IOGCC Annual Meeting

Gov. Doug Burgum

Medora, ND

Aug. 26, 2019

INTERSTATE Oil & Gas COMPACT COMMISSION

NORTH Dakota

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WELCOME
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GRATITUDE
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INTERSTATE
Oil & Gas
COMPACT COMMISSION

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
NORTH
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INNOVATION and
INVESTMENT
NORTH
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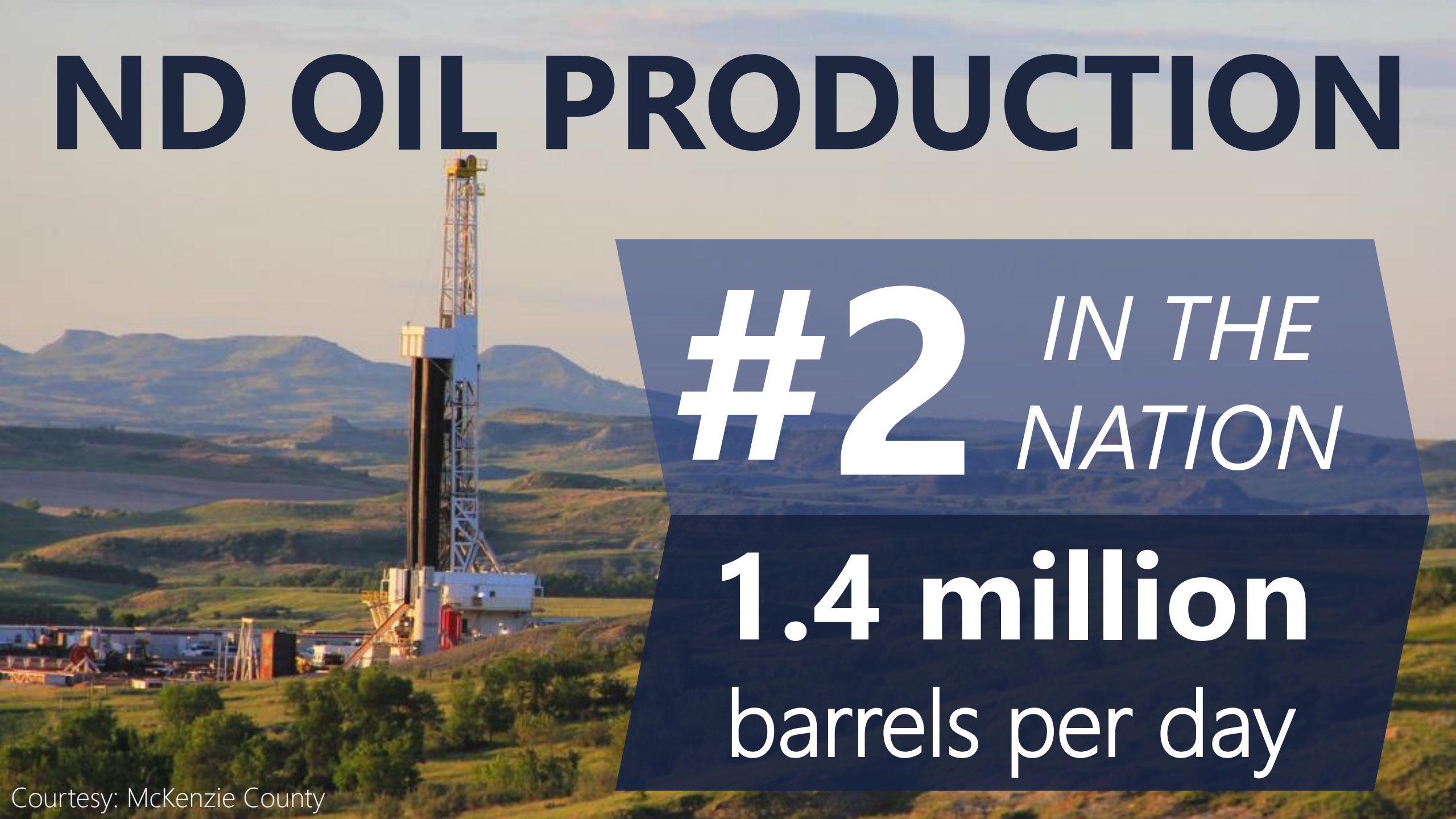
ND OIL PRODUCTION



#2 *IN THE NATION*

1.4 million barrels per day

Courtesy: McKenzie County

TRIBAL TAX AGREEMENT

UNPRECEDENTED COLLABORATION

GLOBAL GAME-CHANGER

U.S. ENERGY DOMINANCE

Courtesy: NASA

INFRASTRUCTURE

Photo: Amy Sisk/Inside Energy

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INNOVATION
NOT REGULATION
NORTH
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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

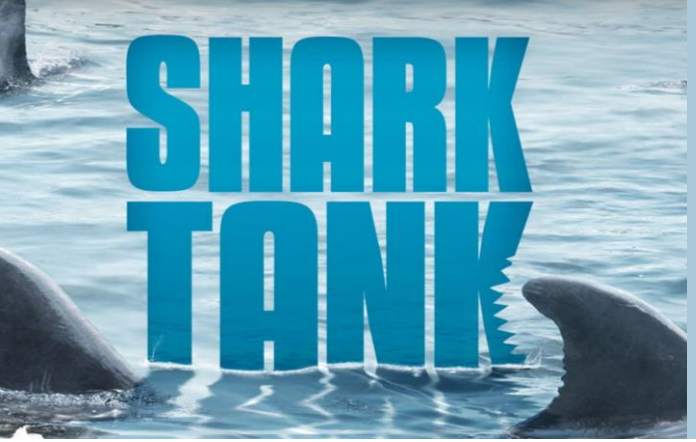
Feedback

- Provide user feedback to hone products

Provide test sites

- Live, operating pipelines upon which technology is developed

ENBRIDGE
GOODNIGHT MIDSTREAM
andeavor
OASIS MIDSTREAM PARTNERS
ONEOK
HESS
dcp Midstream
WHITING
equinor



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**

iPIPE

FIRST SELECTION ROUND

MAY 2018

Satelytics	DETECTION: Opportunistic data collection + AI
INSITU	DETECTION: UAV + advanced analytics + BVLOS
eSmart SYSTEMS Microsoft KONGSBERG	DETECTION: UAV + AI + novel sensor suite
INGU SOLUTIONS	DETECTION/PREVENTION: Golf ball-sized free-floating sensor
SwRI	DETECTION: AI + multiple sensors
omnisens Securing asset integrity	DETECTION/PREVENTION: Fiber optic leak and land movement detection
Rheidiant	DETECTION: Noncontact, Internet of Things monitoring of pipelines

iPIPE

SECOND SELECTION ROUND
OCT. 2018

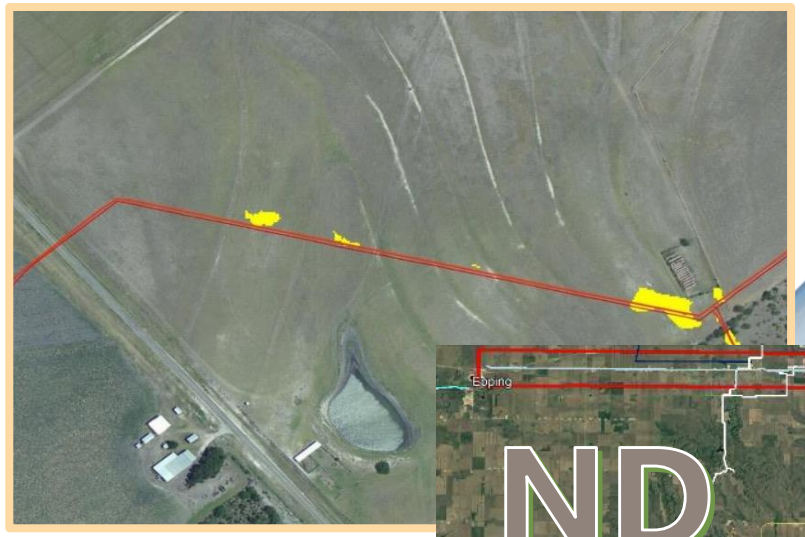
Technology Provider	Function	Technology Summary
Asel-Tech	DETECTION	Non-intrusive negative pressure wave leak detection
Direct-C	DETECTION	Nanotechnology "paint" for leak detection
eSmart Systems	DETECTION	Sensor fusion with novel sensor suite + AI + drone
Expert Infrastructure Solutions	PREVENTION	AI-based risk assessment
High Impact Technologies	PREVENTION	Self-healing coating, pinpoint leak location
Insitu	DETECTION	BVLOS-focused drone-based leak detection
mIQrotech	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

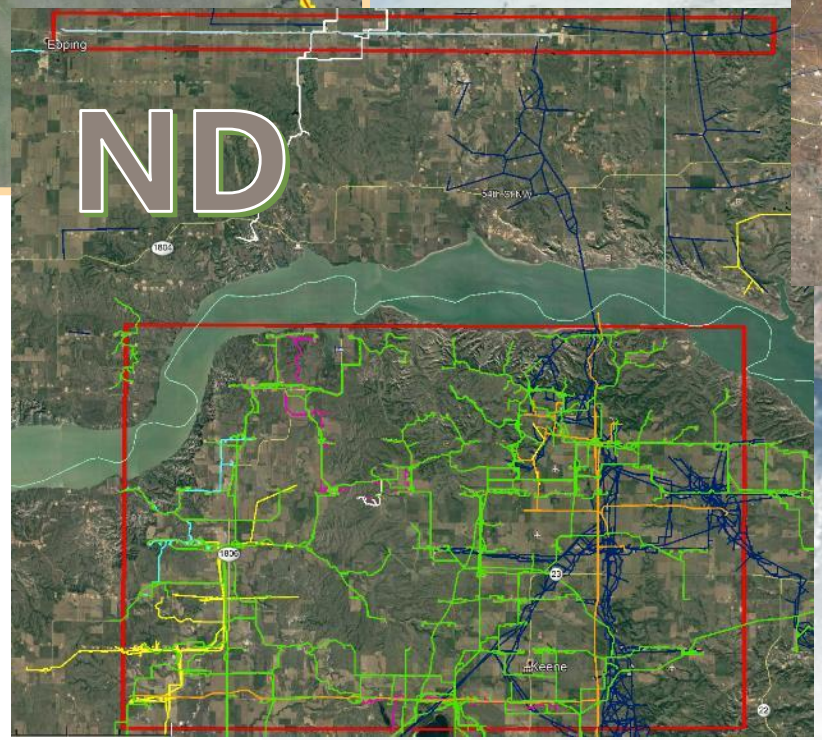
- 20 technologies invited
- 9 technologies presented
- 4 selected for development

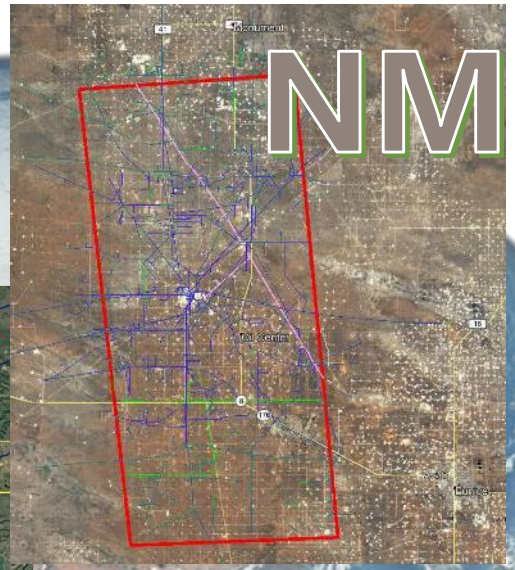
SATELYTICS – OPPORTUNISTIC DATA

Leveraging Big Data:

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







Leveraging Technology

- Satellites
- Drone/UAV
- Nano-satellites
- Aircraft
- Fixed/Persistent Platform

