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API GHG Emission Policy & Programs

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PRCI LEADING PIPELINE RESEARCH
Pipeline Research Council International

PRCI R&D Programs – Past & Present

- **The original SRP – Emission Reduction for Legacy Engines (ERLE)**
  - Motivated by EPA regulations regarding NOx emissions from natural gas compressors
  - Whelan, Couch, Nowack, Peabody & Sherman
  - Comprehensive Roadmap
  - Industry commitment to reducing emissions – this is not new territory
  - Getting into the guts of compressor engine operations and reducing NOx emissions through targeted R&D

- **GHG Emission Reduction SRP – more to follow from PRCI**
  - Getting into the guts of compressor engine operations and reducing methane emissions through targeted R&D
  - PRCI focus on environmental commitment as a strategic goal

Emission Reduction and Climate Focused Programs

CAF Action Plan

1. **Accelerate Technology and Innovation** to reduce emissions across the energy industry supply chain while meeting growing energy needs.

2. **Further Mitigate Emissions from Operations** to speed additional environmental progress for both oil and natural gas systems

3. **Endorse a Carbon Price Policy** to drive economy-wide, market-based solutions.

4. **Advance Cleaner Fuels** to provide lower-carbon choices for consumers.

5. **Drive Climate Reporting** to provide consistency and transparency.

Global demand remains high – produce more, emit less
Drive innovation and technology advancements

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Emission Reduction and Climate Focused Programs (cont.)

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Significant tie to CPS TC and GHG SRP

- **Voluntary program to drive emission reduction across the industry**
  - Initiated in 2017 and progressively growing
  - More than 100 companies participating – represents 70% of US onshore oil and natural gas production
  - 2023 annual report recently released and available - https://theenvironmentalpartnership.org/annual-reports/2023-annual-report/

- **6 Programs Developed**
  - Pipeline Blowdown, manual liquids unloading, leak detection and repair, pneumatic controller, compressor station emission reductions, flaring reductions – more than 202 million component inspections under LDAR.

- **TEP Hazardous Liquids Pipeline**
  - Two new programs developed for HL pipelines in 2023 and being initiated in 2024
    - Integrity and maintenance
    - Energy efficiencies in operations

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Mission

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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Take Action

- Companies implement environmental performance programs that are cost-effective, commercially proven, and achieve significant emissions reductions

Learn

- Host industry workshops to foster operator-to-operator information sharing about best practices and new technologies

Collaborate

- Promote dialogue with key stakeholder groups to share information on new academic research, program learnings, and new technological developments

Take Action

Program Principle

Participating companies voluntarily implement environmental performance programs to address high emitting sources.

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

PNEUMATIC CONTROLLER PROGRAM

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

MANUAL LIQUIDS UNLOADING PROGRAM

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

COMPRESSOR PROGRAM

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

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.

FLARE MANAGEMENT PROGRAM

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

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

ENERGY EFFICIENCIES PROGRAM

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

Learn & Collaborate

Program Principle

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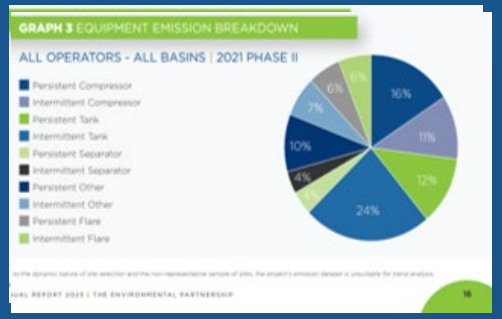
Participants work together with external partners in pursuit of improving environmental performance.



Research & Studies

External Partner Collaboration

Training

Annual Conference, Meeting & Technology Forum

Focus Areas

Targeting operational solutions for primary sources of emission

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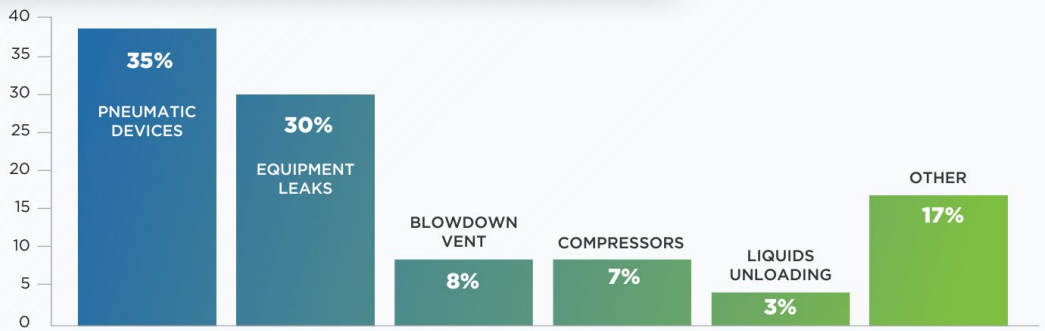
Detection	Operational Sources	Regional
Monitoring	Pneumatics	Storage Tanks	Permian Basin
Measurement	Pipelines	Compressors	Bakken Basin
	Flares		

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 CO_2 emissions from associated gas venting and flaring relative to total Subpart W emissions is 5.3%.

Taking Action to Reduce Emissions

Detecting Emissions Using Flyover Technology

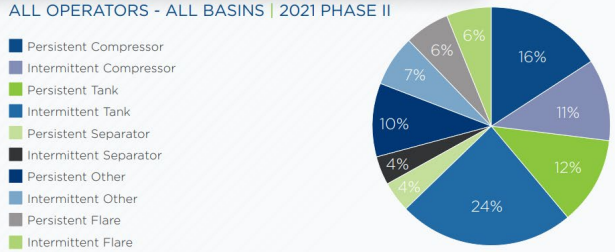
Companies regularly leverage flyover technology as part of their commitment to identifying and reducing methane emissions. Flyover technology measures methane emissions from oil and gas operations using a methane-specific light detection and ranging (LiDAR) instrument, which is mounted on low-flying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

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]

Operators found that the new 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.

