



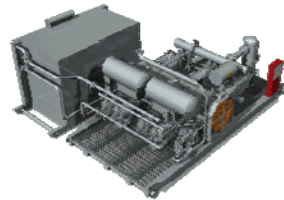
Maryland
Department of
the Environment

Minimizing Methane Leakage in Maryland

Step 2 - Natural Gas Transmission & Storage

Stakeholder Meeting # 2

July 10, 2018



Meeting Agenda

- **Today's agenda is basically divided into 2 pieces**
 - 45 minutes for MDE to provide and overview of methane emission reduction requirements**
 - 1 hour and 15 minutes for comments and discussion**
- **Because of this, we will be holding all comments until after the MDE briefing is completed**
- **Use your name card**



Purpose of Today's Meeting

To identify and take comment (written comments are welcome as well) on MDE's current thinking on reducing methane emissions from the natural gas transmission and storage sector

- Multiple emission reduction practices
- Environmental assessment and reporting requirements
- Some regulatory ... some through non-regulatory agreements that include data reporting that demonstrate effectiveness
- Builds from
 - Other state rules like CO, CA and PA
 - Federal efforts and current or future federal rules
 - EPA Natural Gas STAR, Methane Challenge Programs, ONE Future, Quad Oa
 - Comments and documents prepared by the environmental advocacy community
 - Maryland stakeholders
- Over the past year MDE has discussed many issues with stakeholders at 1 on 1 meetings
- To be implemented ASAP but no later than the end of 2018

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Background

Methane – The Basics

- Methane is the second most prevalent greenhouse gas (GHG) emitted in the U.S. from human activities
- The atmospheric lifetime of methane is about 10 years which is much shorter than carbon dioxide (CO₂) which can remain in the atmosphere for up to 200 years
- On a per unit basis, methane is at least 25 times more potent at trapping heat in the atmosphere than CO₂ over a 100 year period, and about 72 times more potent over a 20 year period
- Methane accounts for about 10% of all U.S. greenhouse gas emissions from human activities*



* EPA 2016 estimate

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Why the Concern Over Methane?

- Maryland and many other states are making significant progress in reducing the primary GHG - CO₂
 - This is partially linked to shifts in the energy sector driven by low cost natural gas (composed mostly of methane)
 - Methane is 25 times more efficient at trapping radiation compared to CO₂
- States like Maryland are also pushing to reduce other “short-lived” climate pollutants like methane and black carbon
 - A recently announced initiative of the U.S. Climate Alliance that Maryland is a part of ... The Short-Lived Climate Pollutant Challenge
- Increased use of natural gas has led to increased methane emissions
 - NG industry is Maryland's largest source of methane emissions
 - Significant, cost-effective methane reduction opportunities exist
- A major issue discussed as part of the Maryland Climate Change Commission (MCCC) process

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Maryland Commission on Climate Change

- Originated in 2007 under Executive Order
- Developed the 2008 Maryland “Climate Action Plan” which led to the “Greenhouse Gas Emission Reduction Act” of 2009
- MCCC codified into law in 2015
 - Recommended enhancements to the 2009 GGRA
 - Reauthorized by the General Assembly in 2016 to add an additional goal to GGRA for 2030
 - 40 % GHG reduction by 2030
 - The act also requires that the plan support a healthy economy and create new jobs
- Basic charge of the Commission:
 - Provide recommendations on how to reduce GHG emissions and develop plans responding to the impact of climate change

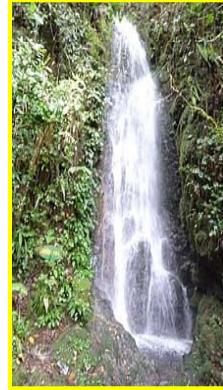


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MCCC on Methane

- The MCCC, through its Mitigation Working Group (MWG), recommended that Maryland should reduce methane emissions from landfills, natural gas infrastructure (e.g. compressor stations and underground storage), and waste water treatment plants
- The MWG recommend that MDE continue to pursue the most locally relevant and complete methods for calculating a GHG emission inventory including the life-cycle emissions generated by out-of-state extraction, processing, and transportation of fossil fuels based on in-state consumption (both direct consumption of fuel as well as fuel used to generate electricity which is then consumed in-state)
- The MWG recommend that the Commission and the State strongly support the need for robust Federal regulations and strong regulations in other states to minimize out-of-state methane emissions



