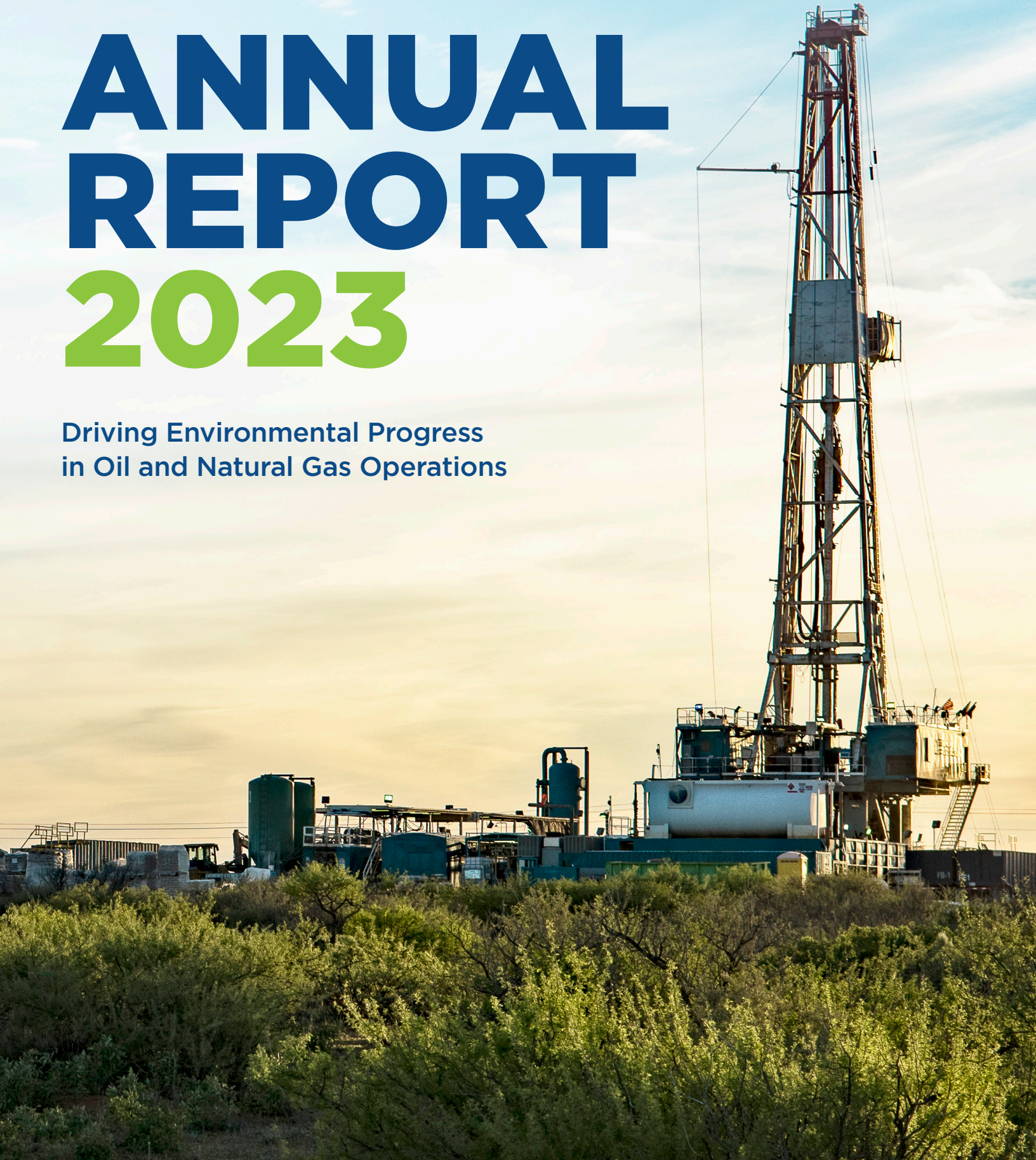


ANNUAL REPORT 2023

Driving Environmental Progress
in Oil and Natural Gas Operations



Our Mission

To continuously improve the industry's environmental performance by taking action, learning about best practices and technologies, and fostering collaboration to responsibly develop our nation's essential oil and natural gas resources.





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Joint Message

from the Director and Chair

The Environmental Partnership celebrated its 5-year anniversary in 2022, and we are excited by the tremendous growth – in both scope and participation – achieved in this timeframe. Five years in, and The Partnership has quadrupled in industry participants, expanded its environmental performance programs to cover more emission sources across the energy supply chain, and hosted multiple opportunities for operators to share strategies and solutions to bring down emissions.

