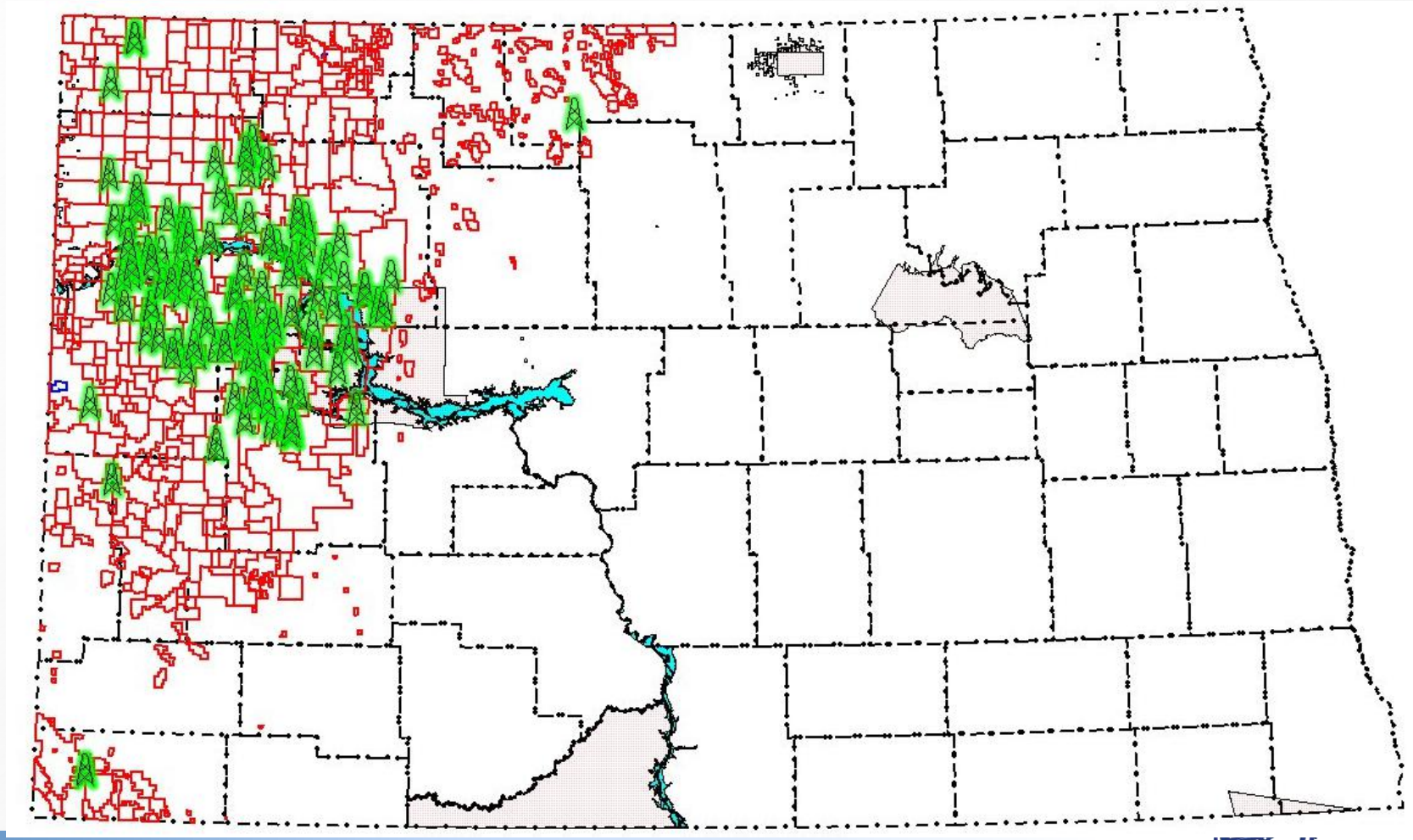
THE BAKKEN

NORTH DAKOTA'S GAME-CHANGING OIL SHALE RESOURCE

The Bakken is a Big Area – 11,000 Sq Miles

Williston Basin



The Bakken

Upper shale member

Middle member

Lower shale member

Three Forks Formation

2018 welcomes new records

$55.66

AVERAGE PRICE PER BARREL

January-August

1,269,366

barrels per day in July

NEW ALL-TIME HIGH

1.2

MILLION BARRELS PER DAY AVG.

January-July

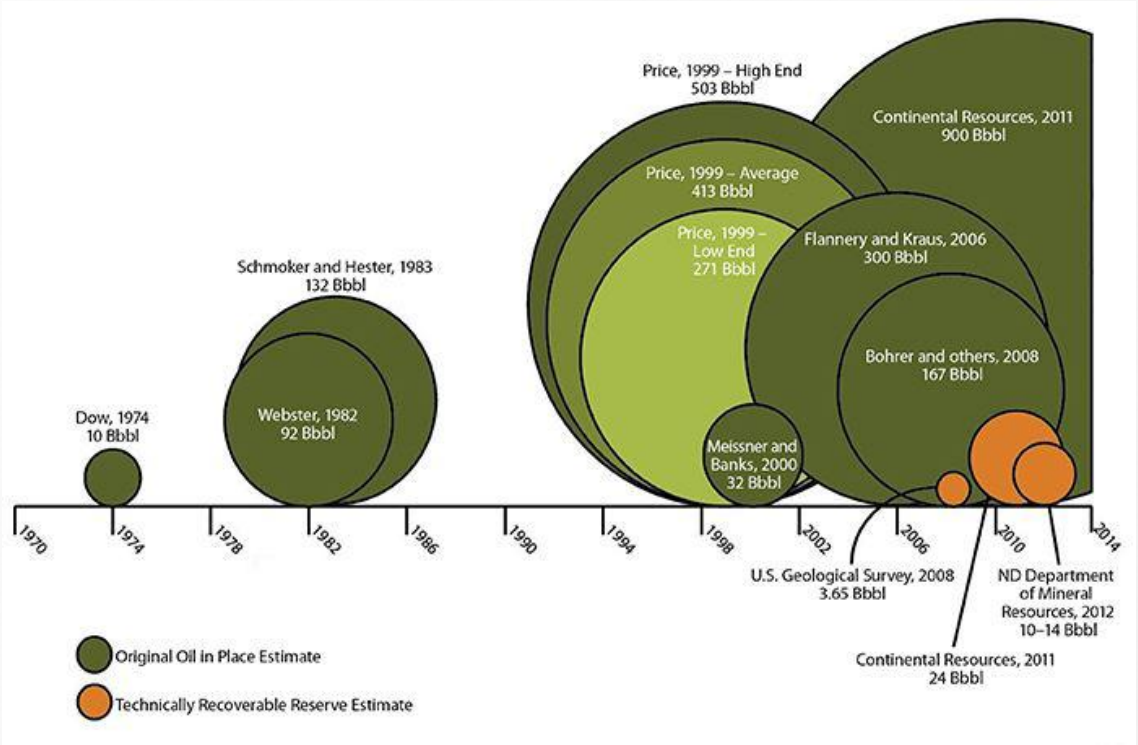
14,972

PRODUCING

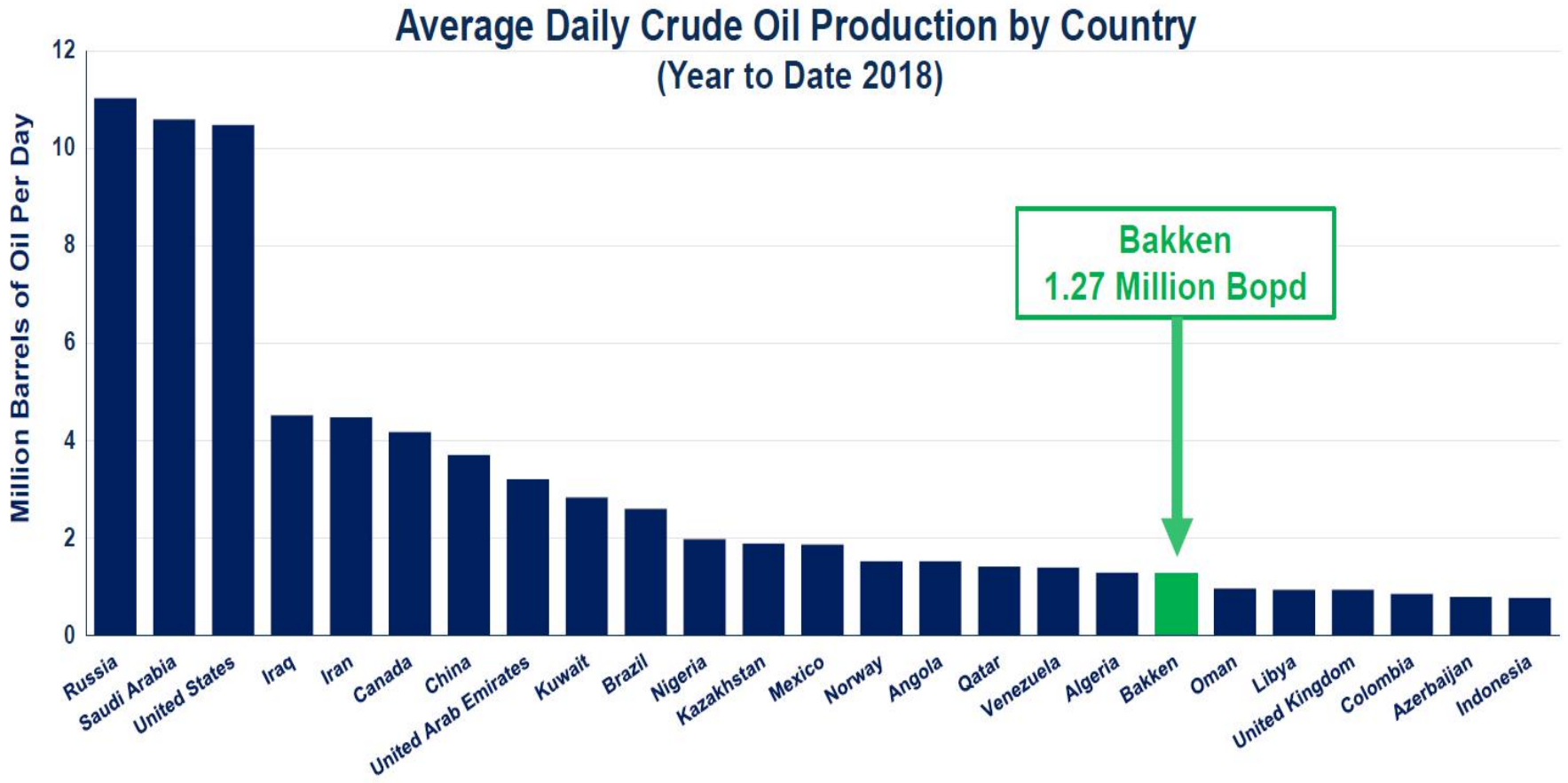
WELLS

As of July 2018 (NEW ALL TIME HIGH)

