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UC Berkeley Environmental Law Clinic (on behalf of EJ orgs) Comments - SB 100 Draft Modeling Results

Additional submitted attachment is included below.

September 15, 2020

RE: SB 100 Modeling Results Workshop. Docket #: 19-SB-100

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) and the Greenlining Institute submit the following comments on the Senate Bill (SB) 100 Modeling Results Workshop.

I. The Joint Agencies Have a Statutory Duty to Implement an Equity Scenario that Excludes Combustion.

The Joint Agencies' modeling only considers one No Combustion scenario, which is included as a study scenario only, despite the Joint Agencies' duty to consider it as a core scenario. We reiterate that the Legislature requires the equitable implementation of SB 100. SB 100 must follow its predecessors, SB 1078 and SB 350, and account for energy policy impacts on disadvantaged communities (DACs) and public health. Furthermore, as part of the state's climate policy, SB 100 must include a similar environmental justice focus. SB 100 is an integral part of the state's broader climate policies and emission reduction strategies, seeking to "[m]eet[] the state's climate change goals by reducing emissions of greenhouse gases associated with electrical generation."[1] The state's other climate legislation also emphasizes incorporating social costs and non-energy benefits (NEBs) in the Joint Agencies' cost-benefit analyses. The Legislature has affirmed the need to consider equity in California's climate policy, and therefore, the Joint Agencies must now consider equity in SB 100 implementation.

It is also essential that the individual Joint Agencies follow their own policies requiring the consideration of environmental justice. Each of the Joint Agencies has also developed a policy framework that prioritize equity when developing energy policies. The California Energy Commission (CEC) has the Barriers Study from SB 350; the California Public Utilities Commission (CPUC) has its Environmental and Social Justice Action Plan; and the Air

[1] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 1, subd. (e)(1).

Resources Board (CARB) has its internal environmental justice policy. It is imperative that the Joint Agencies follow their own policies and integrate equity into a critical piece of the state's climate framework, SB 100.

As noted in our prior comment, all combustion sources pose a threat to the health and safety of low-income communities.[2] Reliance on carbon capture technologies must include an analysis of the cost-effectiveness of those technologies, but the significant costs of those still questionable technologies is absent from the modeling.[3]

Furthermore, SB 100 aims to reduce fossil fuel use by increasing "zero-carbon" resources and does not include energy from combustion sources in the definition of renewable resources. There is no mention of combustion as a "zero-carbon" option in the statute and no support for the continuation of fossil fuel generation plants in the legislative history. Although the statute does not define what qualifies as "zero-carbon,"[4] the Legislature notes that "[d]isplacing fossil fuel consumption" is a priority when increasing renewable resources.[5] The Senate Committee noted that the term "zero-carbon" resource is purposefully left undefined, but stated that these resources "should displace fossil fuel use."[6] In addition, the inclusion of combustion-based "zero-carbon" options is also contrary to SB 100's predecessors, SB 1078 and SB 350. These laws do not allow the use of *any* fossil fuel combustion methods to meet the renewable portfolio standard (RPS), and only permit the use of "eligible renewable energy resources."[7] The Joint Agencies therefore have a duty to consider the no-combustion scenario as a core scenario, and not merely a study scenario.

II. By Ignoring Social Costs and NEBs, the Total Resource Cost Test Insufficiently Considers Equity.

As stated in our prior comments, equitable implementation of SB 100 requires the adequate consideration of non-energy benefits (NEBs) and social costs of energy resources. The Joint Agencies should apply other cost-effectiveness tests in their SB 100 modeling besides the Total Resource Cost (TRC) test. As outlined in the SB 100 Draft Results presentation, the TRC

[2] See Cushing, et al., *A Preliminary Environmental Equity Assessment of California's Cap-And-Trade Program* (Sept. 2016) USC Dornsife p. 1–2 <https://dornsife.usc.edu/assets/sites/242/docs/Climate_Equity_Brief_CA_Cap_and_Trade_Sept2016_FINAL2.pdf>

[3] See Plumer, *A Rare Trump-Era Climate Policy Hits an Obstacle: The Tax Man* (Feb. 11, 2020) N.Y. Times <https://www.nytimes.com/2020/02/11/climate/carbon-capture-tax.html> (noting that tax breaks are necessary for making $1 billion carbon capture investments for power plants cost effective).

