

Oil and Gas Production Segments in the 2016 GHGI

Overview of Methodology
Updates Under Consideration

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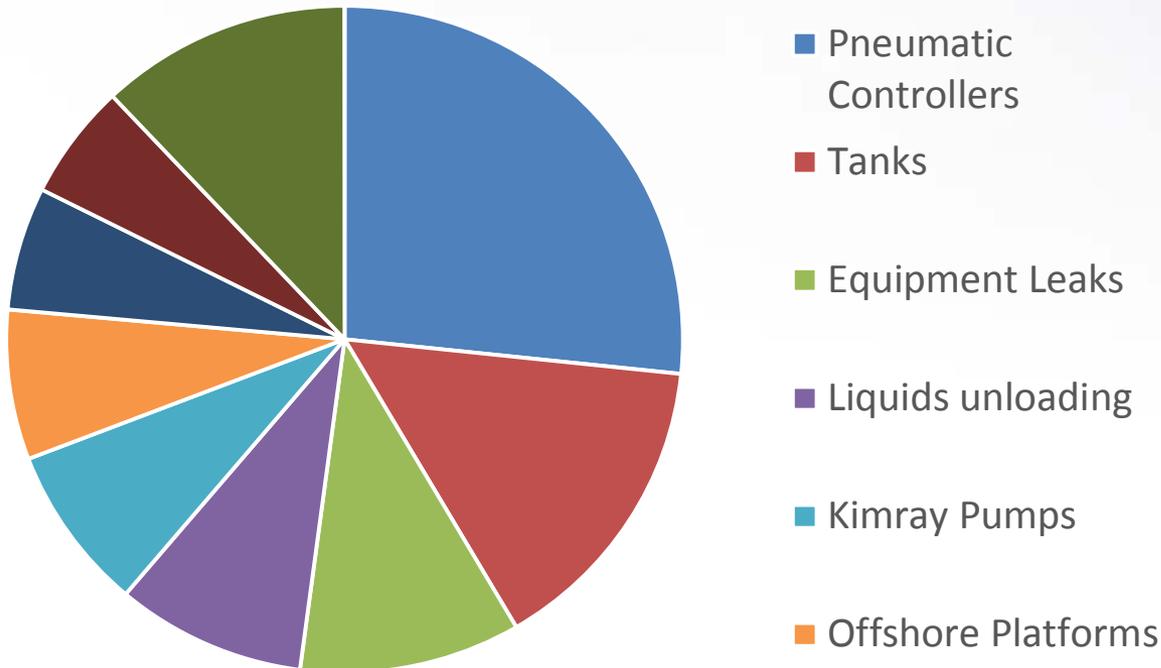


Oil and Gas Production Segments in 2015 GHGI



- 71 MMT CO₂e
- 39% of total natural gas and petroleum systems CH₄ emissions

2013 Production Segment Emissions



Production Segment Emission Sources



- Fugitives
 - Wellheads
 - Separators
 - Heaters
 - Dehydrators
- Vented and combusted
 - **Pneumatic controllers**
 - Well drilling, completions, workovers
 - Pneumatic pumps
 - Dehydrator vents
 - Condensate and oil storage tanks
- Meters/piping
- Compressors
- Heaters/treaters
- Others
 - Gas engines
 - Liquids unloading
 - Flares
 - Blowdowns
 - Upsets
 - Others

Pneumatic Controller Activity Data: Current Inventory Method



- Natural Gas Systems
 - EPA/GRI (1996) study estimate of controllers per well developed for 1992 base year.
- Petroleum Systems
 - Segregated by bleed rate (high versus low).
 - Industry Review Panel established estimate of four devices per heater-treater and three devices per battery without a heater treater; 35% of devices being high bleed.

Fugitives Activity Data: Current Inventory Method



- Natural Gas Systems
 - Non-associated gas wellhead counts calculated from DrillingInfo DI Desktop® for all years
 - Other major equipment (separators, heaters, dehydrators, meters/piping, compressors) counts are driven from EPA/GRI (1996) study estimate based on well counts in a given year relative to 1992 base year.
 - Major equipment activity factors (equipment per well) are segregated by NEMS region (NE, MC, GC, SW, RM, WC).
- Petroleum Systems
 - Wellheads and header counts are calculated based on oil well counts from DrillingInfo DI Desktop®, stripper well counts, and activity factors from EPA/Radian (1999) study.
 - Other major equipment (separators and heater-treaters) counts are driven from EPA/Radian study estimate based on production and well counts in a given year relative to 1993 base year.
 - Major equipment activity factors are segregated by production type (heavy versus light crude).

Subpart W Production Segment Activity Data



- Subpart W collects data from onshore production facilities that meet the 25,000 MT CO₂e reporting threshold.
 - *Facility* definition: On or associated with a single well pad
 - Reporters represent ~500 facilities
 - Reporters (in 2013) represent 425,125 out of estimated 1.3 million active O&G wells
- Pneumatic controller counts are available from all reporters, segregated by bleed rate (high, low, intermittent)
- Subpart W provides data on major equipment counts (used to calculate equipment leak emissions)

Subpart W Production Segment

Activity Data Scale-up Considerations



- Portion of the national population not meeting reporting threshold
 - Assess year to year variation
- Allocation to natural gas and petroleum systems
 - EPA is considering using reported number of sub-basins of each production type to allocate wellhead, pneumatic controller, and other equipment counts accordingly
- *Example: A simplistic approach to scale-up.* Assume that since the subpart W data set represents X% of active wells, then subpart W represents the same proportion of other national equipment counts (i.e., that the ratio of each type of equipment-per-wellhead is the same for non-reporting wells as it is for reporting wells).



Example: Simple Scale-Up

Using 2013 GHGRP Data

- Use of well count coverage in 2013 data
- Assume that subpart W equipment per well is representative of equipment per well for non-reporters
- Does not make distinction between natural gas and petroleum
- Other approaches could lead to higher or lower results

Equipment	2015 Inventory	Subpart W (Reported)	Subpart W Scaled
Total: Pneumatic Controllers	911,474	707,974	2,190,237
Total: Wellheads	1,315,196	425,125	1,315,196
Total: Separators	388,222	243,531	753,404
NG: Heaters	107,735	49,319	152,577
NG: Dehydrators	62,919	7,974	24,669
NG: Meters/piping	390,586	222,802	689,276
NG: Compressors	35,354	21,318	65,951
Petro: Heater-treaters	84,262	26,350	81,518
Petro: Headers	92,395	32,559	100,727

Requests for Stakeholder Feedback: Subpart W Production Segment AD Scale-up



- What other approaches are available for scaling up subpart W data for use in the Inventory?
- Are there specific subpopulations for which subpart W average information should not be used or should be modified?
 - E.g. smaller well sites, stripper wells
- Are data sources available that could be used to determine key characteristics of the non-reporting population?
- Are there other approaches available for allocating subpart W activity factors (e.g., counts per well) between oil and gas?
- How should EPA account for geographic variation in subpart W data (by AAPG basin, by NEMS region, etc.)?
- How should EPA account for year-to-year variation in subpart W data?

Requests for Stakeholder Feedback: Other Revisions Under Consideration



- HF oil well completions and workovers
 - “Potential” emission factor calculated in 2015 NSPS OOOO proposal
 - AD from DI Desktop
- Emission Factors
 - Pneumatic controllers
 - GHGRP allows for categorization of activity data and emission calculations into three bleed rate categories
 - Could use GHGRP split and apply GHGRP emission factors
 - Other sources
 - GHGRP factors
 - Factors from new study data
- Abandoned wells
 - Review of available activity and emissions data
- Super-emitters