Technical Services Group
Environmental Department

Actions to Reduce Methane & VOC Emissions from the Oil & Natural Gas Industry:

NSPS OOOOa – Regulatory Changes & Highlights

GCA Exposition April – 2017

Areas of Focus

Overview

- *Methane*
- *Actions to Reduce Methane*
- *Updates at a Glance*
- *The Oil & Gas Industry: A Topical View*

Technical Information

- *New Methane Rule*
- *Midstream Impacts*
- *Fugitive Emissions from Compressor Stations*
- *Natural Gas Processing Plants*
- *Upstream Impacts*
- *Requirements for Specific Equipment at Well Sites*
- *Fugitive Emissions at Well Sites*
- *What are the Costs of Compliance*
- *Information Collection Requests*

Source Aggregation

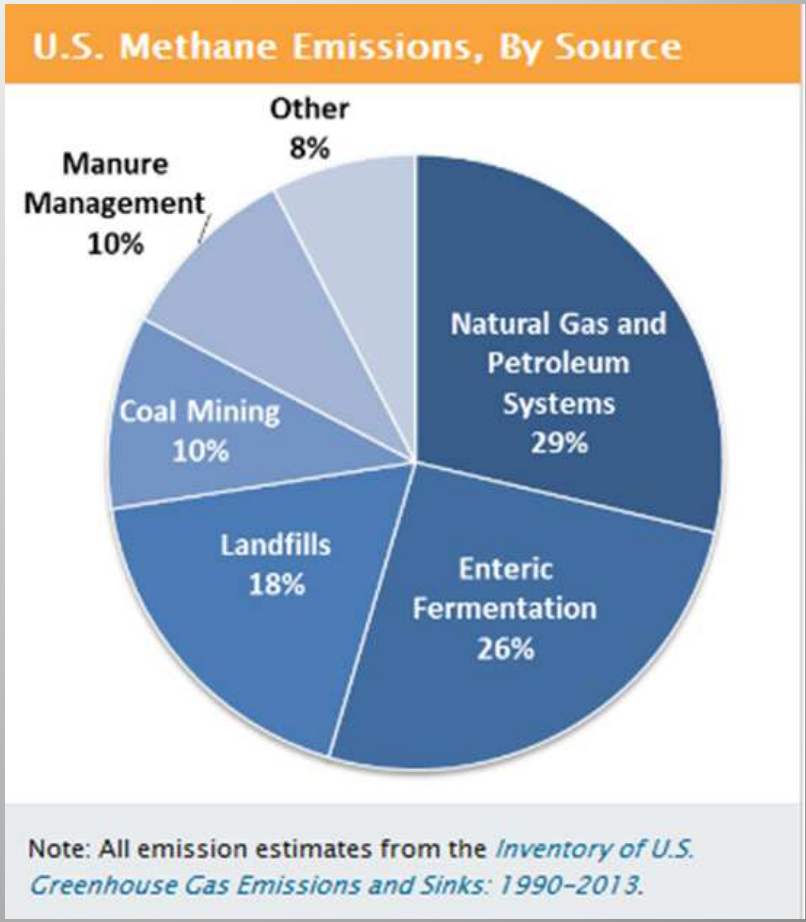
Resources & Questions

Methane

Methane is one of the most potent **greenhouse gases** with a global warming potential (GWP) more than 25 times greater than carbon dioxide.

Specifically it is the **second most prevalent greenhouse gas** emitted in the U.S. and nearly 30% of those emissions come from the Oil & Gas Industry.

Methane from the oil and gas industry comes **packaged with other pollutants** like volatile organic compounds (VOCs), which are the main ingredient in smog (ground level ozone); and BTEX – benzene, toluene, ethylbenzene and xylene.



