

Memo: Modeled impacts from EPA methane rollbacks

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In 2016, U.S. EPA issued landmark standards for new and modified facilities in the oil production and natural gas production, process, and transmission and storage industries. These standards reduce methane and other harmful air pollutants from facilities they cover in several key ways. Furthermore, the promulgation of methane pollution standards from these new and modified sites (in addition to standards for ozone-smog precursors), triggered an obligation for EPA to issue corresponding standards for existing facilities – the vast fleet of oil and gas sites that were in place before the 2016 standards were first proposed.

In 2018 and 2019, EPA issued two proposals to weaken the 2016 standards. These proposals were designed to weaken the 2016 standards in several ways. First, they would revise the 2016 rules to weaken the standards, so that the oil and gas industry would need to perform less inspections to reduce leaks and other emissions of methane and other pollutants from their sites. Additionally, EPA is proposing to carve out the transmission and storage segment, removing all sources in that segment from applicability to the 2016 standards. EPA is also proposing to remove the standards for methane emissions from these sites from the rules (so that the standards would only apply to ozone-smog precursors), because doing so will remove EPA’s obligation to issue standards to reduce methane pollution from existing facilities.

These two rollback proposals, if finalized and implemented (surviving legal challenges), would vastly increase climate pollution from the U.S. oil and gas industry. Together, the impacts from these two proposals will increase 2025 emissions by 4.3 million metric tons, VOC emissions by 1 million metric tons and HAP emissions by 38,000 metric tons. These estimates include the additional emissions that will occur if EPA does not issue standards for existing oil and gas sites, since EPA is obligated to do so under the current rules but will not be if the current rollback proposals are finalized and implemented. The additional oil and gas methane pollution emitted because of these rollbacks would, over the near-term, warm the climate as much as the carbon dioxide emissions of nearly 100 coal-fired power plants.

This memo provides a summary description of the rollback proposals and the increases in emissions that would result from them, and it describes how Clean Air Task Force has estimated these emission increases.

Summary of regulatory proposals

The first rollback proposal, published by EPA in 2018, would reduce the frequency of leak detection and repair (LDAR) surveys at several types of oil and gas facilities (See Table 1 below). We refer to this proposal as the “2018 LDAR Revision.” The longer permissible time periods between inspections would mean that leaks of methane and other pollutants from these sites will persist for a longer period of time before they are identified and fixed, resulting in increased emissions. This would directly apply to new/modified sources that, absent the 2018 LDAR Revision, would be subject to the more stringent inspection frequency requirements of the 2016 standards. (The proposal would also revise the 2016 rules in several other ways, though the impacts of those changes are relatively minor compared to the proposed LDAR revisions.)



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Table 1: Required Inspection Frequency under EPA's 2016 Rules, and as Proposed in the 2018 LDAR Revision¹

| | 2016 NSPS as proposed | 2018 LDAR Revision (Option 3) |
|--|-----------------------|-------------------------------|
| Well Pads | Semi-Annual | Annual |
| Gathering and Boosting Compressor Stations | Quarterly | Semi-Annual |
| Transmission and Storage Compressor Stations | Quarterly | Semi-Annual |

The second rollback proposal, which EPA published in 2019, would remove all regulations from the entire natural gas transmission and storage segment of the industry, directly allowing more emissions from new/modified transmission and storage facilities. Additionally, the 2019 rollback would also remove all methane emissions standards for the entire oil and gas sector. As described above, this would arguably remove the duty for EPA to regulate existing sources in the oil and gas industry that it currently faces. We refer to this rollback proposal as the "2019 Methane / T&S Revision," where "T&S" is an abbreviation for the transmission and storage segments of the natural gas industry.

Emission Increases in 2025

Table 2 shows the increased emissions in 2025 anticipated as a result of EPA's 2018 LDAR Revision and the 2019 Methane / T&S Revision.

Table 2: Estimate of Increased Emissions Resulting from 2018/2019 EPA actions:

| | | Increased Emissions in 2025 (Metric Tons) | | |
|--|-----------------------------|---|------------------|---------------|
| | | Methane | VOC | HAP |
| New & Modified Sources | 2018 LDAR Revision* | 980,000 | 260,000 | 9,800 |
| | 2019 Methane / T&S Revision | 170,000 | 4,700 | 150 |
| New & Modified Subtotal | | 1,100,000 | 270,000 | 10,000 |
| Existing Sources: Obligation to regulate removed by 2019 Methane Rollback** | | 3,200,000 | 750,000 | 28,000 |
| Total Increased Emissions | | 4,300,000 | 1,000,000 | 38,000 |

Note: Numbers may not sum due to independent rounding. *As noted above, Option 3 in 2018 LDAR Revision Proposal is modeled. **For existing source estimate, we have quantified emissions reductions foregone from an existing source rule modeled on the 2016 NSPS (rather than an existing source rule modeled on an NSPS weakened by the 2018 LDAR Revision).