[4] Sen. Bill No. 100 (2017–2018 Reg. Sess.) (2).

[5] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 2 (Pub. Util. Code § 399.11, subd. (b)(1)).

[6] *Id.* at p. 6.

[7] Sen. Bill No. 1078 (2001–2002 Reg. Sess.) § 3 (Cal. Pub. Util. Code § 399.12 subd. (a)) (qualifies geothermal and small hydropower plants as eligible sources alongside resources defined in Cal. Pub. Util. Code § 383.5); Sen. Bill No. 350 (2015–2016 Reg. Sess.) § 18 (Cal Pub. Util. Code § 399.12, subd. (e)(2)(A)) (disqualifying combustion of municipal solid waste as a renewable energy resource).

test "includes existing system costs (baseline costs), capital investments and operation costs."[8] The test considers costs and benefits to utilities and their ratepayers,[9] but it insufficiently accounts for social costs and NEBs. The CEC, CARB, and CPUC exist to serve all Californians, not just utilities and their ratepayers. Thus, when evaluating programs, the Joint Agencies should use cost-effectiveness tests that factor in costs and benefits to society as a whole.

The CPUC has used other cost-effectiveness tests that better account for social costs and benefits to all California constituents and stakeholders. For instance, the Societal Cost Test (SCT) considers total resources costs to society overall, not merely to utilities and ratepayers.[10] The SCT factors in NEBs including the health benefits of lowered electricity generation and fossil fuel combustion.[11] Thus, it more appropriately measures societal benefit and aligns costs and benefits across all resources, as the CPUC has acknowledged.[12] Additionally, the Energy Savings Assistance Program Cost Effectiveness Test (ESACET) factors in non-economic benefits beyond those the TRC test considers, including health, safety, and comfort benefits.[13] The ESACET is also capable of measuring qualitative non-economic benefits,[14] which are crucial to evaluating the overall cost-effectiveness of programs. We look forward to working with the Joint Agencies further to develop an appropriate cost-effectiveness test, but for now, we would like to draw the agencies' attention to the existence of other tests that better account for equity impacts that the agencies are statutorily required to consider.

For example, the next phase of the CPUC's San Joaquin Valley (SJV) Proceeding, Rulemaking 15-03-010, will consider NEBs and lessons learned from the Energy Savings Assistance (ESA) Program. The ESA program evaluates factors such as emissions, indoor air quality, environmental-related illness, sick days from work or school, asthma and allergy symptoms, and other public health impacts.[15] The CPUC will explore lessons learned from this experience and work with a contracted technical expert to develop recommendations for an Economic Feasibility Framework for the SJV Proceeding.[16] CPUC staff and the technical expert

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[8] Liz Gill, *SB 100 Draft Results*, Cal. Energy Comm'n 24 (Sept. 2, 2020).
[9] *Addressing Non-Energy Benefits in the Cost-Effectiveness Framework*, Cal. Pub. Util. Comm'n 1, https://library.cee1.org/system/files/library/9734/CEE_EvalNEBCostEffect.pdf.
[10] Brian Horii, *Summary of CPUC Workshop on Societal Cost Test* 2 (Sept. 22, 2016), https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/2016-09-21%20Societal%20Cost%20Test%20Workshop%20--%20E3%20Recap%20of%202013%20Societal%20Cost(1).pdf.
[11] *Id.* at 7.
[12] Cal. Pub. Util. Comm'n, *Decision Adopting Cost-Effectiveness Analysis Framework Policies For All Distributed Energy Resources* 33, Rulemaking 14-10-003 (May 21, 2019), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M293/K833/293833387.PDF.
[13] Joy Morgenstern, *The Basics of Cost-Effectiveness Analysis*, Cal. Pub. Util. Comm'n 31 (March 2015); Anna Valdberg & R. Olivia Samad, *Joint Proposal Addressing Economic Feasibility Standards For Pilot Projects And Comments On Proposed Workshop Agenda* 8, Cal. Pub. Util. Comm'n, R.15-03-010 (July 19, 2018).
[14] Valdbergy & Samad, *supra* note 7, at 9.
[15] Lisa A. Skumatz et al., *Non-Energy Benefits and Non-Energy Impact (NEB/NEI) Study for the California Energy Savings Assistance (ESA) Program* 25–26, 31–33, 46 (DRAFT July 2019); *id.* at 7 ("Jurisdictions around the world increasingly recognize that a fair and balanced accounting of the costs and benefits of program offerings requires additional exploration of the non-energy benefits (NEBs)—those benefits beyond energy and demand savings.")
[16] Cal. Pub. Util. Comm'n, *Decision Approving San Joaquin Valley Disadvantaged Communities Pilot Projects* 139, Rulemaking 15-03-010 (Dec. 19, 2018).

