September 4, 2025

Colorado Department of Public Health and Environment, Air Pollution Control Division
Emailed to climatechange@state.co.us

*Re: GHGRP Comment - Comments of Sierra Club and ACEEE on Draft Facility Greenhouse Gas Emission Reduction Plans*

Dear Air Pollution Control Division staff:

The Sierra Club and The American Council for an Energy Efficient Economy (ACEEE) respectfully submit these comments on the draft Greenhouse Gas Emission Reduction Plans ("Plans") submitted by facilities subject to the Greenhouse Gas Emissions and Energy Management for Manufacturing 2 Rule ("GEMM 2"). These comments include general comments that apply to all of the Plans, as well as specific comments on each of the Plans submitted by covered facilities.

## I. General Comments Applicable to All Plans

### *A. Support for Key Provisions and Recommendations to Strengthen GEMM 2*

The Sierra Club and ACEEE commend the Colorado Department of Public Health and Environment's Air Pollution Control Division ("APCD") for their efforts in developing and implementing the GEMM 2 rule, which is a critical step towards meeting Colorado's statutory greenhouse gas ("GHG") reduction targets for the industrial and manufacturing sector. While we support the rule's intent and several key provisions, we believe that our review of the GEMM 2 Plans submitted by covered facilities revealed some gaps in the program, and areas where the program can be strengthened to ensure the state achieves its climate goals and protects public health.

The decisions made in the individual GEMM 2 GHG reduction plans are of significant importance, as they can set a precedent and influence other rulemaking efforts and cost-effectiveness assessments in Colorado and across other states and regions. With recent federal actions rolling back funding for clean technology projects and key air pollution

regulations—such as the Mercury and Air Toxics Standards ("MATS"), the Good Neighbor Plan for interstate pollution, and revisions to the particulate matter ("PM2.5") National Ambient Air Quality Standards ("NAAQS")—state-level programs like GEMM 2 are now more critical than ever. The technologies and strategies evaluated in these plans could serve as a model for future technology considerations elsewhere, making it crucial that they undergo a rigorous and thorough review.

While this letter is intended to provide feedback on each industry plan submitted, we want to acknowledge our strong support the following elements of the GEMM 2 rule:

- **Mass-based emissions reductions:** The requirement for facilities to achieve specific, mass-based GHG reductions is crucial. This approach provides certainty and directly contributes to Colorado's economy-wide climate targets, ensuring real, tangible reductions in pollution.
- **Prioritizing onsite reductions:** We applaud the rule's emphasis on onsite GHG and co-pollutant reductions. This is particularly important for improving air quality in **disproportionately impacted communities** that often bear the brunt of industrial pollution. Focusing on onsite measures directly benefits the health and well-being of neighboring residents.
- **Inclusion of a broad range of facilities:** Expanding the GEMM rule to cover 18 additional manufacturing facilities is a necessary step to address a larger portion of the state's industrial emissions.
- **Establishment of a GHG reduction plan requirement:** Requiring facilities to submit a GHG Reduction Plan and undergo third-party review is a positive step toward ensuring transparency and accountability in the compliance process.

While most submitted plans generally adhere to the procedural requirements of the rule, our review found the following areas for improvement:

*B. Consideration of All Technically Feasible Options*

The plans' reliance on a limited number of reduction technologies, from only select manufacturers, presents some concerns. While some plans propose a portfolio of measures, others rely on a single expensive or complex technology. This suggests that the evaluation of "all technically feasible GHG reduction measures," as required by Regulation 27, Part B, Section II.A.2,[1] may not have been as comprehensive as the rule intends. The rule generally contemplates plans that cast a wide net, identifying all potential control measures that meet basic threshold requirements and narrowing down to a selected portfolio of measures based on factors like emission reduction potential and cost. Sierra Club and ACEEE anticipated that industries would

[1] Unless otherwise specified, references to rule sections in these comments are to AQCC Reg. 27, Part B, which contains provisions applicable to GEMM 2 facilities.

utilize a rigorous approach to evaluate technologies, modeled after existing regulatory or air permitting assessments. More specifically, federal processes for identifying Best Available Control Technology ("BACT") under the Clean Air Act can serve as a model for conducting control measure and cost evaluations.[2]

We urge the Commission to apply a standard similar to a top-down, BACT-style analysis for evaluating feasible technologies, which is a well-established precedent in federal and state air permitting programs. This rigorous, step-by-step process requires that:

- All available control technologies are identified (including zero emissions options).
- Technically infeasible options are eliminated.
- The remaining controls are ranked by effectiveness.
- The most effective controls are evaluated for energy, environmental, and economic impacts.
- The BACT is selected, representing the maximum degree of emissions reduction achievable.

Applying this approach would ensure that the final portfolio of measures represents the most effective and equitable path to emissions reduction.

### C. *Inconsistent Application of Economic Impact Analyses*

A significant concern is the inconsistent and, in some cases, prohibitively high cost of proposed reduction measures. The GEMM 2 rule establishes a 2030 social cost of carbon ("2030 SCC") at $89/metric ton of $CO_2e$ ("mtCO2e") for carbon dioxide.[3] However, several plans propose measures with costs far exceeding this benchmark. This raises concerns about whether all economically feasible options were fully explored, particularly lower-cost energy efficiency and electrification measures. The plans' varied and often high costs suggest that the economic impact analysis may be inconsistently applied. Additionally, specific technology providers were sometimes referenced, with specific costs instead of a range of costs from similar technology providers.

Moreover, several measures evaluated in the plans had costs fairly close to the 2030 SCC. Some of these measures may be expected to have costs below $89/mtCO2e by 2030, especially those involving fast-developing technologies like equipment electrification. We encourage APCD and GEMM 2 facilities to re-evaluate the cost-effectiveness of these measures as 2030 approaches.

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[2] As APCD gains experience with facilities' proposed and approved GEMM 2 emission reduction measures, it may consider developing a "GEMM 2 clearinghouse" compiling information about measures and their costs, based on the federal clearinghouse used for RACT and similar determinations. *See* EPA, *RACT/BACT/LAER Clearinghouse (RBLC) Basic Information*, https://www.epa.gov/catc/ractbactlaer-clearinghouse-rblc-basic-information.

[3] The rule also establishes a cost of $2,500 per metric ton of methane and $33,000 per ton of nitrous oxide, but most plans appear to have primarily relied on the social cost of CO2 value.

Since GEMM participants report a wide range of measure costs ($/mtCO2e avoided) and plants present a variety of reduction opportunities, we recommend that participants benchmark themselves against known projects in their planning. Publicly available data from California programs show that industrial facilities can achieve significant results at values lower than Regulation 27's $89/tCO2e, even with the higher costs typically associated with California:

- CA Food Production Investment Program (FPIP): $40.9/mtCO2e
- CA Industrial Decarbonization and Improvement of Grid Operations (INDIGO): $10.9/mtCO2e

Furthermore, awardees in the Colorado Clean Air Program are achieving reductions at approximately $127/mtCO2e avoided. Ultimately, because submitted plans rely on facilities' estimates and calculations of their GHG reduction measure costs, APCD and its selected independent third-party reviewers must perform a detailed review to validate facilities' estimates.

*D. Limited Evaluation of Co-Pollutant Benefits*

Finally, while we appreciate the inclusion of co-pollutant analysis, more detailed information on the specific community benefits of these reductions is needed. The rule prioritizes local air quality benefits, especially for Disproportionately Impacted Communities. The plans should include a more robust discussion of how their chosen measures will impact local air quality and public health.

*E. Community Benefit Plan Requirements*

We also recommend consistent requirements for community impacts. The explanation of local impacts varies greatly between the submitted GEMM 2 plans. Additional considerations may include risks, mitigation, co-benefits of measures, and any other community engagement plans that incorporate education/awareness of industrial activities or workforce development for facility employees. The requirements should require companies to describe the impacted communities, the impacts of the proposed plan measures on the local community and the extent of that impact, the plan and intent of the company to reduce any expected negative impacts of their plan. Additional questions include: (1) how were the requirements for "1-mile from a Disproportionately Impacted Community" and "15 miles from a residential community" established? (2) Can the 1-mile radius be applied to cover additional vulnerable Disproportionately Impacted Communities that may have pipelines traversing their area (e.g., for the CCS proposed projects transporting carbon to the Northeastern part of Colorado), especially since Disproportionately Impacted Communities s may have fewer resources to address and mitigate issues compared to other residential communities.

