

Industry Perspectives on PHMSA's Gas Pipeline Leak Detection and Repair (LDAR) NPRM

Western Regional Gas Conference



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PIPES Act 2020 Look-Back

- **Section 113 – Gas Pipeline Leak Detection**
 - Minimum performance standards for advanced leak detection technologies
 - Leak detection and repair programs that can identify/locate/categorize all hazardous leaks
 - Require use of advanced leak detection technologies and practices, e.g.
 - Periodic surveys using handheld and/or mobile technology
 - Continuous monitoring on or along pipeline
 - Include schedule for appropriate leak deadlines
 - *Exception:* pipe with a leak so small that it poses no potential hazard

Gas Pipeline Leak Detection & Repair (LDAR) NPRM

- NPRM published **5/18** in the Federal Register
- NPRM joint-industry comments submitted to docket **8/16**
- Major provisions:
 - 6-month effective date ⚠
 - Increase in leak survey and patrolling requirements (frequency, instrumentation)
 - Advanced Leak Detection Program (“ALDP”) performance standard ⚠
 - Amendment of existing code to require operators to grade and repair ***all*** detectable leaks
 - Amendment making “leaks” and “hazardous leaks” synonymous ⚠
 - New reporting requirements, including
 - (1) revision of gas transmission and distribution annual reports to include aggregate emissions for all leaks, and
 - (2) a new report for unintentional and intentional large-volume gas releases (> 1 MMCF)




Gas Pipeline Leak Detection & Repair (LDAR) NPRM

- Major provisions:
 - Requirement to design, configure, and (for existing facilities) assess and remediate pressure relief devices to minimize unnecessary releases
 - Definition of pipeline “failure” (as per § 192.617) to include leaks, requiring failure investigation ⚠
 - Accelerated leak repair intervals (including 6 months for Grade 2)
 - Limited exemptions for leaks planned for elimination under strategic replacement program ⚠
 - No exemption for Class 2
 - Class 3 must be replaced within 5 years
 - Emissions mitigation for *all* planned venting ⚠
 - Placing “environmental benefits” on a par with pipeline safety benefits ⚠

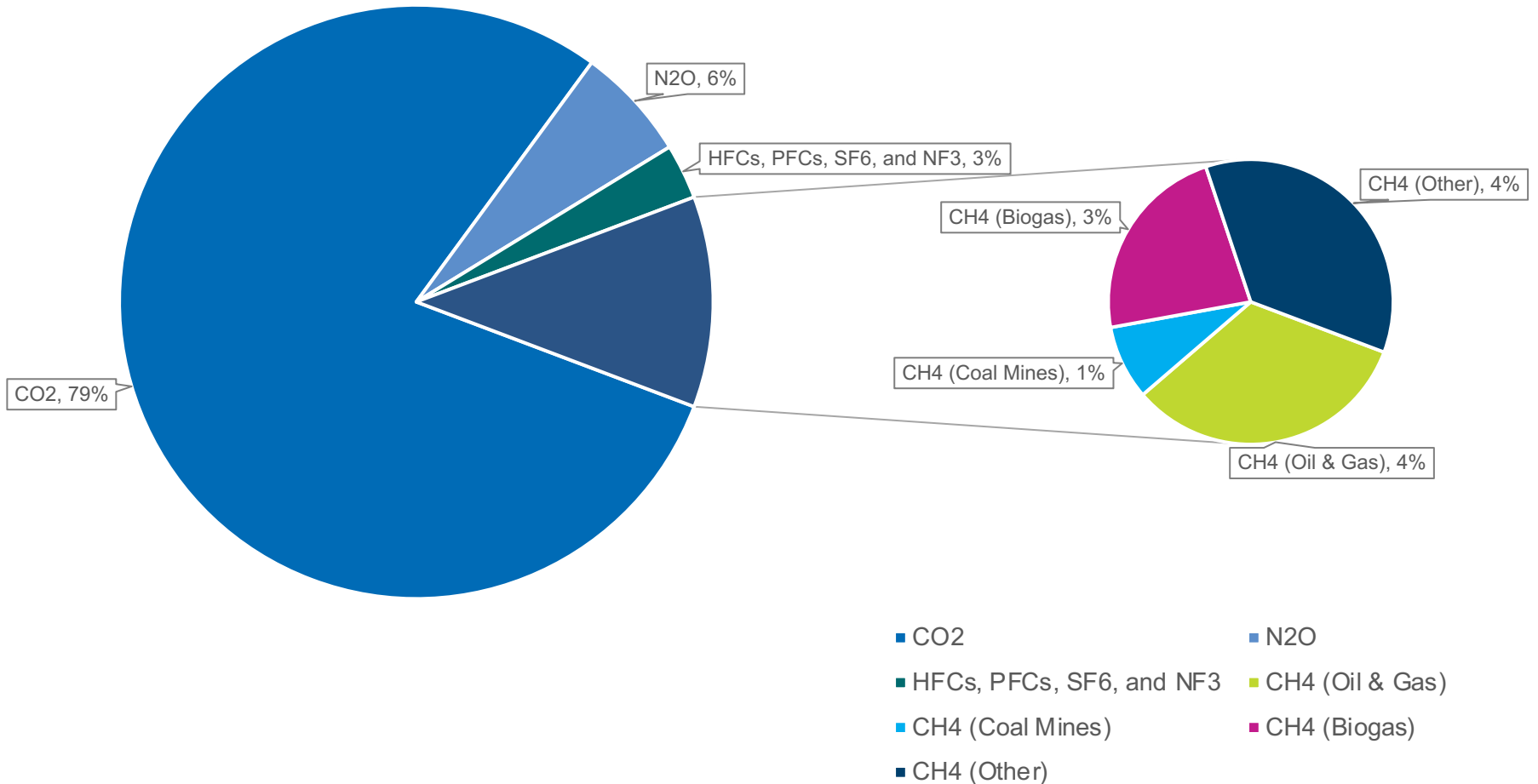
Industry Commitment to GHG Emissions Reduction

