

Oil and gas methane pollution by the numbers

The final New-Source Performance Standards are projected to reduce methane emissions by **510,000 short tons a year**ⁱ (equal to 460,000 metric tons), by 2025.

By 2025, these methane reductions have the same 20-year climate benefitsⁱⁱ as:

- Burning 11 fewer **coal-fired power plants** every yearⁱⁱⁱ
- Taking 8.5 million **cars off the road** every year^{iv}

These rules will save **around \$100 million** in Americans natural gas that would have otherwise been wasted^v

The rule is expected to reduce 210,000 tons of VOCs and 3,900 tons of air toxics annually by 2025.

In 2014 the U.S. oil and gas industry released **9.8 million** metric tons of methane^{vi}.

This is **34% higher** than reported by earlier estimates^{vii}.

This methane has the same 20-year climate impact^{viii} as

- Burning almost **225 coal-fired power plants** for a year^{ix}
- Driving **2/3 of all of the cars in the U.S.** for a year (over 175 million cars)^x

This wasted natural gas is worth **almost \$2 billion**^{xi} and could have met the heating and cooking needs of **over 7 million homes** for a year.^{xii}

Oil and natural gas production is expected to rise by 13% and 9% respectively in the next decade.^{xiii}

All of the national actions proposed or announced to date will still leave methane from the vast majority, at least 75%, of all of the wells and oil and gas infrastructure in use today virtually unregulated.^{xiv}

Companies at **over 500 locations** around the country employ Americans who are plugging leaks and cleaning the air.^{xv}

PA

Pennsylvania oil and gas operators reported releasing **over 100,000** metric tons of methane in 2014.^{xvi}

This methane has the same 20-year climate impact^{xvii} as:

- **Burning 2 coal-fired power plants for a year**^{xviii}

- **Driving about 2 million cars** for a year^{xix}

This wasted natural gas is worth **over \$20 million^{xx}** and could have met the annual heating and cooking needs of **over 60,000 homes in Pennsylvania.^{xxi}**

OH

Ohio oil and gas operators reported releasing **over 22,000** metric tons of methane in 2014.^{xxii}

This methane has the same 20-year climate impact^{xxiii} as **driving over 400,000 cars** for a year^{xxiv}

This wasted natural gas is worth **over \$4 million^{xxv}** and could have met the annual heating and cooking needs of **over 12,500 homes in Ohio.^{xxvi}**

NM

New Mexico oil and gas operators reported releasing **nearly 200,000** metric tons of methane in 2014.^{xxvii}

This methane has the same 20-year climate impact^{xxviii} as:

- **Burning 4 coal-fired power plants for a year^{xxix}**
- **Driving over 3.5 million cars** for a year^{xxx}

This wasted natural gas is worth **nearly \$40 million^{xxxi}** and could have met the annual heating and cooking needs of **over 200,000 homes.^{xxxii}**

CO

Colorado oil and gas operators reported releasing **over 235,000** metric tons of methane in 2014.^{xxxiii}

This methane has the same 20-year climate impact^{xxxiv} as:

- **Burning 5 coal-fired power plants for a year^{xxxv}**
- **Driving over 4 million cars** for a year^{xxxvi}

This wasted natural gas is worth **over \$45 million^{xxxvii}** and could have met the heating and cooking needs of **over 160,000 homes** for a year.^{xxxviii}

