

IOGCC Annual Meeting

Gov. Doug Burgum
Medora, ND
Aug. 26, 2019



NORTH
Dakota
Be Legendary.™



WELCOME



GRATITUDE



MISSION

To promote the conservation and efficient recovery of domestic oil and natural gas resources while protecting health, safety and the environment.



EMPOWER PEOPLE
IMPROVE LIVES
INSPIRE SUCCESS



INNOVATION *and* INVESTMENT

ND OIL PRODUCTION

The background of the image shows an oil well with a tall derrick and a black pipe extending into the ground. The well is situated in a hilly, green landscape with rolling hills in the distance. The sky is clear and blue.

#2 *IN THE
NATION*

1.4 million
barrels per day

TRIBAL TAX AGREEMENT

UNPRECEDENTED COLLABORATION



GLOBAL GAME-CHANGER



U.S. ENERGY DOMINANCE

INFRASTRUCTURE



Photo: Amy Sisk/Inside Energy

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An oil pumpjack and several large storage tanks are situated in a field of tall, golden grass under a blue sky with scattered white clouds. The pumpjack is on the left, and the tanks are on the right. A small white building is between them. The foreground is filled with green and yellow vegetation.

INNOVATION NOT REGULATION

iPIPE

Intelligent Pipeline Integrity Program



THE iPIPE MISSION

Foster development of emerging technologies to prevent pipeline releases.



Fund development work

- ND Industrial Commission
- Pipeline & tech companies
- \$5M investment over 3 yrs



Feedback

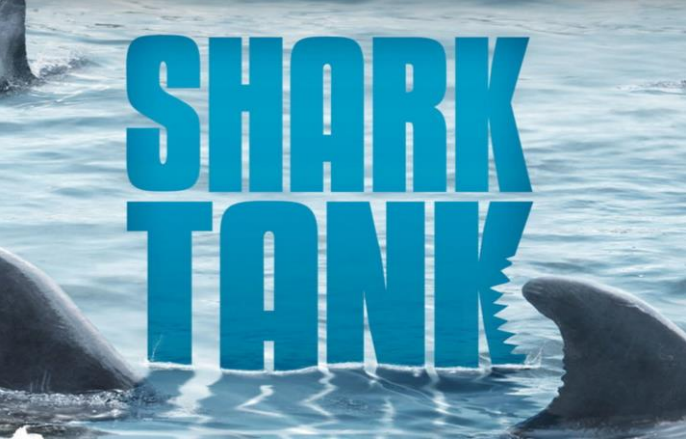
- Provide user feedback to hone products



Provide test sites

- Live, operating pipelines upon which technology is developed





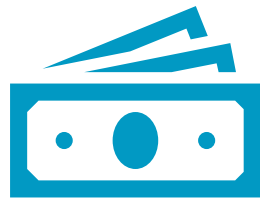
COMPETITIVE SELECTION PROCESS FOR PROVIDERS

Modeled after ABC's *Shark Tank*

- Annual events for technology providers to pitch solutions to expert selection committee.



TECH



COST












SCHEDULE



OUTCOME

FIRST SELECTION ROUND

MAY 2018

| | |
|---|--|
|  | DETECTION: Opportunistic data collection + AI |
|  | DETECTION: UAV + advanced analytics + BVLOS |
|    | DETECTION: UAV + AI + novel sensor suite |
|  | DETECTION/PREVENTION: Golf ball-sized free-floating sensor |
|  | DETECTION: AI + multiple sensors |
|  | DETECTION/PREVENTION: Fiber optic leak and land movement detection |
|  | DETECTION: Noncontact, Internet of Things monitoring of pipelines |

SECOND SELECTION ROUND

OCT. 2018

| Technology Provider | Function | Technology Summary |
|---------------------------------|------------|---|
| Asel-Tech | DETECTION | Non-intrusive negative pressure wave leak detection |
| Direct-C | DETECTION | Nanotechnology "paint" for leak detection |
| eSmart Systems | DETECTION | Sensor fusion with novel sensor suite + AI + drone |
| Expert Infrastructure Solutions | PREVENTION | AI-based risk assessment |
| High Impact Technologies | PREVENTION | Self-healing coating, pinpoint leak location |
| Insitu | DETECTION | BVLOS-focused drone-based leak detection |
| mlQrotech | BOTH | Mesh network sensor package + AI |
| NAR Technologies | DETECTION | Drones + machine learning |
| Ominsens | BOTH | Fiberoptics leak detection and land movement |
| One-Bridge | BOTH | Machine learning/cathodic protection |
| PSI | DETECTION | Laser-based hydrocarbon leak "sniffer" |
| PureHM | BOTH | Miniaturized inspection tool |
| Rheidiant | DETECTION | IoT leak detection |
| Satelytics | DETECTION | Phase II of current work |
| Seal-Tite International | PREVENTION | "Platelet clotting" leak repair |
| SwRI | DETECTION | Machine learning-based hydrocarbon identification |
| Trinity Bend Solutions Inc. | DETECTION | Determining optimal resolution for leak detection |

- 20 technologies invited
- 9 technologies presented
- 4 selected for development

SATELYTICS – OPPORTUNISTIC DATA

Leveraging Big Data:

- Data Acquisition
- Spectra
- Bands
- Algorithms
- Analytics
- Alerts and Dashboards

Leveraging Technology



Satellites



Drone/UAV



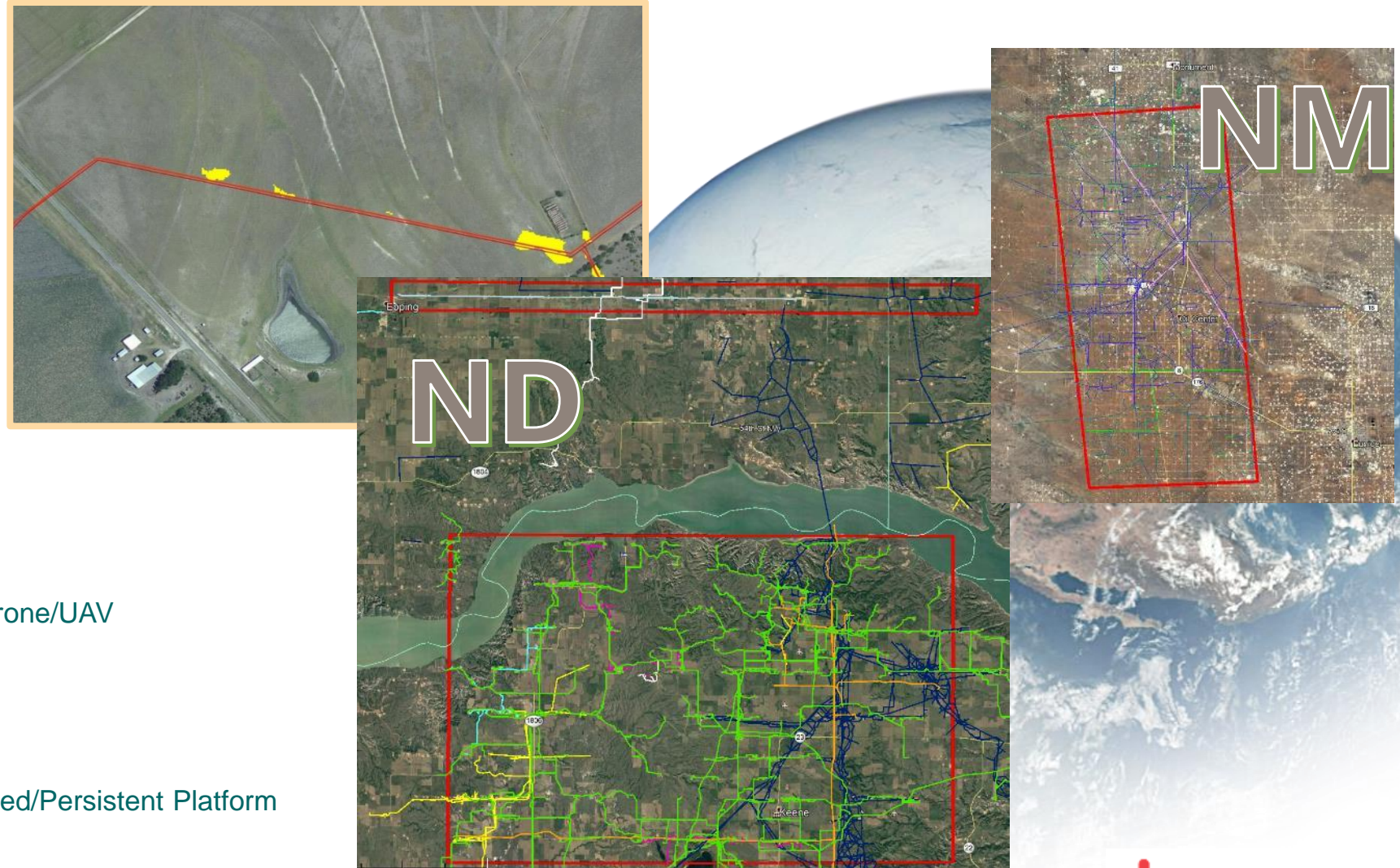
Nano-satellites



Aircraft



Fixed/Persistent Platform



"GOLF BALL" PIPELINE SENSOR

Pipers™: Control in the palm of your hand

- Deploy when needed in all pipelines
- No downtime

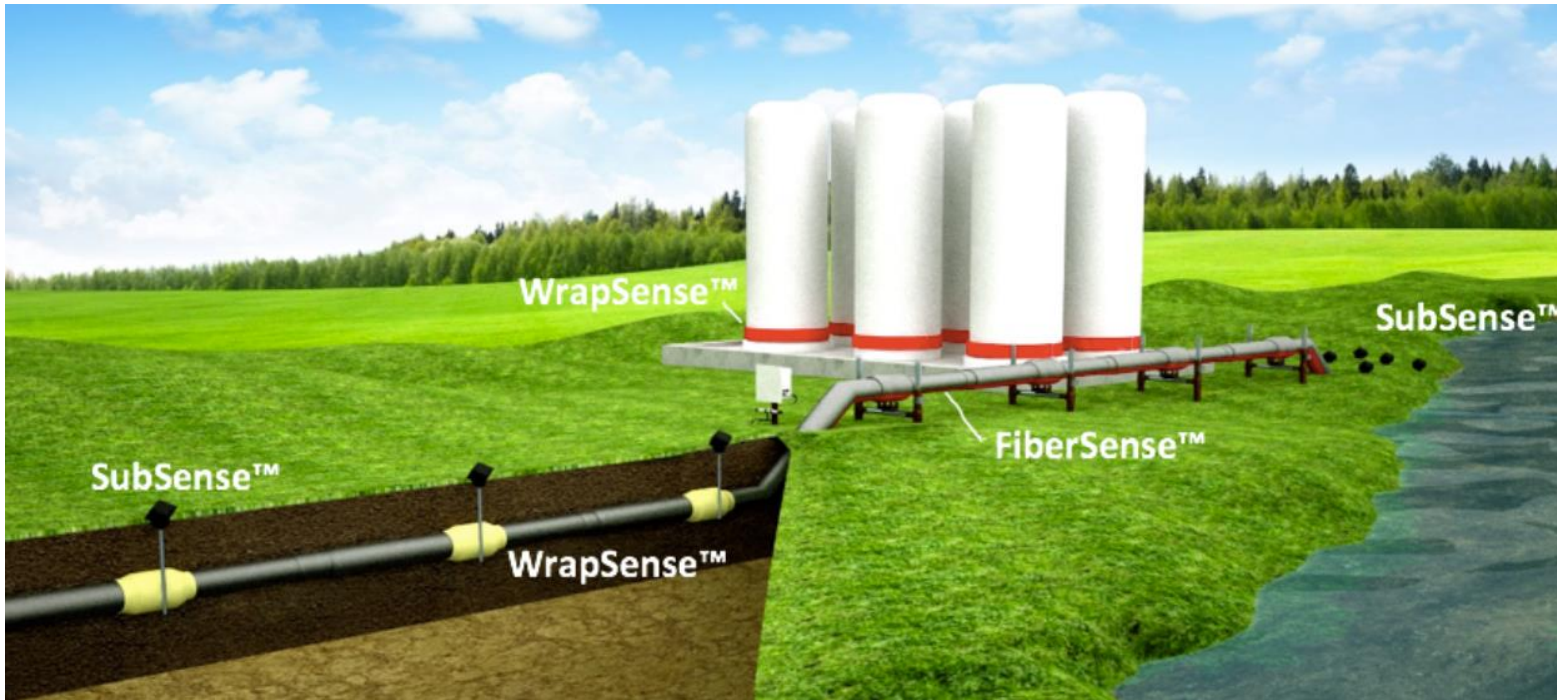


- Golf ball-sized (1.5 inch)
- Free-flowing; adjustable weight
- Current sensors
 - Pressure
 - Temperature
 - Position (acceleration/rotation)
 - Magnetic fields
 - Acoustics

- Detect leaks
- Locate deposits
- Identify pipe wall flaws
- Locate pipeline centerlines