### *F. Need for Long-Term Planning Aligned with Statewide Climate Targets*

Some facilities do not need to implement any GHG reduction measures to achieve their 2030 targets. This suggests that more ambitious targets can be cost-effectively implemented. Although the current GEMM 2 rule bases its cost thresholds and associated planning requirements on an $89/mtCO2e 2030 SCC, we encourage APCD and the AQCC to consider whether a higher cost threshold may be appropriate in the future. A higher threshold would be supported by numerous estimates of the social cost of carbon that are several times greater than $89/mtCO2e in 2030.[4]

Moreover, the industrial sector must continue reducing its emissions beyond 2030 if it is to contribute to increasingly stringent statewide statutory decarbonization targets.[5] Although relatively low cost thresholds are appropriate in early stages of industrial decarbonization, we must keep long-term objectives in mind. A series of incrementally-increasing cost thresholds could result in path dependence by encouraging near-term investments in measures that will be difficult or impossible to scale as deeper emission reductions are required. This effort should be complemented by signals from APCD to acknowledge that as new technology is demonstrated and becomes cost-effective, these technologies may be required under policies that build on current GEMM 2 requirements or other programs aimed at achieving local emissions reductions or State Implementation Plan ("SIP") requirements. By clarifying long-term expectations for greater emission reductions in the future, GEMM 2 facilities may be further incentivized to invest in somewhat higher-cost measures that have the potential to achieve much deeper on-site emission reductions, such as equipment electrification, instead of relying on investments that could produce incremental reductions in the near-term but lock in long-term emissions (i.e., by replacing fossil fuel equipment), or strategies to offset GHG emissions.

## II. Comments on Natural Soda Plan

Sierra Club and ACEEE commend Natural Soda for its evaluation of several available zero-emission measures for its boilers and dryers. The availability and low cost of these measures indicates that other facilities with similar equipment should evaluate these zero-emission measures, and that the cost of these measures may fall below the 2030 SCC before 2030. Natural Soda's Plan demonstrates the potential for greater ambition in the GEMM 2 Rule's GHG reduction targets, the importance of evaluating all technically feasible and commercially available emission reduction measures, the promise of zero-emitting electric equipment to provide cost-effective emission reductions in the near future, and the potential for electrification to produce significant co-benefits.

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[4] *See, e.g.*, U.S. EPA, *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances* (Nov. 2023), https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf; Rennert et al., *Comprehensive evidence implies a higher social cost of CO2*, Nature 610, 687 (2022), https://doi.org/10.1038/s41586-022-05224-9.

[5] *See* 25-7-102(g), C.R.S. (setting statewide targets that include a 75% emission reduction by 2040 and a 100% reduction by 2050).

We recommend that APCD approve Natural Soda's Plan, but direct Natural Soda to re-evaluate the cost-effectiveness of zero-emission equipment adoption, including costs from a range of representative technology providers, and submit the findings of this evaluation with Natural Soda's 2027 three-year compliance certification required by Section IV.B.

### *A. Plan Background*

Because Natural Soda received an emission baseline adjustment from APCD, its 2024 emissions (49,062 mtCO2e) were already lower than its 2030 emission limit under GEMM 2 (51,729 mtCO2e), even without applying any emission reduction measures through the GEMM 2 Plan.[6] While we recognize the provision for production-based baseline emission adjustments in Section II.CC, we observe that this adjustment has led to a 2030 emission limit that will not require any incremental emission reductions despite the availability of comparatively low-cost opportunities, which are discussed further below.

This indicates that the emission limits in GEMM 2 could be strengthened to more effectively advance the emission reductions needed to meet statewide climate targets while maintaining reasonable compliance costs, especially for facilities that received a production-based baseline adjustment. We encourage APCD and the AQCC to focus on the potential for greater emission reductions when implementing GEMM 2 and in any future revisions to the rule.

### *B. Evaluation of GHG Reduction Measures*

Natural Soda's primary emission sources are two ~100 MMBtu/hr boilers which were replaced in 2011, as well as three 7-10 MMBtu/hr natural gas dryers.[7] Despite Natural Soda's 2030 emission limit being greater than its 2024 emission levels, Natural Soda evaluated potential measures to reduce its GHG emissions, as required by Section II.A.2.a. GEMM 2 facilities must list "all GHG reduction measures that result in greater than de minimis GHG reductions and that are technically feasible and commercially available," and include the information about each measure set forth in Section II.A.2.a.

Natural Soda's Plan includes the required evaluation and information for five GHG reduction measures, including two forms of electric boilers, a heat pump, electric dryers, and a heat battery paired with solar generation to power the battery. Although none of the measures evaluated had an expected cost per tonne below the $89/mtCO2e 2030 SCC, the electric boiler options ranged from $182-192/mtCO2e, which is approximately two times the 2030 SCC.[8]

[6] Natural Soda Plan at 3-4.
[7] Natural Soda Plan at 1, 3.
[8] Natural Soda Plan at 5.

Because the costs of electrification options that Natural Soda evaluated are close to the 2030 SCC and may be lower than that amount by 2030, we recommend that APCD direct Natural Soda to re-evaluate these options in its 2027 three-year compliance certification. APCD may appropriately direct such a re-evaluation for at least two reasons: First, GEMM 2 requires facilities to meet annual GHG emission reductions requirements through any available onsite measures at or below the 2030 SCC (independent of its requirement to submit and implement GHG reduction plans), and such an updated evaluation would be needed to determine whether such onsite measures are available.[9] Second, Natural Soda has affirmatively expressed that it "looks forward to implementing additional GHG reduction and efficiency measures at its Rifle Plant in compliance with the GEMM 2 rule and will promptly do so once technologically feasible and cost-effective measures are available for implementation at the Rifle Plant."[10]

Electrification of industrial equipment, especially boilers, is experiencing rapid technological and market development that is projected to reduce costs in coming years.[11] Additionally, many of the major boiler manufacturers have zero emission boiler lines that are comparable to their fossil fuel boiler models. If these trends proceed as expected, Natural Soda may be able to implement the electrification measures it evaluated at or below the 2030 SCC by 2030, due to both general cost declines across the market and specific effects on the emission reduction technologies it evaluated.

For example, Natural Soda's Plan states that the high-temperature heat pump ("HTHP") "is a relatively new technology, and therefore any HTHP solutions would be a custom design."[12] As the market for this "relatively new" technology matures, standardized models may become available at lower cost than the custom designs evaluated for Natural Soda's Plans. Similarly, for the heat battery option, Natural Soda notes that "Rondo heat batteries are a new technology type and are proprietary to the Rondo company," and meeting the facility's requirements would

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[9] AQCC Reg. 27, Part B, Sections I.A (requiring GEMM 2 facilities to "comply with the GEMM 2 annual GHG emissions requirements set forth in Part B, Section I.A, as applicable"), III.A (requiring each GEMM 2 facility to "first attempt to meet its GEMM 2 annual GHG reduction requirement through technically feasible, onsite measures at or below the 2030 social cost of GHGs").

[10] Natural Soda Plan at 1.

[11] *See, e.g.*, Zuberi et al., *Electrification of Boilers in U.S. Manufacturing* at 22, 48 (Nov. 2021), https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/62fb89dfb827c92c3340eed9/1660652049933/Boiler+Electrification-final+Rev2.pdf; Zuberi et al., *Electrification of U.S. Manufacturing with Industrial Heat Pumps* at 63 (Nov. 2021), https://eta-publications.lbl.gov/sites/default/files/us_industrial_heat_pump-final.pdf; Renewable Thermal Collaborative, *Electrifying U.S. Industry: A Technology- and Process-Based Approach to Decarbonization* at 72, 74 (Jan. 2021), https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/6018bf7254023d49ce67648d/1612234656572/Electrifying+U.S.+Industry+2.1.21.pdf; E3, *Decarbonizing Industrial Heat: Measuring Economic Potential and Policy Mechanisms* at 9 (Oct. 2024), https://static1.squarespace.com/static/5a1aca61ccc5c5ef7b931da7/t/67212e1d2feca83d67300002/1730227748077/CAELP+Industrial+Electrification+Report+FINAL.pdf; Evergreen Action & Sierra Club, *Embracing Clean Heat* at 33, 45, 48-49 (May 2025), https://www.sierraclub.org/sites/default/files/2025-05/embracing-clean-heat-report.pdf.