Copies of key MCCC recommendations on methane are in your packet

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Key Methane Efforts in Maryland

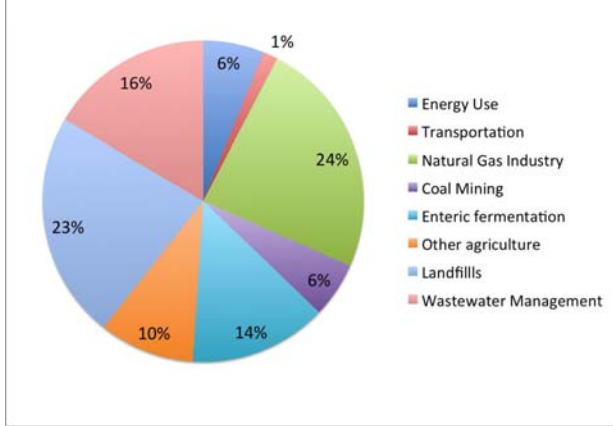
- Ban on hydraulic fracturing - A major first step
 - Adopted by Governor in April 2017
- Reducing methane leakage in Maryland
 - Focused on three largest in state emission categories
 - Compressor stations
 - Landfills
 - Waste water treatment plants
 - A significant second step
- Addressing upstream methane leakage - A third effort
 - Estimates of upstream emissions being included as a complementary data set while MDE is developing GHG inventories for the 40 by 30 goal
 - Will be reviewed by MCCC and Mitigation Working Group and used to support efforts to go beyond the 40% by 2030 target in current law
 - Beyond 40 by 30 is encouraged - must also support economic improvement and job creation
 - Maryland and many other states are also challenging EPA in Court over federal rules for new and existing sources in the natural gas sector

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Maryland Methane Emissions

Maryland Methane Emissions, By Source



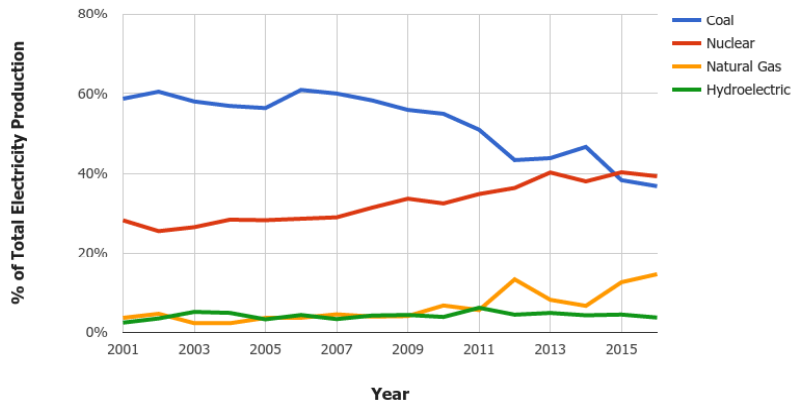
Sources of methane emissions in Maryland based on the Maryland Department of the Environment's 2014 GHG Emissions Inventory.

