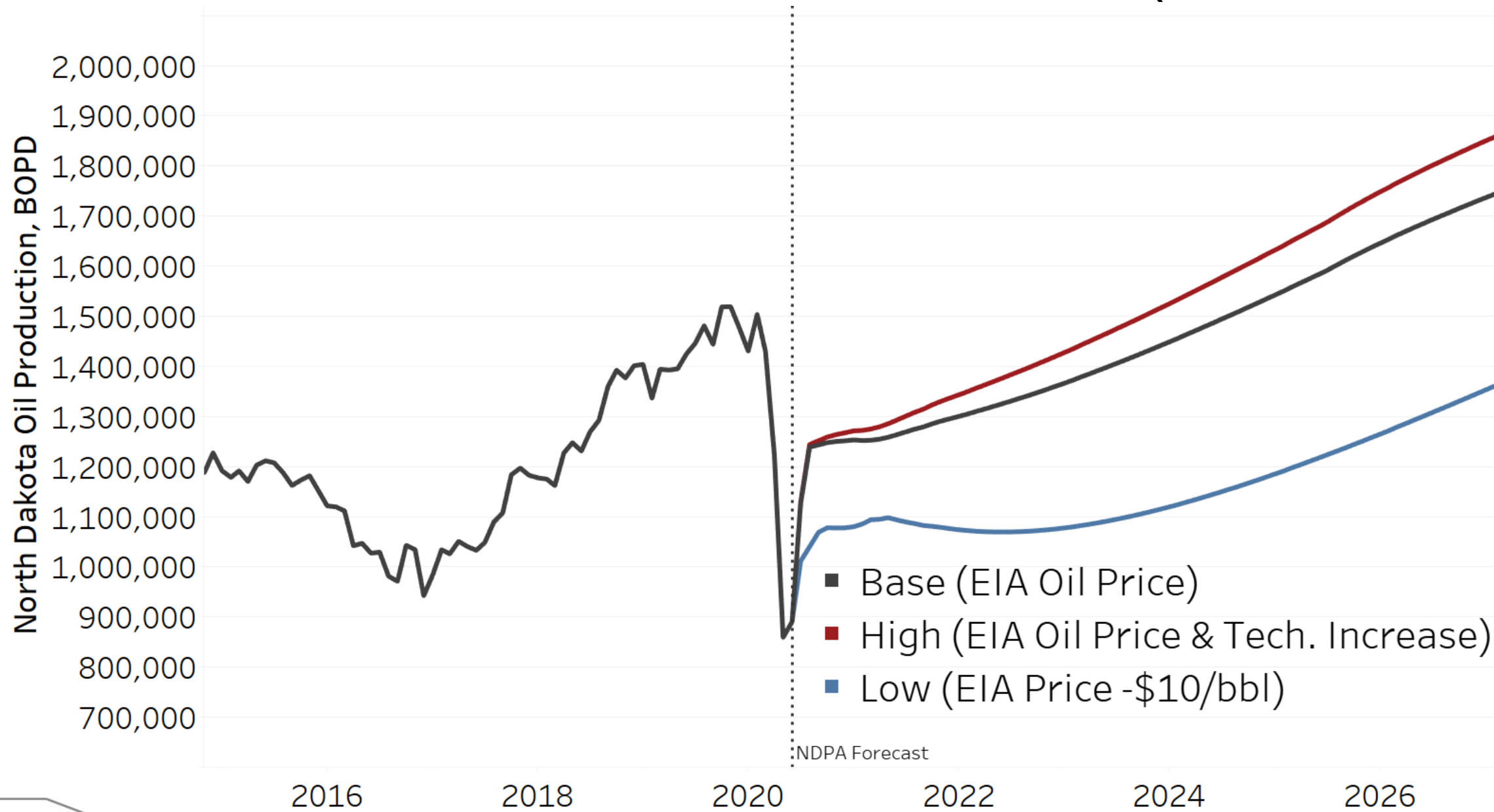




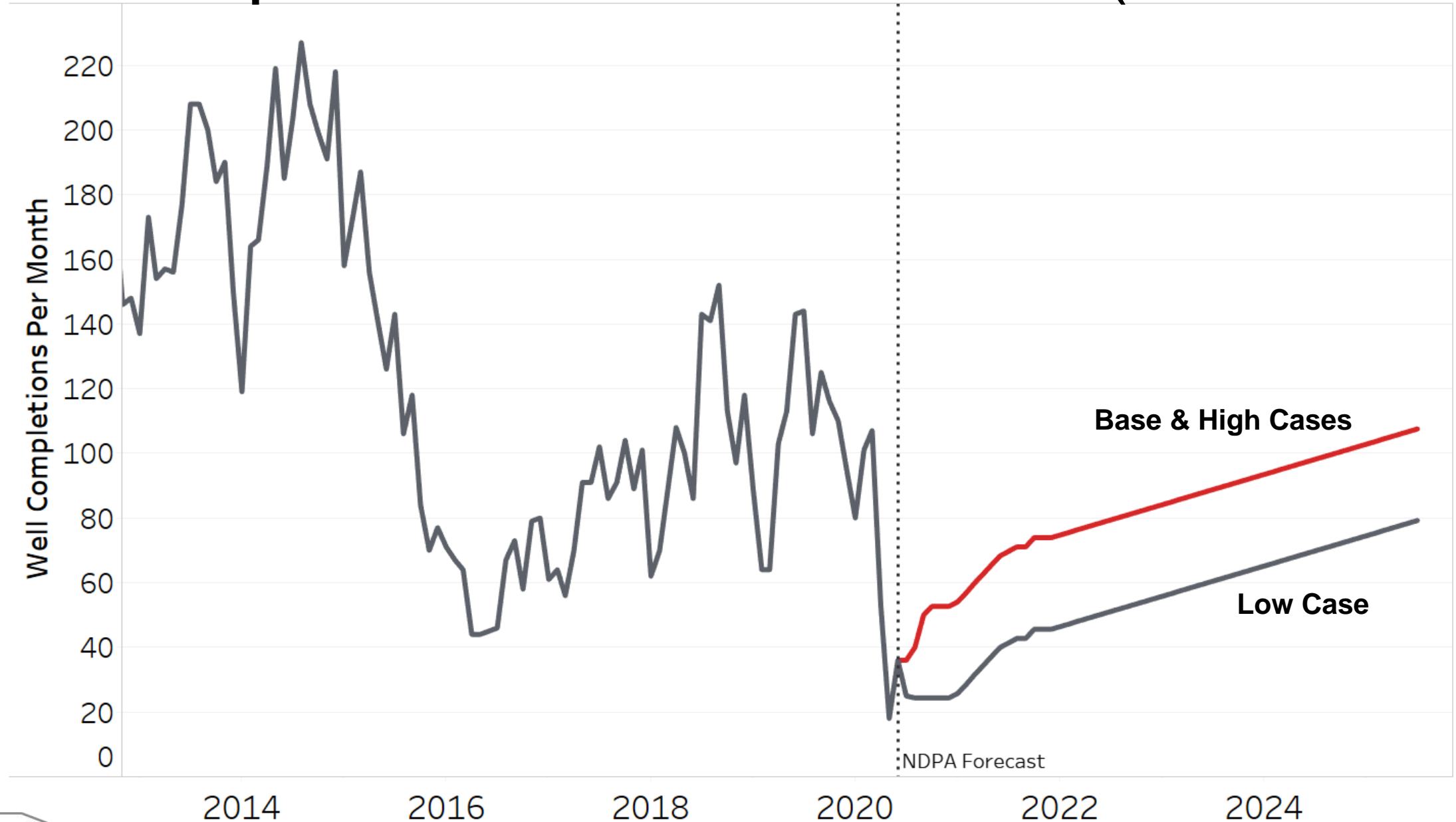
# Shut-In Assumptions: EIA Price Deck



# ND Oil Production: EIA Price Deck (Near Term)

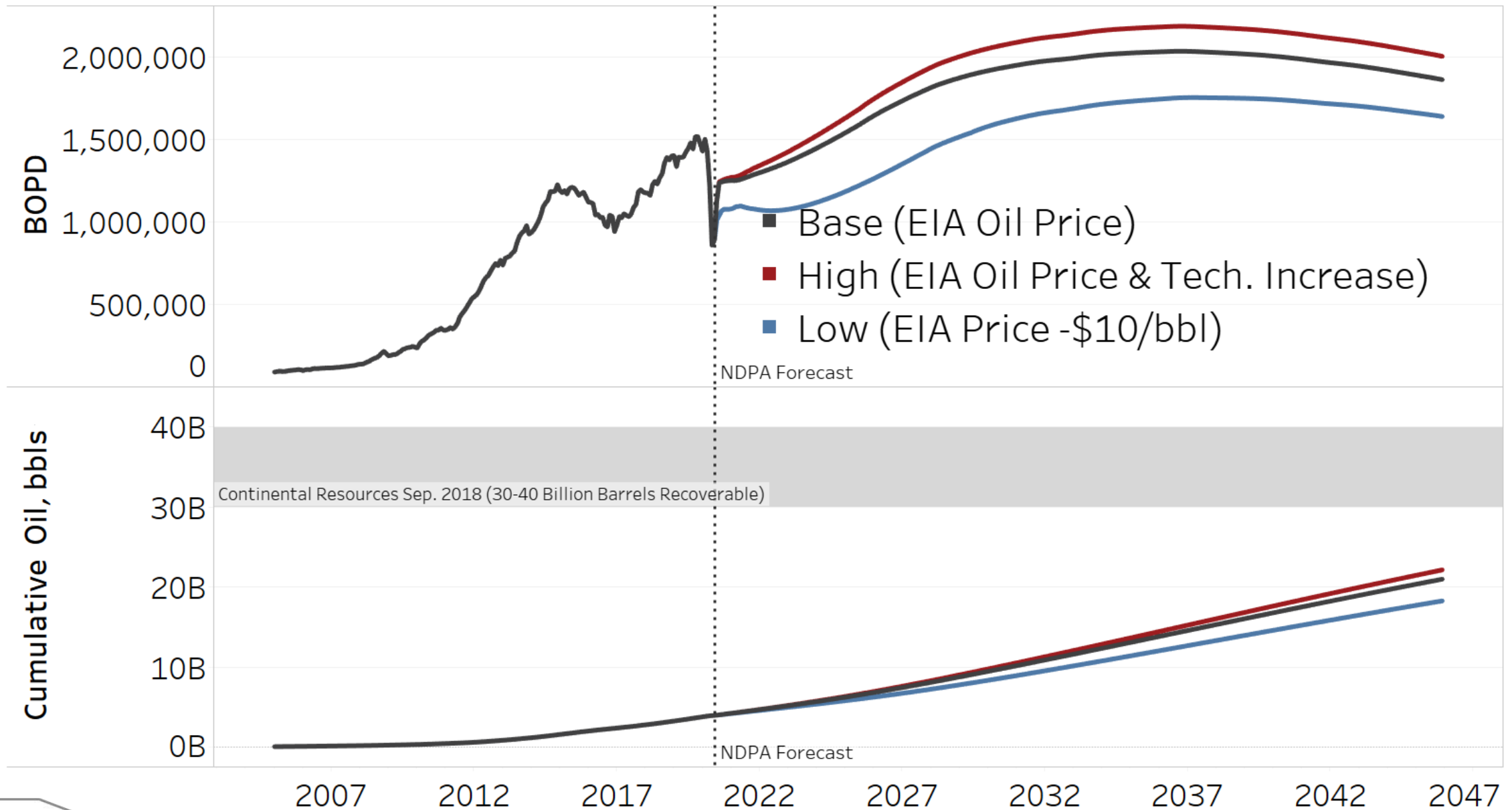


# ND Completions: EIA Price Deck (Near Term)

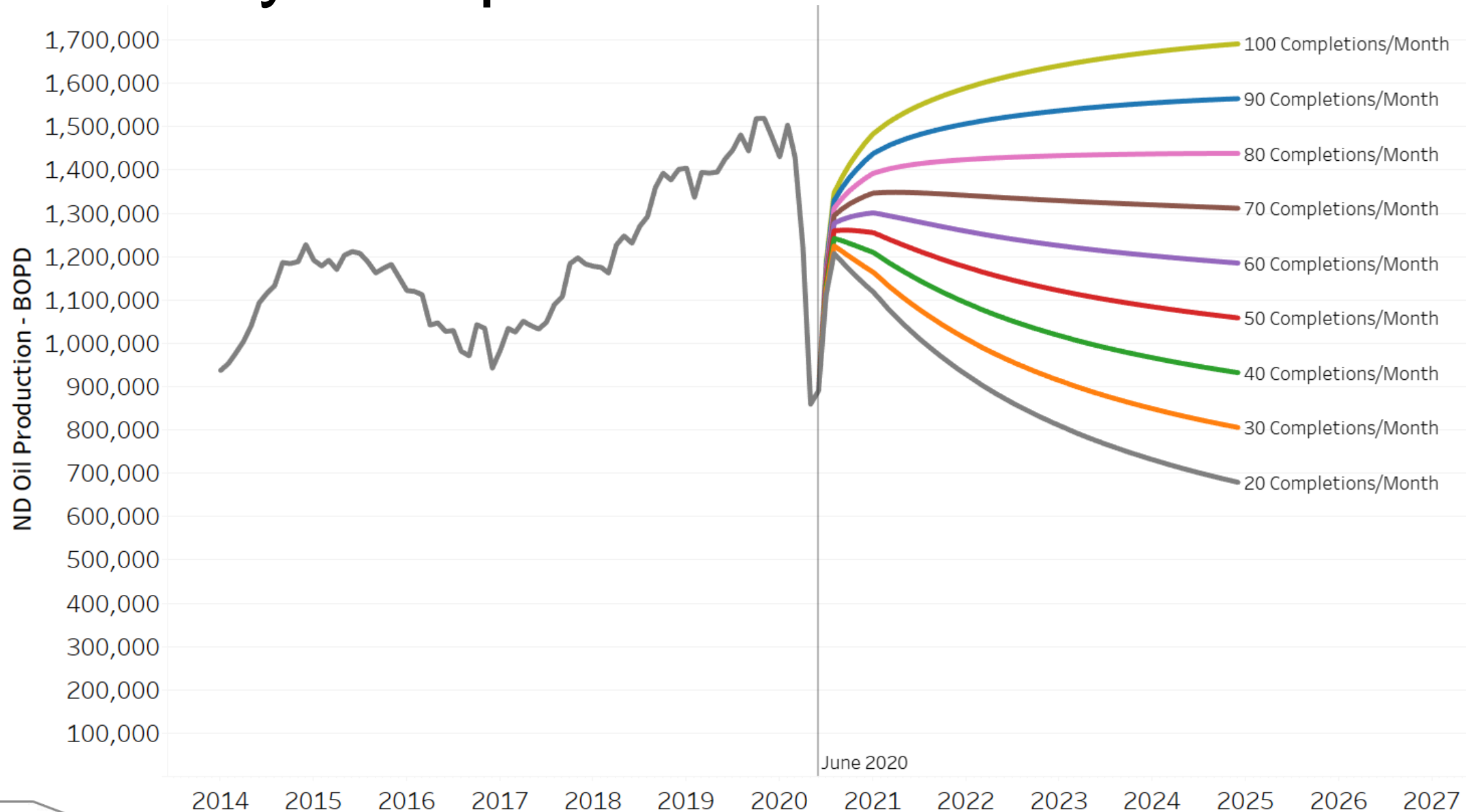




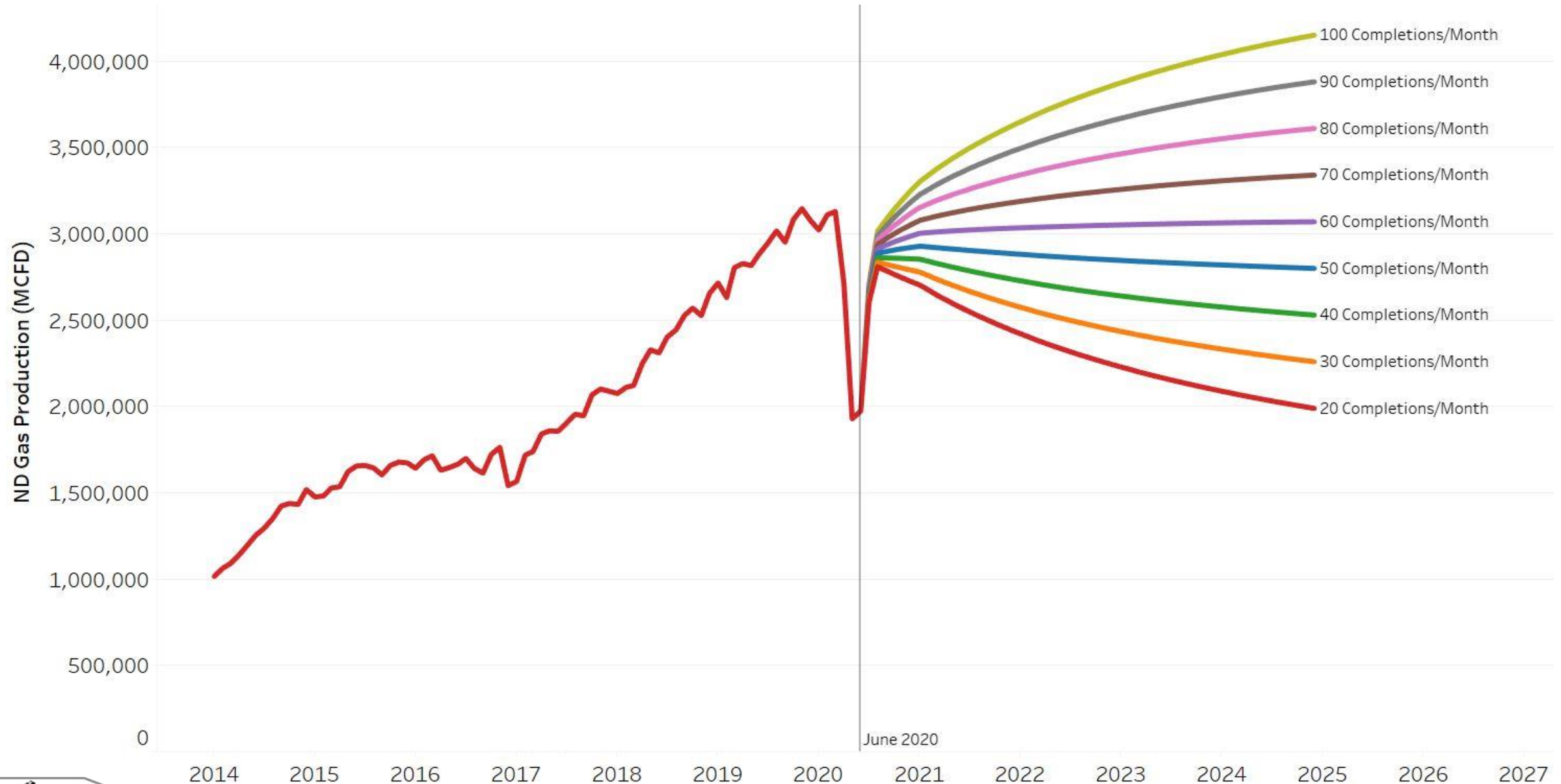
# ND Oil Production: EIA Price Deck



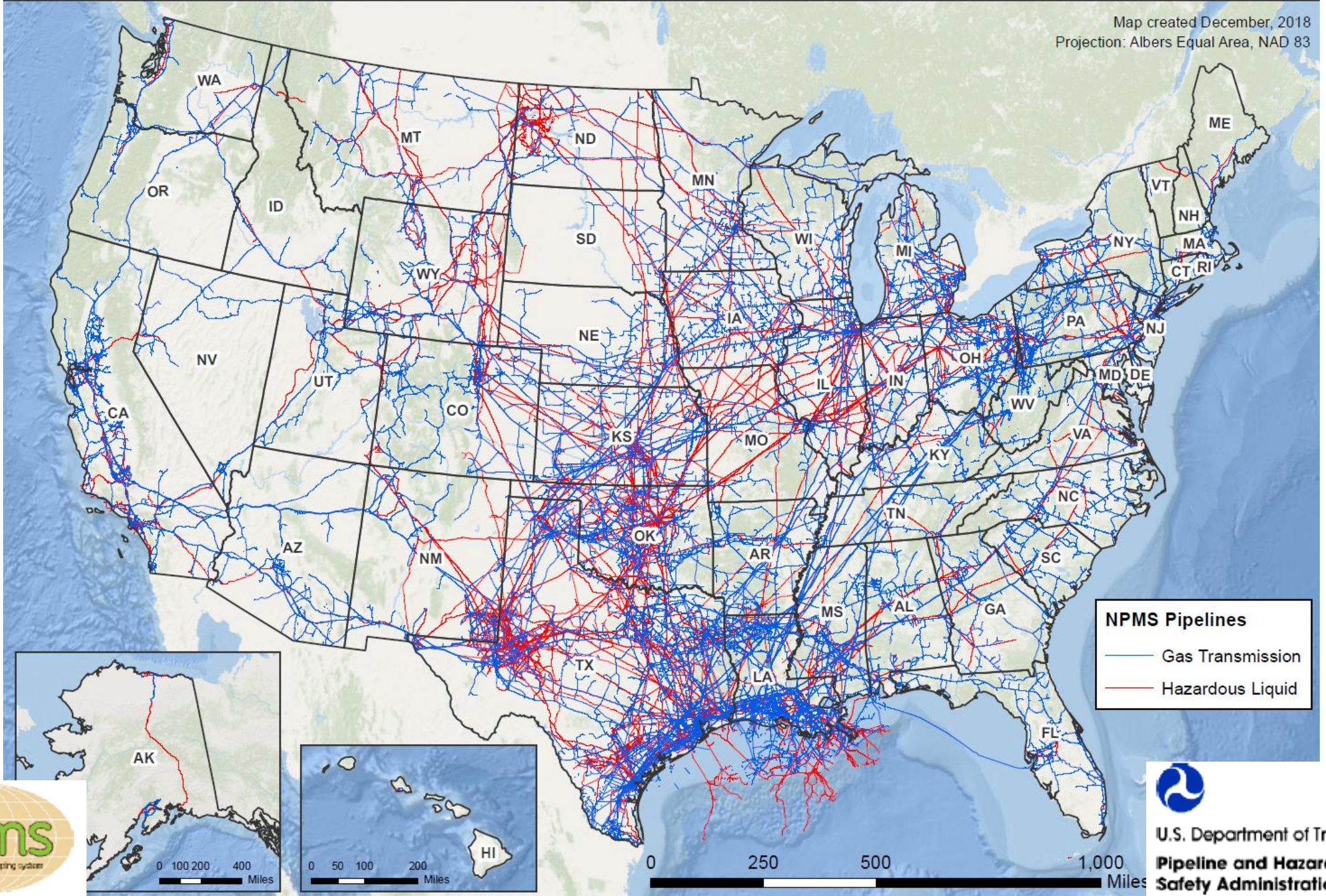
# Monthly Completion Scenarios: Crude Oil



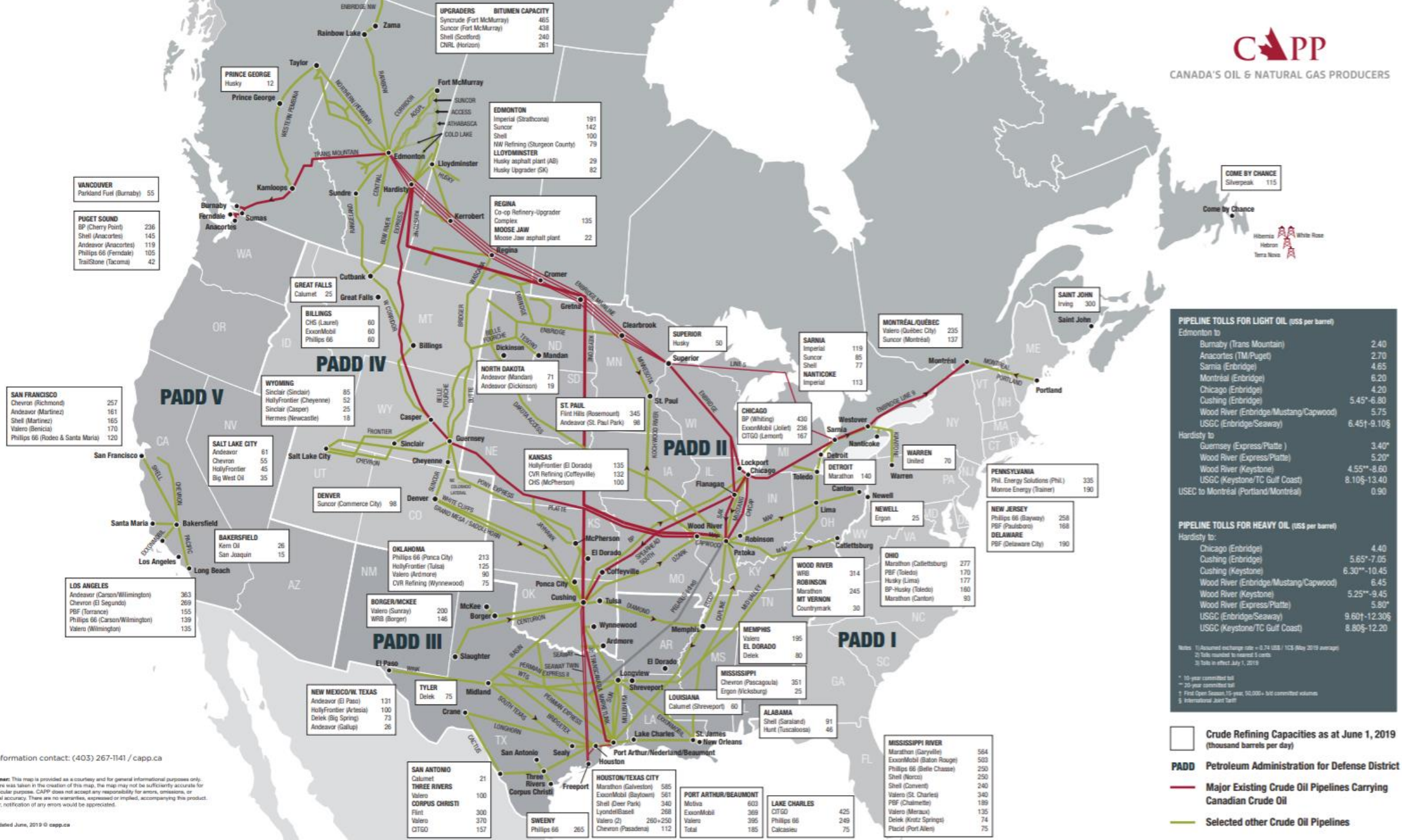
# Monthly Completion Scenarios: Wellhead Gas









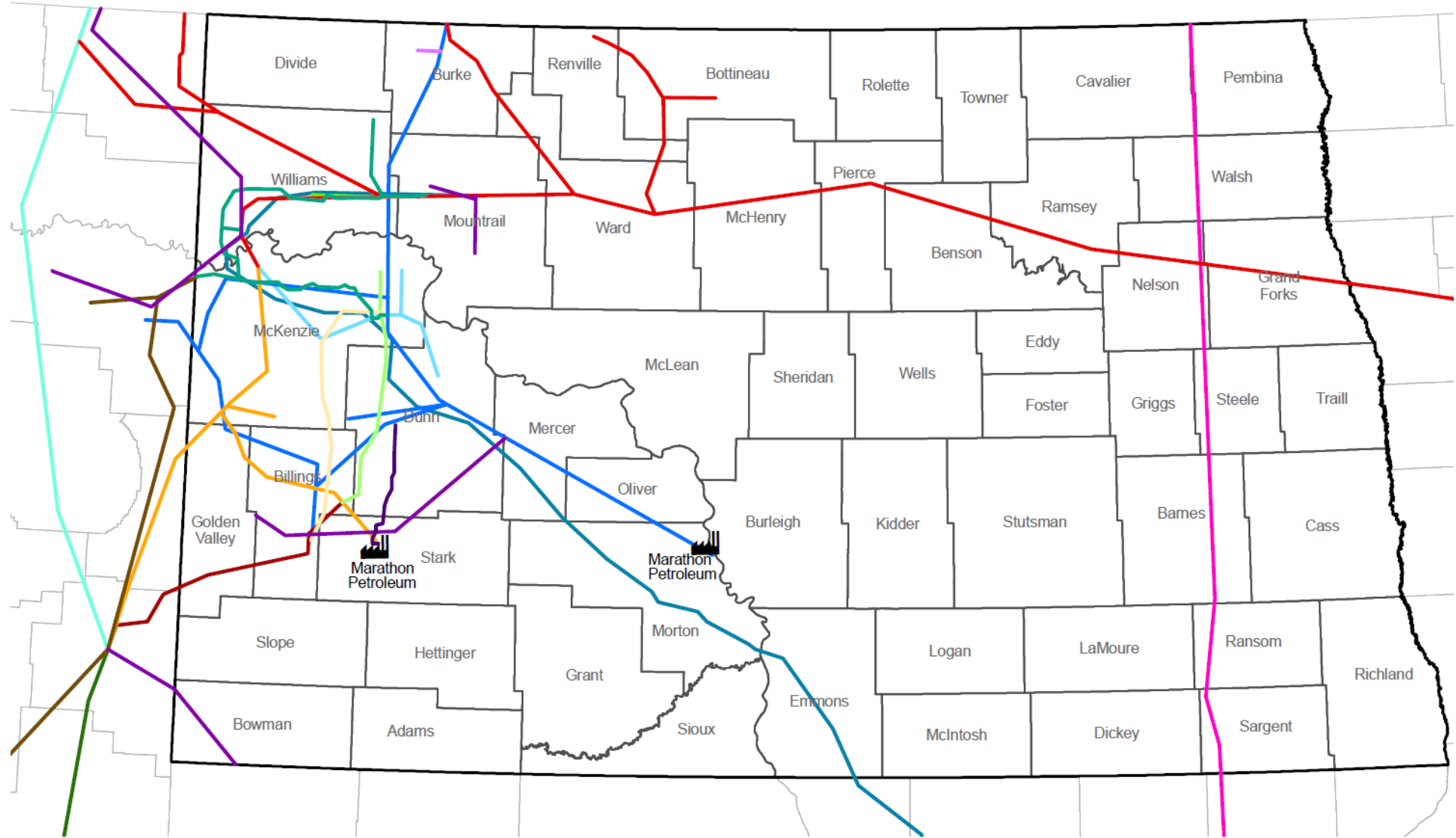