Bakken a world-class resource
With a LOT of oil left

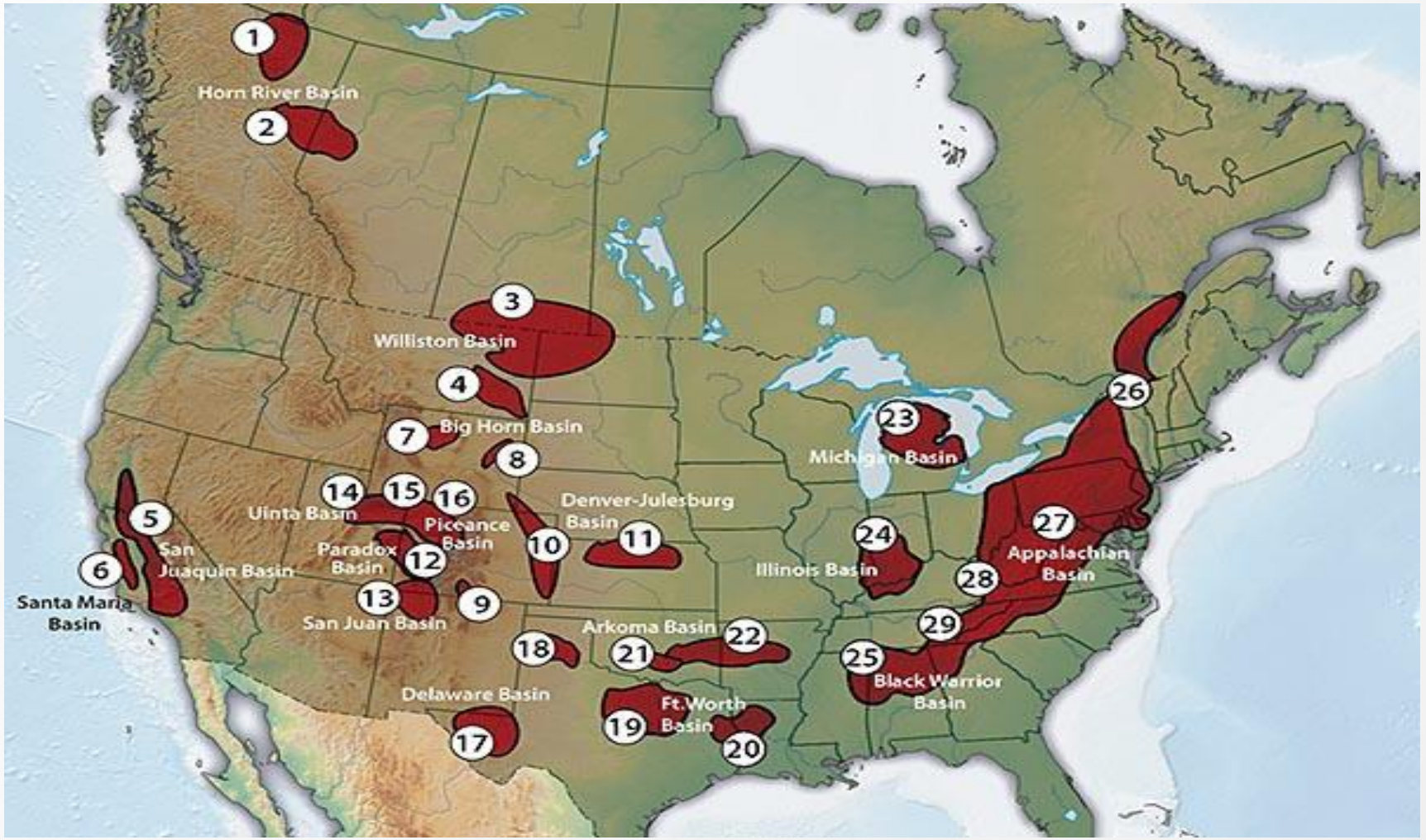


Bakken Production Hits New Record In July 2018

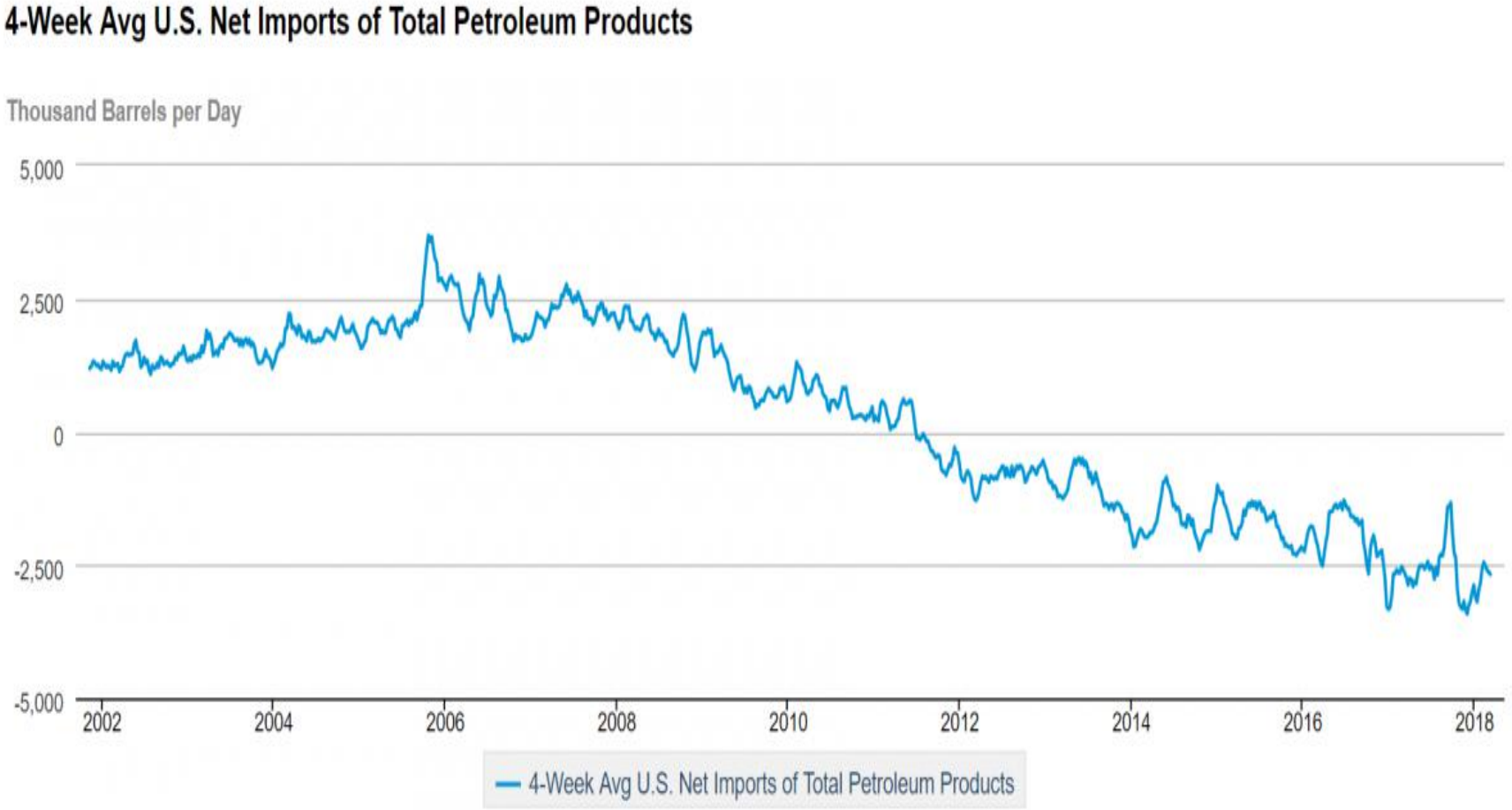


*Data as of 3Q18 (latest available international data). "Petroleum Liquids" includes Crude Oil and Condensate. *Source*: EIA.