[12] Natural Soda Plan at 10.

require a combination of both models currently available from Rondo.[13] By 2030, competitors may offer alternative heat battery options at lower prices than Rondo's currently available models, or Rondo may develop a new model that can meet Natural Soda's needs more efficiently than the currently-proposed combination of the two existing models.

Moreover, Natural Soda's cost evaluations were conducted in 2023 and do not reflect the last two years of market development.[14] Natural Soda believes the costs of GHG reduction measures have increased since 2023 due to inflation, tariffs, and supply chain constraints,[15] but these are likely temporary market conditions that are not expected to persist over the long-term trend in cost reduction as the market matures.[16]

### C. *Cost-Effectiveness Analysis*

Natural Soda's Plan does not appear to consider various factors and options that could reduce the cost of the GHG reduction measures it evaluated. First, the Plan does not consider the avoided equipment replacement cost that would be associated with electrifying gas boilers before the end of their life. The Colorado Public Utilities Commission, CDPHE's sister agency, has recognized that it is appropriate to consider these avoided replacement costs when evaluating costs and benefits of early equipment replacement,[17] and these avoided costs can be quantified using methods applied by experts such as E3 consulting.[18] We recommend that APCD direct Natural Soda to incorporate avoided equipment replacement costs in the 2027 updated analysis, and issue guidance to all GEMM 2 facilities that assessments of compliance options should include these avoided costs.

Additionally, Natural Soda's Plan does not explain why the specific equipment models were selected for evaluation (e.g.. Chromalox 022-307547-104 electric resistance boiler and Cleaver Brooks MVE electrode boiler), or address whether cost savings could be realized by using a different model or manufacturer or by purchasing used equipment.[19] To facilitate review and build trust with stakeholders, the 2027 analysis should include an explanation of why the equipment evaluated represents the most cost-effective option available in the market.

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[13] Natural Soda Plan, Appendix 1, at 16.
[14] Natural Soda Plan at 1.
[15] Natural Soda Plan at 1.
[16] Moreover, to the extent that economy-wide inflation broadly affects the costs and benefits of emission reductions, this should be accounted for in the escalation rate applied to the Social Cost of GHGs.
[17] Colorado PUC, Proceeding No. 24M-0261G, Recommended Decision No. R25-0083, 81 (Feb. 5, 2025) ("[A]n appropriate discounting based on average age of existing equipment would properly acknowledge that customers inevitably have a cost to change out equipment and to pretend otherwise is inaccurate and improperly assigns more participant costs to an NPA than is appropriate.").
[18] E3, Benefit-Cost Analysis of Targeted Electrification and Gas Decommissioning in California at 36, 74 (Dec. 2023), available at https://www.ethree.com/wp-content/uploads/2023/12/E3_Benefit-Cost-Analysis-of-Targeted-Electrification-and-Gas-Decommissioning-in-California_u.pdf.
[19] *See* Natural Soda Plan at 8-10.

Similarly, Natural Soda's Plan does not explain why the evaluated HTHP system was sized to displace 55% of the facility's boiler use, rather than some other amount. The 2027 analysis should explain how proposed equipment sizes were selected, and include evaluation of other sizing options as appropriate.

Finally, Natural Soda's Plan does not explain why it only evaluated a heat battery in conjunction with 100MW of solar, or whether cost-effectiveness could be increased by implementing a heat battery without the accompanying solar.[20] The 2027 evaluation should explain whether a standalone heat battery could achieve greater cost-effectiveness, and include all required information about this emission reduction measure if so.

*D. Harmful Air Pollutant Analysis*

The electrification options evaluated by Natural Soda have the potential to produce significant air quality co-benefits. Natural Soda summarized the expected reductions in several pollutants from the electrification options it evaluated, including nitrogen oxides ("NOx"), particulate matter ("PM"), benzene, and others, as required by Section II.A.2.a(ii).[21] Because the electric dryers measure can be combined with other measures such as the heat battery and solar measure, the total emission reductions from electrification could be as much as 17.7 tons/yr of NOx, 2.3 tons/yr of VOCs, and 3.2 tons/yr of PM, in addition to reductions in other pollutants. These estimated reductions appear consistent with the emission rates listed for gas combustion (which would be avoided through electrification of gas equipment) in the U.S. EPA's AP-42 publication.[22]

Using EPA's COBRA Web Edition tool—a screening tool used to evaluate the impacts of air pollution reductions—Sierra Club and ACEEE estimate that the emission reductions from Natural Soda's evaluated electrification measures could avoid as much as $720,000 per year in monetized health effects.[23] These annual co-benefits significantly exceed the combined NPV cost of the dryer electrification and heat battery plus solar measures of roughly $200,000 over the *entire* 20-year evaluation period in Natural Soda's Plan.[24]

This has at least two important implications. First, if multiple, comparable emission reduction measures are later determined to have costs below the 2030 SCC, Natural Soda should pursue the

[20] Natural Soda Plan at 9-10.
[21] Natural Soda Plan at 5, Appendix 3.
[22] EPA, AP-42: Compilation of Air Emissions Factors from Stationary Sources, Chapter 1.4: Natural Gas Combustion, https://www.epa.gov/sites/default/files/2020-09/documents/1.4_natural_gas_combustion.pdf.
[23] EPA, CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA) Web Edition, https://cobra.epa.gov/. Scenario evaluated reduces Garfield County emissions from the Fuel Combustion: Industrial Gas sector by 3 tons/year of PM2.5, 17.7 tons/year of NOx, and 2.3 tons/year of VOC.
[24] Natural Soda Plan, Appendix 1, at 20.

measures that produce the greater reduction in harmful air pollution, as set forth in Section II.A.3.a. Second, we encourage APCD and the AQCC to focus on the substantial air quality co-benefits that can be achieved through equipment electrification when implementing GEMM 2 and in any future revisions to the rule.

### *E. Other Issues*

Finally, we note that some requirements in GEMM 2 are not addressed in Natural Soda's Plan. The Plan does not appear to address the timeframe to implement each of the measures evaluated, as required by Section II.A.2.a.(iv). Additionally, the Plan does not include certification from a responsible agent of Natural Soda that the Plan's documentation is complete and accurate, as required by Section II.B. We believe these issues can be addressed through relatively minor revisions to an otherwise thorough and well-documented Plan, and we recommend that APCD direct Natural Soda to make these revisions before approving the Plan. The other issues raised in these comments will best be addressed in the updated evaluation of emission reduction measures that we have recommended APCD direct Natural Soda to submit in 2027.

## III. Comments on American Gypsum Plan

Sierra Club and ACEEE do not recommend that APCD approve American Gypsum's Plan until key deficiencies in its evaluation of potential GHG reduction measures have been addressed. American Gypsum's Plan fails to evaluate available measures including electrification of its drying equipment and operational changes to require less drying, and its analysis of measures' cost-effectiveness fails to account for synergies between measures that displace gas-fired electricity generation and measures that reduce the heat required by drying equipment.

### *A. Evaluation of GHG Reduction Measures*

American Gypsum's baseline emissions are 75,047 mtCO2e, and its 2030 emission limit is 65,666 mtCO2e.[25] Significant sources of American Gypsum's emissions include gas-fired cogeneration turbines that provide power and heat to its facility, impact mills, and a dryer used to dry the wallboards produced at its facility.[26]

American Gypsum evaluated 7 potential GHG reduction measures in its Plan.[27] Five of these measures would reduce emissions from the facility's gas-fired power generation. American Gypsum explains that the emission reductions from these measures are limited by the need for heat in its dryer equipment, which currently uses waste heat from the cogeneration turbines. The other two measures considered would implement heat exchangers, reducing the heat required by the drying equipment.

