



Colorado's oil and natural gas industry has greatly reduced its [emissions](#) over the past decade, even as oil and gas production in the state has increased. The reductions, made possible by increased technology and innovation, come at a time when Colorado legislators and regulators continue to target additional emissions reductions to combat global climate change.

2005 Baseline & Required Reductions

In 2019, [HB19-1261](#) set statewide greenhouse gas (GHG) emission reduction requirements from a 2005 emissions baseline. Baseline values and emission reductions must be measurable. To do so, GHG pollutants are quantified as carbon dioxide equivalents (CO₂e). In this manner, carbon dioxide, methane, water vapor, or any other GHG has a CO₂e value.

To guide emission reductions, the state drafted the Colorado [GHG Roadmap](#), with requirements for a 26-percent statewide CO₂e emissions reduction by 2025, 50 percent by 2030, and 90 percent by 2050, all from the 2005 baseline. Concurrently, the Air Quality Control Commission issued a [resolution](#) for the oil and natural gas industry to lower its emissions even further, to 13 Million Metric Tons (MMT) CO₂e by 2025 and to 8 MMT by 2030.

Different economic sectors present different challenges, with some sectors able to adjust in the near term while others must adjust over the long term. For example, reducing transportation emissions will be very complicated and take significant time. This motivated Colorado regulators and legislators to lean on two specific sectors that have experienced considerable innovation over the past decade: utilities and oil and gas. As a result, in 2021, [HB21-1266](#) placed an elevated proportional share of emission reduction requirements for these two sectors into state law, with a mandated drop in oil and natural gas emissions of 60 percent by 2030 from a [2005 baseline](#) of 19.945 MMT CO₂e. Consequently, 2030 emissions from this sector cannot exceed 7.978 MMT CO₂e.

Understanding Our Air

According to [NASA](#), Earth's air is 78 percent nitrogen, 21 percent oxygen, 1 percent argon, and 0.04 percent trace gases. It is within these trace gases where we find greenhouse gas (GHG) pollutants. The [EPA](#) explains that GHG emissions are 80 percent CO₂, 10 percent methane, 7 percent nitrous oxide, and 3 percent fluorinated gases. Water vapor is an important and sizable GHG, but it is left out in this case, as it is naturally occurring. However, without water vapor in the atmosphere the Earth would freeze.

CO₂ emissions are produced by combustion and remain in our atmosphere for 300 to 1,000 years, while methane lasts about 10 years. However, methane's global warming impact is estimated to be 28 times larger than CO₂ over a 100-year period. This is in part how CO₂ equivalents are calculated, allowing for an apples-to-apples comparison.

Some methane emissions are naturally occurring, from wetlands and even the ocean, but methane is also a key component of natural gas. Without regular maintenance to fix leaks and repair equipment, methane can be emitted during the development, transmission, and processing of oil and natural gas.

Emissions Reductions to Date

It's important to emphasize that while Colorado emission reduction targets will not be easily met, the oil and natural gas industry has been working for more than a decade on this difficult challenge.





DJ Basin – This basin is located along Colorado’s Front Range and produces a significant amount of oil and gas. Over 90 percent of the state’s oil comes from Weld County alone. The DJ Basin saw a five-fold increase in oil production between 2011 and 2018. At the same time emissions dropped, due to several [innovations](#) taking place in the field. Ramboll, a leading environmental health consultancy, conducted analysis of methane emissions in 2020 by using NASA’s Atmospheric Infrared Sounder ([AIRS](#)) satellite data. That [analysis](#) showed methane emissions peaking in 2013 at 39.8 parts per billion (ppb), and dropping 52 percent to 19.3 ppb by 2019 (chart below). This satellite data lines up with ground-based measurements that reveal similar decreases, according to Ramboll.

Piceance Basin – The Piceance is the second largest natural gas basin in the country, behind the Marcellus in Pennsylvania and Ohio, and it is located in western Colorado with a significant amount of dry gas production taking place in Garfield County. In 2020, Air Resource Specialists, an air quality monitoring firm, conducted analysis of Garfield County measurement data from 2008 to 2019. It’s important to note that while methane is a non-hazardous pollutant that does not have a reactivity rate high enough to produce ground-level ozone, it coexists with the volatile organic compounds (VOCs) that do produce ozone. That means environmental controls and techniques to reduce VOC emissions during oil and gas development also reduce methane.

In the [Garfield County analysis](#), four of five measurement sites experienced a 60 to 70 percent drop in VOC emissions between 2008 and 2019. When methane was measured in 2019 and compared to the VOC data, the results confirmed that low levels of methane match the low levels of VOCs, demonstrating that important co-benefit. This is significant for both air quality and efforts to reduce global climate change. That co-benefit is observed in the Front Range and on the Western Slope.

Monitoring & Emission Inventory

The Air Quality Control Commission (AQCC) adopted new rules that require ongoing air monitoring at oil and natural gas locations, as well as requiring companies to submit annual air [emissions inventory](#) data. That data was collected for the first time in 2020, and it confirms how far Colorado oil and natural gas emission have fallen. The Regional Air Quality Council ([RAQC](#)) has released emissions inventories for VOCs for years, showing significant reductions. As explained in the Piceance example above, methane does not have a high enough reactivity rate for the EPA to consider it a significant local source contributor to ozone formation, but it does coexist with VOCs. Efforts to reduce VOCs and ozone formation have included the co-benefit of reducing methane, and the new emissions inventory being managed by the state verifies these [sizable reductions](#).

In Summary

Colorado contributes only 0.213 percent to global greenhouse gas emissions levels. With state-of-the-art technology being deployed in Colorado’s oil and natural gas fields, coupled with environmental regulations considered to be the national gold standard, it is expected that the state’s emissions profile from this industry will continue to decrease in years to come.

Additional Resources & Information

For more graphs and examples, view the online version of this Fact Sheet:
www.coga.org/factsheets/climate-change-emissions

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