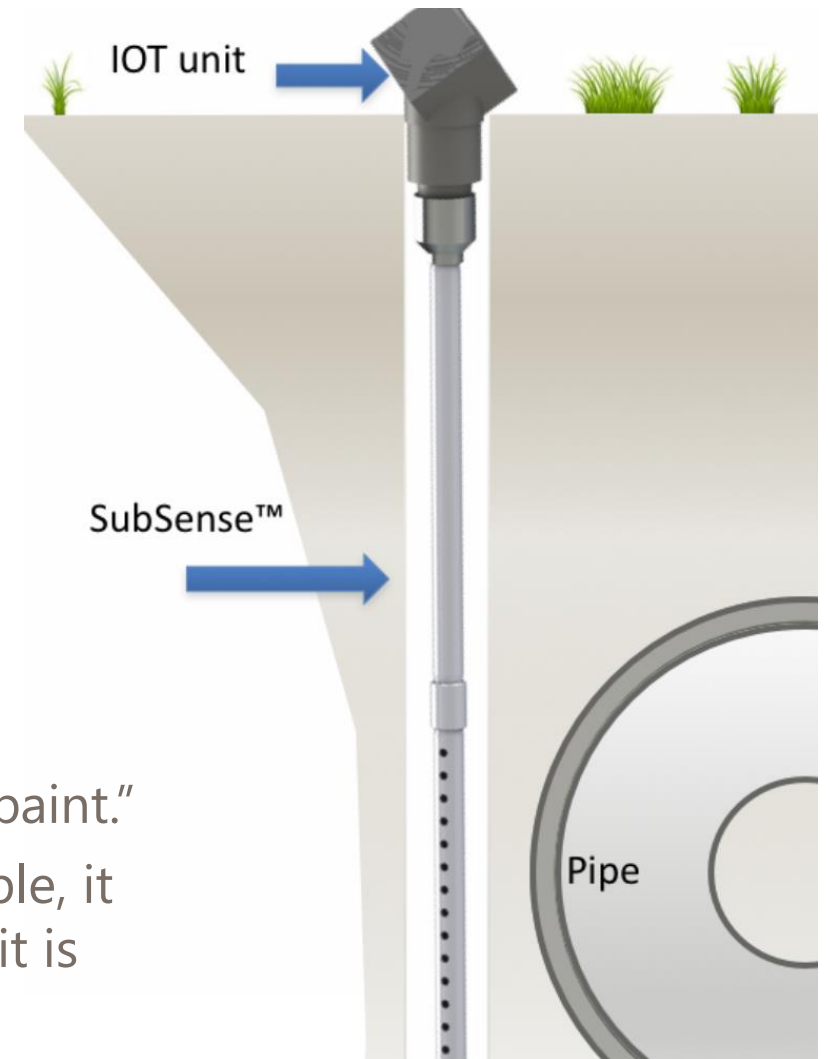


DIRECT-C



- Uses polymers mixed with nanoparticles to create an “intelligent paint.”
- When applied to a PCB board, flexible substrate, or fiber optic cable, it creates a sensor to indicate presence of different fluids for which it is tuned (hydrocarbons or brine).

iPIPE





iPIPE is already producing results.



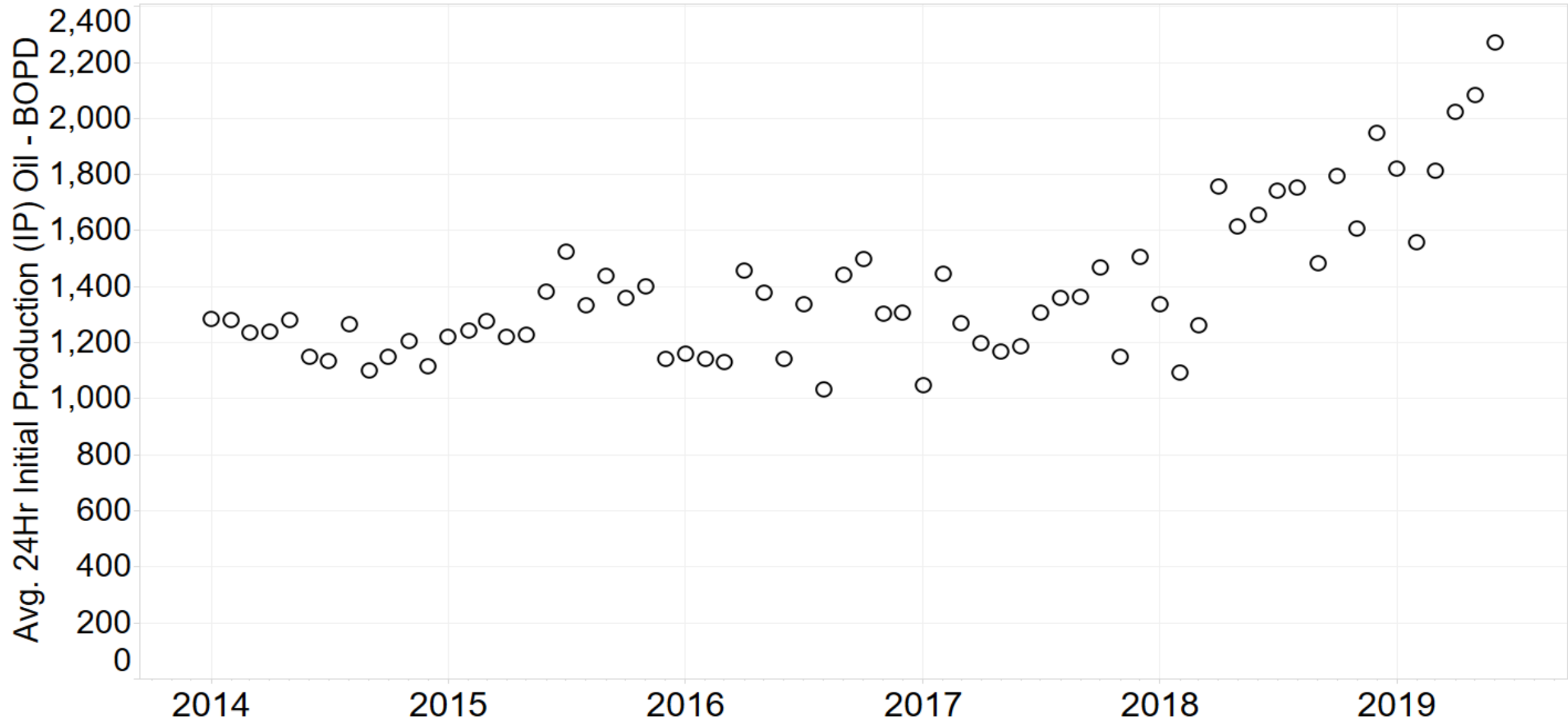
UAV Inspection



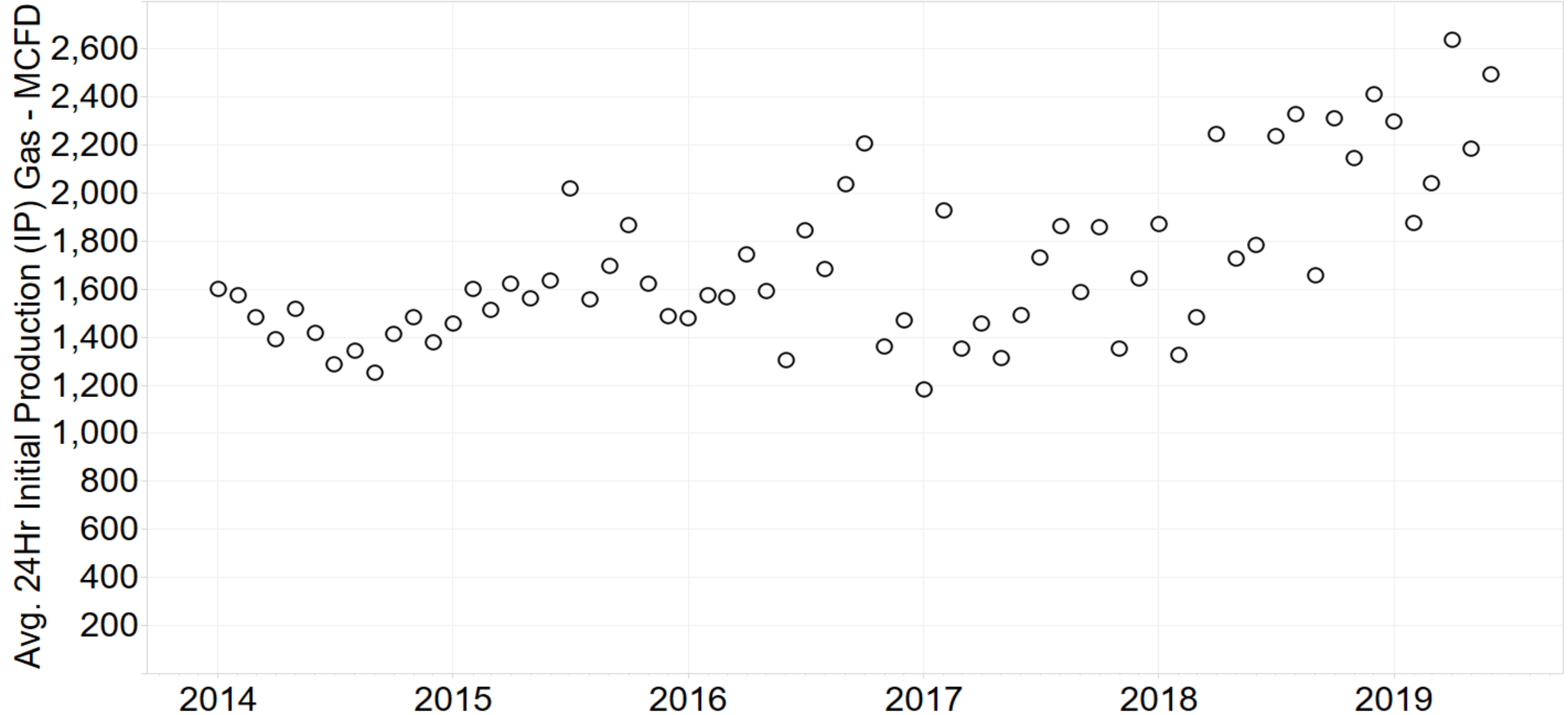
INCREASED GAS PRODUCTION



ND Initial Oil Production Rates



ND Initial Gas Production Rates



VALUE-ADDED INFRASTRUCTURE

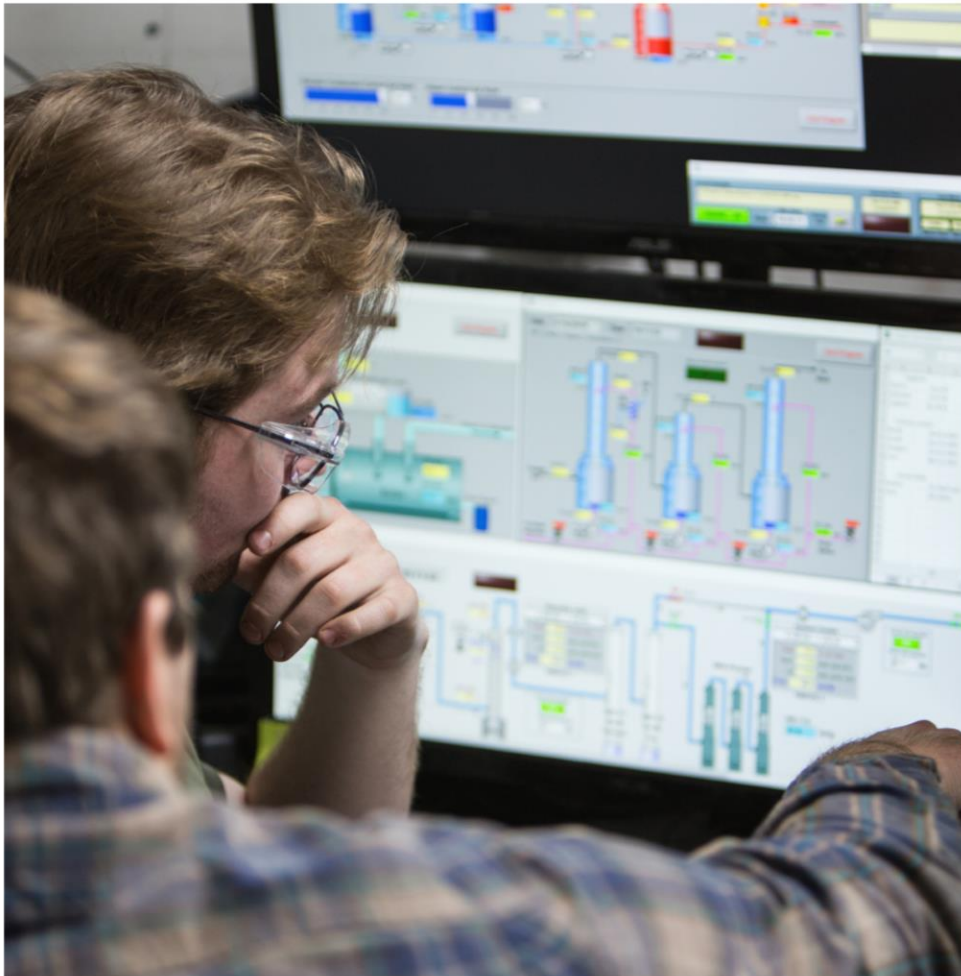


Touring petrochemical facilities in Alberta.