[25] American Gypsum Plan at 1-2.
[26] American Gypsum Plan at 1-2.
[27] American Gypsum Plan at 2-2, 3-2.

American Gypsum's Plan includes fairly limited information about the potential measures evaluated. We recommend that APCD direct American Gypsum to submit a revised Plan that includes more information about the measures it evaluated, including available information about equipment vendors, models, specifications, and any other comparable products available in the market.

American Gypsum's Plan mentions at least two additional potential GHG reduction measures, but does not include the information needed to evaluate them pursuant to Section II.A.2. These additional potential measures include operational changes like producing sizes and thicknesses of wallboard that require less drying, and opportunities to improve the efficiency of existing gas-fired equipment.[28] Because these measures appear to be technically feasible and commercially available, they should have been evaluated pursuant to Section II.A.2.

Additionally, American Gypsum did not evaluate opportunities to reduce its emissions through technically feasible and commercial available electrification measures. Such measures are likely available for the drying equipment types American Gypsum uses, as evidenced by the inclusion of dryer electrification in Natural Soda's Plan.[29] Other electric drying technologies are also available, including induction, infrared, microwave, radiofrequency, and heat pump dryers.[30] We recommend that APCD direct American Gypsum to evaluate all available electrification options in its resubmitted Plan.

### *B. Cost-Effectiveness Analysis*

American Gypsum's evaluation of cost-effectiveness does not appear to account for synergies between measures that displace gas-fired electricity generation and measures that reduce the heat required by drying equipment. Each of the portfolios evaluated includes one measure to reduce the facility's gas-fired electricity generation along with both heat exchanger options.[31] American Gypsum's evaluation of the electricity generation measures accounts for the additional gas combustion required by the facility's dryers due to a reduction in the generator waste heat that is currently used by the dryers.[32] The dryer heat exchanger measures would reduce the amount of heat required by the dryers, thereby avoiding some of the tradeoff between decreasing generation emissions and increasing dryer emissions. (And measures that fully electrify the dryer would have the potential to completely eliminate this tradeoff.) When evaluating portfolios that include

[28] American Gypsum Plan at 2-2, 3-1.
[29] Natural Soda Plan at 4-5, 9. Natural Soda's Plan also evaluates a heat battery, which may also be appropriate for meeting American Gypsum's operational needs.
[30] U.S. Department of Energy, *Industrial Electrification Technologies Booklet* at 2-14, https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/FINAL%20Industrial%20Electrification%20Booklet.pdf.
[31] American Gypsum Plan at 3-2.
[32] *See, e.g.*, American Gypsum Plan at 3-3.

both generator and dryer measures, American Gypsum simply adds up the emission reductions from each measure, without accounting for ways in which deploying the two together could mitigate the tradeoff between reducing generator emissions and reducing dryer emissions. Although it is possible that the heat exchanger options' assumed reduction in dryer emissions perfectly offsets the assumed increase in dryer emissions in the evaluation of generation measures, this is unlikely to be true in all cases. We recommend that APCD direct American Gypsum to explain and expressly account for these synergies in its resubmitted Plan.

## IV. Comments on Sterling Ethanol Plan

Sierra Club and ACEEE do not recommend approving Sterling Ethanol's Plan without substantial revisions. The Plan does not meet the requirement to evaluate all significant technically feasible and commercially available onsite emission reduction measures set forth in Section II.A.2.a. Contrary to Sterling Ethanol's claims, it does not qualify for the exemption from this requirement set forth in Section II.A.4 because it is not "already in the process of constructing or implementing" on-site measures projected to achieve its 2030 emissions requirement. Moreover, the emission reduction measures that Sterling Ethanol did not consider include electrification opportunities with significantly lower costs and greater reductions in harmful air pollution than the carbon capture and sequestration ("CCS") proposal that it intends to pursue.

### *A. Inapplicability of Section II.A.4 Exemption*

Sterling Ethanol's 2024 emissions were 57,631 mtCO2e, exceeding its 2024 emissions limit by 1,977 mtCO2e.[33] Sterling Ethanol's 2030 emission limit is 49,324 mtCO2e.[34] Significant sources of Sterling Ethanol's emissions are not clearly explained in its Plan, but appear to include its fermentation scrubber, which "has a high CO2 concentration," a gas boiler, its fermentation off-gas system, and its truck and rail loadouts.[35]

Sterling Ethanol proposes to reduce its 2030 emissions by implementing a carbon capture and sequestration measure.[36] Its Plan does not evaluate any other technically feasible and commercially available GHG reduction measures. Instead, Sterling Ethanol asserts that it is exempt from this requirement under AQCC Reg. 27, Part B, Section II.A.4 because its proposal to pursue CCS is "already in process and projected to achieve the entirety of the facility's 2030 GEMM 2 annual GHG emissions requirement."[37] This is incorrect for two reasons.

[33] Sterling Ethanol Plan at 1-3 to 1-4.
[34] Sterling Ethanol Plan at 1-3.
[35] Sterling Ethanol Plan at 1-2, 3-2.
[36] Sterling Ethanol Plan at 3-2.
[37] Sterling Ethanol Plan at 3-1.

First, Sterling Ethanol's CCS requirement does not meet the requirement in Section II.A.4 to be "already in the process of constructing or implementing" measures that will meet its 2030 emissions requirement. Contrary to Sterling Ethanol's suggestions, having the CCS project "in process" at the planning and permitting stage does not satisfy this requirement. To "construct" means "to make or form by combining or arranging parts or elements."[38] To "implement" is defined as "to give practical effect to and ensure of actual fulfillment by concrete measures."[39] Both require concrete actions to physically bring GHG reduction measures into being, not merely plan them. The rule text removes any doubt that pre-construction planning does not qualify for the Section II.A.4 exemption by specifying that "the process of constructing or implementing" includes "post-construction project implementation or ramp up," but omitting any reference to pre-construction steps. Limiting this exemption to actual construction or implementation makes sense. The requirement to evaluate a broad range of potential emission reduction measures is at the heart of GEMM 2's GHG reduction planning requirement, so APCD should not interpret it as being easily bypassed. Section II.A.4 includes a narrow carveout to these planning requirements in cases where actual emission reduction projects are underway. In such cases, there is reasonable certainty that a facility's 2030 emission reduction targets will be met. Plans. investments, or permit applications for a future project are too speculative to trigger Section II.A.4, especially where the project involves a novel and relatively untested technology like CCS.

Sterling Ethanol's Plan makes clear that it is in the pre-construction planning and permitting stage, and not yet "already in the process of constructing or implementing" its CCS project. The Plan does not describe any construction or implementation activities, and instead states only that the project's permit application "is currently under EPA review."[40] Further, the Plan describes the "Timeframe for Implementation" not as current, underway, or ongoing, but expected "By 2030," noting that even this future implementation timeframe is "contingent on the timely issuance of a Class VI well permit from the EPA."[41] The EPA permit application tracking webpage cited in Sterling Ethanol's Plan indicates that the status of the application is in the "Technical Review" phase—the second of five phases—and that the applicant responded to EPA's first Request for Additional Information on June 10, 2025, over a year after the request was issued.[42] EPA's webpage explaining Class VI well lifecycles describes the period between when EPA receives a permit application and when it issues a permit as the "Pre-Construction" phase.[43] Carbon America's webpage for the project confirms that construction and implementation are not yet

[38] Merriam-Webster Dictionary, "Construct," https://www.merriam-webster.com/dictionary/implement.
[39] Merriam-Webster Dictionary, "Implement," https://www.merriam-webster.com/dictionary/implement.
[40] Sterling Ethanol Plan at 3-1.
[41] Sterling Ethanol Plan at 3-1.
[42] EPA, Underground Injection Control (UIC) Class VI Permit Tracker (last updated Aug. 15, 2025), https://awsedap.epa.gov/public/single/?appid=8c074297-7f9e-4217-82f0-fb05f54f28e7&sheet=51312158-636f-48d5-8fe6-a21703ca33a9&theme=horizon&bookmark=6218ffed-bb6e-42e4-a4f1-52d87e036a1b&opt=ctxmenu.
[43] EPA, Class VI - Wells used for Geologic Sequestration of Carbon Dioxide, Lifecycle of a Class VI project, https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide#ClassVI_Lifecycle.

