


API Emission Updates for the GHG Inventory

EPA Stakeholders Workshop
October 27, 2017

Key Messages

- Inventory changes are methodological, not “new emissions”
- API supports using GHGRP data over outdated emission factors
  - API is proposing more representative methods of extrapolating GHGRP data for use in the GHGI
  - Source types where industry practices are changing should be evaluated annually
    - For example, liquids unloading, completions and workovers with hydraulic fracturing, and associated gas venting and flaring
- GHGRP data must be screened for data quality issues prior to use

Example GHGRP Data Quality Issues

- 2015 GHGRP total volume of gas produced is 14 times larger than HPDI national gas production volume
- GHGRP throughputs for some individual dehydrators at gas plants are larger than the total national gas processing throughput
- Data sets reporting flaring emissions but no corresponding volume of gas to flare
- Data sets reporting associated gas venting but no corresponding count of wells venting
- Data sets reporting volume of gas to flare and flare feed gas composition, but no CH_4 or CO_2 emissions
- Data sets reporting flared CH_4 emissions higher than CO_2 emissions

API Information Reflected in the 2017 GHGI

- GHGI well counts
  - 2017 GHGI revised methodology results in well counts far more comparable to other data sources
- GHGI emissions for gas plants based on GHGRP data
  - Implementing API's recommendations resulted in 445 ktonnes CH_4 emissions from gas plants compared to EPA's 2016 GHGI estimate of 960 ktonnes CH_4
- API is continuing to analyze GHGRP data to provide improved emissions and activity factors in lieu of decades old data that has been used in the GHGI
  - For example, for reciprocating compressors at gas plants, implementing API's recommendations resulted in 71 ktonnes CH_4 emissions compared to EPA's 2016 GHGI estimate of 474 ktonnes CH_4




API Emission Estimates for Key Source Types:

- Associated Gas Venting and Flaring
- Liquids Unloading
- Flare Stacks
- Gas Well Completions and Workovers with Hydraulic Fracturing

Drivers for Alternate Emission Approaches

- Data sources such as associated gas venting and flaring and liquids unloading show distinct regional variability
  - Average emission factors from total data sets will overestimate emissions
  - For example, 97% of associated gas flaring emissions are due to 5 basins out of 27 basins reporting emissions for this source
- GHGRP data are skewed toward newer, high production wells
  - GHGRP data shows average of 11,394 bbls/oil well compared to a national average of 6,264 bbls/oil well from HPDI and 2,977 bbls/oil well for non-GHGRP facilities
  - Extrapolation based on well count may not be accurate

Comparison of API and EPA Emission Estimates for Key Emission Sources

Summary of API recommended changes to EPA's proposed CY2015 National GHG Emission Estimates, tonnes CO2e

	EPA Estimate	API Estimate
Associated Gas Venting*	1,094,704	936,702
Associated Gas Flaring*	31,192,920	12,841,930
Liquids Unloading*	5,237,719	4,235,908
Flare Stacks*	9,488,657	5,086,194
Gas Well Completions & Workovers w/ HF	1,794,157	739,284
TOTAL for sources shown	**48,808,157**	**23,840,018**

Details comparing API's proposed methodology revisions to EPA's current methods are provided in the slides below

* Based on regional (basin-level) analysis

Summary of Analysis for Associated Gas Venting and Flaring

EPA Approach

- Uses emissions and # wells venting and flaring for associated gas from GHGRP
- Calculates GHGRP % wells venting and flaring for associated gas relative to wellhead counts reported under Equipment Leaks

API Approach

- Uses emissions and volume of oil produced for associated gas from GHGRP
- Evaluates top 5 basins separately
- Calculates GHGRP % oil produced (by basin) with associated gas that is vented or flared

Summary of Analysis for Liquids Unloading

EPA Approach

- Uses emissions and # wells venting with and w/out plunger lift from GHGRP
- Averaged data for 2011-2015
- Calculates GHGRP % wells venting with and w/out plungers using gas wellheads reported under Equipment Leaks in the denominator
- Extrapolates based on national HPDI gas well counts

API Approach

- Uses 2015 GHGRP data to develop EFs (tonnes/well)
  - Top 8 basins analyzed separately
- Developed EF annually by basin for each reporting year
- % wells venting with and w/out plunger determined using GHGRP count of non-oil wells in denominator
- Extrapolates based on national HPDI non-oil wells

Summary of Analysis for Flare Stacks

EPA Approach

- Calculates the fraction of wells that were gas and oil wells for each facility using the well counts reported in the Equipment Leaks
- Apportions each facility's reported miscellaneous flaring CO_2 and CH_4 emissions by well type
- Extrapolates based on national HPDI gas and oil well counts

API Approach

- Corrected erroneous gas production volumes
- Converts gas production to BOE
- Apportions each facility's reported miscellaneous flaring CO_2 and CH_4 emissions by production
  - Top 8 basins with highest flare stack emissions are analyzed separately
- Extrapolates based on national HPDI production volumes