Actions to Reduce Methane

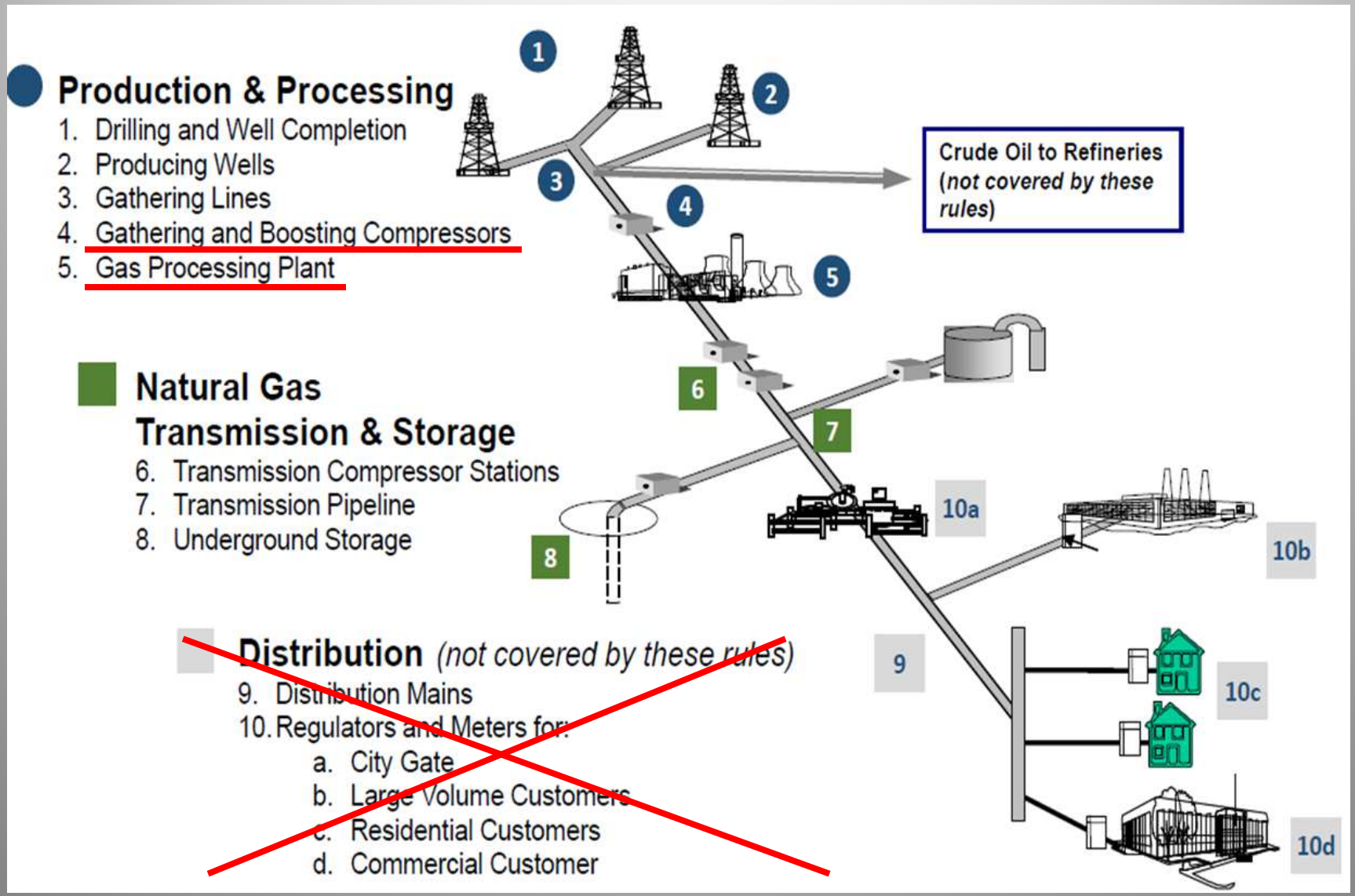
May 12, 2016 – The EPA took another set of steps under Obama's ***Climate Action Plan: Strategy to Reduce Methane Emissions*** and the Clean Air Act to cut emissions of methane from the oil and gas industry.

