Reducing Methane from the Oil and Natural Gas Source Category

NOVEMBER 2, 2021
EPA’s Proposal for the Oil and Natural Gas Source Category

On November 2, 2021, EPA issued a proposed rule to reduce climate- and health-harming pollution from the oil and natural gas industry.

EPA’s proposal would:

• Secure major climate and health benefits for all Americans
• Expand and strengthen emissions reduction requirements for new, modified and reconstructed sources in the oil and natural gas industry
• Require states to minimize or eliminate pollution from hundreds of thousands of existing sources nationwide
• Encourage the use of innovative monitoring technologies and other cutting-edge solutions
Overview of Proposal Impacts

EPA’s proposal would:

• Yield nearly $4.5 billion in climate benefits a year, totaling $48 to $49 billion from 2023 through 2035 – after factoring in costs

• Increase recovery of natural gas that otherwise would go to waste, valued at $690 million in 2030 alone

• By 2035, reduce approximately:
  o 41 million tons of methane emissions (equivalent to 920 million metric tons of CO₂)
  o 12 million tons of smog-forming VOC emissions
  o 480,000 tons of air toxics emissions
Greenhouse Gases

Greenhouse gases trap heat in the atmosphere.

People have added greenhouse gases to the atmosphere by burning fossil fuels and other activities.

The Earth’s climate is changing because of increasing concentrations of greenhouse gases in the atmosphere.

Methane is a potent greenhouse gas.
Climate Change Affects Everyone

- Climate change affects all Americans, regardless of socioeconomic status, and many impacts are projected to worsen as temperatures and sea levels continue to rise, snow and rainfall patterns shift, and some extreme weather events become more common.

- At the same time, climate change is projected to have disproportionate and unequal risks on communities that are least able to anticipate, cope with, and recover from adverse impacts.
Methane is a greenhouse gas that traps at least 25 times as much heat as carbon dioxide.

Methane emissions are responsible for about a third of the warming due to human emissions of greenhouse gases.

Reducing methane emissions will slow the rate of climate change.
Global Atmospheric Concentrations of Methane Are Unprecedented

Global atmospheric concentrations of methane are unprecedented compared with the past 800,000 years.

The concentration of methane in the atmosphere has more than doubled since pre-industrial times, mostly due to agriculture and fossil fuel use.

This figure shows concentrations of methane in the atmosphere from hundreds of thousands of years ago through 2019, measured in parts per billion (ppb). The data come from a variety of historical ice core studies and recent air monitoring sites around the world. Each line represents a different data source.

Data source: Compilation of five underlying datasets.
The oil and gas sector is the **largest industrial source of methane emissions** in the United States.

The oil and gas sector also emits other harmful pollutants, like smog-forming volatile organic compounds, and toxic chemicals like benzene.
Crude Oil and Natural Gas Industry: Where EPA’s Proposed Methane Rules Would Apply

**Production & Processing**
EPA's methane proposal covers equipment & processes at:
1. Onshore well sites
2. Storage tank batteries
3. Gathering & boosting compressor stations
4. Natural gas processing plants

**Natural Gas Transmission & Storage**
EPA's methane proposal covers equipment & processes at:
5. Compressor stations
6. Storage tank batteries

**Distribution**
(not covered by EPA rules)
7. Distribution mains/services
8. City gate
9. Regulators and meters for customers

Figure: Adapted from American Gas Association and EPA Natural Gas STAR Program
Executive Order 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

To improve public health and protect our environment

To ensure access to clean air and water

To limit exposure to dangerous chemicals and pesticides

To hold polluters accountable, including those who disproportionately harm communities of color and low-income communities

To reduce greenhouse gas emissions

To bolster resilience to the impacts of climate change

To prioritize both environmental justice and the creation of the well-paying union jobs necessary to deliver on these goals
EPA’s Charge for the Oil and Natural Gas Sector

Develop or review standards or guidelines to reduce methane pollution for:

• New, modified, and reconstructed oil and natural gas facilities
• Existing oil and natural gas operations
Pre-Proposal Outreach

May 25 - 27, 2021
Public Training Sessions

June 15 - 17, 2021
Public Listening Sessions

August 23 - 24, 2021
Methane Detection Technology Workshop

May 14 - July 30, 2021
Non-Regulatory Docket

June 29 and July 12, 2021
Roundtables with the Environmental Council of the States and the Interstate Oil and Gas Compact Commission

July 15 - September 20, 2021
Potential Small Business Advocacy Review Panel
Fulfill the directive of EO 13990 by reducing methane emissions from new and existing sources.

Learn from state efforts.

Use new and developing technologies.

Build on emission reduction efforts of leading companies.

Consider community concerns.

Incorporate information and ideas collected through outreach.