CARBON CAPTURE AND STORAGE



Courtesy: Project Tundra



CARBON UTILIZATION

ABANDONED WELLS

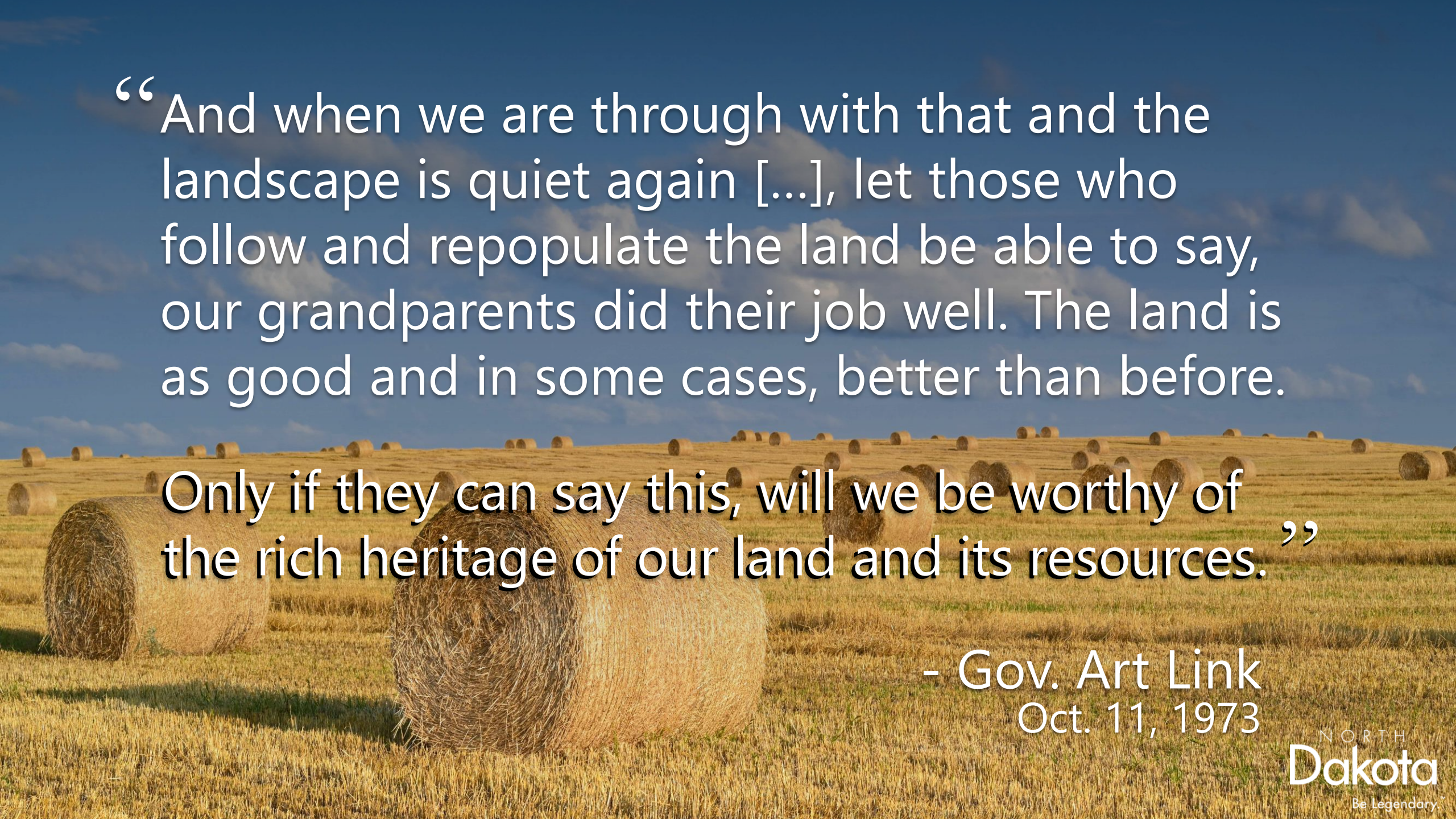


Courtesy: Iain Woessner / Forum News Service

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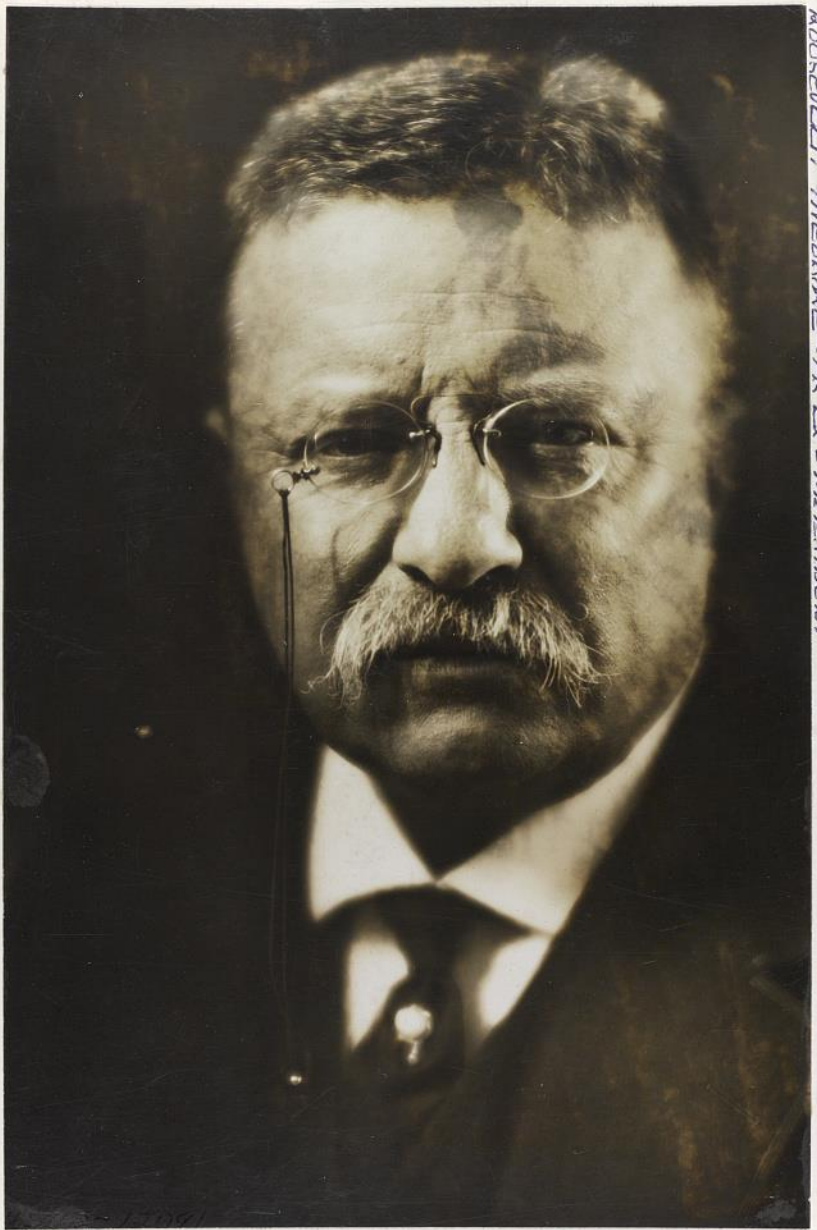
STEWARDSHIP OF THE LAND



“And when we are through with that and the landscape is quiet again [...], let those who follow and repopulate the land be able to say, our grandparents did their job well. The land is as good and in some cases, better than before.

Only if they can say this, will we be worthy of the rich heritage of our land and its resources.”

- Gov. Art Link
Oct. 11, 1973



“Conservation means development as much as it does protection.

I recognize the right and duty of this generation to develop and use the natural resources of our land; but I do not recognize the right to waste them, or to rob, by wasteful use, the generations that come after us.”

— Theodore Roosevelt
The New Nationalism
Sept. 1, 1910



GRATITUDE

Welcome to the IOGCC Annual Conference!



DOE Oil and Natural Gas Update

Shawn Bennett
Deputy Assistant Secretary
Office of Oil and Natural Gas

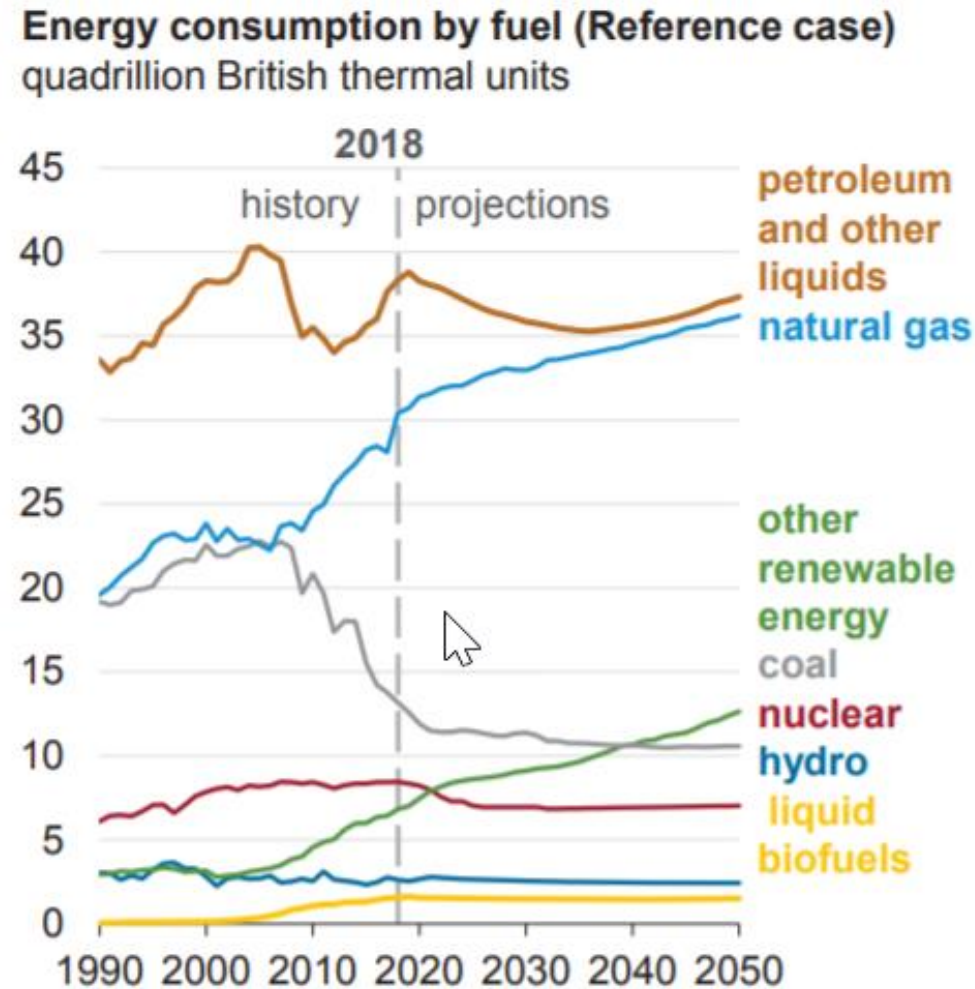
August 26, 2019
2019 IOGCC Annual Conference



Oil and Natural Gas Continue to Fuel the Economy

Key elements:

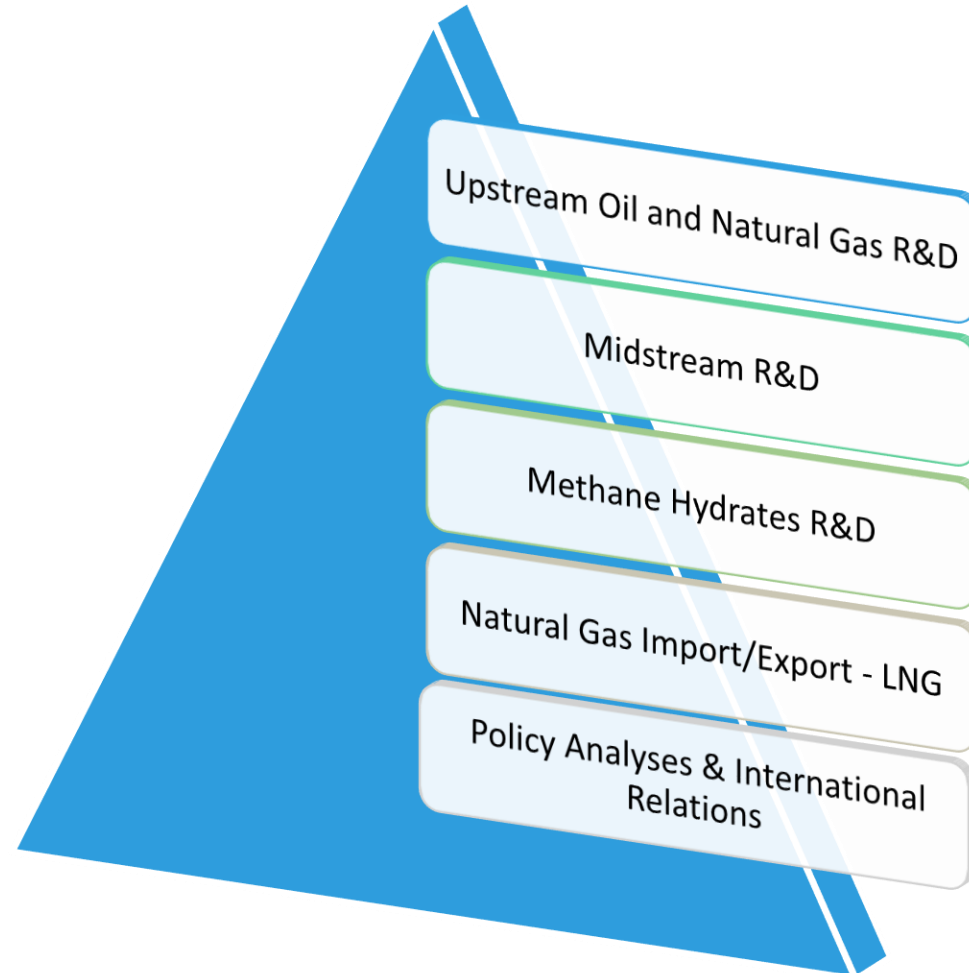
- Energy dominance – expanded energy supplies for economic growth and energy security for the U.S. and its allies
- U.S. technological leadership
- Streamlined regulation, less red tape
- Federal-State collaboration



