



May 13, 2020

Colorado Department of Public Health and Environment
Colorado Air Pollution Control Division & Colorado Air Quality Control Commission
4300 Cherry Creek Drive South
Denver, CO 80246
cdphe.commentsapcd@state.co.us
cdphe.aqcc-comments@state.co.us

Colorado Energy Office
1600 Broadway, Suite 1960
Denver, CO 80246
coloradoenergyoffice@state.co.us

Submitted via Email and [Online](#)

cc: Will Toor, Keith Hay, John Putnam, Garry Kaufman, Clay Clarke, Patrick Cummins

Re: [Comments by Environmental Defense Fund and Western Resource Advocates on the Colorado GHG Pollution Roadmap](#) modeling effort (“Roadmap”)

Environmental Defense Fund (“EDF”) and Western Resource Advocates (“WRA”) submit the following comments regarding the effort underway by the Air Pollution Control Division (“APCD”) of the Colorado Department of Public Health and Environment (“CDPHE”), the Colorado Energy Office (“CEO”) and other state agencies to “assess the effects of the 2019 policy changes on meeting the state’s GHG pollution targets, and evaluate potential pathways towards the state’s GHG pollution reduction goals.” EDF and WRA appreciate the opportunity to comment on the state roadmap effort, both through participation in the environmental non-governmental organization “stakeholder meeting” held on March 20th and through submission of these comments through the online form.

The Air Quality Control Commission (“AQCC”) is responsible for ensuring Colorado meets the science-based greenhouse gas reductions required under Colorado law. To meet this challenge, the AQCC must primarily adopt implementing regulations that are:

- **quantifiable** and capable of meeting Colorado’s climate goals;
- **enforceable**, providing a critical backstop to voluntary or incentive-based efforts; and

- **equitable**, by relieving burdens on communities that have historically been disproportionately impacted by pollution and poor air quality.

The Roadmap should be designed and tailored to provide insights that inform the AQCC’s fulfillment of these critical statutory requirements.

Our comments focus on four core areas: 1) ensuring that the analysis is calibrated appropriately to inform the development of regulations by the AQCC to achieve Colorado’s statutorily mandated greenhouse gas reduction goals; 2) generating a true “base case” or “business-as-usual” scenario that accurately reflects current state policy, from which to evaluate the mitigation scenarios; 3) focusing mitigation scenario modeling on regulatory policy tools that can be deployed by the AQCC to achieve state mitigation requirements; and 4) using draft results to inform the required July 1, 2020 regulatory proposal.

I. The Roadmap Analysis Should Inform AQCC Development and Adoption of Rules and Regulations to Achieve Colorado’s Greenhouse Gas Reduction Requirements

In 2019, the Colorado legislature acted to address the substantial and imminent threat posed by climate change by passing groundbreaking climate legislation. This legislation vests the AQCC with new authority and, critically, new obligations to combat climate change. Two pieces of 2019 legislation are of particular relevance to the roadmap effort: House Bill 19-1261, which sets binding statewide GHG emission reduction goals for the years 2025, 2030, and 2050,¹ and Senate Bill 19-096, which, among other obligations, requires the Commission to propose “rules to implement measures that would cost-effectively allow the state to meet its greenhouse gas emission reduction goals.”²

Because the AQCC is the expert state agency with the sole responsibility and authority to craft a regulatory program that achieves the science-based GHG reduction goals established by H.B. 19-1261, the Roadmap should be focused on measures that are within the AQCC’s jurisdiction and control.

The Colorado Air Pollution Prevention and Control Act (“APPCA”), as amended by H.B. 19-1261 and S.B. 19-096, **expressly and exclusively assigns the responsibility to achieve GHG reduction goals to the AQCC.**³ Other agencies cannot assume any of the AQCC’s responsibilities because those other state agencies are not subject to carefully designed statutory instructions as to the development of rules and regulations.⁴ While complementary actions by other agencies can be taken into account as the AQCC crafts its rules and regulations, the AQCC

¹ H.B. 19-1261, 72d Gen. Assemb., First Reg. Sess. (Colo. 2019), 2019 Colo. Sess. Laws 3262–69 (codified at §§ 25-7-102, -103, -105, C.R.S. (2019)).

² *Id.* § 25-7-140(2)(a)(III).

³ C.R.S. § 25-7-105(1)(e)(II).

⁴ *See* C.R.S. § 25-7-105(1)(e)(II), (IV), (VI).

may not rely on other agencies' ongoing initiatives to satisfy the AQCC's legal obligation to ensure rules and regulations are in place to meet the goals.

Moreover, the plain language and context of the APPCA make clear that the rules and regulations that the AQCC adopts must comprise measures that ensure definite, quantifiable, enforceable reductions of statewide GHG pollution. Because Colorado's goals are binding reduction requirements⁵ that equate to specific numerical emission limits, policies that do not guarantee quantifiable and enforceable emission reductions are not "consistent with" these goals.