Satelytics

“GOLF BALL” PIPELINE SENSOR

Pipers™: Control in the palm of your hand

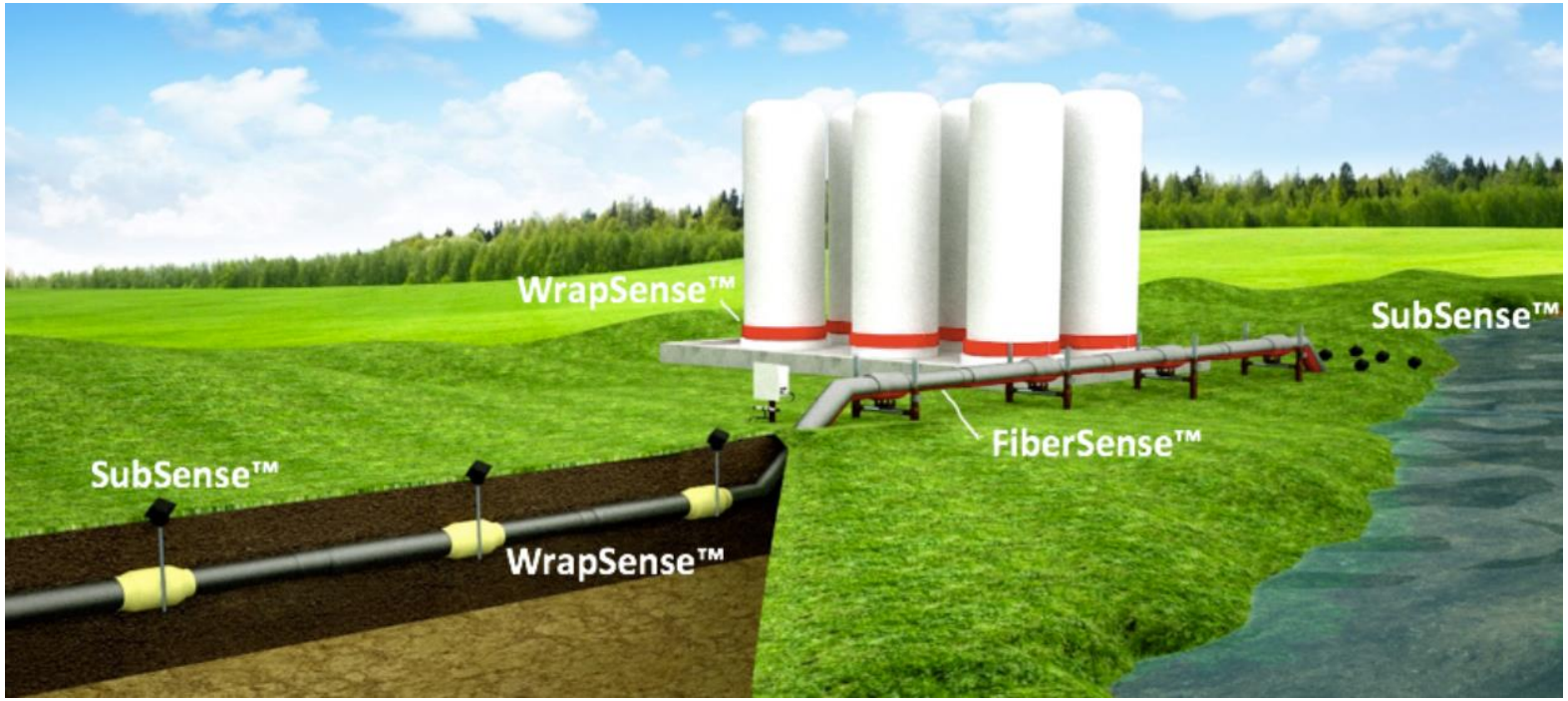
- Deploy when needed in all pipelines
- No downtime

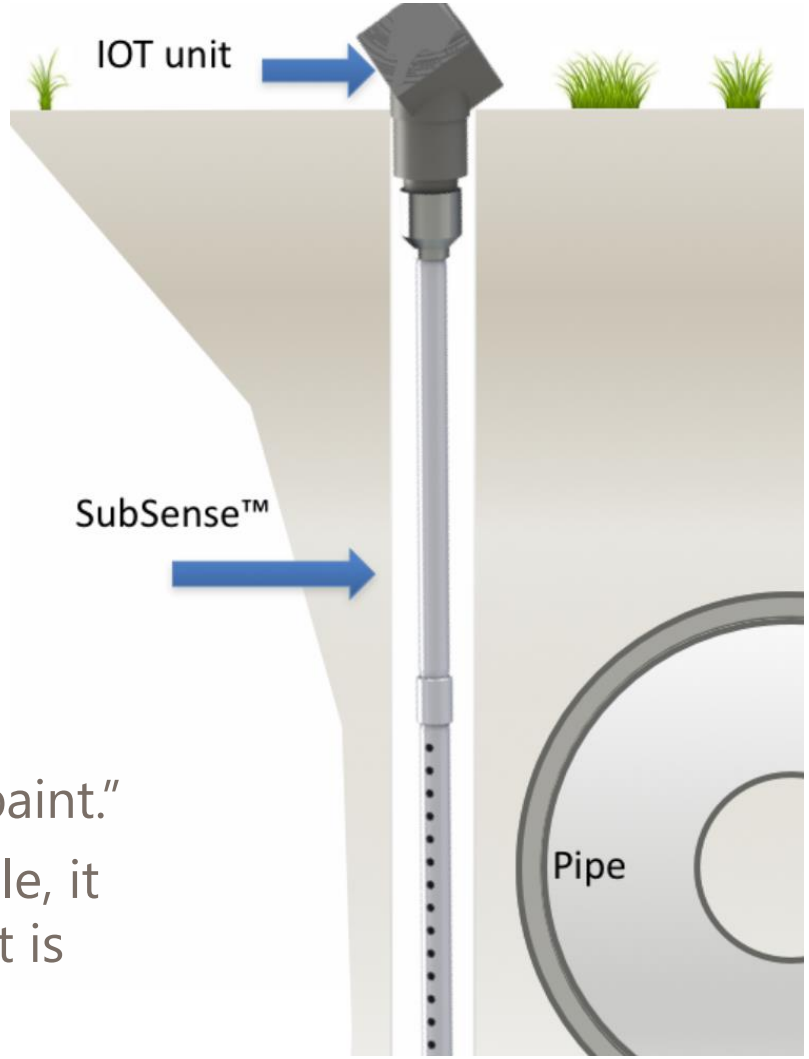
- Golf ball-sized (1.5 inch)
- Free-flowing; adjustable weight
- Current sensors
  - Pressure
  - Temperature
  - Position (acceleration/rotation)
  - Magnetic fields
  - Acoustics

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

INGU SOLUTIONS

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 is already producing results.

UAV Inspection

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INCREASED GAS
PRODUCTION
NORTH
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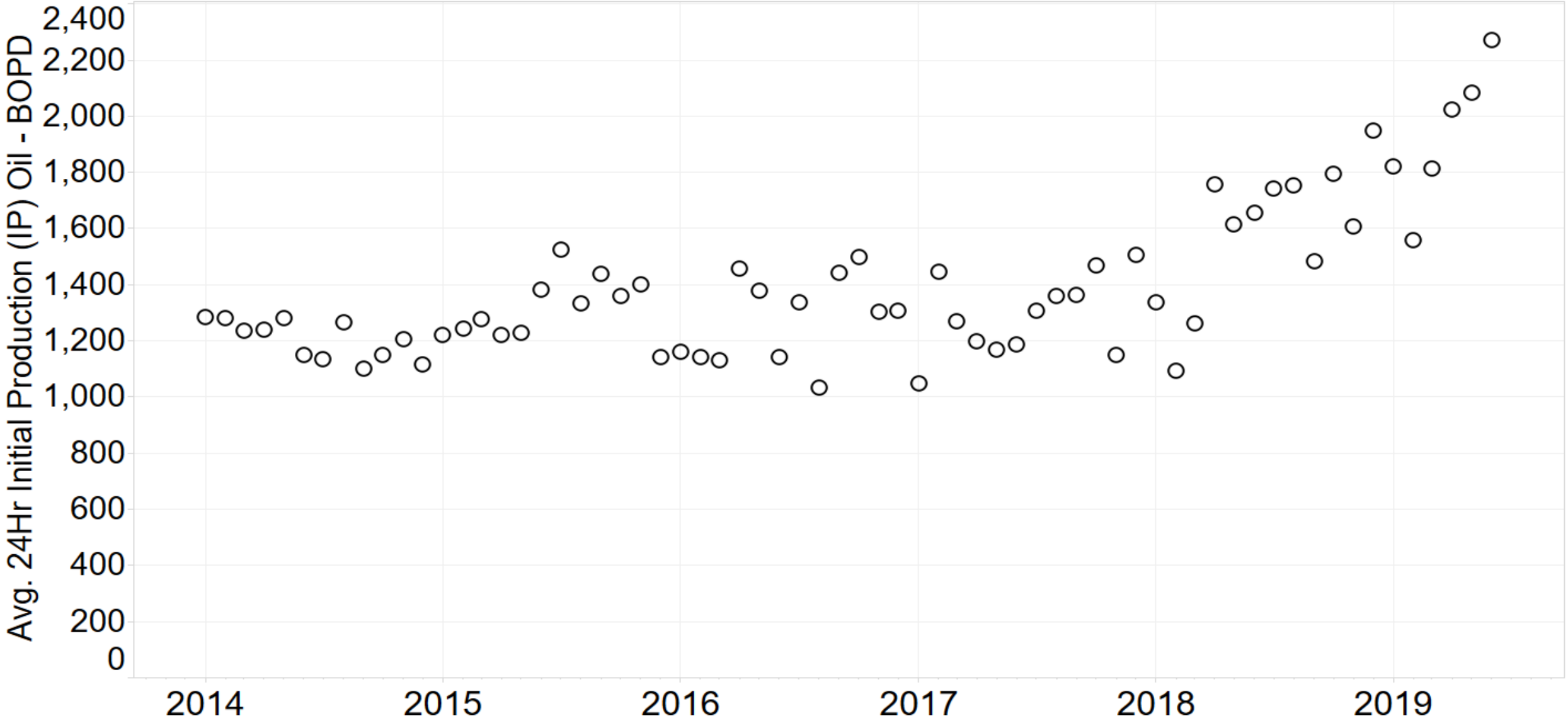
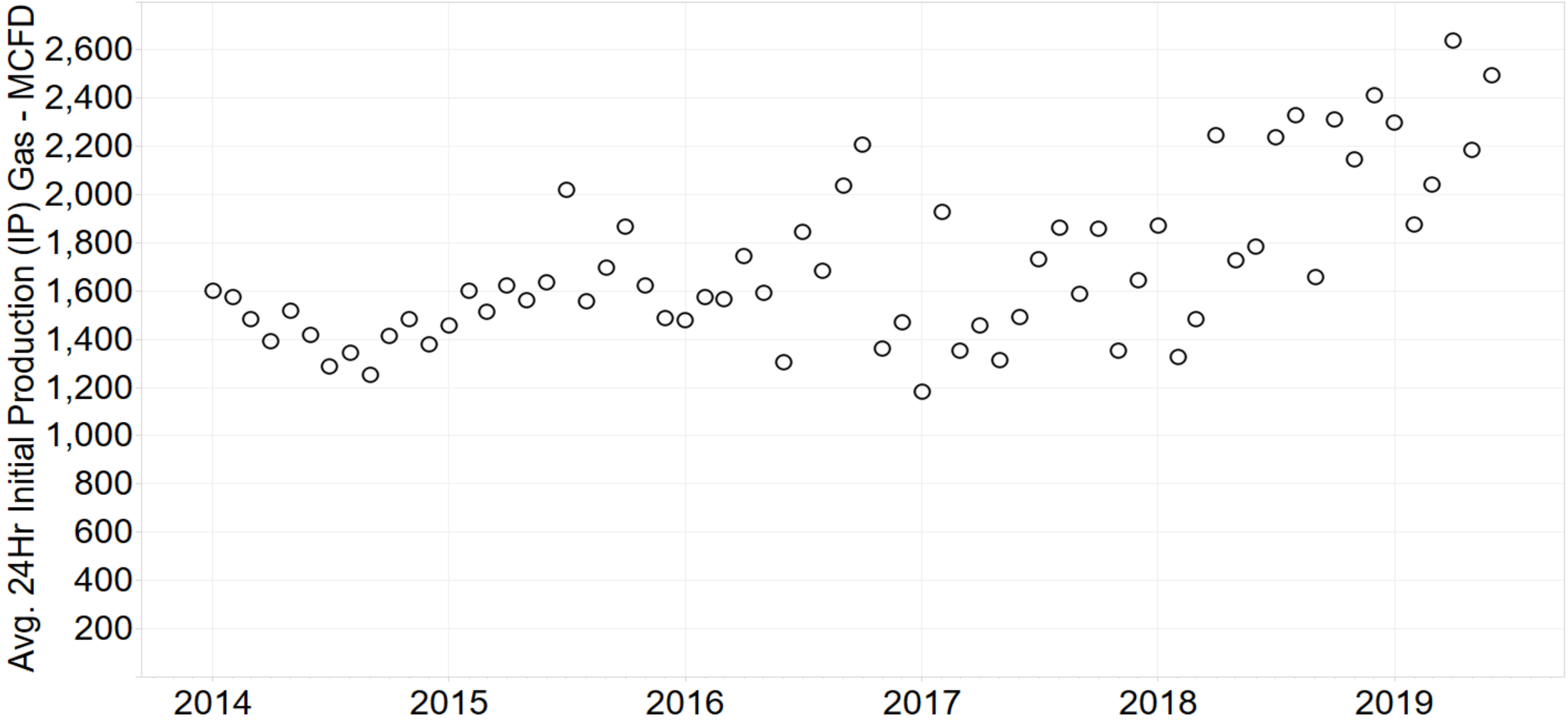
ND Initial Oil Production Rates



ND Initial Gas Production Rates



VALUE-ADDED INFRASTRUCTURE

Touring petrochemical facilities in Alberta.