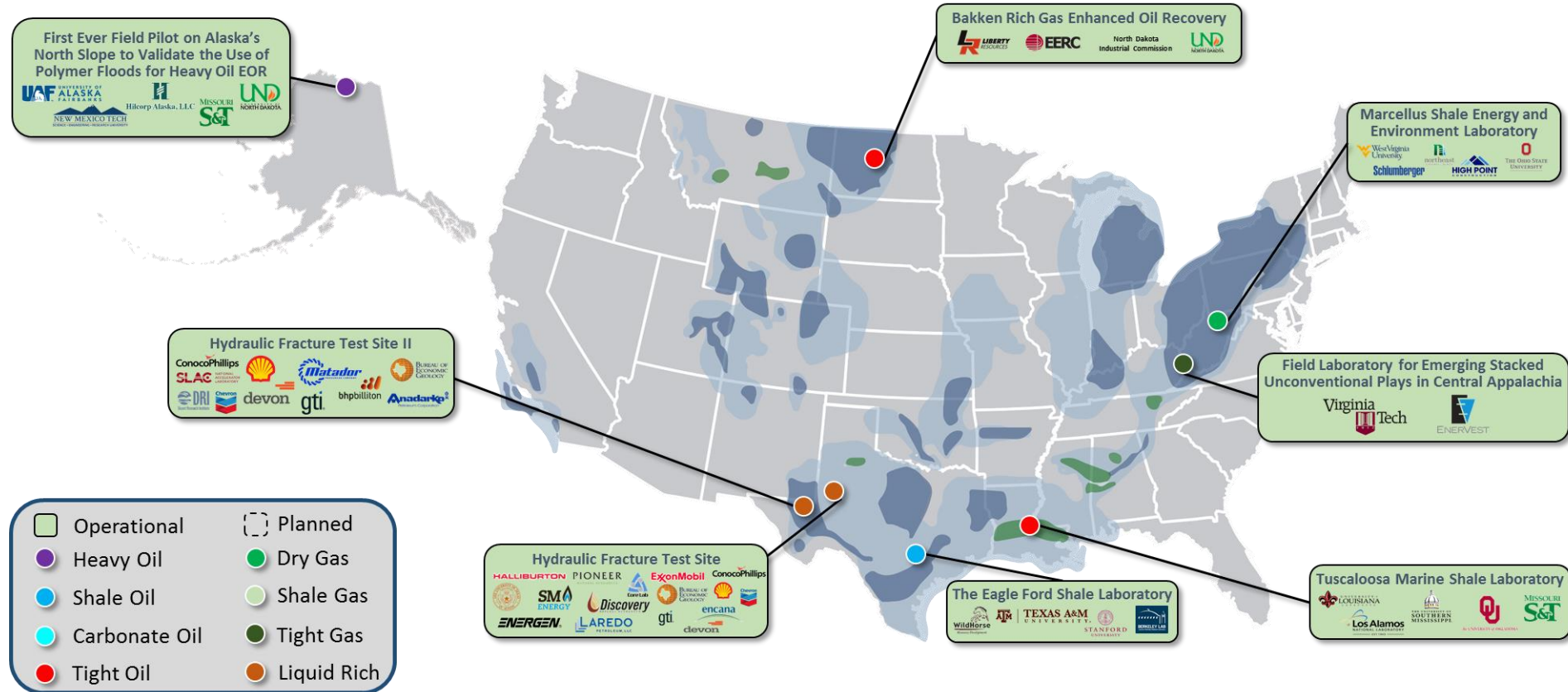
Source: EIA, Annual Energy Outlook 2019

DOE Oil and Natural Gas Program

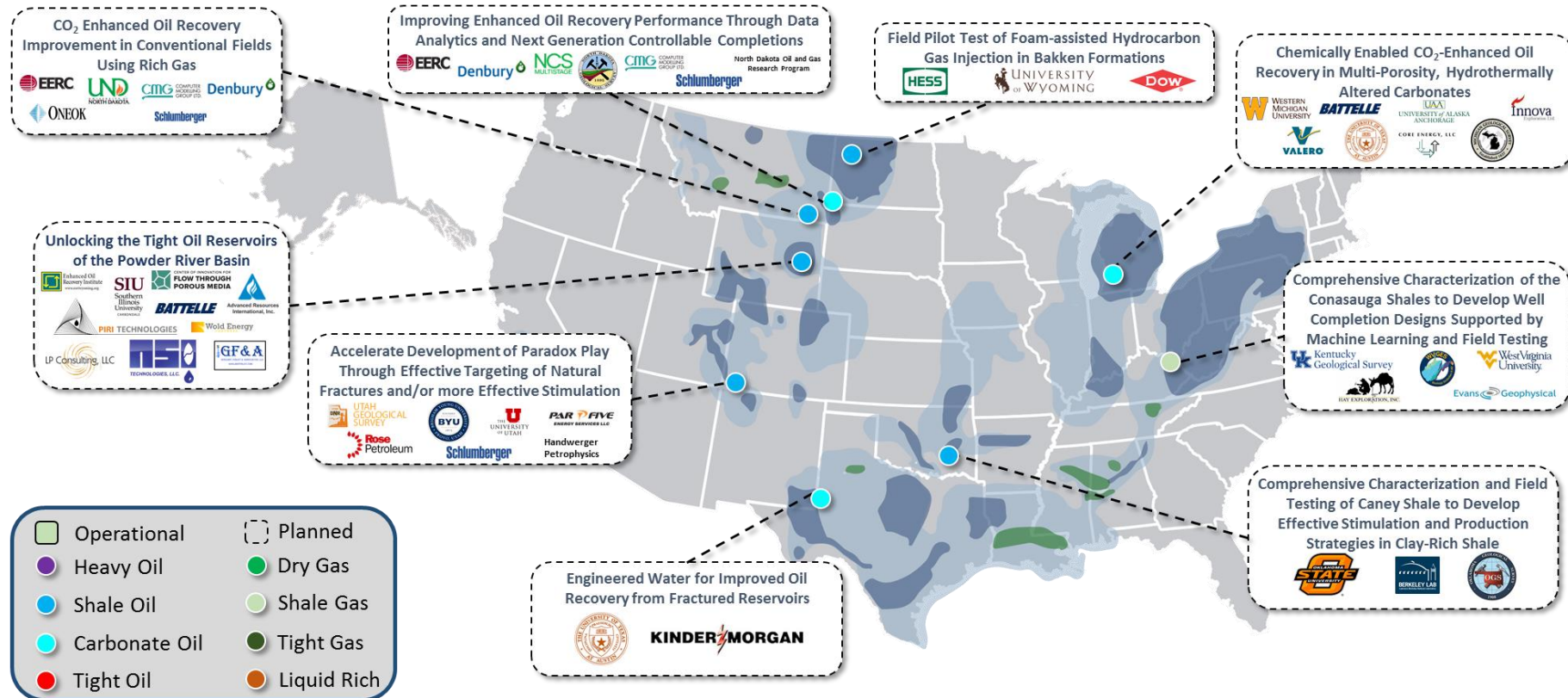
Mission: Maximize the value of U.S. oil and gas resources to the public and ensure their responsible development and delivery through policy, research, innovation, and outreach



DOE Field Laboratories: Basin-specific Research



Nine Potential New DOE Field Labs



DOE Field Lab Partners



2018

Potential New Doe Field Lab Partners



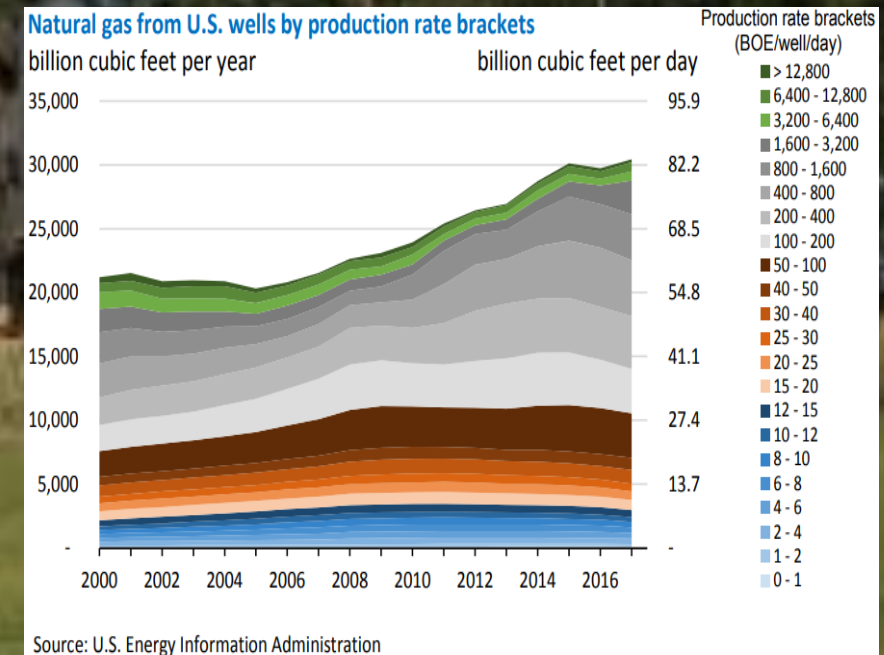
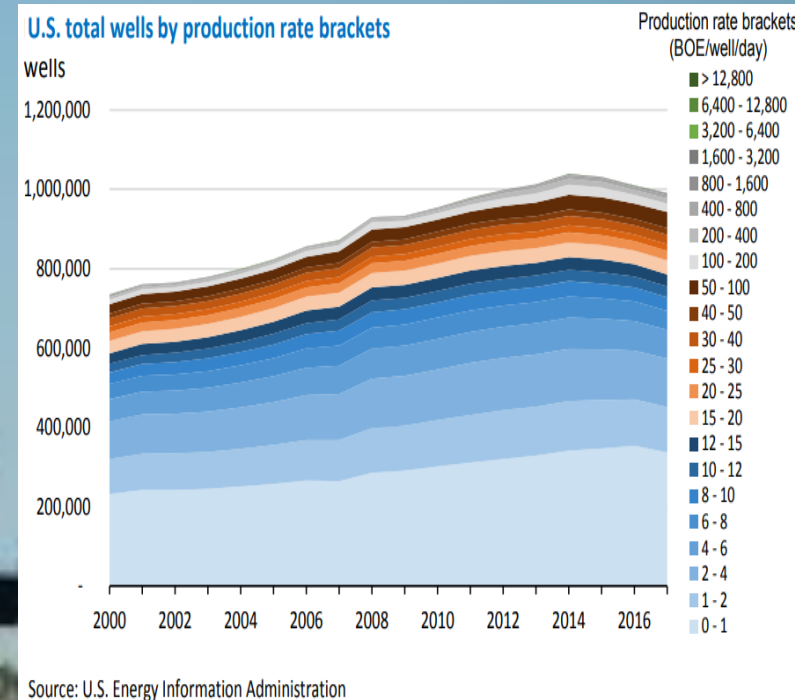
2019

Marginal Oil and Gas Wells

DOE Undertakes Study to Quantify Methane Emissions from Marginal Oil and Gas Wells. Fall 2018.

In 2017, 81% of the nearly 1 million U.S. wells produced 15 or fewer BOE per day.

These “marginal wells” accounted for 15.2% of U.S. oil production and 10.6% of natural gas production.

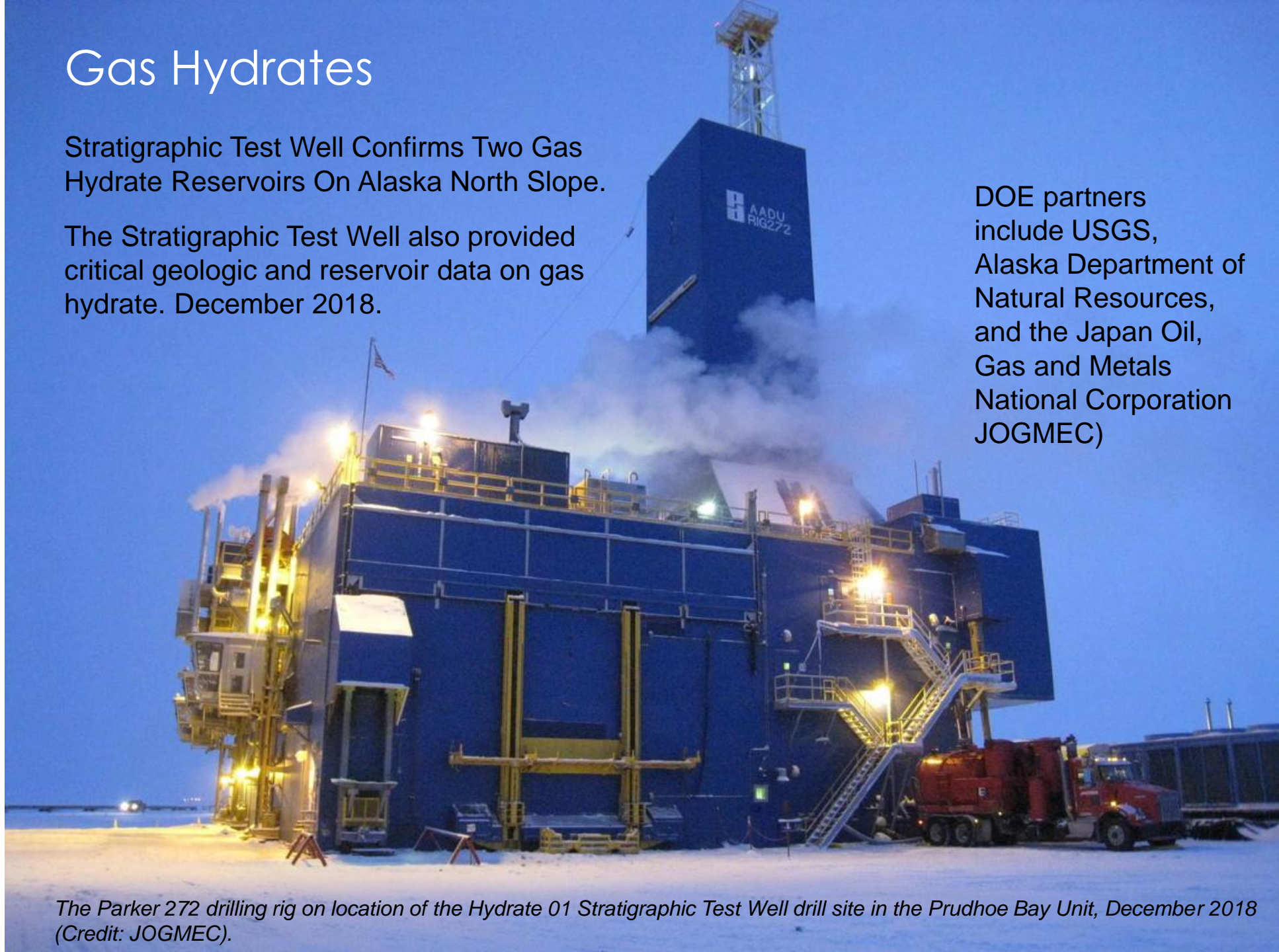


Gas Hydrates

Stratigraphic Test Well Confirms Two Gas Hydrate Reservoirs On Alaska North Slope.