For information contact: (403) 267-1141 / capp.ca

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# North Dakota Crude Oil Pipelines

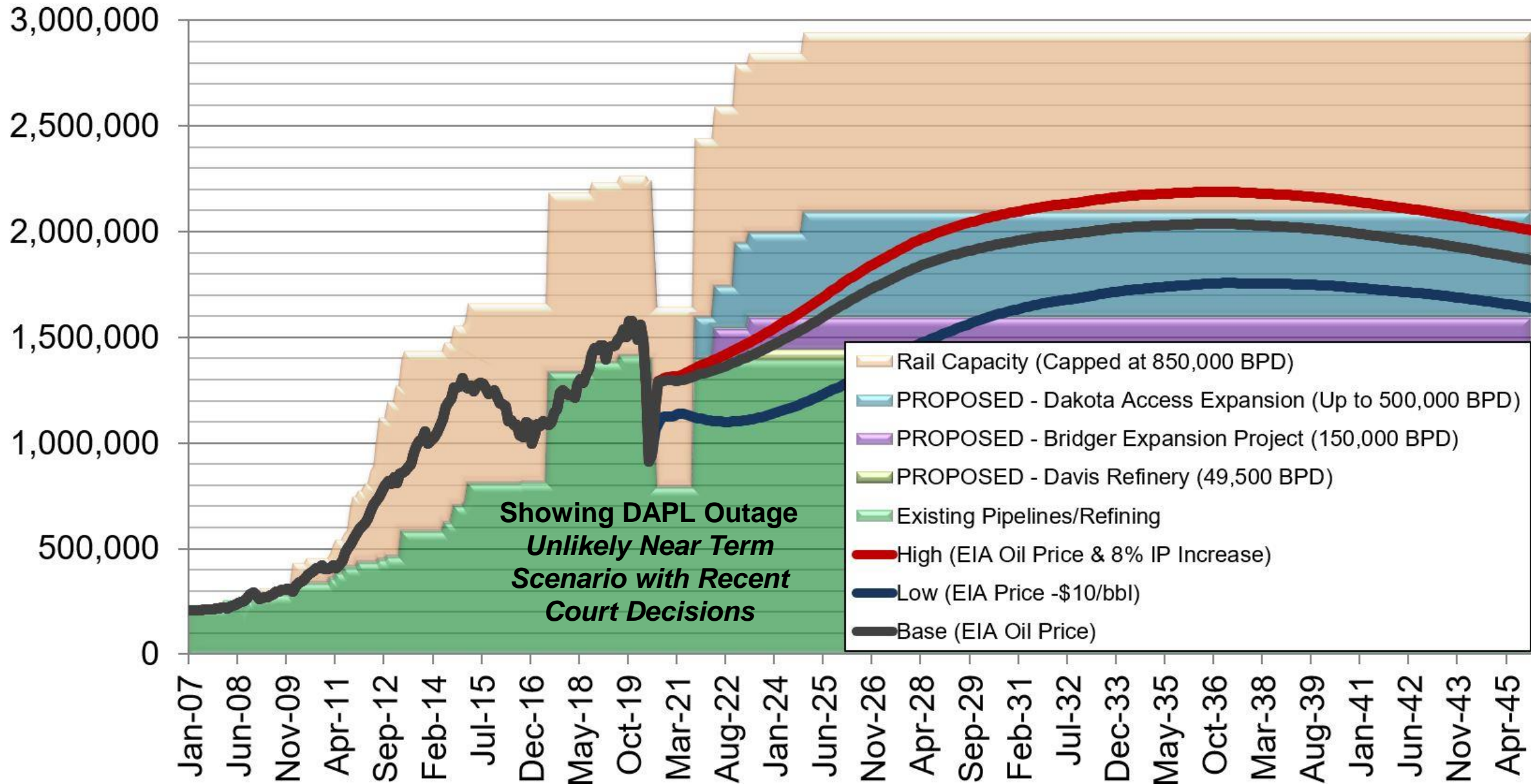


- |                    |                 |               |            |                   |           |
|--------------------|-----------------|---------------|------------|-------------------|-----------|
| Refinery           | Basin Transload | Butte         | Double H   | Hiland            | Bridger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