Other Shale Plays

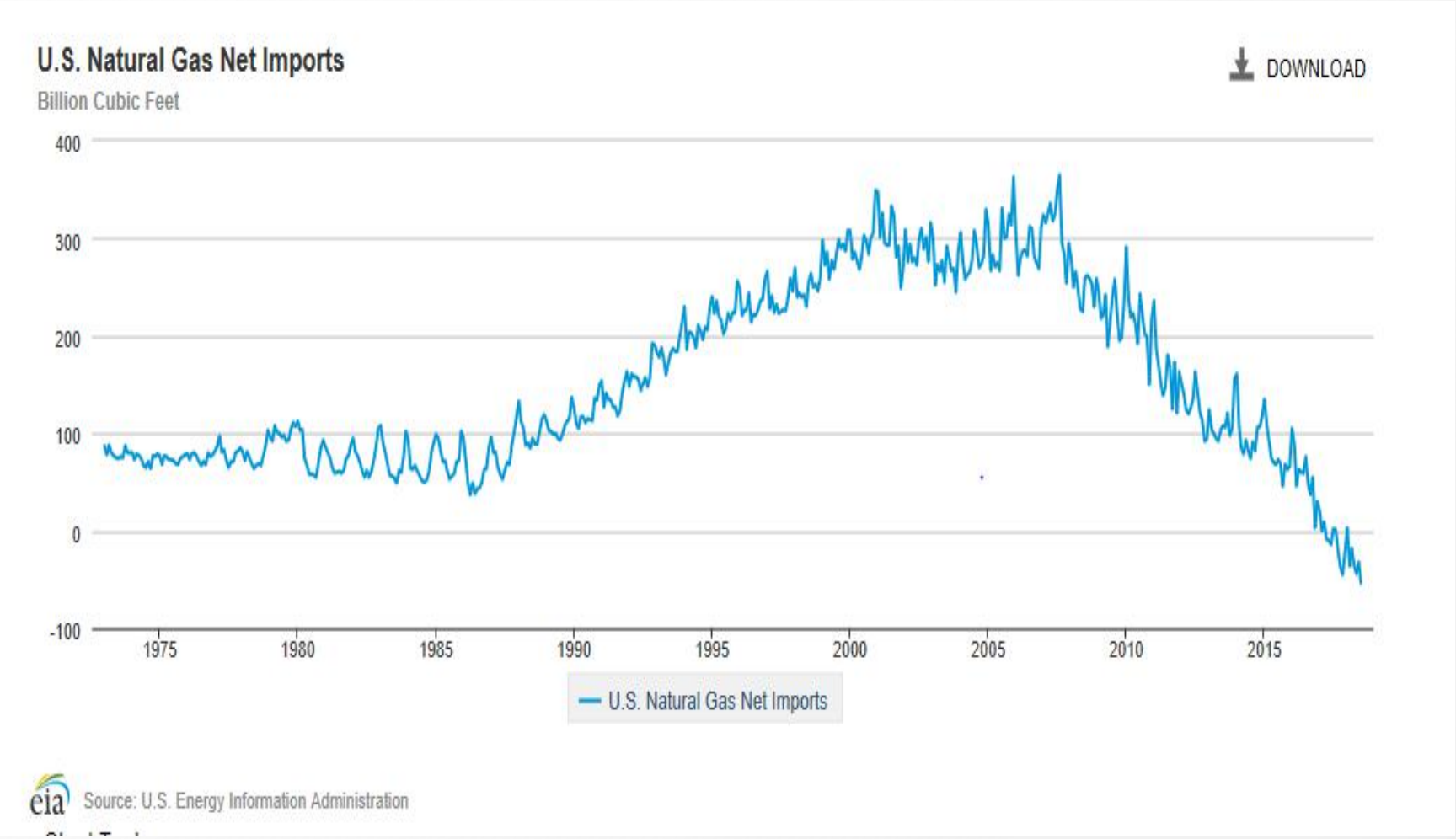


Imports of Petroleum

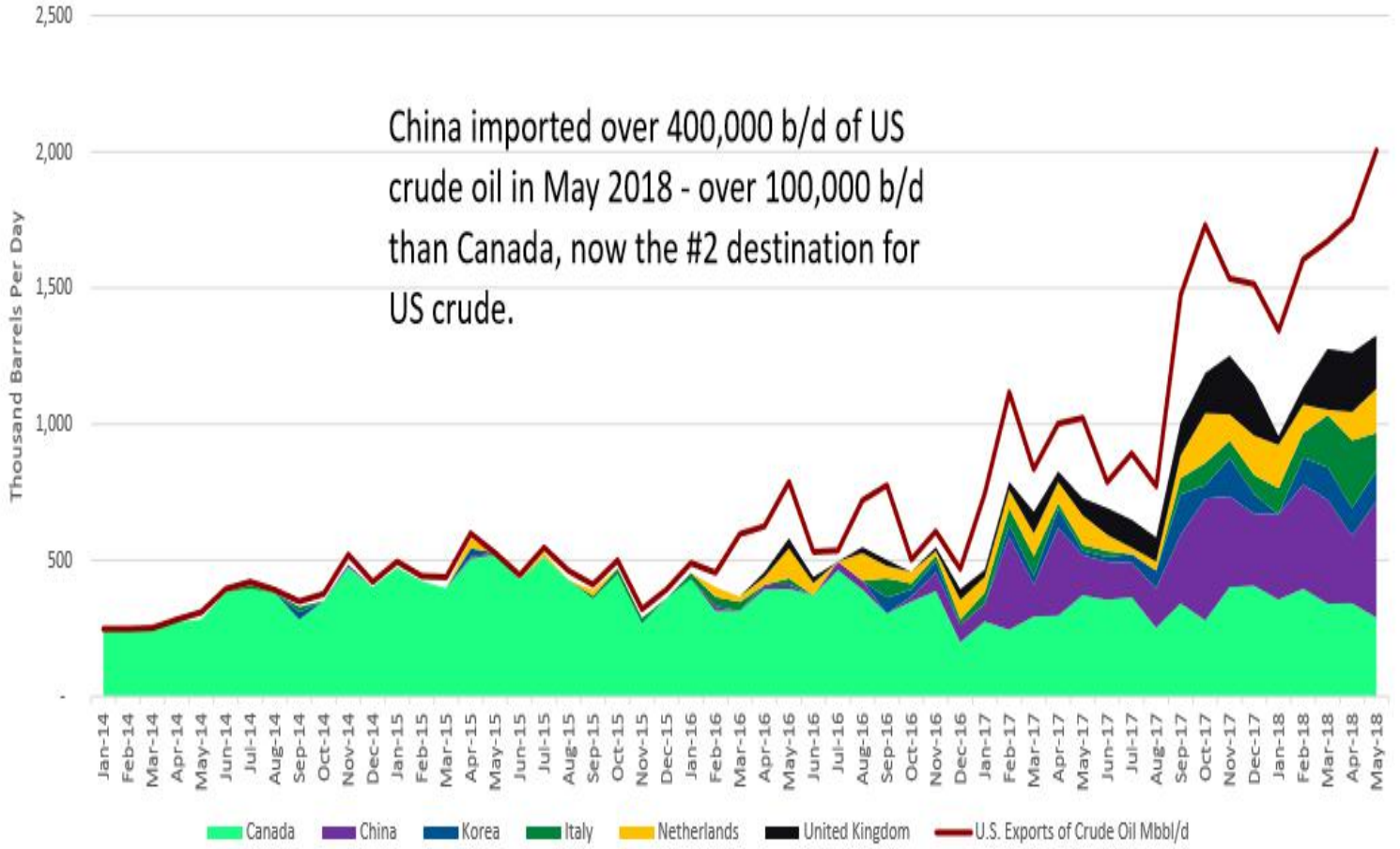


Source: U.S. Energy Information Administration

U.S. now net exporter of Natural Gas

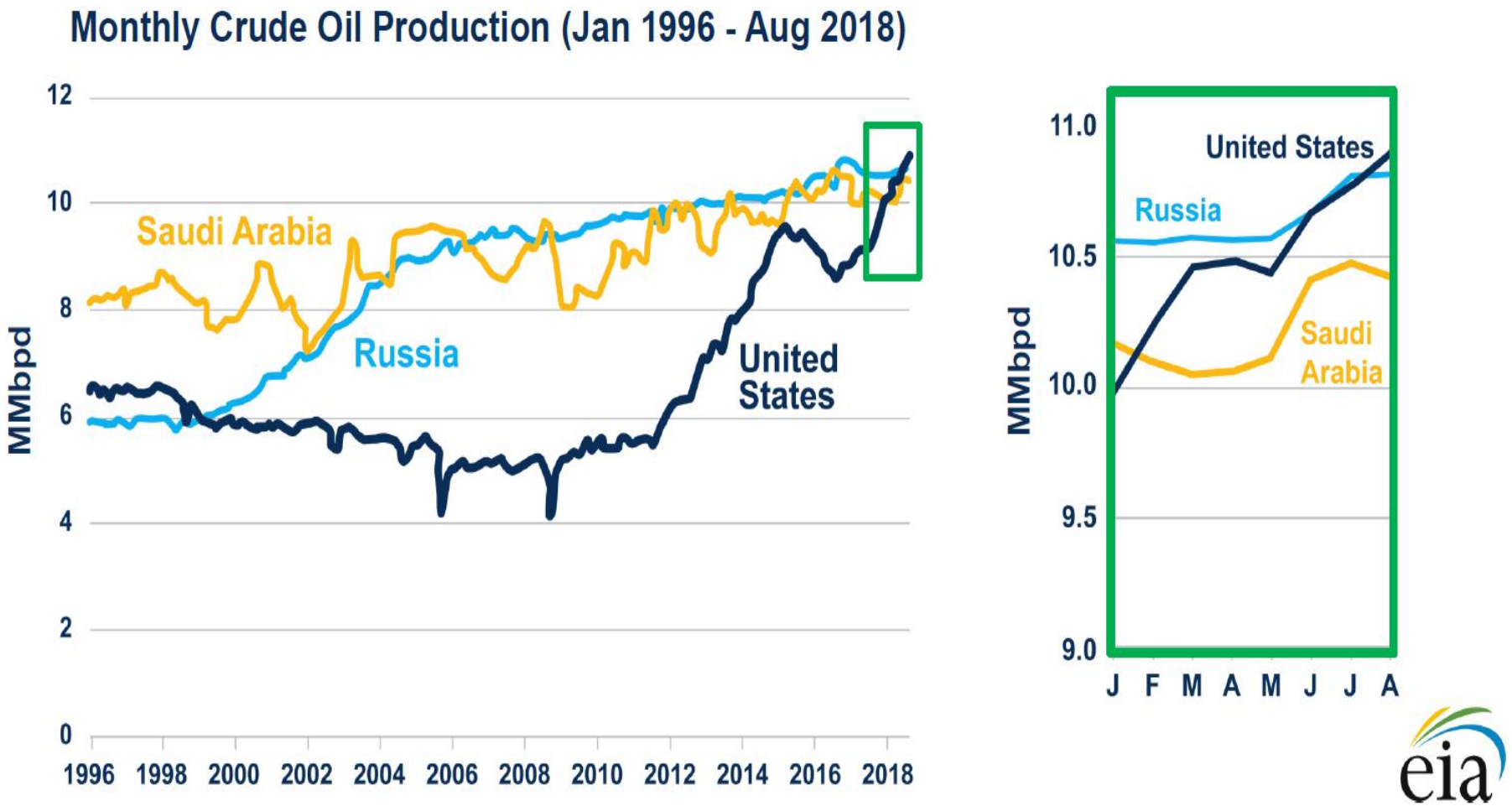


US Exports of Crude Oil



Source: EIA

EIA Announces U.S. Now World's Largest Crude Oil Producer



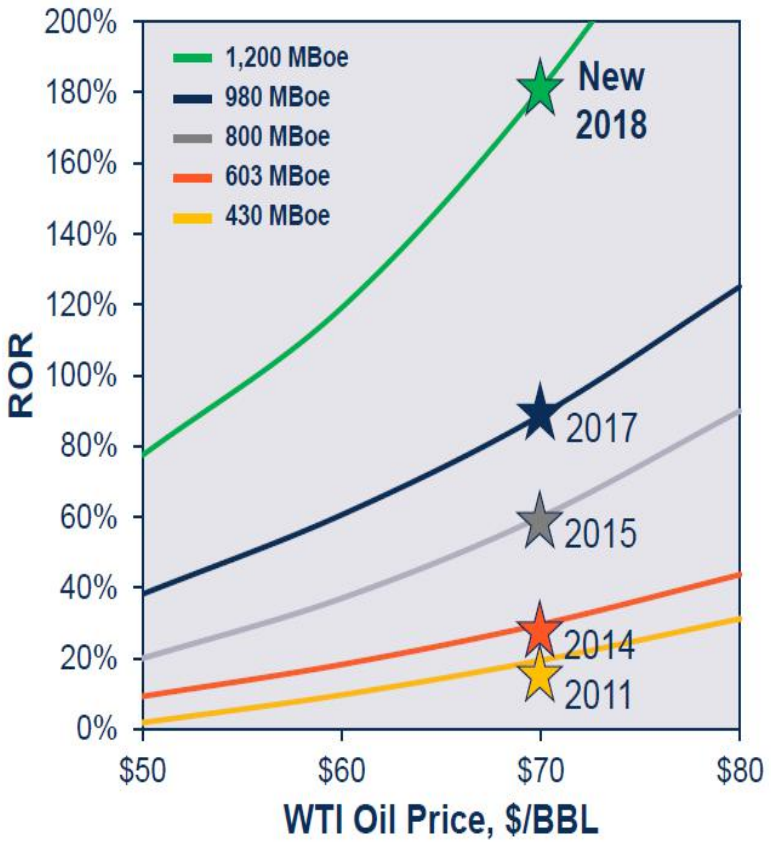
Source: EIA, September 2018.

