

June 16, 2020

Colorado Department of Public Health & Environment
Colorado Air Quality Control Commission
4300 Cherry Creek Drive South
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cdphe.aqcc-comments@state.co.us

Re: Policy Framework for Addressing Methane in Colorado's Greenhouse Gas Regulations

Dear Commissioners:

The Clean Air Task Force, Earthjustice, and Western Resource Advocates appreciate the Commissioners' discussion at the hearing on May 22 on how to advance policies to address greenhouse gas emissions in Colorado; in particular, we recognize the importance of addressing methane in Colorado's greenhouse gas regulations. We respectfully submit the attached memorandum discussing our recommended policy framework for addressing methane in Colorado's greenhouse gas regulations.

To address the climate crisis and to meet the greenhouse gas reduction goals of HB 19-1261, Colorado must reduce emissions of long-lived greenhouse gases such as CO₂ *and* short-lived climate pollutants like methane. Historically, climate mitigation policies have considered all pollutants in a single "basket," by measuring reductions in terms of CO₂ equivalence (CO₂e). This "single-basket" approach presents challenges in implementing rules to achieve the emission reductions in HB 19-1261 and may incentivize trade-offs between methane and long-lived climate pollutants. Instead of this approach, **we recommend that the AQCC adopt a "two-basket" policy framework, where short-lived and long-lived pollutants must each decline on a steady trajectory.** For example, a two-basket approach would require methane to be reduced by 50% below 2005 levels by 2030 *and* would require long-lived climate pollutants (e.g., CO₂ and N₂O) to be reduced by 50% by 2030. This framework would ensure that Colorado achieves the reductions in pollution necessary to address climate change.

The attached memorandum discusses our recommended policy framework in greater detail. Thank you very much for your consideration.

Respectfully submitted,

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Policy Framework for Addressing Methane in Colorado’s Greenhouse Gas Regulations

Clean Air Task Force, Earthjustice, and Western Resource Advocates
June 16, 2020

I. Summary

To address the climate crisis, states and nations must reduce emissions of long-lived greenhouse gases (GHGs), such as carbon dioxide (CO₂), *and* short-lived climate pollutants like methane: long-lived pollutants like CO₂ must be reduced immediately in order to avoid long-term warming and stabilize the climate, while short-lived pollutants like methane must also be rapidly reduced to slow the near-term rate of warming.

Colorado’s legislature established nation-leading, science-based climate goals through HB 19-1261, and directed the Air Quality Control Commission (AQCC) to enact regulations that ensure Colorado achieves those goals. The AQCC may evaluate different policies to achieve the emission reductions; those policies should ensure that Colorado adopts regulations that drive reductions in *both* long-lived and short-lived GHGs like methane.

Historically, most climate mitigation policies have considered the impact of greenhouse gases by determining the global warming equivalency between different pollutants as compared to CO₂, and measuring reductions in terms of CO₂ equivalence, or “CO₂e.” This approach requires the AQCC to make a policy decision about the appropriate time horizon over which to measure global warming equivalency, and can force trade-offs between methane and long-lived climate pollutants. Rather than pursuing this framework, which we characterize as a “single basket” framework, we recommend the AQCC adopt a “two-basket” policy framework. A two-basket policy framework would, for example, require short-lived climate pollutants like methane to be reduced by 50% below 2005 levels by 2030 *and* would require long-lived climate pollutants (e.g., CO₂ and N₂O) be reduced by 50% by 2030, thereby ensuring that Colorado is addressing the pollutants that drive long-term warming and those that can pose the risk of near-term climate tipping points.¹

The AQCC has the legal authority to adopt a two-basket approach for reducing statewide greenhouse gas emissions. The legislature has granted the AQCC broad discretion to adopt rules “consistent with” HB 19-1261. C.R.S. § 25-7-105(1)(e)(II). The two-basket approach will result in significant reductions in total net emissions, and is therefore consistent with HB 19-1261’s directive to “eliminate greenhouse gas pollution by the middle of the twenty-first century” and to

¹ The great majority of US HFC emissions (on a CO₂e basis) are gases with lifetimes below 50 years (~97% for 2018, according to USEPA), so it would be appropriate to group HFCs with methane in a “short-lived greenhouse gas” basket. Alternatively, HFC gases could be separated and listed separately, since HFC-23 and HFC-236fa have lifetimes over 100 years. Given the small contribution of these gases to total HFC emissions and total GHG, this level of specificity is not necessary, in our opinion.