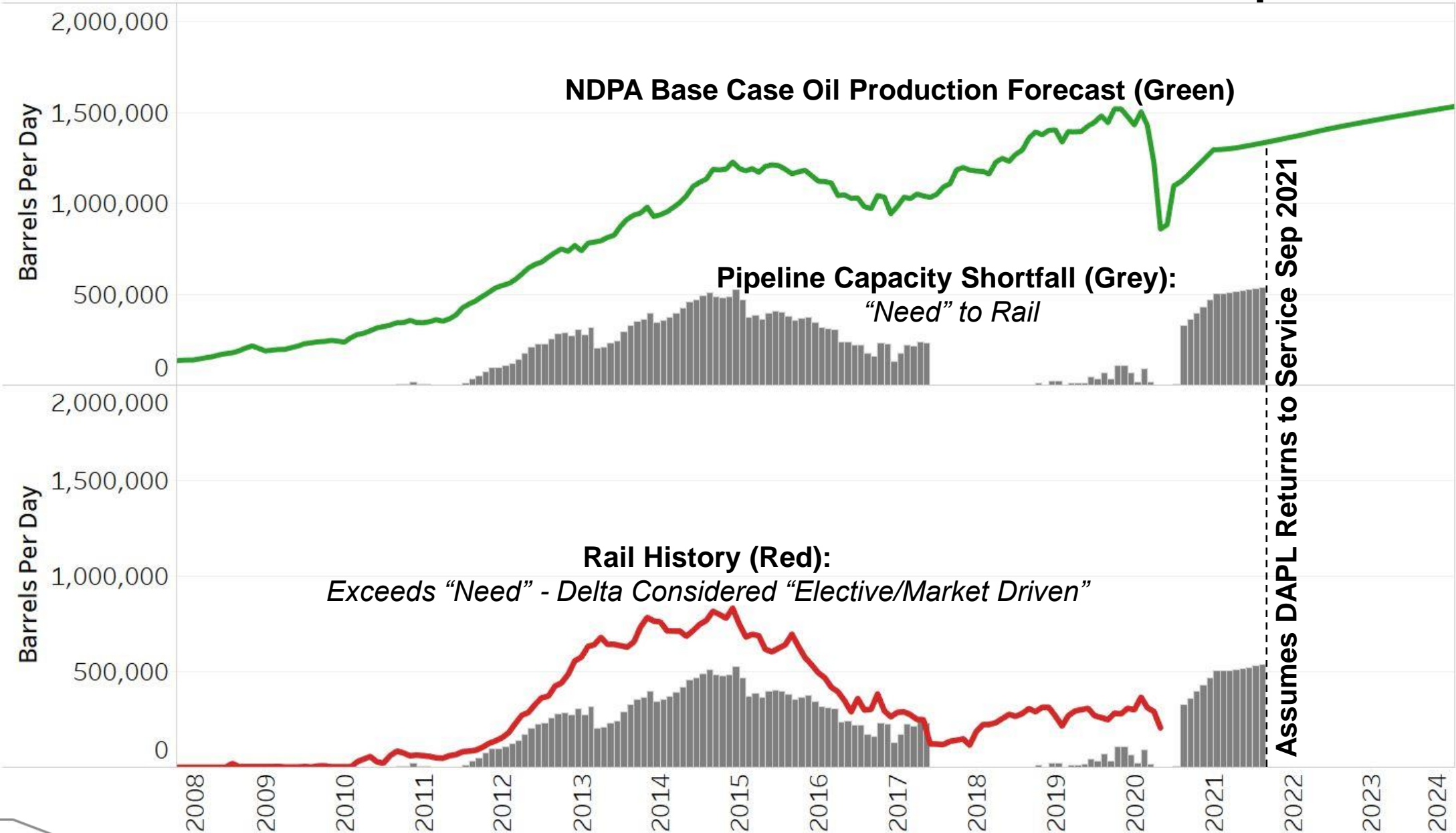


# Williston Basin Oil Production & Export Capacity, BOPD

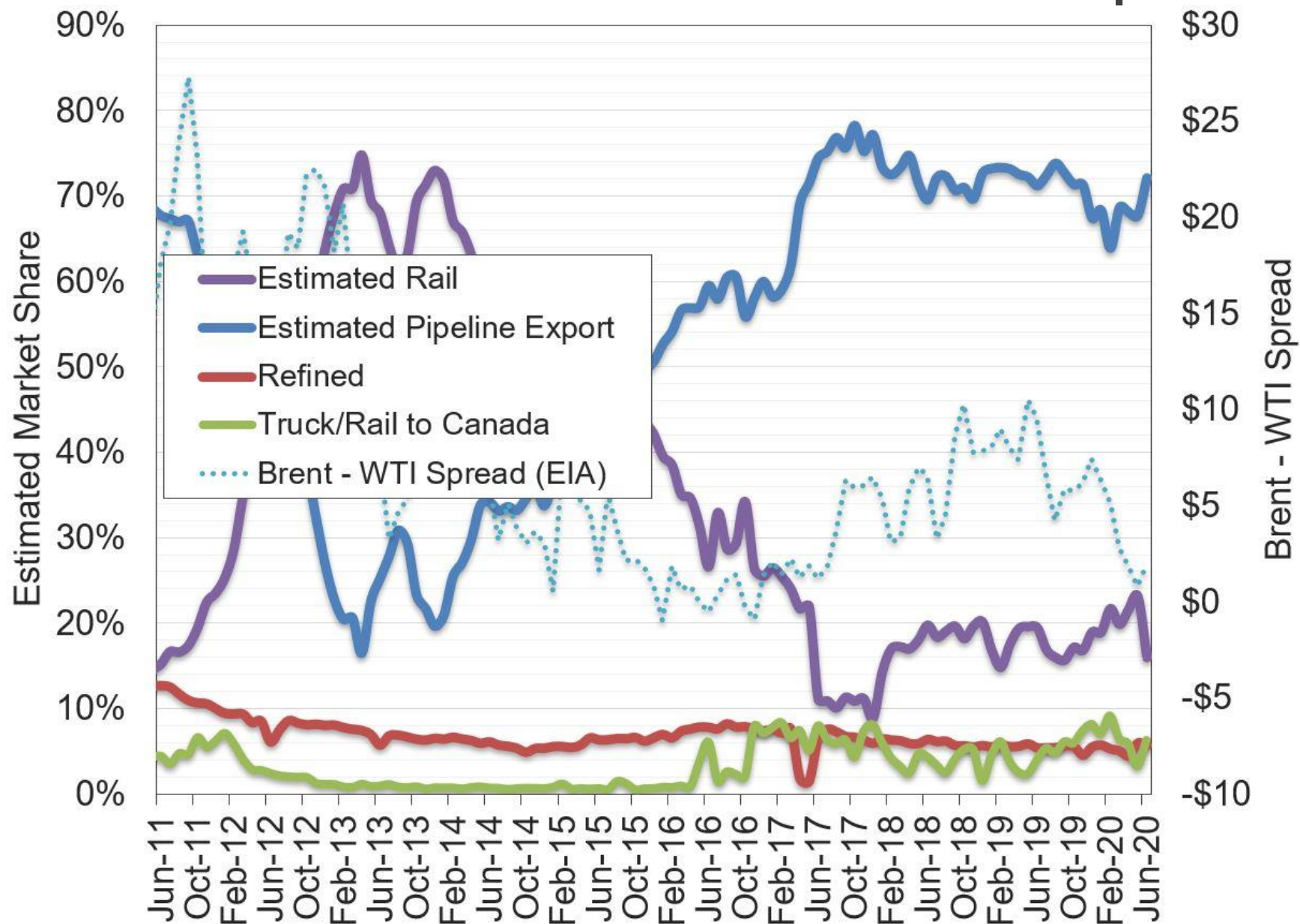
Barrels Per Day



# NDPA Production Forecast and Rail Transportation



# Estimated Williston Basin Oil Transportation



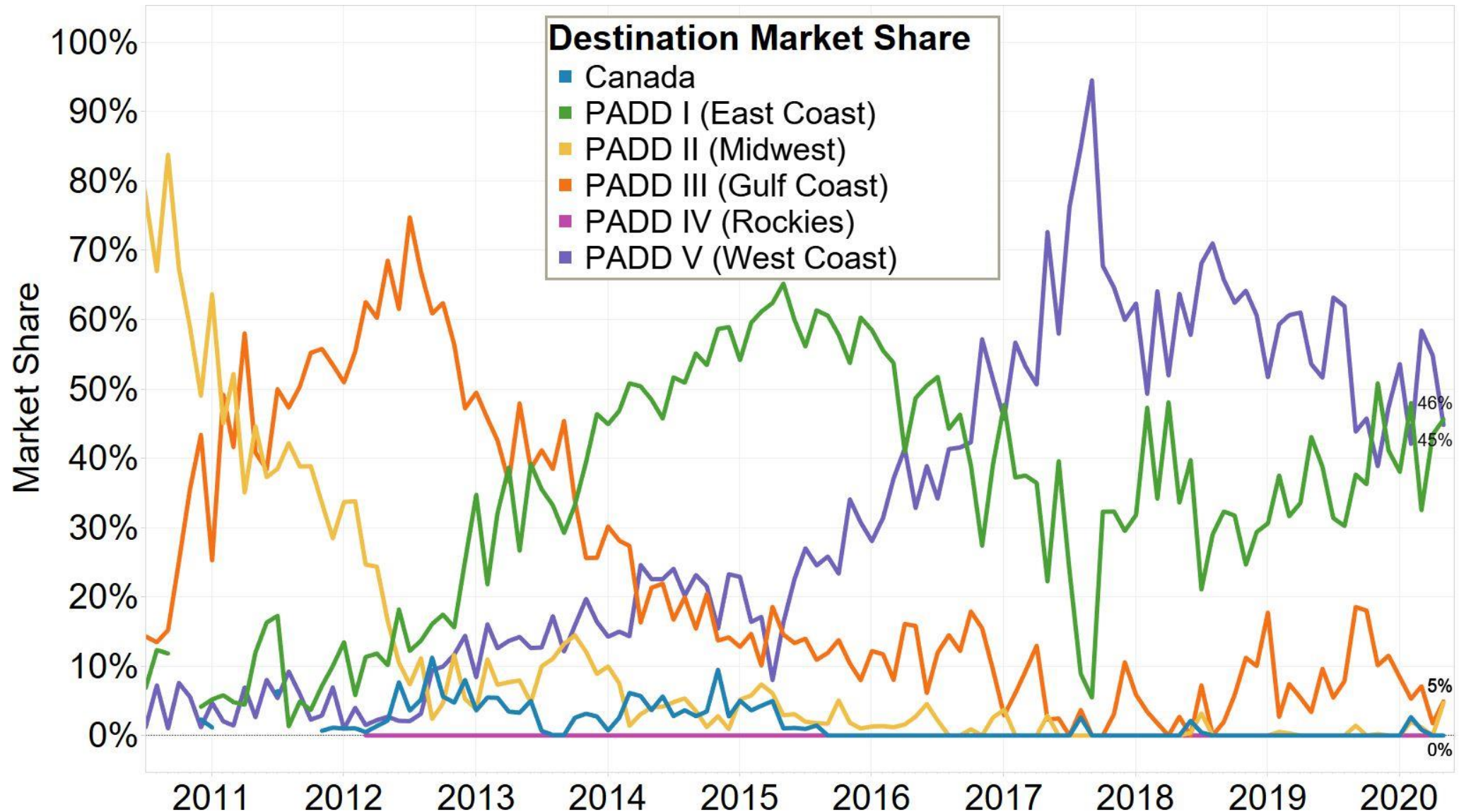


# Estimated ND Rail Export Volumes



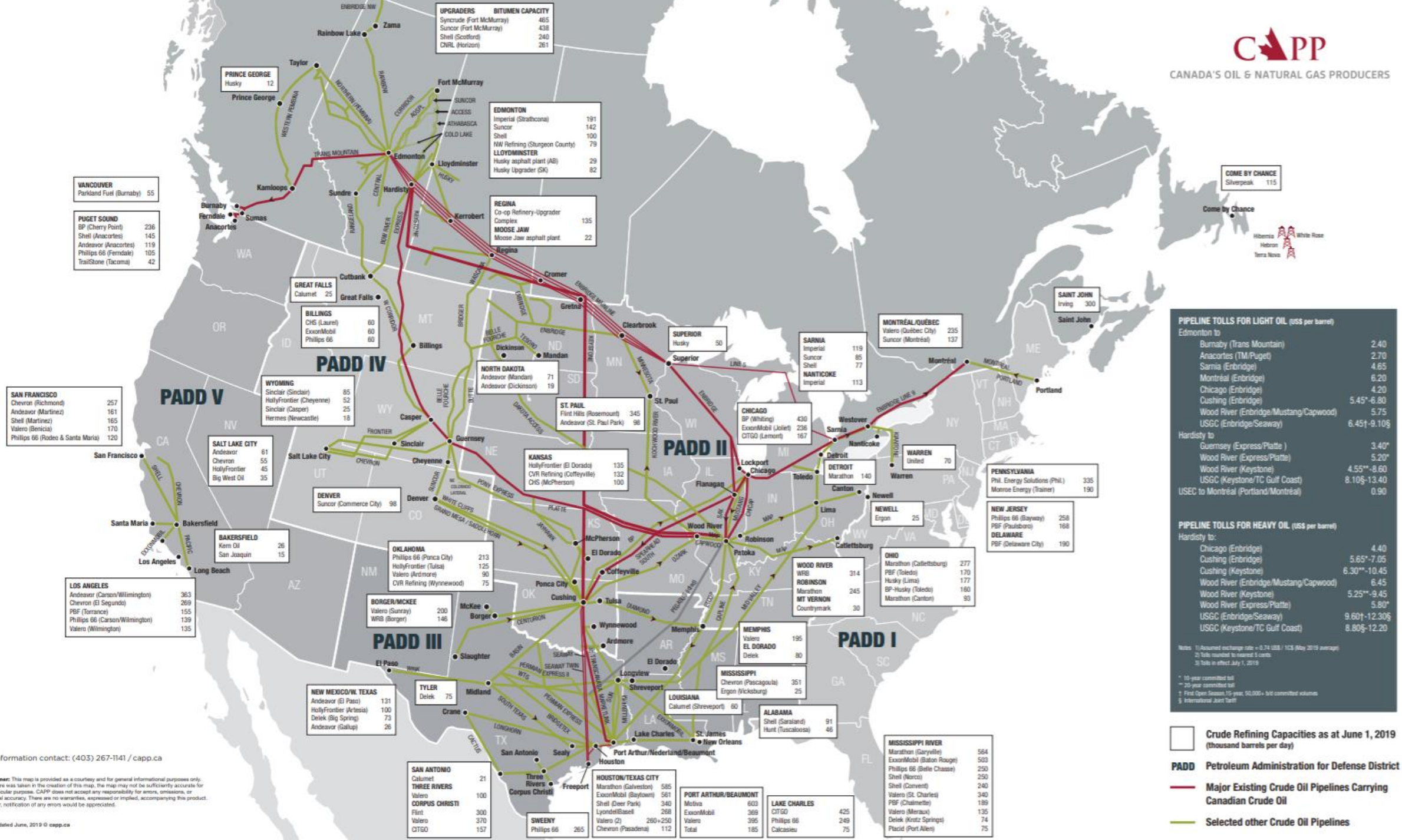


# Rail Destinations Market Share (May 2020)



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





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# Natural Gas Update