Proposal Development
Clean Air Act Section 111

Different approaches for new and existing sources

New sources under section 111(b)

Federal standards for new, modified, and reconstructed sources

Existing sources under section 111(d)

State programs for existing sources that are equivalent to federal guidelines

Photo: U.S. Department of Energy
Reducing Emissions at New, Modified, and Reconstructed Sources

EPA’s standards for **new sources** reflects the degree of emission limitation achievable through the application of the **best system of emission reduction**

Standards are **reviewed at least every 8 years** and revised, if appropriate

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**Congress**  
Clean Air Act Section 111(b)

**EPA**  
Sets new source performance standards

**States**  
Issue state permits

**Emissions Reductions**
Reducing Emissions at Existing Sources

Congress recognized that existing sources do not have as much flexibility as new sources to build emission controls into their design.
Proposed Emission Guidelines for Existing Sources

- EPA’s proposal includes:

  Proposed **best system of emission reduction** for existing sources

  **Presumptive standards** based on the best system of emission reduction for existing sources (called “designated facilities”)

  - Most presumptive standards mirror the standards EPA is proposing for new sources

- Once Emissions Guidelines are final, states may adopt the presumptive standards as part of their plans, or they may develop their own standards that generally are as strict
  - States have flexibility when applying the standard of performance in their plans to take into consideration, including the remaining useful life of the source, among other factors

- EPA expects to soon propose updates to the general provisions related to state requirements under Clean Air Act section 111
  - Will provide additional direction to states and tribes on related issues, such as timeframe to submit state plans and considering the remaining useful life of a source
Key Components of the Proposal
Finding and Repairing Methane Leaks at New and Existing Well Sites and Compressor Stations

• Focus monitoring efforts on sites and equipment that are most likely to have large emissions

**Larger well sites** (estimated emissions ≥ 3 tons per year): Must monitor for leaks at least once every three months and promptly repair any leaks found

**Smaller well sites** (estimated emissions < 3 tons per year): Must conduct a one-time survey to demonstrate no leaks or malfunctions; ongoing monitoring not required

**EPA is co-proposing requirement** that well sites with estimated emissions between 3 and 8 tons per year be monitored semi-annually, rather than quarterly

All new and existing **compressor stations** would monitor and repair leaks at least once every three months

Surveys must include inspections of equipment most prone to large leaks and malfunctions, including storage vessels and flares

Sources on the Alaska North Slope would have different monitoring schedules to account for weather
Encouraging Innovation by Incorporating Advanced Measurement Technologies

- To find major leaks rapidly and at a lower cost, many stakeholders have expressed strong support for the use of advanced measurement technologies.

- EPA’s proposal includes an alternative to the proposed fugitive monitoring requirements, allowing owners and operators to use these advanced technologies to detect leaks at all well sites and compressor stations (including well sites with estimated emissions < 3 tons per year).

  - Any technology capable of meeting a rigorous minimum detection threshold would be permitted.
  - Leak surveys and follow-up repairs using these advanced technologies would be required at least once every two months.
  - To ensure smaller leaks are detected, surveys must be supplemented by annual monitoring using optical gas imaging or EPA Method 21.

- EPA is taking comment on whether this advanced measurement technology pathway is the best system of emission reduction and should be required for all well sites and compressor stations.
Transitioning to Zero-Emitting Technologies for Pneumatic Controllers

• EPA proposes to:

Regulate emissions from intermittent vent pneumatic controllers for the first time

Require all new and existing pneumatic controllers in production, processing, and transmission and storage facilities to have zero methane and VOC emissions, with the exception of sites in Alaska that do not have power

• Natural gas-driven pneumatic controllers are currently used extensively in production, processing, and transmission and storage facilities
  • The vast majority of these emissions come from intermittent vent controllers that are currently unregulated under the Clean Air Act
  • Multiple zero-emitting alternatives to these pneumatic controllers exist, and several major oil and gas-producing states and Canadian provinces now require their use at new and existing facilities
Eliminating Venting of Associated Gas from Oil Wells

• EPA’s proposal would:

Eliminate venting of associated gas from oil wells and requires at least a 95 percent reduction in methane and VOC emissions from associated gas that cannot be captured and sold.

Ensure that flares are operating properly through recordkeeping and reporting requirements.

• Oil wells frequently produce large amounts of associated natural gas:
  • In many areas, there is no sales line for this associated gas, so producers vent or flare the gas.
  • This venting, currently unregulated under the Clean Air Act, releases large amounts of methane into the air (nearly 40,000 tons in 2019 alone).
Strengthening Requirements for Storage Tanks

- EPA’s proposal would add storage tank batteries (groups of tanks that are adjacent and receive fluids from the same source) to the definition of a storage tank covered by the rule for new, modified, and reconstructed storage tanks or tank batteries with a potential to emit 6 or more tons of VOC per year, owners/operators would have to reduce VOC and methane emissions by 95 percent.

Under the proposed presumptive standard, existing storage tanks or tank batteries with a potential to emit of 20 tons of methane per year or greater, owners/operators would have to control their emissions by 95 percent.
Broadening the Type of Pneumatic Pumps Covered by the Rule

• The proposal extends current requirements for new pneumatic pumps to include all natural gas-driven diaphragm and piston pumps in the production segment of the industry, and diaphragm pumps in the transmission segment.

  Standards require pneumatic pumps with access to an onsite control device to reduce emissions by 95 percent.

  For existing sources, the presumptive methane standards for pneumatic pumps would mirror those proposed for the NSPS but exclude piston pumps.