The Stratigraphic Test Well also provided critical geologic and reservoir data on gas hydrate. December 2018.

DOE partners include USGS, Alaska Department of Natural Resources, and the Japan Oil, Gas and Metals National Corporation (JOGMEC)



The Parker 272 drilling rig on location of the Hydrate 01 Stratigraphic Test Well drill site in the Prudhoe Bay Unit, December 2018 (Credit: JOGMEC).

WATER CROSSCUTS DOE AND OUR COLLABORATION WITH STATES

DOE Water Security Grand Challenge. DOE, USGS and EPA are partnering to transform produced water from a waste to a resource. Initial workshop Oct. 2018.

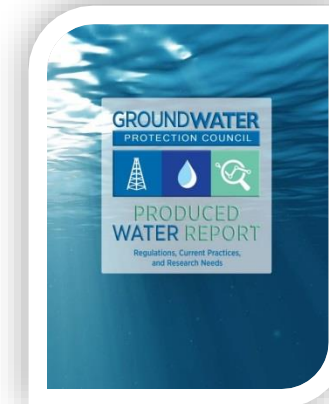


States Leveraging Efforts to Enable Informed Regulatory Decision Making and Increased Transparency.

★ **Risk Based Data Management System (RBDMS).** Over 20 states and the Osage Nation use RBDMS -- an integrated suite of data management tools -- for managing oil and gas regulatory data. Launched in 1992 with DOE support. With **NorthStar**, North Dakota is undertaking a major system upgrade, adapting new innovations previously developed for California **WellStar**.



FracFocus.org. Jointly sponsored by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission. 26 states require or allow operators to use this national registry for the public disclosure of chemicals used in hydraulic fracturing.



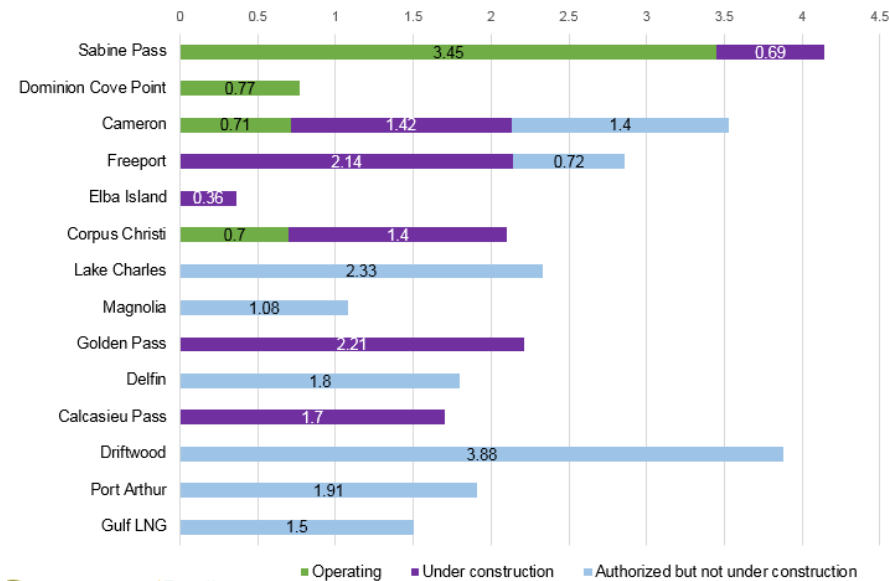
Ground Water Protection Council releases its Produced Water Report which examines current regulations, practices, and research needed to expand the use of produced water, a byproduct of oil and gas production, as a resource. June 2019.



LNG Exports

U.S. Liquefied Natural Gas Export Continue Record Growth –36 Countries Receiving U.S. Natural Gas Exports as LNG

Fully Permitted Lower-48 LNG Export Projects
Volumes in billion cubic feet per day (Bcf/d)



LNG Exports Since February 2016



| Region | Volume Exported (Bcf) | No. of Cargos |
|---------------------------|-----------------------|---------------|
| East Asia and Pacific | 1,042 | 304 |
| Europe and Central Asia | 546 | 168 |
| Latin America/Caribbean | 797 | 262 |
| Middle East and N. Africa | 199 | 58 |
| South Asia | 164 | 48 |
| Sub-Saharan Africa | 0 | 0 |
| TOTAL LNG EXPORTS | 2,747 | 840 |

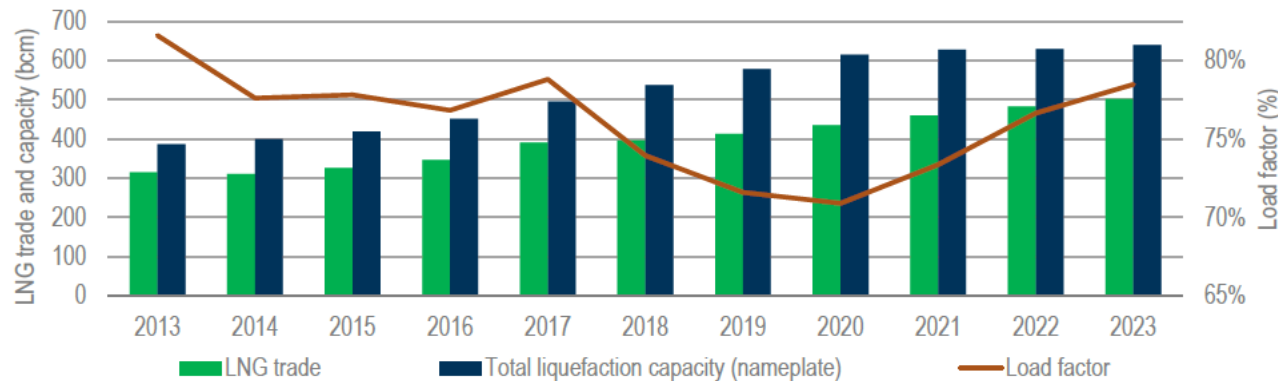
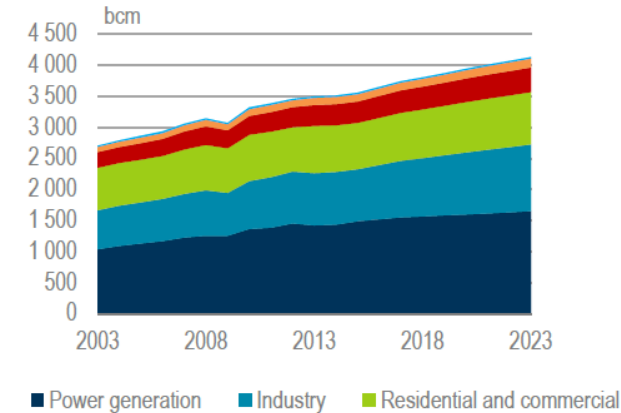
LNG Exports

Growing global demand for natural gas will continue to increase natural gas and LNG trade

Global Natural Gas Demand by Sector

2003-2023

Source: IEA



Global LNG Liquefaction Capacity and Utilization, 2013-2023

Source: IEA

Policy Analysis and International Relations

International Highlights

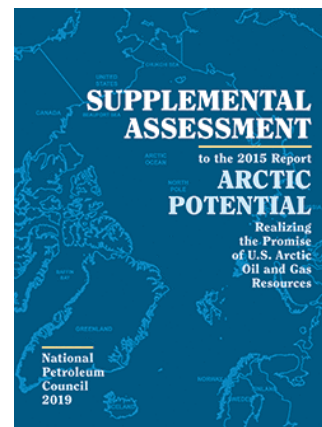
US-Israel Center of Excellence in Energy, Engineering and Water Technology. Call for Research Proposals. April 2019

US-India Economic Engagement. DOE is supporting a new industry-led initiative -- the **India Gas Task Force** -- focused on ways the government of India can improve and modernize its natural gas markets, regulation and infrastructure.

Appalachian Manufacturing Opportunity

Ethane Storage and Distribution Hub. President Trump visits Shell's Petrochemical Cracker in Beaver County, Pennsylvania. August 2018. DOE's Report to Congress underscores the potential for expanded manufacturing in the region. December 2018.

National Petroleum Council



Carbon
Capture,
Storage and
Utilization

In Process

U.S. Oil and
Natural Gas
Transportation
Infrastructure

In Process



www.energy.gov/fe/science-innovation/oil-gas-research
www.netl.doe.gov/research/oil-and-gas



February 21, 2016

Solutions for Today | Options for Tomorrow



Welcome to the IOGCC Annual Conference!



Welcome to the IOGCC Annual Conference!



Idle and Orphan Oil and Gas Wells --- Regulatory Solutions



2019

Hal Fitch

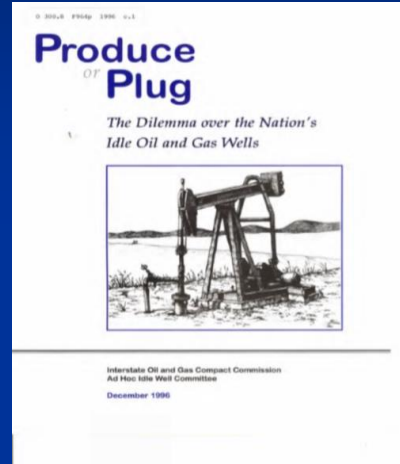
IDLE & ORPHAN WELL CHALLENGES

- **Transfer of ownership**
- **Bonding adequacy**
- **Plugging & Restoration Funding**
- **Undocumented wells**

PREVIOUS WORK

A Study of Idle Oil and Gas Wells in the United States

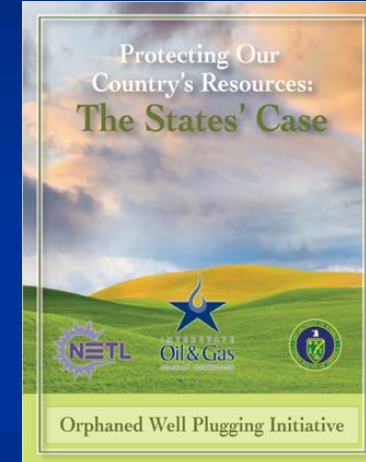
1992



1996

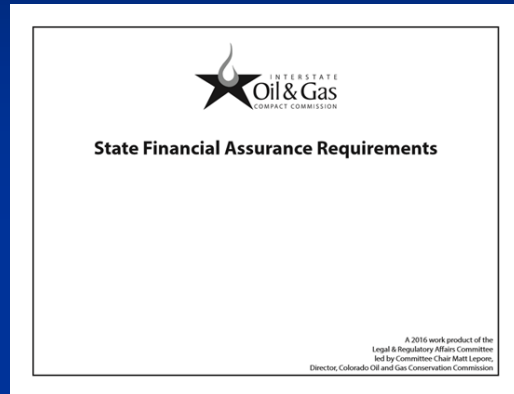


2000



2008

LEGAL & REGULATORY AFFAIRS COMMITTEE



2016



2017



2018

2019 STUDY

Survey of states & provinces

- **Definitions**
- **Idle wells**
- **Orphan wells**
- **Plugging funds**
- **Financial assurance**
- **Incentives**
- **Innovations and successes**