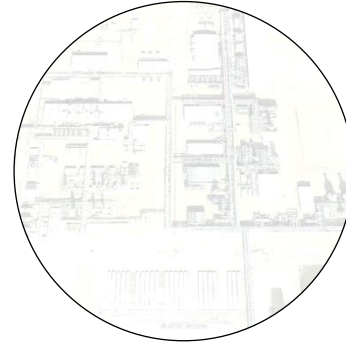
## Production

- Technology
- Markets



## Gathering

- Capacity
- Connections



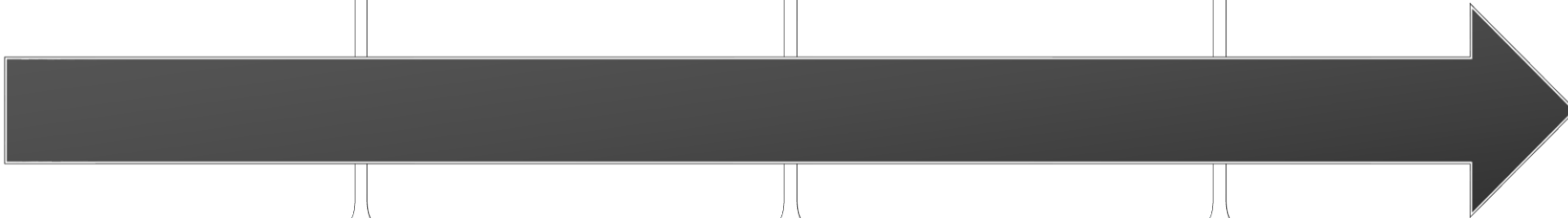
## Processing

- Capacity
- Location

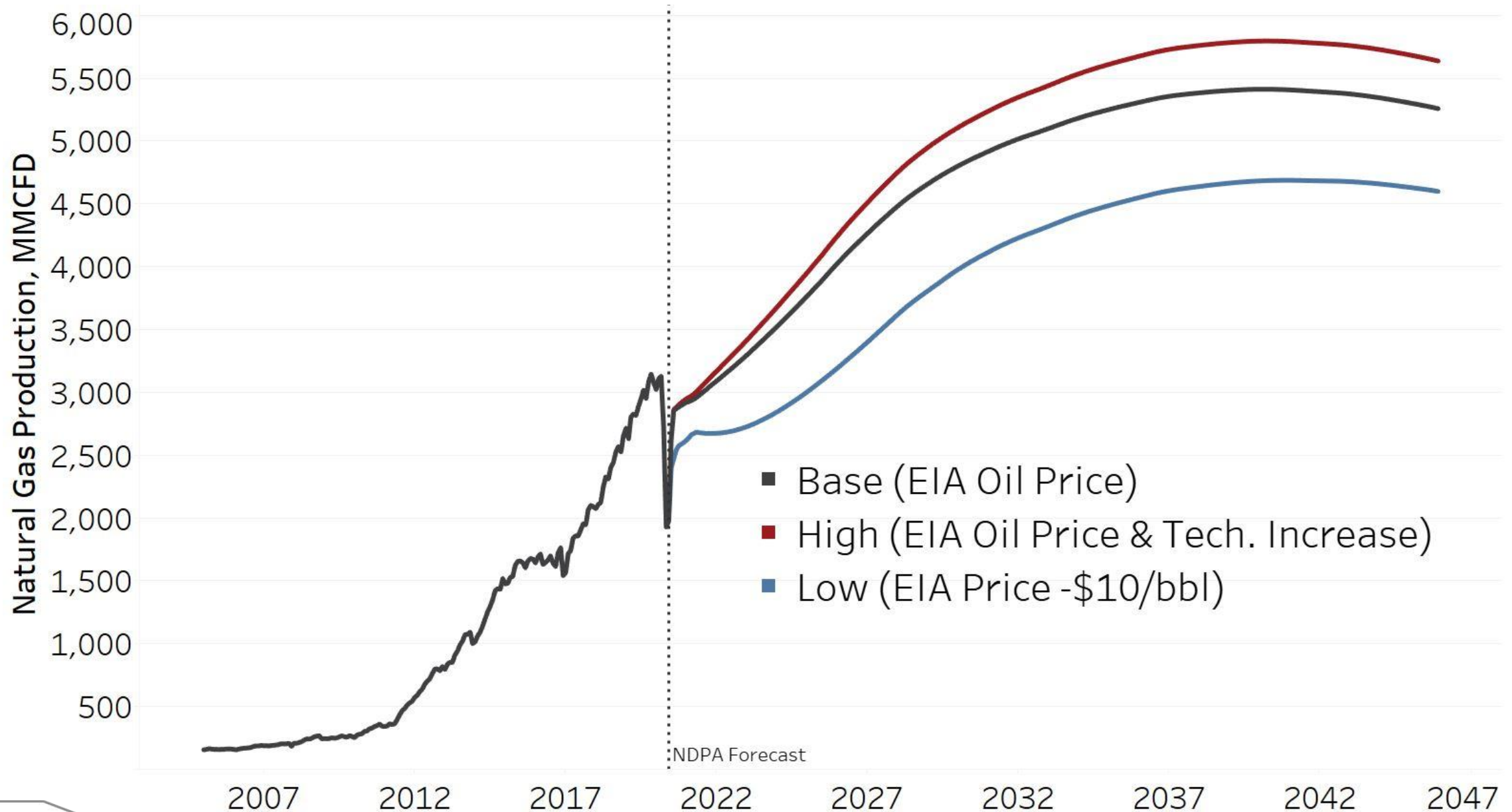


## Transmission

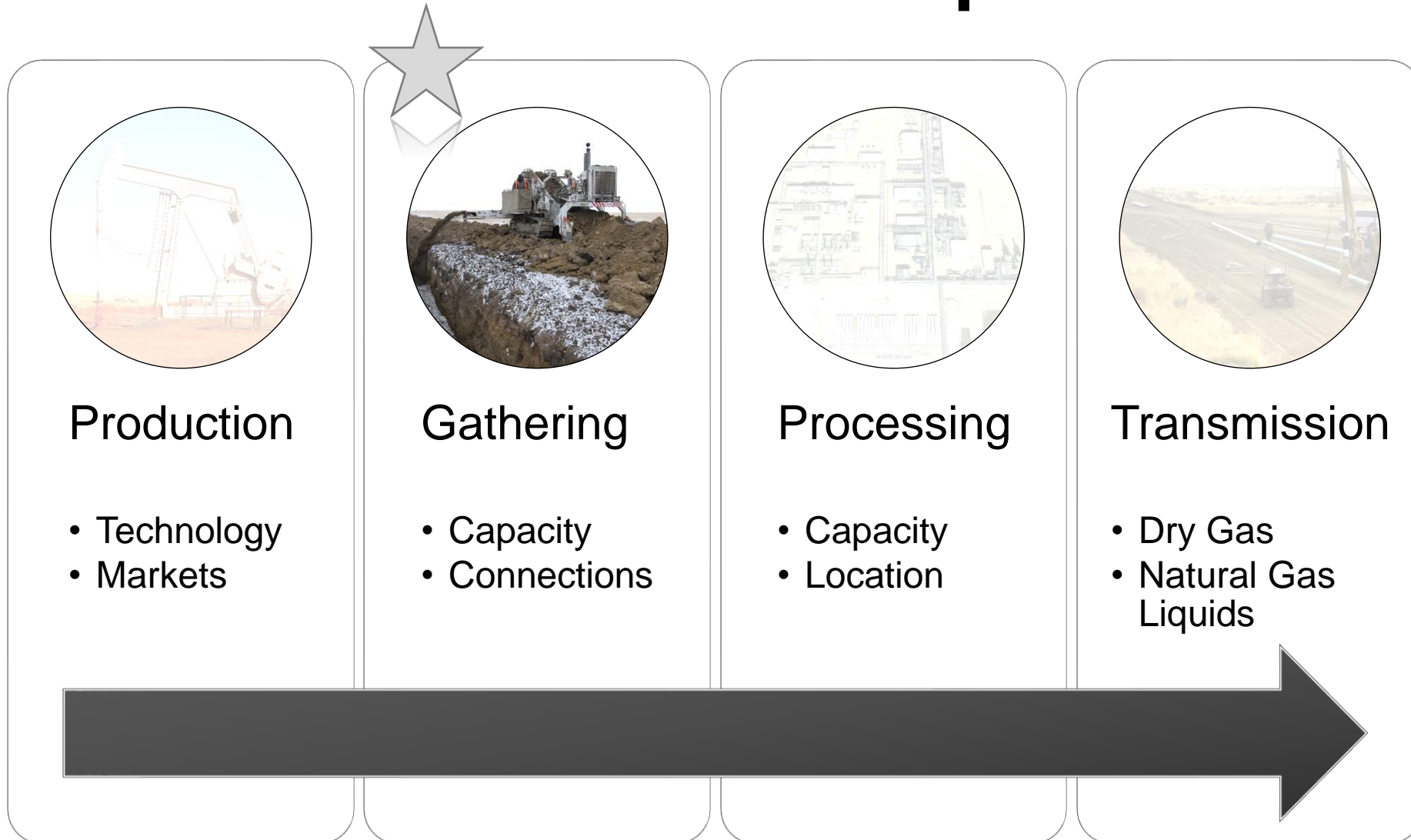
- Dry Gas
- Natural Gas Liquids



# ND Gas Production: EIA Price Deck

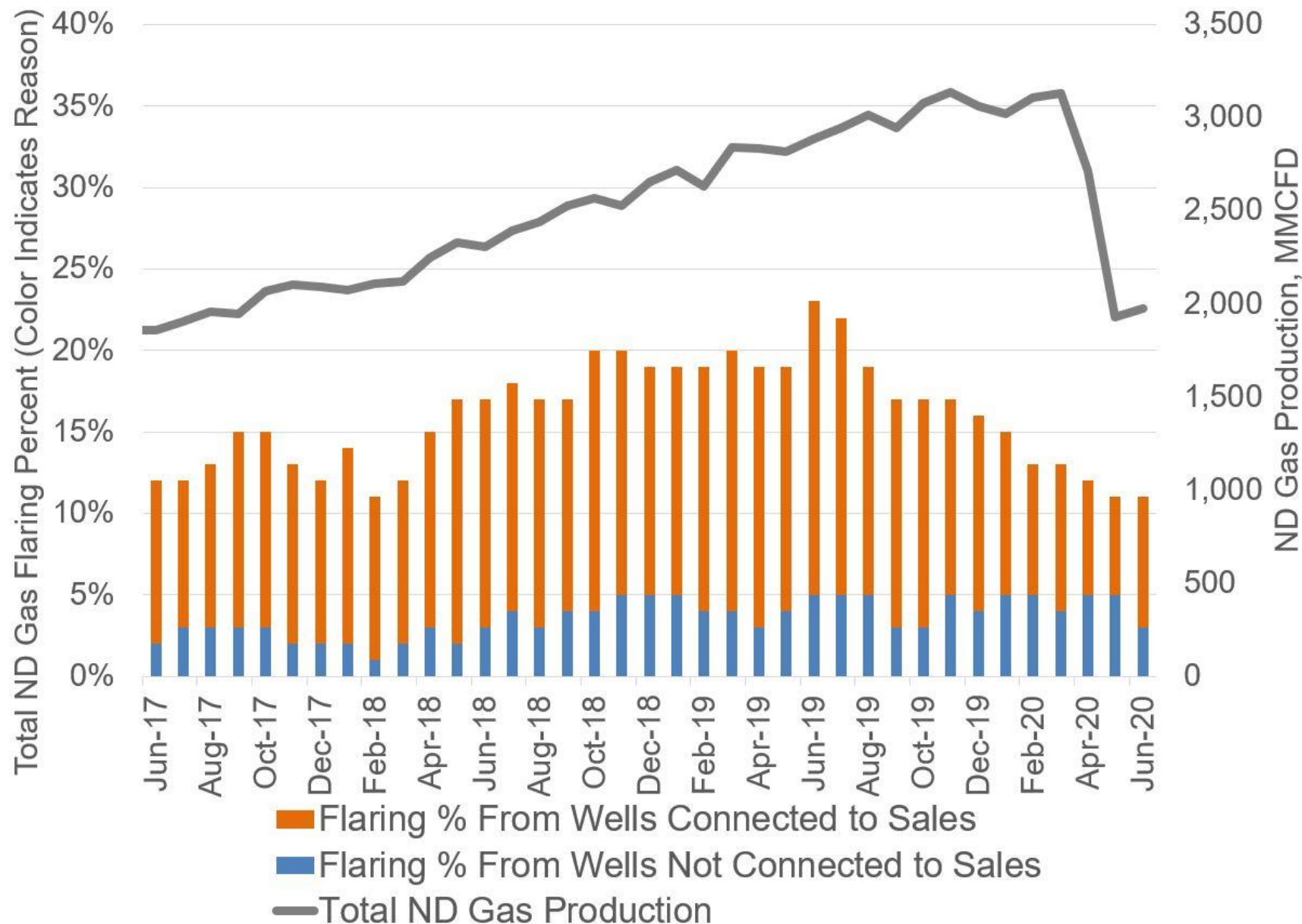


# Natural Gas Update

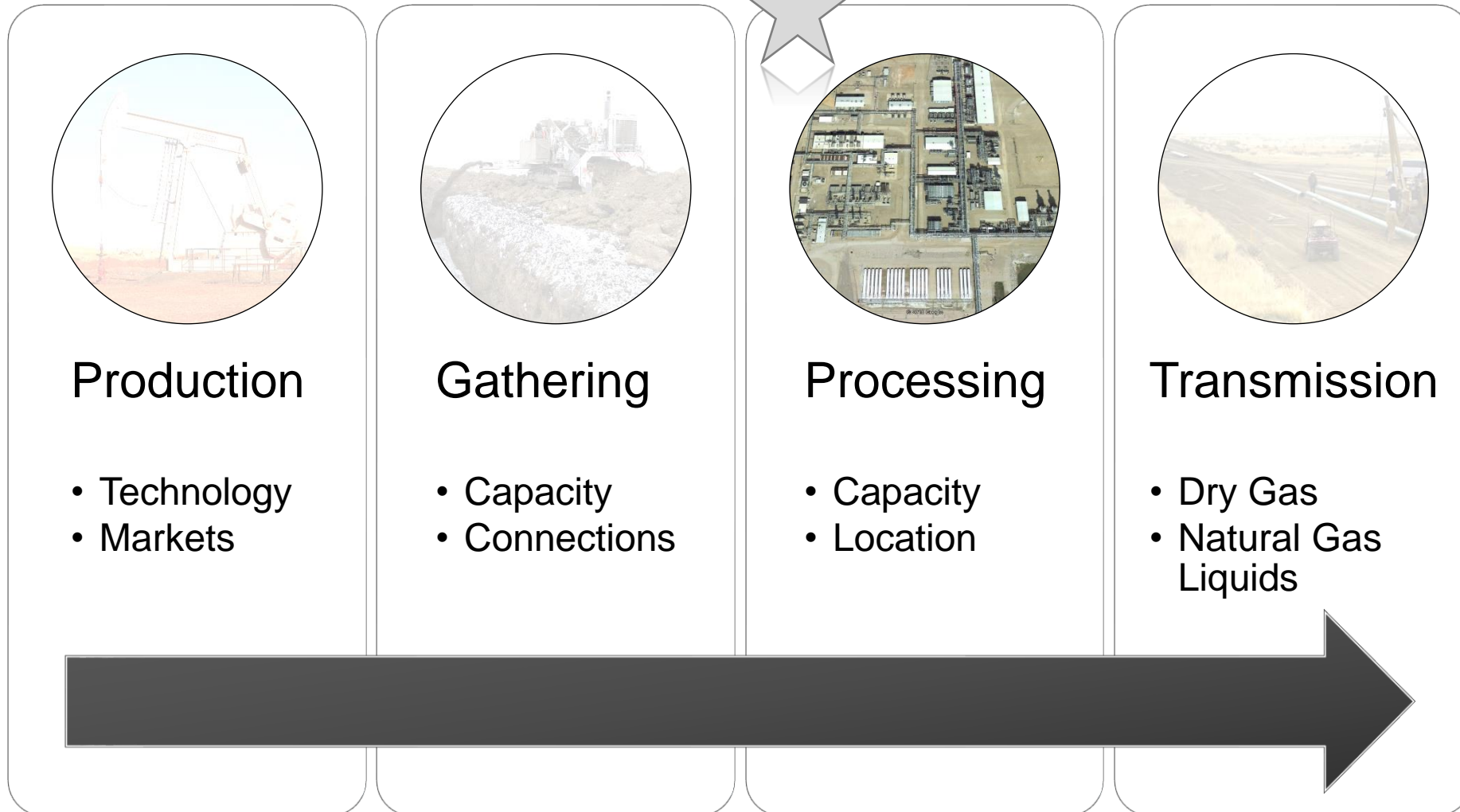




# Solving the Flaring Challenge

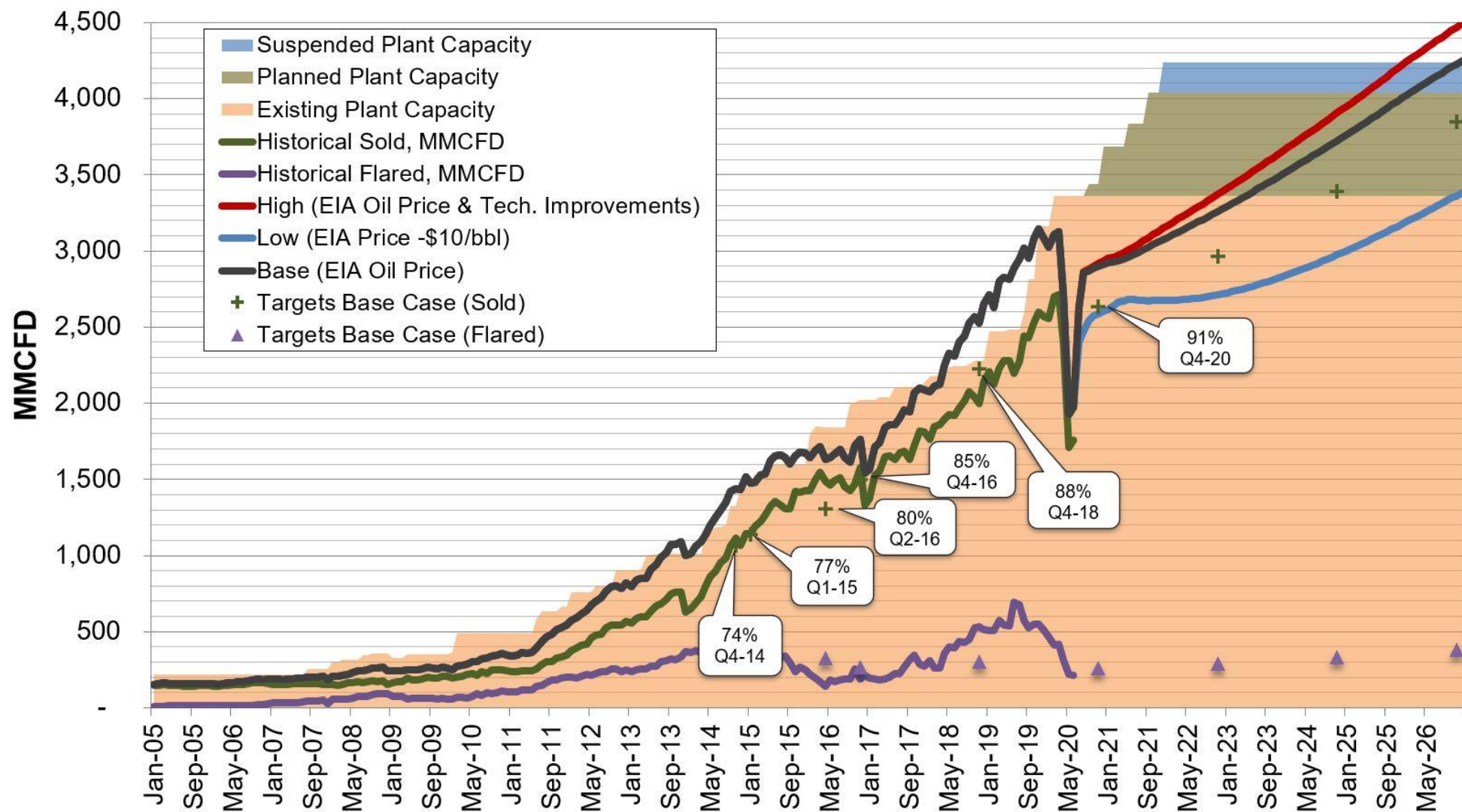


