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Comments on the Draft Joint Agency Report

Additional submitted attachment is included below.

December 18, 2020

Re: Comments on the Draft Joint Agency Report

To the California Energy Commission, Public Utilities Commission, and Air Resources Board,

The Central California Asthma Collaborative ("CCAC"), the Center on Race, Poverty & the Environment ("CRPE"), the California Environmental Justice Alliance, Sierra Club California, GRID Alternatives, the Greenlining Institute and Leadership Counsel for Justice and Accountability submit the following comments on the Senate Bill ("SB") 100 Draft Joint Agency Report.

SB 100 requires the Joint Agency Report to include "[a]lternative scenarios in which [this] policy . . . can be achieved and the estimated costs and benefits of each scenario."[1] In doing so, the statutory mandate further provides that the Joint Agencies must "tak[e] into full consideration the economic and environmental costs and benefits of renewable energy and zero-carbon resources."[2] The Draft Joint Agency Report, however, fails to meet this mandate. The Joint Agencies cannot adequately evaluate the costs and benefits of energy resources without meaningfully assessing non-energy benefits ("NEBs") and social costs. Adequately understanding the local impacts of energy resources requires an evaluation of NEBs, the use of comprehensive cost-effectiveness tests, and reliance on lifecycle assessments. Excluding significant externalities, positive or negative, over the entire lifecycle of an energy resource's use critically undermines the Joint Agencies' understanding of the true costs and benefits of alternative scenarios, and to the harm of disadvantaged communities ("DACs").

As detailed in our prior comments to the Joint Agencies, SB 100 also requires the Joint Agencies to meaningfully consider equity. We are pleased that the Draft Joint Agency Report confirms this requirement, but the Draft Report fails to include a full consideration of equity consistent with the statutory language and California's climate and decarbonization policies.

[1] SB 100, Pub. Util. Code § 454.53(d)(2)(E).
[2] *Id.* at (b)(2).

Accordingly, to meet SB 100's mandate and California's equity policies and requirements, we respectfully request the Joint Agencies adequately address equity by including at least the following six additions in the final January 2021 Joint Agency Report:

1. The Joint Agency Report should include the No Combustion and Accelerated Timeline scenarios as core scenarios, not simply study scenarios.

2. The Joint Agency Report should include a timeline to determine NEBs and social costs in coordination with other Joint Agency efforts, including the CPUC's San Joaquin Valley Proceeding and the next CARB Climate Change Scoping Plan.

3. The Joint Agency Report should document the deficiencies of the current cost-effectiveness test and provide a schedule for updating evaluation tools to capture the externalities of energy resources.

4. The Joint Agency Report should include a schedule to consider the lifecycle air and water quality impacts of candidate energy resources in DACs.

5. The Joint Agencies should remove candidate resources from consideration where the extent of significant local pollution impacts is unknown.

6. In particular, the Joint Agencies should remove dairy biomethane as a candidate resource until the CPUC performs its SB 1440 cost-effectiveness analysis and the CEC evaluates the extent of significant local pollution from the SB 1383 dairy biomethane pilot projects.

I. BACKGROUND

Climate change is directly affecting Californians every day. The Joint Agencies have acknowledged that California will need a climate change adaptation strategy to cope with the expected impacts of global warming in the state,[3] including saltwater contamination of the State's delta and levee systems, losses to the Sierra snowpack and water supply, damage to agriculture, and increased demand for electricity.[4] Most recently, the 2020 wildfire season has been responsible for some of the largest wildfires in California history.[5] Over 4.1 million acres have burned, resulting in the deaths of 31 people to date, the destruction of thousands of homes,

[3] *See* Cal. Pub. Utils. Comm'n, *Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation* 2, Rulemaking 18-04-019 (April 26, 2018); Cal. Energy Comm'n, *California's Fourth Climate Change Assessment: Statewide Summary Report* 13, (August 2018) <https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf>; Cal. Air Res. Bd., "*Climate Change*" (2020) <https://ww2.arb.ca.gov/our-work/topics/climate-change>.

[4] Xavier Becerra, Attorney General, "Climate Change Impacts in California," CAL. ATTORNEY GENERAL'S OFFICE, <https://oag.ca.gov/environment/impact>.

[5] Thomas Fuller & Derrick Bryson Taylor, "Trump Reverses Decision to Reject California's Request for Wildfire Relief," THE N.Y. TIMES, (Oct. 18, 2020), <https://www.nytimes.com/2020/10/16/us/trump-california-wildfire-relief.html>.

and the displacement of thousands more Californians.[6] While some of the destruction can be attributed to inadequate forest management strategies and increased urban development in the wildland-urban interface, much of the new severity is a consequence of the increasing heat and changing rain and snow patterns of climate change.[7] These conditions have amplified California's fire severity every time a fire is ignited, whether by natural or human-made causes.[8] Furthermore, each time a wildfire rages, many Californians must reckon with the fires' effects on air quality, dealing with orange skies and falling ash.[9] In 2018 alone, researchers estimate the smoke from wildfires led to 3,652 additional deaths.[10] In DACs that "most suffer from a combination of economic, health, and environmental burdens,"[11] the worsened air conditions exacerbate poor air quality already experienced by community members.[12] DACs are affected first and worst by climate change, often suffering the most severe public health consequences as a result.[13] Similarly, the COVID-19 pandemic has highlighted the significant and disproportionate social costs that impact communities living in high pollution areas. In evaluating any proposal under SB 100, these very real and significant impacts must be at the forefront of the Joint Agencies' considerations.

One example of worsened public health due to climate change can be found in the San Joaquin Valley ("SJV"). The SJV has some of the nation's worst air quality as a result of the valley's topography and pollution sources like oil drilling, industrial agriculture, and heavy emissions transportation—activities regulated by the Joint Agencies.[14] The SJV is well known for its farmland, providing food for Americans in California and across the country.[15] However,

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[6] *Id.*; *see also* Anne Mulkern, "Fast-Moving California Wildfires Boosted by Climate Change," SCIENTIFIC AMERICAN, (Aug. 24, 2020), <https://www.scientificamerican.com/article/fast-moving-california-wildfires-boosted-by-climate-change/>.

[7] Alexandra Borunda, "The science connecting wildfires to climate change," NAT'L GEOGRAPHIC (September 17, 2020), <https://www.nationalgeographic.com/science/2020/09/climate-change-increases-risk-fires-western-us/#close>.

[8] *Id.*

[9] *See* Cal. Air Res. Bd., "Protecting Yourself from Wildfire Smoke," (2020), <https://ww2.arb.ca.gov/protecting-yourself-wildfire-smoke>.

[10] Danielle Venton, "California Wildfires Killed 106 People 2 Years Ago. Researchers Say the Smoke Killed 3,652," KQED, (Dec. 11, 200), <https://www.kqed.org/science/1971666/california-wildfires-killed-106-people-two-years-ago-researchers-say-the-smoke-killed-365>.

[11] Cal. Pub. Utils. Comm'n, "Disadvantaged Communities," <https://www.cpuc.ca.gov/discom/#:~:text=Disadvantaged%20communities%20refers%20to%20the,of%20asthma%20and%20heart%20disease>.

[12] Abené Clayton, "California fires: local groups fill in gaps as Black and Latino communities are left to prepare on their own," THE GUARDIAN, (Sept. 26, 2020), <https://www.theguardian.com/us-news/2020/sep/26/california-disaster-groups-black-latino-wildfires>.

[13] Forman et al., "Chapter 8. Bending the Curve and Closing the Gap: Climate Justice and Public Health," (2016) COLLABRA, 2(a), 22 DOI: <http://doi.org/10.1525/collabra.67>; *see also* Cal. Pub. Utils. Comm'n, *Environmental and Social Justice Action Plan* 17 (Feb. 21, 2019) < https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/Infrastructure/DC/Env%20and%20Social%20Justice%20ActionPlan_%202019-02-21.docx.pdf>.

[14] U.S. Envtl. Prot. Agency, "EPA Activities for Cleaner Air," < https://www.epa.gov/sanjoaquinvalley/epa-activities-cleaner-air>.

[15] Rory Carroll, "Life in San Joaquin valley, the place with the worst air pollution in America," THE GUARDIAN, (May 13, 2016) < https://www.theguardian.com/us-news/2016/may/13/california-san-joaquin-valley-porterville-pollution-poverty>.

much of that food is picked by low-wage employees, who are required to harvest even during highly polluted days.[16] Those effects are not just felt by the workers, but also their families, resulting in the SJV having the United States' highest asthma rate for children.[17] Earlier this year, the SJV was enveloped by some of the largest fires in California history, resulting in record high pollution.[18] Employers are required to make masks available to employees free of charge if the air quality index exceeds 151.[19] However, the preferred N95 masks are in short supply in order to help healthcare workers grapple with the ongoing pandemic.[20] As a result, many low-income workers who live in SJV DACs are exposed to high levels of pollution and suffer increased health impacts due to public emergencies exacerbated by climate change, such as the recent wildfires.

SB 100 explicitly acknowledges "[s]upplying electricity to California end-use customers that is generated by eligible renewable energy resources is necessary to improve California's air quality and public health, particularly in disadvantaged communities."[21] Quite simply, to meet its zero carbon targets, California must prioritize DACs.