underway, stating "The Carbon America team is currently conducting engineering, geology and environmental studies to design the CCS system."[44] This is consistent with other statements in Sterling Ethanol's Plan that CCS "is planned to be utilized," and that "Prior to injection," (i.e., before construction and implementation commence, "the site undergoes extensive geologic characterization to confirm that the formation can safely contain the $CO_2$."[45]

Second, Sterling Ethanol does not qualify for the planning requirement exemption in Section II.A.4 because its proposed CCS project does not comply with an APCD-approved CCS protocol. Section III.A requires each GEMM 2 facility to "first attempt to meet its GEMM 2 annual GHG reduction requirement through technically feasible, onsite measures at or below the 2030 social cost of GHGs."[46] Section III.A.1 specifies how this requirement applies to CCS projects: "GHG reductions from onsite carbon capture and storage from onsite carbon capture and storage measures are considered onsite measures for purposes of Section III.A," if APCD has established a standardized CCS protocol. Sterling Ethanol's Plan does not reference any such protocol, and we are not aware of one that has been released by APCD. The proposed CCS project is therefore not projected to compliantly "achieve the entirety of" Sterling Ethanol's 2030 emissions requirement, and Sterling Ethanol cannot qualify for the exemption in Section II.A.4.

### *B. Evaluation of GHG Reduction Measures*

Because Sterling Ethanol cannot qualify for the exemption in Section II.A.4, its Plan must evaluate "all GHG reduction measures that result in greater than de minimis GHG reductions and that are technically feasible and commercially available," as required by Section II.A.2. Other Plans submitted by GEMM 2 facilities demonstrate that multiple such measures are available. These measures must be evaluated before Sterling Ethanol's Plan can be approved. There are likely additional measures that meet the criteria in Section II.A.2, but it is difficult to identify these measures without more information about Sterling Ethanol's emissions than it has included in its Plan (e.g., the size and annual emissions of its gas boiler). To facilitate identifying emission reduction measures, Sterling Ethanol should be required to submit additional information about the emission sources at its facility in its revised Plan.

First, Sterling Ethanol's truck loadout emissions are controlled by a flare, but its rail loadout is not.[47] Controlling the rail loadout emissions by flare is technically feasible, as indicated by Sterling Ethanol's use of a flare control for its truck loadout emissions and by Yuma Ethanol's

[44]Carbon America, Cleaner ethanol, Greener economy:Yuma and Sterling Ethanol Carbon Capture and Storage Projects, https://www.carbonamerica.com/yuma.
[45] Sterling Ethanol Plan at 3-2.
[46] There may also be questions about whether the proposed CCS facility qualifies as "onsite" as required by Section III.A and as specified in Section III.A.1. The CCS project will not be located at Sterling Ethanol's facility or used exclusively by Sterling Ethanol. Instead, Sterling Ethanol's Plan says the projected injection well will be located somewhere "in northeastern Colorado." Sterling Ethanol Plan at 2-5.
[47] Sterling Ethanol Plan at 1-2.

use of a flare control for both its ruck and rail loadouts.[48] Sterling Ethanol should therefore be required to evaluate this emission control measure for its rail loadout.

Second, emissions from Sterling Ethanol's boiler can be avoided through electrification, as demonstrated by the boiler electrification measures evaluated in Natural Soda's Plan. Sterling Ethanol's Plan should therefore be required to evaluate this emission control measure. Assuming Sterling Ethanol could electrify its boiler at a comparable price to Natural Soda, this could reduce its emissions at less than one seventh the cost per ton of its proposed CCS project.[49] And while the proposed CCS project would not reduce any harmful air pollutants,[50] electrifying Sterling Ethanol's boiler could significantly reduce harmful air pollution, as demonstrated in Natural Soda's Plan.

Sierra Club and ACEEE recommend that APCD require Sterling Ethanol to consider all available GHG reduction measures as required by Section II.A.2, including electrification of its boiler, before approving Sterling Ethanol's Plan.

## V. Comments on Yuma Ethanol Plan

Sierra Club and ACEEE do not recommend approving Yuma Ethanol's Plan without substantial revisions. Like Sterling Ethanol, Yuma Ethanol failed to meet its 2024 emissions limits. Yuma Ethanol proposes to rely on the same proposed CCS project as Sterling Ethanol to meet its GEMM 2 planning requirements.[51] Yuma Ethanol does not qualify for the exemption from considering all available GHG reduction measures set forth in Section II.A.4, for the same reasons that Sterling Ethanol does not qualify. Sierra Club and ACEEE therefore recommend that APCD require Yuma Ethanol to consider all available GHG reduction measures as required by Section II.A.2, including electrification of its boiler, before approving Yuma Ethanol's Plan.

## VI. Comments on JBS Swift Beef Plan

Sierra Club and ACEEE commend JBS Swift Beef ("JBS") for its proposal to capture methane emissions from its wastewater treatment plant, but we are concerned that its plans to transport this methane by pipeline and sell it into the Colorado market may introduce risks of methane leaks and double-counting emission reductions. We recommend that APCD direct JBS to submit an updated analysis of the second phase of its proposed project, including analysis of potential new methane leaks and measures to avoid double-counting emission reductions, prior to beginning work on the second phase of the project. We also note that JBS's Plan does not include

[48] Yuma Ethanol Plan at 1-2.
[49] Electrode boiler price per ton / CCS price per ton = $182/mtCO2e / $1,323/mCO2e = 13.8%.
[50] Sterling Ethanol Plan at 3-1, Table 3-1 (listing "N/A" for "Total Harmful Air Pollutants Reduced").
[51] *See, e.g.*, Carbon America, Cleaner ethanol, Greener economy:Yuma and Sterling Ethanol Carbon Capture and Storage Projects, https://www.carbonamerica.com/yuma.

measures to reduce emissions from fuel combustion for its meat processing equipment, which appear to represent 25% of the facility's total emissions.

### *A. Proposed GHG Reduction Measures*

JBS proposes to meet its 2030 emission limit by capturing and flaring methane at its wastewater lagoon, which is responsible for 75% of the facility's GHG emissions.[52] This measure is projected to achieve a substantial 65% emission reduction compared to JBS's baseline emissions.

JBS indicates that a future second phase of this project will inject the captured biogas into a pipeline to sell into the Colorado market, but this second phase is not part of JBS's current GEMM 2 Plan submission.[53] This potential second phase would introduce at least two risks that should be addressed in an updated Plan filed with APCD before JBS begins work on the second phase.

First, processing the captured biogas and injecting it into a pipeline would introduce new opportunities for methane leaks, beyond those present in the simpler capture-and-flare system that JBS has currently proposed. This will affect the emission reduction achieved through JBS's project, although the emissions from newly-introduced methane leaks are likely to be small compared to the amount of methane that will be captured. Before beginning work on a second phase of the project, JBS should submit an updated analysis of the project's expected emission reductions, to ensure that the emission reductions reflected in its Plan remain accurate.

Second, selling the captured biogas into the Colorado market introduces a risk of double-counting emission reductions if appropriate protocols are not carefully followed. The updated analysis for phase two of JBS's project should include information about how JBS will ensure that all applicable emissions accounting protocols are followed, including those contained in AQCC Reg. 27, Part D, and AQCC Reg. 22, Part C (Recovered Methane Protocols). Especially relevant are AQCC Reg. 27, Part D, Section III.D, which avoids double-counting by prohibiting the sale or use of GHG credits generated under Regulation 27 "in any carbon or GHG offset registry or trading market outside of the GHG crediting and tracking system," and AQCC Reg. 22, Part C, Sections I.C.2.b and I.C.4.d, which provide that manure management systems and wastewater treatment operations are "only eligible for recovered methane credits issued by the Division for greenhouse gas or methane emission reductions achieved above and beyond the reductions required by … proposed or final federal, state, or local rule[s] or regulation[s]."