Our participants remain committed to reducing methane emissions within their operations through innovative facility design, improvements in operational practices and procedures, advancements in detecting and measuring emissions, and improved accuracy in data emissions reporting. In fact, U.S. operators have reduced methane emissions relative to production by 66 percent in the largest producing regions from 2011-2021. Through its core principles of taking action, learning and collaborating, the Partnership supports participating companies across these critical methane reduction elements by developing performance programs and providing opportunities for industry experts to identify, share and advance the latest innovations and practices in methane reduction.

Our 5-year anniversary milestone provided an opportunity to reflect on the achievements and advancements made since 2017 and also to look towards the future and how we can continue to grow the Partnership to meet the dual challenge of increasing energy production while forging ahead on environmental progress. In 2022, the Partnership once again made great strides to advance best practices to reduce emissions. A few highlights are:

- The Partnership expanded its focus to more emission sources across the energy supply chain by developing two new environmental performance programs for liquid pipeline

operators addressing maintenance and integrity in one and energy efficiencies in operations in the other.

- Program participants improved efforts to quickly and proactively find and fix methane emission events, increasing the number of monitoring surveys conducted in 2022 by 43% from the previous year.
- Participating companies continued to reduce their flaring, achieving a 14% reduction in total volumes reported and a 2.4% reduction in flare intensity from the previous year.
- And through research collaborations with key external partners, The Partnership advanced industry knowledge on the capabilities of aerial detection technology as well as understanding of methane emissions profiles and primary sources of methane emissions.

The progress reported by our participants reflect the ingenuity, creativity, and know-how of the women and men powering our lives while minimizing environmental impacts.

The Partnership has been integral to developing energy and environmental solutions and serves as a springboard to advance technological innovation, cultivate best practices, and reduce energy-related emissions. We are grateful for the enthusiastic leadership and support from our participating companies, and we look forward to accelerating emissions reductions and innovations in the next five years.



VANESSA RYAN
Chair
Chevron



EMILY HAGUE
Director
The Environmental
Partnership

Participating Companies

102 Participating in 2022





Program Summary

Our Principles



1 Take Action

Participants commit to taking action to improve their environmental performance through eight environmental performance programs that can be implemented and phased into their operations.

2 Learn

Participants commit to continuous learning about the latest industry best practices and innovations to help further reduce their environmental footprint while safely and responsibly growing energy production.

3 Collaborate

Participants commit to collaborating with one another and with academics, researchers, and regulators on the best strategies, tools, and tactics to improve environmental performance.





Background

The U.S. oil and natural gas industry has committed to protecting human health, safety and the environment. Even as the United States has recently led the world in oil and natural gas production, methane emissions from petroleum and natural gas systems have fallen, thanks to industry leadership, a motivated workforce and investment in new technologies.

Seeking to build on this continued success, The Environmental Partnership was formed in December 2017 around a simple, shared commitment: continuously improve the industry's environmental performance by reducing methane emissions.

The Environmental Partnership's first initiative focused on taking action to further reduce emissions, including methane and volatile organic compounds (VOCs) associated with oil and natural gas production.

Methane is a greenhouse gas, emitted both in nature and through human activity. Because methane is the primary component of natural gas, minimizing its release is important to industry from environmental and business standpoints. VOCs are naturally occurring compounds containing carbon that can be emitted during production and are an important target for reductions because they are a precursor to ground-level ozone formation and smog.

Since its creation over five years ago, The Environmental Partnership has grown tremendously in both size and scope. Participation has quadrupled in size, going from 23 companies to more than 100, and now represents nearly 70% of U.S. onshore production across every major oil and natural gas basin, all committed to accelerating progress in emissions reduction.

Environmental Performance Programs

As The Partnership continues to grow in participation, it has also expanded its actions to cover more emission sources across the supply chain. Informed by data from the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Reporting Program, there are now eight environmental performance programs that oil and natural gas production, processing and transmission companies can implement within their operations. Below is a summary of each of the eight programs.

1. Leak Detection and Repair Program

Leak monitoring, followed by timely repair, at sites using detection methods and technologies such as portable analyzers, optical gas imaging cameras and laser-based aerial surveys.

2. Pneumatic Controller Program

Replace, remove or retrofit gas-driven pneumatic controllers with low- or zero-emitting devices.

3. Manual Liquids Unloading Program

Implement an industry best practice that minimizes emissions by monitoring the removal of liquids that, as a natural gas well ages, can build up and restrict gas flow.

4. Compressor Program

Implement reduction practices that minimize emissions associated with centrifugal and reciprocating compressors – such as routing vapors to control or replacing rod packings.