On June 12, 2020, CCAC, CRPE, the Greenlining Institute, GRID Alternatives, Leadership Counsel for Justice and Accountability, Sierra Club California and the California Environmental Justice Alliance, submitted comments to the Joint Agencies detailing the need to consider an equity scenario that excludes combustion, require the adequate consideration of NEBs and the social costs of energy resources, and create a mechanism for adequate community engagement.[22] The comment addressed both the statutory grounding that binds the Joint Agencies to consider equity, including SB 100, SB 1078 and SB 350, and the larger policy considerations that require the Joint Agencies to prioritize equity, specifically with an equity scenario. This equity scenario excludes combustion-based sources of energy and includes consideration of social costs and NEBs. The Joint Agencies must evaluate NEBs and social costs in all cost-benefit analyses in order to accurately reflect the economic and public health impacts of California's energy choices. Finally, the Joint Agencies should learn from adequate community engagement efforts in order to adequately consider NEBs and social costs.

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[16] *See id.*
[17] *Id.*; *see also* Lee Romney, "Poverty and Racism Leave People More Vulnerable to Wildfire Smoke," KQED, (Sept. 4, 2020) <https://www.kqed.org/news/11836398/who-is-most-vulnerable-to-wildfire-smoke-poverty-and-racism-play-a-part>; Laura Klivans & Matthew Green, "Asthma Rates Higher in California's Historically Redlined Communities, New Study Finds," KQED, (May 29, 2019) <https://www.kqed.org/news/11749299/asthma-rates-higher-in-californias-historically-redlined-communities-new-study-finds> ("current residents of [predominantly minority neighborhoods] are more than twice as likely as their peers to visit emergency rooms for asthma").
[18] Manuela Tobias, "Air quality in San Joaquin Valley is 'worst we've ever had,' officials say," THE FRESNO BEE, (Sept. 29, 2020) < https://www.fresnobee.com/news/local/article246094805.html>.
[19] *Id.*
[20] *Id.*
[21] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 2, subd. (e)(1).
[22] Comment on the SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future Docket #: 19-SB-100, The Central California Asthma Collaborative and the Center on Race, Poverty & the Environment joined by the Greenlining Institute, GRID Alternatives, Leadership Counsel for Justice and Accountability, Sierra Club California and the California Environmental Justice Alliance, (June 12, 2020).

In response to this comment, the Joint Agencies developed a No Combustion Scenario. However, the critical flaw is that the No Combustion Scenario is included as a mere a study scenario that the Draft Joint Agency Report deems out of the scope of SB 100. The Joint Agencies have also developed an Accelerated Timeline Scenario, but also as a mere study scenario.

On September 15, 2020, CCAC, CRPE and the Greenlining Institute submitted additional comments on the SB 100 Modeling Results Workshop. That comment reiterated the statutory duty of the Joint Agencies to implement an equity scenario that excludes combustion-based sources of energy and provided substantive critiques of the modeling approaches proposed by the Joint Agencies. The comment also illustrated the flaws inherent in the Total Resource Cost Test that preclude the consideration of social costs and NEBs. The comment made clear that the Joint Agency's zero-carbon definition failed to account for leaks from natural gas and biomethane infrastructure and that failing to include capital costs for biomethane infrastructure in the Core Scenario modeling distorts the cost-effectiveness assessments. The comment also addressed how the current SB 100 modeling failed to consider both air and water quality impacts. Finally, the comment supported an accelerated timeline for the deployment of solar and storage resources. The Draft Modeling Report did not include an evaluation of NEBs and social costs in the analysis. Joint Agency staff and the Draft Joint Agency Report, however, acknowledge the importance of this consideration. As Richard Corey, Executive Officer of CARB, stated during the SB 100 Draft Results Workshop, including NEBs and social costs is a critical issue to include in any cost effectiveness analysis:

> Equally important is cost benefit. What are those amortized cost of capital outlay as well as the annualized operation costs relative to those benefits . . . in the context of NOx . . . as part of the underlying rationale for regulatory work is avoided premature mortalities associate with those air quality impacts, avoided asthma cases, avoided workdays lost and school days. In fact, those become more significant from a benefits standpoint, then the carbon element and associated social costs of carbon, which also needs to be included . . . Our ability to monetize benefits falls far short of the social actual social costs are set to view elements that can be monetized. Our ability to monetize benefits falls for short of the social actual social costs are set to view elements that can be monetized.[23]

II. The Joint Agency Report Should Include the No Combustion and Accelerated Timeline Scenarios as Core Scenarios that Prioritize Environmental Justice Communities.

We thank the Joint Agencies for developing a No Combustion Scenario. However, the Joint Agencies describe the study scenarios as largely informational in purpose and "outside the scope" of SB 100. In other words, the Joint Agencies can only implement the core scenarios; the

[23] SB 100 Draft Results Workshop- Recording 1, 5:57, <https://energy.zoom.us/rec/play/bUuRf6kjOhSZ7g8MIGF_J-Dox3NUx-JR3jwfmhJU2l4gvy8tok-MowBJUJB5gruufv1CQlP8E2A726Jb.sxqE-UdkX6egs13i?continueMode=true&_x_zm_rtaid=bbtqRRIvRxyZtiwxKkIvGQ.1599261507324.db25140b864492794d7ec91acedd47c1&_x_zm_rhtaid=490>.

study scenarios lack teeth. As our prior comments to the Joint Agencies have illustrated, *substantive* consideration of equity is not merely within the purview of the Joint Agencies but is a requirement of SB 100.[24] Including a No Combustion Scenario merely for study purposes is not sufficient to cure the Joint Agencies' deficient consideration of equity, especially if the scenario has no potential to shape the priorities of SB 100 planning. Instead, the Joint Agencies should include the No Combustion Scenario among the core scenarios.

The Joint Agencies' proposed interpretation of "zero-carbon resources" is narrowly and improperly cabined to consider only "onsite greenhouse gas emissions."[25] This interpretation misses the mark and flouts the statutory purposes of SB 100. Furthermore, the Joint Agencies' SB 100 Modeling excludes "de minimis emissions" when considering onsite emissions,[26] demonstrating that even the onsite emissions metric fails to meet the plain requirement of "*zero*-carbon." The cumulative impact of even de minimis emissions in DACs is significant, and presently unaddressed. While SB 100 does not define "zero-carbon resources," there is no ambiguity in the plain language of that term, and harmonizing with other statutory provisions to achieve in-state reductions of criteria and toxic air pollution,[27] and prioritizing DACs, leaves no other reasonable interpretation but just that plain language: zero carbon. This excludes carbon capture and biomethane. To cure this defect, the Joint Agency Report should include the No Combustion Scenario as a core scenario. Alternatively, the Joint Agency Report should detail how the study scenario could become a core scenario, as Joint Agency staff have stated during the November 2020 DAC Advisory Group meeting.

Similarly, there is no reason to delay a nondiscriminatory energy infrastructure to 2045, and Californians will be best served if that equitable future comes sooner. In describing climate change increasing the severity of wildfires, Governor Newsom recently remarked "we're going to have to do more and we're going to have to fast-track our efforts [to meet SB 100]."[28] As such, the Joint Agencies must prioritize development of an Accelerated Timeline model. The Joint Agencies must prioritize deployment of solar and storage energy resources to address both the urgent demands of climate change and the needs of DACs. Solar power remains the cheapest clean and renewable energy source in the state of California and one of the fastest and easiest to bring online.[29] Delaying the deployment of solar energy, paired with storage, results in the continued reliance on existing combustion sources, many of which disproportionately pollute and harm DACs.[30] The social costs associated with combustion sources of energy are well established, but currently not considered by the Joint Agencies. The land use and environmental

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[24] CCAC and CRPE Comments on the Joint Agency Report, June 12, 2020, available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=233461&DocumentContentId=65990.
[25] The agencies define "zero-carbon resource" to include energy sources that (1) are RPS-eligible and (2) have "zero onsite greenhouse gas emissions." Cal. Energy Comm'n, *2021 Senate Bill 100 (SB 100) Joint-Agency Report Modeling Framework and Scenarios Overview* 2 (Aug. 31, 2020).
[26] *Id.* at 2 n.3.
[27] Sen. Bill No. 100 (2017–2018 Reg. Sess.), § 2 (codified at Cal. Pub. Util. Code § 399.11, subd. (b)(2)–(3)).
[28] *See eg. California governor pushes to fast track climate goals as wildfires burn the state*, UtilityDive, September 15, 2020, *available at* https://www.utilitydive.com/news/california-governor-fast-track-climate-goals-as-wildfires-burn/585208/.
[29] Eckhouse, *Solar and Wind Cheapest Sources of Power in Most of the World*, BLOOMBERG, <https://www.bloomberg.com/news/articles/2020-04-28/solar-and-wind-cheapest-sources-of-power-in-most-of-the-world>.
[30] *See* our Sept. 15, 2020 comment at 14.

impacts of carbon-based energy sources (including local air and water pollution impacts) far outweigh the local impacts from solar and storage development.[31] Additionally, the economic benefits of distributed solar are significant, enabling local communities to enjoy both the economic and employment benefits of energy generation.[32] The Joint Agencies must fully consider the many benefits of an Accelerated Timeline in their SB 100 modeling. We request that the Joint Agencies either include it as a core scenario, or, similarly detail how the study scenario could become a core scenario.

III. The Joint Agency Report Should Include a Timeline to Determine NEBs and Social Costs in Coordination with the CPUC's SJV Proceeding, the CARB Climate Change Scoping Plan, and Other Joint Agency Efforts.