Gov. Burgum's Vision: 2 million barrels per day

> "I don't think that's at all impossible. I think that is something this industry should be thinking about.

Photo: North American Shale Magazine

Bakken Performance Better Than Ever…Thanks To Technology



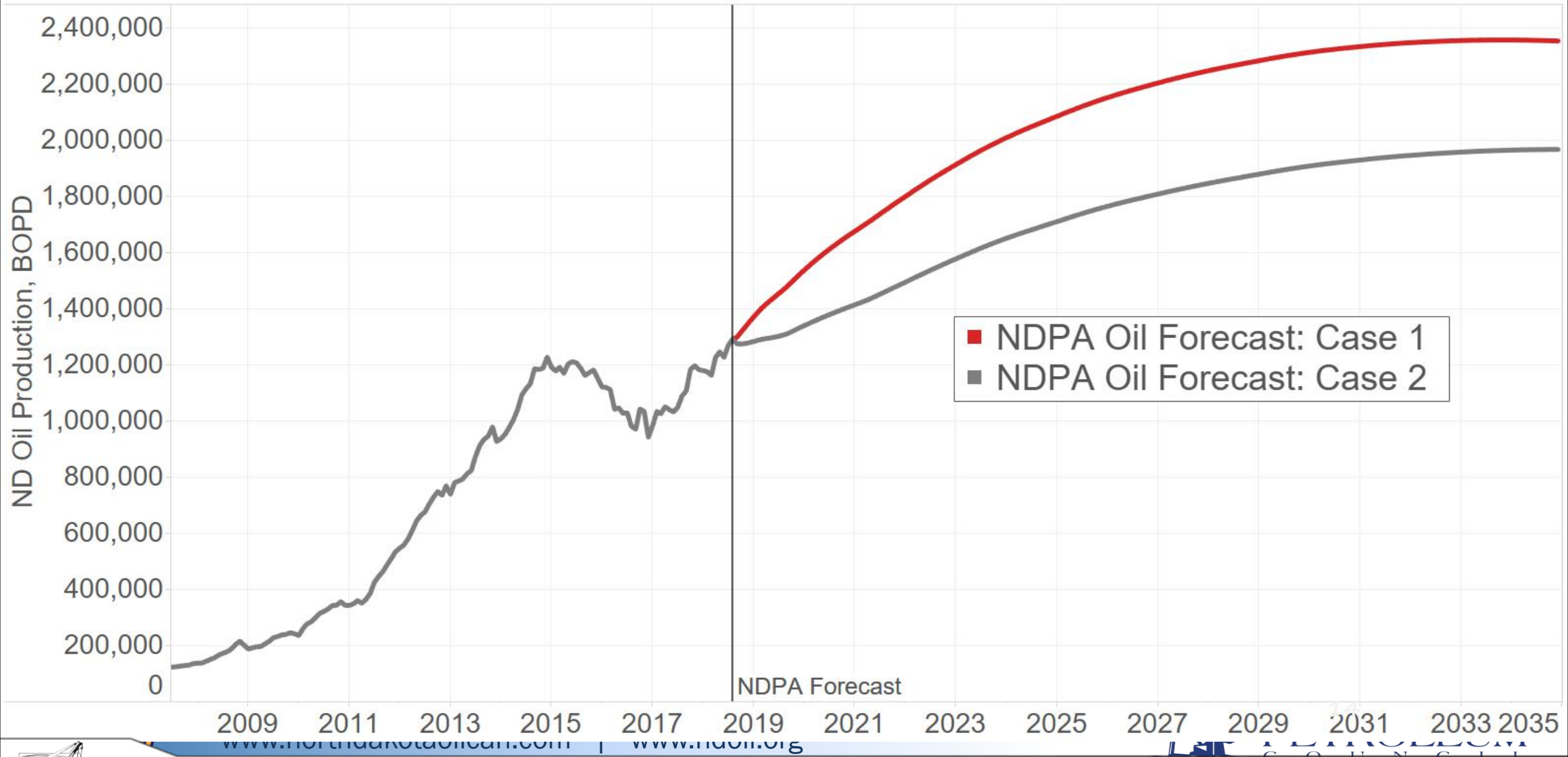
Updated Type Curve Highlights

- 1,200 MBoe EUR
- Capex: $8.4MM
- ~175% ROR[1] at $70 WTI
- ~7 month payout[1]
- $16MM PV-10 per well[1]
- ~$3.5MM incremental first-year cash flow per well vs. 2Q17's 980 MBoe type curve[2]
- ~90,000 barrels of additional oil per well first year[2]

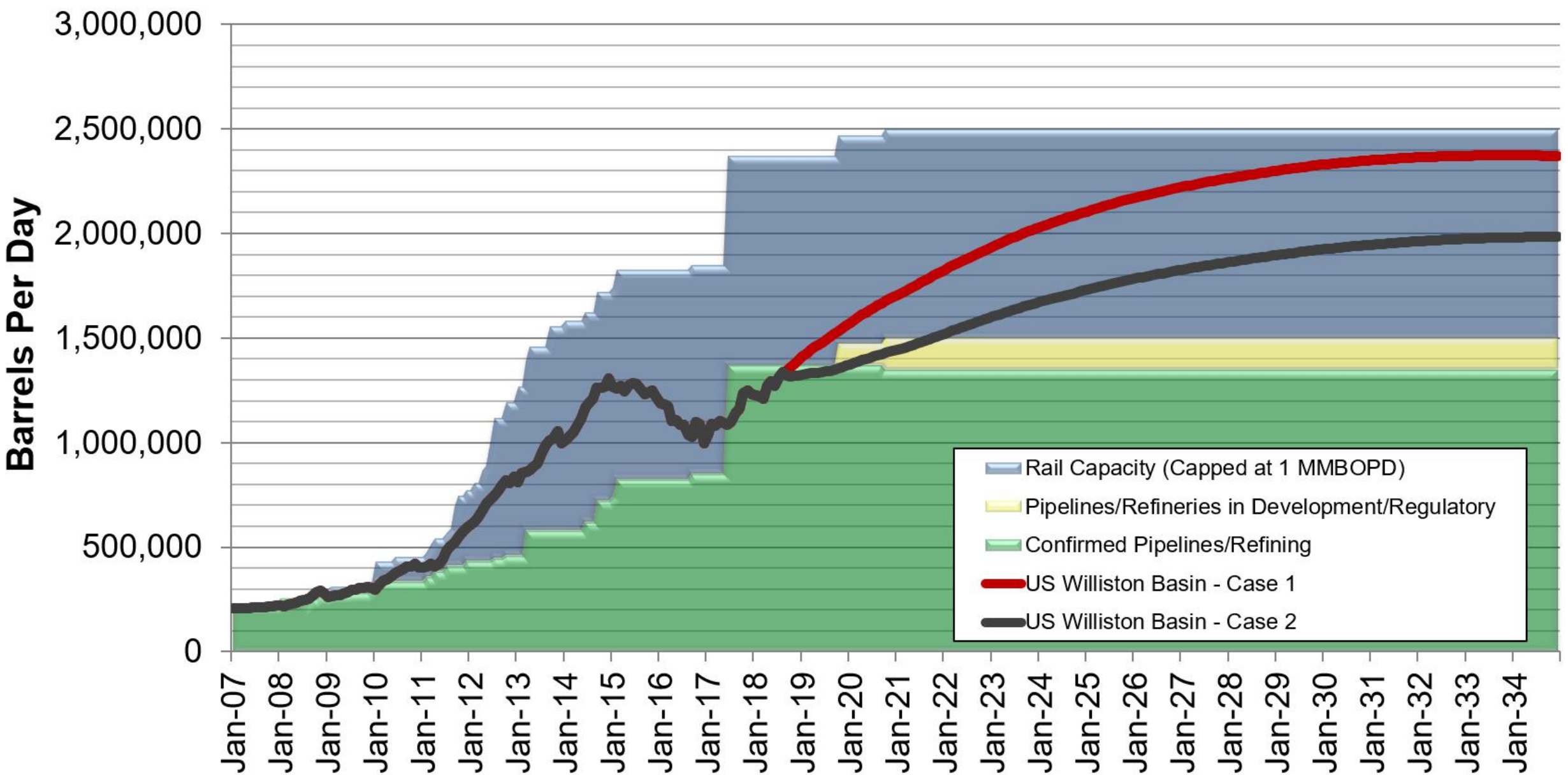
The Rocks Did Not Change!

1. ROR, PV-10 & payout are based on $70 WTI and $3.00 Henry Hub with $8.4 MM of Capex. Pre-tax rate of return (ROR) is based on projected cash flow and time value of money; costs include completed well cost, production expense, severance tax and variable operating costs.
2. Compared to 2017's 980 MBoe type curve and based on $70 WTI price; cash flow per well is on a gross basis.

North Dakota Oil Production Forecast



Williston Basin Oil Production & Export Capacity, BOPD



Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning

Bakken Phase 1 – Exploration

Vern Whitten Photography

Continental's ECO-Pad Technology

Phase II – The Harvest **(development)**

It Takes $

$20 million a day is being spent by industry

$138 million a week

+ Infrastructure

Currently 14,293 producing wells in North Dakota.

