

Natural Gas Distribution in the 2016 GHGI

Overview of Potential
Methodology Updates

November 19, 2015

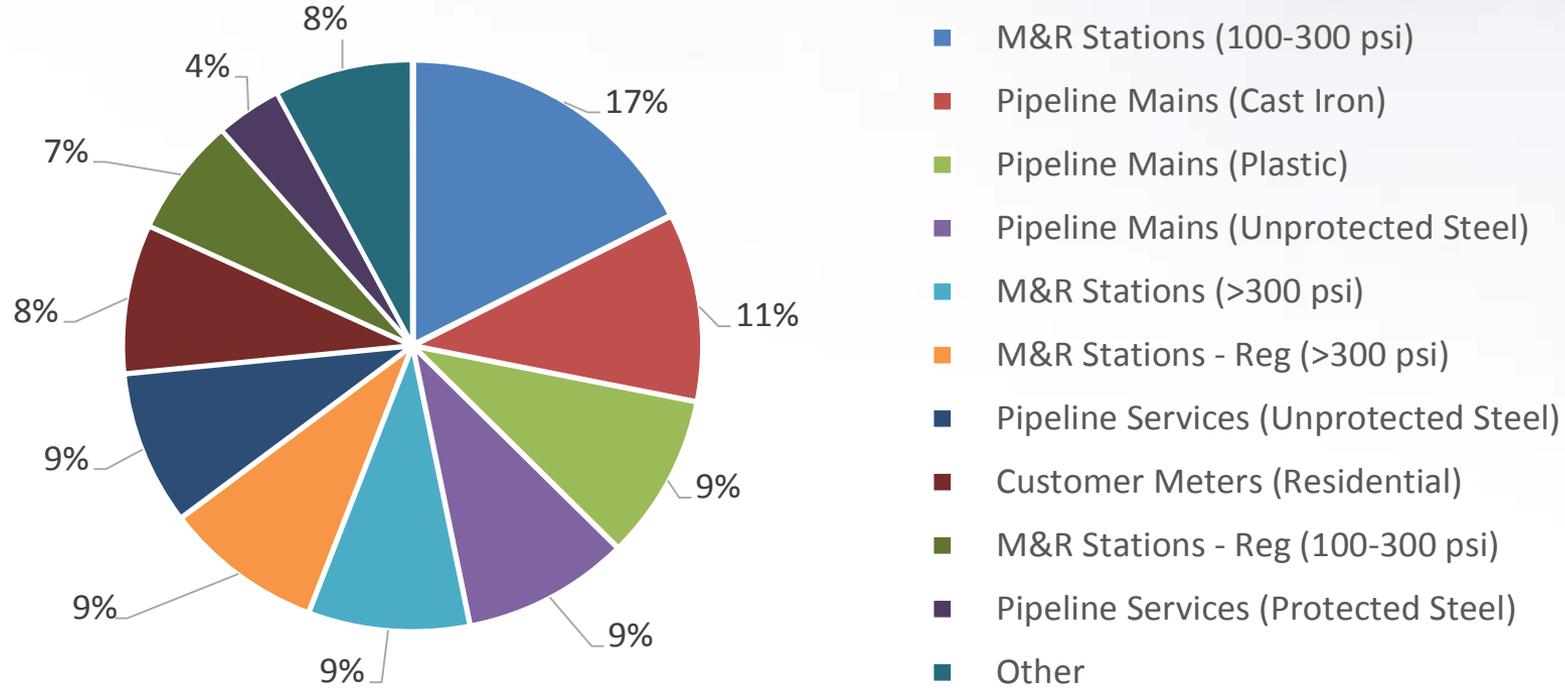


Distribution Segment in 2015 GHGI



- 33.3 MMT CO₂e
- 21% of natural gas systems methane emissions

2013 Distribution Segment Methane



Distribution Segment Emission Sources



- Meter/Regulator (M&R) stations
 - Stratified by station type (M&R versus regulator stations), location (vault versus above ground) and inlet pressure range.
 - Note this is a generic term that encompasses custody transfer stations and pressure regulator stations.
- Pipeline leaks
 - Stratified by type (mains versus service lines) and pipeline material.
- Customer meters
 - Stratified by customer type (residential versus commercial/industrial).
- Other sources include:
 - Pressure relief valve releases
 - Pipeline blowdowns
 - Upsets, including mishaps (dig-ins)

Recent Data on Distribution Segment Emissions



Emission Source	GHGRP (Annual)	Lamb et al. 2015	Clearstone 2011	AGA Gas Facts (Annual)	GTI 2009	GTI 2013
M&R Stations	AD, EF	EF	-	-	EF	-
Pipeline leaks	AD	EF	-	-	-	EF
Customer Meters	-	-	EF	AD	EF	-
Pressure Relief Valve Releases	-	-	-	-	-	-
Pipeline Blowdowns	-	EF	-	-	-	-
Mishaps (Dig-Ins)	-	EF	-	-	-	-