Methodology

These emissions estimates are based on a model developed by Clean Air Task Force. The structure of the model is based on EPA's 2019 GHG Inventory, and the model uses as a primary input emissions for 2017 from that Inventory. To this baseline, we also add in an estimate of abnormal process conditions at production sites based on a 2018 study which estimated nationwide oil and gas methane emissions based on measurements at over 400 oil and natural gas sites in six states.²

¹ EPA's Option 3 from the 2018 LDAR Revision Proposal, one of two co-proposed options, is summarized in the table, and the estimates of additional emissions from the 2018 LDAR Revision presented below are based on Option 3.

² R. A. Alvarez et al. (2018), "Assessment of methane emissions from the U.S. oil and gas supply chain," *Science* 361 186-188. <https://science.sciencemag.org/content/361/6398/186>.



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For each of the dozens of categories of emissions in the EPA GHG Inventory, we project emissions in future years based on projections of gas and/or oil production from the U.S. Energy Information Administration's [AEO 2019](#) Reference Case. This accounts for the increase in emissions from the larger amounts of equipment, etc., that will be in place as production grows in the future.³

We first create projections representing an estimate of oil and gas methane emissions in the absence of any state or federal regulations. Then, to create our baseline case, we then model the impacts of EPA's 2012 OOOO rule and existing source regulations in California, Colorado, and Wyoming's Upper Green River Basin. Because the EPA inventory contains estimates of emissions from many different types (leaks, venting from pneumatic controllers, venting from tanks, etc.), it is relatively straightforward to model the emissions reductions from regulations that require specific controls for certain types of equipment.

We then modeled emissions under four regulatory scenarios to assess the impact on EPA's proposals. First, under current rules (new/modified sources rule as finalized in 2016) and under two combinations of weakened new/modified source rules (reflecting the two recent rollback proposals), and finally under an existing source rule based on the new/modified source rule as finalized in 2016 (see Table 3).

Table 3: Nationwide emissions under various national regulatory scenarios

| Regulatory Scenario | 2025 methane emissions (metric tons) |
|--|--------------------------------------|
| New/Modified Source Rules Only | |
| 1. As Finalized by EPA in 2016 | 12,300,000 |
| 2. With 2018 LDAR Revision | 13,300,000 |
| 3. With 2018 LDAR Revision & 2019 Methane / T&S Rollback | 13,400,000 |
| New/Modified Source Rules and Existing Source Rules | |
| 4. Based on NSPS OOOOa as finalized in 2016 | 9,100,000 |

Currently, the 2016 New/Modified Source Rules are in effect, and EPA has an obligation under those current rules to promulgate existing source standards. If EPA were to follow the law and comply with this obligation in a reasonable time frame and issue existing source rules based on the standards of the 2016 New/Modified source rule, we estimate that emissions in 2025 would be 9,100,000 metric tons of methane (**scenario 4**). By weakening the new source rules and changing the standards to eliminate the obligation to issue existing source rules, EPA will allow emissions to be far higher, as reflected in the second or third scenarios. If both of the rollback proposals are finalized as proposed, we estimate oil and gas methane emissions in 2025 will be 13,400,000 metric tons (**scenario 3**) – 4.3 million metric tons higher than they will be under current rules and law (**scenario 4**). Subtracting emissions under the scenarios in Table 3 produces the estimates of additional emissions that will occur in 2025 as a result of the rollback provisions EPA is currently considering, if they are finalized and implemented.