Summary of Analysis for Completions and Workovers with Hydraulic Fracturing

EPA Approach

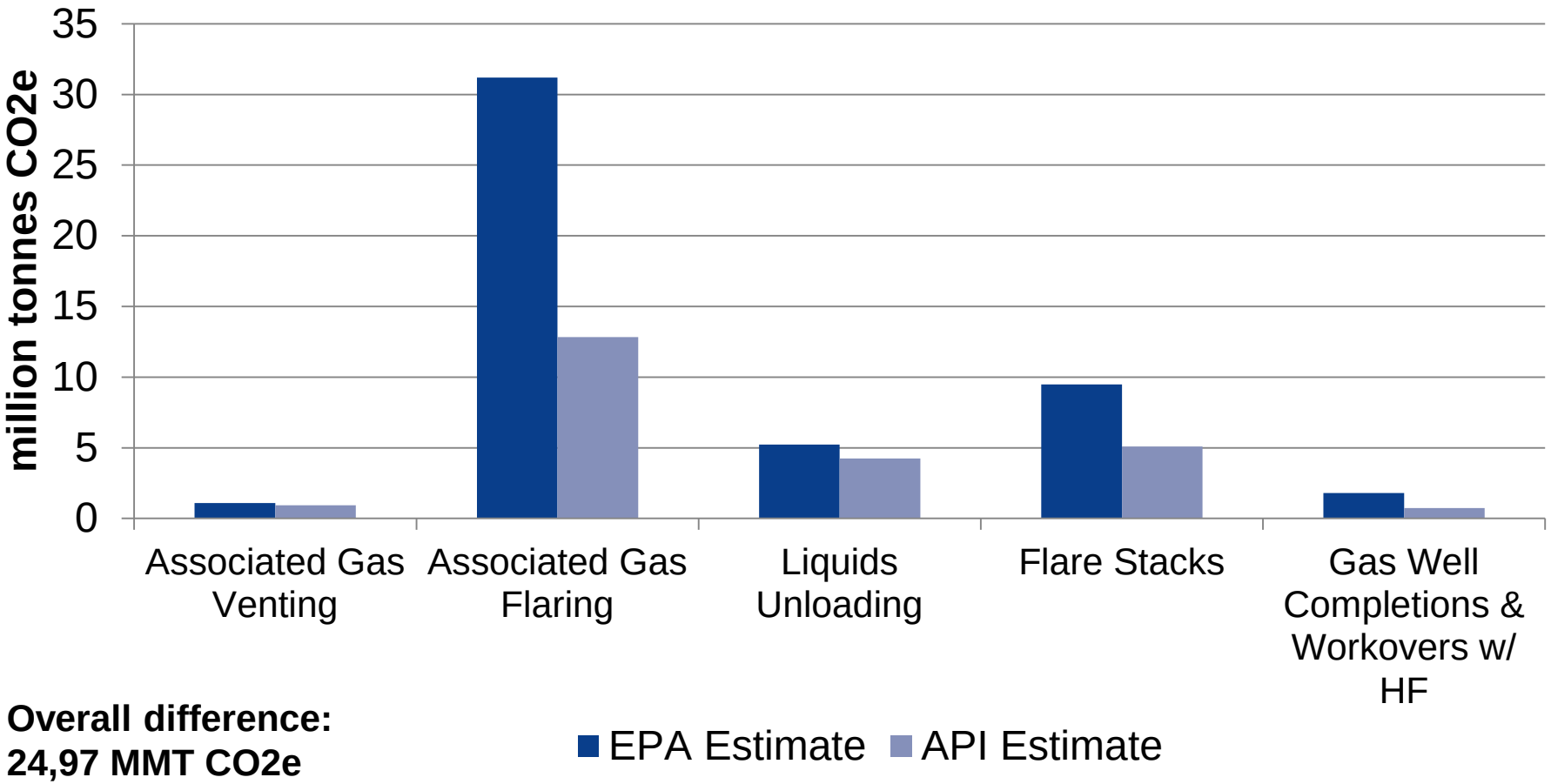
- Developed EFs based on average of 2011-2013 GHGRP data
- Developed emissions data for 4 control categories
- Uses GHGRP event counts for national count
- Uses emissions and events reported for gas and oil formations

API Approach

- Developed EFs annually for each reporting year
- Uses same 4 control categories established by EPA
- Uses GHGRP event counts for national count
- Removed data sets from oil formations

Comparison of API and EPA Emission Estimates for Key Emission Sources

2015 National GHG Emission Comparison, tonnes CO2e



Overall difference:
24,97 MMT CO2e

Other API Activities

- API is evaluating alternative approaches for using GHGRP data from tanks to estimate national emissions

- *API Study:*
  Quantification of Methane Emissions from Process Equipment Leaks and Pneumatic Controllers from U .S. Onshore Oil and Natural Gas Operations

Conclusions and Recommendations

- API appreciates opportunity to work through emission updates with EPA through multiple workshops this year
- Regional differences warrant regional analysis for some emission sources
- Temporal changes warrant annual emissions analysis for more emission sources
- GHGRP data must be screened for data quality issues prior to use