CATF FACT SHEET:

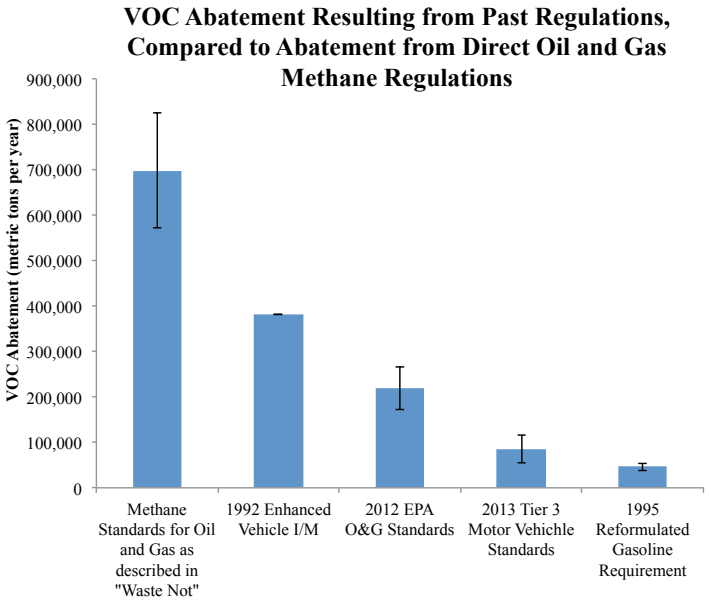
# Nationwide Standards for Methane Emissions from Oil and Gas Are Key to Controlling Ozone

December 2014

Ground-level ozone (or smog) is formed when volatile organic compounds (VOCs) react in sunlight with nitrogen oxides ($NO_x$). Ozone can impair lung function, trigger asthma attacks, and aggravate conditions of people with bronchitis and emphysema.[1] Children, the elderly, and people with existing respiratory conditions are the most at risk from ozone pollution. Due to these and other concerns, in November 2014 the EPA proposed to strengthen ground-level ozone standards from 75 parts per billion (ppb) to between 65 and 70 ppb.

Many counties have ozone levels above the proposed range of health-based standards—358 counties have average ozone levels above 70 ppb, and an additional 200 counties have average levels above 65 ppb.[2] In many regions, including a number of areas where ozone levels exceed the proposed standards, VOCs emitted from the oil and gas facilities significantly contribute to ozone formation.[3] Furthermore, methane itself is a meaningful precursor of global ozone[4] – for example anthropogenic methane generates as much as 7 ppb of Midwest-Northeast U.S. ozone.[5]

Some areas such as southwestern Wyoming and Colorado's Front Range have already issued standards to reduce emissions from new and existing oil and gas facilities in order to meet existing, less stringent ozone standards. In this Fact Sheet we show that nationwide standards for emissions of methane from the oil and gas industry would result in very large nationwide VOC emission reductions – larger than many VOC abatement programs. Further, there is a large overlap between areas with a lot of oil and gas production and areas with ozone in excess of the proposed standards. As a result, nationwide methane emissions standards for oil and gas are key to controlling harmful ozone pollution in many areas.




## Nationwide VOC Emissions and Abatement Potential

Total U.S. anthropogenic VOC emissions from all sources in 2013 were 13 million metric tons.[6]

We documented in *Waste Not* that methane regulations have the co-benefit of reducing VOC emissions from oil and gas operations by 16-23 percent, or 571,000 to 825,000 metric tons of VOC.[7] Surprisingly, direct regulation of methane

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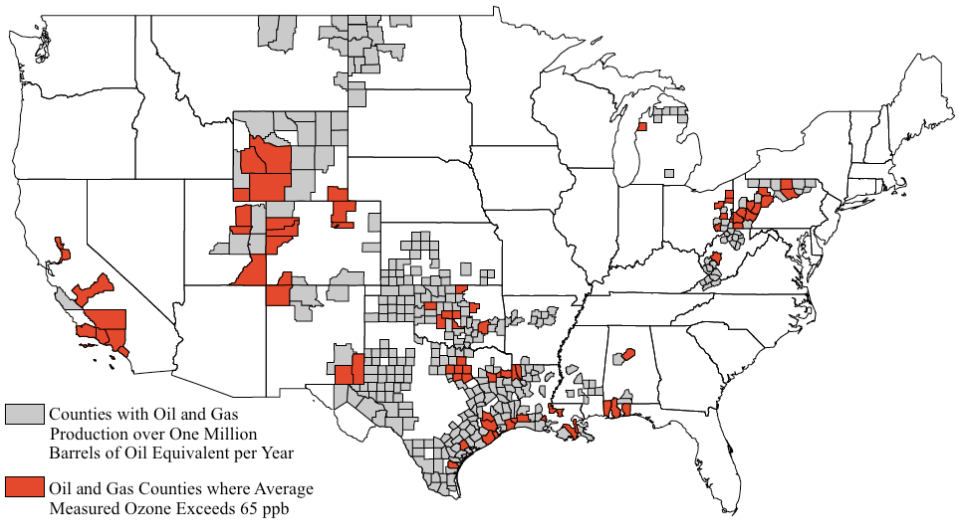
[1] EPA. Ground Level Ozone: Health Effects. *Available at*: http://www.epa.gov/groundlevelozone/health.html.
[2] EPA. Counties Violating the Primary Ground-level Ozone Standard. *Available at*: http://www.epa.gov/groundlevelozone/pdfs/20141126-20112013datatable.pdf.
[3] Olaguer, EP. 2012. The Potential Near-source Ozone Impacts of Upstream Oil and Gas Industry Emissions. Journal of the Air and Waste Management Association 62: 966-977. *Available at*: http://www.ncbi.nlm.nih.gov/pubmed/22916444.
[4] Fiore, A.M., et al. 2008. Characterizing the tropospheric ozone response to methane emission controls and the benefits to climate and air quality. *Journal of Geophysical Research* (113) D08307. Although it is well understood that methane pollution contributes to ozone smog in a manner analogous to VOC, methane is not regulated as VOC because it reacts more slowly to form ozone than VOC, so it contributes to global ozone pollution on a global scale, rather than on a regional or local scale.
[5] Comment by Clean Air Task Force et al. National Ambient Air Quality Standards for Ozone, Dkt. No. EPA-HQ-OAR-2005-0172-12808. *Available at*: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2005-0172-12808.
[6] EPA. Air Quality Trends. *Available at*: http://www.epa.gov/airtrends/aqtrends.html (14 million short tons).
[7] CATF, NRDC, Sierra Club. 2014. Waste Not: Common Sense Ways to Reduce Methane Pollution from the Oil and Natural Gas Industry. *Available at*: http://www.catf.us/resources/publications/view/205.