PROJECT TUNDRA

CARBON CAPTURE AND STORAGE


CARBON
UTILIZATION
NORTH
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ABANDONED WELLS

Courtesy: Iain Woessner / Forum News Service

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STEWARDSHIP
OF THE LAND
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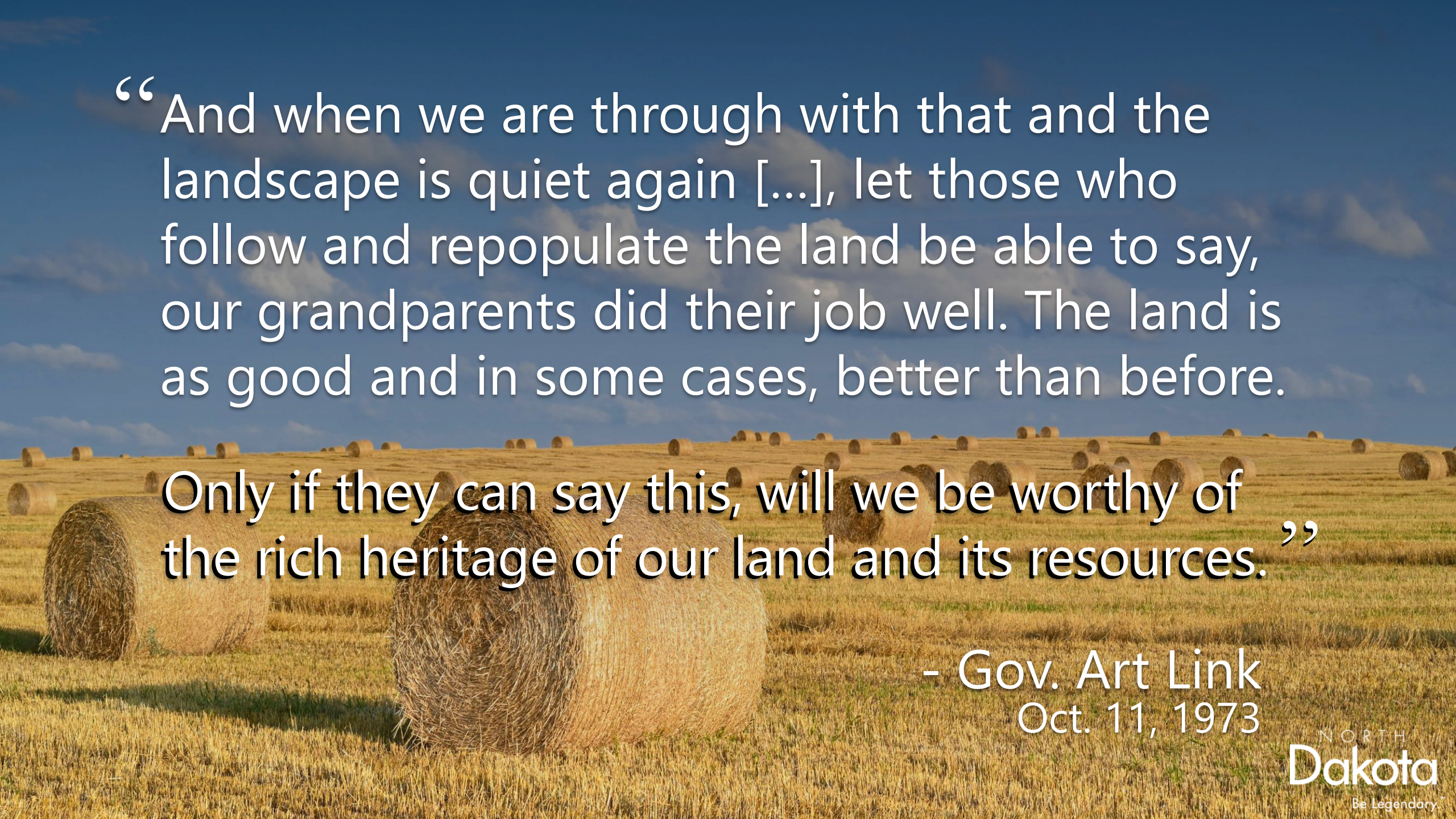
“And when we are through with that and the landscape is quiet again [...], let those who follow and repopulate the land be able to say, our grandparents did their job well. The land is as good and in some cases, better than before.
Only if they can say this, will we be worthy of the rich heritage of our land and its resources.”
- Gov. Art Link
Oct. 11, 1973
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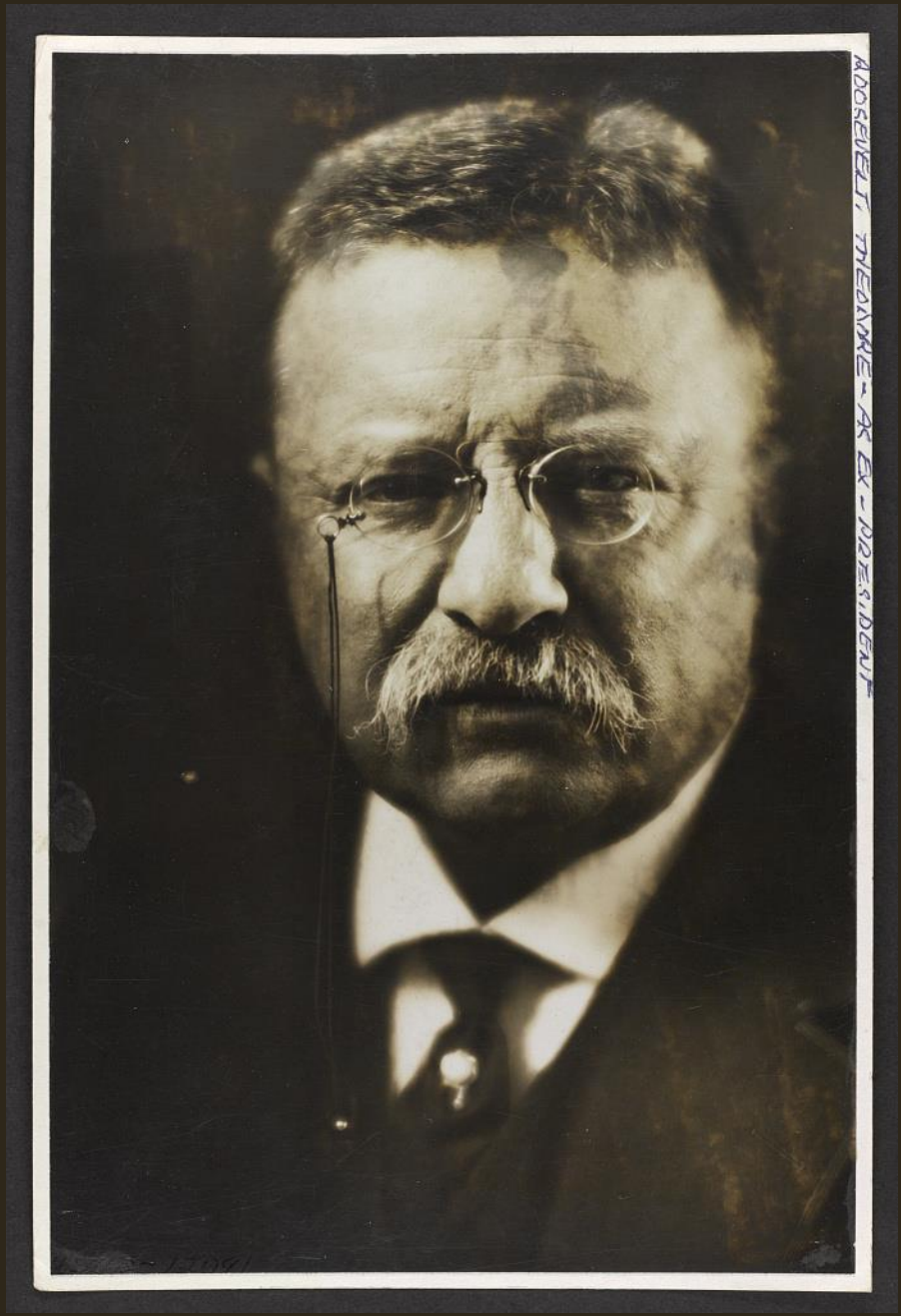

“**Conservation means development as much as it does protection.** I recognize the right and duty of this generation to develop and use the natural resources of our land; but I do not recognize the right to waste them, or to rob, by wasteful use, the generations that come after us.”

— Theodore Roosevelt
The New Nationalism
Sept. 1, 1910


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Welcome to the IOGCC Annual Conference!

DOE Oil and Natural Gas Update

Shawn Bennett
Deputy Assistant Secretary
Office of Oil and Natural Gas

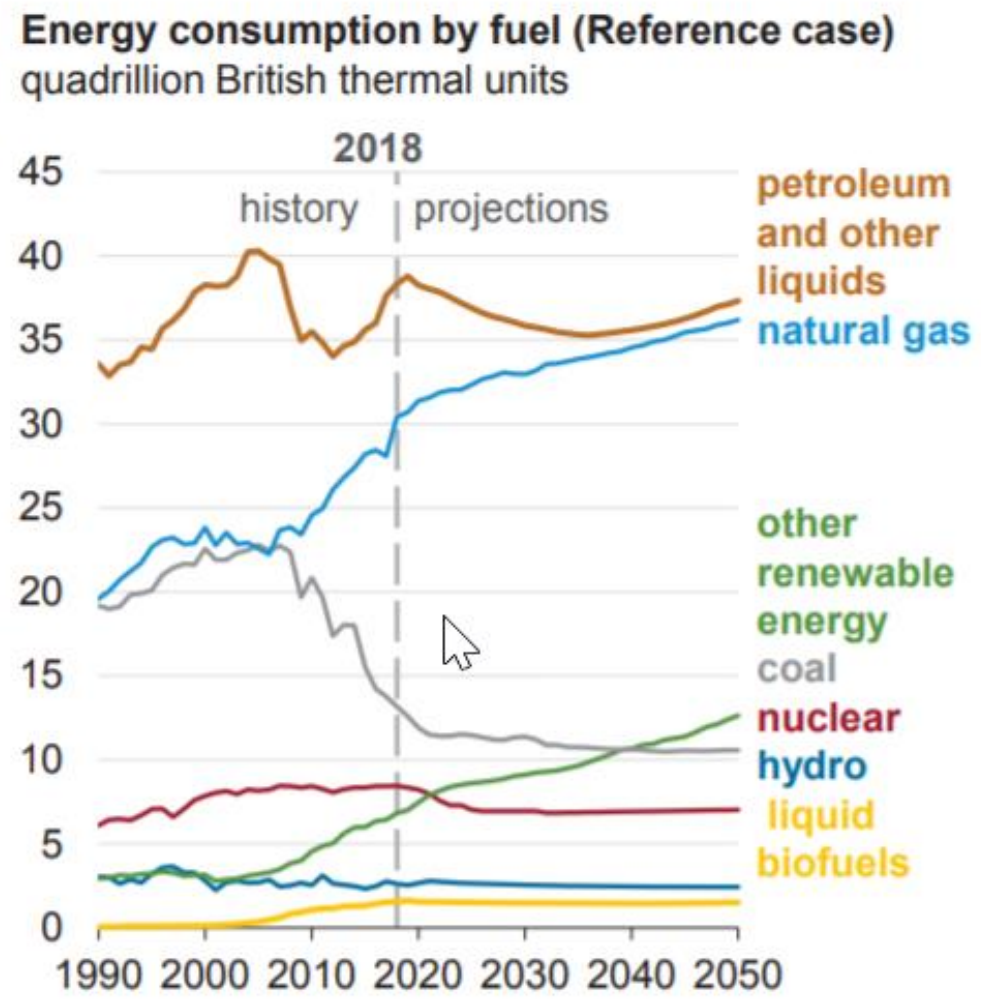
August 26, 2019
2019 IOGCC Annual Conference

U.S. DEPARTMENT OF ENERGY | Fossil Energy
OFFICE OF OIL & NATURAL GAS

Oil and Natural Gas Continue to Fuel the Economy

Key elements:

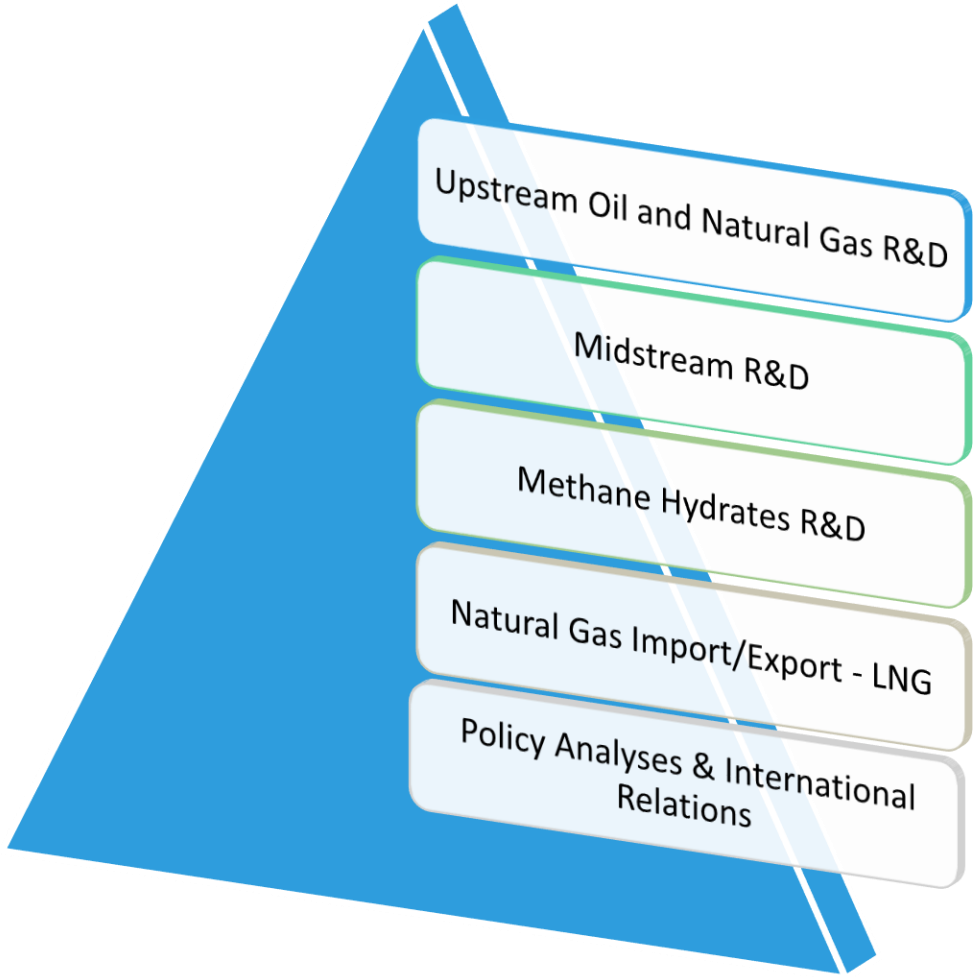
- Energy dominance – expanded energy supplies for economic growth and energy security for the U.S. and its allies
- U.S. technological leadership
- Streamlined regulation, less red tape
- Federal-State collaboration