### *B. Other GHG Reduction Measures*

[52] JBS Plan at 3.
[53] JBS Plan at 3, 6.

Sierra Club and ACEEE note that JBS's Plan does not include measures to reduce the significant emissions from sources other than its waste lagoon. These other sources, including gas-fired equipment like boilers and dryers used in JBS's meat processing operation, appear to represent 25% of the facility's total emissions,[54] or approximately 56,000 tons of CO2 in 2024.[55] Some or all of these combustion emissions can likely be avoided through electrification at relatively low costs, as demonstrated by Natural Soda's evaluation of various boiler electrification measures.

JBS asserts that its Plan does not need to evaluate these opportunities because it qualifies for the exemption under Section II.A.4.[56] The Plan indicates that construction on the methane capture and flaring project "is scheduled to begin in August 2025, with completion planned in July 2026."[57] If construction did begin in August, this would appear to satisfy the requirement in Section II.A.4 to be in the process of constructing or implementing the emission reduction measure "as of the GEMM 2 facility's submittal deadline for its GHG reduction plan," which is September 30, 2025, as set forth in Section II.A.

We recommend that APCD direct JBS to submit verification that construction has commenced before September 30 before approving JBS's Plan. Even assuming that JBS qualifies for the exemption in Section II.A.4, its uncontrolled gas equipment emissions represent a significant unrealized opportunity to achieve cost-effective emission reductions. We encourage APCD and the AQCC to consider opportunities to drive greater emission reductions in situations such as this when implementing GEMM 2 and in any future revisions to the rule.

## VII. Comments on Cargill Plan

Sierra Club and ACEEE recommend that APCD approve Cargill's Plan, but provide direction to help ensure Cargill avoids double-counting of emission reductions and correctly accounts for harmful pollutant emissions as it implements the Plan.

### *A. Plan Background*

Cargill's baseline emissions are 39,588 mtCO2e and its 2024 emissions were 33,623 mtCO2e.[58] These 2024 emissions are already below Cargill's 2030 emission limit, even without applying any emission reduction measures through the GEMM 2 Plan. This indicates that the emission limits in GEMM 2 could be strengthened to more effectively advance the emission reductions needed to meet statewide climate targets while maintaining reasonable compliance costs,

[54] JBS's Plan lists boilers, dryers, and the wastewater treatment facility as the facility's primary emission sources. The Plan indicates that the wastewater treatment facility accounts for 75% of the facility's total emissions, leaving about 25% of total emissions from the boilers and dryers. *See* JBS Plan at 3, 5.
[55] JBS Plan at 6, Table 2-1 (listing 56,164 tons of emissions from CO2, which equals 25% of the facility's total 2024 emissions).
[56] JBS Plan at 3, 8.
[57] JBS Plan at 8.
[58] Cargill Plan at 2-2.

especially for facilities that received a production-based baseline adjustment. We encourage APCD and the AQCC to focus on the potential for greater emission reductions when implementing GEMM 2 and in any future revisions to the rule.

### *B. Proposed GHG Reduction Measures*

Cargill proposes to meet its 2030 emission limit by capturing methane from its wastewater lagoons and using the biomethane in its facility's boilers.[59] Cargill asserts that it is exempt from GEMM 2's requirements to evaluate other potential GHG reduction measures under Section II.A.4, because construction of its proposed measure is already in process and the proposed measure would meet Cargill's 2030 emission limit.[60]

This appears to be correct, in light of Cargill's statement that construction on its dual fuel boiler (Boiler 6) "began on June 10th, 2025, with the boiler tentatively coming online in late August 2025."[61] However, Cargill's Plan is not completely clear on this point,[62] and its biogas system upgrade is not yet in construction.[63] The status of the biogas system upgrade would not prevent Section II.A.4 from applying if APCD considers these system upgrades to be part of the same GHG reduction measure as the upgrades to the boilers that will use the captured biogas.

Using biogas introduces some risk of double-counting emission reductions if appropriate protocols are not carefully followed. However, this risk is not as great as it would be if Cargill proposed to sell the biogas into the market, potentially requiring the biogas commodity to be separated from its environmental attributes.

### *C. Harmful Air Pollutant Analysis*

Cargill may overestimate the reductions in harmful air pollution that its Plan will produce. Cargill's Plan shows a significant reduction in harmful air pollution from proposed measures, including from both its boilers and its flare.[64] Burning captured biogas in a boiler will reduce the boiler's fossil gas combustion and associated GHG emissions by the amount of fossil gas that is replaced with biogas. However, because the boiler will still combust methane, it is expected to produce the same amount of harmful air pollution (unless the boiler upgrades substantially increase the boilers' efficiency, but the Plan does not indicate that they will). While harmful air pollution from the flare may decrease due to decreased total combustion at the flare, a reduction

[59] Cargill Plan at 3-1.
[60] Cargill Plan at 3-1.
[61] Cargill Plan at 3-3.
[62] *See* Cargill Plan at 3-3 ("The new thermogenics dual fuel boiler (Boiler 6) is currently in the engineering design phase.").
[63] Cargill Plan at 3-3 ("The biogas system upgrade is currently in the engineering design phase. Construction is tentatively planned for spring 2026 with completion in the same year.").
[64] Cargill Plan at 3-2 & Appendix B (compare Historical Emissions in Base Year (2022) table with Projected Emissions in Compliance Year (2030) table).

in harmful air pollution from the boilers is not expected. We recommend that APCD direct Cargill to submit additional information clarifying its calculations of harmful air pollution reductions, and to ensure that its future reporting on harmful air pollution is accurate and consistent with APCD guidance.

## VIII. Comments on Golden Aluminum Plan

Sierra Club and ACEEE commend Golden Aluminum for its proposed emission reduction measures, but we recommend revisions to Golden Aluminum's analysis to determine whether additional measures may be part of a cost-effective portfolio of measures.

### *A. Evaluation of GHG Reduction Measures*

Golden Aluminum evaluated two emission reduction measures in its Plan: a replacement and upgrade of its caster, and upgrades to one of its three melting furnaces.[65] It is difficult to determine whether additional measures would meet the criteria in Section II.A.2 without more information about Golden Aluminum's emission sources (e.g., whether there are significant emission sources other than the caster and melting furnaces, and what emission reduction technologies are available for each emitting process at Golden Aluminum's facility).

To facilitate identifying potential emission reduction measures, Golden Aluminum should be required to submit additional information about the emission sources at its facility. Golden Aluminum should also be required to submit additional information about how it selected the measures proposed in its Plan (e.g., why it proposed an upgrade to Melter 1 in its Plan but deferred evaluation of upgrades to Melters 2 and 3 until at least 2027, and how the caster and melter upgrades are expected to reduce the facility's emissions),[66] to facilitate evaluation of these measures and whether additional or alternative measures may be available.

### *B. Cost-Effectiveness Analysis*

Golden Aluminum's analysis appears to underestimate the cost-effectiveness of its evaluated measures in several ways. Before Golden Aluminum's plan can be approved, these issues should be corrected to determine whether a portfolio that includes Golden Aluminum's proposed measures and potentially other measures can reduce emissions below the applicable cost threshold set forth in the GEMM 2 rule.

First, replacing the caster "is expected to improve yield 7% while simultaneously reducing natural gas use."[67] While the reduction in natural gas use will help Golden Aluminum meet its 2030 emission limit, this does not appear to be the only purpose of the replacement. Therefore, it

[65] Golden Aluminum Plan at 2-3.
[66] Golden Aluminum Plan at 3.
[67] Golden Aluminum Plan at 2.

is not appropriate to attribute the full cost of replacing the caster to meeting emission limits for purposes of evaluating its cost-effectiveness as an emission reduction measure. Instead, any costs associated with increasing the facility's yield (as opposed to reducing its emissions), should not be included in the emissions abatement cost calculations. These costs could be identified by, for example, comparing the cost of the proposed replacement caster to one that would achieve the natural gas reductions but would not increase yield, or by calculating the expected revenues from the increased yield and deducting them from the caster replacement cost used in Golden Aluminum's cost-effectiveness calculations. Similarly, any expected operational savings from reducing the facility's gas consumption should be accounted for in the cost-effectiveness evaluation.[68]

Second, if this is an end-of-life equipment replacement, then Golden Aluminum would incur the costs of replacing its caster whether or not the replacement was used as an emission reduction measure in its Plan. The only emission reduction costs that should count toward its cost-effectiveness calculations are the incremental costs of its proposed emission-reducing caster, above the costs of a baseline replacement caster that does not reduce emissions (or does not reduce them as much). This is the standard approach used, for example, in evaluating the cost-effectiveness of energy efficiency measures compared to baseline-efficiency equipment in utilities' energy efficiency programs. Even if the caster is not at the end of its life, Golden Aluminum's cost-effectiveness analysis should account for the avoided equipment replacement cost associated with replacing the caster before the end of its life, using the method described in our comments on Natural Soda's Plan above.