GRAPH 3 EQUIPMENT EMISSION BREAKDOWN

ALL OPERATORS - ALL BASINS | 2021 PHASE II



[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.

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- Voluntary, no dues/fees required to join.
- Participating companies agree to annual reporting by April 30th of each year to track progress.
- The Partnership's programs are purposefully designed to evolve in response to new information from its implementation.
- Annual Reports typically released in August/September

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Performance

Highlights

2022 DATA

LEAK DETECTION AND REPAIR PROGRAM

0.07%
leak occurrence rate, or less than 1 component leaking in a thousand

More than
157,000
sites surveyed

More than
664,000
surveys conducted

More than
202 million
component inspections performed

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

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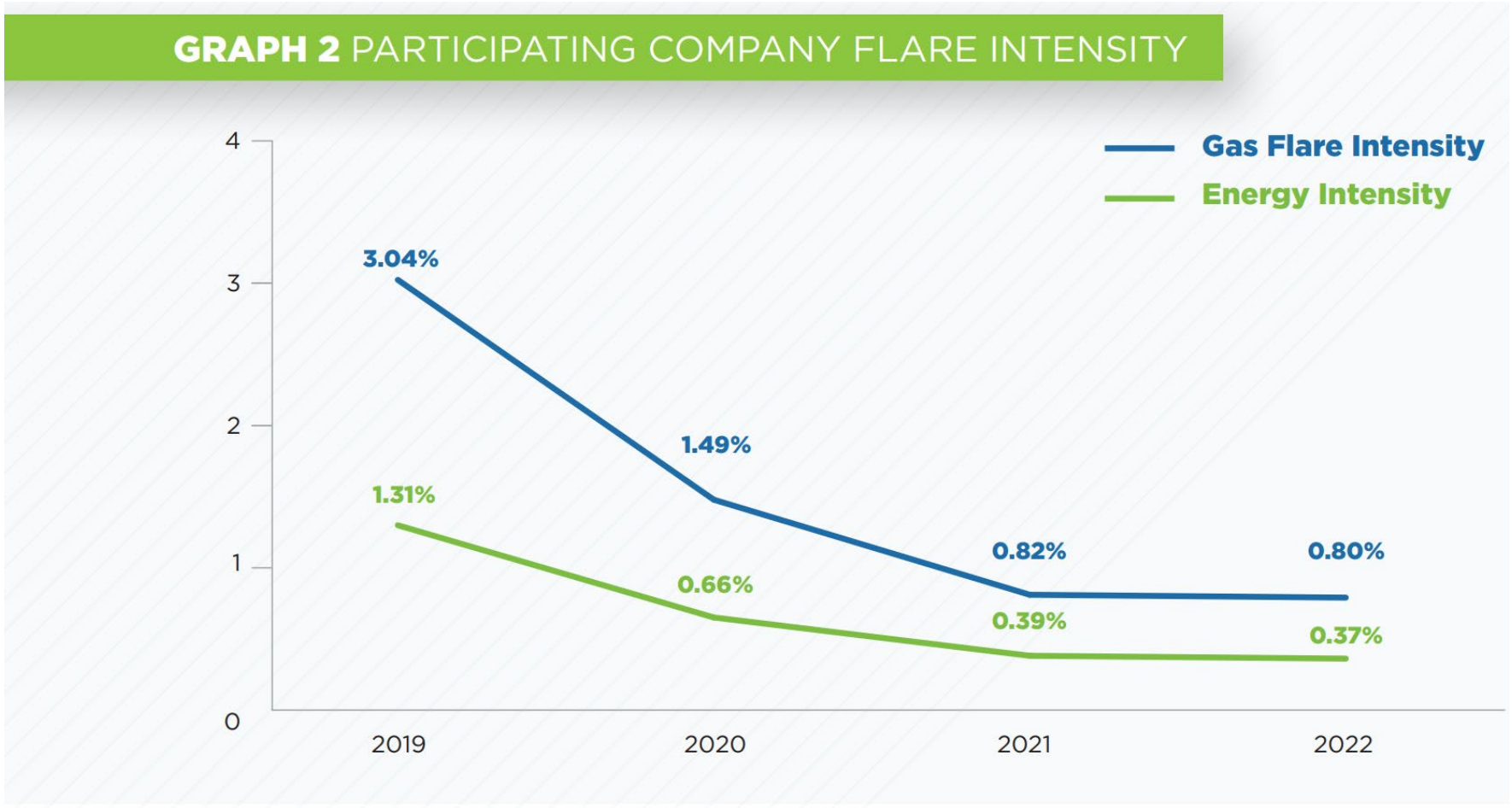
GRAPH 2 PARTICIPATING COMPANY FLARE INTENSITY



* **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)

Participating companies continued to take action to reduce their flaring, achieving a 2.4% reduction in flare intensity and a 14% reduction in total flare volumes reported from the previous year.

Closing Thoughts & Remarks

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- PHMSA LDAR rule and focus on methane emissions
- Link between PRCI R&D and TEP programs
- Connect the dots – your company is likely already involved
- Attend the TEP annual meeting and promote coordination with PRCI
- DOE Informational webinar on GHG Supply Chain MMRV Framework
  - March 14
    https://useadc.webex.com/weblink/register/rcf1def18425596784 21f8828dadba618

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Please visit www.TheEnvironmentalPartnership.org to learn more!

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