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Methane

A Status Report from MDE

Maryland Commission on Climate Change

Joint Meeting - Scientific & Technical and Mitigation Working Groups

June 27, 2016

Discussion Topics

- Methane – An overview
  - A snapshot of Maryland's methane inventory
- EPA Initiatives
- Initiatives in other states
- What's going on in Maryland?

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Methane – The Basics

- Methane (CH_4) is the second most prevalent greenhouse gas emitted in the U.S. from human activities
- The atmospheric lifetime of methane is much shorter than carbon dioxide (CO_2)
- On a per unit basis, methane is at least 25 times more potent at trapping heat in the atmosphere than CO_2 over a 100 year period, and about 85 times more potent over a 20 year period
- According to the EPA, methane accounted for about 10.6% of all U.S. greenhouse gas emissions in 2014

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Global Warming Potential

- CO_2 has a Global Warming Potential (GWP) of 1
  - CO_2 is the baseline unit to which all other greenhouse gases are compared
- Equivalent CO_2 (CO_2e) is the concentration of CO_2 that would cause the same level of radiative forcing
- Maryland used the Intergovernmental Panel on Climate Change (IPCC) 100 year GWP in the 2011 inventory
  - Carbon Dioxide: 1
  - Methane: 21
- IPCC GWP revised periodically

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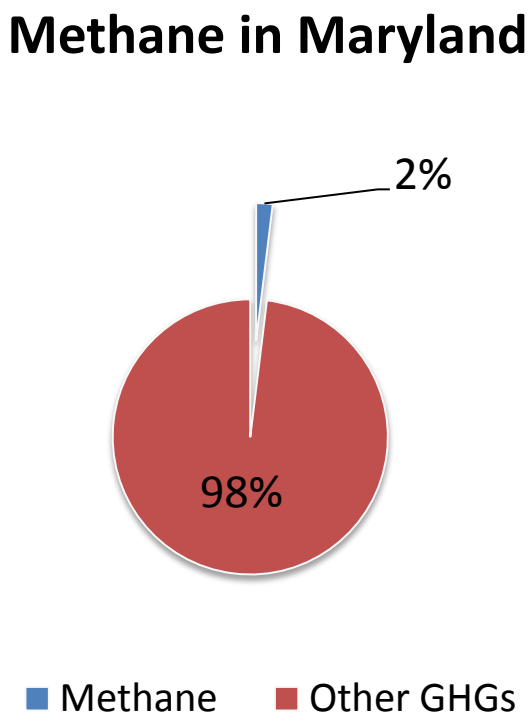
Current MD Inventory - A Snapshot