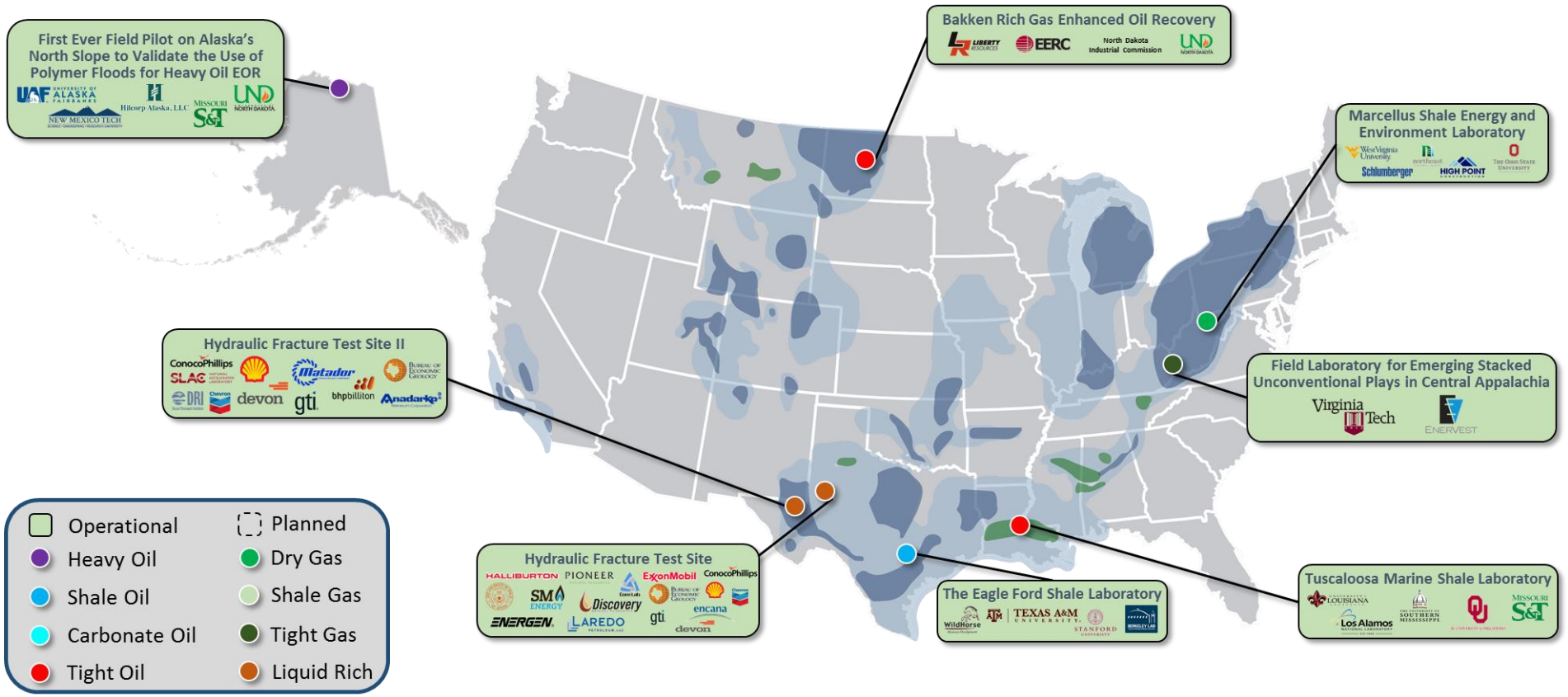
Source: EIA, Annual Energy Outlook 2019

DOE Oil and Natural Gas Program

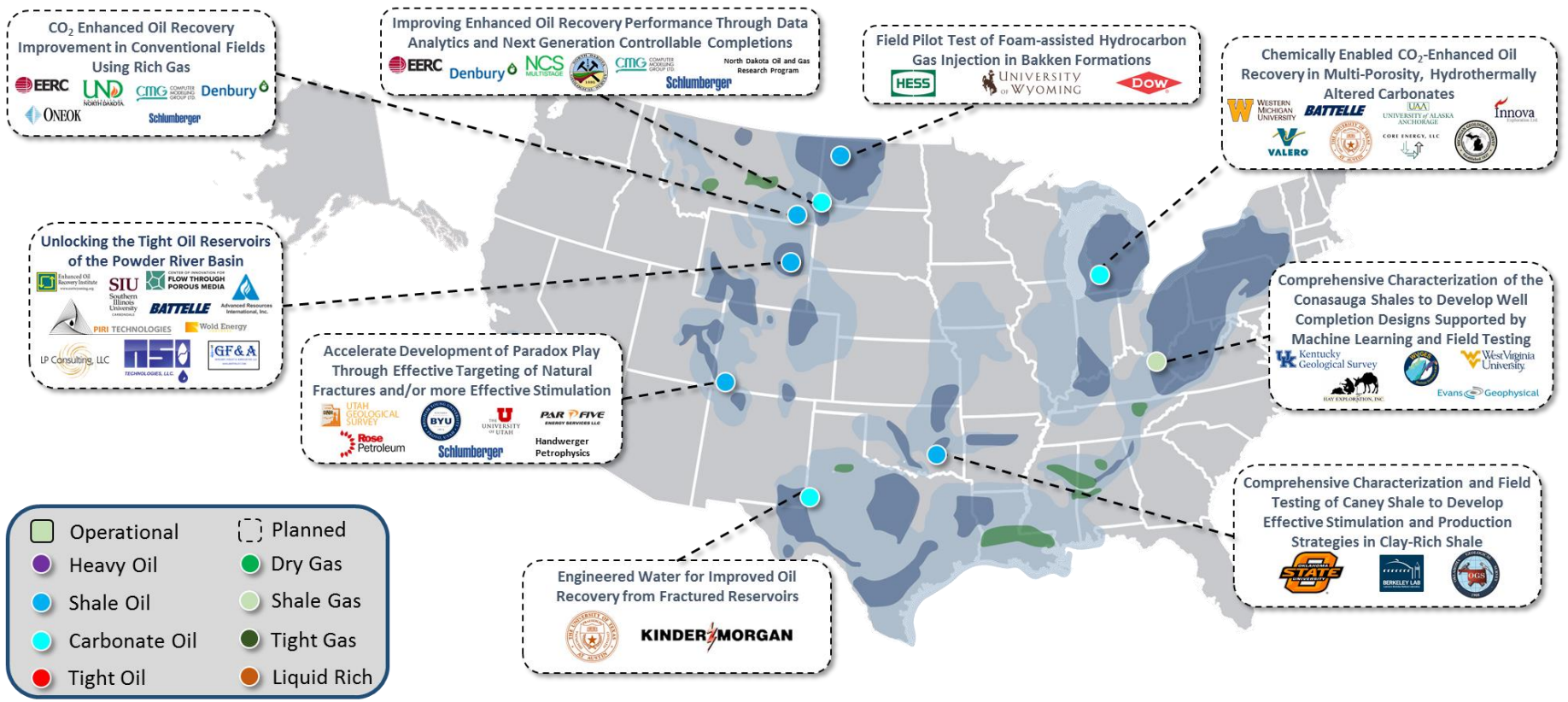
Mission: Maximize the value of U.S. oil and gas resources to the public and ensure their responsible development and delivery through policy, research, innovation, and outreach



DOE Field Laboratories: Basin-specific Research



Nine Potential New DOE Field Labs



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OFFICE OF OIL & NATURAL GAS

DOE Field Lab Partners

2018

Potential New Doe Field Lab Partners

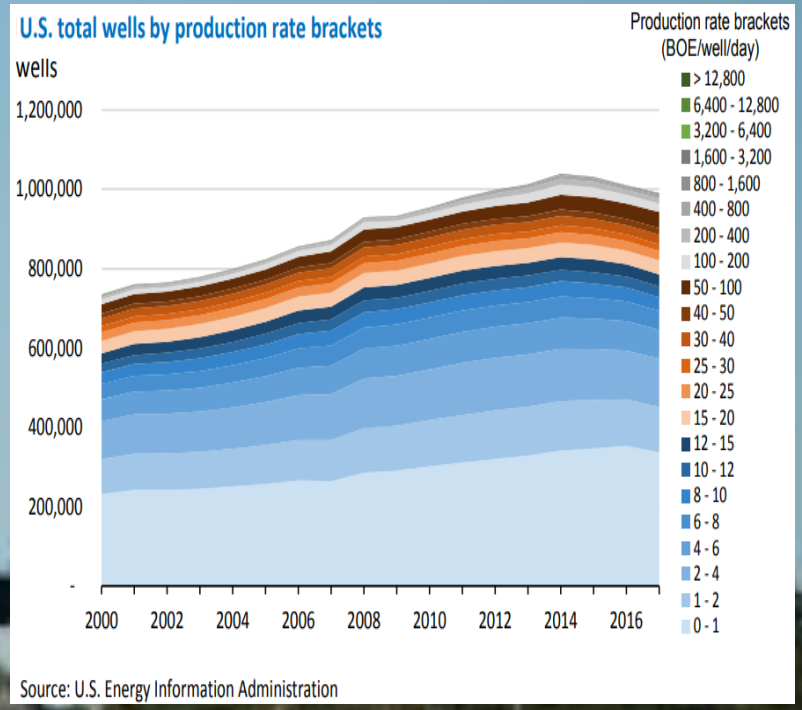
2019

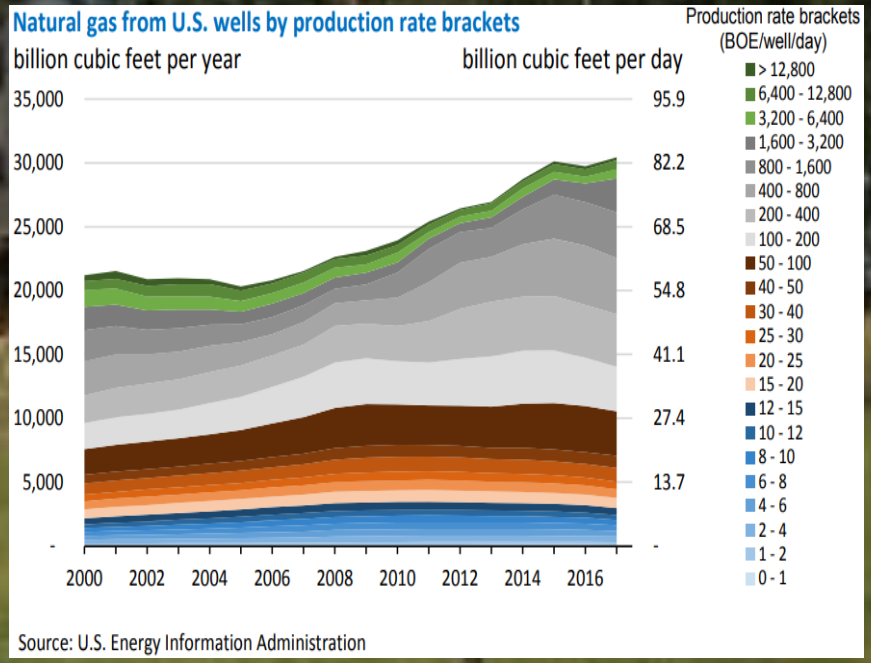
Marginal Oil and Gas Wells

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.