5. Pipeline Blowdown Program

Implement reduction practices to minimize emissions during pipeline blowdowns – such as routing natural gas to a low-pressure system or reducing pressure.

6. Flare Management Program

Implement practices to reduce flare volumes, promote beneficial use of associated gas and calculate flare intensity to demonstrate progress.

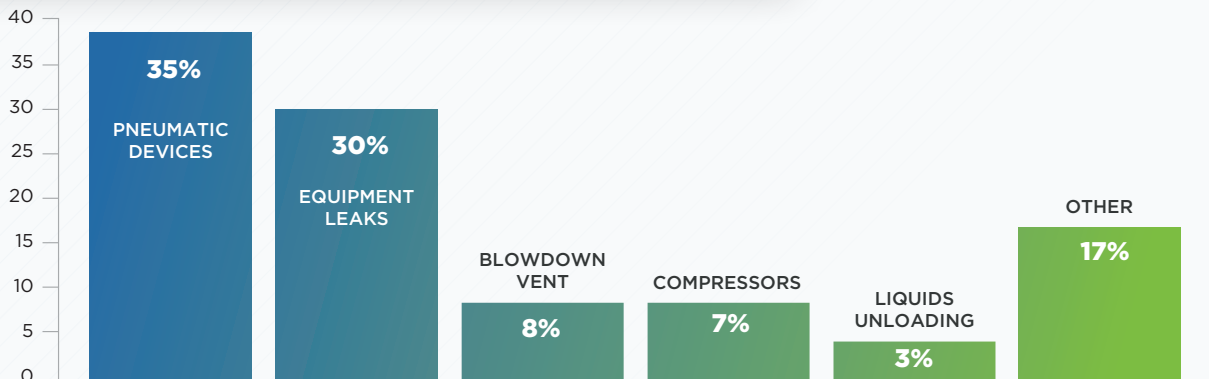
7. Maintenance & Integrity Program

Implement best practices that improve liquid petroleum pipeline and facility integrity and maintenance programs to reduce emissions and product releases to the environment.

8. Energy Efficiencies Program

Implement best practices to reduce energy consumption for liquid petroleum pipelines and facilities within the transmission and storage segments.

GRAPH 1 EPA'S GHGRP 2020 CH4 EMISSIONS



1. Other is comprised of 17 additional emissions sources, including associated gas flaring.

2. The percentage of CO₂ emissions from associated gas venting and flaring relative to total Subpart W emissions is 5.3%.

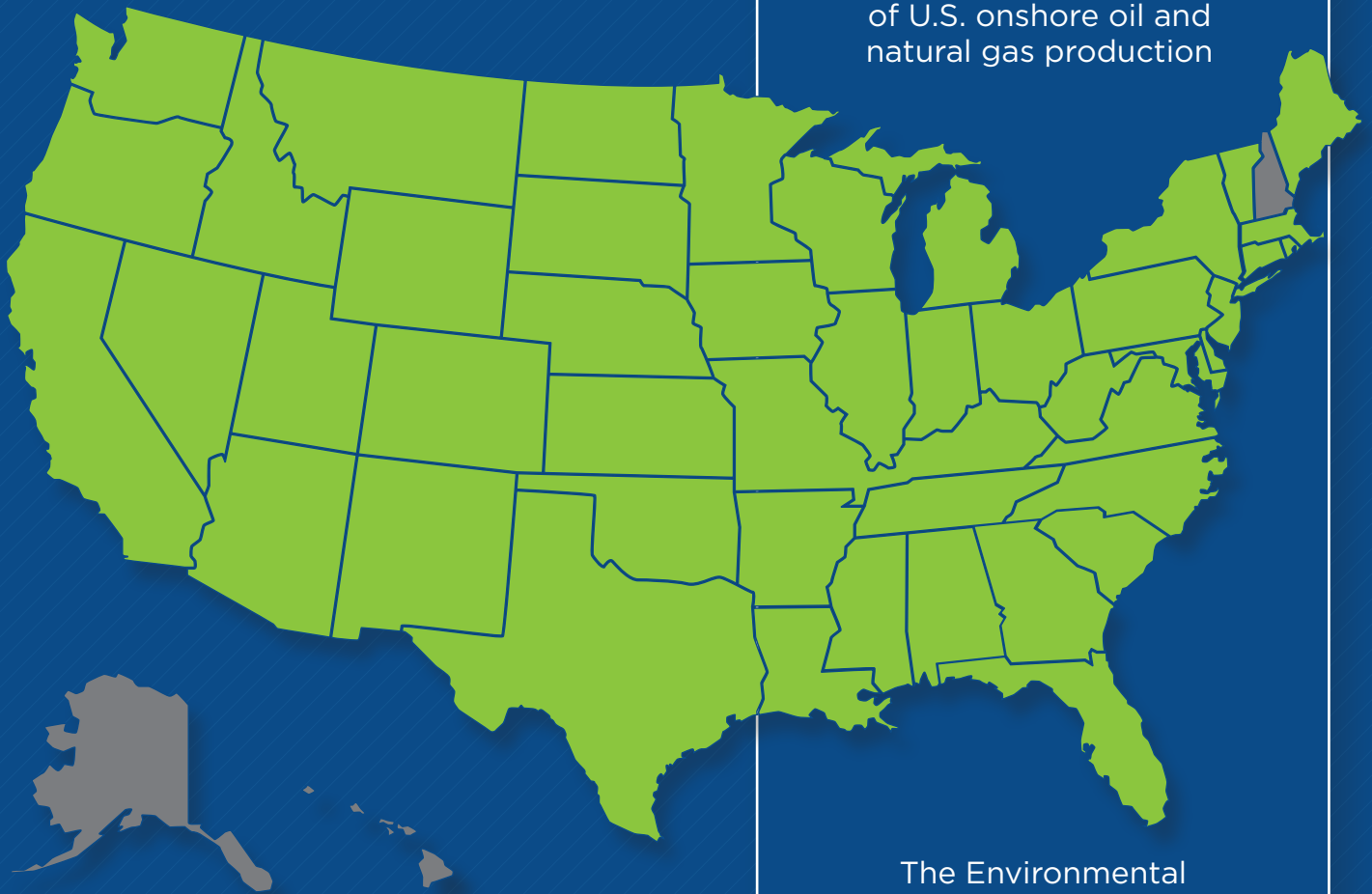
Improving Operations from Coast to Coast