Impact per rig

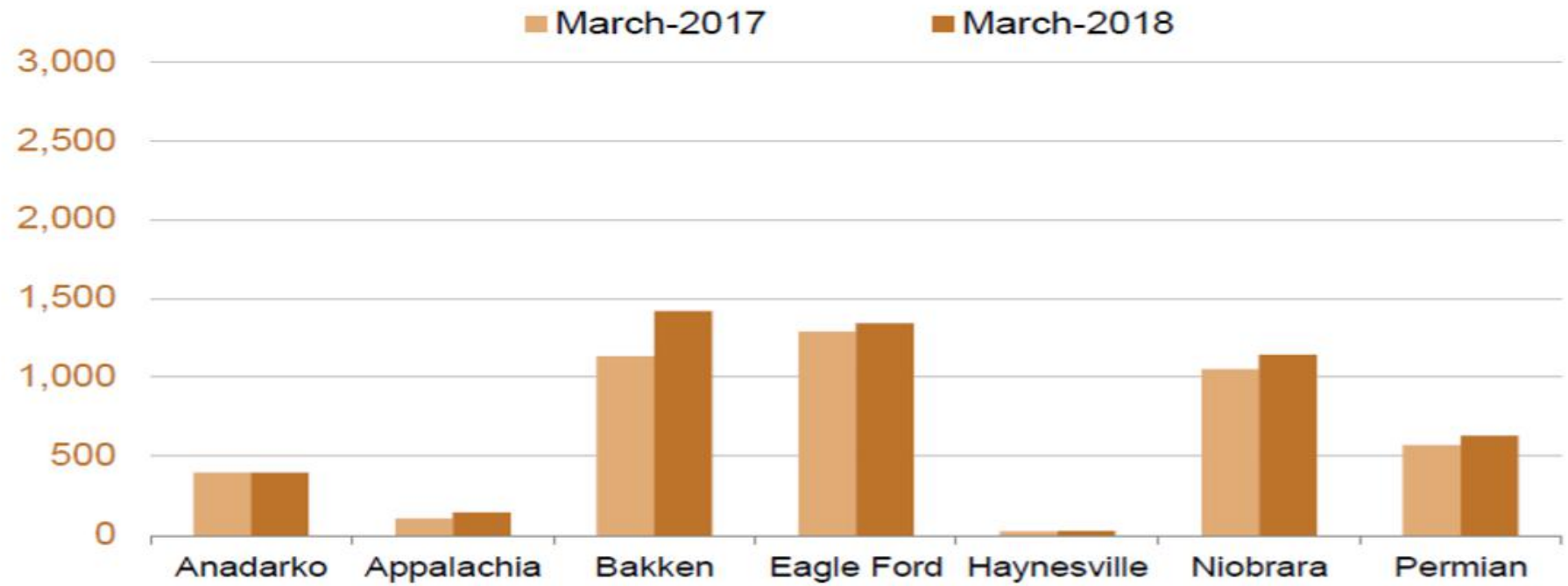
- $58 million in in-state expenditures
- $1.57 additional secondary business per $1 of direct
- $155 million total impact
- $1.47 million in tax
- 182 direct and secondary jobs

Impact per well

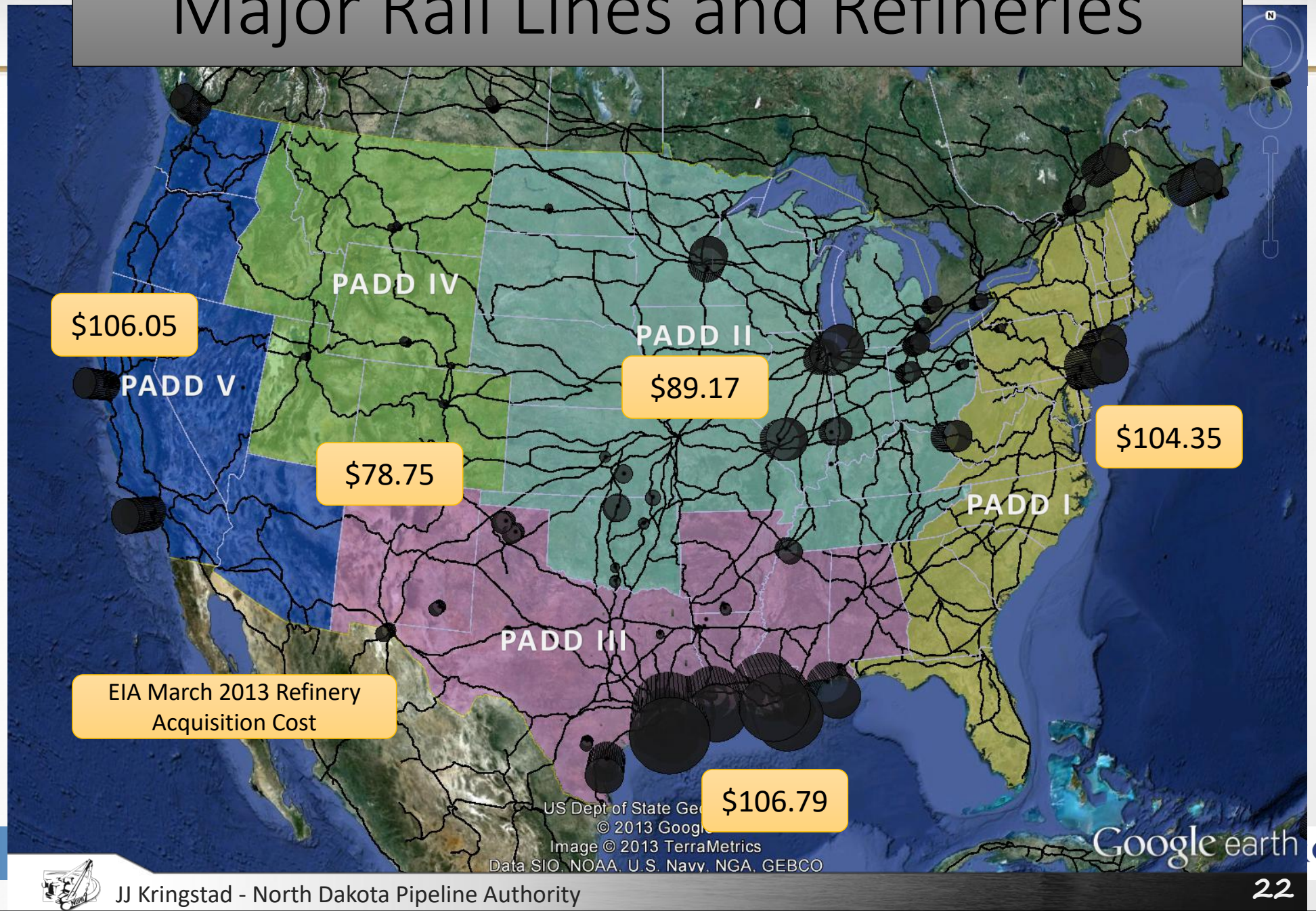
- $523,000 in in-state expenditures
- $1 additional secondary business per $1 of direct
- $1 million total impact
- $160,200 in taxes
- **1.9 direct and secondary jobs**