At present, even with the Joint Agencies' commitment to consider NEBs, social costs, and other significant externalities, the Draft Joint Agency Report's acknowledgement of the importance of these factors, but the failure to consider them, runs contrary to the mandate of SB 100. This exclusion poses disproportionate risks to DACs who bear a disproportionate share of social costs of energy production from fossil fuels and carbon sources. In order to demonstrate that the Joint Agencies are taking a reasoned, fair approach and fulfilling their commitments and duties in a timely manner, the Joint Agency Report must: first, more fully develop and document the deficiencies in analysis from omitting consideration of NEBs and social costs; and second, include a schedule to determine NEBs and social costs in coordination with stakeholders and relevant agency proceedings or actions. The Joint Agency Report should also specify which NEBs and social costs the agencies will determine, which should include, but is not limited to: land use and localized environmental impacts; health, safety and comfort; air quality (indoor and outdoor); water quality and supply; economic impacts (including local job creation, economic development and affordability); resiliency (including addressing adaptation) impacts; and community engagement and pride.

During the next phase of the CPUC's SJV Proceeding (Rulemaking 15-03-010), the CPUC will consider NEBs related to fuel switching pilot projects in the SJV.[33] The CPUC has the opportunity to learn the full range of non-energy benefits of decarbonization approaches from 11 community-wide pilot projects in 11 SJV DACs where electrification (10 communities) and natural gas (one community) replace wood-burning and propane resources. The proceeding also benefits from extensive community engagement and seeks to take lessons learned from the Energy Savings Assistance Program to determine NEBs, including those listed above, for the new energy resources. The Joint Agencies should leverage this opportunity, which the Joint Agency Report should detail. Similarly, the Joint Agency Report should also describe anticipated coordination with other related Joint Agency efforts, including the CPUC's Air Quality Adder and social cost of carbon progress, and the development of CARB's next Climate Change

[31] *See* Allred, *supra* note 208.
[32] Seel, *Non-Energy Benefits of Distributed Generation*, SIERRA CLUB, <https://content.sierraclub.org/creative-archive/sites/content.sierraclub.org.creative-archive/files/pdfs/1137-Distributed-Generation-White-Paper_03_low.pdfontent.sierraclub.org.creative-archive/files/pdfs/1137-Distributed-Generation-White-Paper_03_low.pdf>.
[33] Cal. Pub. Util. Comm'n, *Decision Approving San Joaquin Valley Disadvantaged Communities Pilot Projects* 139, Rulemaking 15-03-010 (Dec. 19, 2018).

Scoping Plan. Other state agency efforts may also be informative, such as CalEPA's carbon neutrality studies.[34]

A. The Joint Agency Report Must Acknowledge the Importance of Adequately Considering NEBs, Social Costs, and Other Externalities.

The Joint Agencies' current SB 100 modeling omits significant externalities of energy production. NEBs and social costs enable decision-makers to internalize those externalities into the relative cost of each energy resource considered to meet SB 100. Furthermore, although CARB recognized the importance of measuring social costs in 2017, it has delayed production of any useful research or framework for doing so. The Joint Agency Report must acknowledge this delay and set a schedule to correct this Joint Agency deficiency.

When consumers make a purchase, the product typically has a direct cost, the price.[35] However, some products also have indirect costs that are not necessarily reflected in the price.[36] Some of those indirect costs are small, but others are large, either standalone or when viewed in aggregate.[37] Large indirect costs are known as externalities.[38] Pollution is a traditional example of a negative externality, where the polluter makes decisions based solely on the direct cost of and profit from production without considering the indirect costs suffered by third parties harmed by the pollution.[39] A relevant example of this can be seen in industrial dairies where the focus on methane emissions has excluded detrimental impacts to local communities from cost summaries, omitting discussion of increasing herd sizes and leading to the mistaken belief that biomethane is a clean fuel option.[40] The reality is that communities local to expanding industrial dairies suffer from consequent increasing air and water pollution, which in turn causes detrimental health impacts.[41] To accurately price any product, the externalities need to be internalized into the industry price so that the cost accurately reflects the true cost for consumers and nearby communities.[42] When a price does not reflect the costs of externalities, market outcomes may not be efficient because products with positive externalities will be underproduced and products with negative externalities will be overproduced.[43] Inefficiencies due to inadequately considered externalities are a form of "market failure."[44] To avoid such

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[34] CalEPA Carbon Neutrality Studies, Final Scope of Work, *available at* https://calepa.ca.gov/2020/05/21/carbon-neutrality-studies-study-2-final-scope-of-work/

[35] Thomas Helbling, "What Are Externalities?" International Monetary Fund, *Finance & Development*, 47 Dec. 2010, <https://www.imf.org/external/pubs/ft/fandd/2010/12/basics.htm>.

[36] *Id.*

[37] *Id.*

[38] *Id.*

[39] *Id.*

[40] *Prepared Testimony of Dr. Dustin Mulvaney, Julia Jordan, and Leslie Martinez on behalf of Sierra Club and Leadership Counsel for Justice and Accountability on the Application of Southern California Gas Company and San Diego Gas & Electric Company for Renewable Natural Gas Tariff* 31 [hereinafter "Prepared Testimony"], Docket A.19-02-015 (Oct. 14, 2019).

[41] *Id.* at 30-31.

[42] Thomas Helbling, "Externalities: Prices Do Not Capture All Costs," International Monetary Fund, *Finance & Development,* (February 24, 2020) < https://www.imf.org/external/pubs/ft/fandd/basics/external.htm>.

[43] *Id.*

[44] *Id.*

failure, and adequately consider the cost effectiveness of various energy sources, the Joint Agencies must ensure that the considered costs have internalized the externalities.

NEBs and social costs are the externalities of consuming electricity that the SB 100 process must consider in order to accurately capture the price of consumption for energy sources. By including social costs, the Joint Agencies can factor in that some energy sources pollute more than others, to the detriment of local and statewide third parties. For instance, the projected average cost (cents/kWh) indicates that both SB 100 Core (16.0) and 60% RPS (14.8) are more cost effective than the No Combustion Scenario (18.1).[45] If NEBs and social costs were factored into this model, it is likely that both the SB 100 Core and the 60% RPS scenarios would increase in cost to account for the very real costs associated with air and water pollution, making the No Combustion Scenario more affordable per kWh.[46] For example, 2018 California wildfire damages in 2018 change significantly and add up when including various social costs metrics. Damages "totaled $148.5 (126.1–192.9) billion (roughly 1.5% of California's annual gross domestic product), with $27.7 billion (19%) in capital losses, $32.2 billion (22%) in health costs and $88.6 billion (59%) in indirect losses (all values in US$)."[47]

As detailed below, the cost-effectiveness test used by the Joint Agencies, the Total Resource Cost Test cannot adequately include NEBs or social costs, and therefore cannot capture such significant externalities, and, equity concerns.[48] Considering NEBs and social costs reveals the true costs of energy sources. It would be arbitrary and capricious for the Joint Agencies to fail to internalize these externalities in the SB 100 model, causing a discriminatory impact on DACs who bear the lion's share of the indirect costs of combustion.

B. CARB Has Failed to Timely Determine Social Costs.

Although CARB acknowledged the importance of measuring social costs and benefits more than three years ago, it has yet to produce any meaningful framework for measuring social costs or research to inform such an effort. In its 2017 Climate Change Scoping Plan, CARB noted the importance of determining the social costs of GHG reduction strategies and committed to "engag[e] with experts to evaluate the comprehensive California-specific impacts of climate change and air pollution."[49] Yet, CARB has failed to evaluate such social costs within a reasonable time. CARB has recently issued a research proposal for "evaluat[ing] the full social costs and benefits" of state climate change and air quality programs.[50] The proposal explains at length the importance of "accurate information about the health benefits (and avoided damages)" of state air quality and climate policies to help inform communities and decision-makers.[51]

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[45] Liz Gill, *SB 100 Draft Results*, Cal. Energy Comm'n 23, 35 (Sept. 2, 2020).
[46] *See* our Sept. 15, 2020 comment at 8-9.
[47] Wang, D., Guan, D., Zhu, S. *et al.* Economic footprint of California wildfires in 2018. *Nat Sustain* (2020). https://doi.org/10.1038/s41893-020-00646-7.
[48] *Addressing Non-Energy Benefits in the Cost-Effectiveness Framework*, Cal. Pub. Utils. Comm'n 1, <https://library.cee1.org/system/files/library/9734/CEE_EvalNEBCostEffect.pdf>.
[49] Cal. Air Res. Bd., *California's 2017 Climate Change Scoping Plan* 41 (Nov. 2017), <https://ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/scoping_plan_2017.pdf>.
[50] Cal. Air Res. Bd., *Developing a Comprehensive Framework for Estimating the Social Costs of Emissions of Criteria Pollutants and Air Toxics in California, and Identifying Other Direct and Indirect Benefits of California's Climate and Air Quality Programs* 2, Interagency Agreement, CARB CPRA 120-091020 000001.
[51] *Id.* at 1.

Recognizing that "new metrics are needed to better quantify climate, air quality health, and other co-benefits of California's climate programs," the proposal aims to "qualitatively assess[] the environmental, energy, economic, and social benefits" of such policies.[52] CARB proposes to measure "air-quality health benefits," "estimates of the agricultural and visibility benefits of improvements in air quality, ecosystem benefits, and incorporate the interaction of the nitrogen cycle with air quality."[53] The proposal also points to other benefits, including "ecological impacts (e.g., on water quality) [and] energy security." This important work, however, is not currently expected to be completed until 2023.