Comprehensive and swift action is critical to achieving the state's GHG emission reduction targets. A recent analysis by M.J. Bradley & Associates ("GHG Abatement Report") found that absent *significant* additional action (with ambition greater than recent or currently contemplated efforts), the state is likely to significantly fall short of its goals.⁶ According to the GHG Abatement Report, to achieve Colorado's statutory emission reduction targets, state GHG emissions must be reduced by 32 million and 62 million metric tons carbon dioxide equivalent ("CO₂e") below 2005 emission levels in 2025 and 2030, respectively.⁷ The same report projects that under current policies and relative to 2005 levels, Colorado's emissions will decline by only 2 million and 16 million metric tons CO₂e in 2025 and 2030, respectively—creating an emission reduction gap of 30 million metric tons CO₂e in 2025 and 46 million metric tons CO₂e in 2030.⁸ **In other words, current efforts will secure merely 6.25% of the reductions required by 2025—five short years away.**

As such, EDF and WRA recommend that the GHG Roadmap effort *focus on identifying and evaluating the binding rules and regulations that can be adopted by the AQCC to meet the statutory obligations in the APPCA*. While it is clear that other state agencies, local governments, and the legislature will be valuable partners in advancing decarbonization policies, the AQCC has the authority and sole responsibility to *ensure* Colorado achieves its 2025, 2030, and 2050 emission goals.

II. "Business-as-Usual" and "2019 Action" Scenarios Should Accurately Reflect Current State Law

Over the past ten years, and in particular over the past 16 months, Colorado has made significant progress in advancing clean energy policies. This progress should be accurately and

⁵ The APPCA commands that the AQCC's rules and regulations be "[c]onsistent with section 25-7-102(2)(g)," C.R.S. § 25-7-105(1)(e)(II), which sets forth the binding numeric GHG reduction goals.

⁶ M.J. Bradley & Associates, LLC, Colorado's Climate Action Plan Emission Targets: Illustrative Strategies and GHG Abatement Potentials (Feb. 28, 2020) ("GHG Abatement Report"), <https://www.mjbradley.com/reports/colorado%E2%80%99s-climate-action-plan-emission-targets-illustrative-strategies-and-ghg-abatement>.

⁷ *Id.* at 6.

⁸ *Id.* The emissions projections used in the GHG Abatement Report are derived from the Rhodium Group's U.S. Climate Service. *Id.* at 4. The projections are "broadly in agreement" with emissions projections made by CDPHE, and the GHG Abatement Report therefore uses the Rhodium Group projections as the basis for this analysis.

fully reflected in the “business as usual” or reference scenario. However, the AQCC and stakeholders would benefit from a clear delineation between currently adopted and *enforceable* policies and those that reflect goals, and should ensure all policies are accurately modeled. For example, while Governor Polis’ executive order on electric vehicles provides important, aspirational policy direction, it does not reflect actions or investments that are enforceable. Thus, the goals set forth in that executive order cannot and should not be considered “business as usual” at this point.

The “Business-as-Usual” or reference scenario in the GHG roadmap should reflect all currently adopted state policies, including Colorado’s adoption of low- and zero-emission vehicle standards⁹, the new oil and gas control measures adopted by the Colorado AQCC in December 2019, and coal plant retirements that have already been approved by an appropriate regulatory body, such as the Colorado Public Utilities Commission (“PUC”). The “Business-as-Usual” scenario should also reflect the latest fuel price and technology cost projections. We commend the state for relying on data sources such as the Energy Information Administration’s (“EIA”) Annual Energy Outlook in addition to Colorado-specific data, and recommend that the state ensure that the fuel and technology cost assumptions used reflect the latest projections and are consistent with current trends, such as increasingly low natural gas price projections and declining renewable costs as reflected in the National Renewable Energy Laboratory’s (NREL) Annual Technology Baseline costs for renewables¹⁰.

It is critical that any emission reductions resulting from *economic* decisions in the PATHWAYS model are clearly specified. For example, if the PATHWAYS model economically retires a unit or significantly changes its operations in a manner inconsistent with plans that have been approved by the utility’s regulators or air quality regulators, that should be clearly noted.

In addition, under all scenarios (both baseline and any mitigation scenarios), we encourage the state to provide stakeholders with key modeling assumptions, which will improve transparency and the robustness of the modeling results. Specifically, the state should provide data regarding projected demands and their drivers, fuel and technology price forecasts, and the policy assumptions under each scenario modeled.

Finally, the APPCA defines statewide greenhouse gas pollution in terms of net anthropogenic emissions.¹¹ As such, we recommend that the baseline scenario(s) as well as mitigation scenarios reflect net emissions.

⁹ State of Colorado, Department of Public Health and Environment, Air Quality Control Commission, Regulation Number 20, “Colorado Low Emission Automobile Regulation,” (September 30, 2019), available at: <https://drive.google.com/file/d/1LmJQHfKUKzG6HuAKDZ0xzDO4MJMchxxA/view>.

¹⁰ The GHG Abatement Report relied upon greenhouse gas emission projections for Colorado from the Rhodium Group’s U.S. Climate Service, which used EIA’s 2019 Annual Energy Outlook high oil and gas resource and technology side case to reflect low natural gas price projections and NREL’s 2018 Annual Technology Baseline’s mid-cost projections for renewables. GHG Abatement Report at 4.