For simplicity in the text, we refer to a CO₂ basket and a methane basket, rather than a long-lived GHG basket and a short-lived GHG basket.

achieve “at a minimum” a 26% reduction in greenhouse gas pollution by 2025, a 50% reduction by 2030, and a 90% reduction by 2050, as compared to 2005 levels. C.R.S. § 25-7-102(2)(g).

The following sections present greater detail on the scientific and practical reasons for adopting a two-basket approach and the legal authority of the AQCC to do so.

II. Background

Methane, the predominant short-lived climate pollutant, is emitted from numerous sectors, including oil and gas, agricultural operations, landfills, and municipal wastewater operations.² According to the 2019 Colorado GHG Inventory, entities emitted 0.96 million metric tons (MMT) of methane in 2005, increasing to an estimated 1.2 MMT in 2015.³

Methane is a relatively short-lived but potent greenhouse gas: it exists for about 12 years before it degrades to CO₂ and other products.⁴ Carbon dioxide, in contrast, lasts in the atmosphere for hundreds to tens of thousands of years.⁵ The amount of global climate change is based on the *concentration* of greenhouse gases in the atmosphere. Because CO₂ lasts for millennia, its concentration is based on cumulative emissions. Because methane lasts for 12 years, its concentration – and its effect on warming – declines rapidly after emissions of it cease.

The impacts of climate change depend on the rate of warming, the peak temperature, and the duration of warming.⁶ Emissions of CO₂ and other long-lived climate pollutants will predominantly determine the total magnitude of warming and peak temperatures; accordingly, to mitigate climate change, it is essential that we *rapidly* reduce CO₂. In the near-term, reducing

² The 2019 Colorado GHG Inventory indicates that very minor amounts of methane are emitted from residential, commercial, and industrial uses and electricity generation; coal mines emitted an estimated 1.9 MMTCO₂e in 2015.

³ Methane emissions are reported in terms of CO₂e in the 2019 Colorado GHG Inventory; these figures reflect a conversion to CH₄ based on the global warming potential of 25, used in the 2019 Inventory. Note that the State of Colorado is further evaluating emissions from the oil and gas sector, the top source of methane emissions in the state in 2015.

⁴ The chemical reactions also produce tropospheric ozone, stratospheric water vapor, and CO₂, each of which enhance the warming effect of methane. See Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 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 Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, at 697-698.

⁵ If a gigaton of CO₂ is emitted in 2020, approximately 70% would be fully absorbed by sinks within 100 years; an additional 10% is absorbed over the next 300 years, and the remaining 20% lasts for “tens if not hundreds of thousands of years before being removed.” The last 20 – 30% of the pulse of CO₂ emissions is absorbed by sinks through processes such as deep ocean circulation and the weathering of silicate rocks, which occur over very long time horizons. Yale Climate Connections, <https://www.yaleclimateconnections.org/2010/12/common-climate-misconceptions-atmospheric-carbon-dioxide/>

⁶ IPCC, 2018: Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

methane emissions could reduce the rate of temperature rise and help avoid tipping points in the broader climate system, such as irreversible effects on certain ecosystems or the melting of permafrost. However, if policies and resources are focused on reducing methane emissions *at the expense* of mitigating CO₂ emissions, they could inadvertently lock in greater long-term warming.

III. Effects of a “Single Basket” Approach and Choosing a Global Warming Potential

Under a “single basket” approach, the AQCC must determine the global warming potential (GWP) of methane, in terms of CO₂e. This creates challenges in implementing rules to achieve the emission reductions in HB 19-1261, because it requires the AQCC to make a determination of the appropriate time horizon over which the GWP is determined,⁷ and that determination has complex implications:

1. A higher GWP for methane, in line with more recent scientific assessments and more consideration of near-term impacts, reduces the need for near-term CO₂ mitigation.
2. Counter-intuitively, under a decarbonization policy, a higher GWP for methane can also *slow down* methane abatement in the near term.