More than 100

participating companies
represent nearly

70%

of U.S. onshore oil and
natural gas production



The Environmental
Partnership is at work in

**47 OF 50
STATES**

 States Where Program
is Implemented

Performance

Highlights

2022 DATA

LEAK DETECTION AND REPAIR PROGRAM

More than

202 million
component inspections performed

More than

664,000
surveys conducted

More than

157,000
sites surveyed

0.07%

leak occurrence rate, or less than
1 component leaking in a thousand

PNEUMATIC CONTROLLER PROGRAM

More than

61,700
additional gas driven controllers
replaced or removed from service

4,000

zero-emission pneumatic controllers
installed at new sites

More than

700

high-bleed pneumatic controllers replaced,
retrofitted or removed from service

61

participating companies no longer have high-bleed
pneumatic controllers in their operations

MANUAL LIQUIDS UNLOADING PROGRAM

Monitored more than

23,100
manual liquids unloading events

PIPELINE BLOWDOWN PROGRAM

Emissions reduction practices
implemented during more than

3,600

pipeline blowdowns

COMPRESSOR PROGRAM

Rod packing changes on more than

4,800
reciprocating compressors

Approved emissions reduction
practices utilized on more than

730
compressors

Accelerating Progress

Since the start of The Partnership, we are seeing measurable progress each year through the actions participating companies take to reduce emissions.

2018-2022 LEAK DETECTION AND REPAIR PROGRAM

More than

903 million

component inspections performed

Nearly

1.9 million

surveys conducted

2018-2022 PNEUMATIC CONTROLLER PROGRAM

More than

114,000

gas driven controllers replaced or removed from service

More than

14,100

zero-emission pneumatic controllers installed

2020 - 2022 MANUAL LIQUIDS UNLOADING PROGRAM

Monitored more than

107,300

manual liquids unloading events

2020 - 2022 PIPELINE BLOWDOWN PROGRAM

Emissions reduction practices implemented during more than

11,800

pipeline blowdowns

2020-2022 COMPRESSOR PROGRAM

Rod packing changes on more than

10,000

reciprocating compressors

Approved emissions reduction practices utilized on more than

2,500

compressors

Progress on Flaring: Continued Focus on Flare Reduction

The Environmental Partnership and its participants are committed to reducing flaring. Since the launch of the flare management program in 2020, The Partnership has advanced best practices to reduce flare volumes, promote the beneficial use of associated gas, and improve flare reliability and efficiency when flaring is necessary. Typically, high-pressure flares are used when there is a lack of natural gas gathering lines or processing capacity, during facility or downstream facility maintenance, or during unplanned events to safely alleviate pressure. In these instances, flaring is better for the environment, releasing fewer greenhouse gases than venting the gas directly into the air.