While this proposal is an important step, CARB is only starting the research process into social costs three years after committing to do so in 2017. In addition, Assembly Bill ("AB") 197 requires CARB to consider social costs when adopting rules or regulations to achieve emissions reductions and protect DACs.[54] Addressing social costs also furthers the intent of CARB's recent resolution to pursue racial equity and environmental justice, and "reduce air pollution and greenhouse gas emissions in disadvantaged communities and communities of color, in partnership with those communities."[55] Currently, without a full understanding of social costs, it is not possible for the state to meet this commitment and the parallel mandates in AB 197 and SB 100. It is critical for the Joint Agency Report to address how the State will remedy this deficiency that threatens increasing harms to DACs.

IV. The Joint Agency Report Should Document the Deficiencies of the Current Cost-effectiveness Test and Provide a Schedule for Updating Evaluation Tools to Capture the Externalities of Energy Resources.

The Joint Agencies currently rely exclusively on the Total Resource Cost Test ("TRC") to compare SB 100 scenarios. Because this test cannot comprehensively measure NEBs and social costs, its use is of dubious value at best and discriminatory against DACs at worst. In order to prevent discriminatory impacts and adequately account for equity concerns, the Joint Agencies must apply a cost-effectiveness test that reasonably approximates all significant NEBs and social costs. The Joint Agency Report should include a timeline to develop an appropriate cost effectiveness test, noting the deficiencies of the existing cost-effectiveness test, and detail the need to consider at least NEBs and social costs related to air quality, and water quality and supply.

A. The Joint Agency Report Should Include a Timeline for Incorporating an Appropriate Cost-Effectiveness Test.

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[52] *Id.* at 1.
[53] *Id.*
[54] "When adopting rules and regulations pursuant to this division to achieve emissions reductions beyond the statewide greenhouse gas emissions limit and to protect the state's most impacted and disadvantaged communities [cap and trade program], the state board shall follow the requirements in subdivision (b) of Section 38562, consider the social costs of the emissions of greenhouse gases . . . " Assem. Bill. No. 197 (2015–2016 Reg. Sess.), Ch. 250, § 5.
[55] CARB Resolution 20-33, Commitment to Racial Equity and Social Justice, October 22, 2020, *available at* https://ww3.arb.ca.gov/board/res/2020/res20-33.pdf.

In order to adequately meet their statutory duties to consider the costs and benefits of alternative scenarios and to equitably implement SB 100, the Joint Agencies must use a sufficiently robust and comprehensive cost-effectiveness test to assess various SB 100 scenarios. The TRC Test does not rise to this occasion. The Joint Agency Report should document the deficiencies of the TRC Test, particularly the test's inability to comprehensively measure, or even consider, significant local impacts on DACs. Failure to track and include disproportionate impacts on DACs in the SB 100 model simply perpetuates, and could even exacerbate, harms in low-income communities of color.[56] The Joint Agency Report should provide a schedule for the agencies to update their cost-effectiveness tests to capture NEBs and social costs.

(i) The TRC Test Cannot Adequately Account for NEBs and Social Costs.

The TRC Test considers costs and benefits to utilities and their ratepayers,[57] as it "includes existing system costs (baseline costs), capital investments and operation costs."[58] However, the TRC Test falls short by failing to measure social costs and NEBs. The test does not consider costs and benefits to society or Californians as a whole; rather, it provides a myopic analysis focused on the perspective of utilities and ratepayers. While these costs and benefits are certainly important to measure, the Joint Agencies each exist to serve all Californians, not merely utilities and ratepayers. As such, the agencies should use a cost-effectiveness test, or combination of tests, that can account for social costs and NEBs. Continuing to rely on the TRC Test for modeling will contravene the agencies' statutory duty to equitably implement SB 100. Continued reliance on this inadequate test also perpetuates the agencies' inability to comply with AB 197. Put simply, the TRC Test ignores disproportionate public health impacts on DACs. The Joint Agency Report must acknowledge this deficiency.

Worse yet, reliance on the TRC Test leads to distorted cost comparisons and provides the agencies and stakeholders with inaccurate cost-effectiveness data. By undercounting NEBs and social costs, the TRC Test provides biased comparisons of the Core Scenario, No Combustion Scenario, and other scenarios to the detriment of DACs. For example, under the TRC Test, the No-Combustion Scenario will cost 18.1 cents/kilowatt-hour ("kWh") on average, while the Core Scenario will cost 16 cents/kWh on average.[59] This comparison using the TRC Test fails to account for the social costs of maintaining fossil fuel infrastructure under the Core Scenario and similarly undercounts the NEBs associated with a No Combustion Scenario, such as improved indoor air quality or reduced health impacts. In fact, as part of the research funding associated with the IDER proceeding, Energy and Environmental Economics, Inc. (E3) worked with air quality researchers at the University of California, Irvine to model the air quality impacts of natural gas power generation in California, using a state-of-the-art high resolution dispersion model. The report, Air Quality Adder Documentation and Benchmarking (December 2020), quantifies air quality impacts at a statewide average value of 2 cents/kWh. Therefore,

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[56] *See* Catherine Garoupa White, *Reframing Air Pollution as a Public Health Crisis in California's San Joaquin Valley*, Case Studies in the Environment (2020) 4 (1): 1–9, <https://doi.org/10.1525/cse.2020.sc.965681>.
[57] *Addressing Non-Energy Benefits in the Cost-Effectiveness Framework*, Cal. Pub. Utils. Comm'n 1, <https://library.cee1.org/system/files/library/9734/CEE_EvalNEBCostEffect.pdf>.
[58] Gill, *supra* note 38, at 24.
[59] *Id.* at 36.

considering only one of the associated NEBs and social costs, air quality *alone*, bridges the cost gap between the Core Scenario and No Combustion scenario.

(ii) The TRC Test Cannot Adequately Account for Affordability.

In addition, the TRC Test has limited application to address affordability, in particular the incrementally larger fixed cost of fossil fuel infrastructure that DACs are at greatest risk of bearing as the state edges closer to the SB 100 2045 target. The Joint Agency Report should document and set a schedule to remedy this shortcoming.

(iii) The TRC Test Cannot Adequately Account for Significant Capital Costs and the Costs of Maintaining Natural Gas Infrastructure.

Similarly, the TRC Test even fails to account for the significant capital costs of certain candidate energy sources. For instance, the modeling omits infrastructure costs of biomethane in the Core Scenario, leading to an incomplete cost-effectiveness analysis at a purely financial degree. For example, the total estimated capital and maintenance costs of the six SB 1383 dairy biomethane pilot projects is approximately $319 million over twenty years.[60] Current modeling, however, omits these millions of dollars. These costs are particularly relevant to an adequate cost-effectiveness analysis due to their potential impact on ratepayers, as the CPUC is considering whether utilities should recover their investments in biomethane interconnection utility infrastructure from ratepayers under AB 3187.[61] As California transitions away from natural gas, the fixed and sunk costs, such as these hundreds of millions of dollars, of maintaining natural gas infrastructure will place increasing economic burdens on a decreasing number of ratepayers. This raises troubling affordability concerns, particularly as the last customers to transition away from natural gas are likely to be residents of DACs. The failure to include these economic costs and their likely impacts on ratepayers in the Core Scenario diminishes the value of a No Combustion Scenario by artificially inflating the benefits of dairy biomethane resources.

In addition, by failing to account for the capital costs of natural gas infrastructure, current modeling also incorrectly assumes that there are zero costs of keeping gas plants online. It is important for the Joint Agency Report to detail these significant costs that future modeling must address. Those costs include: impacts on air quality from cycling, partial load and regular operation of natural gas infrastructure; methane leakage and impacts from that leakage associated with continued use of natural gas; GHG emissions associated with continued use of natural gas, in particular, the higher GHG emissions from partial load operations; health and welfare impacts from each of these preceding factors; operational and maintenance costs of gas generators and gas lines, considering the increased cycling, bearing in mind that these costs increase over time due to the wear and tear of the units; and the costs of major modifications and maintenance due to the wear of cycling as well as extension of life of some of these facilities.

The Joint Agency Report should also include a discussion of the high potential for fluctuating costs of natural gas. This discussion should present the various market forces that could affect the price of natural gas, and would also be informed by an analysis of the potential impacts of natural gas plants being called on from out-of-state. Modeling thus far does not

[60] *See* Cal. Energy Comm'n, *Adopted 2019 Integrated Energy Policy Report*, A-9 (2020). *See also* Five Points Pipeline, L.L.C., *Solicitation for SB 1383 Dairy Pilot Projects* 571 (2018).
[61] *See id.* at A-10.

examine the likely dispatch of units to meet out of state load. Overall, current modeling wrongly assumes that not retiring gas plants is more economical than the many alternatives.