ⁱ <https://www3.epa.gov/airquality/oilandgas/may2016/nsps-overview-fs.pdf>

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- ⁱⁱ This uses the 20-year Global Warming Potential of fossil fuel methane of 87, which includes carbon feedback and methane oxidation. Source: IPCC AR5 Ch 8 p. 714, see chart and note b https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, giving a carbon dioxide equivalent of 850,094,400 mt CO₂e
- ⁱⁱⁱ At GWP 25, 3,808,651 metric tons CO₂e/power plant from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>. Using the 87 GWP, this is 10.6 coal fired powered plants
- ^{iv} At GWP 25, 4.75 metric tons CO₂E /vehicle/year from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references> Using the 87 GWP, this is 8,474,064 cars.
- ^v Using 78.8% methane in natural gas, this is 643,821,391 Mcf of natural gas. At the \$3/Mcf this equals \$92 million. At \$4 this is \$122 million of natural gas.
- ^{vi} Methane emissions from natural gas and petroleum systems were equal to 244.2 mmt CO₂e in 2014, according to EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2014 <https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport.html>. Using a global warming potential (GWP) of 25 (as used by EPA per reporting requirements under the United Nations Framework Convention on Climate Change), this amount is equal to 9.77 mmt of CH₄.
EPA inventory of Greenhouse Gases and sinks
- ^{vii} The 2013 inventory, released April 2015, found methane emissions from natural gas and petroleum systems were equal to 182.6 mmt CO₂e, which using a global warming potential (GWP) of 25 is equal to 7.304 mmt of CH₄, 34% lower than 9.77 mmt of CH₄.
<https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Main-Text.pdf>
- ^{viii} This uses the 20-year Global Warming Potential of fossil fuel methane of 87, which includes carbon feedback and methane oxidation. Source: IPCC AR5 Ch 8 p. 714, see chart and note b https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, giving a carbon dioxide equivalent of 850,094,400 mt CO₂e
- ^{ix} At GWP 25, 3,808,651 metric tons CO₂e/power plant from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>. Using the 87 GWP, this is 223 coal fired powered plants
- ^x At GWP 25, 4.75 metric tons CO₂E /vehicle/year from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references> There are 253 million cars in the United States
<http://www.latimes.com/business/autos/la-fi-hy-ihs-automotive-average-age-car-20140609-story.html> Using the 87 GWP, this is 178,967,241 cars.
- ^{xi} Using 78.8% methane in natural gas, this is 643,821,391 Mcf of natural gas. At the \$3/Mcf this equals \$1,931,464,174 of natural gas. Average price per MMBtu from EIA (<https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm>) multiplied by EIA conversion of 1.032 MMBtu/Mcf (<https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>).
- ^{xii} US average home use 73.65 Mcf Natural Gas, as calculated by dividing total household natural gas consumption http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm by total residential natural gas customers http://www.eia.gov/dnav/ng/ng_cons_num_a_EPG0_VN3_Count_a.htm . Using 95% methane in pipeline quality natural gas, you get 534,032,902 Mcf of gas, which, divided by the household number is 7,250,699
- ^{xiii} Annual Energy Outlook 2015, <http://www.eia.gov/forecasts/aeo/>
- ^{xiv} See explanation here: http://blogs.edf.org/energyexchange/files/2016/05/75-percent-stat-explanation_HH.pdf
- ^{xv} Datu research 2014 report <https://www.edf.org/energy/us-methane-mitigation-industry>
- ^{xvi} 109,088 mt CH₄ Data from Subpart W of EPA's GHG Reporting Program. Production emissions allocated to each state based on percentage of production from each basin in the states <http://www2.epa.gov/ghgreporting>. Production information from DrillingInfo. Processing and transmission/storage emissions are given by point source. Does not include local distribution.
- ^{xvii} This uses the 20-year Global Warming Potential of fossil fuel methane of 87, which includes carbon feedback and methane oxidation. Source: IPCC AR5 Ch 8 p. 714, see chart and note b https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, giving a carbon dioxide equivalent of 9,490,656
- ^{xviii} At GWP 25, 3,808,651 metric tons CO₂e/power plant from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>. Using the 87 GWP, this is 2.5 coal fired powered plants
- ^{xix} At GWP 25, 4.75 metric tons CO₂E /vehicle/year from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references> Using the 87 GWP, this is 1,998,032 cars.

^{xx} Using 78.8% methane in natural gas, this is 7,187,775 Mcf of natural gas. At \$3/Mcf this equals \$21,563,325 of natural gas. Average price per MMBtu from EIA (<https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm>) multiplied by EIA conversion of 1.032 MMBtu/Mcf (<https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>) .

^{xxi} Average 2014 natural gas consumption per house in Pennsylvania is 94.03 mcf, as calculated by number of residential natural gas consumers by state, EIA website http://www.eia.gov/dnav/ng/ng_cons_num_a_EPG0_VN3_Count_a.htm and natural gas consumption in Pennsylvania: http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SPA_a.htm. Using 95% methane in pipeline quality natural gas, you get 5,962,070 Mcf of gas, which, divided by the Pennsylvania-specific household gas consumption is 63,406.