Sierra Club and ACEEE recommend that APCD direct Golden Aluminum to resubmit its Plan with more complete information about available emission reduction measures and a corrected cost-effectiveness analysis of all measures evaluated.

## IX. Comments on Suncor Plan

Sierra Club and ACEEE do not recommend approving Suncor's Plan, which lacks the transparency required by GEMM 2 and apparently fails to comply with GEMM 2's portfolio approach.

[68] Golden Aluminum apparently recognizes that these operational savings should be accounted for in cost-effectiveness calculations, stating in its Plan that "Final cost-effectiveness will be reassessed post-implementation based on measured data and operational savings." Golden Aluminum Plan at 8; *see id.* at 7 (describing additional operational efficiencies that could yield additional savings). Because operational savings can be reasonably estimated using currently-available information (i.e. expected reductions in gas consumption and existing gas rates), these expected savings can and should be incorporated into the cost-effectiveness calculations included in Golden Aluminum's Plan.

Suncor's 2022 baseline emissions were 951,898 mtCO2e, by far the most of any GEMM 2 facility.[69] Suncor's 2024 emissions were 977,758 mtCO2e, exceeding its 2024 emissions limit of 937,619 by 40,139 mtCO2e.[70] Suncor's 2030 emissions limit is 133,266 mtCO2e.

*A. Incomplete and Non-Transparent Plan Information*

Suncor's Plan fails to provide basic information about emission sources at its facility, the emission reduction measures it evaluated for its Plan, and whether any evaluated measures are alternate options or redundant or incompatible with each other. This lack of transparency violates GEMM 2 requirements and makes it impossible for the public to fully understand and comment on Suncor's Plan.

First, Suncor's Plan does not include any information about the processes that produce GHG emissions at its facility.[71] Every other Plan submitted by a GEMM 2 facility includes a narrative summarizing the facility's emission sources, which is necessary to determine whether the facility has evaluated all technically feasible and commercially available emission control measures as required by GEMM 2.

Second, Suncor's Plan does not include a complete and verifiable list of all available GHG reduction measures, as required by Section II.A.2. Suncor's Plan includes a list of 18 evaluated measures that identifies each measure only by a number, without a description or even a title of each measure.[72] Suncor includes slightly more information about the five measures it proposes to implement, which indicates that it could have provided at least this much detail about the other measures it evaluated.[73] But even for the measures that Suncor did describe, it did not provide enough detail to meaningfully evaluate whether Suncor's estimates of cost and emission reductions are reasonable, such as cost information or equipment specifications from vendors. Suncor does not even identify the "third-party engineering contractor" that Suncor retained to prepare its Plan.

Suncor asserts that all of the "applicable supporting information" for its Plan is confidential business information that will be provided to APCD separately pursuant to Section V.C.[74] This limited provision does not authorize Suncor's failure to submit the required Plan information in its Plan, which violates GEMM 2. Specifically, Sections II.F-G provide that APCD will post to its website each GEMM 2 facility's GHG reduction plan (which must meet the requirements of Section II, including requirements in Section II.A.2 to include information on evaluated GHG

[69] Suncor Plan at 3.
[70] Suncor Plan at 3, 7
[71] Instead, the section of Suncor's Plan providing basic emissions information consists entirely of a one-line table. Suncor Plan at 3.
[72] Suncor Plan at 5.
[73] Suncor Plan at 2-3.
[74] Suncor Plan at 6.

reduction measures) and provide a 30-day public comment period. Additionally, Section II.I provides that APCD will hold at least 3 public meetings to review the approved GEMM 2 facility GHG reduction plans.

Section V.C provides a narrow exception to the provision in Section V.B for posting documents to APCD's website. That exception applies to "[c]onfidential business information *contained in* records" submitted to APCD pursuant to GEMM 2 (italics added), and it requires that confidential information to be "clearly identified." To qualify for this exemption, a facility must clearly identify the confidential information that is contained within the records it is submitting to APCD, for example by redacting that information in the submitted documents.

Rather than identifying confidential information in this way, Suncor has completely omitted much of the required information from its Plan as described above, only vaguely identifying the information it will submit pursuant to Section V.C as "applicable supporting information." This violates GEMM 2's provisions regarding the required contents of GHG reduction plans and the required public process for submitted plans.

*B. Evaluation and Selection of GHG Reduction Measures*

Based on the information that is included in Suncor's Plan, Suncor does not appear to have satisfied all applicable requirements to evaluate and propose GHG reduction measures. First, Suncor considered measures that reduce less than 1,000 mtCO2e/yr to be de minimis and removed them from consideration.[75] It is not clear that Suncor's 1,000 mtCO2e/yr threshold comports with the requirement in Section II.A.2.a to list measures that result in greater than de minimis GHG reductions. At the very least, this threshold should not be applied to other facilities, which have lower baseline emissions (such that a 1,000 mtCO2e/yr reduction would represent a greater portion of baseline emissions), and some of which have already evaluated potential measures below this threshold.[76]

Second, and more importantly, it appears that Suncor's proposed measures do not satisfy the portfolio approach set forth in Section II.A.3. Suncor evaluated 18 measures and proposed to include 5 measures in its Plan.[77] The proposed measures include the four measures with estimated costs below the $89/mtCO2e 2030 SCC, but not Measure 8, which has the next-lowest cost at $107/mtCO2e. Based on the estimated cost per tonne and emission reductions for each measure included in Suncor's Plan, a portfolio that includes the four lowest-cost measures and Measure 8 would have a weighted average cost per ton of $70.81 per tonne, which is below the 2030 SCC. The table below shows the weighted average cost per ton of this portfolio, calculated

[75] Suncor Plan at 4.
[76] *See, e.g.*, American Gypsum Plan at 3-2 (listing heat exchanger options that would reduce 359-611 mtCO2e/yr).
[77] Suncor Plan at 5.

using the method in APCD's Guidance for GEMM 2 Greenhouse Gas Reduction Plans and Co-Pollutant Analysis.[78]

| Measure # | Cost ($/mtCO2e) | GHG Reductions (mtCO2e/yr) | Total Cost of Measure ($/yr) | Cumulative Cost ($/yr) | Cumulative Reduction (mtCO2e/yr) | Weighted Average Cost ($/mtCO2e) |
|---|---|---|---|---|---|---|
| 14 | -$19 | 1,353 | -$25,707 | -$25,707 | 1,353 | -$19.00 |
| 5 | $59 | 14,642 | $863,878 | $838,171 | 15,995 | $52.40 |
| 9 | $82 | 11,016 | $903,312 | $1,741,483 | 27,011 | $64.47 |
| 1 | $84 | 1,980 | $166,320 | $1,907,803 | 28,991 | $65.81 |
| 8 | $107 | 4,005 | $428,535 | $2,336,338 | 32,996 | $70.81 |

This portfolio, including Measure 8, is required by the portfolio approach set forth in Section II.A.3 because its weighted average cost per ton of GHG reductions is below the 2030 SCC. Suncor acknowledges that the portfolio approach applies to Section II.A.3.[79] Accordingly, Suncor is required to add Measure 8 to its portfolio.