**Incorporates Legal & Regulatory Affairs
Comm. studies**

STATES SURVEYED AND RESPONDING

1996: 31 States

2000: 31 States

2006: 28 States

2019: 31 States + 5 Provinces

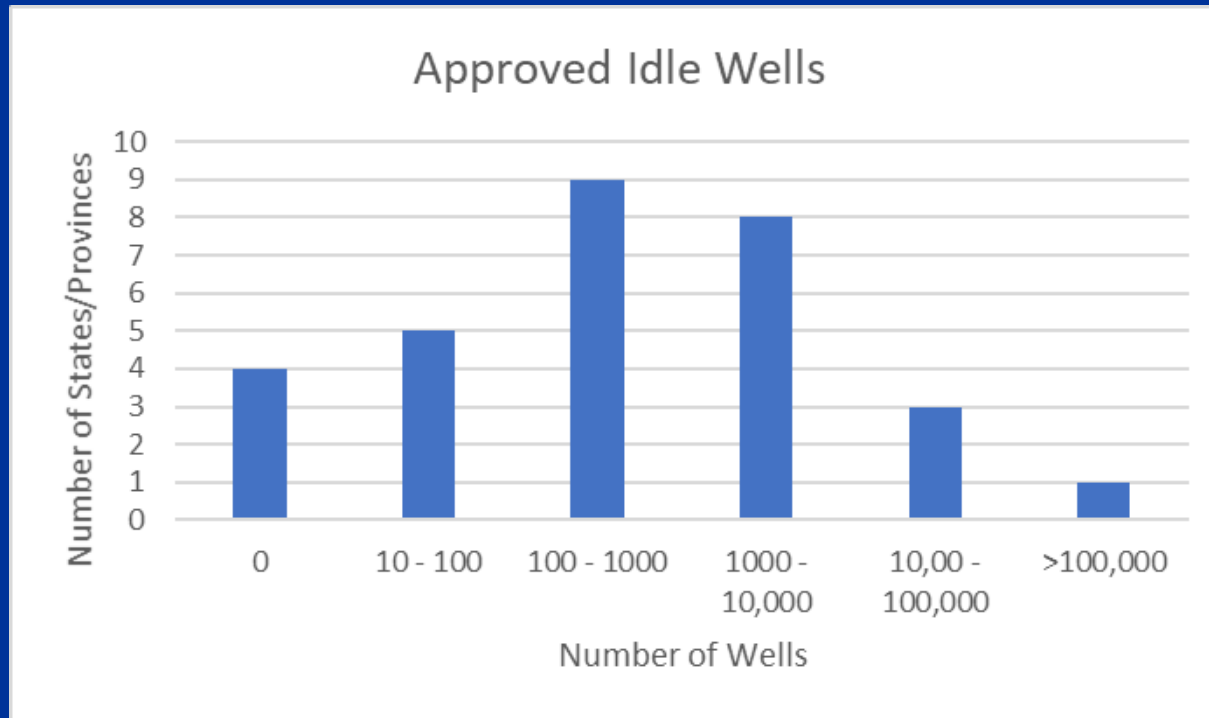
STUDY RESULTS

Idle and Orphan
Oil and Gas Wells

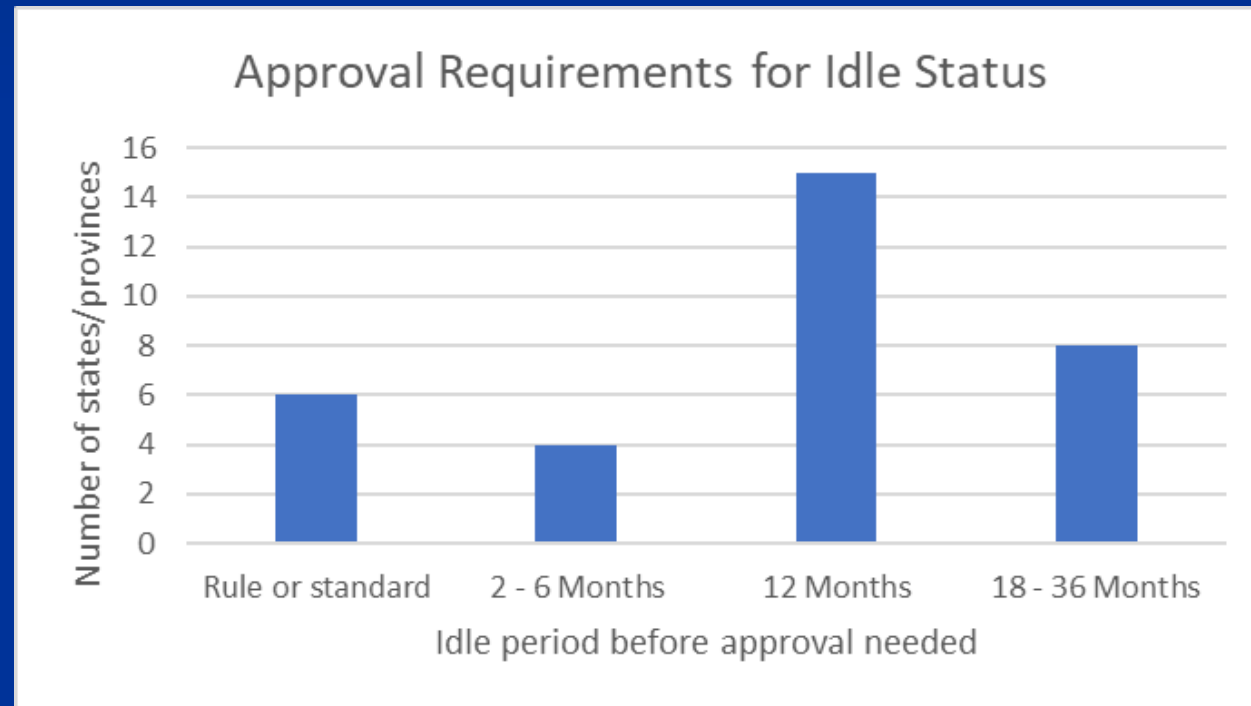
Regulatory Solutions

IDLE WELLS

- **Total approved idle wells: 290,422**
- **May be approved by rule or specific written approval**

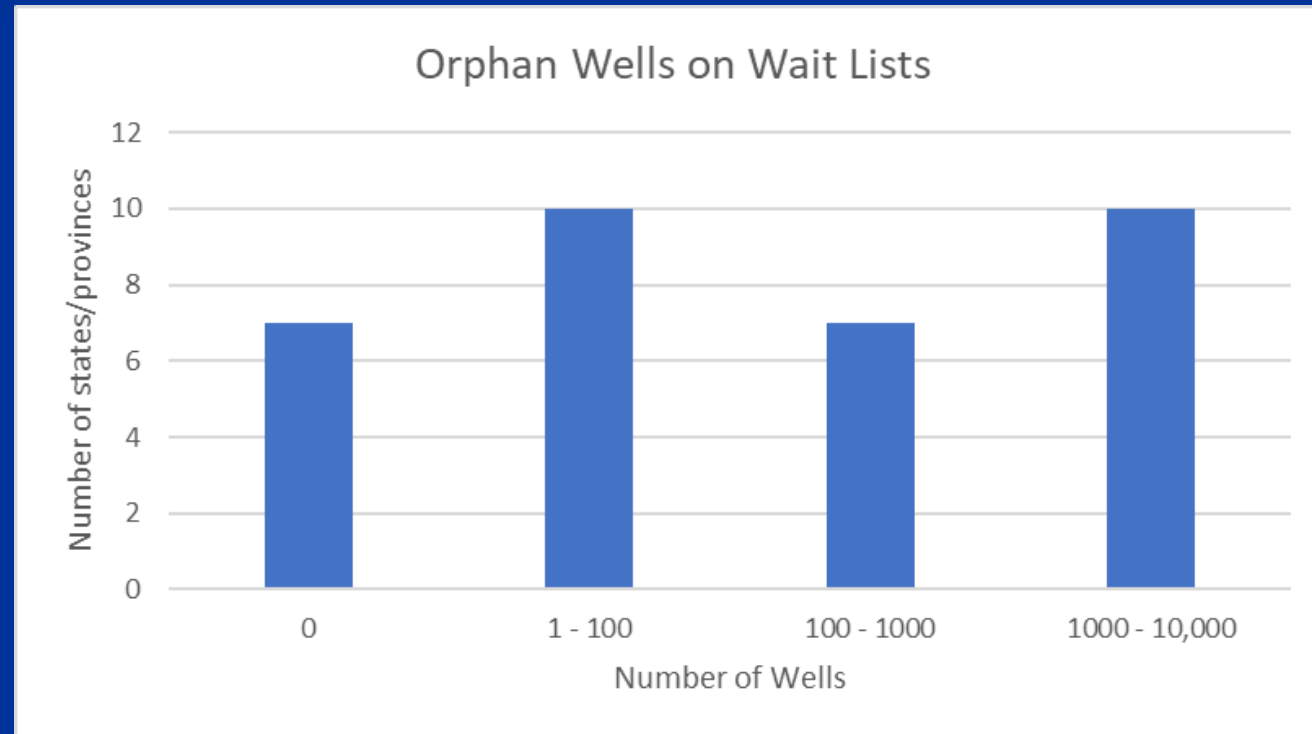


PERIOD A WELL MAY REMAIN IDLE BEFORE APPROVAL IS REQUIRED

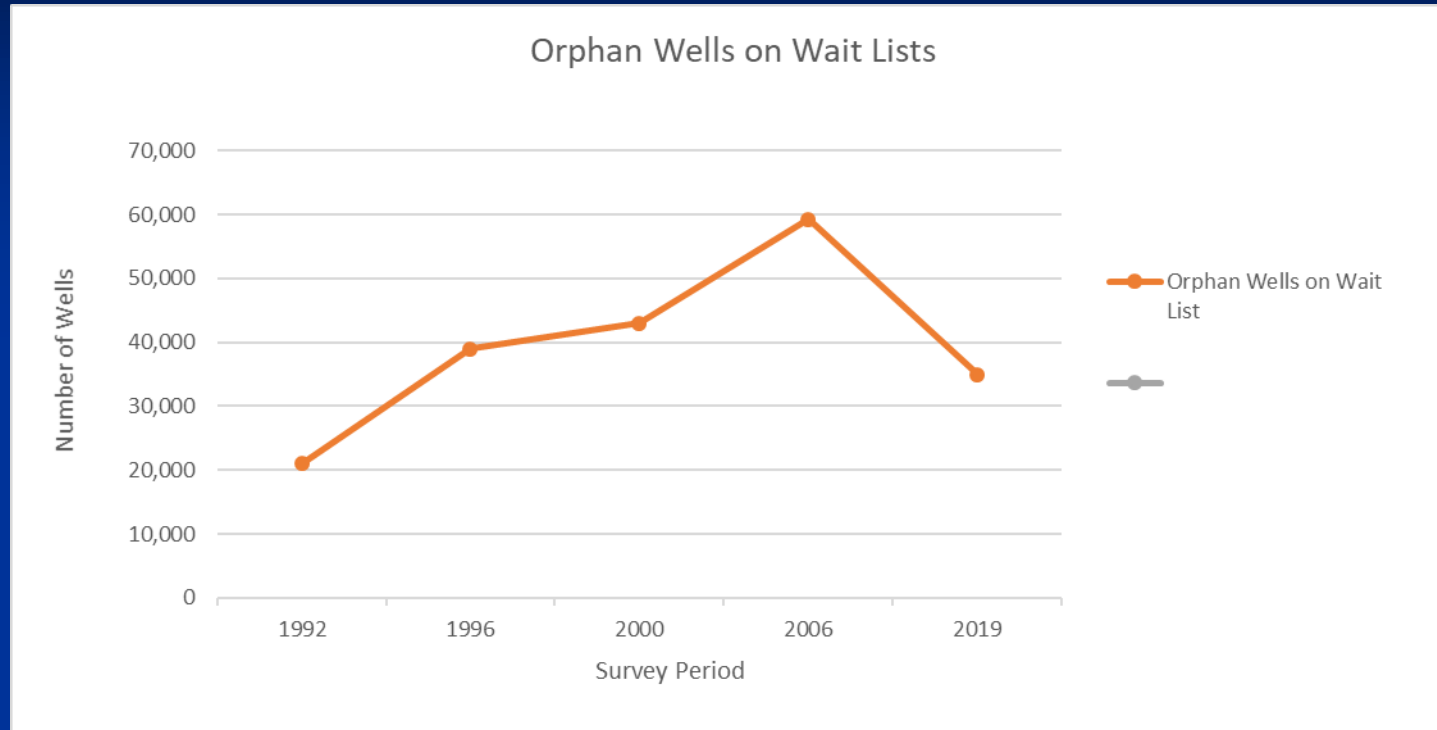


ORPHAN WELLS

- **29 states: 36,353 orphan wells on wait lists**
- **5 provinces: 3,610 orphan wells on wait lists**



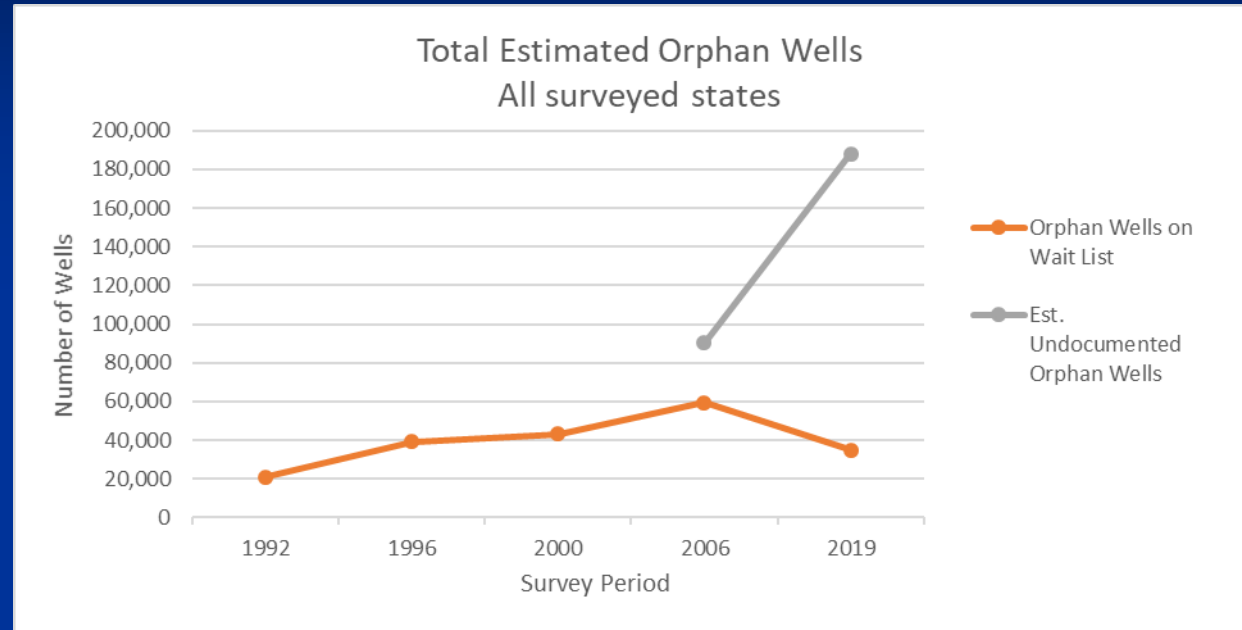
ORPHAN WELL TRENDS



- States have made progress in reducing orphans
- Chart does not include provinces (no numbers < 2019)

