North Dakota Petroleum Council

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September 26, 2018
Natural Gas Update

Production
- Technology
- Markets

Gathering
- Capacity
- Connections

Processing
- Capacity
- Location

Transmission
- Dry Gas
- Natural Gas Liquids
DOE-EIA Forecasted Oil Price

- EIA Forecast
- Historical
North Dakota Oil Production Forecast

- NDPA Oil Forecast: Case 1
- NDPA Oil Forecast: Case 2
Statewide Gas Performance

~16% Improvement Over 2017

Average BKN/TF Well Performance Statewide
Bakken and Three Forks Well Performance
Historic Bakken/Three Forks GOR

GOR

Oil, bbl

Gas, Mcf

Wells

Current Statewide Bakken/Three Forks GOR

GOR

NDPA North Dakota Gas Production Forecast

![Graph showing natural gas production forecast with two cases: ND Gas Case 1 and ND Gas Case 2. The graph includes data from 2009 to 2035.](image-url)
NDIC “Core” Activity

Non-Confidential Well Completions

Wells Drilling or Confidential Status

NDIC Core
- Core
- Non-Core

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Solving the Flaring Challenge

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

July 2018 Data – Non-Confidential Wells
Flaring By Category – July 2017

Non-Confidential Wells Only

Non-Confidential Wells Only
Flaring By Category – July 2018

Non-Confidential Wells Only

Non-Confidential Wells Only
Average Bakken/Three Forks Well Flaring Volumes
Avg. Statewide Monthly Flaring For Connected Wells

IP Year
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018

Flare Gas Percentage

Production Month
Solving the Flaring Challenge

- New Wells Selling Gas
- New Producing Wells

Number of Wells Per Month

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Solving the Flaring Challenge

- Planned Plant Capacity
- Existing Plant Capacity
- NDPA Case 1 Forecast
- NDPA Case 2 Forecast
- Historical Sold, MMCFD
- Historical Flared, MMCFD
-Targets Case 1 (Sold)
-Targets Case 1 (Flared)
Solving the Flaring Challenge

- Planned Plant Capacity
- Existing Plant Capacity
- NDPA Case 1 Forecast
- NDPA Case 2 Forecast
- Historical Sold, MMCFD
- Historical Flared, MMCFD
- Targets Case 1 (Sold)
- Targets Case 1 (Flared)
Upcoming Expansion

- No
- Yes
Upcoming Expansion

MMCFD
Natural Gas Update

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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

*Data Source: Northern Border IPS*
Northern Border Pipeline

*Data Source: Northern Border IPS*
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 1.28-1.58 BCFD (from July-18) before Northern Border is 100% Bakken production. **BTU management becomes increasingly important for Bakken residue gas.**
Conclusion: **IF** no other gas export options open and all other deliveries on other pipelines stay static, ND gas production could increase 1.28-1.58 BCFD (from July-18) before Northern Border is 100% Bakken production. *BTU management becomes increasingly important for Bakken residue gas.*

- **Gas Plants With C2+ Capture**
  - ~1,010+ BTU Residue Gas
- **Gas Plants With C3+ Capture**
  - ~1,150+ BTU Residue Gas
Foothills Pipeline

Map & Raw Data Source: TransCanada
Now What?
LNG Exports to Benefit ND by Shifting Gas Flow
LNG Exports to Benefit ND by Shifting Gas Flow
Regional NGL Infrastructure

- Kinder
- Alliance Tioga Lateral
- Prairie Rose
- Alliance (Dense Phase Gas)
- ONEOK (Y-Grade)
- Northern Border (High CO2%)

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North Dakota Captured* NGL’s

*Non-flared NGL’s & Assumes 10 GPM
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
North Dakota Pipeline Construction

- New Miles
- Year End Miles

Sources: NDIC & PHMSA
North Dakota Pipeline Construction

Sources: NDIC & PHMSA

- Gas Gathering
- Oil Gathering
- Produced Water
- Gas Transmission
- Petroleum Transmission

New Miles

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<th>Petroleum Transmission</th>
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Sources: NDIC & PHMSA
New Miles and Well Completions
New Bakken/Three Forks Work
Full Slide Deck - September 14, 2018 NDIC Presentation Online
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