Current Inventory Methodologies



- Activity Data
 - **M&R Stations:** EPA/GRI (1996) survey data from 12 companies in conjunction with PHMSA pipeline mileage data to estimate number of stations per mile of main, of each station subcategory. Other years scaled from 1992 value based on EIA residential gas consumption relative to 1992.
 - **Pipeline Leaks:** Number of pipeline miles and counts of services of each type of material (cast iron, unprotected steel, protected steel, plastic) for the given year, from PHMSA.
 - **Customer Meters:** EPA/GRI (1996) study data from AGA's *Gas Facts* for year 1992. Other years scaled from 1992 value based on EIA residential or commercial/industrial gas consumption relative to 1992.
 - **PRVs/Blowdowns/Mishaps:** PHMSA pipeline mileage data, scaled from 1992 base year
- Emission Factors
 - **M&R Stations:** EPA/GRI (1996), station type-specific
 - **Pipeline Leaks:** EPA/GRI (1996), Mscf/mile for each subcategory of main type and Mscf/service for each subcategory of service type
 - **Customer Meters:** EPA/GRI (1996), combined EF for commercial and industrial meters
 - **PRVs/Blowdowns/Mishaps:** EPA/GRI (1996)

Key Revisions Under Consideration – Activity Data



- ***M&R Stations:***
 - Use GHGRP for 2011-2014 and scale up to national representation.
 - Estimate that GHGRP represents approximately 84% of national M&R stations based on percentage of PHMSA pipeline miles matched to GHGRP reporters.
 - Apply same split as in current GHGI to break out GHGRP station counts into existing subcategories. Use existing estimates for earlier years.
- ***Pipeline Leaks:*** Unchanged
- ***Customer Meters:*** *Gas Facts* for each year
- ***Blowdowns and Mishaps:*** Direct PHMSA pipeline mileage data for mains and services

Key Revisions Under Consideration– Emission Factors



- ***M&R Stations***: Use results of Lamb et al. (2015) for recent years (?-2014) and existing EFs for earlier years (1990-?), with linear interpolation in between.
- ***Pipeline Leaks***: Use results of Lamb et al. (2015) for recent years (?-2014) and existing EFs for earlier years (1990-?), with linear interpolation in between.
- ***Customer Meters***
 - Residential Meters – multiple options using GTI (2009), Clearstone (2011), *and/or* EPA/GRI (1996) data.
 - Commercial & Industrial Meters – multiple options using GTI (2009) *and/or* EPA/GRI (1996) data
- ***Blowdowns and Mishaps***: Multiple options using EPA/GRI (1996) and/or Lamb (2015) data

Overview of Key Revisions Under Consideration: Year 2013 Example



Emission Source	Activity Data		Methane Emission Factor (MT CO ₂ e/year)	
	2015 Inventory	Potential Revision	2015 Inventory	Potential Revision
M&R Stations	147,697 stations	129,837 stations	0.4 – 758 /station	0.6 – 54 /station
Pipeline leaks	1.3 million miles of main and 66 million service lines		1.5 – 115 /mile 0.004 – 0.8 /service	0.2 – 29 /mile 0.005 – 0.1 /service
Customer Meters: <i>Residential</i>	42 million meters	53 million meters	0.7 /meter	GTI: 0.02 /meter Clearstone: 0.03 /meter
Customer Meters: <i>C&I</i>	4.8 million meters	5.6 million meters	0.02 /meter	GTI Commercial: 0.2 /meter GTI Industrial: 98 /meter
Pipeline Blowdowns	1.4 million miles	2.1 million miles	0.05 /mile	Lamb: 0.003 /mile Combined: 0.03 /mile
Mishaps (Dig-Ins)			0.8 /mile	Lamb: 1.2 /mile Combined: 0.9 /mile

Requests for Stakeholder Feedback



- Top Down versus Bottom Up Studies
 - EPA is seeking stakeholder comment on the atmospheric observations compared to bottom up studies in distribution, and on how this information could be taken into account in the Inventory.
- Drive Around Studies
 - EPA seeks stakeholder feedback on whether and how findings from these studies may be used to assess or update Inventory estimates.

Requests for Stakeholder Feedback (cont.)



- M&R Stations
 - Over what time frame did upgrades to M&R stations noted in Lamb et al. occur?
- Residential Customer Meters
 - Feedback is sought on trends in the industry over time that would result in lower emissions per meter in recent years compared to the early 1990's timeframe.
- Commercial & Industrial Customer Meters
 - EPA is considering several options for these meters, including replacing the current Inventory EF for commercial and industrial meters (possibly using commercial meter factor for all meters, or using separate EFs), or combining the various data sets and using them across the time series. Are data available to support these approaches?
 - Are there trends over time for these meters that should be reflected in the time series?

Requests for Stakeholder Feedback (cont.)



- Pipeline Blowdowns and Mishaps/Dig-ins
 - EPA seeks feedback on the approach used by Lamb et al., combining limited emissions data from survey respondents with that collected in the GRI study to calculate an EF.
- Natural Gas Leaks at Point of Use
 - EPA seeks stakeholder feedback on the addition of this emission source to the Inventory, including available U.S. specific emissions data for this source.