To track progress, participants in the program report data annually to calculate flare intensity, a measurement of flare volumes relative to production. The annual report reviews flaring trends and reduction efforts, and participants

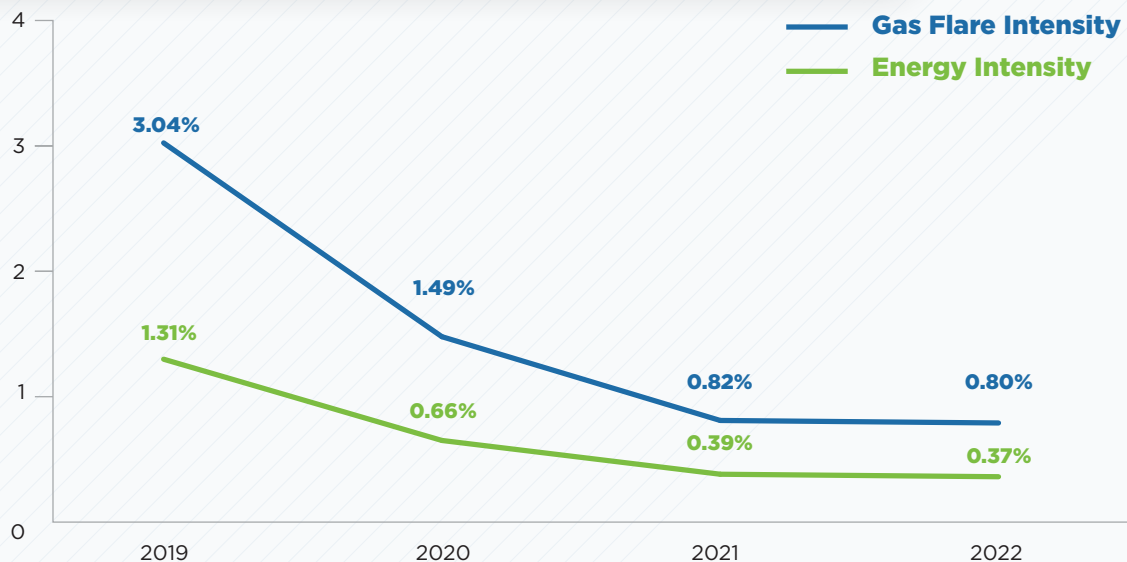
collaborate to share information on flare management programs that include utilization of innovative technologies to reduce flaring intensity.

In 2022, participating companies continued to take action to reduce their flaring, achieving a 14% reduction in total flare volumes and a 2.4% reduction in flare intensity reported from the previous year, even as U.S. oil and gas production grew by 5.6% and 4%, respectively, during the same time period.

Reducing Flare Volumes & Intensity

14% reduction in total flare volumes and a 2.4% reduction in flare intensity

GRAPH 2 PARTICIPATING COMPANY FLARE INTENSITY



* **Gas Flare Intensity** — Flaring relative to gas production in oil fields (MCF gas flared / MCF gas produced)

** **Energy Intensity** — Flaring relative to oil and gas production (BOE gas flared / BOE produced)

Industry Spotlights



Kraken Resources

Kraken Resources is dedicated to the responsible, safe, respectable, and sustainable development of oil and gas, and minimizing the potential for GHG emissions and flare mitigation are a centerpiece of our environmental innovation. We believe a culture of continuous improvement is key in our ever-evolving industry.

We joined The Environmental Partnership last year and immediately began participating in working groups and workshops with other operators. The workshops provide a unique opportunity for operators to come together, learn about the program, and share valuable information about existing practices working to reduce emissions and new practices with the potential to further reduce emissions. Many of the unique challenges that individual operators face are overcome when tackled together, through open dialogues with their industry peers that are fostered at the workshops.

Emissions reduction is bigger than any single company or basin, and The Partnership supports operators to share, learn, and improve by increasing our ability to access key information and better understand how innovation can contribute to methane mitigation. An alliance with our peers and sharing of best practices and approaches play a complementary role in our ongoing work to manage emissions near-term and long-term.

“We are taking a proactive approach to resource development to integrate gas conservation and commercialization - maximizing gas capture and minimizing emissions. Industry initiatives like The Environmental Partnership bring our industry together in order to collaborate and share learnings so that we can ensure operational and environmental excellence as we work to make the Bakken a top producing basin in the United States.”