- Development and sharing of industry best practices and publications
- Research & Development of emission-reducing technologies and innovations
- Creation of emissions-reduction frameworks such as:
 - AGA Natural Gas Sustainability Initiative (NGSI)
 - APGA Environmental Roadmap for public gas systems
 - INGAA Greenhouse Gas Emissions Commitments
 - The Environmental Partnership
- Flagship members of:
 - EPA Methane Challenge program
 - EPA's Natural Gas STAR program

Industry Commitment to GHG Emissions Reduction

- Since 1990 (Gas Distribution):
 - Customers  **22.3 million**
 - Pipeline mileage  **815,100**
 - Methane emissions  **70%**

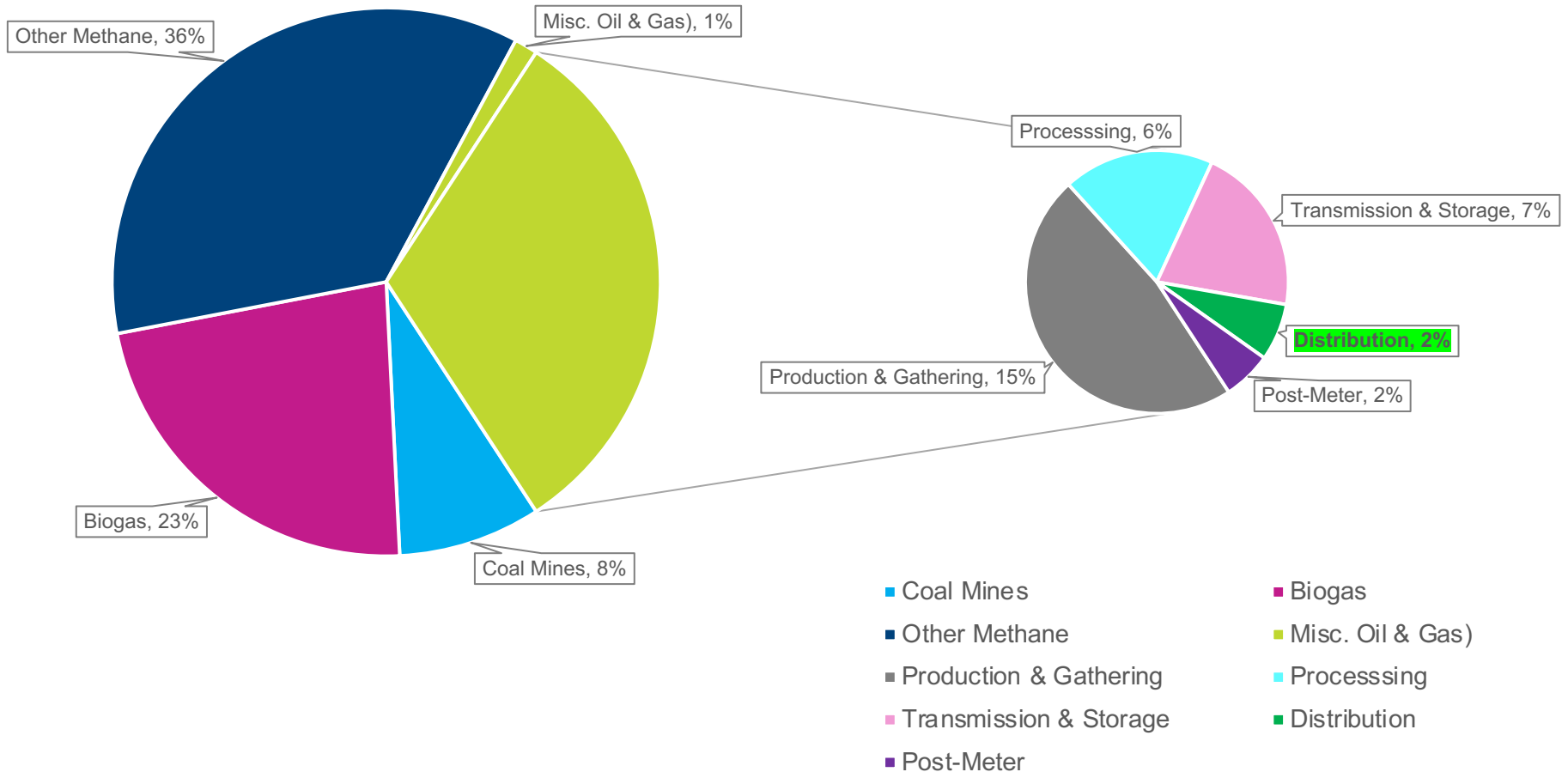
2021 GHG Emissions, U.S.



Source: EPA

[Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021 – Main Report \(epa.gov\)](https://www.epa.gov/greenhouse-gas-emissions-and-sinks)

2021 Methane Emissions, U.S.



Source: EPA

[Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021 – Main Report \(epa.gov\)](https://www.epa.gov/greenw/ghg-inventory-2021-main-report)

Advanced Leak Detection Program (ALDP)

- Minimum instrument sensitivity
 - **PHMSA:** 5 ppm for all leak survey/detection equipment
 - **Cross-industry proposal:** Multiple tiers
 - 5 ppm for **handheld**
 - 500 ppm for **infrared, laser-based, mobile, aerial, or satellite-based platforms**
 - 40 C.F.R. Part 60, subpart OOOO or equivalent for **optical gas imaging (OGI)**
- Performance standard for all leak survey/detection equipment
 - **PHMSA:** operator verification that all equipment can detect leaks producing 5 ppm at 5 feet from pipe wall
 - **Cross-industry proposal:** Adopt minimum equipment sensitivity as performance standard
 - Impractical to administer in a controlled setting; impossible under many field conditions
 - Default to minimum equipment sensitivity (as per mfg.)

Leak Grading & Repair

- Definition of leak
 - **PHMSA:** “leak” and “hazardous leak” are synonymous
 - **Cross-industry proposal:**
 - public safety and environmental protection are not on a par
 - non-zero, relatively insignificant environmental harm of a leak does not = “hazardous”
 - historic understanding of hazardous leak must be preserved
 - leak grading criteria that acknowledges environmental significance
- Grade 2 leaks
 - **PHMSA:** evaluate every 30 days, repair within 6 months
 - **Cross-industry proposal:** evaluate every 90 days, repair within 12 months
 - Leak grades change infrequently
 - Longer repair interval necessary for seasonal/permitting constraints, and to fully leverage project bundling