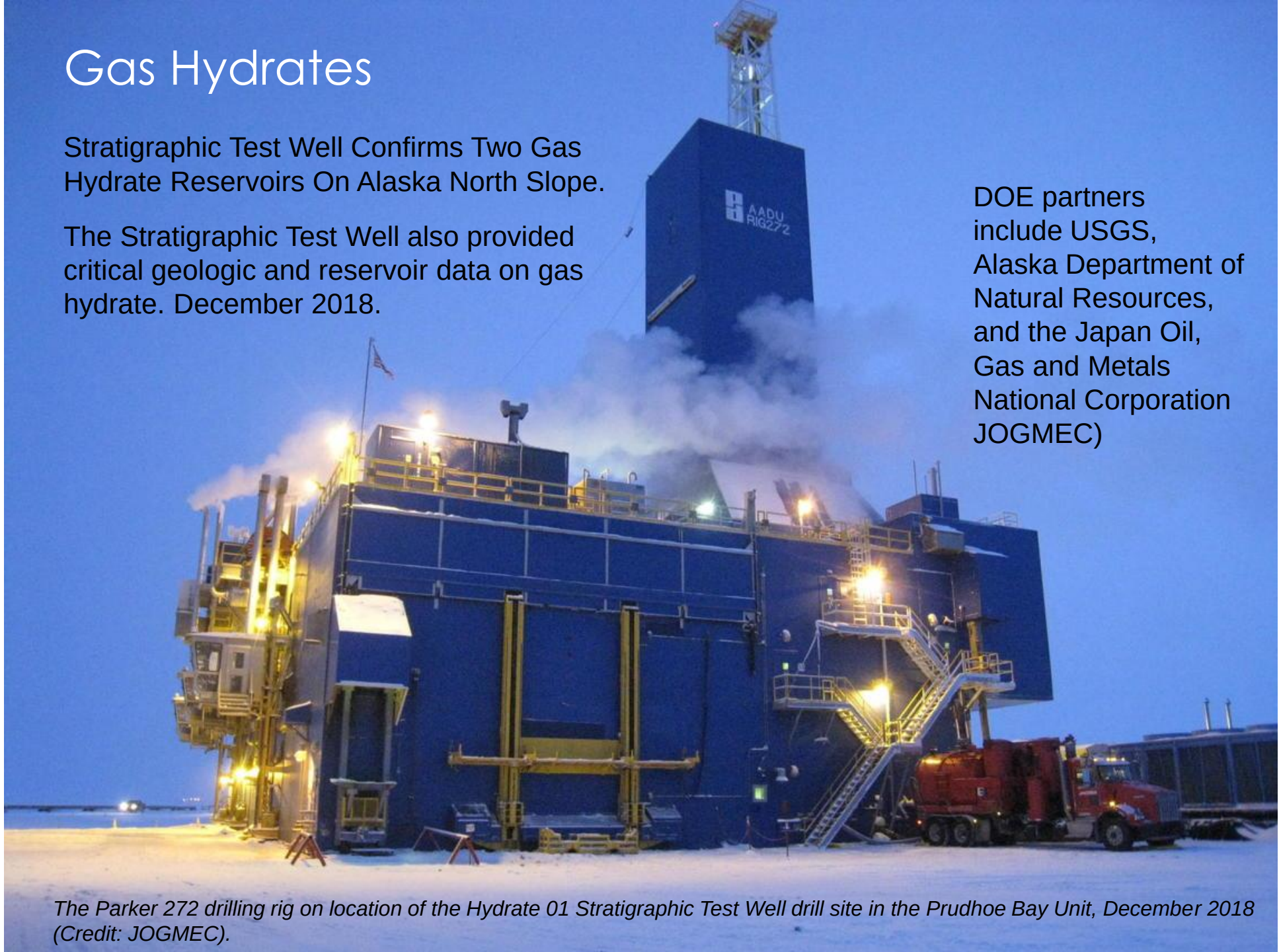


Gas Hydrates

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.**

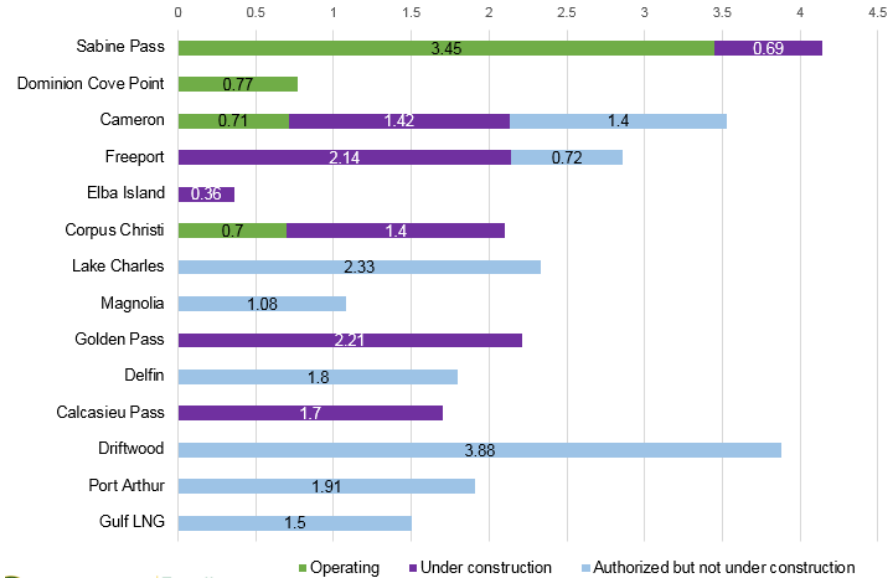
  FracFocus.org. Jointly sponsored by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission. 26 states require or allow operators to use this national registry for the public disclosure of chemicals used in hydraulic fracturing.

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**

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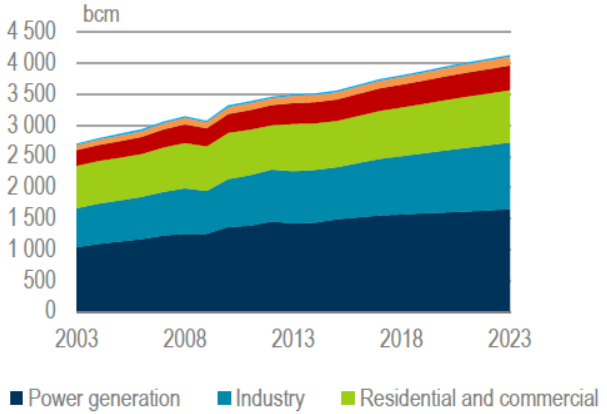
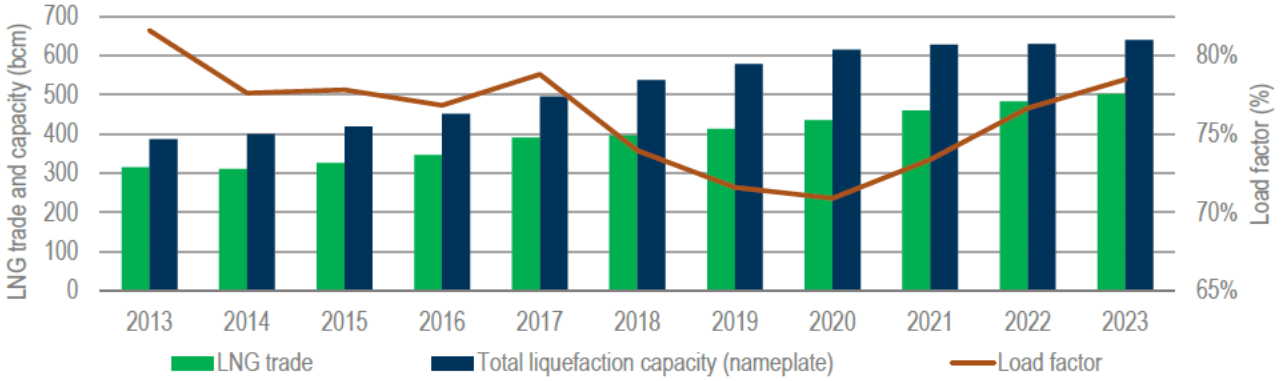
OFFICE OF OIL & NATURAL GAS

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

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Policy Analysis and International Relations

International Highlights

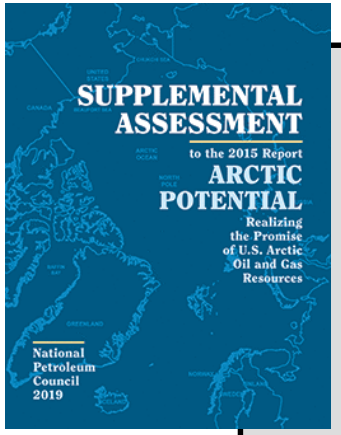
US-Israel Center of Excellence in Energy, Engineering and Water Technology. Call for Research Proposals. April 2019

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

NATIONAL ENERGY TECHNOLOGY LABORATORY

U.S. DEPARTMENT OF ENERGY
Office of Oil & Gas

Welcome to the IOGCC Annual Conference!

Welcome to the IOGCC Annual Conference!

Idle and Orphan Oil and Gas Wells Regulatory Solutions

2019

Hal Fitch

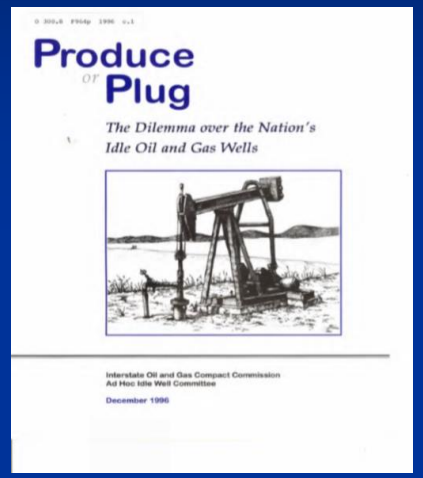
IDLE & ORPHAN WELL CHALLENGES

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

PREVIOUS WORK

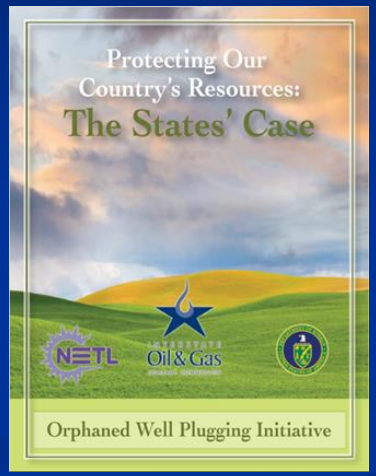
A Study of Idle Oil and Gas Wells in the United States