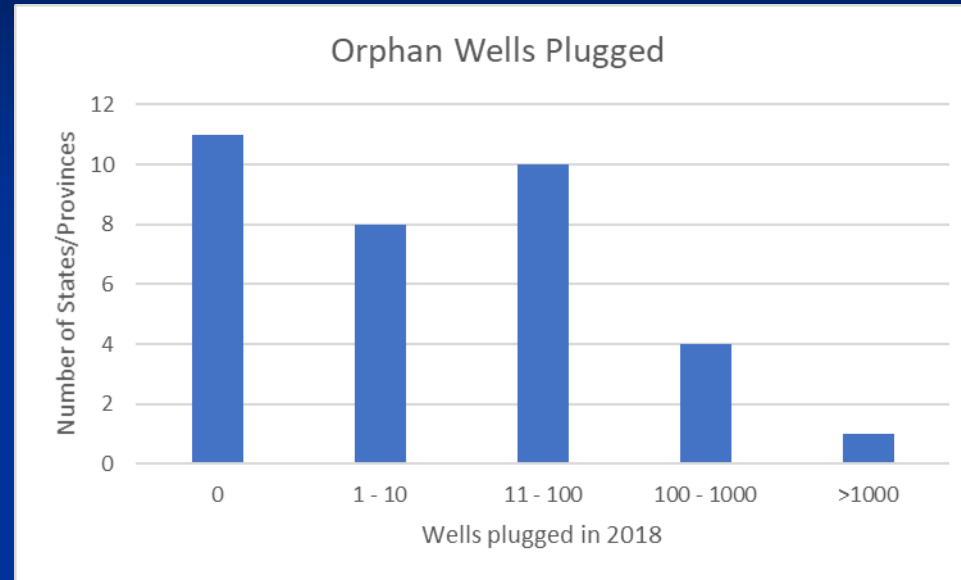
ORPHAN WELL TRENDS

Including Estimated Undocumented Wells



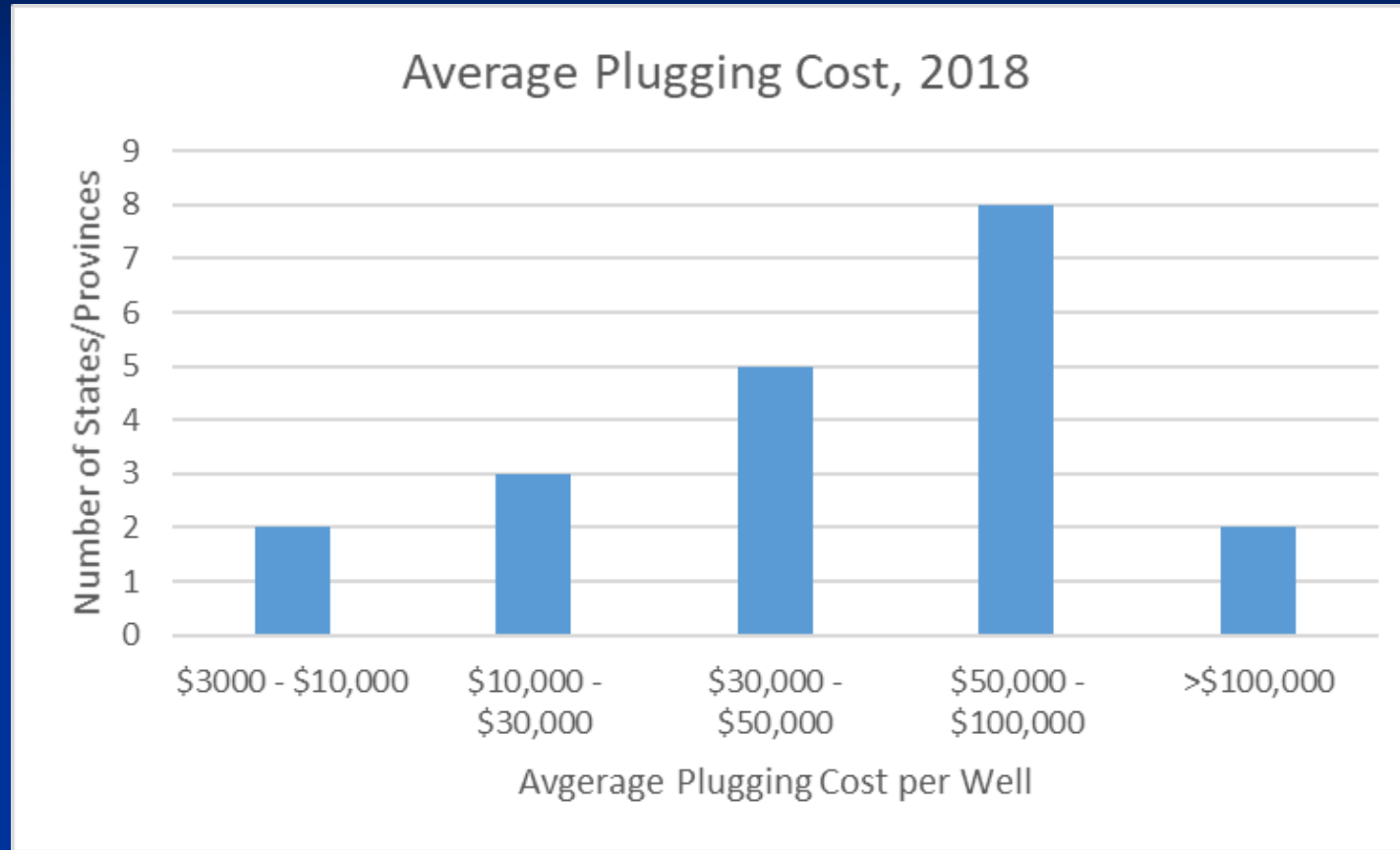
- Total undocumented wells: 188,000 (minimum)
- 11 states provided estimates of undocumented wells
- 11 states may have undocumented orphan wells but no estimate
- 7 states & 5 provinces: no undocumented orphan wells

ORPHAN WELL PLUGGING



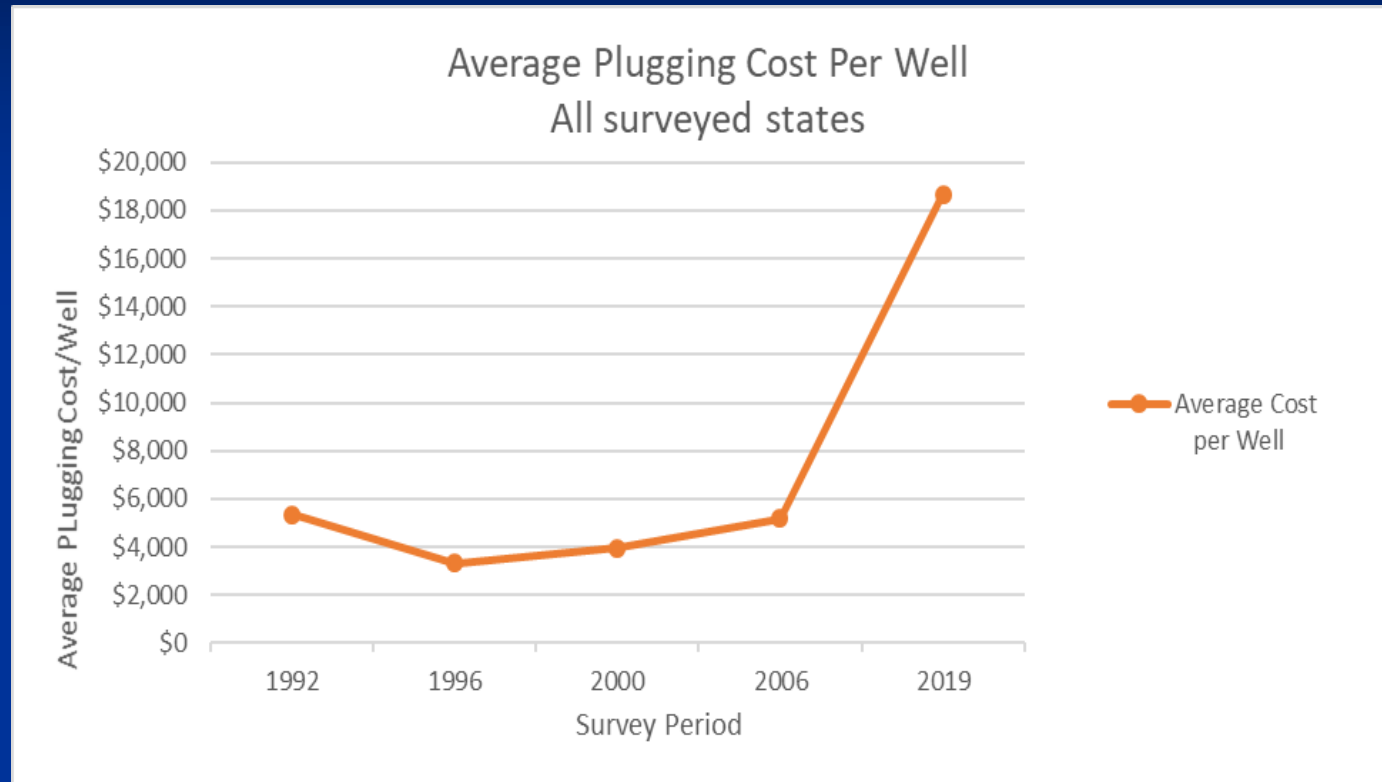
- **> 90% of states & provinces have orphan well plugging funds**
- **23 states and provinces plugged total of 3,334 orphan wells in 2018**

ORPHAN WELL PLUGGING COSTS



Most states & provinces spent \$30,000 - \$50,000/well

ORPHAN WELL PLUGGING COSTS



Cost/well increased >300% since 2006

FINANCIAL ASSURANCE

| Type of financial assurance | Percent of states and provinces w/ type |
|-------------------------------|---|
| Surety or performance bonds | 85% |
| Cash deposit | 74% |
| CD | 68% |
| Letter of credit, irrevocable | 68% |
| Financial statements | 18% |
| Security interest | 6% |
| Certificate of insurance | 3% |
| Escrow account | 3% |
| Liens | 3% |

FINANCIAL ASSURANCE

- **Most states & provinces: single-well & blanket securities**
- **Set amount or multi-tier**
- **Single-well: \$1,500 - \$400,000/well**
- **\$2 - \$12/foot**
- **Blanket: 15,000 - \$30,000,000**

SIX STATES HAVE INCENTIVES TO PLUG ORPHAN WELLS

- **Grants & Reimbursements**
- **Exemptions to bonding**
- **Liability relief**

EIGHT STATES HAVE INCENTIVES TO REACTIVATE IDLE WELLS

- **Tax or fee reductions**
- **Reduction of bonding**
- **Temporary test permit**
- **Transfer of ownership with
conditions & new bond**

15 STATES REPORTED INNOVATIONS & SUCCESSES

- **Outreach**
- **Program efficiencies**
- **Tax structure**
- **GIS & drone technologies**
- **Creative bonding solutions**
- **Landowner assistance**

STATE AND PROVINCE SUMMARIES

STATE/PROVINCE

Regulatory Agency

Statutory or Regulatory Authority

Definitions

Idle Well:

Orphan Well:

Site restoration:

Idle Wells

Classification:

Inactive period without approval:

Inactive period after approval:

Requirements for approval:

Provisions for exceptions:

Orphan wells

Orphan wells on wait list:

Estimated undocumented orphan wells:

Actions to address undocumented orphan wells:

Plugging Funds

Description:

Sources of funding:

Annual authorized expenditure target:

Funds for emergency remedial actions:

Funds for site restoration:

Process for prioritizing orphan wells for plugging:

Financial Assurance

Types of Financial Assurance Allowed

Single Well Securities

| Amount | Criteria |
|--------|----------|
|--------|----------|

Minimum:

Maximum:

Blanket Securities

| Amount | Criteria |
|--------|----------|
|--------|----------|

Minimum:

Maximum:

QUESTIONS?

Idle and Orphan Oil and Gas Wells --- Regulatory Solutions



2019

Welcome to the IOGCC Annual Conference!





2019 E.W. Marland Award

IOGCC ANNUAL CONFERENCE
MEDORA, NORTH DAKOTA
AUGUST 26, 2019

E.W. Marland Award



- E.W. Marland was a U.S. Congressman and the 10th Governor of Oklahoma.
- He is considered the “Father of the Compact.”

The IOGCC established the E.W. Marland award in 1994 to recognize an outstanding state regulator.



The winner of the 2019
E.W. Marland Award is...

E.W. Marland Award

Harold R. “Hal” Fitch



E.W. Marland Award

Hastings High School
Graduation 1967



E.W. Marland Award

Hal completed his Bachelor of Science degree
in Geology from Michigan Technological
University in 1972.



**Michigan
Technological**
University

The Start of Something Grand!



E.W. Marland Award



From 1980 to 1982 Hal attended graduate school in Hydrology and Water Resources at the University of Arizona in Tucson.



E.W. Marland Award

In 1996 Hal was appointed as Chief of the Geological Survey Division.



E.W. Marland Award

Hal spent the next 22 plus years as Director of the Michigan Geologic Survey Division or its successor agencies.



E.W. Marland Award

- Hal served on many committees and work groups for the IOGCC.
- He was elected and served as Vice Chair of IOGCC from 2014-2015.