— Bruce Larsen, President and CEO,
Kraken Resources



Targa Resources

As one of the largest independent midstream infrastructure companies in North America, Targa plays a key role in helping the world meet its growing demand for reliable and affordable energy. We believe that reducing methane emissions is good business and strive to achieve improvements in our performance each year by focusing on implementing emission reduction best practices and investing in new technologies. We are proud to support industry partnerships and initiatives that promote environmental transparency and innovation, and our participation in The Environmental Partnership provides us an opportunity to work with other industry experts to contribute solutions to the world's biggest energy challenges.

Collaborative efforts like the Partnership's aerial survey and compressor projects have helped us to evaluate and pilot the use of state-of-the-art leak detection technologies, further our understanding of emission sources, improve our performance and minimize our environmental impacts.



“The knowledge gained from our own detection surveys combined with collaborative initiatives like The Environmental Partnership’s aerial survey and compressor projects help inform our efforts to find and fix methane leaks. We believe that reducing methane leaks – and working with industry peers to identify and share solutions – is good business.”

— Jessica Keiser, Senior Vice President,
Sustainability, Targa Resources



Taking Action to Reduce Emissions

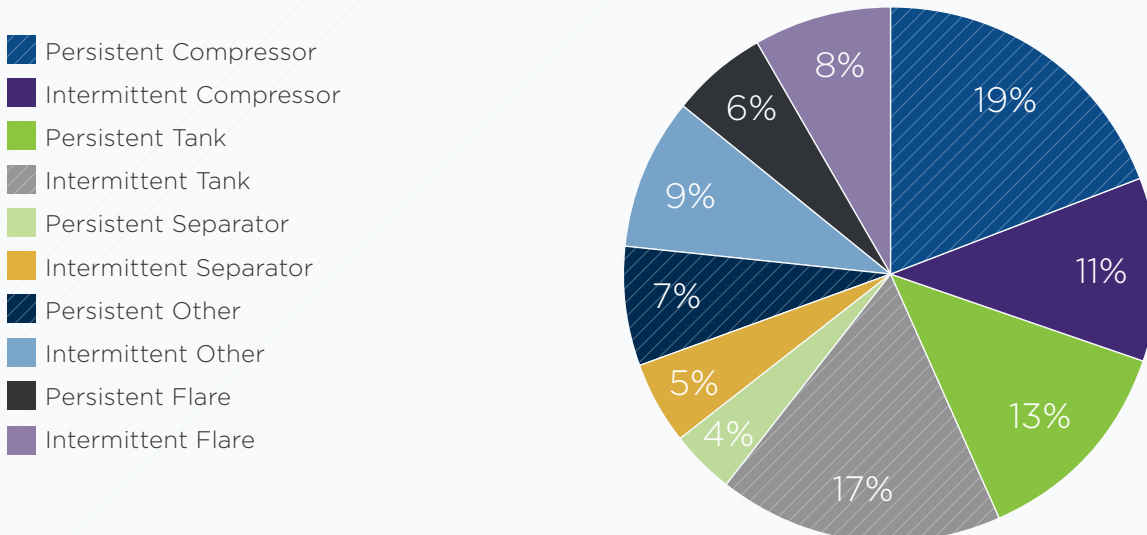
Detecting Emissions Using Flyover Technology

Companies regularly leverage flyover technology as part of their commitment to identifying and reducing methane emissions. Flyover technology measures methane emissions from oil and gas operations using a methane-specific light detection and ranging (LiDAR) instrument, which is mounted on low-flying fixed wing aircraft and offers high-resolution mapping of methane emissions across a wide area of coverage.

Over the past two years, companies participated in flyovers in eight basins (Permian, DJ, Bakken, Marcellus, Anadarko, Eagleford, Haynesville and Powder River), and surveyed nearly 10,000 sites. In many cases, operators surveyed their more complex sites and, in each round of surveys, chose different sites, thereby providing a deeper understanding of emissions across their assets.¹ Such flyovers provided key areas of learning, including: (1) the opportunity to deploy and understand the capabilities of new aerial detection technology and (2) the ability to advance understanding of methane emissions profiles, including source identification and approximate rates, through collected data across a mix of operations.

GRAPH 3 EQUIPMENT EMISSION BREAKDOWN BY VOLUME

ALL OPERATORS - ALL BASINS | 2022 PHASE II



Intermittent = Emissions seen only once across repeated surveys.

Persistent = Emissions seen more than once on surveys repeated on a different day.

Persistent = 50%

¹ Due to the dynamic nature of site selection and the non-representative sample of sites, the project's emission dataset is unsuitable for trend analysis.

Operators found that the flyover technology provided an aerial snapshot in time of methane emissions selective with high enough resolution to attribute such emissions to a single piece of equipment in the field. The results indicated tanks, compressor-driver packages and flares were the primary sources of methane emissions on a volume basis.