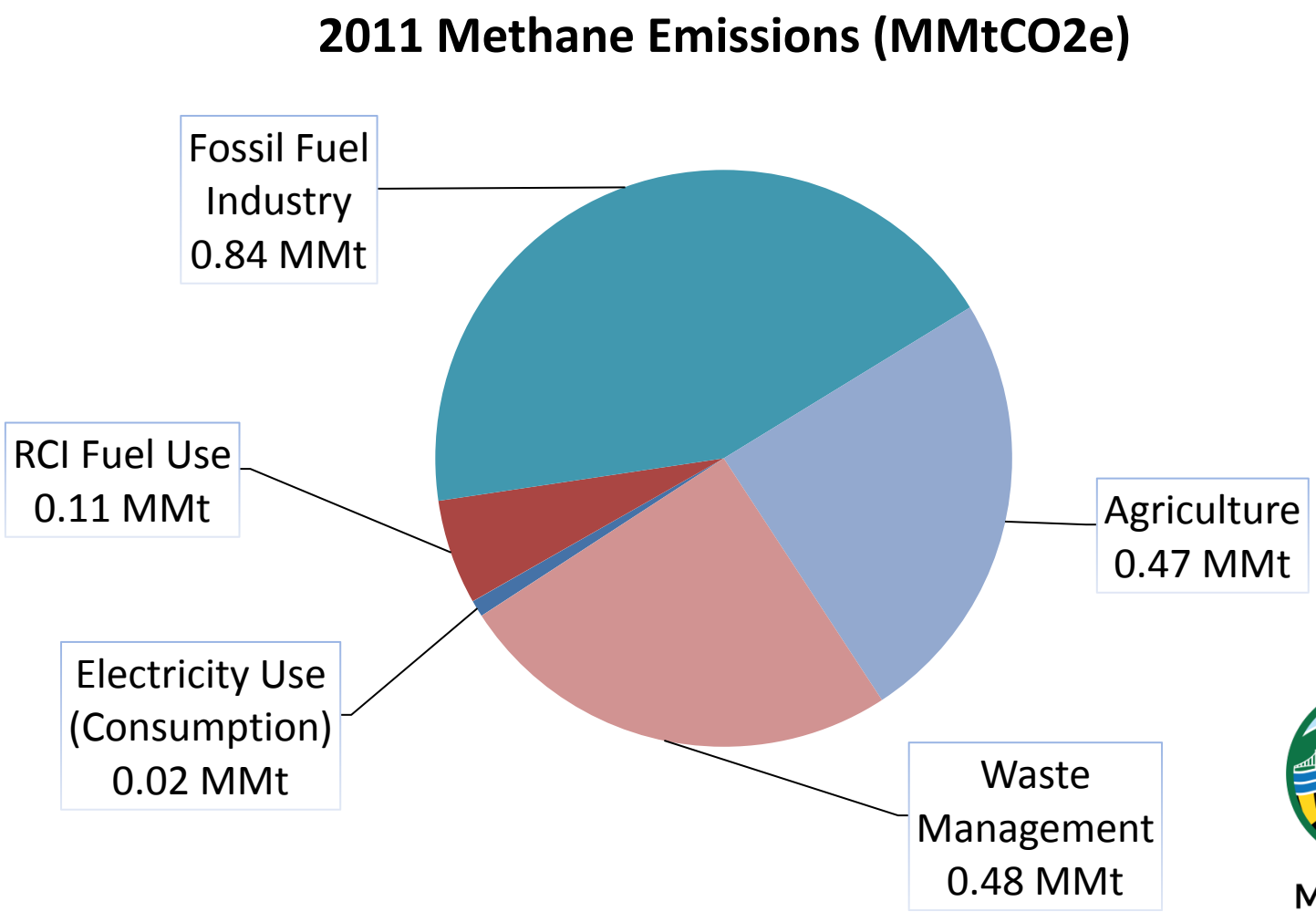
Methane vs. Total GHG Emissions in Maryland

2011 Emissions (MMt CO_2e)		
Sector	**Methane**	**Other GHGs**
Electricity Use (Consumption)	0.02	37.86
RCI Fuel Use	0.11	17.00
Transportation – Onroad	0.00	28.25
Transportation – Nonroad	0.00	7.02
Fossil Fuel Industry	0.84	0.84
Industrial Processes	0.00	4.40
Agriculture	0.47	1.66
Waste Management	0.48	2.26
Total Emissions	1.92	99.28



The Maryland inventory is currently being updated. Methane will be one of the key areas to look at more deeply.

MD Methane by Key Sector



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Reducing Methane Emissions

- Over the past two years, this has been one of the hottest topics in the air pollution world
- Tremendous amount of activity and considerable progress
- Three examples of these efforts
  - EPA initiatives
  - Pennsylvania's efforts
  - Colorado's recent progress

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EPA Initiatives

- EPA's actions include three final rules that together will reduce emissions of methane (and other pollutants) from new, reconstructed, and modified sources in the oil and natural gas sector
  - New Source Performance Standard (NSPS) - 40 CFR part 60, subpart OOOO
- The regulations target the fracking industry and associated infrastructure
  - Finalized on 5/12/2016
  - The rule could reduce methane emissions by 45% from 2012 levels by 2025
- New source rules serve as a prelude to further regulations of existing sources
- EPA's three final rules will provide greater certainty about permitting requirements for sources of methane

For more information on EPA initiatives see:
https://www3.epa.gov/airquality/oilandgas/methane.html
https://www.whitehouse.gov/sites/default/files/strategy_to_reduce_methane_emissions_2014-03-28_final.pdf

EPA Standards for New Sources

- NSPS Subpart OOOO covers:
  - Well sites
  - Compressor stations
  - Gathering and boosting stations
  - Natural gas processing plants

- The NSPS imposes leak detection and repair ("LDAR") requirements at the well sites and sources downstream of well sites (including leakage)
  - Owners or operators will be required to develop and implement leak monitoring plans and repair leaks within specified timeframes

- The NSPS also covers reduced emissions completions of wells (green completions)

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Standards for Existing Sources