1992



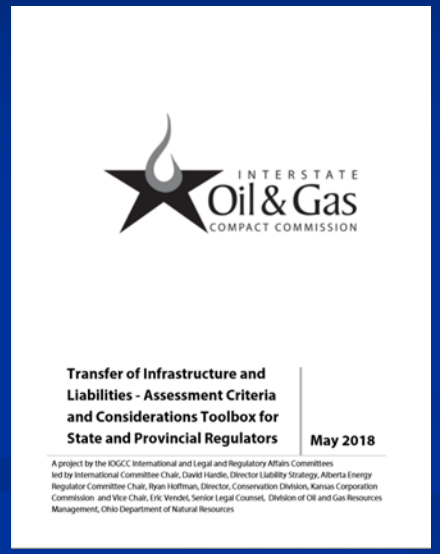
1996

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

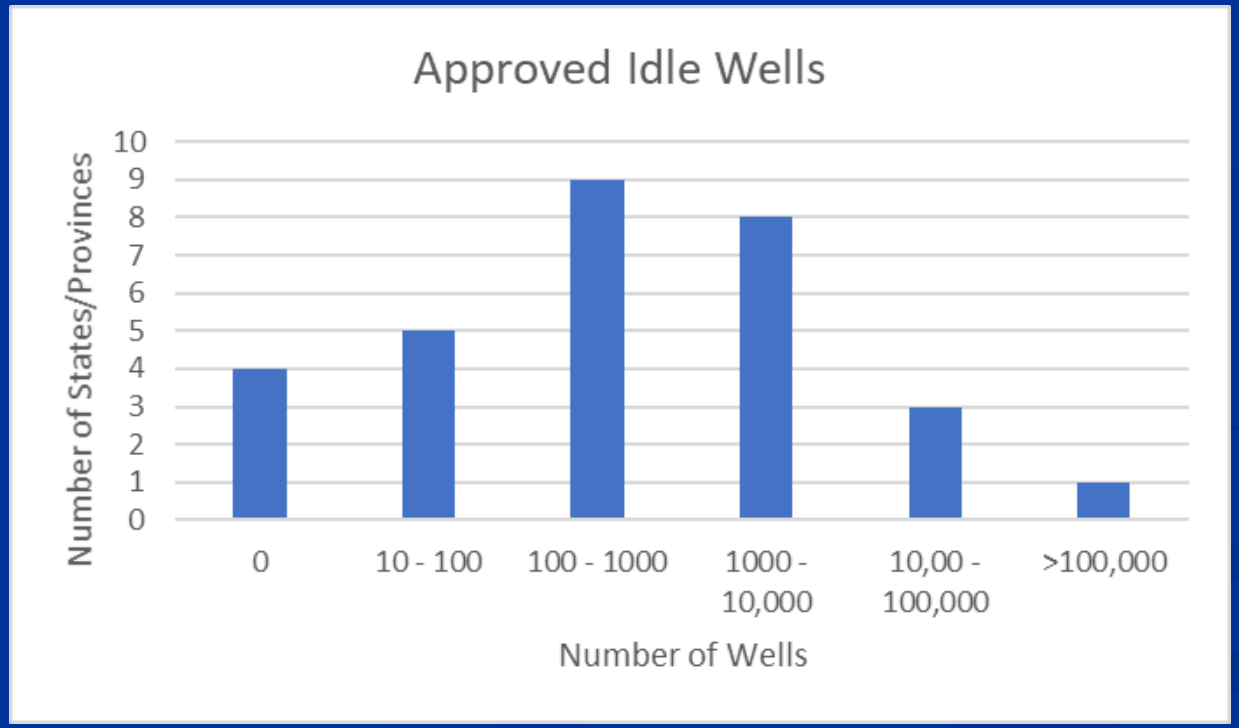
Idle and Orphan

Oil and Gas Wells

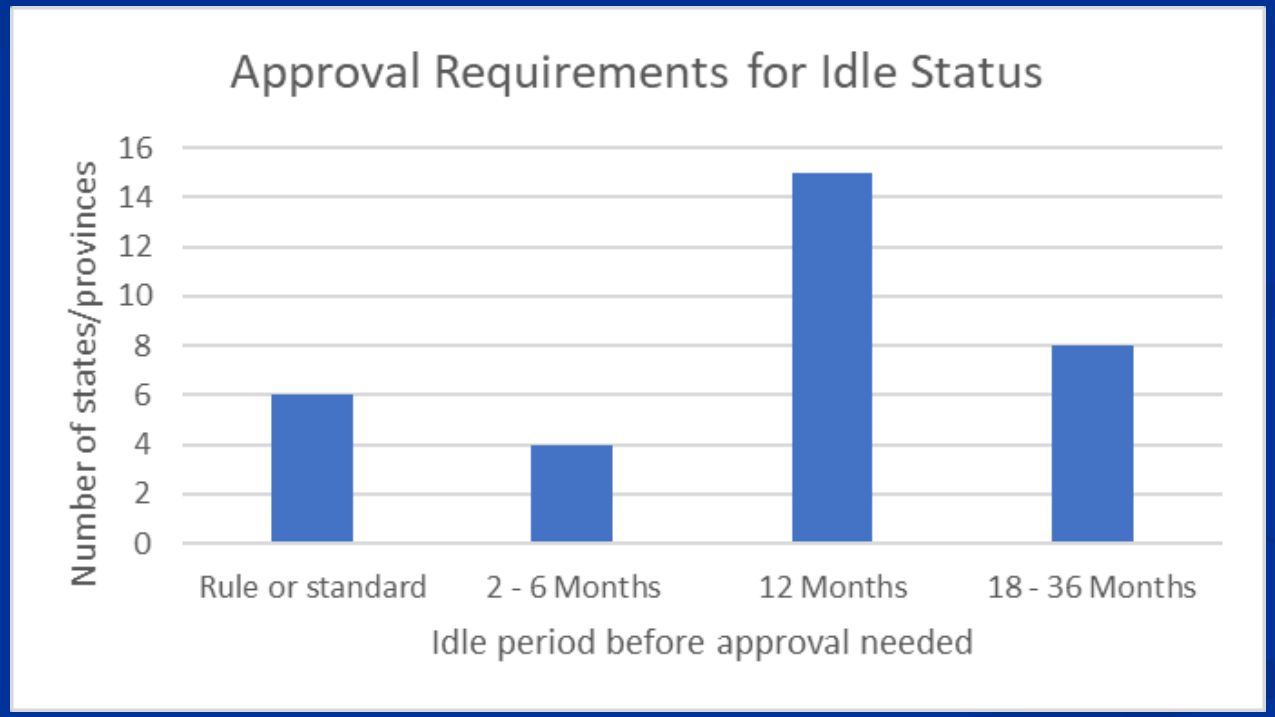
Regulatory Solutions

IDLE WELLS

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

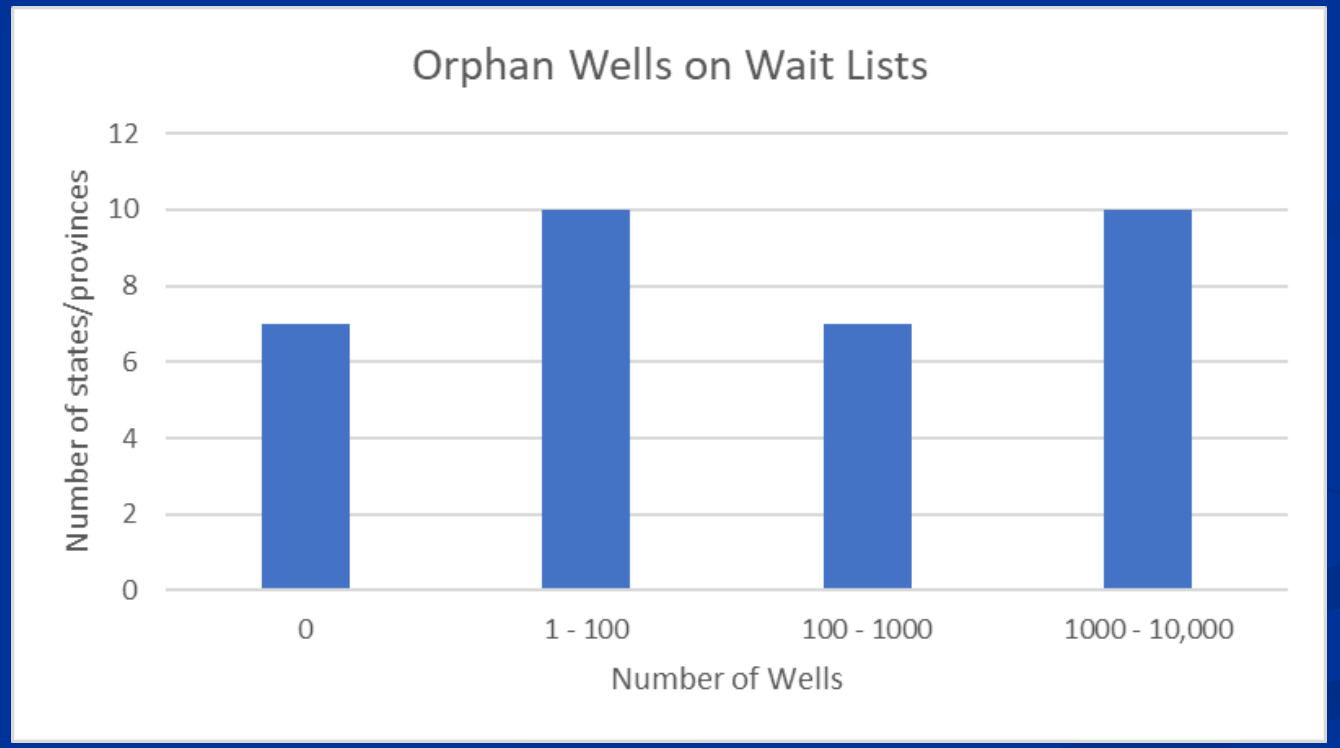


PERIOD A WELL MAY REMAIN IDLE BEFORE APPROVAL IS REQUIRED

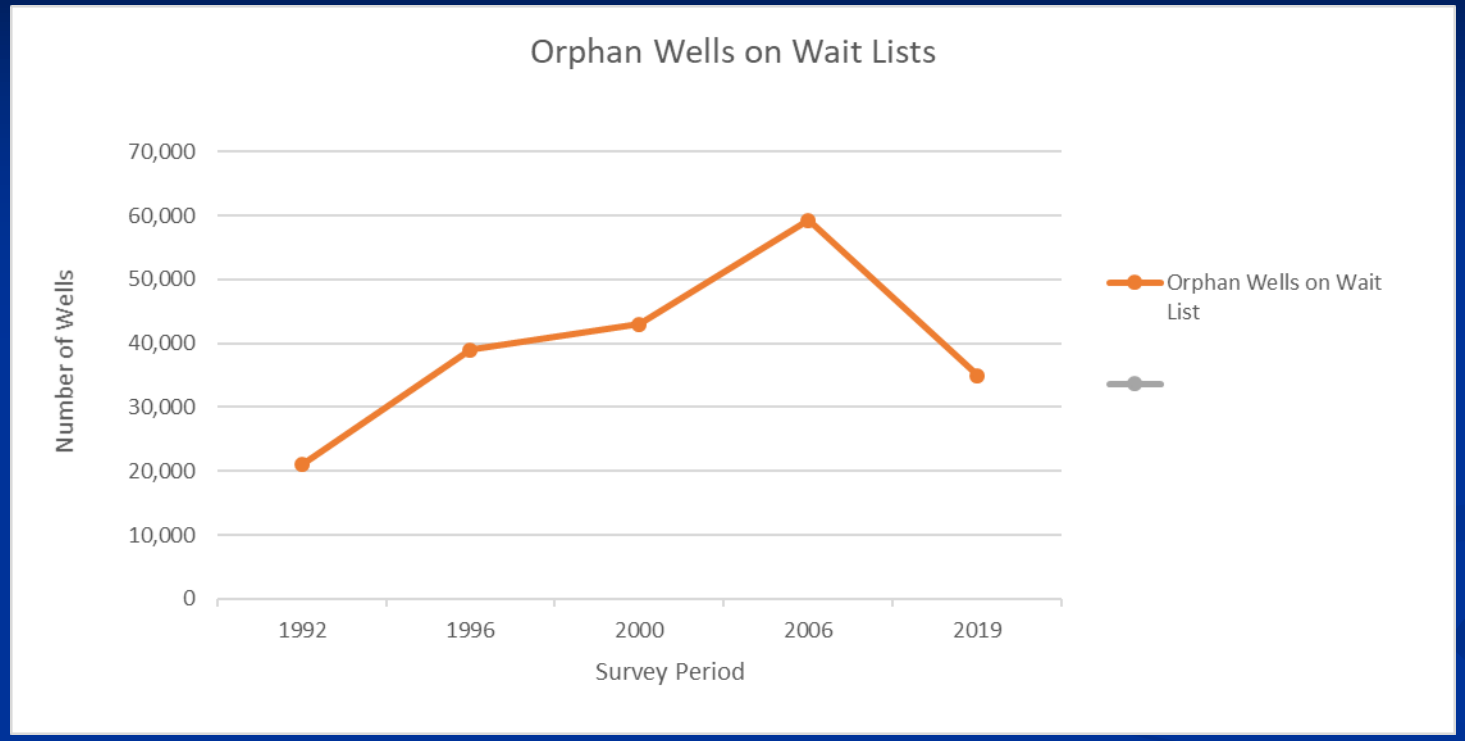


ORPHAN WELLS

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

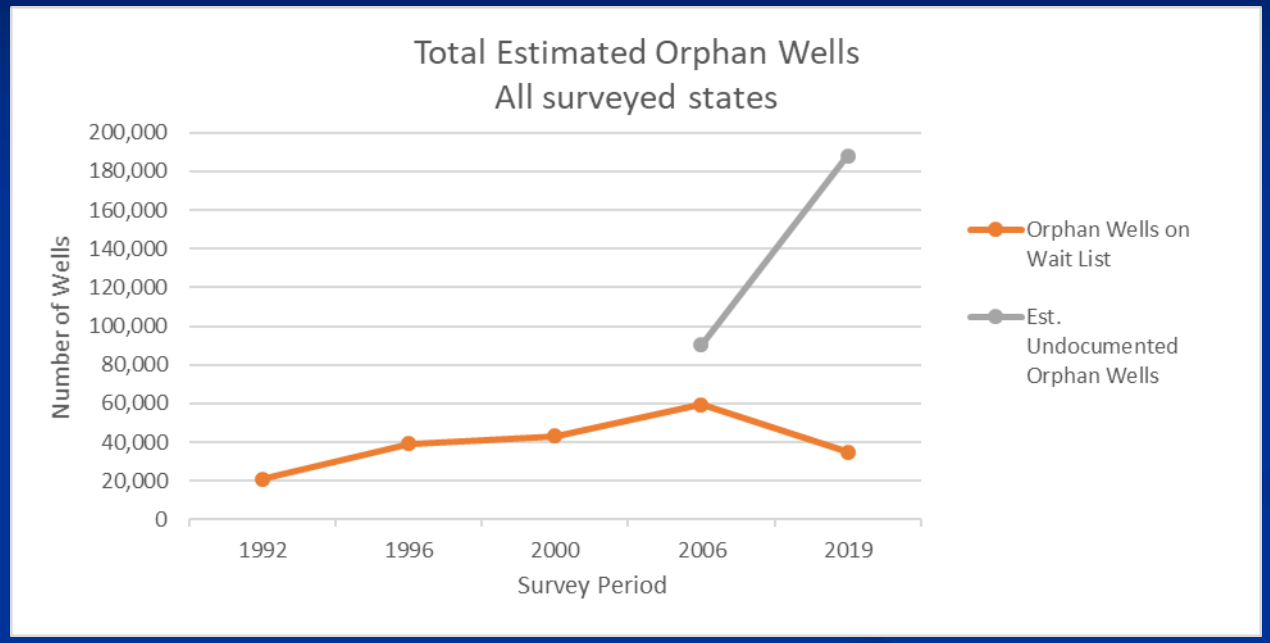


ORPHAN WELL TRENDS



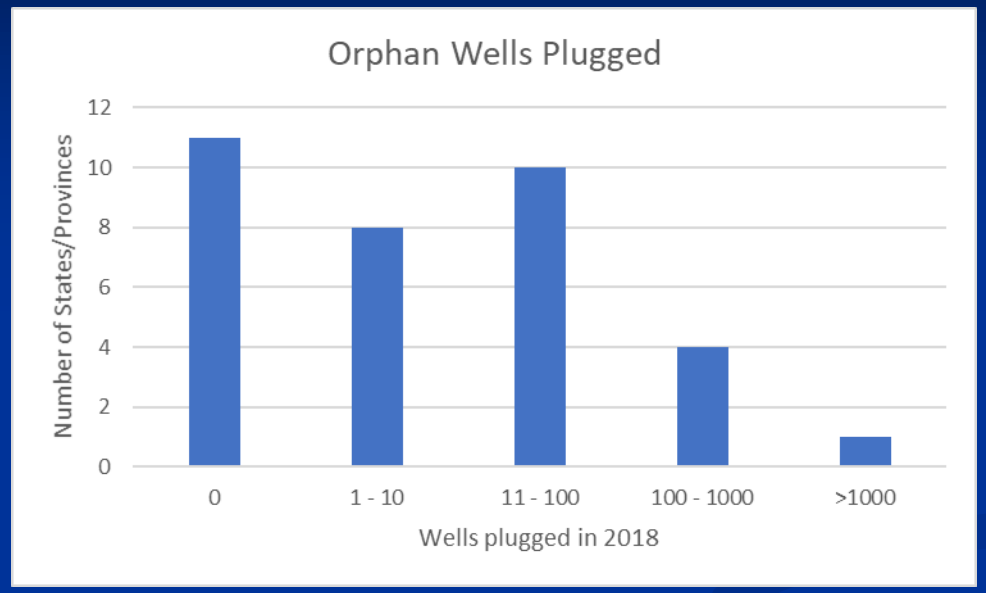
- States have made progress in reducing orphans
- Chart does not include provinces (no numbers < 2019)