- EPA issued **three final rules** to curb emissions of methane, smog-forming VOCs, and BTEX from new, reconstructed and modified oil and gas sources, while clarifying certain aspects of Clean Air Act permitting requirements for the industry
- Also issued for public comment an **Information Collection Request (ICR)** to obtain extensive information necessary for developing final regulations to reduce methane from existing oil and gas sources.
- The final rules and the ICR were intended to keep the Administration on track to cut methane emissions from our industry by 40 – 45 percent below the 2012 levels by 2025.

Updates at a Glance

2016 NSPS OOOOa	• Updates the 2012 standards to cover hydraulically fractured oil wells and other activities in oil and gas production, processing, transmission & storage that is anticipated to impact 13,000 oil wells, 94,000 well pads, and hundreds of compressor stations by 2020;
Source Determinations	• Clarifies when multiple pieces of equipment and activities in the industry must be deemed a single source when determining whether major source permitting is necessary.
Final FIP for Indian Country	• Implements the Minor New Source Review Program for Indian country for oil and gas production and natural gas processing; limits emissions of harmful air pollution while making the preconstruction permitting process more clear cut.
Information Collection Request	• Through two different types of ICR it seeks a broad range of information on how equipment and emissions controls are, or can be, configured; what the installation process is like; and associated costs.

The Oil & Gas Industry: A Topical View



New Methane Rule

For the first time ever, EPA is directly regulating methane as a green house gas. Through Subpart OOOO the EPA already regulates VOC & SO2 emissions and because methane comes from much of the same sources, the Subpart OOOO regulations already limit methane to some extent. On **September 18, 2015**, EPA published NSPS OOOOa to broaden the reach of NSPS OOOO.

- **Two Main Parts:** (1) mandating control devices or practices by **95% efficiency** and (2) fugitive emission leak detection and repair (LDAR) requirements that would **apply only to well sites and compressor stations.**

- **When Does It Apply:** Only to "affected facilities" – specific types of equipment or facilities that are new, modified, or reconstructed AFTER September 18, 2015.

- **When Does It Go into Effect:** Different aspects of rule have different "effective dates," ranging from 60 days to one year. These same standards are also being incorporated into permit requirements on the state level.

New Methane Rule

Requirement	NSPS OOOO	Proposed Rule	Final OOOOa
Regulates VOCs	Yes	Yes	Yes
Regulates Methane	Not directly	Yes	Yes
Hydraulically Fractured Oil Well Completions	No	Yes	Yes
Hydraulically Fractured Gas Well Completions	Yes	Yes	Yes
Fugitive Leaks at Well sites and Compressor Stations	No	Yes	Yes
Fugitive Leaks at Natural Gas Plants	Yes	Yes	Yes
Pneumatic Pumps	No	Yes	Yes (but not at compressor stations)
Pneumatic Controllers	No	Yes	Yes

Midstream Impacts

Source	Requirement
Wet-Seal Centrifugal Compressors	95 % emissions reduction by capture and routing to control device
Dry-Seal Centrifugal Compressors	None
Reciprocating Compressors	(1) Replace the rod packing on or before 26,000 hours of operation or 36 calendar months **OR** (2) Route emissions from the rod packing to a closed vent system under negative pressure
Pneumatic Controllers	Natural gas plants – zero gas bleed rate All other locations – gas bleed rate of 6 scf/h or less
Pneumatic Pumps	Natural gas plants – zero gas bleed rate All other locations – None

Storage Vessel information not covered in today's presentation

Fugitive Emissions from Compressor Stations

Any new, modified, or reconstructed compressor station must conduct quarterly leak – monitoring surveys using OGI or EPA Method 21.

The rule requires a survey of all "fugitive emission components," at the compressor station, meaning "any component that has the potential to emit fugitive emissions of methane or VOC." Examples – valves, connectors, open-ended lines, pressure- relief devices, compressors, instruments, and meters.