Results also found that in the production segment, emissions from compressor driver packages detected by aerial technology differed from follow-up ground level optical gas imaging (OGI) camera surveys. We followed up on these findings to better understand the emission sources of methane from compressors and their drivers and identify the compressor package components responsible for observed emissions.

In conjunction with the aerial surveys, companies participated in a study by Colorado State University to validate the methane specificity of the LiDAR instrument and to conduct controlled release experiments to validate flux calculation accuracy. These results, published in a peer

reviewed scientific journal in November 2022², demonstrated minimal interference from other hydrocarbons including CO₂ commonly found in natural gas, reducing risks of inaccurate measurements.

The aerial surveys allowed a range of operators - from those with only a handful of wells or compressor stations to major companies - to cost-effectively explore a new detection technology and to better understand their methane emissions. Moving forward, participating companies are now able to make more informed decisions on appropriate measurement and monitoring strategies for their organizations, including the use of aerial detection, in their efforts to reduce emissions. The surveys accelerated industry adoption of alternative monitoring technology and helped to prioritize The Environmental Partnership's future work towards identifying solutions for primary sources of methane emissions.



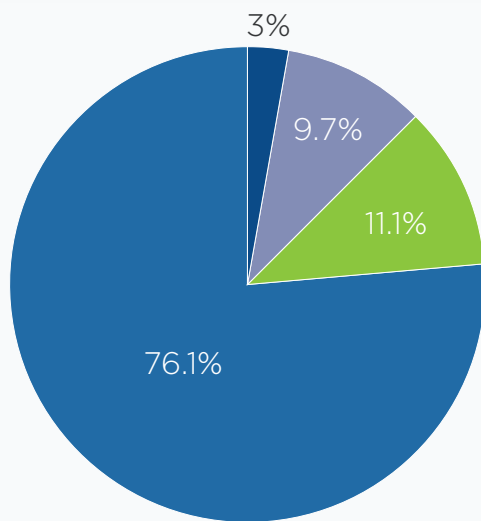
© Bridger Photonics

² <https://online.ucpress.edu/elementa/article/10/1/00080/194657/Single-blind-determination-of-methane-detection>



Tackling Emissions Sources

GRAPH 4
METHANE EMISSIONS
SOURCES OBSERVED



- Fugitives
- Rod Pack Vents
- Engine Crankcase Vents
- Engine Exhaust

Building on findings from the aerial surveys, the Partnership – in collaboration with Colorado State University (CSU) and Bridger Photonics – organized a field analysis in Fall 2022 with 10 participating companies in the Bakken and Permian basins to validate and better understand the emission sources of methane from compressors and their drivers.

CSU and stack testing companies quantified methane emissions from the exhaust stream, as well as from rod packing vents, crankcase vents and fugitives visible on an OGI camera. The team measured sources on 79 units at 24 sites, and 48 of these units' emissions were fully captured by the ground team. While the field team was taking measurements on the ground, aerial surveys with an active source LiDAR system were deployed over the field sites to allow for a comparison between aerial survey data and individual source measurements.

When electric driven units were excluded, over 76% of methane emissions observed during the study were related to engine exhaust (Graph 4). Additionally, CSU found that the majority of units were operating within design specifications and that in most cases engine emissions did not significantly exceed manufacturer estimates.

The average magnitude of emissions for units where the field team was able to completely quantify emissions aligned with average aerial survey totals over the same time period.

These results indicate that the majority of emissions observed from compressor-driver units is related to methane slip through engine exhaust. Companies and The Partnership are working with operators, engine manufacturers and other stakeholders to identify solutions that can further mitigate methane emissions from compressor drivers.



“TEP’s initiative to better understand next generation sensing technologies will help validate and characterize the performance of new measurement techniques on gas compression engines. The interest and engagement of the wide range of operators that TEP brought together supported not only the study’s top-level goal, but also sparked inquiries on how to leverage new emission reduction opportunities from several subsidiary study observations.”

— Tim Vaughn, Research Scientist, Colorado State University



Advancement through Collaboration

Driving Environmental Progress Through Shared Learning

Basin Workshops

The Environmental Partnership's learning and collaboration principles aim to drive industry improvements. In 2022, The Partnership continued to host well-attended workshops and meetings across the country, allowing operators to convene, learn, and share valuable information about new strategies and technologies developed and deployed to drive down emissions.