¹¹ C.R.S. § 25-7-103(22.5).

1. “2019 Action” scenario, as currently crafted, is more appropriately a mitigation scenario

The “2019 Action” scenario described in the February AQCC presentation includes additional measures that are not currently “on-the-books” – i.e., not considered existing state policy – or are not currently enforceable. As a result, key elements of this scenario are more appropriately considered as part of a mitigation scenario reflecting potential future policy. EDF and WRA recommend that the roadmap collapse the “Business-As-Usual” and “2019 Action” scenarios into one “Business-As-Usual” scenario that accurately captures policies adopted in 2019. (Alternatively, the Roadmap could portray the “2019 Action” scenario as a mitigation scenario.) However, if the “2019 Action” scenario remains and continues to be characterized as business-as-usual based on 2019 action, the state should adjust it in the following ways:

i. Fuel Price and Technology Cost Assumptions

The state should ensure that the fuel price and technology cost assumptions used in the “2019 Action” scenario reflect the latest projections and are consistent with current trends, as discussed in our comments above on the “Business-as-Usual” scenario.

ii. Transportation

The “2019 Action” scenario in the GHG roadmap includes a Navigant-modeled scenario of 42% zero-emission vehicle (ZEV) sales by 2030. We understand this is meant to reflect Colorado’s adopted goal of 940,000 electric vehicles on the road by 2030. We encourage the state to provide more clarity surrounding the assumptions embedded in the 42% ZEV sales by 2030 assumption, such as stock turnover, to better understand how that level of ZEV penetration translates into electric vehicles on the road and reduced emissions from internal combustion vehicles. Importantly, the 940,000 electric vehicles on the road by 2030 is an aspirational goal that is not enforceable and does not represent any binding policy in Colorado, and therefore should not be included as part of any business-as-usual scenario based on 2019 action. If 940,000 electric vehicles by 2030 is assumed as part of any *mitigation* scenario, it is also important to ensure that there are policies modeled that will guarantee actual deployment at those levels.

iii. Power Sector

The “2019 Action” scenario models a hard cap on power sector emissions, one reflecting an 80% reduction of greenhouse gas emissions below 2005 levels by 2030 achieved by *all* Colorado electric generators, effectively eliminating coal. We are concerned that this assumption does not accurately reflect current state law. For example, S.B. 19-236 requires that utilities with

more than half a million customers in Colorado reduce carbon dioxide emissions associated with electricity sales by 80% in 2030 relative to 2005 levels. Only one utility – Public Service Company of Colorado (“PSCo”) – had more than 500,000 customers in Colorado in 2018.¹² No existing statute, AQCC rule, or PUC rule requires an 80% reduction in emissions from all Colorado electricity generation facilities, as was modeled in the “2019 Action” scenario.

Similarly, the recently adopted legislation requiring the PUC to consider the social cost of carbon in some contexts should not be interpreted or modeled as a requirement that all electricity generation plants within the state dispatch in accordance with an internalized social cost of carbon. S.B. 19-236 requires electric utilities regulated by the PUC to consider the social cost of carbon in the development of electric resource plans and in other proceedings in which a utility may acquire or retire new generating resources. Modeling the social cost of carbon is critical to fully evaluating the cost of pollution, and will likely affect those regulated utilities’ investment choices; however, it is less likely to affect the *dispatch* of existing resources. Nor will S.B. 19-236 impact investment or retirement decisions by unregulated utilities. If E3 and the state choose to incorporate the social cost of carbon in the PATHWAYS model, they should do so in a way that is consistent with the legislation and near-final PUC rules.

Finally, given that the S.B. 19-236 requirement to reduce carbon dioxide emissions by 80% is specific to emissions associated with electricity serving Colorado customers, the modeling should account for electricity that is imported into the state of Colorado.

iv. Oil and Gas Methane

Both the “Business-As-Usual” and “2019 Action” scenarios assume Colorado’s methane emissions remain constant at 2005 levels. This reflects a significant data gap in the roadmap analysis, potentially skewing the state’s emission projections in 2025 and 2030 considerably: according to Colorado’s GHG Inventory, emissions from oil and gas increased from 8.1 million tons CO₂e in 2005 to 15.6 million metric tons in 2015.¹³ It is critical to ensure Colorado’s inventory and future projections of methane emissions from the oil and gas sector are reasonably accurate given both the substantial share of the total state inventory that those emissions comprise and the significant opportunities for mitigating the oil and gas sector’s methane emissions going forward.

A recent EDF analysis estimates Colorado’s oil and gas sector methane emissions increasing substantially into the future. The analysis first developed an estimate of updated 2015 Colorado methane emissions using recent, peer reviewed scientific studies, which show that

¹² GHG Abatement Report at 4.