ORPHAN WELL TRENDS
Including Estimated Undocumented Wells



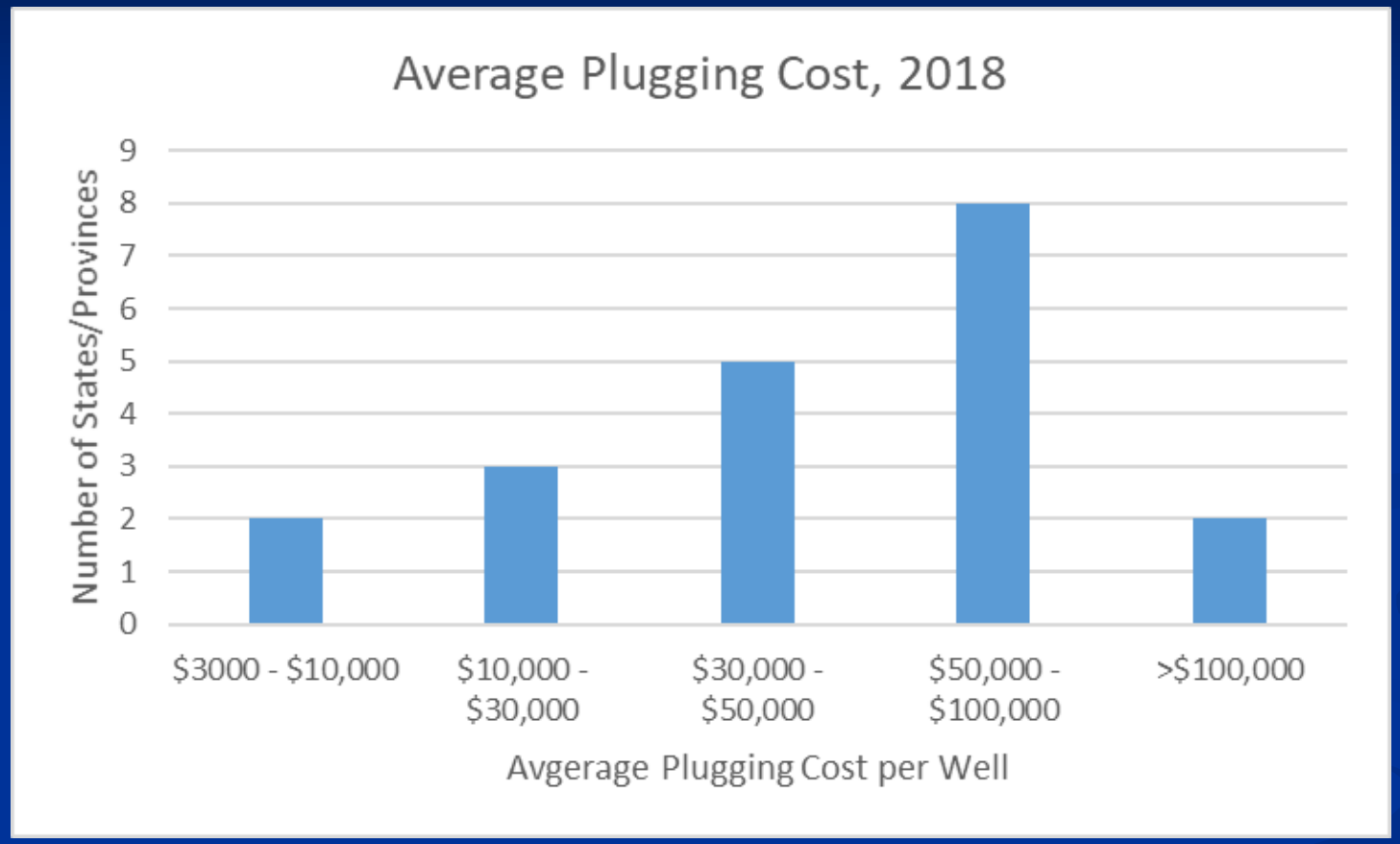
- **Total undocumented wells: 188,000 (*minimum*)**
- **11 states provided estimates of undocumented wells**
- **11 states may have undocumented orphan wells but no estimate**
- **7 states & 5 provinces: no undocumented orphan wells**

ORPHAN WELL PLUGGING



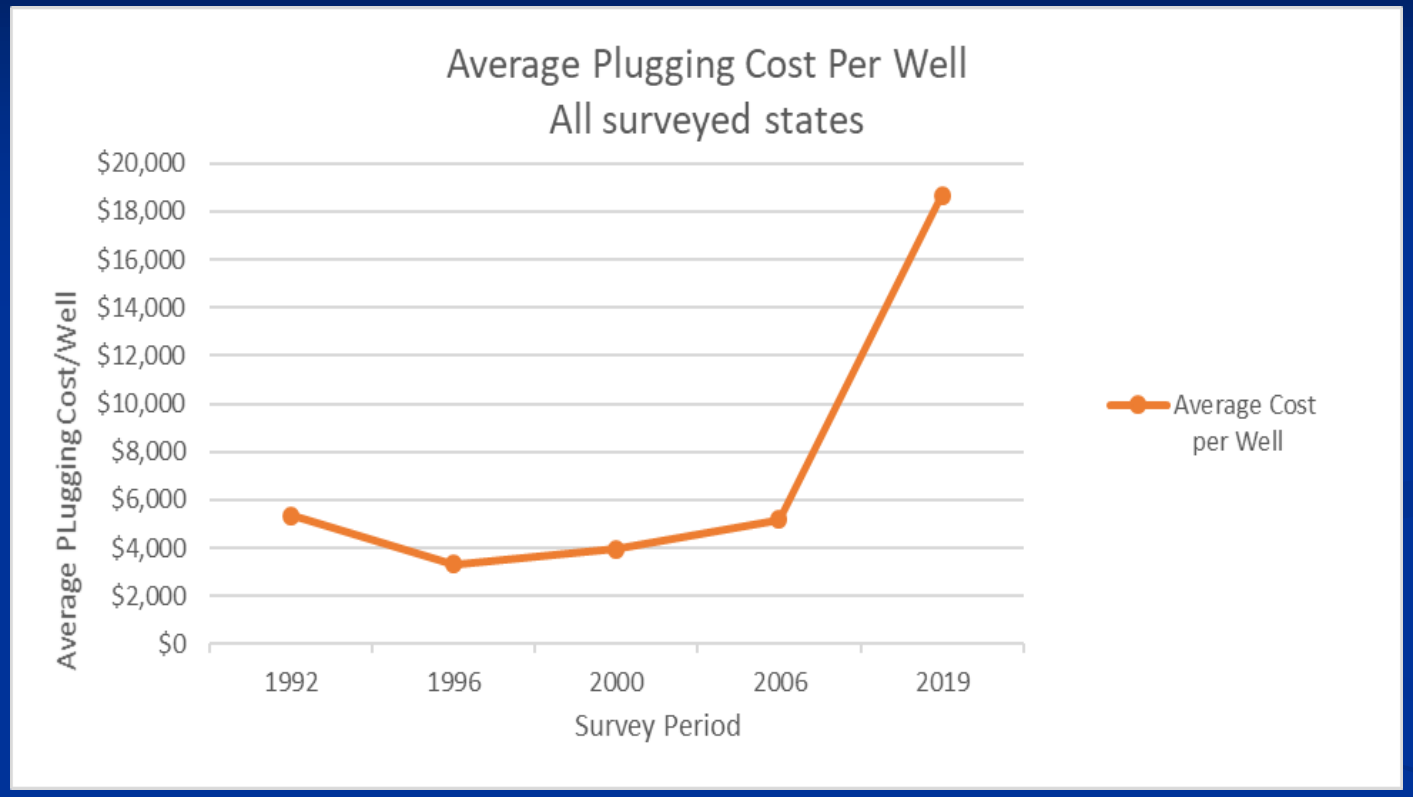
- **> 90% of states & provinces have orphan well plugging funds**
- **23 states and provinces plugged total of 3,334 orphan wells in 2018**

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."

E.W. Marland Award

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

E.W. Marland Award

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.

E.W. Marland Award

The Start of Something Grand!

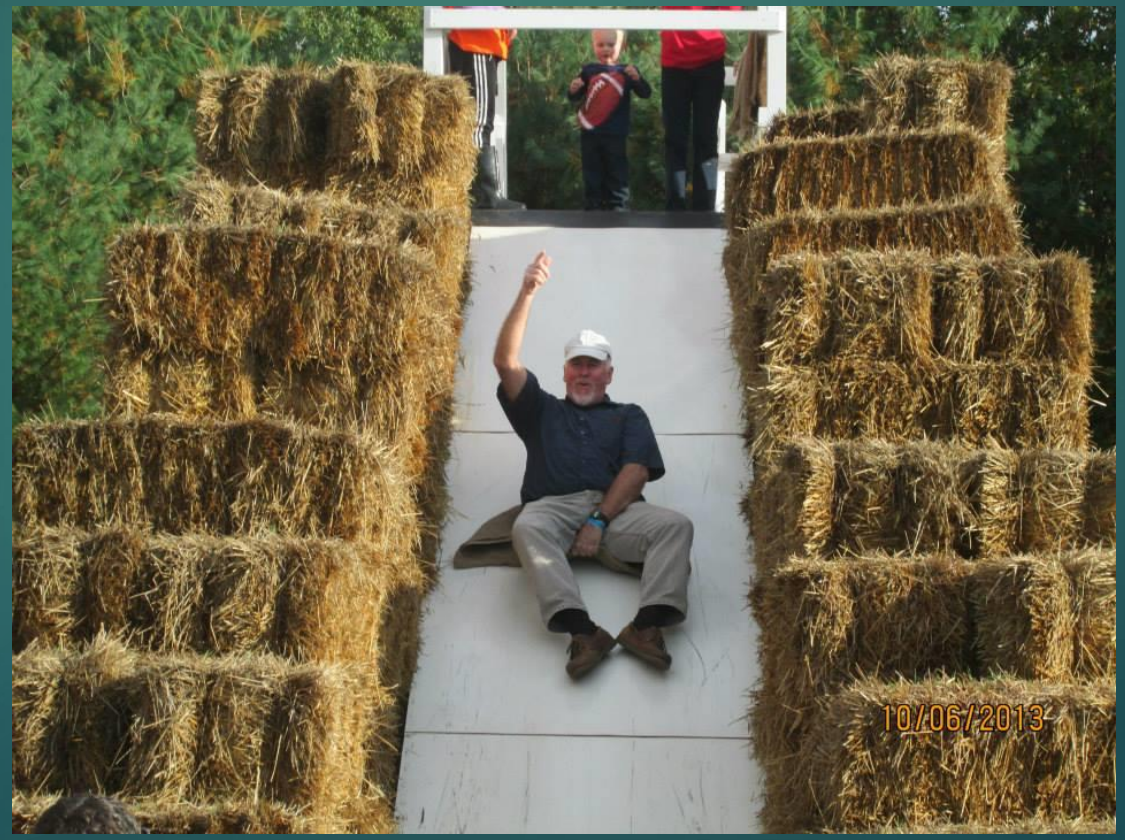
E.W. Marland Award

THE UNIVERSITY OF ARIZONA

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

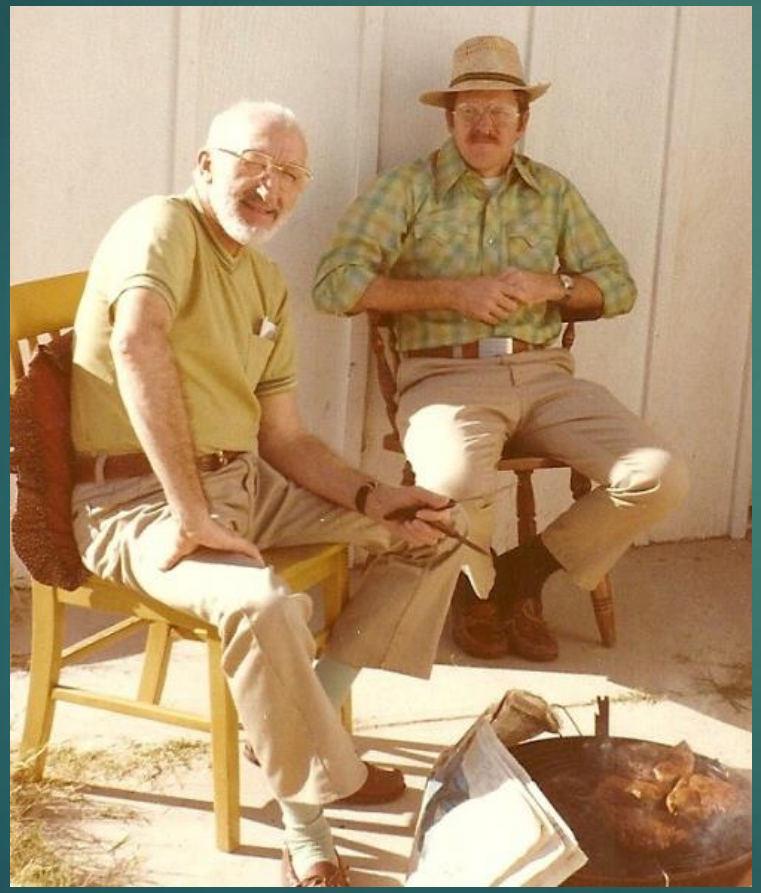
- Hal served on many committees and work groups for the IOGCC.
- He was elected and served as Vice Chair of IOGCC from 2014-2015.