# Natural Gas Update



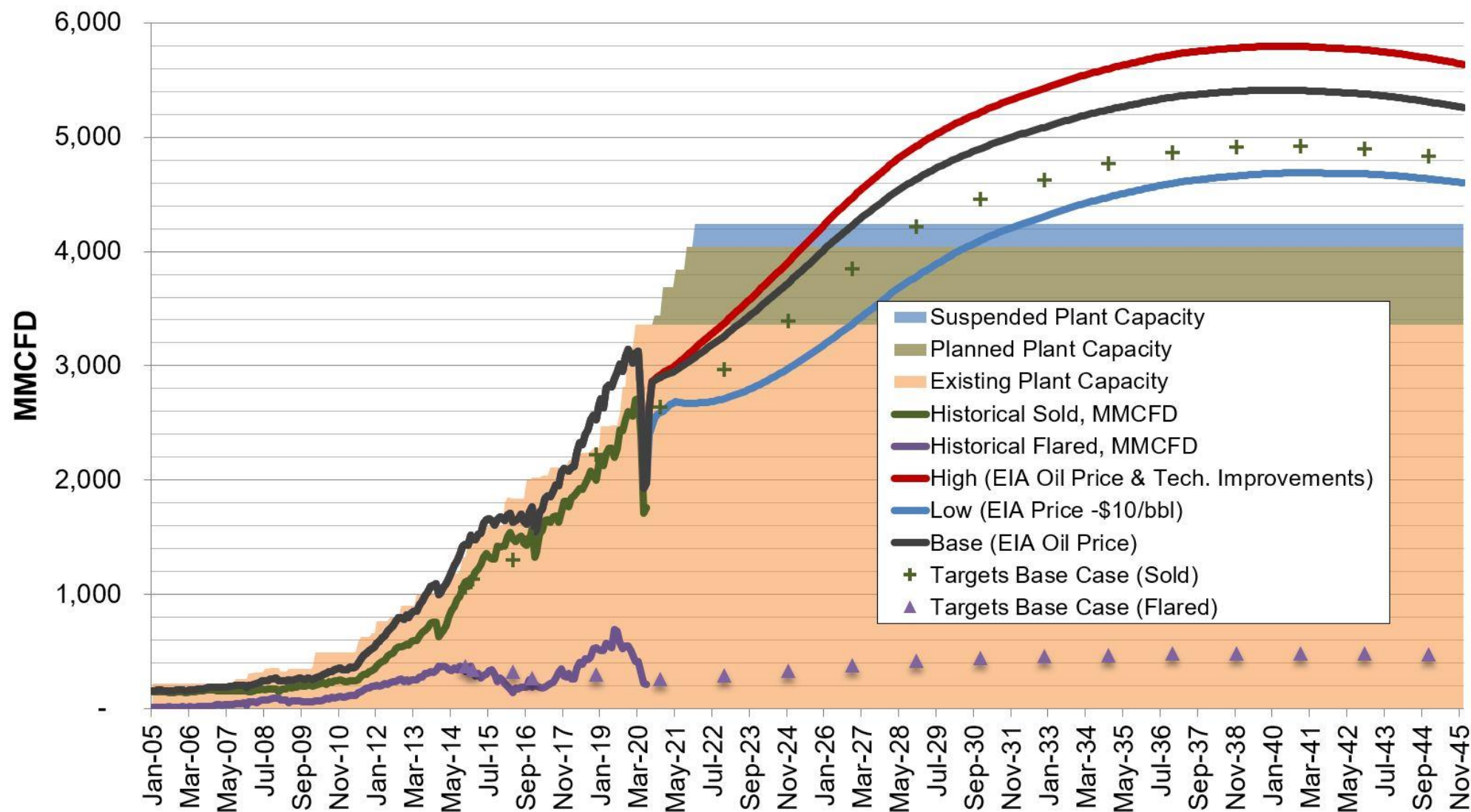
# Solving the Flaring Challenge

*Assumes Current Technology – Enhanced Oil Recovery Not Included*



# Solving the Flaring Challenge

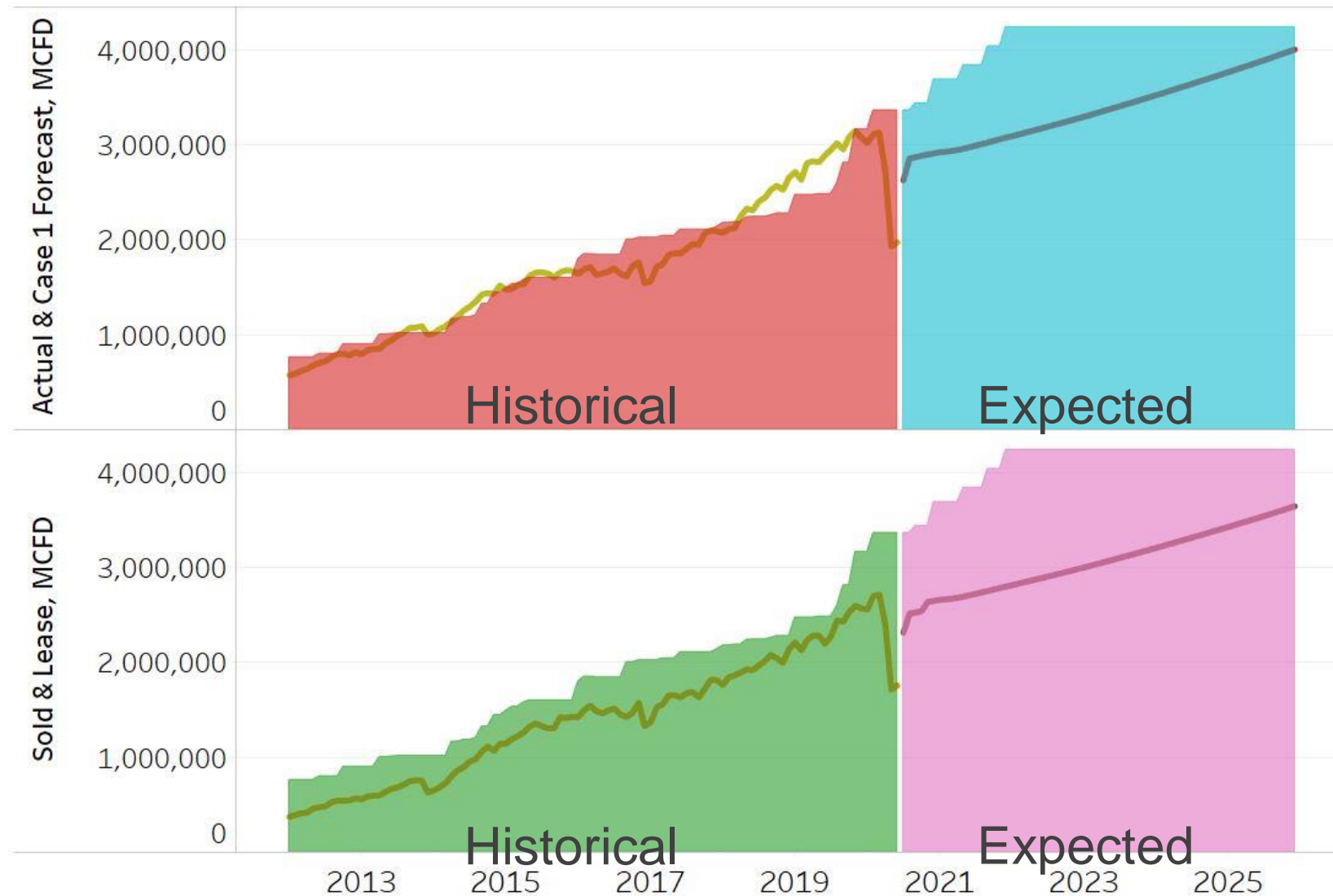
*Assumes Current Technology – Enhanced Oil Recovery Not Included*





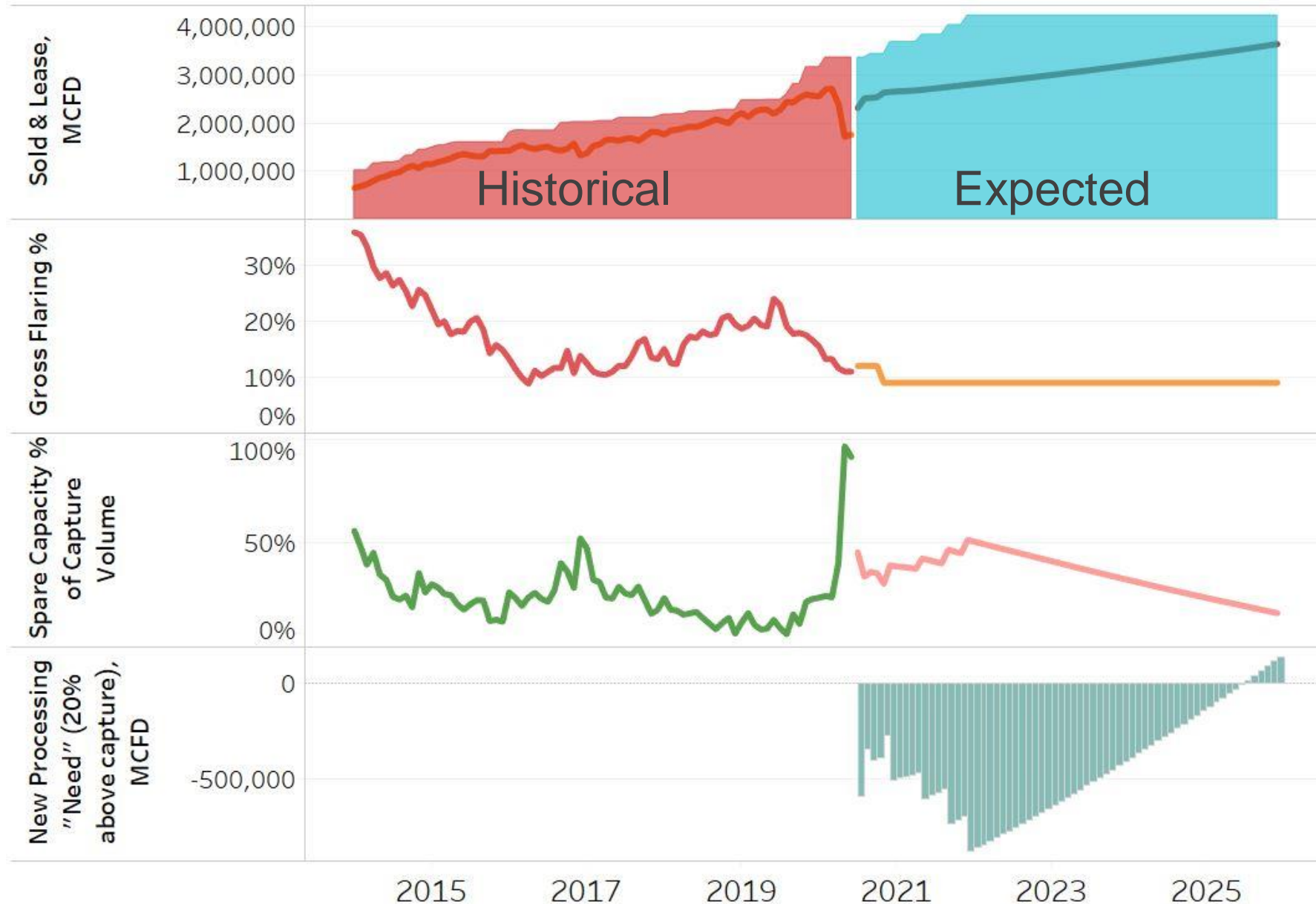
# Gas Processing Capacity & Future Outlook

*Assumes Current Technology – Enhanced Oil Recovery Not Included*

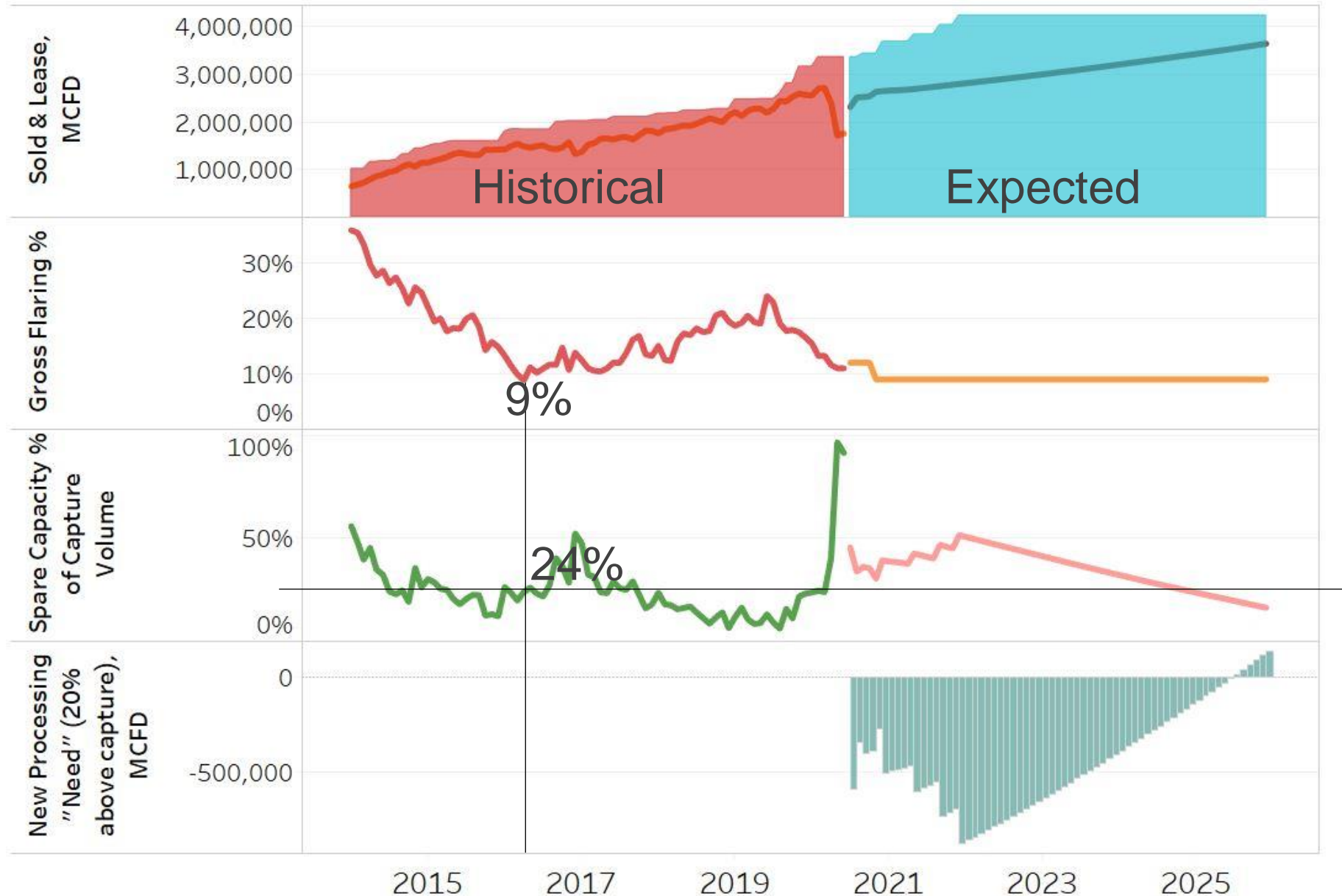




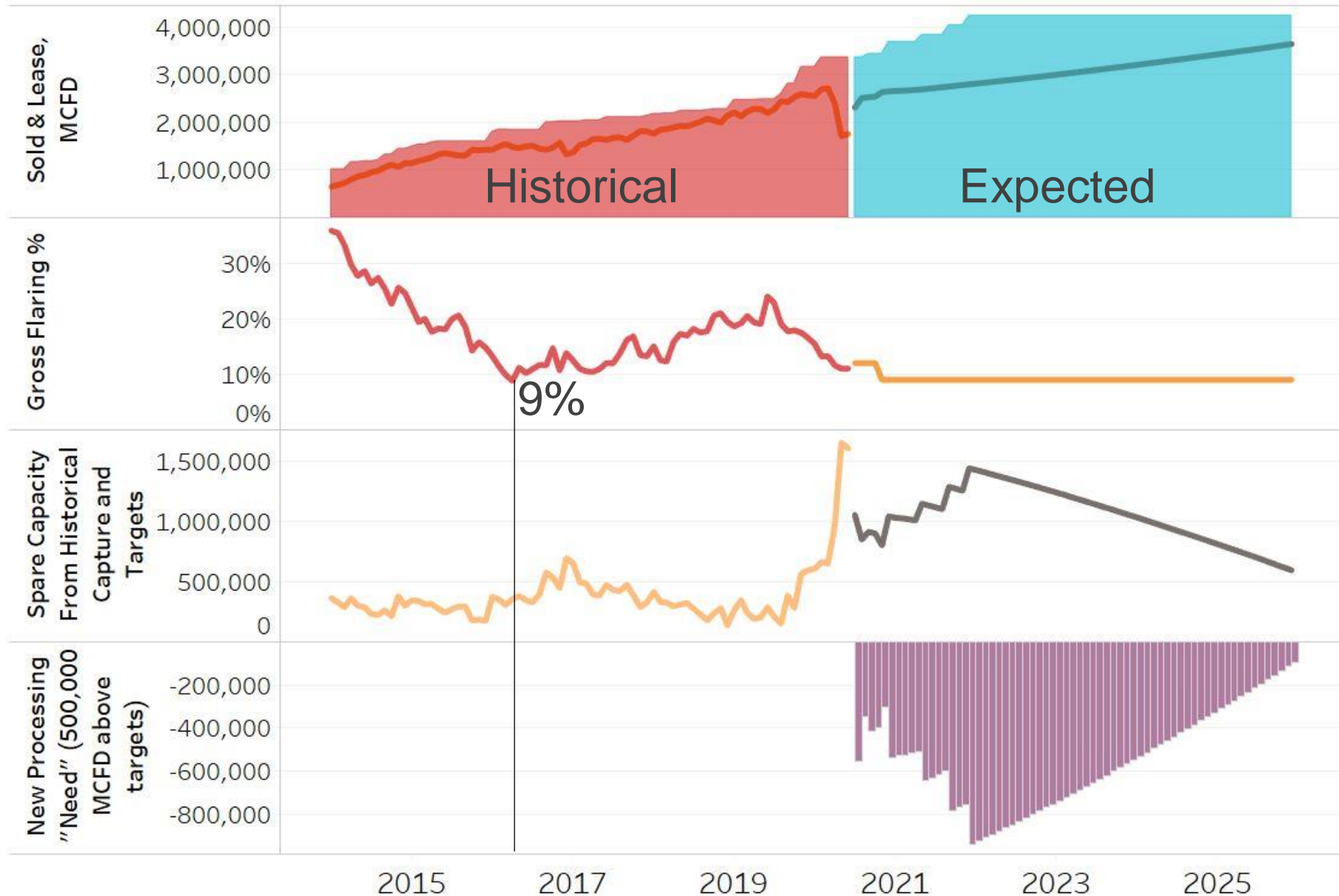
# Gas Processing Capacity & Spare Capacity