¹³ State of Colorado, Department of Public Health & Environment, “Colorado Greenhouse Gas Inventory 2019 Including Projections to 2020 & 2030,” (December, 2019), available at: <https://www.colorado.gov/pacific/cdphe/colorado-greenhouse-gas-reports>

existing inventories often underestimate oil and gas sector methane emissions.¹⁴ These updated 2015 values were then projected forward using Colorado-specific energy production trends from Rystad.¹⁵ The analysis then assessed the impact of existing federal and state methane regulations, ensuring that, where regulatory requirements overlap, the most protective standards were applied to avoid any double counting.¹⁶ Using this methodology, EDF estimated Colorado oil and gas methane emissions of 16.9 mmtCO₂e in 2025 and 15.5 mmtCO₂e in 2030.

The methodologies EDF utilized to develop this estimate are broadly consistent with those used to develop other inventories. For instance, EPA’s Greenhouse Gas Inventory has updated some baseline emission values using findings from the recent Alvarez *et al.* study¹⁷ and relies on similar mitigation assumptions. Though the EDF methodology is more granular than the one Colorado applied in its recent inventory updates, the results of those two analyses are very consistent.¹⁸ For instance, Colorado’s recent inventory projects methane emissions of 15.32 mmtCO₂e in 2030.

Accordingly, we urge that the roadmap reflect a similarly rigorous approach to assessing oil and gas sector methane emissions.

¹⁴ Emission inventories were developed for 2015 in the following manner. Production source-specific emissions were calculated using a combination of EPA Greenhouse Gas Reporting Program data and previously published measurement studies, as reported in Alvarez et al 2018 for the alternative inventory (section S1.4). For the gathering and boosting segment, total methane emissions from gathering stations, pipelines, and blowdowns were estimated according to the methods outlined in Alvarez et al 2018, section S.1.1. For 2015, the transmission, storage, processing, and distribution segments, total U.S. emissions were taken from Alvarez et al 2018 and disaggregated between states and sources based on the following activity factors: Processing emissions were disaggregated by state based on percent of gas processed (EIA). Transmission emissions were disaggregated by state based on transmission pipeline miles (PHMSA). Storage emissions were disaggregated by state based on total storage capacity (EIA). Distribution emissions were disaggregated by state based on gas delivered to customers (EIA). For each of these segments, emissions were disaggregated by source based on the 2018 GHGI.

¹⁵ Depending on the emission source, scaling is done by either oil, gas, or oil+gas energy growth rates. Some emission sources, such as distribution, are held constant.

¹⁶ Reductions from both federal and state standards are based on a mix of supporting documentation (such as Technical Support Documents), emissions modeling, and engineering judgment. For regulations based on an emission threshold, the percentage of emissions covered was calculated from site-specific emission estimates drawn from the synthesis model (Alvarez et al 2018). When these emission thresholds are VOC-based, methane-to-VOC ratios are taken from the EPA Oil and Gas Tool. When regulations depend on location (such as specific to the non-attainment area), GIS mapping was used to determine what percentage of emissions would be covered. On December 19, 2019, the AQCC revised portions of the existing oil and gas control measures, including LDAR requirements for some well production facilities and control of emissions from storage tanks. Reductions attributable to those measures – which the APCD projects to be about 5,000 tons methane (125,000 tons in CO₂e terms) per year—are not included in the baseline.

¹⁷ Alvarez et al., Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain, 361 SCIENCE, 186–188 (2018).

¹⁸ Colorado Department of Public Health and the Environment, Colorado 2015 Greenhouse Gas Inventory Update including Projections to 2020 and 2030, <https://drive.google.com/file/d/1TxyoktxCOLFd6CaUKZzeqsKgEIHMjdtq/view>.

v. LULUCF

The “Business-as-Usual” and “2019 Action” scenarios included in the GHG roadmap should accurately account for all sources of greenhouse gas emissions including land use, land-use change, and forestry (“LULUCF”). It is unclear whether the total greenhouse gas emissions and targets presented in E3’s Roadmap presentation to the AQCC in February represent net greenhouse gas emissions (net of LULUCF) or gross greenhouse gas emissions. For consistency and ease of comparability, we recommend that the Roadmap account for LULUCF in both historic and projected emissions and as part of determining the state’s targets in tonnage terms.

CDPHE’s 2019 Colorado GHG inventory included a wide range of historic LULUCF related sequestration – for example, the inventory estimated 7 million metric tons were sequestered in 2015, compared to just 2 million metric tons in 2005.¹⁹ Rhodium Group’s U.S. Climate Service baseline projections for Colorado, upon which the GHG Abatement Report relied, included average LULUCF-related sequestration of 1.9 million metric tons in 2030.²⁰ These marked differences in LULUCF-related sequestration estimates are a primary driver²¹ behind the seeming near-term growth in total *net* greenhouse gas in the GHG Abatement Report between historic 2015 emissions, which reflect CDPHE’s most recent inventory, and post-2015 emissions, which are based on Rhodium business-as-usual projections.²² As such, differences in LULUCF estimates may meaningfully impact the calculation of total net greenhouse gas emissions. It is important to ensure that LULUCF values are as accurate, and the methods used to estimate them as consistent as possible. We recommend the state work with E3 to identify and develop methods to account for LULUCF such that estimates are consistent across historic and projected emissions and in any assessment of progress towards achieving the state’s targets.

vi. Demand Forecasts

It is unclear whether or how the current health crisis will affect Colorado’s near- and long-term economic growth and energy demands. When updating the “Business-As-Usual” and mitigation scenarios to reflect revised economic projections, the state should prepare a BAU sensitivity and reflect an uncertainty range. Under the most stable times BAU projections are best presented as a range of possible futures; this is particularly important now given the significant uncertainty about the depth and length of any potential economic recession. The economic growth of the last decade could have been hard to predict when the Great Recession began in late 2007, and it would be unwise for Colorado to plan against an artificially economically-constrained future.