In July 2022, The Partnership returned to North Dakota, bringing Bakken operators together to tackle shared challenges and learn about best practices through open dialogue with their industry peers. The Bakken Workshop covered emerging technologies and participant emissions detections efforts as well as a presentation on produced water management, a topic of increasing interest among participants. The workshop also included an update from North Dakota Department of Environmental Quality on their work with industry.



A Permian Workshop held in September 2022 provided a similar forum for upstream and midstream operators in the Permian. The workshop covered evolving technologies for emissions detection and mitigation – from continuous monitoring to aerial surveying – as well as a discussion about the projects within The Partnership, including an overview of the compressor study underway in collaboration with Colorado State University (CSU).



"The participating companies of The Environmental Partnership understand that best practices regarding methane emissions are not a competitive edge. We know it is our responsibility to attend Partnership events and openly discuss our successes and challenges to help accelerate the industry's march toward environmental excellence."

— Arica Gonzalez, Facilities Engineering Supervisor, Diamondback Energy



METEC OGI Camera Training

In July, 29 representatives from participating companies were given the opportunity to attend a 2-day practical course at the Methane Emission Technology Evaluation Center (METEC) at Colorado State University. This optical gas imaging (OGI) camera training provided attendees with the opportunity to improve their methodology and performance through hands-on application, simulated leak detection and repair (LDAR) scenarios and direct feedback from METEC's methane emissions detections experts.



"I have spent my career in oil and gas operations, but I am new to the LDAR field. After taking the METEC class I am not only confident in operating the technology, but I know the specific techniques to utilize and effectively detect leaks on an oil and gas location. The real-world scenarios created for the course were an accurate mock-up of field conditions, and we were able to troubleshoot even the trickiest of leaks. I would recommend this class for both newcomers and veterans in the LDAR field."

— Dustin Westphal, Lead Operator,
Ovintiv USA Inc.



"The METEC instructor did a fantastic job. The course also combined traditional classroom learning and infield training so that we could apply the course concepts in real time. To top it off, there were LDAR technicians in attendance from other operators across the country. This set the stage for networking and knowledge sharing about our past and present LDAR experiences!"

— David Schweitzer, LDAR Operator,
Ovintiv USA Inc.

Annual Meeting, Conference & Tech Forum

In December, as The Environmental Partnership celebrated its fifth anniversary, it also hosted its annual meeting and conference in Houston. The event provided more than 150 attendees an opportunity to collaborate on developments in emissions monitoring and measurement research, the implementation of diverse methane detection technologies and practices to mitigate emissions, and programmatic progress in 2022.

At the 2022 Tech Forum, held in conjunction with the annual meeting and conference, companies that provide emission detection, monitoring, and mitigation services shared how they are working with the industry to implement innovative technologies to reduce emissions, including those advanced by Colorado State University's Methane Emissions Technology Evaluation Center (METEC), Bridger Photonics, GHGSat and others.



"TEP has provided a strong platform for collaboration across the industry. Engagement in emission detection studies has advanced our knowledge and spurred innovative solutions to key industry issues."

— Laura London, Air Compliance Manager, Ovintiv USA Inc.



Program Expansion: Liquid Pipelines

The Environmental Partnership Expands to Liquid Pipelines

The Environmental Partnership is expanding its core mission to reduce emissions across the industry with the launch of two new liquid pipeline programs. Midstream liquid pipeline companies are an integral part of the supply chain, responsible for moving oil and natural gas from the wellhead through the transportation infrastructure necessary to get fuels and feedstocks to market. And midstream companies within The Partnership are committed to meeting today's energy needs in ways that are economically, environmentally and socially responsible.

Developed in 2022, the two programs – *Maintenance & Integrity* and *Energy Efficiencies in Operations* – apply to liquid petroleum pipelines and facilities within the transmission and storage segments. Through these programs, companies will implement best practices that reduce energy consumption and that improve integrity and maintenance

programs to reduce emissions and product releases to the environment.

To gauge progress from year to year, participants will report data including methods used to reduce energy consumption, total energy reduced, and number of incidents where product was released to the environment. The program will aggregate and analyze this data to better understand and identify additional opportunities for the industry to further reduce emissions.

These programs and the additional commitments from midstream companies within The Environmental Partnership build on the industry's progress in reducing methane emissions and are the latest example of how companies are continuously seeking to improve environmental performance while delivering affordable, reliable energy around the world.

2023 Acknowledgment

We would like to thank all of the dedicated individuals who contribute to The Environmental Partnership's core mission of sharing learnings, including external partners who presented during workshops and collaborated on research and studies in 2022. We look forward to the future as we continue to welcome new companies and industry collaboration.

NEW PARTICIPANTS



PARTNERS