The TRC Test provides distorted comparisons of energy resources. A more robust cost-effectiveness test that measures NEBs, social costs, and the significant costs of maintaining natural gas infrastructure will enable the Joint Agencies to pursue a scenario that better protects the health and welfare of DACs while also minimizing overall costs.[62]

B. The Joint Agency Report Should Detail the Need to Consider Additional Social Costs and NEBs of GHG Emissions.

The Joint Agency Report should also detail how relying on the Interagency Working Group ("IWG") Social Cost of Carbon ("SCC" or "$SCCO_2$") estimates to measure GHG emissions impacts of various scenarios, results in an incomplete analysis. CARB itself has noted the insufficiency of the SCC measurement:

> There are additional costs to society outside of the SC-CO2 , including costs associated with changes in co-pollutants. The Intergovernmental Panel on Climate Change (IPCC) has stated that the [SCC] estimates are likely underestimated due to the omission of significant impacts that cannot be accurately monetized, including important physical, ecological, and economic impacts [such as] avoided damages and health/safety co-benefits of living in communities designed to reduce exposure to air pollution, or increased damages due to additional stressors that many low-income communities face (e.g. limited access to active transportation and health care) that increase their vulnerability to the health risks associated with exposure to air pollution.[63]

Importantly, CARB acknowledged that measuring social costs and benefits of GHG reduction policies can help inform decision-makers about cost effectiveness, as "there may be technologies or policies that do not appear to be cost-effective when compared to the SCCO2, SC-CH4, and SC-N2O associated with GHG reductions," but that "these technologies or policies may result in other benefits that are not reflected in the IWG social costs."[64] Instead, a more comprehensive picture of social costs and benefits could reflect local air pollution impacts and criteria pollutant emissions from power plants.[65] While CARB also noted that better measurement of social costs could include "diversification of the portfolio of transportation fuels" as outlined in the Low Carbon Fuel Standard,[66] the Low Carbon Fuel Standard only addresses GHG emissions and does not consider local air and water pollution costs. Thus, as discussed further below, diversifying the transportation portfolio through expansion of biomethane would not likely reduce social costs when considering local air and water pollution impacts caused by biomethane production.

Furthermore, when assessing GHG emissions of various SB 100 scenarios, the agencies should quantify the risk of methane leaks from natural gas and biomethane resources. The Joint Agencies' current interpretation of "zero-carbon resources" ignores the potential for leaks from

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[62] *See* Gill, *supra* note 38, at 5.
[63] Cal. Air Res. Bd., *supra* note 43, at 2–3.
[64] *Id.* at 3.
[65] *Id.*
[66] *Id.*

biomethane and natural gas infrastructure, as it only considers onsite GHG emissions.[67] Yet, the reality of California's natural gas infrastructure belies this assumption that a resource with offsite GHG emissions can be considered "zero-carbon." In recent years, at least two major leaks from natural gas infrastructure have occurred, in Arvin and Porter Ranch, California.[68] These leaks resulted in extensive public health consequences, relocation of residents, and massive GHG emissions, one of which became "the largest methane leak in U.S. history."[69] Unfortunately, such leaks are likely to recur with biomethane, as the same infrastructure that leaked natural gas will inevitably leak biomethane. Biomethane may even bring higher concerns about leaks, as the trace contaminants found in biogas and biomethane "have the potential to cause adverse health effects and pipeline corrosion."[70] A recent study found that such trace contaminants, including lead, copper, hydrogen sulfide, and methyl mercaptan, have a larger than 1% probability of surpassing trigger levels in treated biogas.[71] In addition to the potential for massive leaks like those that occurred in Arvin and Porter Ranch, continued use of natural gas infrastructure for biomethane brings the risk of cumulatively significant methane leaks from throughout the entire natural gas infrastructure and from in-home gas appliances.[72] Such leaks may even increase as natural gas infrastructure continues to age. This infrastructure may fall into disrepair as maintenance costs for a decreasing number of customers becomes prohibitively expensive for remaining natural gas customers, who will likely be disproportionately comprised of renters and low-income households.

C. The Joint Agency Report Should Detail the Need to Consider the Social Costs and NEBs Associated with Local Air and Water Quality Impacts.

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[67] The Joint Agencies interpret zero-carbon resources as generation sources that are RPS-eligible and have "zero onsite greenhouse gas emissions." Cal. Pub. Utils. Comm'n, *2021 Senate Bill 100 (SB 100) Joint-Agency Report Modeling Framework and Scenarios Overview* 2 (Aug. 31, 2020). Yet, the agencies exclude "de minimis emissions" from their modeling, despite recognizing that natural gas generation results in GHG emissions. *See id.* at 2 n.3.

[68] *See* Ruth Brown, *Arvin gas leak reveals lack of oversight*, Bakersfield Californian (Apr. 26, 2014), <https://www.bakersfield.com/news/arvin-gas-leak-reveals-lack-of-oversight/article_9c839848-1db0-516d-af8bec615157561b.html>; Christine Bedell & John Cox, *Pipeline operator fined over Arvin gas leak*, BAKERSFIELD CALIFORNIAN (Feb. 19, 2016), <https://www.bakersfield.com/news/pipeline-operator-fined-over-arvin-gas-leak/article_91c29fcc-2da9-5be3- 9239-822ced6a0c26.html>; *LA County Calls on Governor to Expedite Closure of Aliso Canyon*, NBC Los Angeles (Jan. 7, 2020), <https://www.nbclosangeles.com/news/local/la-county-calls-on-governor-to-expedite-closure-of-alisocanyon/2286869/>.

[69] *LA County Calls on Governor to Expedite Closure of Aliso Canyon*, *supra* note 63; *see also* Brown, *supra* note 64; Bedell & Cox, *supra* note 63; Diana Aguilera, *Seven Months After Gas Leak Arvin Residents Still Can't Return Home*, Valley Pub. Radio (Oct. 28, 2014), <https://www.kvpr.org/post/seven-months-after-gas-leak-arvin-residents-still-cant-return-home>; Sharon McNary, *What Did Porter Ranch Residents Breathe During the Massive Gas Leak? Here's What One Doctor's Quest Revealed*, LAIST (Nov. 5, 2019), <https://laist.com/2019/11/05/aliso-canyon-porter-ranch-gas-leakblowout-health-benzene-nordella.php>.

[70] Katherine F. Chin et al., *Statistical Analysis of Trace Contaminants Measured in Biogas* 1, SCIENCE OF TOTAL ENV'T 729 (2020) 138702.

[71] *Id.* at 7.

[72] *See* Marc L. Fischer et al., *Natural Gas Methane Emissions from California Homes,* LAWRENCE BERKELEY NAT'L LAB. 1–3, 38–40 (Aug. 2018); Eric D. Lebel et al., *Quantifying Methane Emissions from Natural Gas Water Heaters*, 54 ENVTL. SCI. & TECH. 5737, 5737, 5740–43 (April 6, 2020). *See also* Amber Mahone et al., *Deep Decarbonization in a High Renewables Future*, ENERGY & ENVTL. ECONS., INC. 51 (June 2018) ("Some research . . . suggests that methane leakage from the pipeline gas system could be several-fold higher than official state greenhouse gas inventory estimates.").

The Joint Agencies must include water quality, water supply, and air quality impacts in their SB 100 model.[73] As indicated in the SB 100 Draft Results presentation, the model includes Rate Impacts, Workforce Impacts, and Land Use Impacts, but it omits Air Pollutants/Air Quality Impacts and makes no mention of Water Quality Impacts.[74] Consequently, the Joint Agencies contradict the plain language of SB 100, arbitrarily skew the model toward higher polluting technologies, and ignore the disproportionate impacts this pollution would have on DACs.[75] The Joint Agency Report must disclose and set a schedule to address this deficiency.

The plain language of SB 100 requires the Joint Agencies to consider air pollution and water quality. First, an explicit goal of the statute is "[r]educing air pollution, *particularly criteria pollutant emissions and toxic air contaminants*, in the state."[76] Other statutory provisions governing public utilities similarly seek to "[m]inimize localized air pollutants and other greenhouse gas emissions, with early priority on disadvantaged communities."[77] By omitting local air pollutants from the model, the Joint Agencies simply cannot meet this established mandate.

Further, the Joint Agencies must assess the water quality and supply implications of their actions. The plain language of SB 100 requires the Joint Agencies to "prevent unreasonable impacts to . . . water customer rates and bills resulting from implementation . . . taking in full consideration the economic and environmental costs and benefits[.]"[78] This clear statutory mandate is bolstered by the recent Executive Order to conserve 30% of California's land and water.[79]

Water quality and energy usage are inextricably linked. About 12% of the total energy used in California is related to water, with 2% for conveyance, treatment, and distribution, and 10% for end-customer uses like heating and cooling.[80] This co-dependence is highlighted by the reliance of hydroelectric and natural gas generation facilities on access to water supply, a reliance that may be challenged by increasingly severe drought-inducing effects of climate change. Droughts greatly impact hydroelectricity facilities,[81] but also affect combustion-based facilities, in particular with regard to water quality and supply and resultant water customer bills.

Without an analysis focused on equity, the Joint Agencies compare all energy resources, no matter their associated disparate environmental impacts, on equal footing with regard to public health and environmental costs. In failing to include air and water quality impacts in cost-benefit analyses, the Joint Agencies necessarily assume that these impacts are equal for all SB 100 candidate resources and scenarios. Treating these air and water quality impacts equal may

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[73] Gill, *supra* note 38, at 4.
[74] *Id.*
[75] *See* David Keiser et al., *The Social Cost of Water Pollution*, RES. MAG. (May 16, 2019), <https://www.resourcesmag.org/archives/social-cost-water-pollution/>.
[76] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 2, subd. (b)(3) (emphasis added).
[77] *See eg.* Pub. Util. Code §§ 454.52 and 399.13.
[78] *Id.* § 5, subd. (b)(2).
[79] Cal. Exec. Order No. 82-20 (Oct. 7, 2020) <https://www.gov.ca.gov/wp-content/uploads/2020/10/10.07.2020-EO-N-82-20-.pdf>.
[80] *California's 2017 Climate Change Scoping Plan* ES14 (Nov. 2017), <https://ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/scoping_plan_2017.pdf>.
[81] Laura Bliss, *One Way the California Drought Is Contributing to Climate Change*, CITY LAB (Feb. 16, 2016), <https://www.citylab.com/equity/2016/02/how-california-drought-is-contributing-to-climate-change/462951/>.

pose limited consequences for more affluent communities, but it would be far from realistic for California's DACs. Ignoring NEBs and social costs in this context would fundamentally impair any effort to identify economically efficient strategies, at the expense of those in DACs.