# Gas Processing Capacity & Spare Capacity

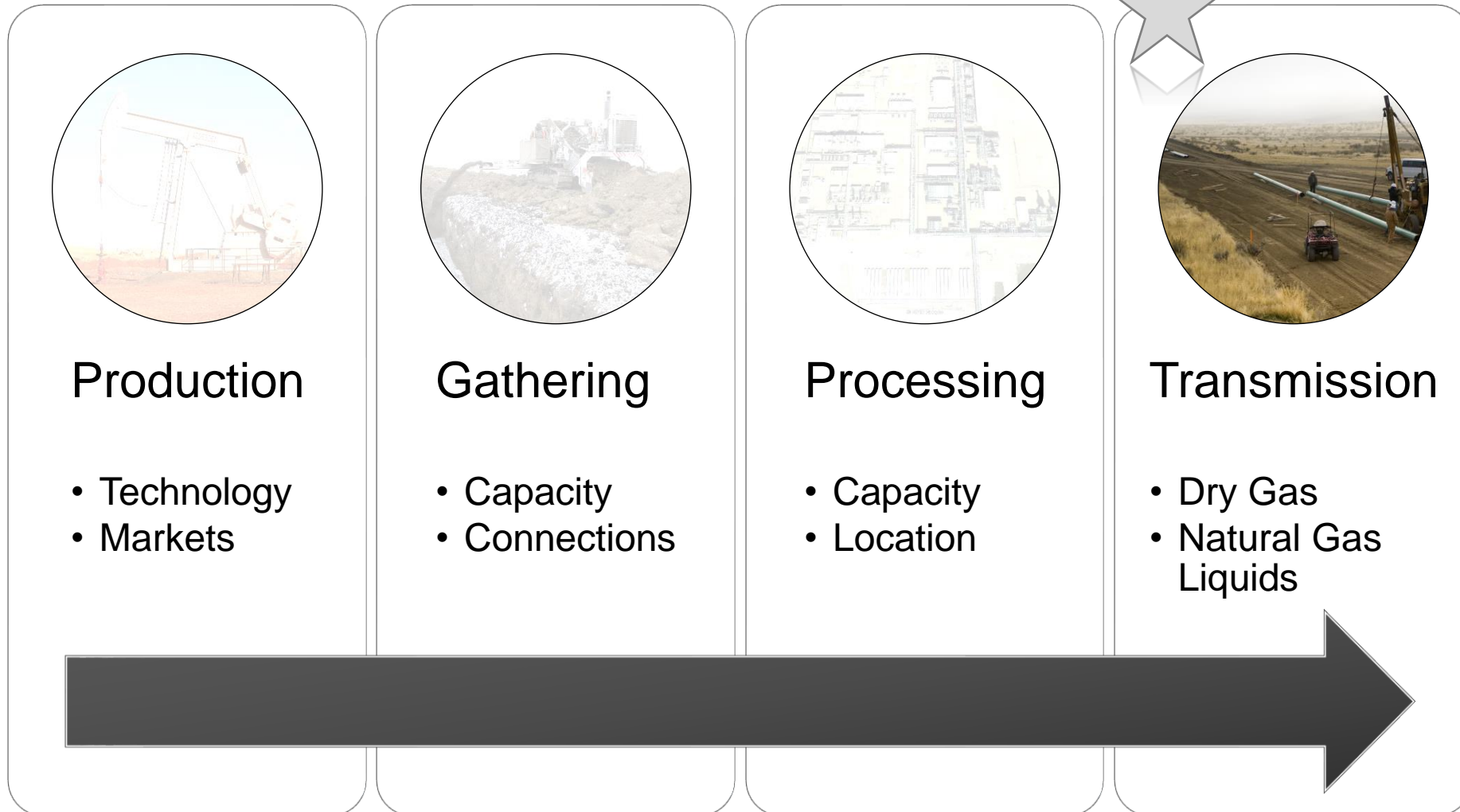


# Gas Processing Capacity & Spare Capacity

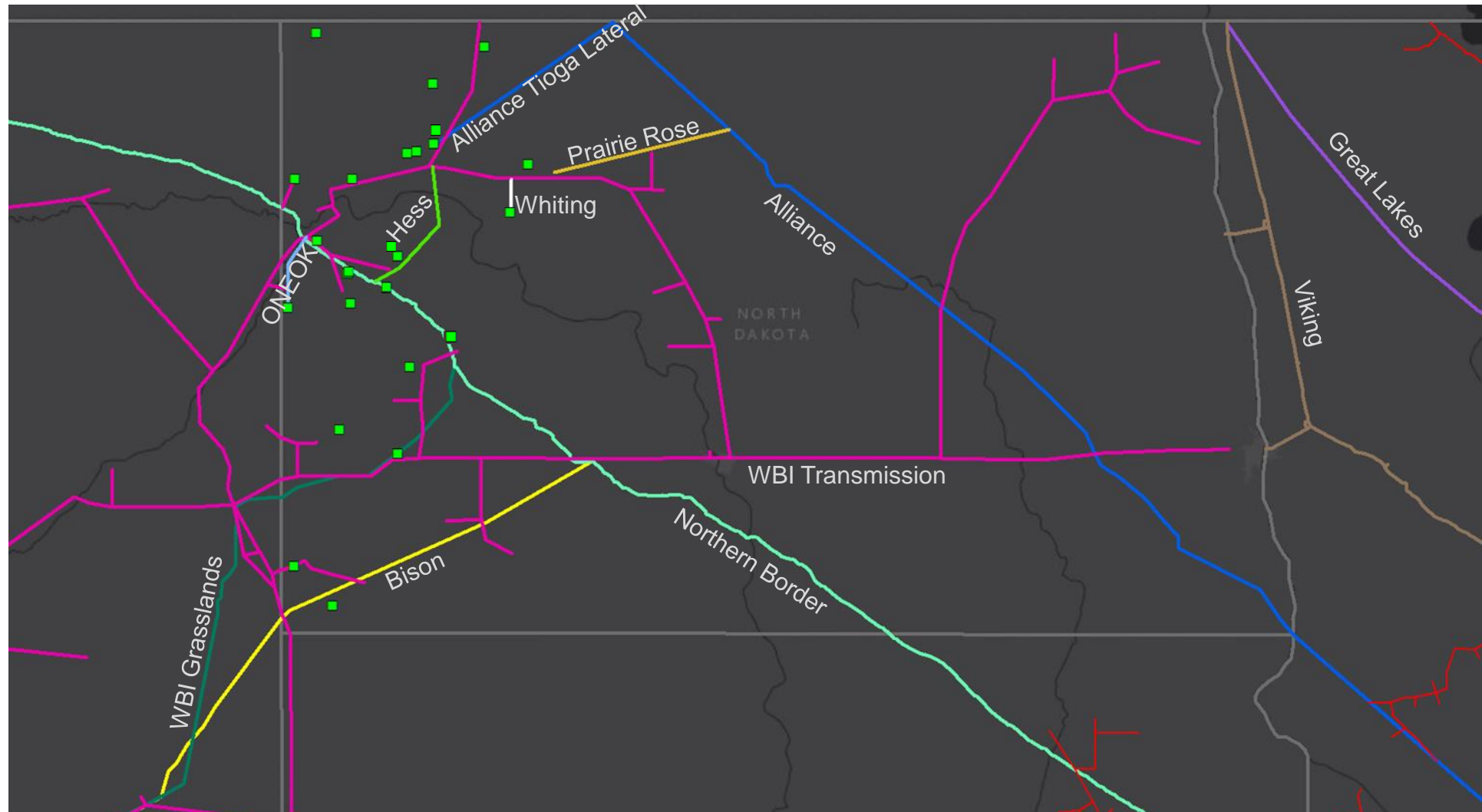




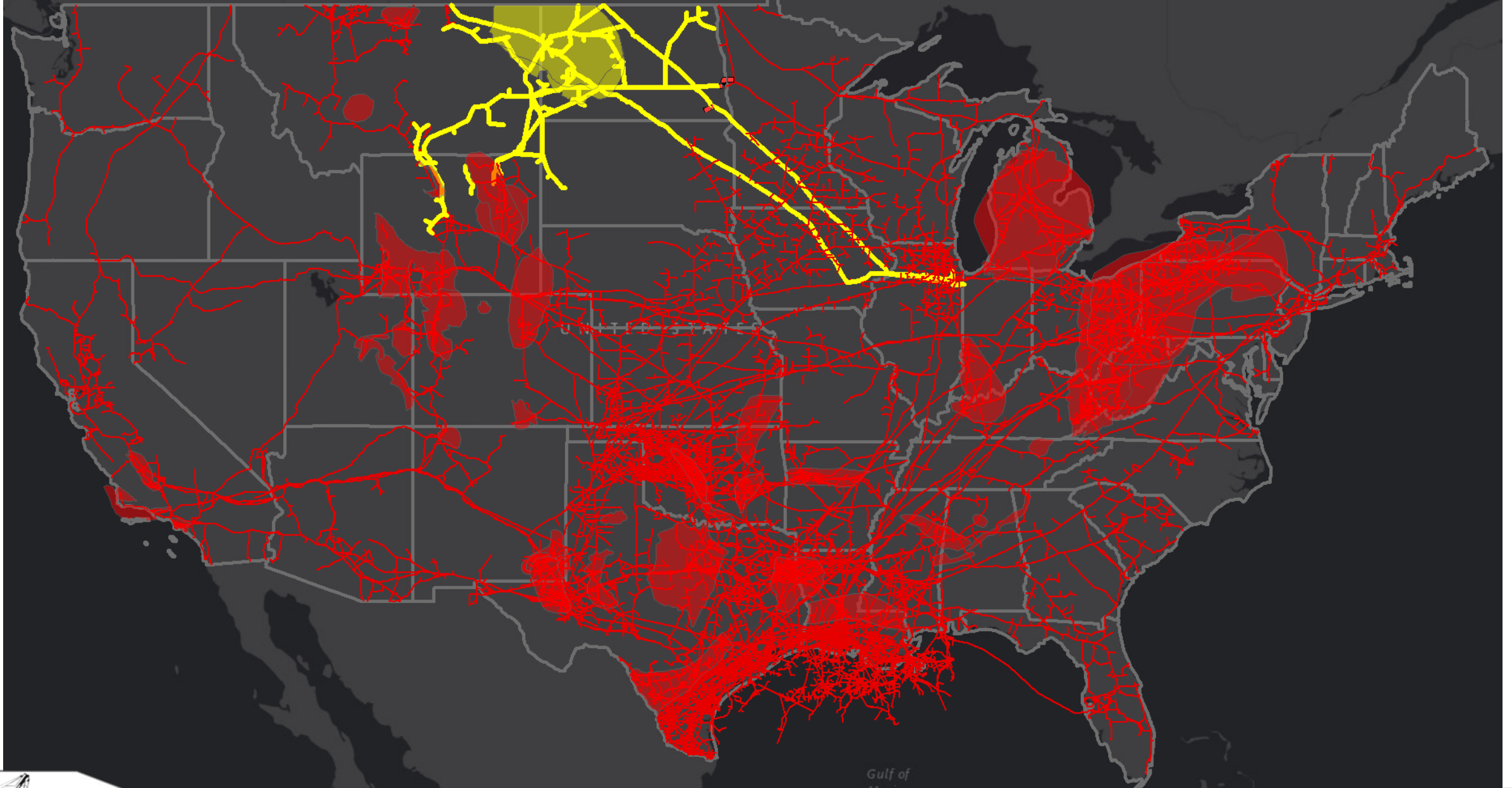
# Natural Gas Update



# Major Gas Pipeline and Processing Infrastructure

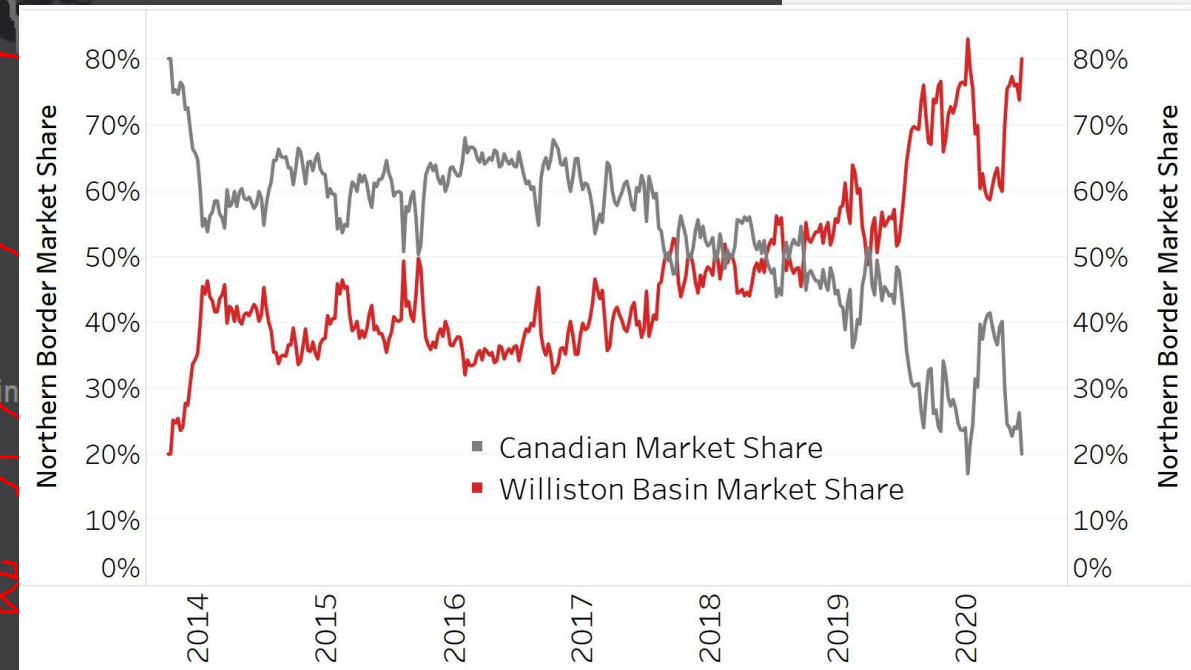
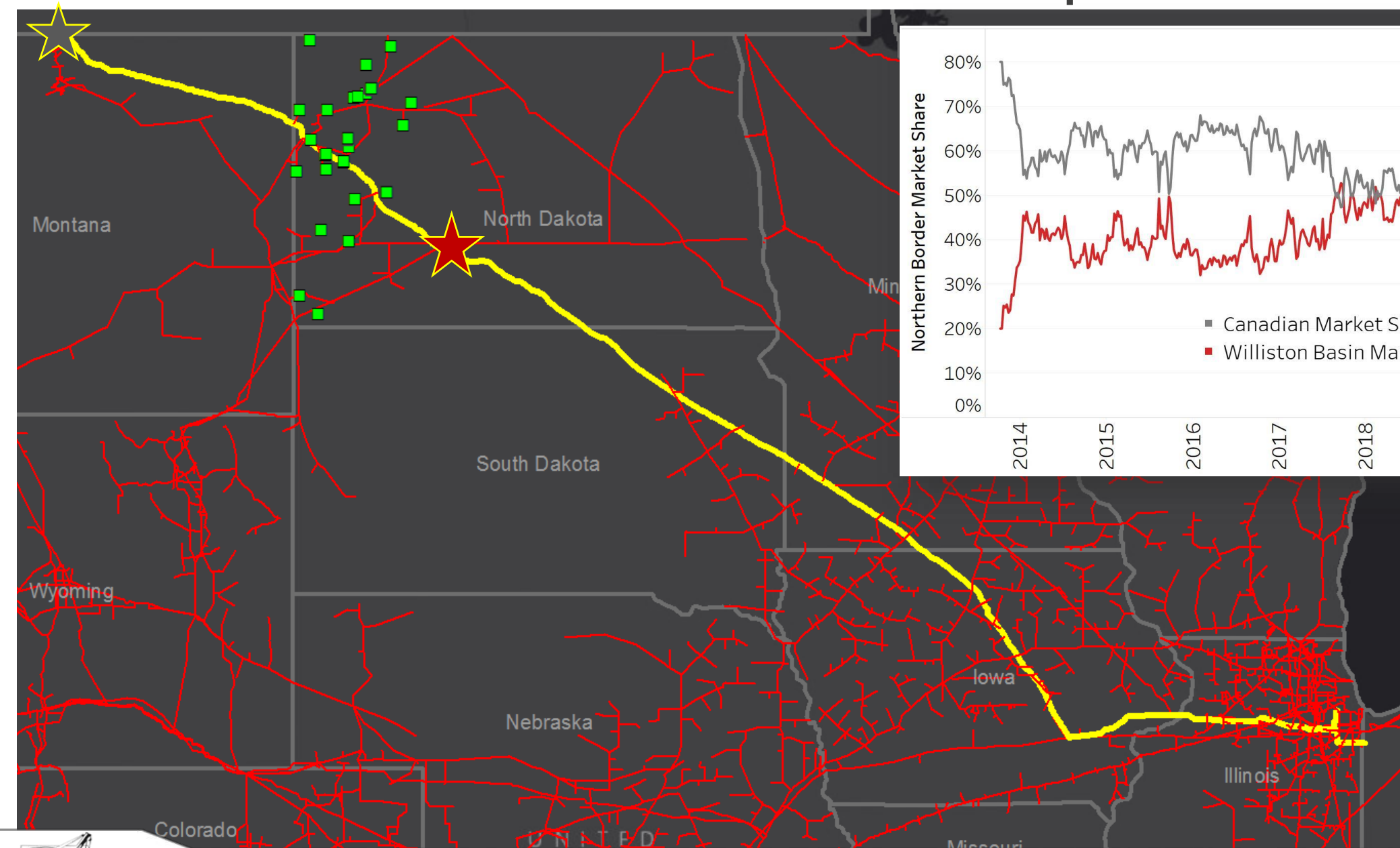