¹⁹ State of Colorado, Department of Public Health & Environment, “Colorado Greenhouse Gas Inventory 2019 Including Projections to 2020 & 2030,” (December, 2019), available at:

<https://www.colorado.gov/pacific/cdphe/colorado-greenhouse-gas-reports>

²⁰ GHG Abatement Report at 4.

²¹ Other drivers include changes in emissions from certain economic sectors

²² *Id.* at 5.

III. Mitigation Scenarios Should Be Modeled to Accurately Reflect the Impact of Policies, and Scenarios Should Ensure the State Targets Are Achieved

The APPCA requires that the AQCC “timely promulgate rules and regulations” consistent with the statutory directive to reduce Colorado’s greenhouse gas pollution, and requires that the regulations are revised over time to ensure “timely progress” towards the targets. The greenhouse gas reduction targets are definitive, quantitative legal requirements, and as such the regulations adopted by the AQCC – and the Roadmap analysis informing the development of those regulations – must similarly be quantitative and reflect emission reductions that are certain to occur, not hypothetical or aspirational reductions.

Further, the Roadmap should accurately quantify the “gap” using this more precise modeling approach in 2025, 2030, and 2050 based on both 2015 actual emissions and projected emissions (under adjusted baseline assumptions as suggested in Section II above). Such a recalibrated baseline should be inclusive of all current state policies (i.e., any policies adopted by May 2020). The roadmap should then evaluate the mitigation potential from a particular policy or policy scenario *relative to this recalibrated baseline projection*.

However, based on the approach taken to-date modeling the “2019 Action Scenario,” EDF and WRA are concerned that “mitigation policies” may be modeled in a manner that doesn’t accurately reflect a reasonable outcome *attributable to* that particular policy driver. For example, as outlined in Section II above, S.B. 19-236 requires an 80% reduction in CO₂ emissions from retail sales from the state’s largest utility. However, that policy was modeled in the “2019 Action Scenario” as a binding cap— an 80% reduction of emissions from *all Colorado generation*. This is a *substantial* difference; while the Clean Energy Plan provisions in state statute may encourage others to voluntarily commit to achieving reductions, they do not require it, and achieving these emission reductions is not a certainty nor a logical outcome attributable to S.B. 236. Therefore, this type of approach is not appropriate for modeling policies in either of the two baseline cases (“Business-as-Usual” and “2019 Action”), **nor is it an appropriate approach for policies modeled in the mitigation policy scenarios**. We urge the APCD and CEO to work with E3 to ensure all mitigation policies are reflected precisely in the model.

a. Mitigation Strategies Should Be Enforceable and Capable of Securing Quantifiable Reductions that Close the 2025 and 2030 Gaps

It is essential that the Roadmap identify the specific, enforceable rules and regulations that can be adopted to close the 2025 and 2030 gaps between projected emissions and Colorado’s required reduction targets. Consistent with the AQCC’s obligations under the APPCA as outlined in Section I above, the GHG roadmap effort should focus on specific mitigation strategies that ensure **enforceable, quantifiable, and definite reductions** and policies the AQCC can implement under current law.

In 2017, E3 developed a [Scoping Plan](#) for the state of California (“2017 Scoping Plan”) following the passage of [2016 legislation](#) mandating the state achieve a 40% reduction in greenhouse gas emissions below 1990 levels by 2030.²³ The scoping plan outlines a core consideration in the analysis: “since the statutory direction on meeting a 2030 GHG target is clear, the issue of certainty of reductions is paramount.” EDF and WRA would urge CEO, APCD, and E3 to take a similar approach in Colorado – the statutory directive is clear, and the certainty of reductions is critical. More importantly, given the short window in which the state must achieve the emission reduction goals, it cannot risk pursuing strategies for which success is uncertain to the detriment of pursuing those strategies that can result in guaranteed reductions. When modeling sector-specific strategies, we would urge the roadmap effort to prioritize strong actions in a wide variety of sectors, including specific required reductions for all large GHG sources and regulating industrial sources through command and control strategies.

In contrast, the Colorado Roadmap process does not appear adequately focused on the specific policies that would ensure the GHG reduction goals are met. The [Roadmap presentation](#) from the April 16th AQCC meeting illustrates²⁴ that significant system-level changes need to take place with regard to how Colorado produces and consumes energy. The ‘wedges’ in the presentation slides are broadly consistent with conventional understanding of the scale of changes needed from the energy system to be on track for deep-decarbonization by mid-century. Yet, the critical question for the Roadmap process, however, is to outline what *rules and regulations* the AQCC can put in place to secure the required reductions in statewide greenhouse gas pollution and enable this shift to a cleaner energy system.