V. The Joint Agency Report Should Include a Schedule to Consider the Lifecycle Impacts, including Local Air and Water Pollution Impacts, of Candidate Energy Resources in DACs.

To follow the intent of SB 100 and meaningfully prioritize DACs, the Joint Agencies should examine the lifecycle impacts of energy production in those communities. To adequately evaluate costs and benefits and consider equity, the Joint Agencies must assess—or at least in the Joint Agency Report, discuss and set a timeline to develop the necessary tools to assess—the lifecycle GHG, air, and water impacts in DACs of SB 100 scenarios. These considerations are especially important where candidate resources are associated with highly polluting and resource-intensive activities, such as hydraulic fracturing for natural gas or sourcing waste from mega-dairies for biomethane. Lifecycle assessments ("LCAs") of impacts in DACs will ensure that SB 100 fulfills its purpose of helping the state meet its climate goals, reduce criteria air pollutants, and prioritize DACs.

LCAs are essential to comprehensively evaluate the cost-effectiveness and equity-related impacts of a given resource. An assessment of a resource's environmental impacts or cost effectiveness that omits significant impacts upstream and downstream from the point of use is likely to miss crucial factors. For instance, two seemingly identical biofuels would vary widely in terms of total costs if one is associated with deleterious land-use changes, more GHG-intensive inputs, and more polluting processes. Likewise, total costs would also vary if the combustion emissions of one resource are distributed in more vulnerable environments and populations. Furthermore, applying LCAs to energy resources is not a novel idea: both CARB and the CEC have applied LCAs of GHG emissions from transportation fuels. Given this experience in the transportation setting, the Joint Agencies should follow this approach in examining candidate resources. This comment describes local impacts from dairy biomethane production as an example of the importance of considering LCAs in DACs.

If the Joint Agencies cannot incorporate LCAs into the Joint Agency Report, the report should at least detail the need to—and provide a schedule for—the Joint Agencies to consider LCAs to identify and avoid disproportionate impacts in DACs.

A. CARB and CEC Programs Already Consider Lifecycle GHG Emissions for Transportation Fuels.

An integral component of California's climate change mitigation efforts, the Low Carbon Fuel Standard ("LCFS") employs a lifecycle analysis to estimate the "carbon intensity" of transportation fuels, which in turn determines the allocation of credits and deficits. Using a version of Argonne National Laboratory's GREET model, CARB incorporates a given fuel's upstream GHG emissions, such as methane leakage during extraction and emissions from processing and transportation, into the imbedded emissions of the fuel itself to calculate a carbon intensity values. The scope of CARB's assessment is comprehensive enough to capture the net

GHG emissions of land-use changes for certain biofuels and far-reaching enough to evaluate fuels produced across the globe.[82]

Similarly, recognizing the importance of lifecycle emissions to optimizing GHG reductions and renewable energy investment, the CEC borrows the lifecycle assessments of transportation fuels from the LCFS to implement the Clean Transportation Program. The CEC relies on these LCAs because it appreciates the relevance of lifecycle GHG emissions and the specificity and consistency of the LCFS assessments.[83]

The Joint Agencies are familiar with LCAs. To adequately consider equity, the Joint Agencies must extend this analysis to apply to DACs as detailed below.

B. The Joint Agencies Should Use Lifecycle Analyses to Consider GHG, Air, and Water Impacts of Candidate Resources.

The Joint Agencies should follow their own proven approach and use comprehensive LCAs to evaluate the global GHG footprint of candidate resources. Although SB 100 does not set standards for total sector-wide GHG emissions like the LCFS does, the lifecycle GHG emissions of candidate resources are nonetheless important to the Joint Agencies' mandate to assess the costs and benefits alternative scenarios. In fact, CARB already assesses the upstream emissions of "feedstock production" for California's generation resources in order to calculate the carbon intensity for transportation powered by electricity and electrolytic hydrogen.[84]

Moreover, SB 100 requires meaningful consideration of GHG emissions that may occur upstream or downstream from the point of generation. The Legislature stated its intent for SB 100 to help California meet its "climate change goals by reducing emissions of greenhouse gases associated with electrical generation."[85] Fugitive and combustion emissions during extraction, processing, and transportation of fossil fuels make significant contributions to California's overall GHG impacts.[86] As noted throughout this comment, it is also important for the Joint Agencies' LCA to consider GHG emissions from leaks.

In addition, the Joint Agencies should consider the lifecycle impacts of candidate resources on air quality in DACs. SB 100 requires the Joint Agencies to reduce criteria and toxic air pollution in the state.[87] Assessing significant lifecycle impacts of candidate generation resources would help the Joint Agencies not only advance this aim but also better satisfy the need to consider equity in SB 100 implementation. Specifically, the Joint Agencies should prioritize direct emission reductions in order to realize the benefits of co-pollutant reductions in DACs.[88] Absent consideration of LCAs in DACs, it is impossible to satisfy this mandate.

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[82] Cal. Air Res. Bd., *Low Carbon Fuel Standard*, <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/about> (last visited Oct. 19, 2020).
[83] Cal. Energy Comm'n, *2020-2023 Investment Plan Update for the Clean Transportation Program* 28 (Sept. 2020).
[84] Cal. Air. Res. Bd., *Low Carbon Fuel Standard, Annual Updates to Lookup Table Pathways: California Average Grid Electricity Used as a Transportation Fuel* 4–5 (January 16, 2020).
[85] Cal. H.S.C. § 38562(b)(8) (2019).
[86] *See, e.g.*, Cal. Air Res. Bd., *supra* note 110.
[87] Cal. H.S.C. § 38562(b)(3).
[88] *See* Cal. H.S.C. § 38562.5 (2019).

In assessing air quality, it is also important for the Joint Agencies to evaluate indoor air quality. The Joint Agency Report should include a discussion of the end use of energy resources which pose threats to increasing indoor air pollution.

For instance, use of biomethane for home heating and appliances, rather than electrification, will lead to higher in-home emissions of criteria pollutants, and their affiliated public health consequences. Studies demonstrate that many in-home gas appliances such as stoves and heaters cause emissions of harmful pollutants—including nitrogen dioxide, carbon monoxide, nitrogen oxides, formaldehyde, and particulate matter—through combustion.[89] This causes troubling indoor air quality concerns which can exacerbate asthma, cardiovascular problems, and other public health concerns, as well as impede childhood brain development.[90] In fact, gas stoves can lead to levels of indoor air pollution that exceed legal outdoor limits set by the U.S. Environmental Protection Agency, which are themselves higher than the World Health Organization's indoor air quality guidelines.[91] These indoor air quality impacts are likely to disproportionately impact low-income communities, and communities of color are already disproportionately burdened by diseases related to air quality, including asthma, and thus most at risk from indoor air pollution caused by gas stoves.[92] Combusting biomethane indoors leads to equivalent levels of air pollution as natural gas—including nitrogen dioxide, carbon monoxide, and formaldehyde, which contribute to respiratory and other health issues—as the two gases are "virtually chemically indistinguishable."[93] In contrast, electric home heating and cooking appliances do not present the same indoor air quality and associated public health concerns.[94]

Finally, the Joint Agencies should also extend LCAs to water quality and supply impacts. SB 100 explicitly requires the Joint Agencies to prevent implementation of the statute from unreasonably impacting "water customer rates and bills . . . taking into full consideration the economic and environmental costs and benefits" of energy resources.[95] Activities during resource extraction or production require large water inputs and cause significant deleterious impacts on water quality.[96] The need for a comprehensive understanding of lifecycle water impacts in SB 100 implementation is elevated by the projections of increased aridity under future climate scenarios and by the state's recent commitment to conserve "at least 30 percent of California's land and coastal waters by 2030."[97] In order to assure that implementation of SB 100

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[89] *See* Brady Anne Seals & Andee Krasner, *Health Effects from Gas Stove Pollution*, Rocky Mountain Inst. 7–9 (May 2020); Yifang Zhu et al., *Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California*, UCLA Fielding School of Public Health 9, 11–14 (April 2020); Haoran Zhao et al., *Indoor air quality in new and renovated low-income apartments with mechanical ventilation and natural gas cooking in California*, Lawrence Berkeley Nat'l Lab. 2 (2020).

[90] *See* Seals & Krasner, *supra* note 151, at 7, 10, 12; Zhu et al., *supra* note 151, at 9, 26–29.

[91] Seals & Krasner, *supra* note 151, at 11; *see also* Zhao et al., *supra* note 151, at 11.

[92] *Id.* at 14–15 ("asthma [is] a disease that is profoundly inequitable: 15.7 percent of African American non-Hispanic children have asthma, compared to about 7.1 percent of white non-Hispanic children"); *see also* Zhu et al., *supra* note 151, at 10, 16–17, 24–25; Zhao et al., *supra* note 151, at 5, 7–8.

[93] *Prepared Testimony*, *supra* note 32, at 16.

[94] For example, cooking with electric stoves causes lower levels of nitrogen dioxide, particulate matter, nitrogen oxides, nitric oxide, carbon monoxide, and formaldehyde pollution. Seals & Krasner, *supra* note 151, at 7–8, 15, 17.