New-well oil production per rig

barrels/day

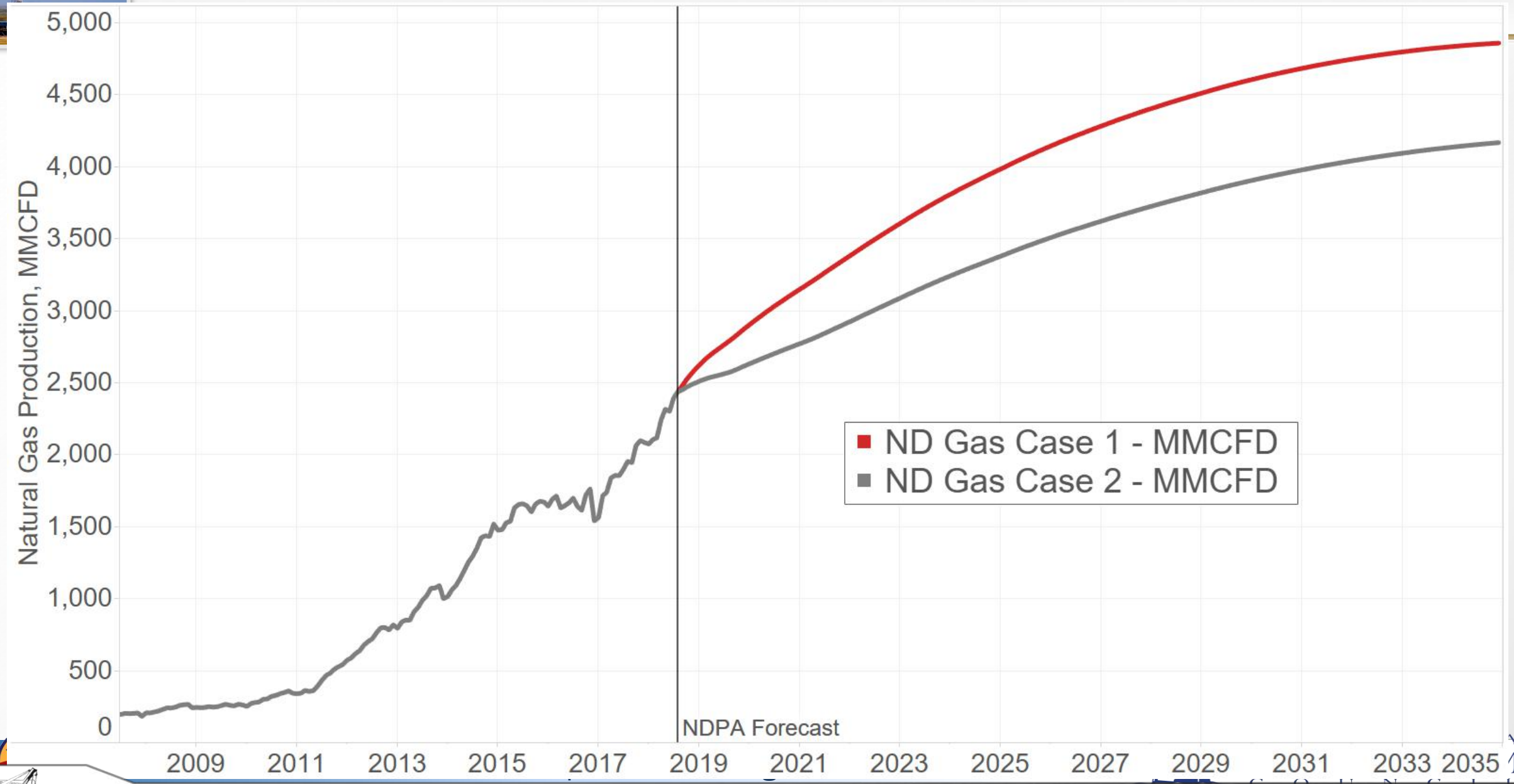


Major Rail Lines and Refineries

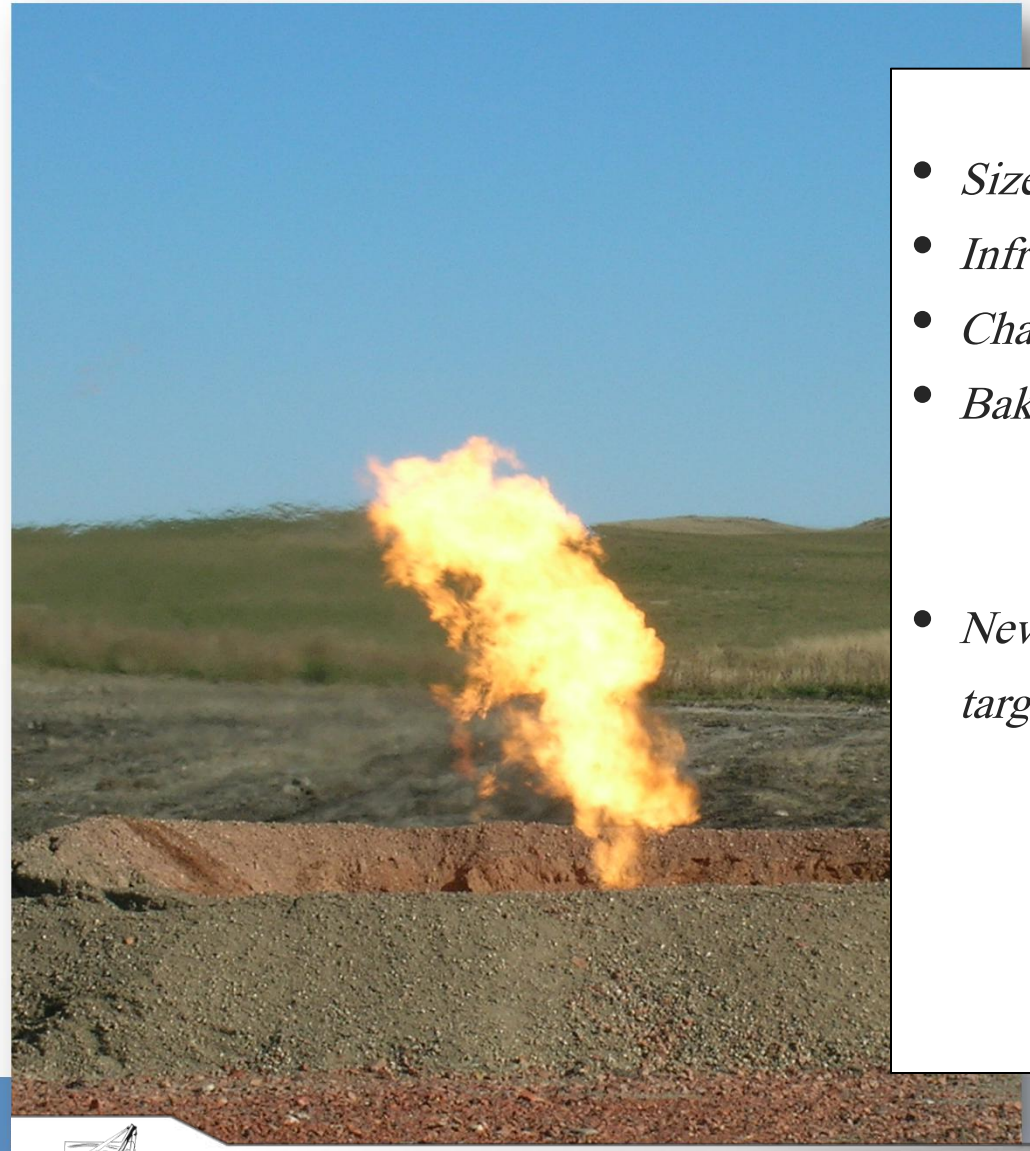


CRUDE BY RAIL

NDPA North Dakota Gas Production Forecast



Natural Gas Flaring Facts/Challenges

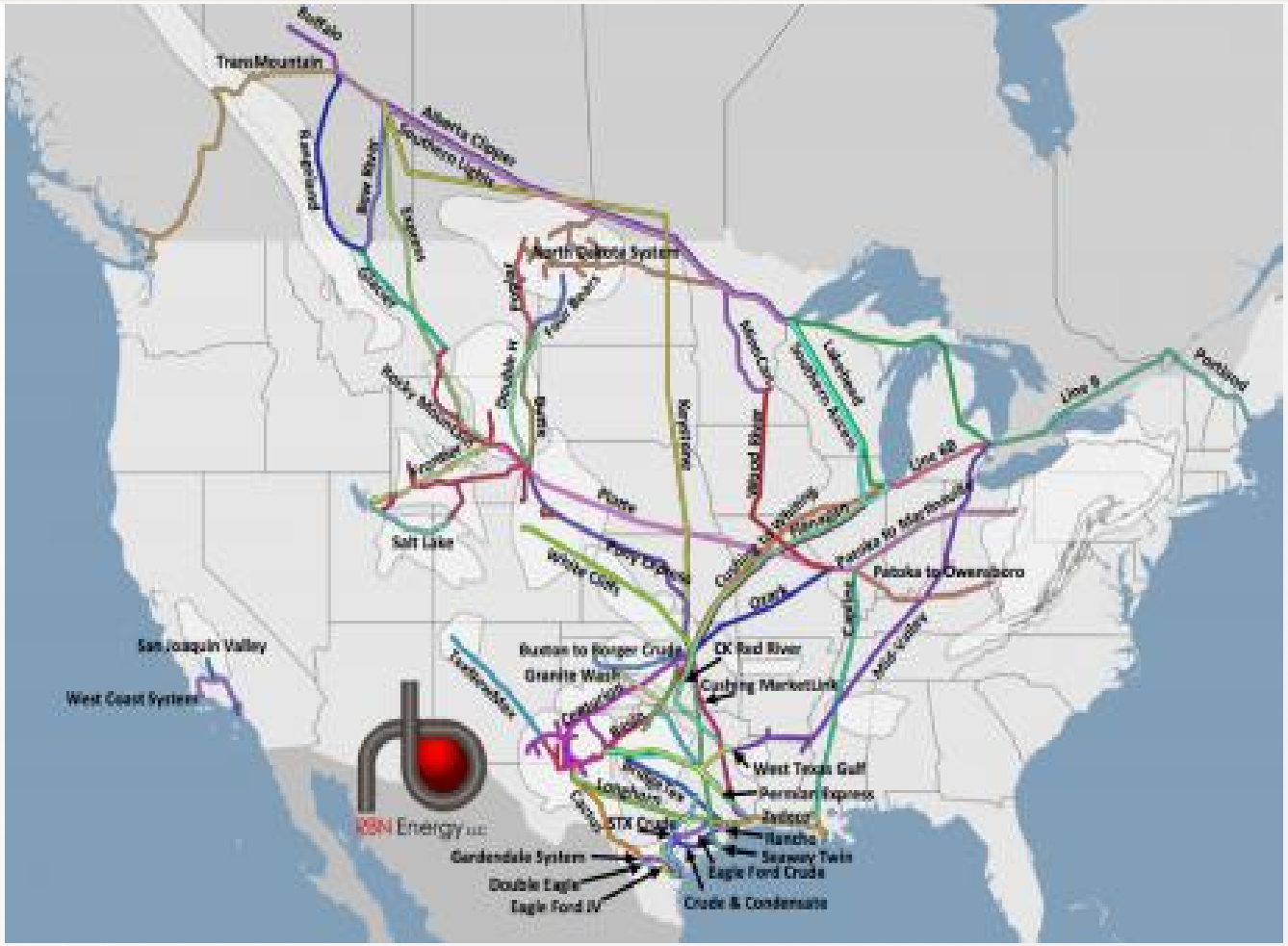


Primary Challenges

- *Size of resource – 15,000 miles*
- *Infrastructure Takes Time*
- *Challenge to Lay Pipelines*
- *Bakken Technology Keeps Getting Better*

New Regulations

- *New Regulations require flaring reduction targets be met.*



Buffalo
TransMountain
Alberta Clipper
Southern Lights
Rangeland
Beer River
Express
Glacier
North Dakota System
Four Bears
Double H
Rocky Mountain
Frontier
Salt Lake
Platte
White Cliffs
Kerrstone
Wood River
Lakehead
Southern Access
Line 6
Portland
Line 6B
Patoka to Marthasville
Patoka to Owensboro
Ozark
Cushing to Whiting
Flanagan
Cushing
Mid-Valley
San Joaquin Valley
West Coast System
Buxton to Borger Crude
Granite Wash
CK Red River
Cushing MarketLink
Texas Gulf
Permian Express
Zydeco
Rancho
Seaway Twin
Eagle Ford Crude
Crude & Condensate
STX Crude
Longhorn
Gardendale System
Double Eagle
Eagle Ford IV
RBN Energy LLC

2018 OIL AND GAS PERCEPTION SURVEY KEY FINDINGS

Positive:

The people of North Dakota recognize the importance of the oil and gas industry to the state's economy.

North Dakotans take pride in the industry, believe that production can happen safely and responsibly, and recognize it is a high-tech sector that offers good jobs/careers

Concerns:

Crime and pipeline spills/safety are the top concerns

Also, want to maintain "balanced" growth and expansion

Image improvement over the past two years

Oil and Gas Image - Trend from January 2016

	January 2016 *		June 2018	
	Statewide	O&G Counties	Statewide	O&G Counties
Total Positive	**71%**	**75%**	**74%**	**73%**
Neutral	**11%**	**12%**	**18%**	**18%**
Total Negative	**17%**	**12%**	**7%**	**8%**

** Data from a survey of N=400 residents conducted January 2016 by Left Brain Concepts on behalf of NDPC. Question wording: "When you think of the oil and natural gas industry in North Dakota, please tell me your image of the industry on a scale of very positive, somewhat positive, neutral, somewhat negative or very negative?"*