For example, rather than modeling the emission reduction potential associated with securing the deployment of a specific number of electric vehicles on the road (one of the “policies” modeled in the “2019 Action Scenario”), the roadmap should model the rules and regulations that would either ensure that level of EV deployment *or* secure a commensurate reduction in pollution from transportation fuels. Such policy options for the transportation sector could include putting a declining emissions cap in place for on-road transportation fuel emissions, deploying advanced greenhouse gas vehicle standards as permitted under federal law, and zero emission vehicle sale mandates.

More broadly, sector-specific mitigation scenarios should include emission control strategies that *guarantee* the overall level of pollution remaining (for instance, sector-specific or source-specific pollution limits, such as the “80% cap” on the power sector that was modeled in the “2019 Action Scenario”) as well as performance standards—control strategies that secure quantifiable, definite reductions from business-as-usual, but under which overall pollution outcomes still vary by industrial activity levels. Performance standards can include requirements for emission control technologies (such as no-bleed pneumatic controllers, or carbon capture and sequestration requirements for stationary sources of carbon pollution), or policies that require improved emissions performance per unit of output (i.e., requiring 20% efficiency improvements at all industrial sources, or reducing the carbon intensity of transportation fuels sold).

²³ This reduction trajectory is comparable to Colorado’s obligation under HB19-1261.

²⁴ See slides 16-17.

b. Mitigation Strategies Should Include Comprehensive Mechanisms

Colorado’s emissions gap is substantial; achieving the state’s emission reductions and catalyzing a 100% clean economy that is equitable and innovative will likely require a broad set of strategies. EDF and WRA recommend that the roadmap effort not prematurely take policies off the table that have effectively achieved emission reductions in jurisdictions across the country and internationally, including policies that establish—and therefore guarantee—emission limits for regulated sources.

Moreover, the APPCA directs the AQCC to propose regulations by July 1, 2020 that “would *cost-effectively* allow the state to meet its greenhouse gas emission reduction goals.”²⁵ The APPCA also directs the AQCC to consider whether “greater or more cost-effective emission reductions are available through program design,”²⁶ and explicitly authorizes the use of “regulatory strategies that have been deployed by another jurisdiction to reduce multi-sector greenhouse gas emissions” and those “that enhance cost-effectiveness, compliance flexibility, and transparency around compliance costs.”²⁷ Programs that establish an overall cap on emissions and allow emission credit trading have proven highly cost-effective for reducing emissions in other jurisdictions. Given these statutory directives and considerations, the GHG roadmap should evaluate the role that multi-sector policies can play in cost-effectively achieving the statewide greenhouse gas emission reduction goals—and specifically the role that flexibility mechanisms such as the use of a carbon market can play in enabling lower-cost compliance. Mitigation scenarios should evaluate the deployment of a cap and trade program in Colorado – as well as the opportunity for even more cost-effective reductions to be secured by developing a program that links with another state or a regional program.

As the scoping plan E3 developed for California outlined,

the Cap-and-Trade Program is fundamental to meeting California’s long-range climate targets at low cost... California’s response to climate change has led to many innovative programs designed to reduce GHG emissions, including the Renewable Portfolio and Low Carbon Transportation Standards, **but the Cap-and-trade program guarantees GHG emissions reductions through a strict overall emissions limit that decreases each year, while trading provides businesses with flexibility in their approach to reducing emissions.**

E3’s California analysis further confirms that between 2020 and 2030, due to a variety of uncertainties (such as efficacy of particular sector-specific reduction strategies, projected economic growth and carbon intensity of the economy) the role that the cap plays relative to reductions driven by other policies can vary— it is designed to “fill the gap in the required emissions reductions over and above what is achieved by the prescriptive measures.” The report further explains that because “total required emissions reductions are uncertain, and the

²⁵ C.R.S. § 25-7-140(2)(a)(III) (emphasis added).

²⁶ C.R.S. § 25-7-105(1)(e)(VI)

²⁷ C.R.S. § 25-7-105(1)(e)(V)

emissions reductions achieved by the prescriptive measures are uncertain” the cap will “backstop” the remaining reductions required to hit the statutory goals. Indeed, E3’s uncertainty analysis for the California scoping plan estimated that the average emission reductions achieved by the cap was about 30 percent higher than the Scoping Plan estimate. In short—even with the other ambitious performance standards modeled as part of the scoping plan, there is uncertainty about the emissions outcomes of those policies and therefore it is critical to have a mechanism in place that *guarantees* the state achieves the required overall greenhouse gas emission reductions.

While a pathways/wedges modeling approach can provide a valuable sense of the scale of emissions reductions necessary from particular sectors (and the types of emission reductions that could be expected from particular system-level changes), we inherently have imperfect foresight into the level of emission reductions that can be achieved with each specific source or sector. Policies that provide for flexibility and foster innovation can help some sectors over-perform relative to current expectations, responding to – and enhancing—favorable trends in technology development and deployment, while simultaneously providing a cushion for industries or sectors where low-cost abatement strategies are slower to materialize. Linking sectors together in a multi-sector program allows regulated entities to take advantage of the lowest cost reductions, while ensuring that the overall emission requirements are achieved. It would be challenging for Colorado to chart the most cost-effective emission reduction pathway without creating a mechanism that allows for cost-effective abatement across sectors. Similarly, it is critical for Colorado to evaluate the opportunity to link a pollution reduction program with those of other jurisdictions, which could enable the state to access broader efficiencies across the linked sources and achieve more ambitious reductions at lower cost.