Investigation of Failures

- Definition of failure
 - **PHMSA:** all leaks are “pipeline failures” requiring investigation under § 192.617
 - **Cross-industry proposal:**
 - Functional definition of failure in ASME B31.8S (referenced in NPRM) should prevail
 - ASME B31.8S references pipelines that are “completely inoperable,” “incapable of satisfactorily performing its intended function,” or “unreliable or unsafe for continued use”
 - Leaks generally do not fit these definitions (though a few will)

Mitigating Vented Emissions

- “Minimize” vs. “Reduce”
 - **PHMSA:** menu of methods to “minimize” vented emissions
 - **Cross-industry proposal:** Strike “minimize” from regulatory text and replace with “reduce”
- Applicability
 - **PHMSA:** any intentional release of gas
 - **Cross-industry proposal:** any intentional release of gas that would exceed 1 MMCF without mitigative action

Effective Date

- Rule effective from publish date
 - **PHMSA:** 6 months from publish date
 - **Cross-industry proposal:** Effective January 1, not less than 36 months from publish date
 - Revision of operators processes and procedures for leak survey, investigation, and repair
 - Alignment of leak survey schedules to account for new requirements
 - Standing up an Advanced Leak Detection Program (ALDP)
 - Revision to OQ programs; training and/or knowledge demonstration of operator and contractor personnel
 - Sourcing and adoption of new equipment and technologies across industry

Remaining focused on public safety

- Strategic replacement of leak-prone pipe
 - Informed by performance-based DIMP programs
 - Mandated by Section 114 of PIPES Act 2020
 - Supported by PHMSA's Natural Gas Distribution Infrastructure Safety and Modernization (NGDISM) grants

Table 1. Hazardous Leaks on Distribution Mains and Services Before and After DIMP Regulations

Threat		% Hazardous Leaks on Mains 2010	% Hazardous Leaks on Mains 2021	% Hazardous Leaks on Services 2010	% Hazardous Leaks on Services 2021
Time Dependent Threat	Corrosion Failure	23%	17%	23%	16%

Table 2. PHMSA Reportable Incidents on Natural Gas Distribution Systems by Threat Type

Threat ¹²⁵		# of Incidents (2011 – 2023)	% Total Incidents
Time Dependent Threat	Corrosion Failure	6	2%

Remaining focused on public safety

- NPRM's recognition of leak-prone pipe

Table 8: Gas distribution system methane emission factors from selected studies.

Pipe material	EPA & GRI (1996)		Lamb <i>et al.</i> (2015)		Weller <i>et al.</i> (2020)	
	Leak incidence (leak/mile)	Emissions rate (g/min-leak)	Leak incidence (leak/mile)	Emissions rate (g/min-leak)	Leak incidence (leak/mile)	Emissions rate (g/min-leak)
Bare (unprotected) steel	1.82	1.91	2.51	0.77	0.51	2.24
Cast iron	N/A	3.57	2.88	0.90	1.00	1.72
Coated (protected) steel	0.14	0.76	0.11	1.21	0.61	2.00
Plastic	0.18	1.88	0.05	0.33	0.43	2.03
Total (all materials)	0.35	N/A	0.23	N/A	0.51	N/A

N/A: Value not available.
 Source: Adapted from Table 1 and Table 2 in Weller *et al.* (2020)

Remaining focused on public safety

- Cost-benefit

Table ES-4: Comparisons of the total annualized costs and benefits of the proposed rule (million 2020\$)							
Discount Rate	Item	Gathering	Transmission	Distribution		Total ¹	
				Lamb et al. (2015)	Weller et al. (2020)	Low	High
3%	Benefits	\$553	\$12	\$515	\$1,754	\$1,081	\$2,320
	Costs	\$211	\$15	\$514	\$654	\$740	\$880
	Net benefits	\$343	-\$3	\$1	\$1,100	\$341	\$1,440
7% ²	Benefits	\$549	\$12	\$512	\$1,743	\$1,073	\$2,304
	Cost	\$209	\$15	\$530	\$677	\$753	\$900
	Net benefits	\$340	-\$3	-\$18	\$1,067	\$320	\$1,404

Questions?

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The American Gas Association, founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 76 million residential, commercial and industrial natural gas customers in the U.S., of which 95 percent — more than 72 million customers — receive their gas from AGA members. Today, natural gas meets more than 30 percent of the United States' energy needs.

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