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Natural Gas in the Maryland Power Sector

Maryland Energy Mix



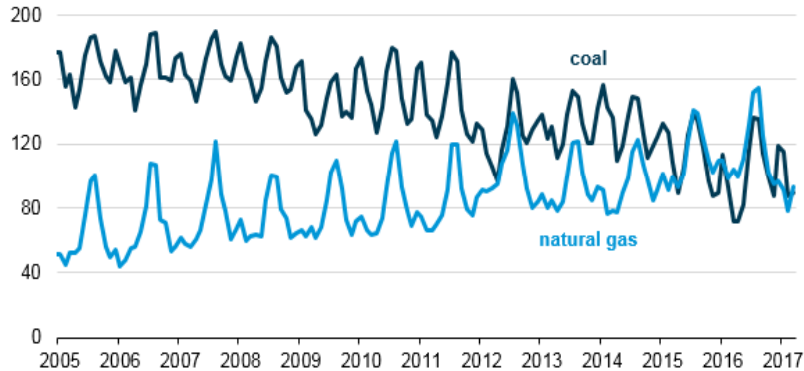
Source: U.S. Energy Information Administration, 2016



Natural Gas Nationally

In 2016, natural gas surpassed coal as the leading generation source in the US

Monthly U.S. net electricity generation from coal and natural gas (Jan 2005-Mar 2017) eia
million megawatthours

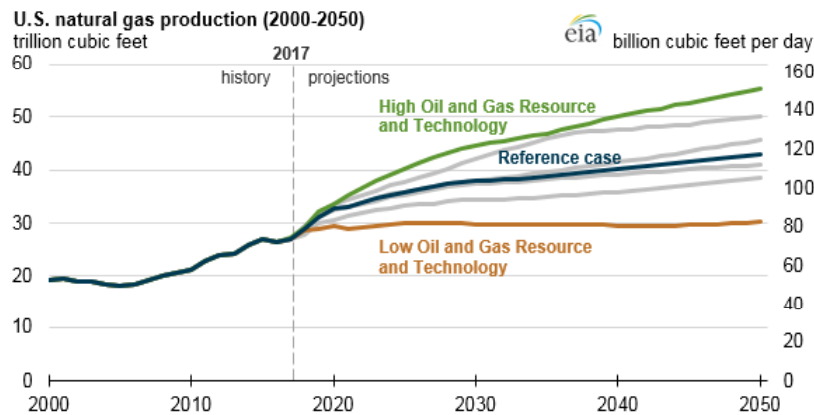


Source: U.S. Energy Information Administration, *Electric Power Monthly*



Continued Growth

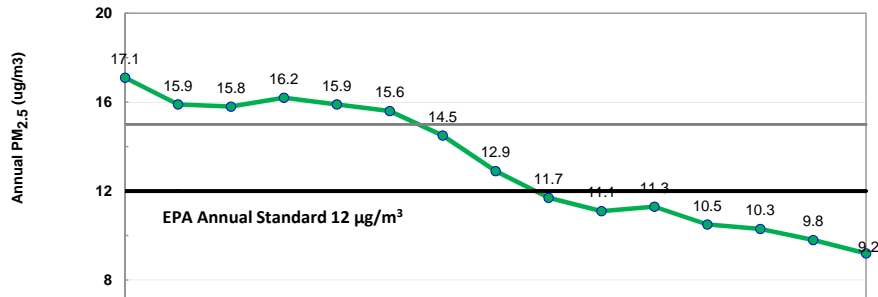
US Natural Gas Production and Consumption are Expected to Keep Rising