Finally, multi-sector approaches are critical for realizing emission reductions in certain sectors. Colorado has tremendous potential for unlocking mitigation opportunities in natural and working lands. A multi-sector, market-based program design could create opportunities for investments in those strategies and achieve emission reductions that would otherwise be difficult to attain.

Multi-sector approaches may be particularly important for certain industries, such as when addressing emissions from energy-intensive, trade-exposed (“EITE”) manufacturing sectors. The APPCA requires that the state provide some type of multi-source or multi-sector option for these sources, and outlines that “the commission shall consider how program design as relevant to those sources can further mitigate the cost of reducing emissions for such manufacturers while providing an incentive to improve efficiency and reduce emissions. **Specifically, the commission shall design the program as relevant to those sources such that as the sources are subject to emission reduction requirements, those sources will have, under the program, a pathway to obtain equivalent lower-cost emission reductions at other regulated sources to satisfy their compliance obligations.**”²⁸

Given that this is a requirement for any AQCC program, it is important that these types of program options are included in the modeling of mitigation scenarios. Further, it is important to

²⁸ C.R.S. § 25-7-105(1)(e)(IX)

note that the Act does not provide the AQCC with the option of omitting these sources from their program (“the commission *shall* design the program as relevant to those sources such that...”).²⁹

c. Mitigation Strategies Should Include those that Secure Reductions in Pollution in Disproportionately Impacted Communities

The APPCA requires that “the implementing rules... must include strategies designed to achieve reductions in harmful air pollution affecting [disproportionately impacted] communities.”³⁰ It is imperative that the roadmap effort evaluate climate mitigation strategies that are designed to achieve *quantifiable* emission reductions in order to fulfill this obligation. EDF and WRA recommend that the Roadmap mitigation scenarios identify policies that will meaningfully provide air quality co-benefits, such as capping total greenhouse gas emissions from transportation fuels, expanding leak detection and repair and other emissions control requirements for oil and gas operations across the state, and targeting strategies to reduce emissions from refineries and other major point sources in densely-populated areas.

d. Mitigation Strategies Should Be Compared on a Cost-per-Ton of CO₂e Basis

The APPCA directs the AQCC to propose regulations that “would cost-effectively allow the state to meet its greenhouse gas emission reduction goals.”³¹ Furthermore, the AQCC, in adopting rules and regulations, must consider not only “the costs of compliance” but also “whether greater or more cost-effective emission reductions are available through program design.”³² “Cost-effective” means “the cost per unit of reduced emissions of greenhouse gases expressed as carbon dioxide equivalent.”³³ Thus, although the AQCC must consider total costs in adopting regulations to meet the greenhouse gas goals, the statute expressly requires the AQCC to evaluate whether it can secure more cost-effective emission reductions “through program design.”³⁴ At this stage of the regulatory process, cost-effectiveness is an important (and required) metric to compare costs across potential mitigation scenarios. It is critical that the Roadmap estimate the cost per ton of CO₂e reduced of different policies or strategies.

IV. Preliminary Roadmap Results Should Inform the July 2020 Regulatory Proposal

Given the pace and scale of emission reductions required – both by Colorado statute and by climate science – Colorado cannot delay promulgating greenhouse gas rules. Indeed, the APPCA delineates that the AQCC shall, “by July 1, 2020, publish a notice of proposed rule-making that proposes rules to implement measures that would cost-effectively allow the state to

²⁹ *Id.* (emphasis added).

³⁰ C.R.S. § 25-7-105(1)(e)(II).

³¹ C.R.S. § 25-7-140(2)(a)(III).

³² C.R.S. § 25-7-105(1)(e)(VI).

³³ C.R.S. § 25-7-105(1)(e)(XI)(A).

³⁴ C.R.S. § 25-7-105(1)(e)(VI).

meet its greenhouse gas emission reduction goals;”³⁵ that obligation has been in place since May 30, 2019.

The GHG roadmap is important, but its development should not delay promulgation of rules. As outlined by the APCD website, the GHG roadmap is

[1] designed to establish the 2005 greenhouse gas pollution baseline. [2] The Roadmap also will assess the effects of recent legislative and administrative policy changes, including 14 bills the General Assembly passed in 2019 on meeting the state’s GHG pollution targets. [3] Finally, the Roadmap will evaluate additional pathways to ensure timely progress toward the state’s GHG pollution reduction goals.