Final Rule Burdens Removed:

- Initial Survey and repair completion are slightly longer
- OGI OR Method 21
  - Still a trade off – Time and resources of OGI vs. labor-intensive and time consuming with much smaller leaks detected.
- Language updated to allow one monitoring plan for all compressor stations within a company defined area vs. individual facility plans

Fugitive Emissions from Compressor Stations

Surveys, Repair Time Frames, & Frequencies

Requirement	Final OOOOa Rule
Initial Survey	The later of one year from publication of final rule or 60 days after startup or modification
Periodic Survey Frequency	Quarterly, at least 60 days between any two surveys
Survey Method	OGI or Method 21
Time to Make Repairs	30 days
Time from Repair to Resurvey	30 days
Time to Repair When It Would be Technically Infeasible or Unsafe	The soonest of 2 years or next facility shutdown
Exemptions & Extensions	Unsafe, difficult to monitor, or temperature based

Natural Gas Processing Plants

Natural gas processing plants added or modified between April 23,2011 and September 18, 2015 are already subject to Subpart OOOO. Those added or modified after September 18, 2015 are subject to OOOOa. EPA has revised the text in OOOO to provide more uniformity between the two sets of requirements.

Highlights of continuity between the rules:

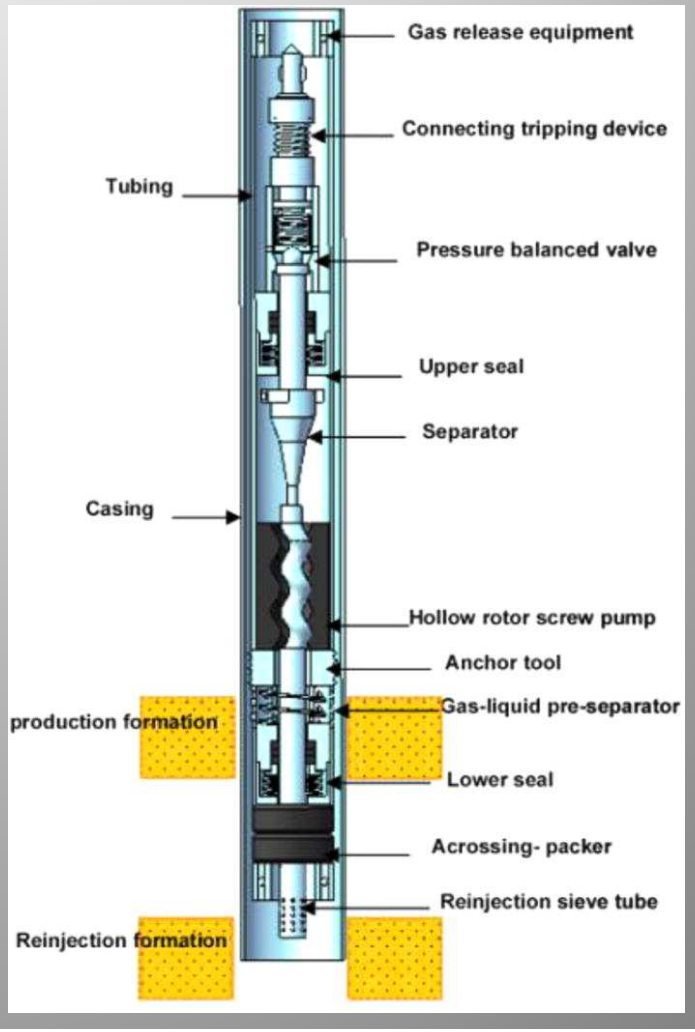
- P.E. Certification for bypass devices that divert emission streams away from a control device
- P.E. Certification for flare design and operation standards or manufacture requirements.
- Record keeping requirements for repair logs for control devices
- Clarification on reporting deadlines for initial annual reporting
- Component Challenge: Modification is not triggered due to the addition of one component but rather based on “capital expenditure,” for the entire unit.