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2018*



Natural Gas and Improved Air Quality - Fine Particles

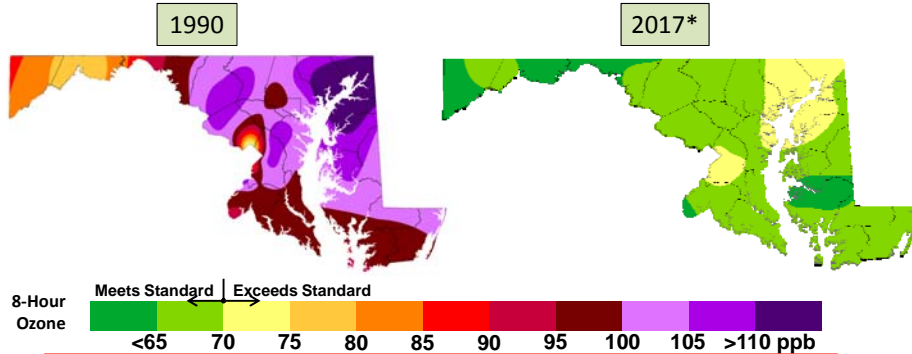


- Since 2012, Maryland has been attaining the daily and annual fine particle standards across the state
- Fine particulate levels continue to trend downward
- This is a major success story as the health risks associated with fine particulate are very significant
- Increased use of natural gas across the East has played a major role in this progress

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Maryland's Shrinking Ozone Problem



- Maryland is on the verge of attaining the most recent standard for ground level ozone (70 ppb)
- For the last five years, we have seen nitrogen oxide (NOx) emissions drop dramatically each year
- Increased use of natural gas across the East has played a major role in reducing NOx emissions and lowering ozone levels

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What Will Be in Each Facility's Methane Emission Reduction Plan?

- Six Key Areas Covered by Each Facility's Methane Emission Reduction Plan
 - Fugitive Emissions
 - Data collection and reporting
 - Compressors and pneumatic devices
 - Other emission sources
 - Fence-line measurements
 - Offsets

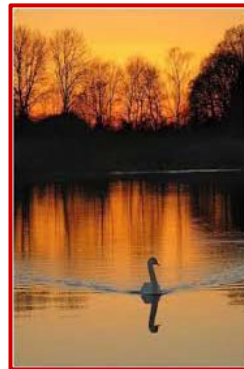


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Facilities Required to Have A Methane Emission Reduction Plan

- Dominion Charles Station
- Dominion Cove Point
- Dominion Myersville
- Texas Eastern Spectra Accident
- Trans Canada Rutledge
- Transco Ellicott City



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Overview of Requirements

- The following 6 tables provide a snapshot of what will be requested from each of the facilities
- The tables also begin to identify which requirements will be included in regulations and which will be required as part of data driven, non-regulatory agreements
- Some measures may be unique to a specific facility
- Some measures will work best at newer facilities but will still be required at older facilities

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Reducing Leaking Methane

Addressing fugitive emission leaks and implementing other control practices can be highly cost-effective

- MDE requirements built from efforts in other states, private sector initiatives in Maryland and elsewhere, analyses and recommendations from environmental advocacy groups and community organizations and EPA
- Facilities must implement a Leak Detection and Repair (LDAR) program and other controls that include monitoring, record keeping and reporting quantifies emission reductions
- Methane recovery techniques can provide economic and environmental benefits, in addition to operational and maintenance improvements, cost savings, and enhanced safety
- Recent studies indicate that there are practical, cost-effective solutions to fugitive leaks available now, and mitigation programs that include data collection will help the public and private sector develop new strategies
- Short-term climate impacts from methane emissions are a real threat - there's little time to waste if we want to avoid the worst of the impacts

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Requirements Under the Maryland Methane Emission Reduction Plan

Fugitive Emission Controls

An LDAR program shall include these basic elements→	Quarterly survey using infrared camera or Method 21	Repair w/in 30 days if visible (camera) or >500 ppm	Delay of repair provisions	Must include monitoring, record keeping and reporting conditions	Opportunity to utilize advanced technology for measurement
Charles Station	X	X	X	X	X
Cove Point	X	X	X	X	X
Myersville	X	X	X	X	X
Transco	X	X	X	X	X
Texas Eastern	X	X	X	X	X
TransCanada	X	X	X	X	X

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Requirements Under the Maryland Methane Emission Reduction Plan (continued)

Data Collection and Reporting

	Initial Survey	Quarterly Inspection	Repair/Replacement Reports	Annual Summary Report with update on Progress
Charles Station	X	X	X	X
Cove Point	X	X	X	X
Myersville	X	X	X	X
Transco	X	X	X	X
Texas Eastern	X	X	X	X
TransCanada	X	X	X	X

