

Natural Gas in the GHG Inventory

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Overview

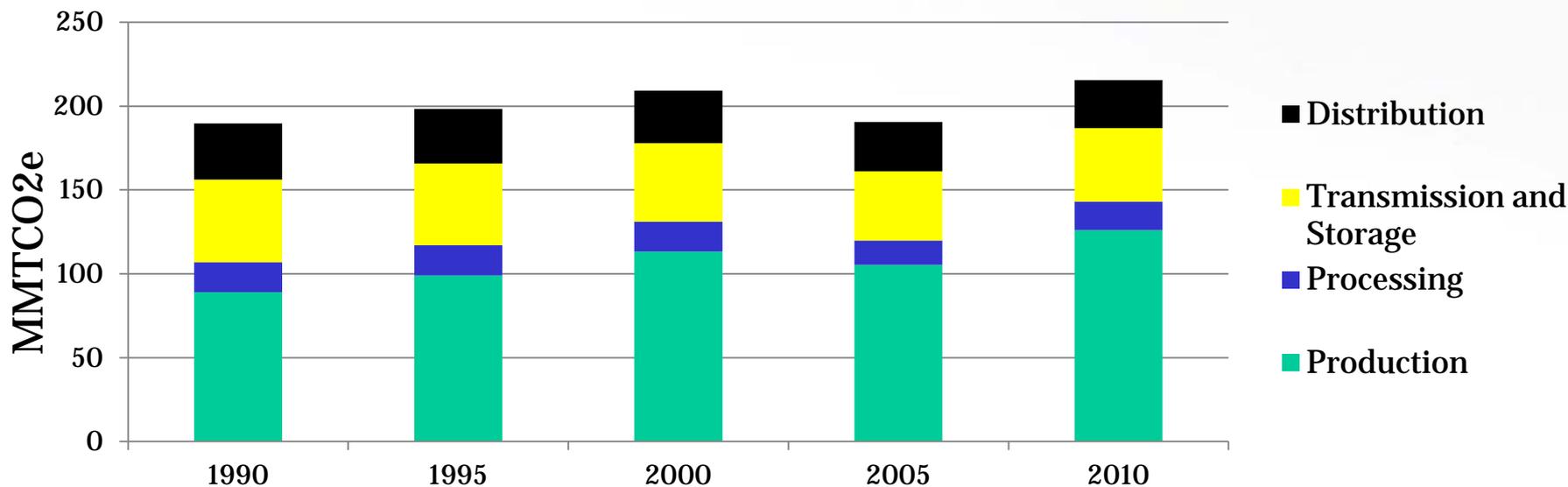


- Natural Gas in the GHG inventory
- General Methodology
- Calculation of National GHG Emissions
- Emission Factors and Activity Data Sources
- Updates in 2011 Inventory
- 2012 and 2013 Inventories

Natural Gas in the GHG Inventory



- 215.4 MMTCO_{2e} CH₄ emissions from natural gas systems
 - 126.0 from production sector
 - 17.1 from processing sector
 - 43.8 from transmission and storage sector
 - 28.5 from distribution sector
- 32% of total U.S. CH₄ emissions; 3% of total U.S. GHG emissions
- Emissions increased 25.8 MMTCO_{2e}, or 13.6%, from 1990-2010
 - Key driver of increase is increased production of natural gas



(2012 Inventory)

Calculation of National Emissions



Step 1. Calculate Potential Methane--*Collect activity data on production and equipment in use and apply emission factors (i.e., scf gas per unit or activity)*

- 1a – Activity Data
- 1b – Emission Factor

Step 2. Compile Reductions Data--*Calculate the amount of the methane that is not emitted, using data on voluntary action and State regulations*

- 2a – Voluntary Reductions Reported to GasStar
- 2b – Regulatory Reductions

Step 3. Calculate Net Emissions--*Deduct methane that is not emitted from the total methane potential estimates to develop net CH4 emissions*

Example: 2010 Emissions from pneumatic devices in transmission sector (2012 Inventory)

Activity Data (# of pneumatics)	Emission Factor (Scf/device)	Calculated Potential (MMTCO ₂ e)	Reductions (MMTCO ₂ e)	Emissions (MMTCO ₂ e)
71,130	x 162,197	= 4.7	- 1.0	= 3.7



Step 1. Calculate Potential Methane Emission Factors and Activity Data Sources

Activity Data (AD) × Emission Factor (EF) = Calculated Potential

- Calculated potential represents methane release in the absence of application of any control technologies or practices
- Inventory uses primarily EPA/GRI (1996)
 - Emissions factors, activity data
- Annual activity data from many sources
 - E.g. EIA, Oil and Gas Journal, BOEMRE, HPDI
- For sources without updated activity data, annual activity data calculated by scaling through use of “drivers”
 - Example: Centrifugal compressors in processing sector
- For some sources, updated emission factors were developed
 - E.g., liquids unloading, storage tanks, completions and workovers at wells with hydraulic fracturing

Step 2. Compile Reductions Data



- Voluntary Reductions
 - EPA Natural Gas STAR Program
 - Partnership between EPA and U.S. oil and natural gas industry started in 1993
 - Collaboration on implementation of methane emissions reducing technologies and practices
 - Partners report voluntary emission reductions on a wide range of activities that reduce methane emissions
- Regulatory Reductions
 - State regulations resulting in emissions reductions

Step 3. Calculate Net Emissions



**Calculated Potential – Voluntary Reductions – Regulatory Reductions
= Net Emissions**

- Emissions totals in the Inventory are net emissions
- Deduction of reductions
 - Match Gas STAR reductions to certain emissions source, and deduct them
 - For others, reductions are summed and deducted at the sector-level
 - Some reports include emissions reductions across multiple activities included in the Inventory for each sector
 - Regulatory reductions are matched with specific Inventory activities
- Approach allows incorporation of annual data on emissions reductions
 - Shows increases and decreases in emissions over time
 - Shows where reductions are occurring
 - Key UNFCCC requirement

Updates in 2011 Inventory



- Based on new data from Gas STAR and other sources and analyses, EPA updated Inventory
 - Updates from EPA/GRI (1996) factors and data
 - Increased emission estimates for the natural gas sector by 120% (compared to the 2010 Inventory)

Emissions Source	Update	Impact
Liquids unloading (Production)	•Applied new method, emission factor	Large increase in emissions
Well completions with hydraulic fracturing (Production)	•Differentiated between wells with and without hydraulic fracturing •Applied new emission factor	Small increase in emissions
Condensate storage tanks (Production)	•Applied new emission factor and method to account for leaks from malfunctions	Small increase in emissions
Centrifugal compressor seals (T&S, Processing)	•Applied separate emission factors for wet and dry seals	Small increase in emissions

2012 and 2013 Inventories



- **2012 Inventory**
 - Calculated emissions for natural gas sector using the same methodologies, emission factors, and sources of activity data as the 2010 Inventory

- **2013 Inventory**
 - Considering a number of potential improvements
 - Discussed in upcoming presentations
 - Seeking updated information from stakeholders
 - Availability of new data and information
 - Recommendations for documenting methods in the GHG Inventory