Upstream Impacts

For this portion of the rule a well site is defined as a single well that conducts a well completion operation following hydraulic fracturing or refracturing and the requirements apply to any well site where construction, modification, or reconstruction commenced after September 18, 2015.

Well Completion Control Requirements:

- Hydraulically fractured oil well completions required to use a completion combustion device – Subcategory 1 wells
- Wildcat, delineation, and low pressure wells – during completion, must use a completion combustion device – Subcategory 2 wells
- Wells with gas to oil ration of less than 300 scf of gas/barrel of oil DO NOT REQUIRE controls



Requirements for Specific Equipment at Well Sites

Tricky Issues Related to Well Sites –

Equipment found at well sites are considered modified or constructed if existing equipment is replaced with new equipment after September 18, 2015. For example, adding one new pneumatic controller at a well site will mean that the single new controller will be subject to the rule but no other controller on site.

Well site – defined under this section of the rule is one or more surface sites that are constructed for the drilling and subsequent operation of any oil well, natural gas well, or injection well.

Collective fugitive emissions monitoring is required for all new or modified well sites after September 18, 2015. ***Well sites that only contain wellheads are not covered by the LDAR requirements.***

Fugitive Emissions at Well Sites

The LDAR requirements for well sites are almost identical to those for compressor stations, see below:

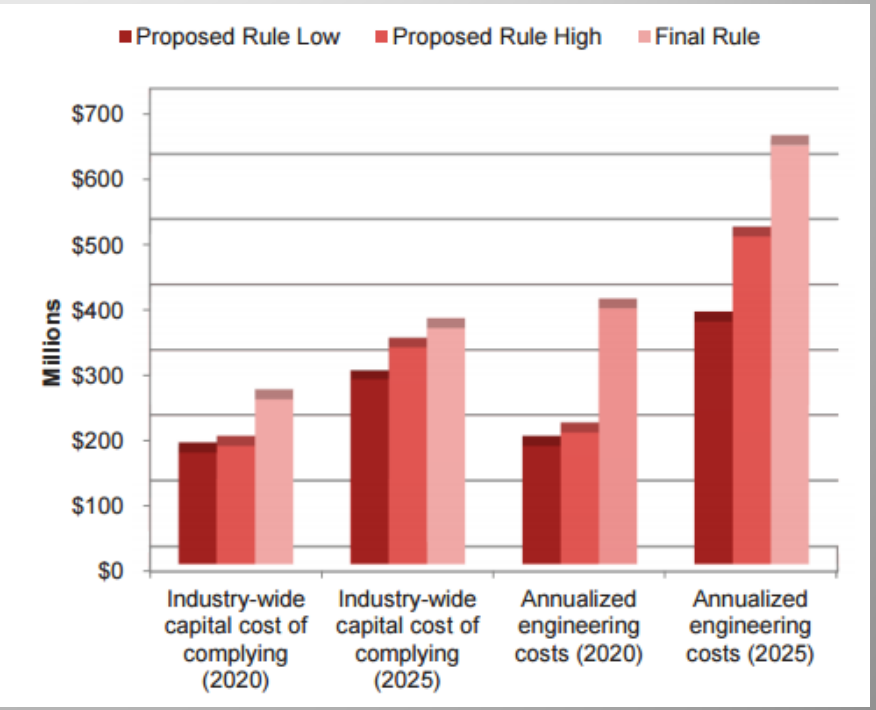
Requirement	Final OOOOa Rule
Initial Survey	The later of one year from publication of final rule or 60 days after startup or first day of production
Periodic Survey Frequency	Semi-annually, at least 4 months apart
Survey Method	OGI or Method 21
Time to Make Repairs	30 days
Time from Repair to Resurvey	30 days
Time to Repair When It Would be Technically Infeasible or Unsafe	The soonest of 2 years or next well shutdown/in; after any vent blowdown
Exemptions & Extensions	Unsafe, difficult to monitor, or temperature based

What are the Costs of Compliance?

EPA uses "BSER," (Best system of emission reduction) standards to determine the estimates of the total industry wide capital cost of complying with the new rule.