Numerous stakeholders have recommended that the AQCC adopt the 20-year GWP for methane. Using the 20-year GWP may be appropriate in certain regulatory frameworks; however, in decarbonization programs, using a high GWP to determine CO₂-equivalency could have unintended consequences.

First, using the 20-year GWP would result in very high credit to investments to reduce methane, *at the expense of investments to reduce CO₂*. For example, under a market-based approach, if a polluter reduces one ton of methane emissions, which is counted as 86 tons of CO₂e (based on the 20-year GWP in AR5) rather than 34 tons of CO₂e (based on the 100-year GWP), that polluter will have effectively avoided an obligation to reduce 52 tons of CO₂ emissions. We expect that, particularly if the 20-year GWP is adopted, many polluters could seek low-cost methane emission reductions at the expense of making the CO₂ reductions needed to address climate change in the longer term.

Using a higher GWP for methane, such as the 20-year GWP, results in a second problematic and counter-intuitive outcome: it potentially *extends* the timeframe over which methane pollution is eliminated. Applying the higher GWP of methane increases the total emissions (in CO₂e) in the baseline year, which can allow polluters to reduce smaller volumes of methane (which are counted or credited at a higher value of CO₂e) to comply with the overall emissions reduction

⁷ The IPCC has published assessed values of the GWP as calculated over several time periods, typically 20, 100, and 500 years, but IPCC also makes clear that the choice among these time horizons cannot be scientifically determined. Rather, a policy decision must be made. See Myhre *et al.* (note 4 above) at 711,

obligation, especially in the initial years.⁸ In other words, using the higher GWP for methane can shrink the actual size of the methane reductions in early years. Meanwhile, using the higher GWP for methane will certainly delay actions to reduce CO₂.

While the examples above are most relevant to a market-based framework under which polluters may prioritize the most cost-effective emission reductions, it is also relevant to a traditional command-and-control type regulation. Under a command-and-control regulation, the AQCC must still determine whether a set of sector-specific regulations achieve the goals established by HB 19-1261; that determination requires establishing a GWP. Even if a 100-year GWP for methane is used, there is a risk that mitigation measures put in place by the AQCC will achieve the mandated reductions by relying heavily on methane abatement, and abating long-lived climate pollutants by significantly less than 26% by 2025 and 50% by 2030. This approach could lead to higher cumulative emissions of long-lived climate pollutants than would be allowed under a two-basket approach, and therefore lower climate benefits.

IV. Benefits of a “Two Basket” Approach

The “two basket” approach requires polluters to reduce *both* short-lived and long-lived pollutants by at least 26% by 2025 and at least 50% by 2030;⁹ importantly, it eliminates potential trade-offs between the two pollutants. The emission reductions could be achieved through sector-specific programs, where the AQCC adopts control regulations or emission limits that ensure methane emissions decline at the appropriate rate, and separate regulations to ensure CO₂ emissions decline at the appropriate rate.

The two-basket approach ensures that Colorado makes steady progress reducing emissions of both pollutants, and would incentivize the development of technologies to mitigate both methane and CO₂.

V. Legal Authority

The AQCC has the legal authority to adopt a two-basket approach for reducing statewide greenhouse gas emissions. House Bill 19-1261 requires Colorado to “eliminate greenhouse gas pollution by the middle of the twenty-first century” and to achieve “at a minimum” a twenty-six percent reduction in greenhouse gas pollution by 2025, a fifty percent reduction by 2030, and a ninety percent reduction by 2050, as compared to 2005 levels. C.R.S. § 25-7-102(2)(g). Unless

⁸ For example, consider a very simple scenario: a state’s baseline emissions are 100 tons of CO₂ and one ton of methane, the state makes annual reductions of 4%/year, and we assume that methane emissions are eliminated first, because they are the cheapest reductions. If methane is counted at the 100-year GWP, it is eliminated in seven years. If methane is counted at the 20-year GWP, it is eliminated in 12 years. (Both calculations reflect the GWP values in the IPCC’s fifth assessment report (AR5).) While this example is extreme, it illustrates the way that GWP does not work appropriately or intuitively in a single-basket decarbonization policy.