^{xxii} 22,455 mt CH₄. Data from Subpart W of EPA's GHG Reporting Program. Production emissions allocated to each state based on percentage of production from each basin in the states <http://www2.epa.gov/ghgreporting>. Production information from DrillingInfo Processing and transmission/storage emissions are given by point source. Does not include local distribution

^{xxiii} This uses the 20-year Global Warming Potential of fossil fuel methane of 87, which includes carbon feedback and methane oxidation. Source: IPCC AR5 Ch 8 p. 714, see chart and note b https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, giving a carbon dioxide equivalent of 1,953,585

^{xxiv} At GWP 25, 4.75 metric tons CO₂E /vehicle/year from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references> Using the 87 GWP, this is 411,280 cars

^{xxv} Using 78.8% methane in natural gas, this is 1,479,553 Mcf of natural gas. At \$3/Mcf this equals \$4,438,659 of natural gas. Average price per MMBtu from EIA (<https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm>) multiplied by EIA conversion of 1.032 MMBtu/Mcf (<https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>).

^{xxvi} Average 2014 natural gas consumption per house in Ohio is 97.62 mcf, as calculated by number of natural gas consumers by state, EIA website http://www.eia.gov/dnav/ng/ng_cons_num_a_EPG0_VN3_Count_a.htm and natural gas consumption in Ohio: http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SOH_a.htm. Using 95% methane in pipeline quality natural gas, you get 1,227,250 Mcf of gas, which, divided by the household number is 12,572.

^{xxvii} 193,729 mt. CH₄ Data from Subpart W of EPA's GHG Reporting Program. Production emissions allocated to each state based on percentage of production from each basin in the states <http://www2.epa.gov/ghgreporting>. Production information from DrillingInfo. Processing and transmission/storage emissions are given by point source. Does not include local distribution

^{xxviii} This uses the 20-year Global Warming Potential of fossil fuel methane of 87, which includes carbon feedback and methane oxidation. Source: IPCC AR5 Ch 8 p. 714, see chart and note b https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, giving a carbon dioxide equivalent of 16,854,423

^{xxix} At GWP 25, 3,808,651 metric tons CO₂e/power plant from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>. Using the 87 GWP, this is 4.5 coal fired powered plants

^{xxx} At GWP 25, 4.75 metric tons CO₂E /vehicle/year from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references> Using the 87 GWP, this is 3,548,298 cars.

^{xxxi} Using 78.8% methane in natural gas, this is 12,764,745 Mcf of natural gas. At \$3/Mcf this equals \$38,294,234 of natural gas. Average per MMBtu from EIA (<https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm>) multiplied by EIA conversion of 1.032 MMBtu/Mcf (<https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>).

^{xxxii} Average natural gas consumption per house in New Mexico is 52.69 mcf, as calculated by number of natural gas consumers by state, EIA website http://www.eia.gov/dnav/ng/ng_cons_num_a_EPG0_VN3_Count_a.htm and natural gas consumption in New Mexico: http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SNM_a.htm. Using 95% methane in pipeline quality natural gas, you get 10,588,020 Mcf of gas, which, divided by the household number is 200,949.

^{xxxiii} 235,804 mt CH₄. Data from Subpart W of EPA's GHG Reporting Program. Production emissions allocated to each state based on percentage of production from each basin in the states <http://www2.epa.gov/ghgreporting>. Production information from DrillingInfo Processing and transmission/storage emissions are given by point source. Does not include local distribution

^{xxxiv} This uses the 20-year Global Warming Potential of fossil fuel methane of 87, which includes carbon feedback and methane oxidation. Source: IPCC AR5 Ch 8 p. 714, see chart and note b https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, giving a carbon dioxide equivalent of 20,514,948

^{xxxv} At GWP 25, 3,808,651 metric tons CO₂e/power plant from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>. Using the 87 GWP, this 5.2 coal fired powered plants

^{xxxvi} At GWP 25, 4.75 metric tons CO₂E /vehicle/year from EPA <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references> Using the 87 GWP, this is 4,318,938 cars

^{xxxvii} Using 78.8% methane in natural gas, this is 15,537,054 Mcf of natural gas. At the \$3/Mcf, this equals \$46,611,161 of natural gas. Average price per MMBtu from EIA

(<https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm>) multiplied by EIA conversion of 1.032 MMBtu/Mcf.

(<https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>).

^{xxxviii} Average 2014 natural gas consumption per house in Colorado is 78.14 Mcf, as calculated by number of natural gas consumers by state, EIA website http://www.eia.gov/dnav/ng/ng_cons_num_a_EPG0_VN3_Count_a.htm and natural gas consumption in Colorado: http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCO_a.htm. Using 95% methane in pipeline quality natural gas, you get 12,887,577 Mcf of gas, which, divided by the household number is 164,929 homes.