In addition to the requirements of Section II.A.3, Suncor must meet the requirements of Section II.A.6 because it is within 1 mile of a Disproportionately Impacted Community and 15 miles of a residential community, and it has proposed to use GHG reduction credits to meet its 2030 emission limit. Suncor proposes to satisfy these requirements by including Measure 18 in its Plan. Suncor appears to have reached this proposal by determining that the cost per ton of Measure 8 is between $89, the 2030 SCC, and $133.50, which is 50% above that amount.[80] Suncor "selected Measure 18 to achieve the reductions of onsite co-pollutants from Measure 8, in accordance with Part B, Section II.A.6.b of Regulation 27."[81] Because Suncor's Plan includes limited information about Measure 18 and no information about Measure 8, it is not clear why Suncor selected Measure 18. Sierra Club and ACEEE support the inclusion of Measure 18 in Suncor's portfolio, which will reduce harmful air pollutants. But because Measure 18 is included

[78] APCD, *Guidance for GEMM 2 Greenhouse Gas Reduction Plans and Co-Pollutant Analysis* at 6, https://cdphe.colorado.gov/GEMM-phase-2-rule#divisionapproved. Calculations are based on the "Weighted Ave. Levelized Cost ($/tonne)" reported in Suncor's Plan, rather than the "Total Cost of Measure ($)." *See* Suncor Plan at 5. The former is more compatible with the method used in APCD's guidance. Suncor's Plan does not address why these two values seem to reflect different total costs in some instances (e.g., negative weighted average levelized cost but positive total cost for Measure 14).
[79] Suncor Plan at 6-7.
[80] Suncor Plan at 2, 5-6.
[81] Suncor Plan at 2.

pursuant to Section II.A.6 and Measure 8 is required to be included under the separate requirements of Section II.A.3, Suncor's Plan should include *both* Measure 8 and Measure 18.[82]

Suncor objects to APCD's guidance applying the portfolio approach to Section II.A.6, but claims that "Suncor has followed the Division's Guidance in this Plan."[83] There are good reasons to believe APCD's guidance reflects the most sensible reading of GEMM 2. For example, it may frequently be the case that any measures with costs between $89/mtCO2e and $133.50/mtCO2e do not bring the weighted average cost of portfolios that include them above $89/mtCO2e. Indeed that is the case here, where Measure 8 is the only measure between $89 and $133.50/mtCO2e and it does not cause portfolio costs to reach $89/mtCO2e. It is unlikely that the AQCC intended Section II.A.6 to have no practical effect in cases like this.

In any event, Suncor's statement that its Plan follows APCD's guidance appears to be incorrect. Based on the estimated cost per tonne and emission reductions for each measure included in Suncor's Plan, a portfolio that includes the eight lowest-cost measures would have a weighted average cost per ton below 133.50/mtCO2e. The table below shows the weighted average cost per tonne of this portfolio, calculated using the method in APCD's Guidance for GEMM 2 Greenhouse Gas Reduction Plans and Co-Pollutant Analysis.

| Measure # | Cost ($/mtCO2e) | GHG Reductions (mtCO2e/yr) | Total Cost of Measure ($/yr) | Cumulative Cost ($/yr) | Cumulative Reduction (mtCO2e/yr) | Weighted Average Cost ($/mtCO2e) |
|---|---|---|---|---|---|---|
| 14 | -$19 | 1,353 | -$25,707 | -$25,707 | 1,353 | -$19.00 |
| 5 | $59 | 14,642 | $863,878 | $838,171 | 15,995 | $52.40 |
| 9 | $82 | 11,016 | $903,312 | $1,741,483 | 27,011 | $64.47 |
| 1 | $84 | 1,980 | $166,320 | $1,907,803 | 28,991 | $65.81 |
| 8 | $107 | 4,005 | $428,535 | $2,336,338 | 32,996 | $70.81 |
| 16 | $165 | 14,190 | $2,341,350 | $4,677,688 | 47,186 | $99.13 |
| 10 | $199 | 14,602 | $2,905,798 | $7,583,486 | 61,788 | $122.73 |
| 6 | $222 | 7,045 | $1,563,990 | $9,147,476 | 68,833 | $132.89 |

[82] Suncor's Plan does not indicate whether any of the GHG reduction measures it evaluated are alternate options or redundant or incompatible with each other. Section II.A.3.b provides that facilities are not required to select and implement such alternate, redundant, or incompatible measures, but only if the facility's plan includes "information as to those GHG reduction measures that are alternate options or redundant or incompatible with each other," as required by Section II.A.2.a.(v). Because Suncor's Plan does not include this information, it cannot avail itself of Section II.A.3.b.

[83] Suncor Plan at 6; *see id.* at 1 n.1.

A portfolio that includes all of the above-listed measures and Measure 18 would reduce Suncor's emissions by 98,105mtCO2e/yr, or 82% of the amount needed to meet Suncor's 2030 emission limit, at a cost approximately equal to one and a half times the 2030 SCC. Such a portfolio would also substantially reduce Suncor's emissions of harmful air pollutants into Disproportionately Impacted Communities. Sierra Club and ACEEE strongly recommend that APCD direct Suncor to implement a portfolio that includes this suite of measures.

### *C. Potential Future Plan Modifications*

Finally, Suncor "reserves the right to request to modify the Plan and [its proposed] GHG reduction portfolio as more detailed engineering and cost information is developed, pursuant to Section II.J.[84] While Section II.J authorizes GEMM 2 facilities to request modifications to their plans at any time, such modifications "must comply with the same requirements for the GHG reduction plan in Part B, Section II." These requirements include evaluating a complete list of potential GHG reduction measures under Section II.A.2, applying the portfolio approach under Section II.A.3, and applying the harmful air pollutant requirements under Section II.A.6, among others.

This means that a request to modify Suncor's Plan must include an updated assessment of available GHG reduction measures, the cost of each measure evaluated, and the reductions in harmful air pollution that each measure could achieve. These updated analyses would be especially important because several of the measures evaluated in Suncor's Plan can currently be included in a portfolio whose costs are close to the $89/ton 2030 SCC. If the expected cost of one or more of these measures decreases before Suncor submits a request to modify its Plan, for example due to market development or technological innovation, this could expand the portfolio of reduction measures required by GEMM 2.

## X. Conclusion

For the reasons set forth above, Sierra Club and ACEEE recommend that APCD:

- When implementing GEMM 2 and in any future revisions to the rule, consider the need and potential for additional, cost-effective emission reductions beyond those that are currently required;
- Update its Guidance for GEMM 2 Greenhouse Gas Reduction Plans and Co-Pollutant Analysis to include avoided equipment replacement cost where appropriate, and to only include costs whose purpose is to reduce emissions when evaluating cost-effectiveness;

[84] Suncor Plan at 6; *see id.* at 3.

- Approve Natural Soda's Plan, but but direct Natural Soda to re-evaluate the cost-effectiveness of zero-emission equipment adoption and submit the findings of this evaluation with Natural Soda's 2027 three-year compliance certification;
- Do not approve American Gypsum's Plan until it is revised to evaluate all potential measures including electrification of drying equipment and operational changes to require less drying, and to account for synergies between measures to reduce emissions from electricity generation and drying equipment;
- Do not approve Sterling Ethanol's Plan until it is revised to evaluate all potential measures including electrification of its boilers;
- Do not approve Yuma Ethanol's Plan until it is revised to evaluate all potential measures including electrification of its boilers;
- Approve JBS's Plan if JBS submits verification that construction of its proposed project has commenced, but direct JBS to submit an updated analysis before beginning work on the second phase of its proposed project that addresses potential methane leaks and double-counting of emission reductions;
- Approve Cargill's Plan, but provide direction to help ensure Cargill avoids double-counting of emission reductions and correctly accounts for harmful air pollutant emissions as it implements its plan;
- Do not approve Golden Aluminum's Plan until it is revised to include more complete information about available emission reduction measures and a corrected cost-effectiveness analysis of all measures evaluated;
- Do not approve Suncor's Plan until Suncor submits a plan that transparently and completely includes all information required by GEMM 2, and proposes a portfolio of emission reductions that complies with GEMM 2's portfolio approach.

Thank you for considering these comments. We are happy to answer any questions you may have.

Sincerely,

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