# Bakken Natural Gas Infrastructure

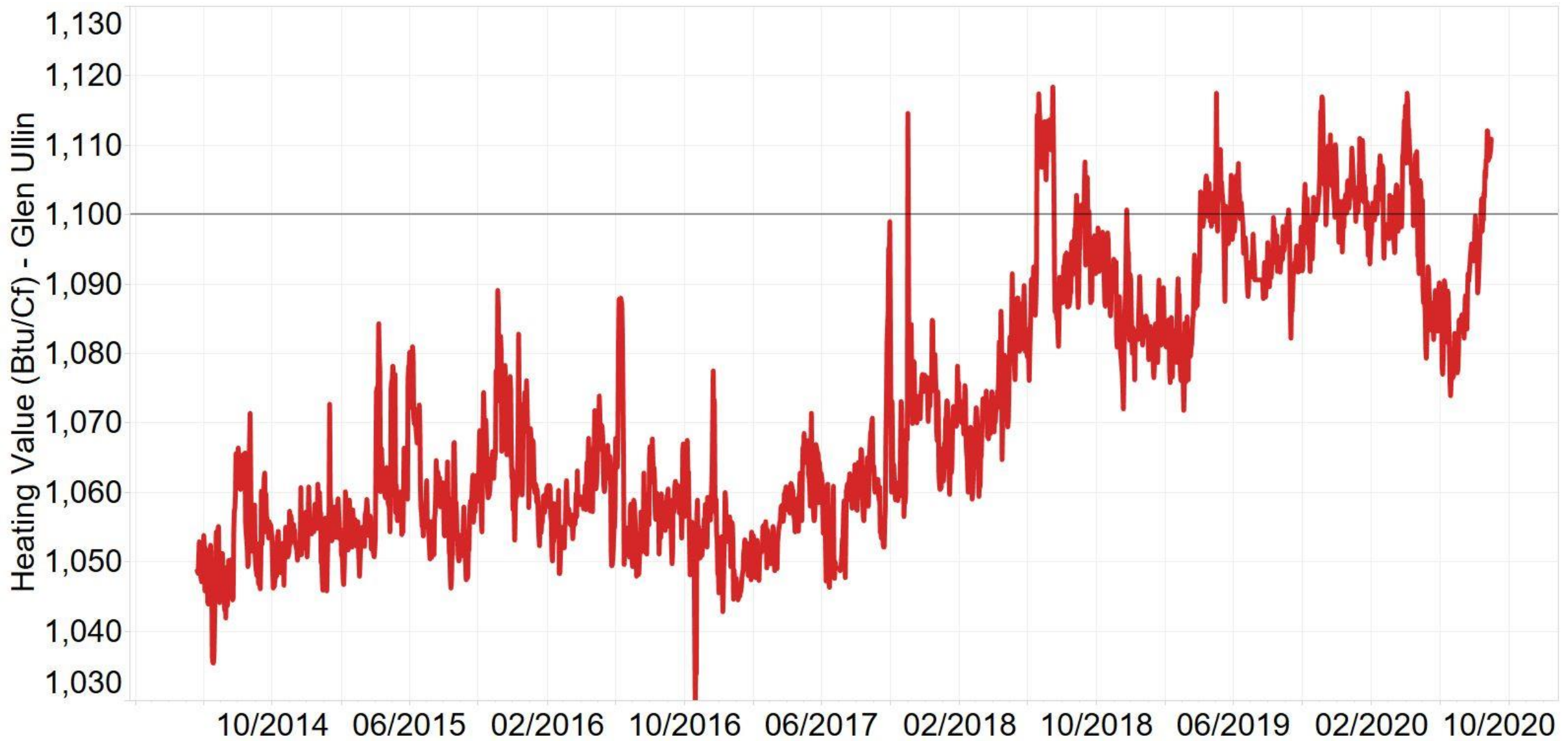




# Northern Border Pipeline

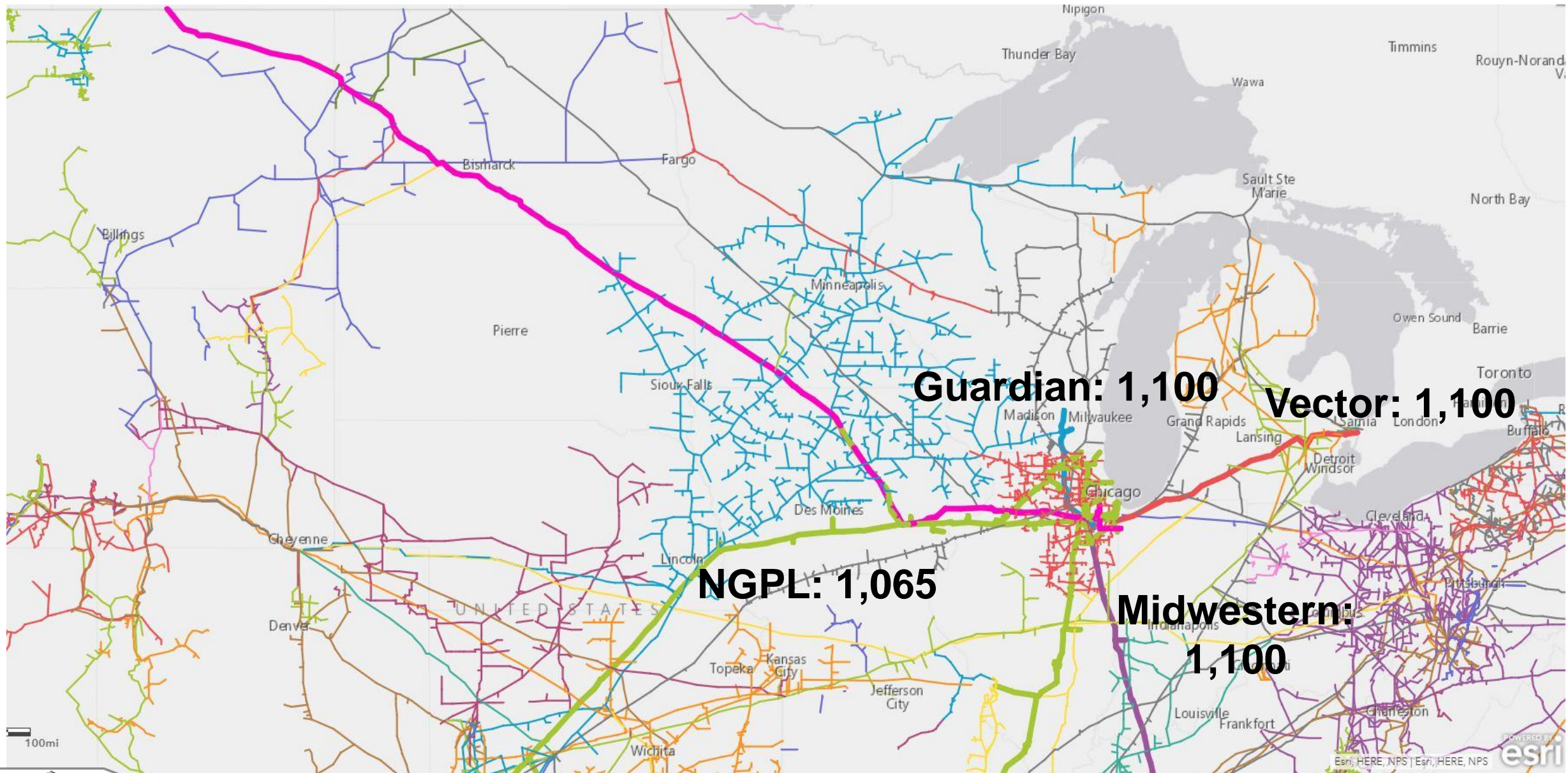


# Northern Border BTU at Glen Ullin, ND



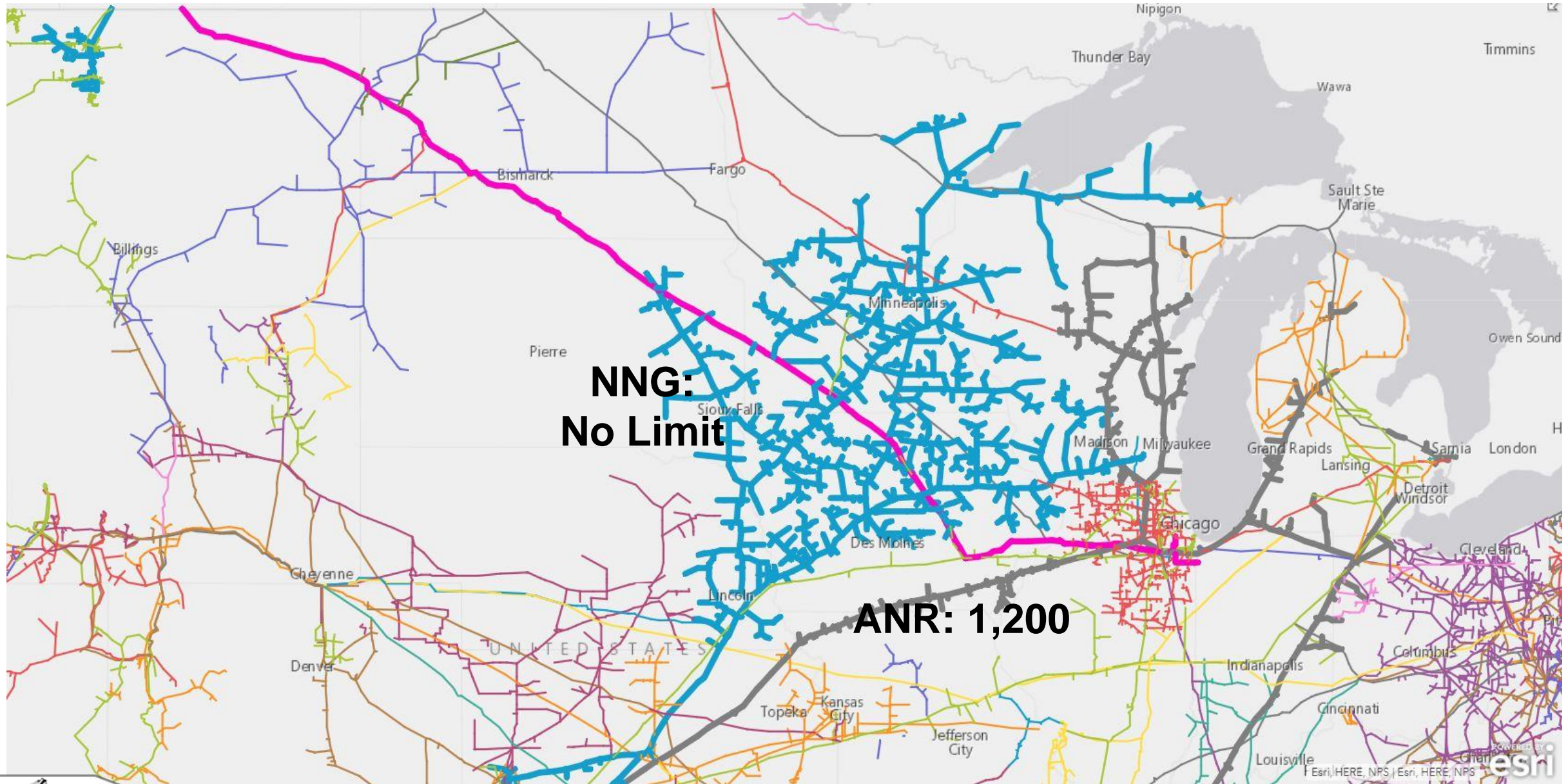


# NB Pipeline Interconnects With Known BTU Limits



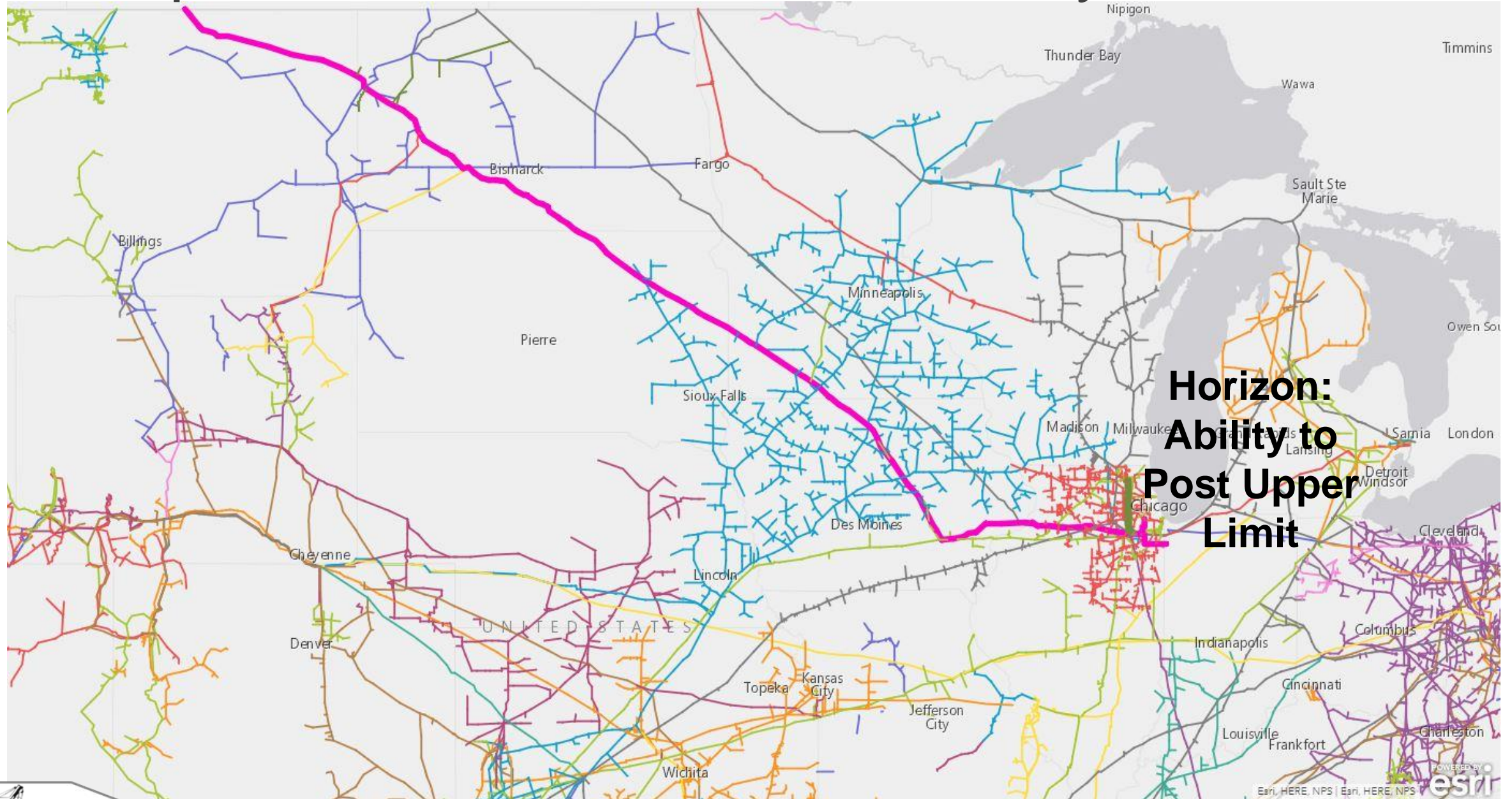


# NB Pipeline Interconnects With BTU Limits $> 1,100$

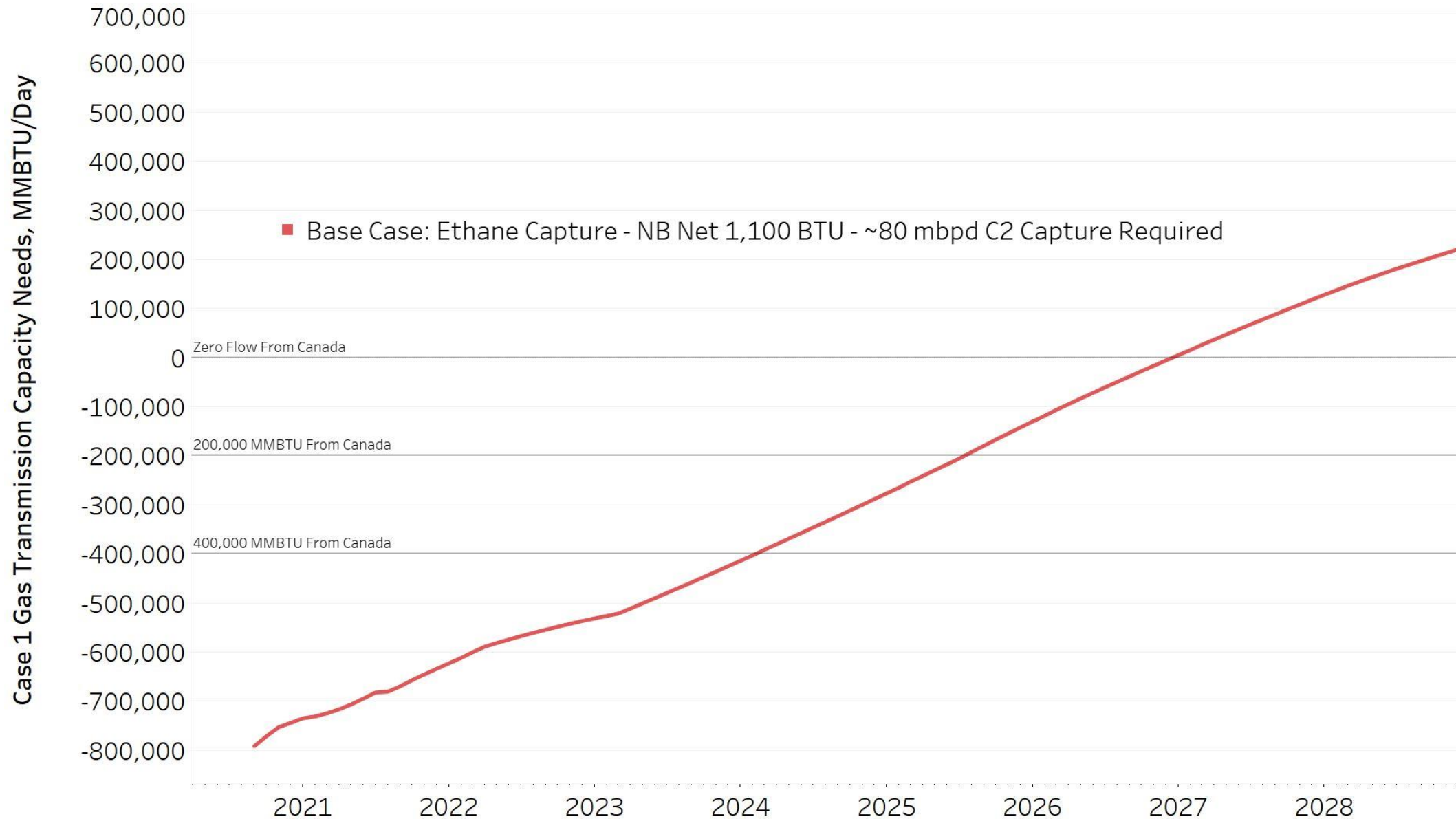




# NB Pipeline Interconnects With Ability to Add Limits

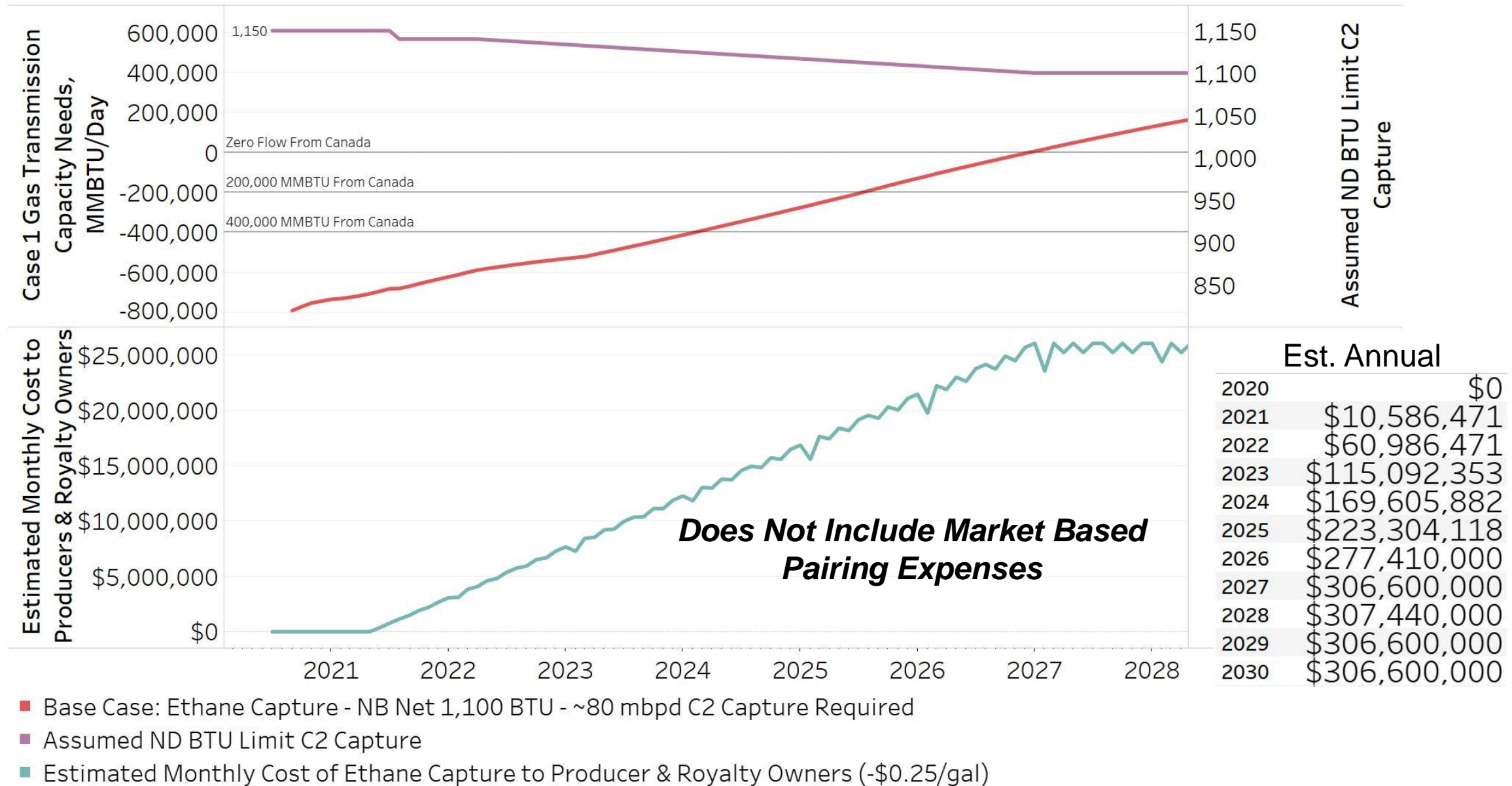


# Northern Border – BTU Calculations\*





# Northern Border – BTU Calculations\*



# BTU Calculations to Meet Proposed 1,100 BTU Spec.

## Approximate Q1-20 BTU Breakdown

Owner Company	Facility	NB Connection	Connection BTU	Major Pts	Glen Ullin	Glen Ullin
Arrow Field Services	Bear Den I	Alexander	1160	1144	1106	2,555,130
Arrow Field Services	Bear Den II	Alexander				
Steel Reef	Lignite	Charbonneau	1185			
ONEOK	Grasslands	Charbonneau				
True Oil	Red Wing Creek	Charbonneau				
Whiting Oil & Gas	Ray	Charbonneau				
Andeavor	Robinson Lake	Charbonneau				
XTO - Nesson	Ray	Charbonneau				
Hess	Tioga	Charbonneau				
Kinder Morgan	Norse	Charbonneau				
Liberty Midstream Solutions	County Line	Charbonneau				
1804 Ltd	Spring Brook	Charbonneau				
Petro Hunt	Little Knife	Glen Ullin	1124			
Andeavor	Belfield	Glen Ullin				
Caliber Midstream	Hay Butte	Hay Butte	1224			
ONEOK	Bear Creek	Killdeer	1136			
ONEOK	Bear Creek II	Killdeer				
Targa Resources	Badlands (LM1,	Little Missouri	1169			
Targa Resources	Badlands (LM3)	Little Missouri				
Kinder Morgan	Roosevelt	North Roosevelt	1170			
Outrigger Energy II	N/A	Outrigger	#DIV/0!			
ONEOK	Lonesome Creek	Rawson	1151			
Kinder Morgan	Roosevelt	Roosevelt	1155			
Targa/Hess JV	LM4	SE Little Missouri	1159			
ONEOK	Garden Creek I	Spring Creek	1155			
ONEOK	Garden Creek II	Spring Creek				
ONEOK	Garden Creek III	Spring Creek				
ONEOK	Demicks Lake	Spring Creek				
ONEOK	Demicks Lake II	Spring Creek				
ONEOK	Demicks Lake III	Spring Creek				
Oasis	Wild Basin	Spring Creek				
Kinder Morgan	Watford City	Squaw Creek	1175			
ONEOK	Stateline I	Stateline	1020			
ONEOK	Stateline II	Stateline				
Hess	Tioga	Watford City	1011			
Hebron	Hebron	Hebron	975	1020		
Manning	Manning	Manning	1127			
