







Lost and Unaccounted for Gas in Massachusetts

A Study Prepared for:

Massachusetts Department of Public Utilities

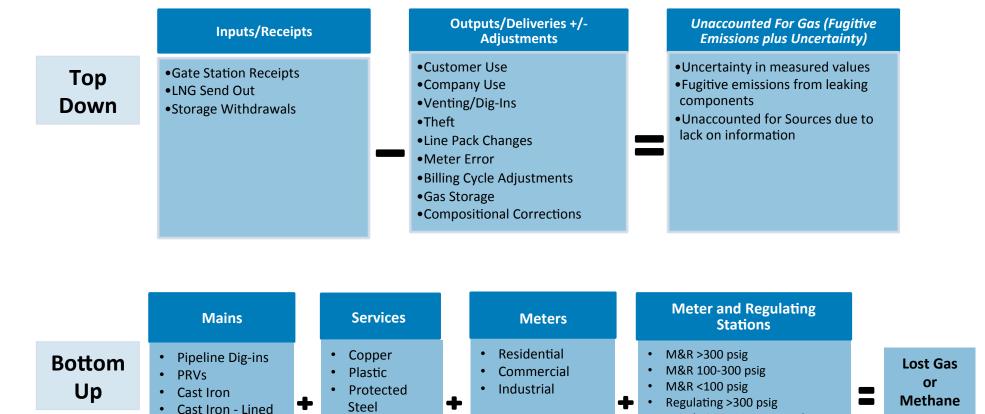
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Top Down and Bottom Up Approaches



Lost Gas or Methane Emissions = Activity Factor (# of sources) x Emissions Factor (rate)

Unprotected

Steel

Plastic

Steel

Unprotected

Protected Steel

Emissions

Regulating >300 psig Vault

Regulating 100-300 psig Vault

Regulating 40-100 psig Vault Regulating <40 (both)

Regulating 100-300 psig

Regulating 40-100 psig

FINDINGS

Results of Top Down and Bottom Up Analyses

Top Down

Division	Receipts	Fugitives + Uncertainty	Fugitives + Uncertainty
	(Mcf)	(Mcf)	(%)
Division 1	9,208,571	240,119	2.6%
Division 2	6,325,044	-10,113	-0.2%
Division 3	10,656,695	29,189	0.3%

Bottom Up

Division	Receipts	Lost Gas	Lost Gas	Methane Emissions	Methane Emissions
	(Mcf)	(Mcf)	(%)	(Mcf)	(%)
Division 1	9,208,571	165,402	1.8%	105,240	1.1%
Division 2	6,325,044	102,791	1.6%	70,518	1.1%
Division 3	10,656,695	63,970	0.6%	58,803	0.6%

Scaling Up Bottom Up Analyses for All of Massachusetts

ICF used measured or extrapolated Activity Factors for each source category to estimate the lost gas and methane emissions for all of Massachusetts.

	Туре	Massachusetts		
Source		Lost Gas (Mcf)	Methane Emissions (Mcf)	
Cubtotale (butuma)	Fugitive	6,960,696	5,379,928	
Subtotals (by type)	Vented	39,872	37,240	
TOTAL		7,000,569	5,417,170	

General Conclusions

- It is important to understand how LAUF, lost gas, and methane emissions are estimated, and the uncertainties in the methods, if we are to use these as metrics in public policy.
- LAUF is a poor surrogate for emissions or lost gas, and if used for other purposes, should have a standard and comprehensive definition and method for calculation.
- The effectiveness of replacing cast iron and unprotected steel with plastic pipe to reduce emissions is clearly demonstrated in this study, as shown by the emissions estimates for Division 3.
- The accuracy of bottom-up methane emissions estimates is directly related to the accuracy and representativeness of emissions factors used.
 Currently available emissions factors have significant uncertainty.

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