[95] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 5, subd. (b)(2).

[96] May Wu & Hui Xu, *Consumptive Water Use in the Production of Ethanol and Petroleum Gasoline — 2018 Update*, ARGONNE NAT'L LAB. TECHNICAL RPT., ANL/ESD-09/01 Rev. 2, at 5 (2018).

[97] Cal. Exec. Order No. 82-20 (Oct. 7, 2020). For instance, the preservation of wetland and estuary ecosystems could be threatened by increased diversion, consumption, and pollution of California's waters. For an example of such

fulfills its statutory requirements and does not obstruct the state's broader environmental policies, the Joint Agencies should consider the full lifecycle impacts of candidate resources on water supply and quality.

Although the Joint Agencies have only ever applied comprehensive LCAs to GHG emissions, doing the same to encompass air and water impacts for SB 100 is a reasonable step to achieve a complete evaluation of costs and benefits alternative scenarios. Argonne National Laboratory offers a range of tools which the Joint Agencies could adapt in service of lifecycle evaluations. Argonne's GREET model, which the LCFS uses for its LCA models, offers a "Well to Wheels" calculator that comprehensively evaluates "energy use, greenhouse gas emissions, *water consumption*, and *air pollutant emissions*" for vehicles.[98] Argonne also offers the Water Analysis Tool for Energy Resources ("WATER"), which evaluates "water resource use and water quality" over the lifecycle of a fuel's use. In addition to providing tools for SB 100 evaluations, these resources demonstrate that air and water impacts are standard and important considerations for evaluating the costs and benefits of renewable and fossil fuels.

C. Biomethane Production from Dairy Waste Illustrates the Importance of Careful Analysis of Lifecycle Impacts in SB 100 Implementation.

The example of dairy biomethane production demonstrates the critical importance of careful lifecycle approaches in cost-benefit analyses and equity considerations. Large industrial dairies in the SJV contribute significantly to the nation's worst regional air quality problem.[99] Emissions from enteric fermentation and manure management on dairies altogether comprise the dominant source of methane emissions in California.[100] At first impression, it seems sensible to capture these emissions. Upon closer inspection however, it becomes apparent that dairy biomethane producers are necessarily expanding dairies, negating any environmental benefits from capture.

Although the dairy industry is responsible for a large fraction of California's methane emissions, the CEC has recognized that total existing potential biomethane feedstocks cannot supplant natural gas.[101] Therefore, if dairy biomethane has a long-term future as a significant energy resource in the state, dairy operations will need to grow in both size and number. In a scenario that requires added biomethane capacity, a lifecycle assessment of biomethane resources must reflect the impacts associated with the necessary expansion of dairies

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risks, *see* Sandra Postel, *Colorado River, Meet the Sea*, NAT'L GEOGRAPHIC (April 12, 2013), <https://blog.nationalgeographic.org/2013/04/12/colorado-river-meet-the-sea/>.

[98] *Id.* (emphasis added).

[99] *Prepared Testimony*, *supra* note 32, at 20–22.

[100] *See* Cal. Air Res. Bd., California Methane Inventory for 2000-2017 — by Category as Defined in the 2008 Scoping Plan 2 (Aug. 12, 2019), <https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_2000-17ch4.pdf>; *Greenhouse Gas Emission Inventory - Query Tool for Years 2000 to 2016 (11th Edition)*, CAL. AIR RES. BD. (2019), <https://www.arb.ca.gov/app/ghg/2000_2016/ghg_sector.php>.

[101] Mahone et al., *supra* note 67, at 31..

themselves.[102] These dairy herd size expansions would not occur *but for* the pursuit of dairy biomethane production.

In addition, biomethane demonstrates that taking a wide time horizon and applying forward-looking projections may be necessary to understand the scope of lifetime costs and benefits. First, the high fixed capital costs of digesters and interconnection infrastructure will likely lead existing mega-dairies to expand herd sizes. The SB 1383 dairy biomethane pilot project applications show that digesters and pipeline infrastructure are typically constructed to accommodate expanded herd sizes.[103] Therefore, dairies will generally have an incentive to expand in order to maximize returns on biomethane investments. Such increases in herd size will necessarily be associated with increased local and regional air pollution, increased water pollution, and increased GHG emissions.[104] Second, because the economies of scale for pipeline injection require clustering of large dairies,[105] scaling up biomethane production will increase the geographic concentration of the dairy industry. In addition to creating pollution hot spots in communities adjacent to these clusters, concentrating the dairy industry in California would likely exacerbate existing air and water quality problems. These economic characteristics show that, after properly accounting for lifecycle impacts, increasing dairy biomethane production will very rapidly reach diminishing marginal returns. Assessments of lifecycle impacts cannot be viewed in a bubble; the Joint Agencies should consider the lifecycle impacts of energy resources under both present and anticipated future conditions.

This is particularly important given the substantial subsidies the state provides to dairy biomethane production. In addition to receiving $114 million in California Department of Food and Agriculture grants for digesters between 2014 and 2018,[106] dairies are major beneficiaries of LCFS credits. Biomethane producers generated LCFS credit for emissions totaling 4 million MT $CO_{2(eq)}$.[107] Meanwhile, biomethane infrastructure on dairies greatly increases on-site energy use, including diesel. For example, the Van Exel dairy anticipates a 208% increase in energy use, including a nearly 14-fold increase in electricity use and a 50% increase in diesel use.[108] Hence the air quality of adjacent communities may deteriorate further even if the region benefits from

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[102] To illustrate, for dairies that previously collected manure in open-pit lagoons, standard practice for mega-dairies in California, the LCFS treats emissions from those lagoons, as well as other emissions like methane from enteric fermentation, as baseline emissions. After a dairy installs a digester, the LCFS treats the resulting drop in GHG emissions relative to baseline as a net drop in GHG emissions and attributes this benefit to the biomethane. However, if the dairy expands its operations, with more cows consuming more feed and producing more methane than baseline and operations burning more diesel and consuming more electricity than baseline, then the LCFS will treat any increase in emissions relative to baseline as net increase in emissions and attribute this cost to the biomethane. Under a rigorous LCA, the total GHG emissions associated with a newly constructed dairy, including the footprint of the feed, the emissions from the cows, and the lifecycle emissions of fuels used, should be attributed to the biomethane.

[103] *See, e.g.*, Five Points Pipeline, L.L.C., *supra* note 54, at 29; *see also infra* notes 130–131 and accompanying text.

[104] *See supra* note 124.

[105] *See* Ali Jalalzadeh-Azar, NREL, *A Technoeconomic Analysis of Biomethane Production from Biomethane Delivery* 12 (October 18, 2010).

[106] Cal. Dpt. Food & Ag., *Report of Funded Projects (2015-2018)* 3 (Jan. 2019).

[107] Cal. Air Res. Bd., *Data Dashboard*, <https://ww3.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm> (last visited Oct. 11, 2020).

[108] Van Exel Dairy, *Solicitation for SB1383 Dairy Pilot Projects* 24 (2018).

fewer diesel engines on the roads. Furthermore, this feature demonstrates that dairy biomethane programs do not comply with the AB 197 requirement to prioritize "direct emissions reductions."[109] Ignoring LCAs in DACs also ignores these significant local impacts that the Joint Agencies must consider.

VI. The Joint Agencies Should Remove Candidate Resources from Consideration Where Local Air and Water Pollution Impacts are Unknown and likely Significant, and Include a Schedule to Determine the Extent of Such Local Impacts in DACs.

The Draft Joint Agency Report notes that there is incomplete data to adequately model certain resources. There is "inadequate cost and supply data for modeling" biomethane, and as noted above, "inadequate supply potential."[110] Similarly, there is a "lack of cost and performance data for 100 percent carbon capture" associated with natural gas electricity generation.[111] Without adequate information on the associated costs and benefits, the Joint Agencies should not include such candidate resources in the core scenarios. But that is exactly what the Joint Agencies have done, and in so doing, have ignored the substantial economic and significant environmental costs associated with these highly polluting resources.

Consequently, the Joint Agencies ignore the significant social costs of dairy biomethane production discussed throughout this comment. Similarly, the Joint Agencies also ignore the risk of stranded gas assets during California's energy transition.[112] While steps must be taken to address these risks and ensure a just and equitable transition, the ability of biomethane to substitute for natural gas does not justify plans to indefinitely preserve natural gas infrastructure. In addition to the severe inadequacy of the biomethane feedstock supply to match natural gas demand,[113] the recent adoption of policies promoting zero-emission vehicles[114] and fully electric buildings[115] highlight the improbability of biomethane as a solution to stranded-asset risk.