Port of Morgan	Port of Morgan	Port of Morgan	1029		1029	

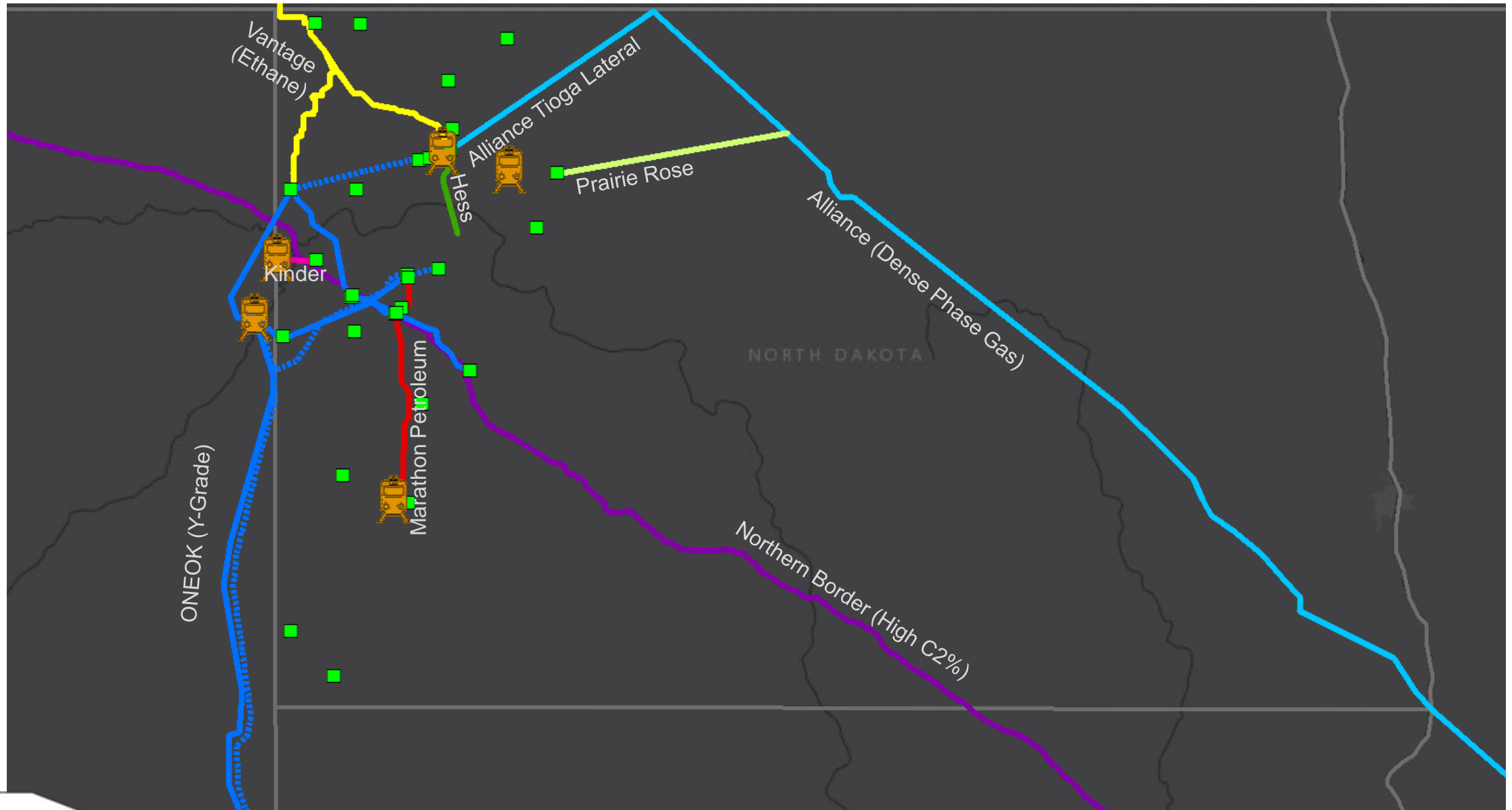
## Demo Pairing Exercise to Meet 1,100 or Less\*

Owner Company	Facility	NB Connection	Connection BTU	Major Pts	Glen Ullin	Glen Ullin
Arrow Field Services	Bear Den I	Alexander	1096	1095	1091	2,520,288
Arrow Field Services	Bear Den II	Alexander				
Steel Reef	Lignite	Charbonneau	1163			
ONEOK	Grasslands	Charbonneau				
True Oil	Red Wing Creek	Charbonneau				
Whiting Oil & Gas	Ray	Charbonneau				
Andeavor	Robinson Lake	Charbonneau				
XTO - Nesson	Ray	Charbonneau				
Hess	Tioga	Charbonneau				
Kinder Morgan	Norse	Charbonneau				
Liberty Midstream Solutions	County Line	Charbonneau				
1804 Ltd	Spring Brook	Charbonneau				
Petro Hunt	Little Knife	Glen Ullin	1124			
Andeavor	Belfield	Glen Ullin				
Caliber Midstream	Hay Butte	Hay Butte	1224			
ONEOK	Bear Creek	Killdeer	1065			
ONEOK	Bear Creek II	Killdeer				
Targa Resources	Badlands (LM1,	Little Missouri	1116			
Targa Resources	Badlands (LM3)	Little Missouri				
Kinder Morgan	Roosevelt	North Roosevelt	1100			
Outrigger Energy II	N/A	Outrigger	1020			
ONEOK	Lonesome Creek	Rawson	1080			
Kinder Morgan	Roosevelt	Roosevelt	1080			
Targa/Hess JV	LM4	SE Little Missouri	1159			
ONEOK	Garden Creek I	Spring Creek	1111			
ONEOK	Garden Creek II	Spring Creek				
ONEOK	Garden Creek III	Spring Creek				
ONEOK	Demicks Lake	Spring Creek				
ONEOK	Demicks Lake II	Spring Creek				
ONEOK	Demicks Lake III	Spring Creek				
Oasis	Wild Basin	Spring Creek				
Kinder Morgan	Watford City	Squaw Creek	1100			
ONEOK	Stateline I	Stateline	1020			
ONEOK	Stateline II	Stateline				
Hess	Tioga	Watford City/WBI	1020			
Hebron	Hebron	Hebron	975	1020		
Manning	Manning	Manning	1127			
Port of Morgan	Port of Morgan	Port of Morgan	#DIV/0!	#DIV/0!		

*\*Exact plant specifications are not publicly available and many assumptions needed to be made for demo pairing. Table may contain errors.*

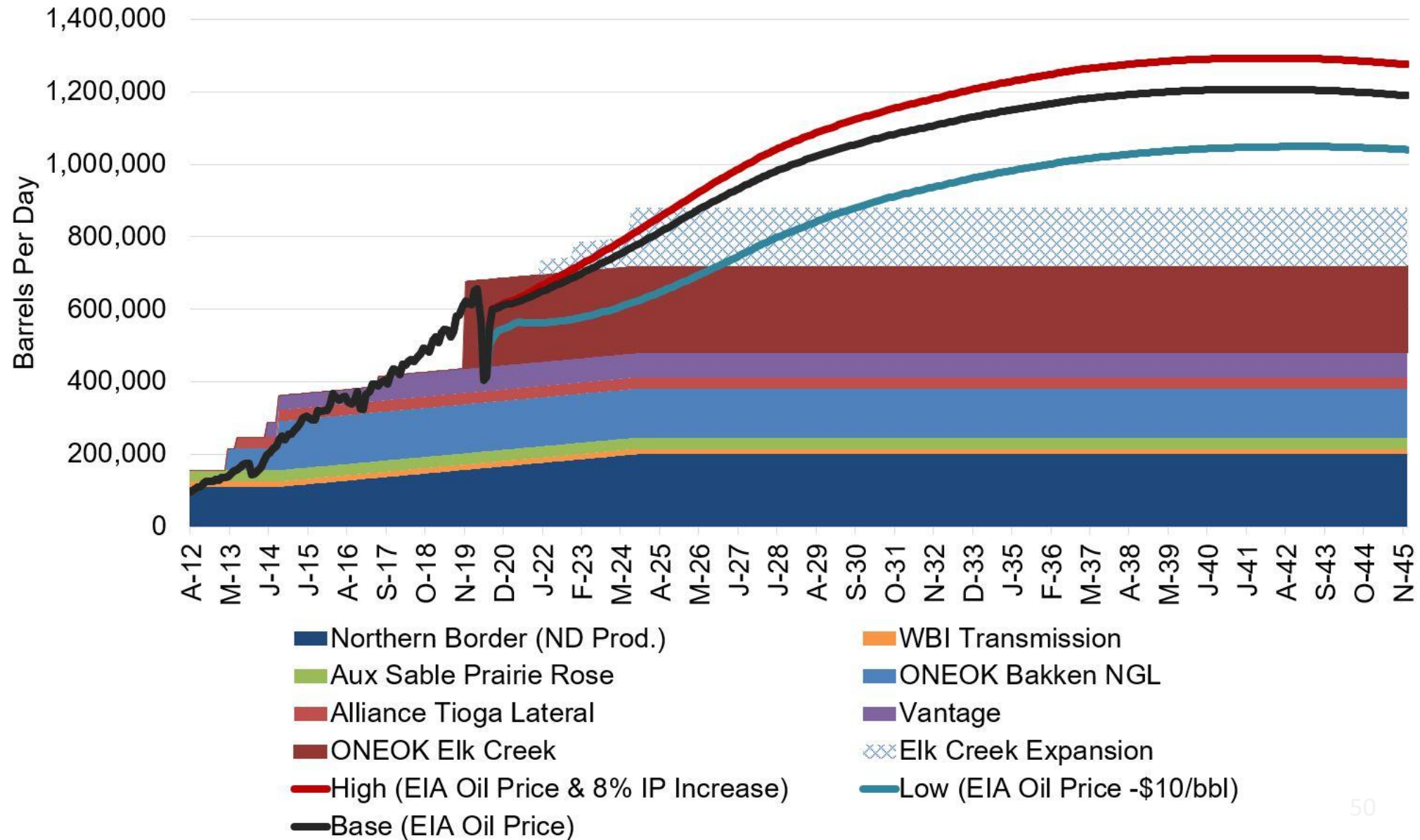


# Regional NGL Infrastructure





# NGL Pipeline Takeaway Options



# Contact Information

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North Dakota Pipeline Authority

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Call before you dig.**

Websites:

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