⁹ A similar approach was recently introduced in the discussion draft of the federal CLEAN Futures Act. <https://energycommerce.house.gov/sites/democrats.energycommerce.house.gov/files/documents/0128%20CLEAN%20Future%20Discussion%20Draft.pdf>

“the context otherwise requires,” “statewide greenhouse gas pollution” as used in the statute means “the total net statewide anthropogenic emissions of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride, expressed as CO₂e calculated using a methodology and data on radiative forcing and atmospheric persistence deemed appropriate by the commission.” *Id.* § 25-7-103.

The AQCC has broad authority to timely promulgate rules and regulations “consistent with” C.R.S. § 25-7-102. *Id.* § 25-7-105(1), (1)(e)(II). C.R.S. § 25-7-105 and C.R.S. § 25-7-140 provide certain requirements that the Commission *must* follow in promulgating these rules, such as the requirement to identify disproportionately impacted communities and the requirement for the Air Pollution Control Division to solicit input regarding different emissions mitigation measures. *Id.* §§ 25-7-105(1)(e)(III)–(IV), 25-7-140(2)(a)(III). But the legislature made it clear that the AQCC is “not limited to” the actions and measures specifically listed in the statute. *Id.* § 25-7-105(1). Accordingly, the AQCC may adopt any abatement approach, as long as it is consistent with the legislative directive to eliminate and reduce greenhouse gas pollution.

Adopting a two-basket approach is consistent with this directive. A two-basket approach treats long-lived gases and short-lived gases separately, and would result in a net reduction of statewide anthropogenic emissions expressed as carbon dioxide equivalent (CO₂e), thereby meeting the requirements of C.R.S. § 25-7-102(2)(g). For example, reducing emissions from long-lived gases by 50% and emissions from short-lived gases by 50% by 2030 will result in a net reduction of at least 50% of CO₂e by 2030. *See id.* § 25-7-102(2)(g). In fact, given that HB 19-1261 requires Colorado to eliminate greenhouse gas emissions by the middle of the twenty-first century, a two-basket approach is particularly appropriate because it abates long-term pollution more effectively than a single-basket approach does. *See supra* pages 3, 5.

Moreover, the definition of “statewide greenhouse gas pollution” states that the AQCC may use any methodology that it “deem[s] appropriate,” which suggests that the AQCC may take into account the unintended consequences of single-basket approaches and choose instead to use a two-basket approach to achieve CO₂e reductions. *Id.* § 25-7-103. The statute also states that the definition of “statewide greenhouse gas pollution” does not apply where “the context . . . requires.” *Id.* § 25-7-103. Because HB 19-1261 and SB 19-096 grant the AQCC broad discretion to promulgate and implement abatement measures, this context further suggests that the AQCC may adopt a two-basket approach.

In sum, the two-basket approach clearly conforms to the text of Colorado’s climate legislation, and will advance the end to be achieved by House Bill 19-1261. *See Klinger v. Adams Cty. Sch. Dist. No. 50*, 130 P.3d 1027, 1031 (Colo. 2006) (in certain circumstances, courts will look to “the consequences of a given construction, and the end to be achieved by the statute” in construing statutory language). The purpose of Colorado’s climate legislation is to reduce and eliminate greenhouse gas pollution in Colorado. *See* C.R.S. § 25-7-102(2). A two-basket approach would not only help to achieve greenhouse gas pollution reduction but would also likely achieve it more effectively than single-basket approaches. As such, the two-basket approach is consistent with the text and purpose of House Bill 19-1261, and the Commission has the authority to adopt it.

VI. Policy Recommendation

Methane is a powerful global warming pollutant and is usually co-emitted with other pollutants. Policies should work to reduce it quickly, *in parallel with* rapid reductions in long-lived global warming pollutants like CO₂.

The AQCC should adopt a “two-basket” approach, where short-lived climate pollutants like methane and long-lived climate pollutants like CO₂ must each decline on a steady trajectory, ensuring that Colorado achieves the overall reductions pollution that are needed to address climate change. Reducing methane – particularly leaks from oil and gas wells – has proven to be cost-effective, and may enable the state to reduce methane by more than the statutory targets. The AQCC has the clear authority to adopt rules that reduce more than 50% of net statewide emissions. *See id.* §§ 25-7-102(2)(g), 25-7-105(1)(e)(II). In future years, the AQCC should evaluate whether to increase its ambition in reducing methane emissions; the AQCC can do so within the two-basket approach.