E.W. Marland Award

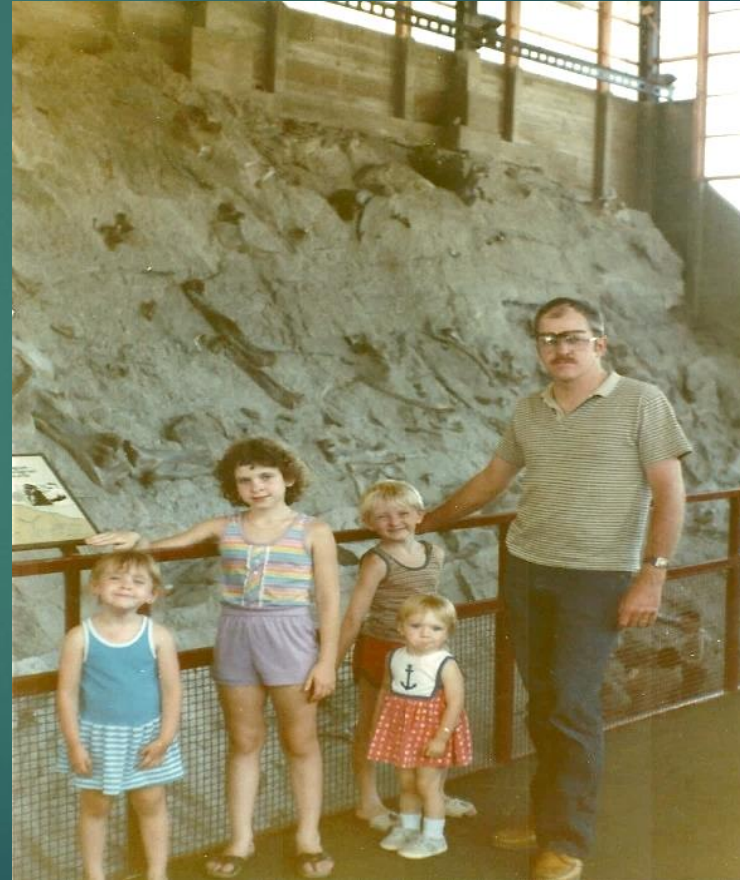
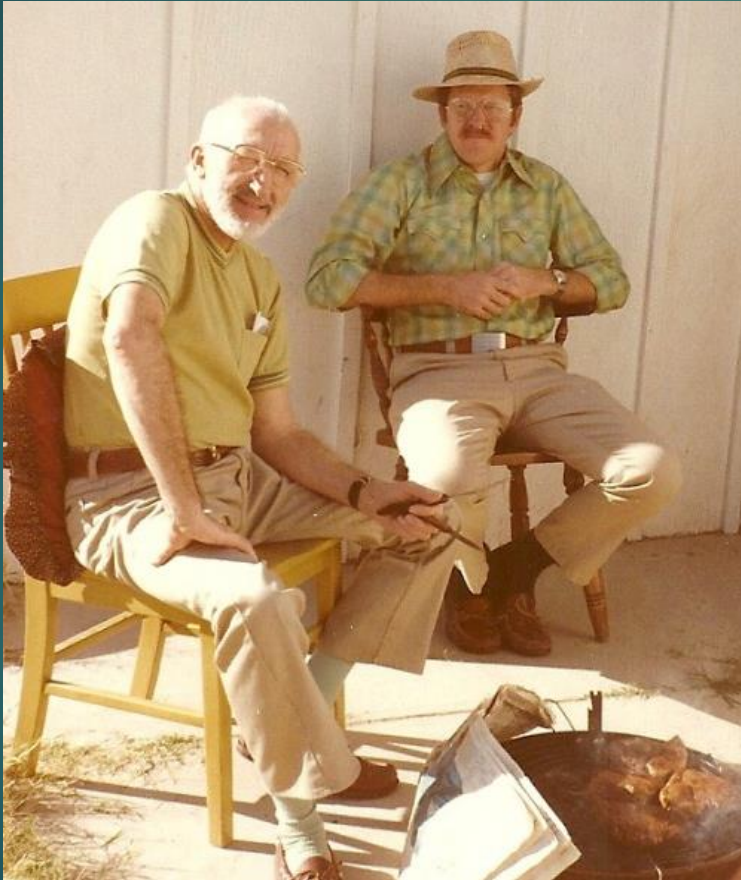


Hal enjoys outdoor activities, including camping, boating, kayaking, hiking, bicycling, and skiing!

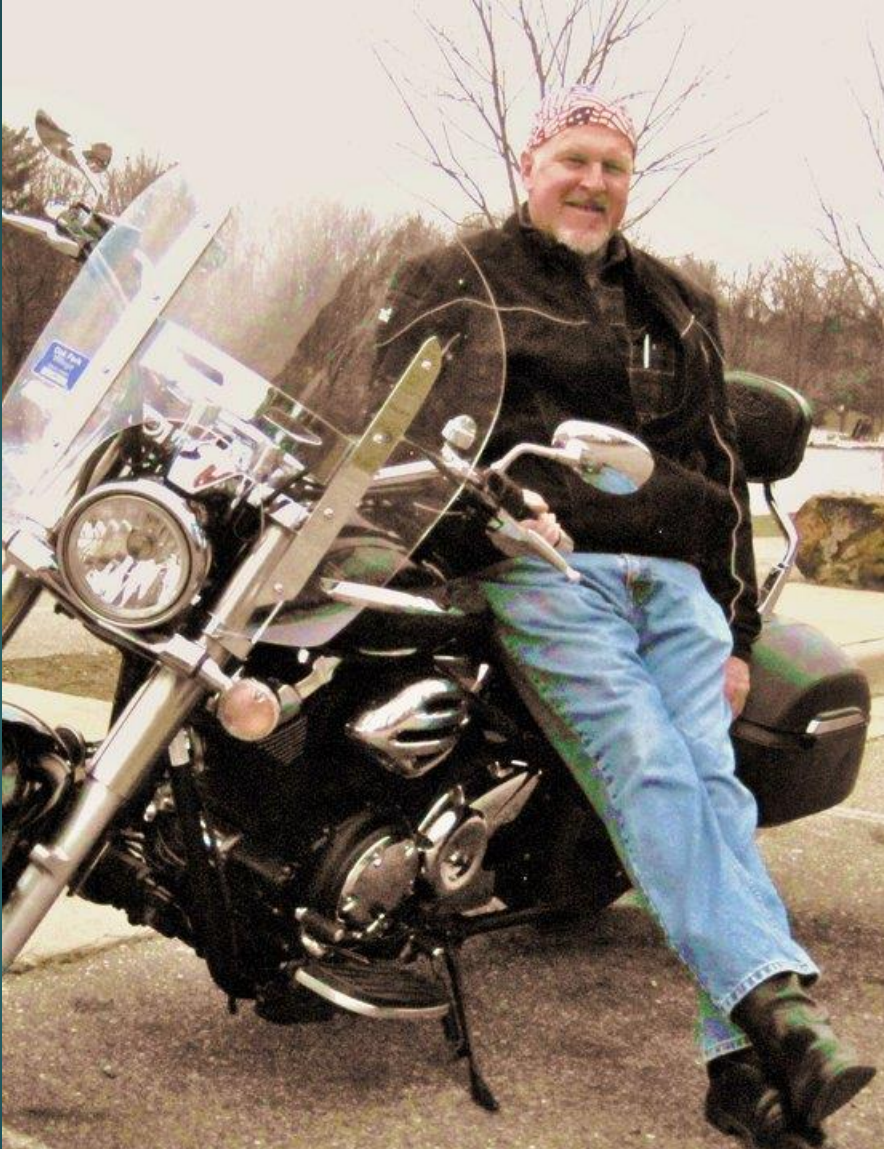


E.W. Marland Award

Family time is the best time!



E.W. Marland Award



Hal is an avid motorcyclist, riding his Harley about 8,000 miles per year!

E.W. Marland Award

Having a little fun every now and again never hurts!



E.W. Marland Award

Thank you, Hal,
for your years of
service and
dedication to the
IOGCC.



Welcome to the IOGCC Annual Conference!





CHAIRMAN'S
STEWARDSHIP
A W A R D S
2 0 1 9



Powerpoint Templates

MAJOR/LARGE COMPANY WINNER – APACHE CORPORATION



EXPLORING WHAT'S POSSIBLE

Balmorhea State Park Pool | Texas



Balmorhea State Park Pool | Texas



Balmorhea State Park Pool | Texas

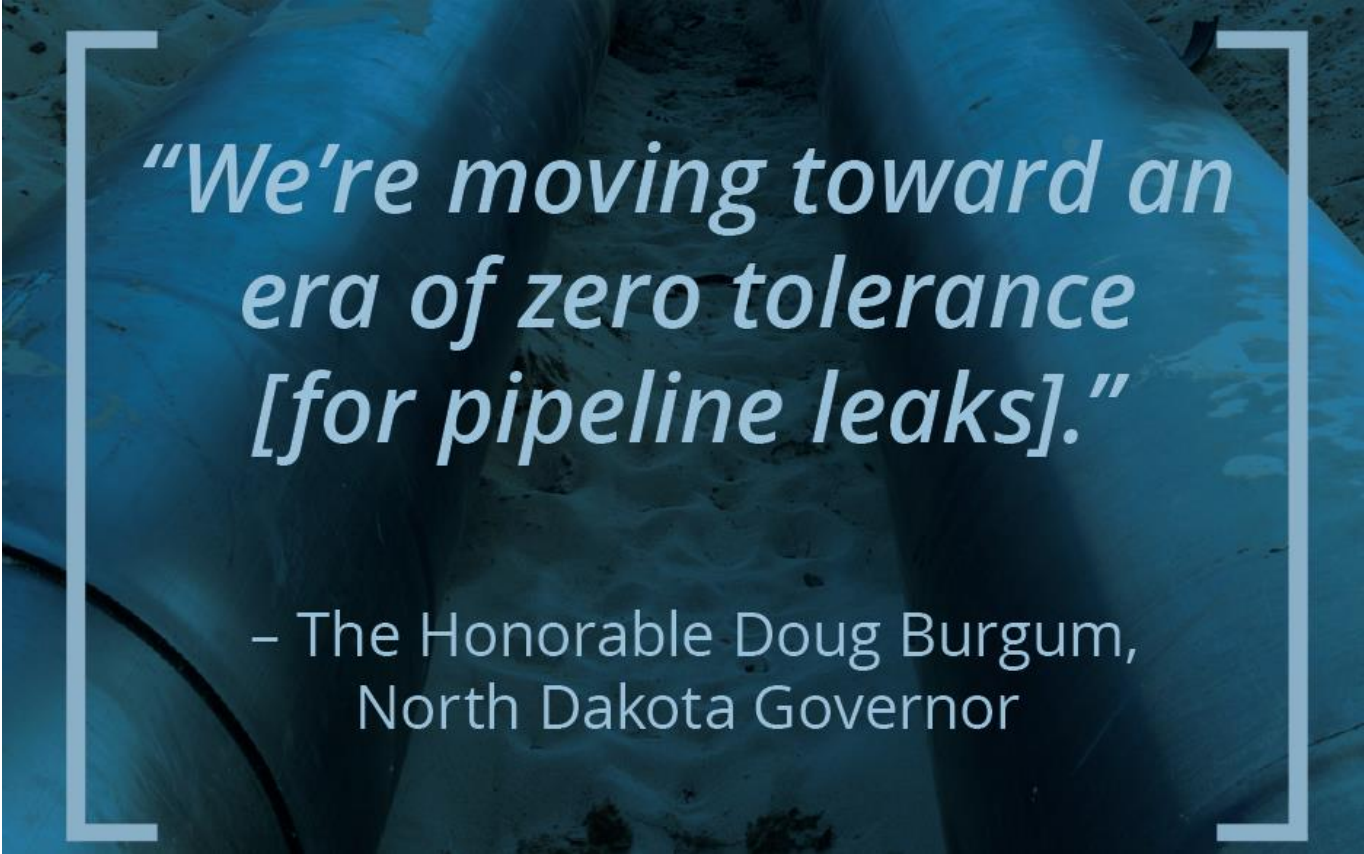




ENVIRONMENTAL PARTNERSHIP COMPANY WINNERS – IPIPE AND NDIC



The Intelligent Pipeline Integrity Program (iPIPE) | North Dakota



"We're moving toward an era of zero tolerance [for pipeline leaks]."

– The Honorable Doug Burgum,
North Dakota Governor

ENVIRONMENTAL PARTNERSHIP: ENERGY &
ENVIRONMENTAL RESEARCH CENTER

[Powerpoint Templates](#)

The Intelligent Pipeline Integrity Program (iPIPE) | North Dakota



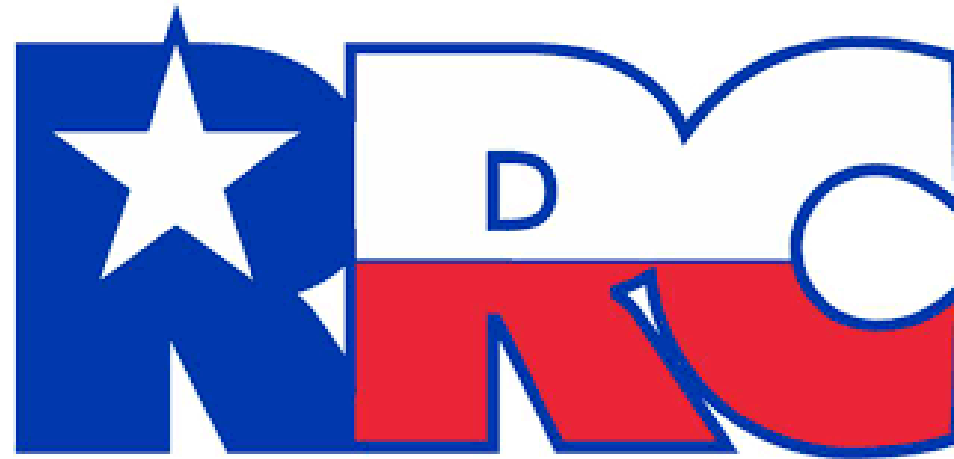
The Intelligent Pipeline Integrity Program (iPIPE) | North Dakota





Powerpoint Templates

ENERGY EDUCATION COMPANY WINNER – RAILROAD COMMISSION OF TEXAS



Railroad Commission of Texas

Online Inspection Lookup (RRC OIL)



THANK YOU
NOMINEES AND
SELECTION COMMITTEE



[Powerpoint Templates](#)

2020 CHAIRMAN'S STEWARDSHIP AWARDS

Contact Cynthia McCollum at
Cynthia.McCollum@iogcc.state.ok.us
or visit the IOGCC website at
iogcc.ok.gov/chairmansstewardshipaward