E.W. Marland Award

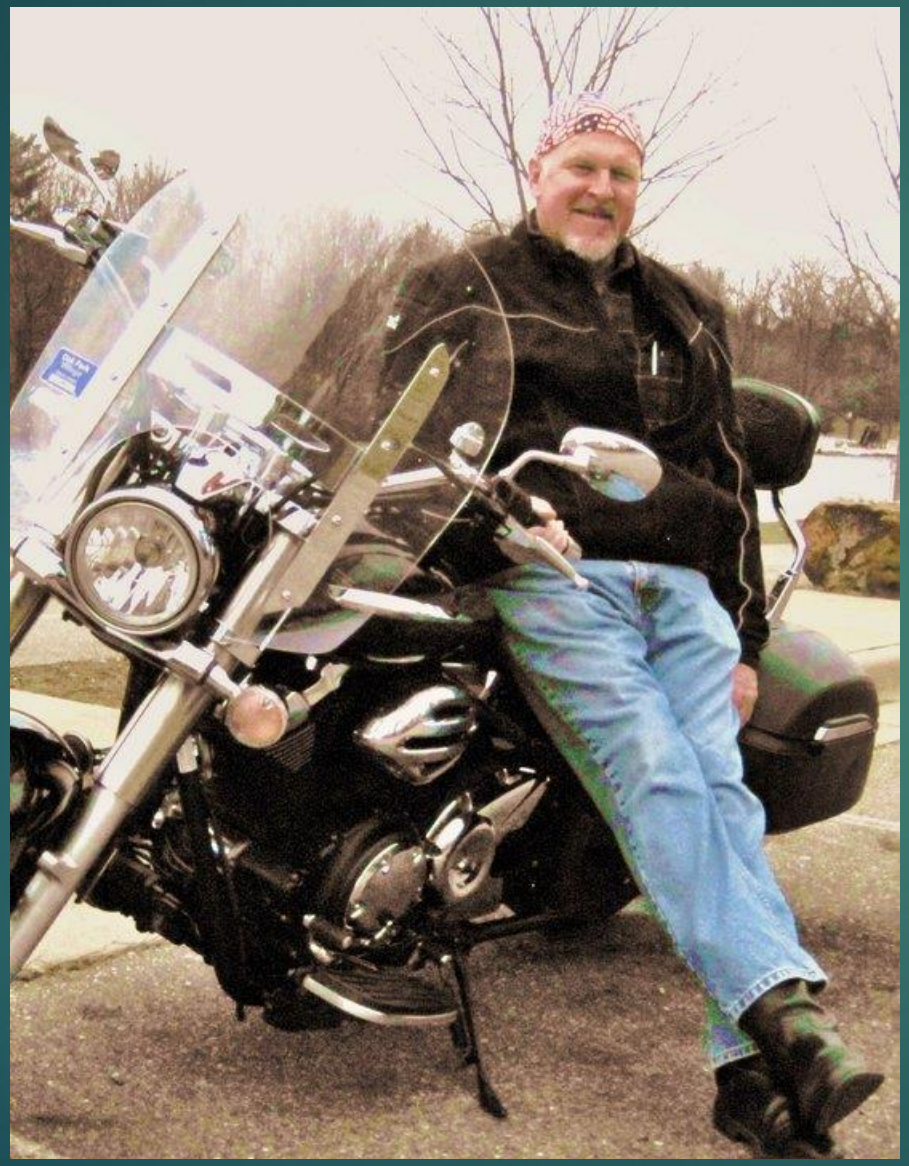
Hal enjoys outdoor activities, including camping, boating, kayaking, hiking, bicycling, and skiing!

E.W. Marland Award

Family time is the best time!



E.W. Marland Award



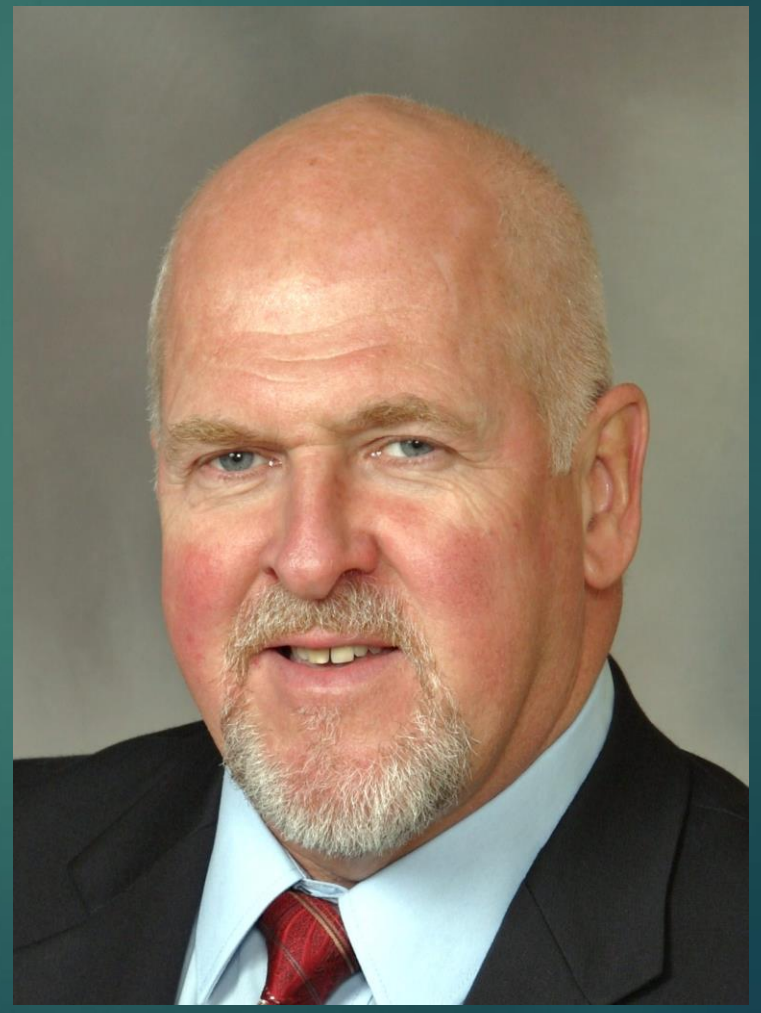
Hal is an avid motorcyclist, riding his Harley about 8,000 miles per year!

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
AWARDS
2019

2019

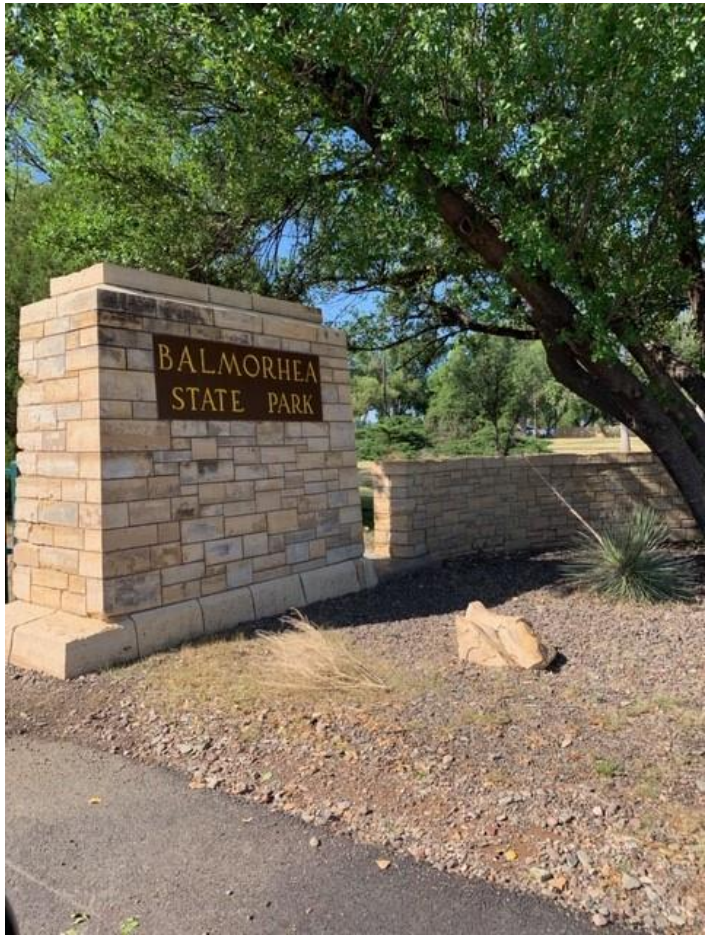
CHAIRMAN'S STEWARDSHIP AWARD

MAJOR/LARGE COMPANY

WINNER – APACHE CORPORATION

Major/Large company: Apache Corporation

Balmorhea State Park Pool | Texas



Major/Large company: Apache Corporation

Balmorhea State Park Pool | Texas

Major/Large company: Apache Corporation

Balmorhea State Park Pool | Texas

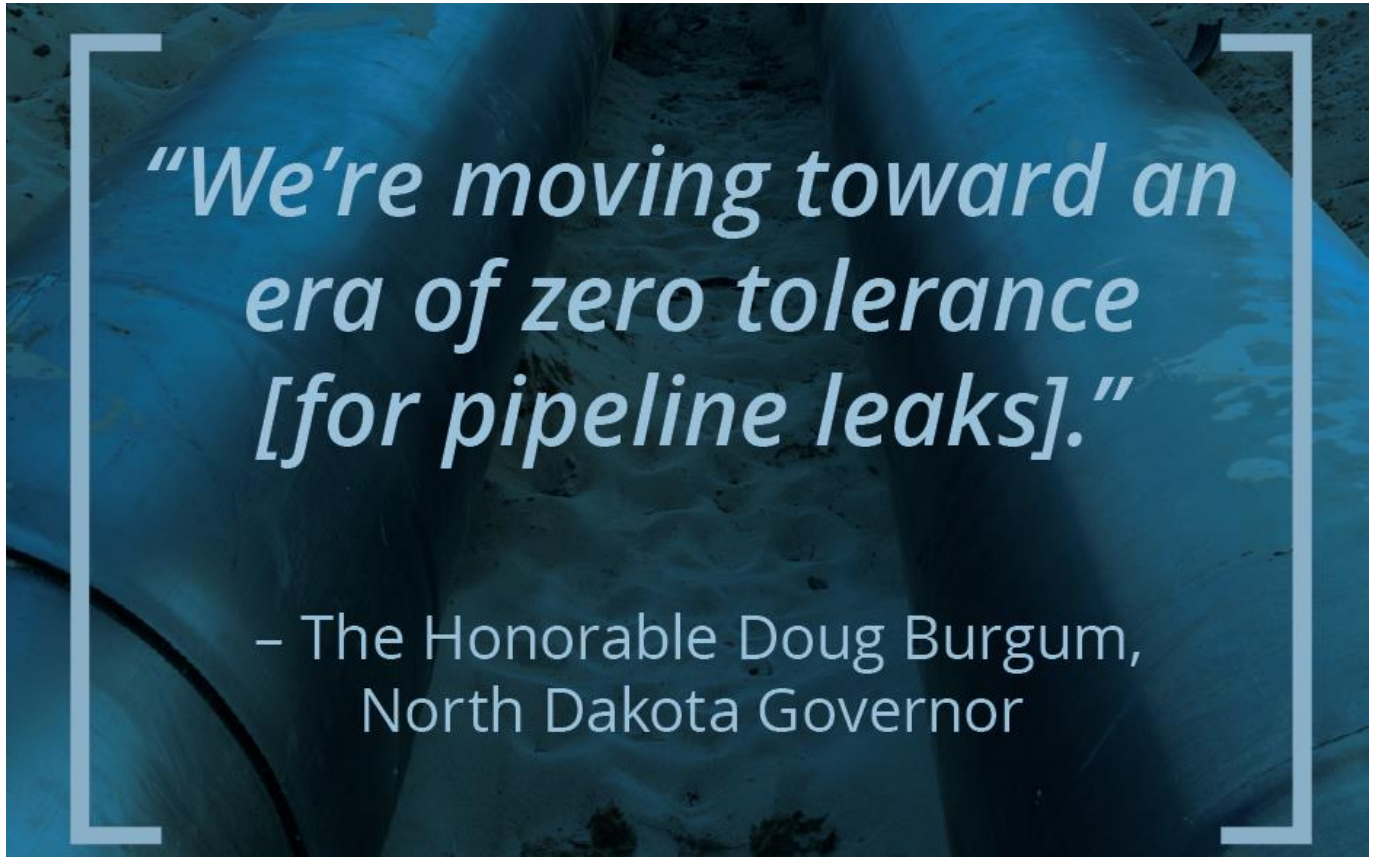
2019

CHAIRMAN'S STEWARDSHIP AWARD

ENVIRONMENTAL PARTNERSHIP COMPANY

WINNERS – iPIPE AND NDIC

The Intelligent Pipeline Integrity Program (iPIPE)|North Dakota



The Intelligent Pipeline Integrity Program (iPIPE) | North Dakota

The Intelligent Pipeline Integrity Program (iPIPE)|North Dakota

2019

CHAIRMAN'S STEWARDSHIP AWARD

ENERGY EDUCATION COMPANY

WINNER – RAILROAD COMMISSION OF TEXAS

Railroad Commission of Texas

Online Inspection Lookup (RRC OIL)

Thank You

Nominees and Selection Committee

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