Regarding the first objective, the state released its most recent inventory in 2019 that included 2005 emission levels. While the APPCA states that an updated “initial inventory . . . must include a recalculation of Colorado’s 2005 greenhouse gas emissions to serve as a baseline for measuring progress against Colorado’s greenhouse gas emission reduction goals,”³⁶ the APPCA is clear that this requirement is not intended to be “construed to slow, interfere with, or impede state action to timely adopt rules that reduce greenhouse gas emissions to meet the state’s greenhouse gas emission reduction goals.”³⁷ The existing inventory—reflected in the E3 slides released to date—is sufficient to understand the significant gap between current emission levels, projected emissions, and the state’s reduction targets. (To the extent that official adjustments are being made to the inventory, EDF and WRA expect that such adjustments would be made in a formal notice and comment process either by (i) the AQCC or (ii) the Division that includes one or more briefings on the potential changes before the AQCC.)

Regarding the second objective, accurately reflecting existing state policies—including any new laws passed or regulations adopted in 2019 or early 2020—in the baseline projections is important, as it will help provide a more accurate representation of how far the state has to go to achieve the reduction goals. The E3 modeling should be able to accurately reflect those policies, as MJB has in their GHG Abatement Roadmap, and as suggested in Section II above.

With respect to the third objective (evaluating “additional pathways to ensure timely progress toward the state’s GHG pollution reduction goals”), EDF and WRA believe it is valuable for the roadmap process to provide insight to the AQCC in advance of the July 1, 2020 deadline to inform the regulatory proposal. While a comprehensive roadmap is not expected to be finalized until September, we recommend the roadmap team share preliminary results with the Commission and prioritize the modeling of demonstrated regulatory strategies that will assure the emission reduction outcomes. Complementary policy measures that work in tandem with emission control strategies – such as those that are primarily geared towards catalyzing innovation, technology deployment, or behavior change—can be modeled in a Phase 2 that helps the state understand the interplay between an enhanced complementary policy framework and foundational, backstop regulations that will ensure achievement of the required emission

³⁵ *Id.* § 25-7-140(2)(a)(III).

³⁶ C.R.S. § 25-7-140(2)(a)(II)

³⁷ C.R.S. § 25-7-140(5)

reductions through definite, enforceable measures. The complete results of a comprehensive roadmap effort can inform an ongoing, robust public rulemaking process.

Almost eleven months have passed since the statewide greenhouse gas reduction targets and the requirement that the AQCC promulgate regulations to achieve those targets were signed into law. Colorado air regulators have a clear understanding of the statutory obligations, the scale of the emissions gap, and the types of regulatory tools they have in their toolbox to achieve these reductions. Prioritizing the modeling of those policies that will meet the AQCC's statutory obligations in the mitigation scenarios must be the leading priority to inform the rapid promulgation of the required regulations. A regulatory framework provides sources with certainty about the reductions they must achieve over the near, medium, and long-term, and enables those sources to identify the most cost-effective investments and develop implementation plans. Given the short window between now and 2025, it is imperative that the APCD and the AQCC act now to ensure that the goals are met, as well as to minimize the regulatory burden on any entities that may be required to implement reduction measures.

In sum, Colorado regulators have a critical task in front of them. To successfully meet this challenge, consistent with Colorado law, we recommend the state quickly ramp up its roadmap effort. The primary focus of the roadmap effort is to inform regulations that the AQCC must adopt, in order to achieve the emission reductions required in Colorado statute. The roadmap process should

- Prioritize evaluating policies and regulations that may be adopted and implemented by the AQCC;
- Ensure the modeling develops an accurate baseline that reflects existing Colorado law and regulations, rather than goals or aspirations;
- Evaluate a broad suite of strategies, including multi-sector strategies, and present the cost-effectiveness of each strategy or regulation modeled; and
- Continue working expeditiously, in order to support the AQCC's obligation to propose draft rules by July 2020.

EDF and WRA recognize the current challenges posed by the COVID-19 pandemic, particularly on state agency staff who are working diligently to address the public health crisis. The pandemic has also created the need for novel approaches for engaging stakeholders, and agencies – including the AQCC – have demonstrated in recent hearings that they can effectively engage stakeholders and solicit robust feedback. We appreciate the state's ongoing work to develop the roadmap analysis and the broader GHG regulations and are prepared to assist and support the state's efforts in a robust way in the sprint to the July 2020 deadline.

EDF and WRA further recommend the state expand stakeholder engagement around the roadmap in order to increase transparency and improve the robustness of modeling results.

Specifically, we recommend further opportunity for public engagement on the roadmap, including comment opportunities on three key phases of the Roadmap development: 1) the technology and policy assumptions that underlie the “Reference Scenario”, “2019 Action Scenario”, and “Mitigation Scenarios”; 2) the proposed modeling workplan for the mitigation scenarios, and 3) the preliminary results from mitigation scenarios, prior to release of the final report. At each of these phases, we recommend the State host a short, defined comment period to solicit public feedback. Soliciting public feedback will enhance transparency and the robustness of the modeling results; however, we encourage the state to manage the public process in a way that does not delay the release of the final Roadmap or the timely proposal and promulgation of rules at the AQCC.

Thank you very much for your consideration.

Respectfully submitted,

Pam Kiely
Peter Zalzal

Environmental Defense Fund
2060 Broadway, Boulder, CO 80302

Stacy Tellinghuisen
Erin Overturf

Western Resource Advocates
2260 Baseline Rd, Boulder, CO 80302