To estimate the additional emissions VOC and HAP resulting from the NSPS rollbacks shown in Table 2, we multiply the figures for additional methane emissions by standard VOC/Methane

³ Based on a comparison of past AEO Reference projections and industry growth in recent years, we believe that AEO Reference is a conservative projection of future industry growth. Therefore, our estimate of future baseline emissions and the additional emissions resulting from the rollbacks are conservative.

and HAP/Methane ratios for each equipment and segment category, based on the values of methane / VOC / HAP content in natural gas that EPA has used in prior rulemakings.⁴

Finally, we have noted that the additional 2025 methane emissions expected under the NSPS rollbacks (4.3 million metric tons of methane) will have the same near-term climate impacts as the CO₂ from about one hundred coal-fired power plants. To calculate this, we have converted this amount of methane to a corresponding carbon dioxide equivalent (CO₂e) using the twenty-year GWP for fossil methane (87) published in the most recent IPCC Assessment Report (AR5),⁵ and then use EPA's Greenhouse Gas Equivalencies Calculator to compare this amount of CO₂e emissions to emissions from a coal-fired power plant.

Comparison with EPA Estimates

Overall, our estimates are higher than those presented by EPA in its 2018 and 2019 RIAs (see Table 4). There are several reasons for this difference between CATF and EPA estimates; here we list some of the most important reasons.

First, EPA entirely ignores the abatement of emissions from sources existing before the 2016 rules. As described above, EPA is currently obligated to issue methane emission standards for these existing sources, but that obligation will be removed if EPA successfully finalizes the 2019 Methane / T&S Rollback. Because there are so many methane sources in oil and gas that predate the 2016 rules, the expected quantity of abatement from existing source rules is very large, and therefore if EPA successfully removes the obligation to reduce emissions from existing sources, 2025 emissions will significantly higher.

There are also significant differences in our estimates of additional emissions due to the rollbacks in the New Source rules from the 2018 and 2019 rollbacks, as shown in Table 4. The biggest difference arises from abnormal process condition emissions. While these emissions are well documented (see above), EPA does not include them in its GHG Inventory for oil and gas methane. As we noted above, they are included in our model. This increases the baseline emissions estimate by roughly 40%. Because LDAR standards are effective at reducing abnormal process emissions, including these emissions significantly increases potential abatement from LDAR programs.

There are other reasons that EPA underestimates the impact of the rollback for emissions from new sources. For example, CATF's estimate of the abatement from the new/modified source rule accounts for both new sources based on industry growth (and the accompanying expansion of the fleet of sources), new sources that are replacements of equipment in the field before the 2016 rules were issued, as that equipment wears out or reaches the end of its useful life, and modified sources where new wells have been drilled at existing sites or existing wells have been refractured (based on conservative assumptions about equipment and well turnover). EPA, in

⁴ Memorandum from Heather P. Brown, P.E., EC/R Incorporated, to Bruce Moore, EPA, (2011) *Re: Composition of Natural Gas for use in the Oil and Natural Gas Sector Rulemaking*, Document ID No. EPA-HQ-OAR-2010-0505-0084.
<https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2010-0505-0084&contentType=pdf>.

⁵ The most accurate twenty-year GWP for methane from the oil and gas industry is 87. This is the value calculated accounting for the carbon-cycle feedback for both methane and CO₂, and accounting for the CO₂ produced by oxidation of methane in the atmosphere. See Myhre, G., et al. (2013) "Anthropogenic and Natural Radiative Forcing." In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the IPCC*. See Table 8.7 (including note b to the table), page 714. https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf.



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contrast, assumes no turnover of that equipment, which means that ignores substantial emissions abatement from the new source rule rollbacks. (Nevertheless, even with reasonable turnover assumptions, the existing source regulations that EPA is currently required to issue are critical for methane reductions, and will in fact reduce 2025 emissions millions of tons of methane below the emissions level the 2016 new source rules along would achieve, if left in place.)

In summary, there are several clear reasons that EPA is underestimating the benefits of the 2016 OOOOa rule, and therefore also underestimating the increased emissions from the proposed rollbacks.

Table 4: CATF vs EPA Estimate of Increased Emissions

| | Increased Emissions in 2025 (Metric Tons) | |
|-----------------------------|---|---------------------------|
| | CATF Estimate | EPA Estimate ⁶ |
| 2018 LDAR Revision* | 980,000 | 69,000 ⁷ |
| 2019 Methane / T&S Revision | 170,000 | 63,000 ⁸ |
| Total | 1,100,000 | 130,000 |

*As noted above, Option 3 in 2018 LDAR Revision Proposal is modeled.



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⁶ EPA figures have been converted from Short Tons to Metric Tons.

⁷ EPA. "Regulatory Impact Analysis for the Proposed Reconsideration of the Oil and Natural Gas Sector Emission Standards for New, Reconstructed, and Modified Sources." (2018). Table 2-13.

⁸ EPA. "Regulatory Impact Analysis for the Proposed Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review (2019). Table 2-8.