What it all means for employment

48,369 DIRECT EMPLOYMENT

23,984 SECONDARY EMPLOYMENT

72,353 TOTAL EMPLOYMENT

SUPPORTED BY INDUSTRY

20%

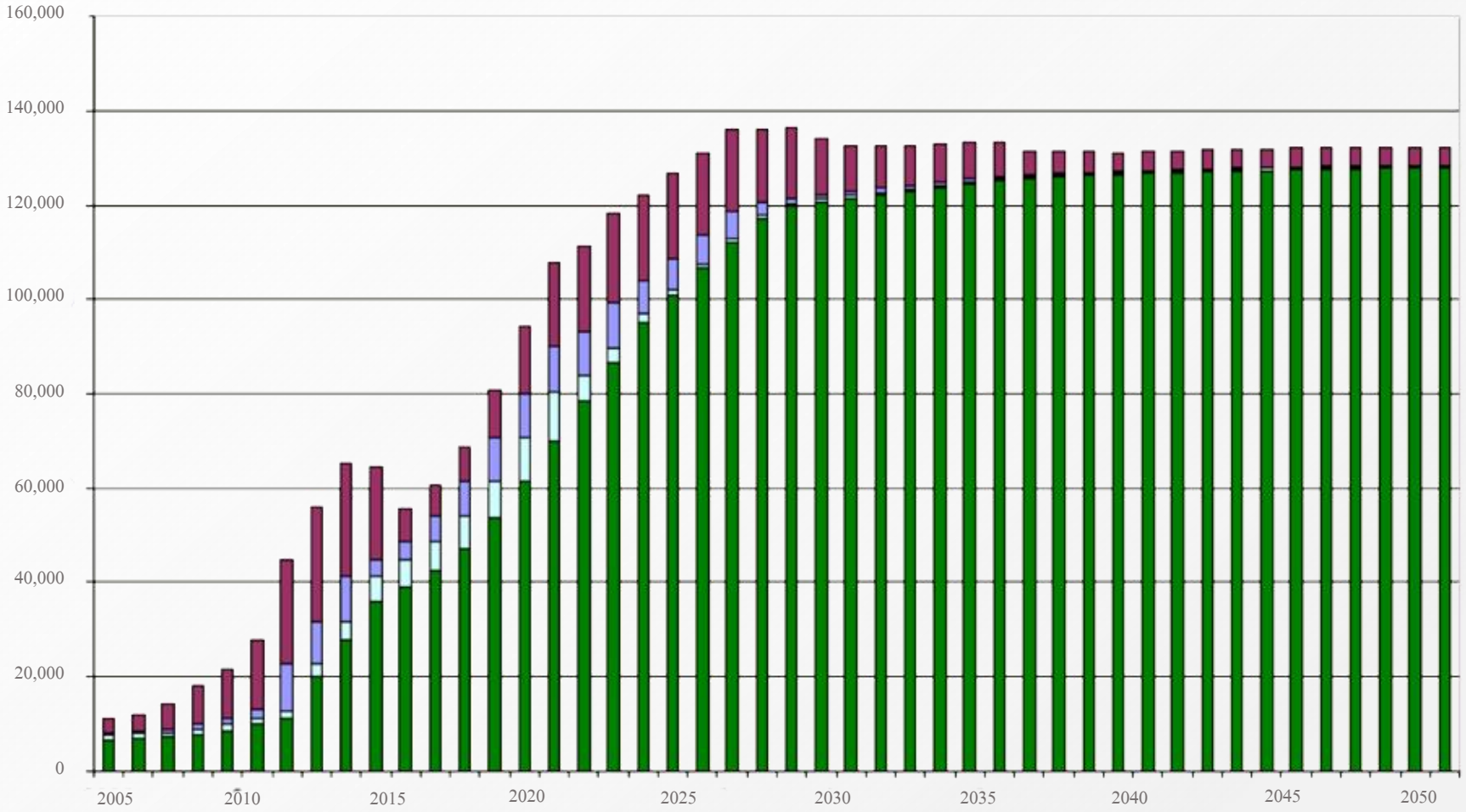
OF ALL PRIVATE SECTOR JOBS IN ND

—

30%

OF PRIVATE SECTOR SALARIES AND WAGES

Permanent employment on the rise



900%

FROM 5,000 IN 2005 TO 50,000 DIRECT IN 2015

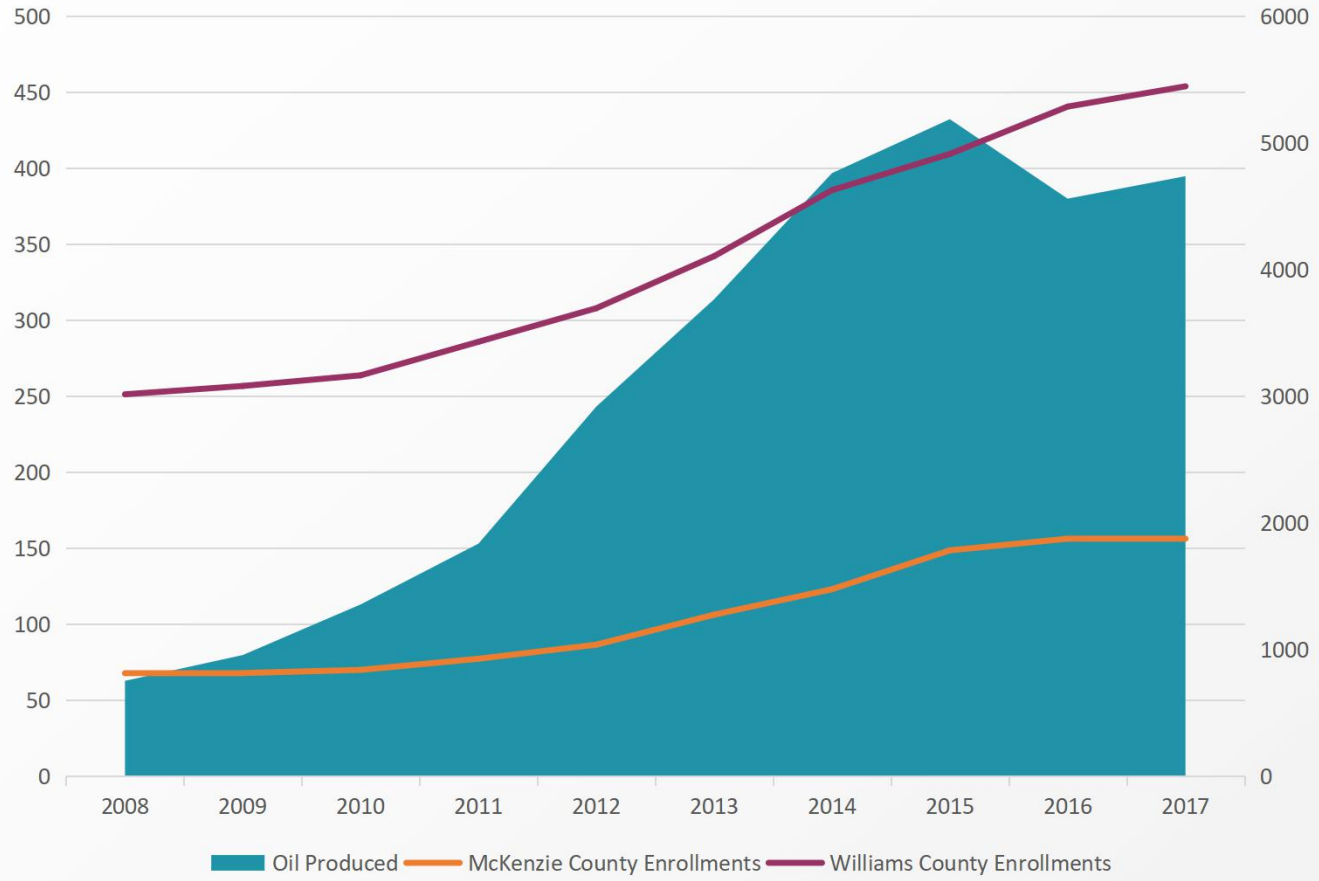
PRODUCTION JOBS
GATHERING JOBS
FRACKING JOBS
DRILLING JOBS

2014 marks a turning point

Production jobs outpaced the more temporary drilling and fracking jobs. Production workers are deeper members of the community:

- Families, schools, etc.
- Involvement
- Permanent housing

School Enrollments maintained growth



MCKENZIE COUNTY ↑ **154%**

FROM 813 IN 2008 TO 2,0691 IN 2018

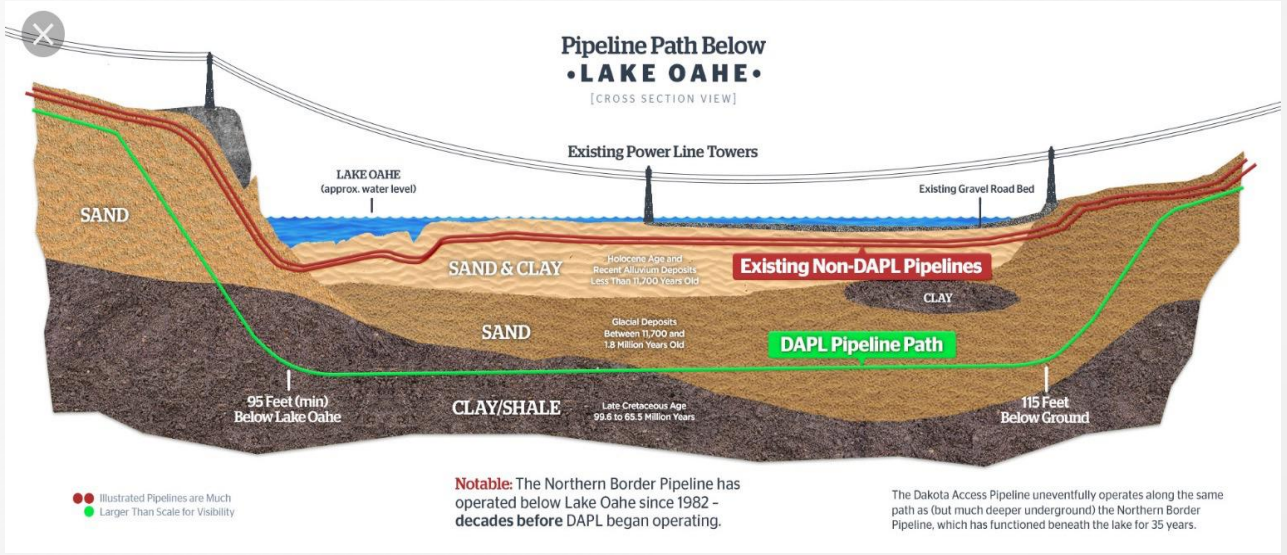
WILLIAMS COUNTY ↑ **92%**

FROM 3,015 IN 2008 TO 5,792 IN 2018

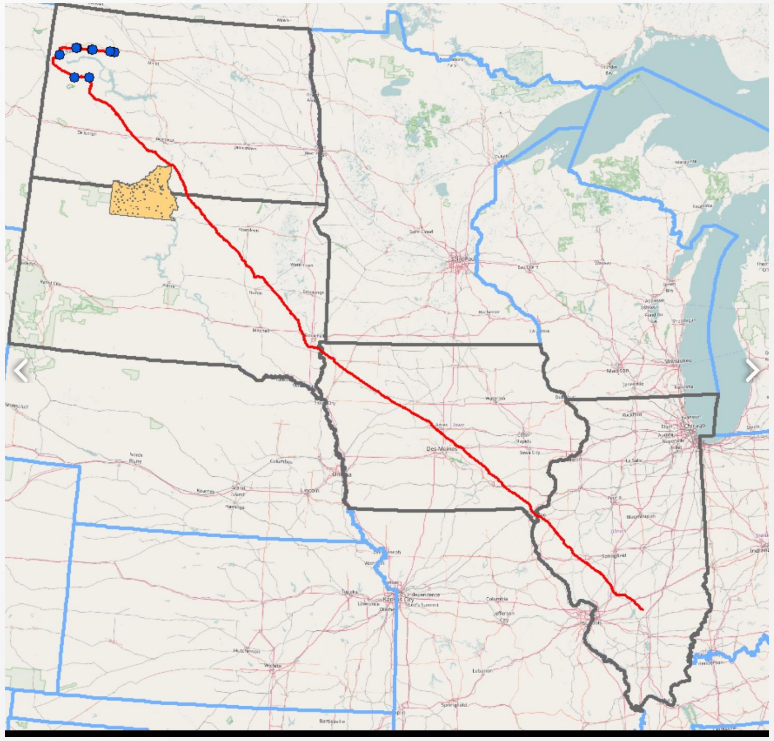
DAPL – Communication

DAPL – Went Above and Beyond (to comply with all rules and regulations)