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Requirements Under the Maryland Methane Emission Reduction Plan (continued)

Compressors and Pneumatic Devices

Just Examples →	Reducing emissions from Blowdowns and Shutdowns	Replacing wet seals with dry seals in centrifugal compressors, if applicable	Replacement of Reciprocating Compressor Rod Packing Systems, if applicable	Convert pneumatic control to instrument air, if applicable	Replacement of high-bleed devices with low-bleed devices, if applicable
Charles Station	X	NA	NA	X	X
Cove Point	X	NA	X	NA	X
Myersville	X	NA	NA	X	X
Transco	X	X	X	X	X
Texas Eastern	X	NA	X	X	X
TransCanada	X	X	NA	NA	X

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Requirements Under the Maryland Methane Emission Reduction Plan (continued)

Other Emission Sources

Emission reduction opportunities not in 2 previous tables →	Emission reduction requirements for Storage Tanks w/ VOC > 6TPY	Consider Installation of electronic flare ignition devices	Installing Yale Closures, if applicable	Consider Elimination of unnecessary auxiliary equipment	Using pipeline pump-down techniques to lower gas line pressure before maintenance
Charles Station	X	X	X	X	X
Cove Point	X	X	X	X	X
Myersville	X	X	X	X	X
Transco	X	X	X	X	X
Texas Eastern	X	X	X	X	X
TransCanada	X	X	X	X	X

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Requirements Under the Maryland Methane Emission Reduction Plan (continued)

Ambient Fenceline Measurements (Sensors)

	Applicability	Regulation or Data Driven Agreement?	Methane and other Pollutants	Average 5 Year Annual Cost Cap at \$5,000
Charles Station	Yes	Agreement to start	Y	Y
Cove Point	Yes	Agreement to start	Y	Y
Myersville	Yes	Agreement to start	Y	Y
Transco	Yes	Agreement to start	Y	Y
Texas Eastern	Yes	Agreement to start	Y	Y
TransCanada	Yes	Agreement to start	Y	Y

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Ambient Fenceline Measurements

- Focusing on low cost sensors
- Methane and other air pollutants
- Cost cap of 5-year average annual cost of \$5000
- To be developed by facilities in consultation with community members and MDE



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Requirements Under the Maryland Methane Emission Reduction Plan (continued)

Methane or Other Greenhouse Gas (GHG) Emission Offsets

	Applicability	Regulation or Data Driven Agreement?	Average 5 Year Annual Cost Cap at \$5,000
Charles Station	Yes	Agreement to start	Y
Cove Point	Yes	Agreement to start	Y
Myersville	Yes	Agreement to start	Y
Transco	Yes	Agreement to start	Y
Texas Eastern	Yes	Agreement to start	Y
TransCanada	Yes	Agreement to start	Y

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Methane or other GHG Emission Offsets

- Recognize that this is controversial
 - Looking for comments from all on this piece
- Designed to provide major incentive to minimize leaking methane emissions
- Preference for methane offsets but reductions of other GHG emissions could be used
 - Linkage to RGGI
- Cost cap of 5-year average annual cost of no more than \$5000
- Landfill methane capture as an example of an available offset (MD approved an offset project in 2017)

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Regulations or Data Driven Non-Regulatory Agreements?

- Probably a bit of both
- MDE requesting comment on this issue for each of the requirements described earlier
 - During today's meeting and in writing
- Some of the requirements may start off as non-regulatory, data driven agreements and be phased into regulations at a later date



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Next Steps - Timing

- Stakeholders provide comments today ... or in writing at a later date
 - Always open to 1-on-1 meetings
- Review draft regulations and templates for data driven, non-regulatory agreements at stakeholder meeting in September
- Non-regulatory agreements signed in November and December
- Regulations proposed in December
- Maryland Methane Emission Reduction Program for the natural gas transmission and storage sector begins generating results by the end of 2018

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Questions



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