A work in progress

- EPA issued a draft Information Collection Request (ICR), indicating that existing source regulations are being developed
- The draft ICR seeks information on existing sources:
  - specifically the nature and cost of technologies currently being utilized to reduce methane emissions
- Owners are required to provide the following information:
  - configurations of the control technologies
  - the feasibility and costs of installation and upgrading or retrofitting controls
  - frequency of staffing or visiting sites
- EPA plans to issue a voluntary request for information, seeking information on efficient strategies that can accurately locate, measure, and mitigate fugitive methane emissions cost-effectively
- EPA schedule pushes to address existing sources with new regulations as expeditiously as possible

Pennsylvania's Initiative

Recently Updated Regulations

- Pennsylvania Governor Wolf has identified the need to address methane leakage as a major environmental initiative in Pennsylvania
- On January 20, 2016, Pennsylvania announced a strategy to reduce methane emissions from the Oil and Natural Gas Industry
- Requires compliance with EPA requirements
- Enhances General Permits for fracking operations:
  - Updated Best Available Technology (BAT) requirements including leak detection and repair (LDAR) for new sources
  - Amends requirements for affected sources
  - Expands the applicability to include sources located at NG transmission stations
- New General Permit to replace earlier exemptions for unconventional wells

For more information on PA initiatives see:
http://www.dep.pa.gov/Business/Air/Pages/Methane-Reduction-Strategy.aspx

Colorado's Initiative

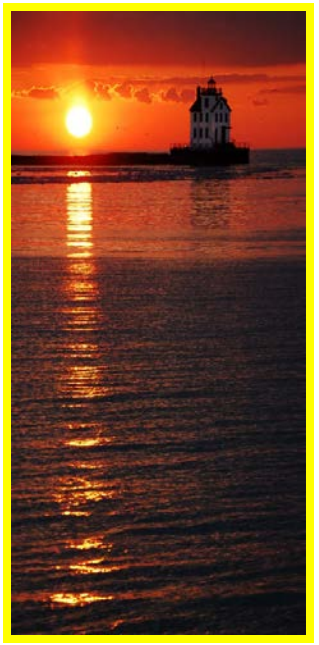
- Series of strengthening rulemakings for the oil and gas industry between 2004 and 2012

- More recently … 2014 to 2016
  - Fully adopted EPA NSPS as well as other improvements to Colorado's oil and gas emission regulations
  - Included a wide range of regulatory requirements aimed at reducing volatile organic compound (VOC) and methane emissions from the oil and gas production sector
  - Included revisions to Colorado's Fracking Regulations
    - The revisions focus on identifying and repairing methane leaks, and contain recordkeeping and reporting requirements
  - About 64,000 tons per year of Methane reduction potential

For more information on Colorado initiatives see:
https://www.colorado.gov/pacific/cdphe/summary-oil-and-gas-emissions-requirements

Maryland's Status

- MDE working on regulation updates to better address methane leakage from existing sources
  - Compressor stations, landfills, more
- Carefully following federal action and action in other states to ensure reductions at upwind sources
- Updated fracking regulations:
  - Maryland established a 2 year moratorium on fracking that became law on May 30, 2015. The ban is in effect until October 2017
  - The bill requires updated Maryland fracking regulations by the time the ban is lifted
  - Public meetings scheduled (1st of 3 occurred on June 22) provided an update on the process to update the Maryland fracking regulations



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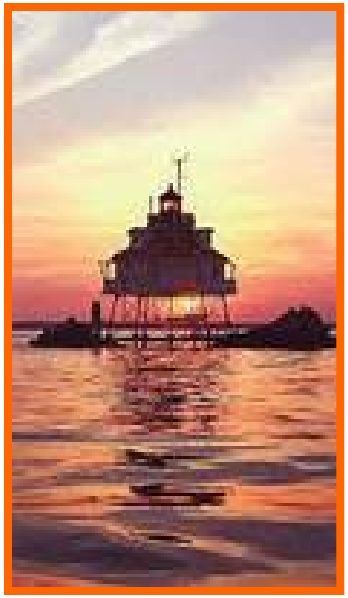
Key Emission Related Requirements

Fracking White Papers

- MDE has released 3 white papers on the updated fracking regulations - much more than air emissions
- Current MDE thinking on methane leakage related fracking requirements:
  - Top-Down Best Available Control Technology (BACT) required - all emitting equipment and leaks
    - Includes comprehensive LDAR programs
  - Methane offset requirement
  - State sponsored air monitoring
  - Compliance with State air toxics requirements



For more information on Maryland's status see:
http://www.mde.state.md.us/programs/Land/mining/marcellus/Pages/index.aspx

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Questions ?