Furthermore, biomethane's exposure to the markets for both dairy and LCFS credits creates significant additional risks that do not justify the resource's high fixed costs. In terms of gross production, the dairy industry in California has essentially stagnated over the past 10 years,[116] and it will face increasing competition from plant-based substitutes.[117] In addition, both dairy products and carbon credits are often subject to high price volatility. If the market for

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[109] Cal. Health & Safety Code § 38562.5.
[110] Draft Joint Agency Report at 18.
[111] *Id.*
[112] *See* Kavya Balaraman, *California Launches Rulemaking to Transition away from Natural Gas*, UTIL. DIVE, (Jan. 17, 2020), <https://www.utilitydive.com/news/cpuc-launches-rulemaking-transition-natural-gas/570653/>.
[113] Mahone et al., *supra* note 67; *see also Prepared Testimony, supra* note 32, at 18 ("Economically feasible biomethane potential in California represents less than four percent of total gas demand.").
[114] Cal. Exec. Order No. 79-20 (Sept. 23, 2020).
[115] *San Francisco to Ban Natural Gas in New Buildings*, AP NEWS (Nov. 11, 2020) <https://apnews.com/article/san-francisco-legislation-california-54b72cd64426c64ef16471705b69eae4>.
[116] Michael Nepveux, *Largest Decline in U.S. Dairy Farms in 15-Plus Years in 2019*, FARM BUREAU (Feb. 28, 2020), <https://www.fb.org/market-intel/largest-decline-in-u.s.-dairy-farms-in15-plus-years-in-2019>.
[117] *See* Jamie Gordon, *Plant-based meat and dairy alternatives market to hit €7.5bn in Europe by 2025*, UK INVESTOR MAG. (Oct. 23, 2020), <https://ukinvestormagazine.co.uk/plant-based-meat-and-dairy-alternatives-market-to-hit-e7-5bn-in-europe-by-2025/>.

LCFS credits experiences a prolonged period of low prices, the business model of biomethane injection could be upended. An event like this would leave biomethane interconnection infrastructure stranded regardless of the trajectory of gas assets.

Finally, dairy biomethane faces significant legal and regulatory risks that proponents fail to appreciate. Under the LCFS, if emissions result from an activity that is legally prohibited, then they cannot be counted as baseline emissions. Therefore, if the state prohibited dairies from using open-pit lagoons to manage waste, then the amount of LCFS credits awarded for dairy biomethane would drop precipitously. Biomethane developers have downplayed this contingent risk by pointing to onsite electricity generation as a back-stop,[118] but the mass conversion of built-out dairy biomethane infrastructure to localized electricity generation would be a disaster for air quality in the SJV and offset significant investments in regional air quality attainment efforts.[119] Given the harms associated with open-pit lagoons, including foul odor and emissions of VOCs, methane, and hydrogen sulfide, and the availability of less harmful alternatives like dry manure management, the risk of such regulation is far from null.[120] The massive size of dairy operations required for biomethane projects may also pose a regulatory risk as the pandemic has placed increasing public scrutiny on current standards in animal agriculture.[121]

VII. The Joint Agencies Should Remove Dairy Biomethane as a Candidate Resource Until the CPUC Performs its SB 1440 Analysis and the CEC Evaluates the Dairy Biomethane Pilot Projects.

It is premature for the Joint Agencies to include dairy biomethane in core scenarios until the Joint Agencies meet SB 100's mandate to provide "full consideration of . . . economic and environmental costs and benefits" of energy resources.[122] The extent of significant increases in pollution from dairy biomethane production, however, is still unknown until the CPUC performs its SB 1440 analysis and the CEC evaluates the dairy biomethane pilot projects authorized under SB 1383. The Joint Agency Report should exclude biomethane as a candidate resource and provide a schedule for determining the extent of local impacts of biomethane production on DACs, including for the CPUC to perform its statutorily mandated cost-effectiveness assessment of biomethane.

The Joint Agencies have put the cart before the horse by including biomethane as a candidate resource before understanding the extent of its local impacts. A biomethane market will "disproportionately favor the economic sustainability of larger" dairies, where high capital

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[118] *See, e.g.*, Van Exel Dairy, *supra* note 134 at 4.
[119] The SJV Air Pollution Control District asserts that, even with the Best Available Control Technology, using dairy biomethane resources for electricity generation would *increase* NO_x emissions by 2.7 tons per day. Sayed Sadredin, Letter re: CDFA Dairy Digester Research and Development Program (California Bioenergy) 2, (Feb. 20, 2018).
[120] In 2007 the state of North Carolina, not known to be as zealous in its protection of the environment as California, banned the construction and expansion of open-air waste lagoons. Jane Preyer &Tanja Vujic, *North Carolina Bans New Hog Waste Lagoons, Sets Strict Standards for Future Systems*, ENVTL DEF. FUND (July 25, 2007), <https://www.edf.org/news/north-carolina-bans-new-hog-waste-lagoons-sets-strict-standards-future-systems>.
[121] *See, e.g.,* Byrd Pinkerton et. al., *Factory farms are an ideal breeding ground for the next pandemic,* VOX (Oct. 21, 2019), <https://www.vox.com/2020/10/21/21363990/factory-farms-next-swine-influenza-pandemic>.
[122] SB 100, Pub. Util. Code § 454.53(b)(2).

costs of biomethane can be spread out over larger herd sizes.[123] This has potential to "create a perverse effect of accelerating economic trends of dairy consolidation, thereby exacerbating localized pollution" in the SJV.[124]

Several of the SB 1383 dairy pilot project applications reference expected growth of dairies fueled by this growing demand for biomethane as a transportation fuel. For instance, the Lakeside Pipeline LLC pilot application, involving an "initial cluster" plan of 10 dairies encompassing 62,110 cows, noting that the "applicant's future plans include expansions to up to 11 additional dairies (6 digesters)" and *contemplates expansion of dairy herd sizes*.[125] Similarly, the Merced Pipeline LLC pilot application incorporates 8 dairies with 39,290 cows, notes that its "project team is already in discussions with the owners of 2 additional dairies," and explains the possibility of "*another 11 more potential expansion dairies*" and similarly referencing "*likely expansions of those dairies*[']" herd sizes.[126] Both pilot applications note that they have included additional dairies in their California Environmental Quality Act ("CEQA") applications to avoid the need for "another CEQA process," further suggesting that they anticipate expansion.[127]

In stark contrast to the precautionary principle, the Joint Agencies have not publicly disclosed analyses of the local impacts of biomethane pilot projects in the SJV, yet they continue to approve and fund additional projects without any verified knowledge of the actual pollution caused by active pilots. In fact, many residents of the SJV report "fear that, as dairies grow in herd sizes, DACs will experience more water and air contamination issues."[128]

Furthermore, while the dairy biomethane projects on their face may appear to reduce GHG emissions, the potential for leaks, double-counting, and lack of additionality suggests that biomethane will not necessarily directly result in reduced GHG emissions. As described above, natural gas infrastructure in California has resulted in at least two sizeable leaks in recent years, including the largest methane leak in U.S. history, and the cumulative impact of daily de minimis methane leaks throughout the entire natural gas infrastructure is significant.[129] There is no reason that biomethane delivered through this same natural gas infrastructure will not result in similar leaks, particularly as investments in maintaining infrastructure may decrease as California transitions away from natural gas. Moreover, California's biomethane procurement under the Biomethane Tariff Program "is not designed to ensure additionality," meaning "there is insufficient assurance that program participation will result in GHG reductions that are beyond

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[123] *Prepared Testimony*, *supra* note 32, at 20.
[124] *Id.*
[125] Lakeside Pipeline LLC, *Solicitation for SB1383 Dairy Pilot Projects* 15, 17 (2018) (emphasis added). The application also explains: "The individual digesters have been sized to accommodate the full current size of the dairy herds plus all likely expansions of those dairies. Expansion of a dairy herd significantly beyond current expectations would require additional covered digester ponds, at a cost proportional to the initial installation. However, the gathering lines would already be in place and so the project would realize some economies of scale from replication. More importantly, the project area includes 11 potential expansion digesters." *Id.* at 33.
[126] Merced Pipeline LLC, *Solicitation for SB1383 Dairy Pilot Projects* 19, 37, 40 (2018) (emphasis added). The application explains: "The individual digesters have been sized to accommodate the full current size of the dairy herds plus all likely expansions of those dairies. Expansion of a dairy herd significantly beyond current expectations would require additional covered digester ponds, at a cost proportional to the initial installation."
[127] Lakeside Pipeline LLC, *supra* note 139, at 15; Merced Pipeline LLC, *supra* note 140, at 19.
[128] *Prepared Testimony*, *supra* note 32, at 34.
[129] *See supra* notes 63–67.

what would occur in the absence of the Biomethane Tariff Program."[130] Instead, the Biomethane Tariff Program seems "designed to double-count benefits," or even triple count them, as one unit of biomethane produced will (1) help producers reduce their compliance obligations under the state cap-and-trade program, (2) help biomethane buyers meet their own environmental obligations, and (3) could be sold separately as a Renewable Energy Credit to allow yet another entity to claim the credit of GHG reduction.[131] Finally, promoting biomethane may result in consumers choosing to avoid other GHG reduction strategies that could "provide real and additional greenhouse gas, air quality, and public health benefits."[132] Certainly, "[e]ven under optimistic cost assumptions, the blended cost of hydrogen and synthetic natural gas is 8 to 17 times more expensive than the expected price trajectory of natural gas."[133]

The Joint Agency Report should exclude dairy biomethane as a candidate resource until the Joint Agencies understand the extent of these significant costs, the CPUC has performed its SB 1440 cost-effectiveness analysis, and the CEC has completed an evaluation of the local impacts of the dairy biomethane pilot projects.

VIII. CONCLUSION

For the foregoing reasons, we respectfully request the Joint Agencies to modify the Draft Joint Agency Report.

Respectfully submitted,

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[130] *Prepared Testimony*, *supra* note 32, at 3.
[131] *Id.*
[132] *Id.* at 4.
[133] California Energy Commission, *The Challenge of Retail Gas in California's Low Carbon Future*, April 2020, *available at* https://ww2.energy.ca.gov/2019publications/CEC-500-2019-055/CEC-500-2019-055-F.pdf.