• EPA is seeking comment on whether it is feasible to further strengthen the proposed standard, including by requiring the use of zero-emitting pneumatic pumps at new and existing facilities with access to electric power.
Reducing Additional Methane and VOC Emissions Through New and Stronger Requirements

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>Liquids Unloading</td>
<td>Sets nationwide requirements to minimize methane and VOC emissions from liquids unloading for the first time</td>
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</table>
| Natural Gas Processing Facilities | Strengthens current leak detection and repair requirements for new natural gas processing facilities  
                                | Adopts those requirements as presumptive standards for existing sources                                                                  |
| Reciprocating Compressors | Strengthens current standards for methane emissions from new reciprocating compressors  
                                | Adopts those requirements as presumptive standards for existing sources                                                                  |
| Centrifugal Compressors   | Adopts presumptive standards for existing centrifugal compressors that require 95 percent control of emissions from wet seal degassing  
                                | Consistent with current standards for new sources                                                                                       |
Considering Environmental Justice Concerns

EPA is proposing to **expand leak detection programs** for new sources to include known sources of large emission events and proposing to require **more frequent monitoring** at sites with more emissions.

Proposing an additional requirement in the Emissions Guidelines to **require states to engage with the public in a meaningful way**, including with overburdened and underserved communities, during the development of state plans.

Taking comment on **innovative mechanisms** to ensure compliance and minimize emissions:

- Soliciting comment on a structure for communities to identify large emission events which owners or operators would then be required to investigate.
- Potential mechanisms for the collection and public dissemination of this information.
Responding to Small Business Advocacy Review Panel Recommendations

- EPA’s proposal responds to several Small Business Advocacy Review Panel recommendations:
  - Focuses fugitive emissions monitoring requirements on larger emitters and imposes fewer requirements on sources that have lower emissions
  - Maintains the wellhead only exemption from fugitive emissions requirements
  - Allows EPA Method 21 as an alternative option for fugitive emissions monitoring and allows alternative screening technologies as compliance alternatives
  - Maintains the streamlined recordkeeping and reporting requirements from the 2020 Technical Rule
  - Excludes well sites with only a wellhead and small compressor from the definition of a “centralized production facility”
  - Maintains the flexibility for in-house engineers to complete certifications of technical infeasibility
Seeking Additional Information

• EPA intends to issue a supplemental proposal in 2022 that will provide proposed regulatory text, and may expand on or modify this proposal in response to public input.

• EPA is seeking information about other pollution sources from the oil and natural gas sector that may help us further reduce methane and VOC emissions, including:

  - Abandoned and unplugged wells
  - Improving flare performance and minimizing malfunctions
  - Pipeline pigging operations
  - Tank truck loading operations
Seeking Additional Information

• EPA also is seeking comment on:

Proposed approach for fugitive emissions monitoring at well sites
  • Baseline emission threshold and other criteria to determine ongoing monitoring requirements
  • Methodology for calculating baseline methane emissions
  • Ensuring emissions from wells owned by small businesses are addressed while recognizing the challenges specific to small businesses

Ensuring captured associated gas is collected for a useful purpose rather than flared

Feasibility of requiring broader use of zero-emitting technology for pneumatic pumps

Alternative measurement technologies
  • Evaluate whether a change in the best system of emission reduction from the proposed quarterly optical gas imaging monitoring to a monitoring program using alternative measurement technologies is appropriate
Seeking Additional Information Related to Small Businesses

• EPA is seeking comment on several aspects of the proposal that would affect small businesses:

  Whether it is appropriate for existing well sites, or a subcategory of sites, to have different emission profiles due to site characteristics or other factors

  Regulatory alternatives for low-production well sites that accomplish Clean Air Act objectives and minimize significant economic impact to small businesses

  Emissions from low-production well sites, along with information on any factors that may make certain well sites less likely to emit methane and VOCs

  Information that would assist EPA in evaluating the cost burden on the smallest companies or individual well site owners

• The Agency is continuing to examine the impact that fugitive emissions monitoring requirements have on small businesses, particularly on businesses with very few employees
### Highlights from Regulatory Impact Analysis

#### Analysis for 2023 – 2035

<table>
<thead>
<tr>
<th>Total Emission Reductions</th>
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<tr>
<td>• 41 million short tons of methane (equivalent to 920 million metric tons of carbon dioxide)</td>
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<th>Total Net Benefits (2019$)</th>
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<td>• $48 to $49 billion in net benefits (3 percent and 7 percent discount rates, respectively)</td>
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<td>▪ Equivalent to more than $4 billion a year</td>
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<th>Total Benefits (2019$)</th>
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<td>• $55 billion in climate benefits</td>
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<td>▪ $5.2 billion in benefits a year</td>
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<th>Total Costs</th>
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<tr>
<td>• $6.3 billion to $13 billion in costs</td>
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<td>▪ $680 million to $1.2 billion in costs a year</td>
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Rulemaking Process

- Proposal: November 2021
- Comment Period: 60 days
- Supplemental Proposal and comment period: 2022
- Final Rule