- 50% thicker under lake
- 88 feet deeper than required
- Shutoff valves on both ends
- Lost 4 barrels to date
- $189M in easements in 2017
- $55M local taxes



DAPL – lessons learned



- Communication:
  - Company must communicate
  - Must get out the facts to combat the “Fake News”
- Professional protesters—national movement
  - Trained to be arrested
  - Talking points developed
  - Go Fund Me Accounts
  - Laws written to protect citizen’s rights against intimidation, trespass, harassment
- Security:
  - Landowner protection
  - Lawyers, Banks and Associations threatened, families harassed
  - State government impacted
- Cyber Security:
  - NDPC had 4 major email breaches
  - 319 attempts – stopped by monitoring software

DAPL – Social Media

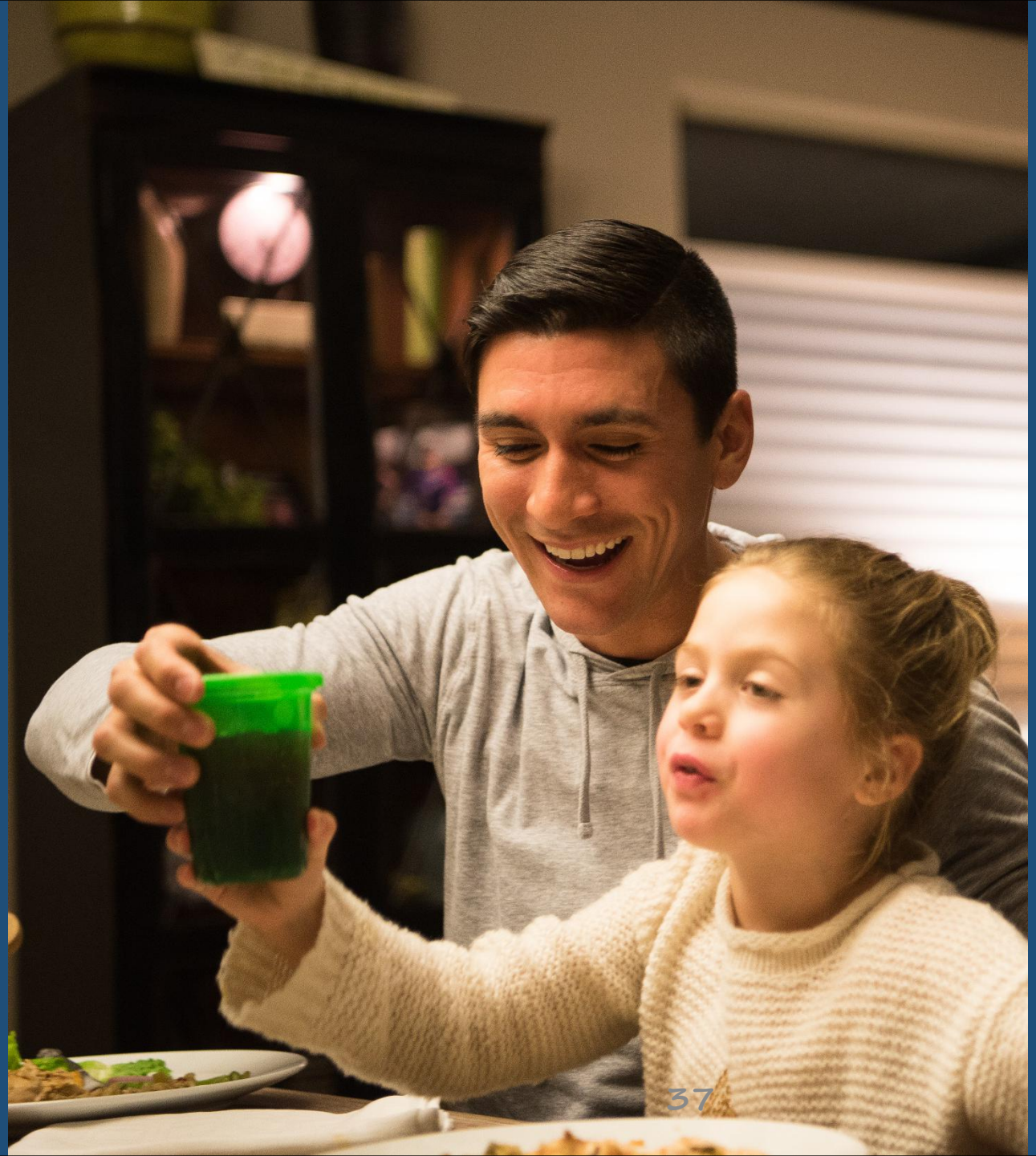
- Social Media matters
  - Protesters dominated social media
    - Those who disagreed were hazed harassed and in some cases, threatened
    - They knew how to get attention
- Everybody was watching
  - North Dakotans
  - The country
  - The world
- Physical actions and responses matter

Quality of Life:

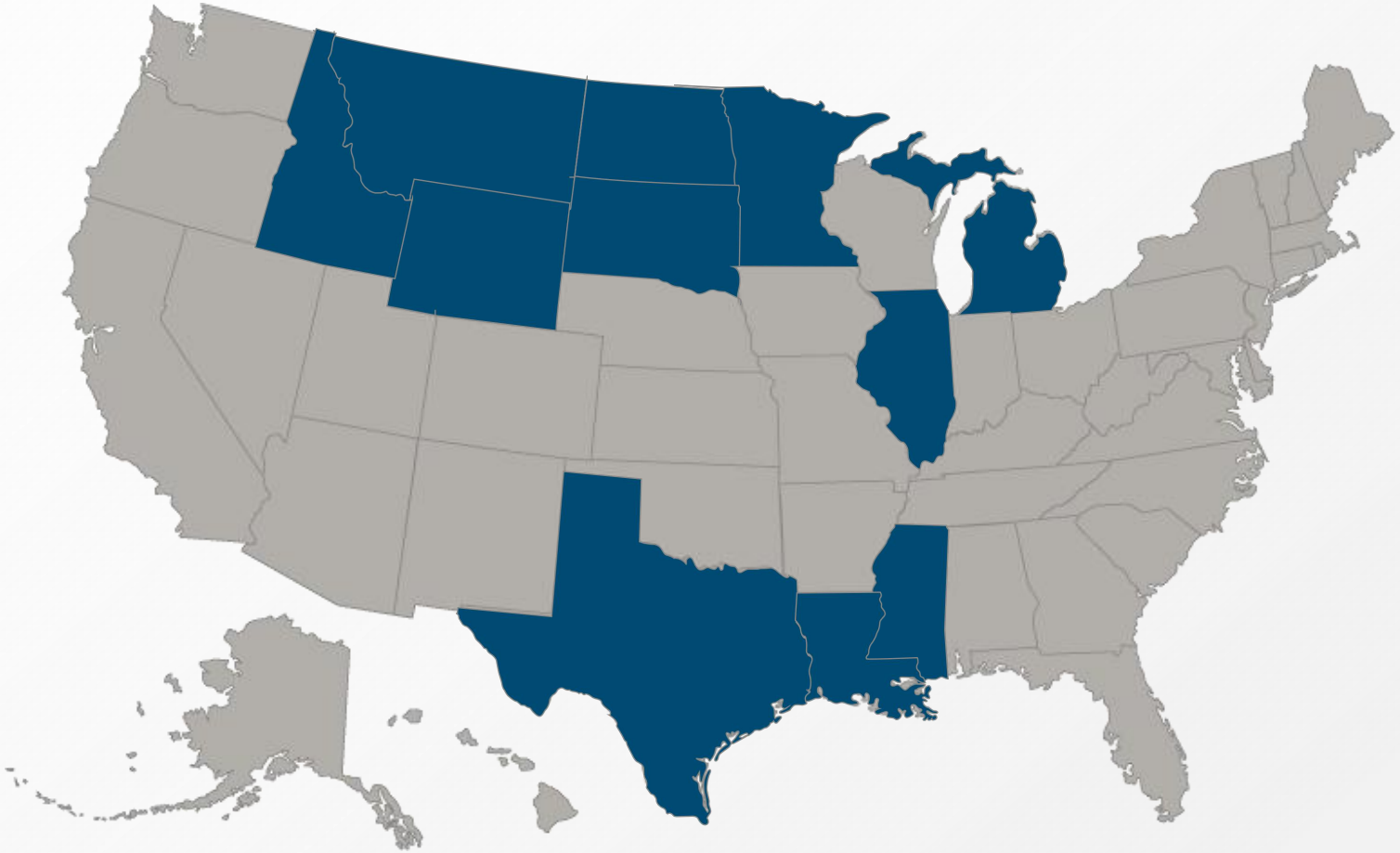
- The BOOM is over, steady growth ahead!
  - Safer highway infrastructure
    - Passing lanes
    - Round-a-bouts
    - Truck bypasses
- Housing market tightening
  - Need for developers/builders
    - Williston, Minot, Dickinson, Watford City

Western ND still seeing in-migration

- #1 in growth of young population;
- #1 in Quality of Life;
- #1 in labor force participation;
- #9 in net migration.



Where they're coming from



NORTH DAKOTA

MINNESOTA

SOUTH DAKOTA

MONTANA

MISSISSIPPI

WYOMING

MICHIGAN

TEXAS

LOUISIANA

ILLINOIS

IDAHO

The Workforce Challenge

Need for skilled workers

- CDL
- Healthcare
- Information Technology
- UAS
- Skilled Heavy Equipment
- Pipeline
- Retail and hospitality

The Impending Community Crunch

- Communities built some infrastructure, but facing an impending crunch (an **opportunity** for developers):
  - Apartment vacancies very low
    - Williston and Watford seeing 90-95% occupancy rates.
  - These are young families moving in - permanent housing needed.

Workforce – What Can Be Done?

- Target Workforce
  - Poach from Competition
  - New Americans
  - High School Graduate
  - College Exitors
  - Tribal Nations
  - Recruitment & Attraction

QUESTIONS?

What Does This For Mean for North Dakota?

- This Does Not Come Without Change/Impacts
  - We Are the Learning Curve for the World on Oil Shale Development
- We Must Re-Invest in the Bakken
  - Renaissance of Rural North Dakota
  - Jobs/Careers in Many Sectors
  - Population Growth – Kids in the Schools
  - Tremendous Wealth Creation
  - Opportunities Are Endless