Largest Portions of Capital Cost:

- New wells, LDAR programs, & pneumatic pumps
- Collectively causing upstream to feel the costs more heavily
  - Well Completion requirements will affect nearly 13,000 oil wells by 2020
  - LDAR will affect close to 94,000 well pads
- Language updated to allow one monitoring plan for all compressor stations within a company defined area vs. individual facility plans



EPA's Interesting Philosophy:

Despite the current state of the natural gas market the EPA has cited that this rule will actually make operators revenue due to selling methane that will no longer be vented to atmosphere. The EPA has valued the methane at about $4.00 per mcf and that in 2020 -- 16,000,000 mcf will be recovered causing a profit of around $ 63 billion.

Information Collection Request

On May 12, 2016, EPA issued a proposed Information Collection Request (ICR) to support the development of new rules to regulate methane emissions at existing oil and gas sources because the emissions were higher than previously understood.

- Asked for a broad range of information to help the EPA determine the best approach to reducing emissions.
  - Included numerous sources, such as natural gas venting, routine maintenance activities, equipment malfunctions, and control device mechanics.
- Survey Comprised of two parts run concurrent
  - Operator survey – all onshore oil and gas production facilities in the U.S. This part of the ICR will collect parent company information and detailed facility level information such as an inventory of site equipment and historical operational changes with a 30 day response time.
  - More detailed facility survey – representative sample of facilities with a 120 day response time.
- The first round of ICR's were sent out in the fall of 2016. However given the timing and the latitude of the Trump administration the ICR's were thrown out.

Source Determination Rule

EPA's source-aggregation proposal has been the cause of significant concern for many in the oil and gas industry due to PSD and major source thresholds. Specifically the definition of what constitutes a "source." However, the final rule has established a somewhat favorable definition for the industry for federal programs and delegated authorities only.

Adjacent:

- Sources are adjacent and can be (BUT NOT REQUIRED TO BE) aggregated if the sources are located with ¼ mile and use shared equipment.

Common Sense Notion of a Plant/ Aggregation:

- Aggregation only occurs if the separate surface sites are within ¼ mile and share equipment necessary to process and store oil or natural gas. Alternatively separate surface sites that do not include shared equipment, even if located within ¼ mile, will not be aggregated.

State Influence:

- All states and local agencies with approved permitting processes may adopt the language at their discretion. It's likely that many states will choose to retain existing approaches to source determination, allowing oil and gas operators to move forward a faster pass.

Important Aspects to Keep in Mind

In a Nutshell

- Modification
  - Well Sites – Addition of a new well or fracturing or re-fracturing of an existing well
  - Compressors – Addition of a new compressor, or when a physical change is made to an existing compressor that increases compression capacity
  - Gas Plants – important changes to modification calculations

- Initial OGI (Optical Gas Imaging) survey within 30 days of startup or modification, and semiannually thereafter, with step-up/down based on performance
  - Skip Period Monitoring – well sites and compressors only
    - Skip to annual (<1% leaks during two consecutive monitoring events)
    - Return to semiannual (leaks >1% and <3% during any monitoring event)
    - Drop to quarterly (leaks >3% during any two consecutive semiannual events)

- In order to document the % leaking, the rule indirectly infers component hard counts

- Things not covered today –Final FIP for Indian Country, & Storage Vessel Compliance.

SUPPORT and RESOURCES

- All GCA Expo presentations can be found at
http://www.gascompressor.org/environmental-membership-tools

- Methane & Climate Change Initiative
http://www3.epa.gov/airquality/oilandgas/actions.html
https://www.whitehouse.gov/blog/2014/03/28/strategy-cut-methane-emissions

- NSPS OOOOa
https://www.federalregister.gov/documents/2016/06/03/2016-11971/oil-and-natural-gas-sector-emission-standards-for-new-reconstructed-and-modified-sources

https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/new-source-performance-standards-and

- ICR Information
https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/oil-and-gas-industry-information-requests

Questions