from oil and gas operations would result in more VOC reductions than could be achieved from a regulation focused directly on VOC emissions from oil and gas operations. This occurs in large part because EPA must control existing sources of certain pollutants – such as methane – if that pollutant is controlled from new sources,[8] but the agency has not interpreted this duty to extend to existing sources of VOCs.

VOC abatement from the recommendations in *Waste Not* also far exceeds reductions achieved from previous EPA regulations:[9]

- The 2012 standards for VOCs and air toxics from oil and gas reduced VOC emissions by 171,000 to 265,000 metric tons.[10]
- The 2013 Tier 3 Motor Vehicle Emissions and Fuel Standards will reduce VOC emissions by 55,000 metric tons in 2020 and 117,000 tons in 2025.[11]
- The 1995 Reformulated Gasoline requirement (Phase 1 and 2) reduced VOCs by 58,000 metric tons per year from 1995-1999 and by 37,000 metric tons per year from 2000 on.[12]
- The 1992 Enhanced Vehicle Inspection and Maintenance Program was estimated to reduce VOC emissions by 381,000 metric tons per year.[13]

## Local Impacts of Oil and Gas VOC and Methane Emissions




Since the worst health impacts of VOC emissions occur in the areas where the pollutants are emitted, we examined the overlap between oil and gas producing counties and counties with current ozone concentrations in excess of the proposed standard. As shown in the map, there is a great deal of overlap. There are 423 counties that produced more than one million barrels of oil equivalent in 2013;[14] of these, 79 counties in 14 states have measured ozone above 65 ppb. In addition, many more oil and gas counties are upwind of counties with ozone problems, and thus may contribute to their ozone problems.

Due to the variable reactivity of various forms of VOC, the variable magnitude of emissions from oil and gas operations, and the complexity of ozone chemistry, we currently cannot precisely quantify the ozone reductions that would result from reducing VOC emissions from oil and gas. The benefits will generally be most significant west of the Mississippi River—in the eastern U.S., ozone formation is typically less sensitive to VOC emissions.

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[8] 42 U.S.C. § 7411(d); 40 C.F.R. § 60.22.
[9] The comparison here is on a mass basis. We note that some VOC emissions from the oil and gas industries produce somewhat less ozone per pound, or produce ozone more slowly, than the VOC emissions some of the programs listed here are designed to control.
[10] EPA. April 2012. Regulatory Impact Analysis: Final New Source Performance Standards and Amendment to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry. Tables 3.4 and 3.5. A*vailable at:* http://www.epa.gov/ttn/ecas/regdata/RIAs/oil_natural_gas_final_neshap_nsps_ria.pdf (190,000 to 290,000 short tons).
[11] EPA. March 2013. Draft Regulatory Impact Analysis: Tier 3 Motor Vehicle Emission and Fuel Standards, p. 7-42, Table 7-17. *Available at* http://www.epa.gov/otaq/documents/tier3/420d13002.pdf. However, Tier 3 is not primarily a VOC reduction strategy. ((61,370 short tons in 2020 and 128,332 short tons in 2025).
[12] EPA. November 1999. Phase II Reformulated Gasoline: The Next Major Step Toward Cleaner Air. *Available at:* http://www.epa.gov/oms/eparfg.pdf. This may actually overstate the VOC benefits of RFG because it appears that EPA is counting both VOCs and NOx in this figure. See also Final RFG RIA at p. 386, which puts VOC abatement from Phase 2 (or perhaps both Phases) at 42,000 tons per year. (64,000 tons per year from 1995-1999 and by 41,000 tons per year from 2000 on).
[13] EPA. November 1992. I/M Costs, Benefits, and Impact. Table 6-8. *Available at*: http://www.epa.gov/otaq/regs/im/im-tsd.pdf.
[14] Data from DI Desktop.