will consider, among other questions, whether the ESA Program Proceeding's NEB Study can be adapted to the community solar pilot projects, authorized in the SJV Proceeding, and ultimately adopt a cost-effectiveness test that can evaluate qualitative benefits or NEBs.[17] Although there are many differences between energy resources and energy efficiency measures, there are certainly lessons learned from how the ESA Program analyzes air and water quality benefits. Furthermore, the fact that these benefits are analyzed in the ESA Program shows that it is possible, and important, to include the same NEBs and social costs analysis for energy resources. As the CPUC is primed to consider NEBs in the near future, the Joint Agencies should coordinate to do the same for the SB 100 implementation. The Joint Agencies should either (1) compare lessons learned from the ESA Program independently or (2) coordinate with the CPUC to incorporate the findings from the SJV Proceeding into SB 100 implementation.

We urge the Joint Agencies to begin using other cost-effectiveness tests that better account for NEBs and social costs in their modeling, in addition to or instead of the TRC test. By only relying on the TRC test, the Joint Agencies' modeling presents an incomplete picture of the costs and benefits of each energy source. Relying on the TRC test alone leads to cost per kilowatt-hour (kWh) estimates that do not provide the best-informed choices as the state plans for our zero-carbon future. For example, CEC's modeling estimates an average 18.1 cent/kWh cost for the no-combustion scenario, compared to a 16 cent/kWh cost for the SB 100 core scenario.[18] The no-combustion cost/kWh is likely far lower—and the cost/kWh for the core scenario far higher—when NEBs and social costs are considered. Thus, modeling costs with a more robust cost-effectiveness test has the potential to change the relative cost of each scenario under consideration, and consistent with CEC findings, "Unrecognized non-energy benefits are often not considered in cost-effectiveness tests, which devalues some of the most important factors that motivate investment in clean energy…such as family health and safety…"[19]. This could enable the Joint Agencies to pursue a scenario that better protects the health and welfare of disadvantaged communities while also minimizing overall costs.[20]

III. The Failure to Include Capital Costs for Biomethane in Core Scenario Modeling Distorts the Cost-Effectiveness Assessments and Rate Estimates Relative to the No-Combustion Scenario.

Under the Core Scenario, the natural gas market will be significantly altered by increased investment in biomethane production and infrastructure, but these effects and associated costs are missing from the current model. By including biomethane as a potential resource to meet the SB 100 target while excluding the capital and social costs of biomethane from their modeling, the Joint Agencies distort the costs and benefits of the Core Scenario.

The costs of capital financing, maintenance of infrastructure, and procurement and processing of biogas are significant. For instance, the California Department of Food and

[17] *Id.* at 139–40.
[18] Gill, *supra* note 3, at 36.
[19] California Energy Commission, Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities, (Dec. 2016), http://www.energy.ca.gov/sb350/barriers_report/ (p.3).
[20] *Id*. at 5.

Agriculture (CDFA) Dairy Digester Research and Development Program, funded by California Climate Investments,[21] awarded $114 million in grants between 2014 and 2018 for dairy digester projects.[22] The program also received applications in 2019 requesting a total of nearly $119 million.[23] In addition, the six dairy biomethane pilot projects approved by the CPUC are expected to cost roughly $319 million in capital and maintenance over twenty years.[24] These costs are particularly relevant to a cost-effectiveness analysis because certain utilities plan to invest heavily in biomethane production. For example, SoCal Gas has agreed to supply over $14 million for just one dairy biomethane pipeline interconnection pilot.[25] Per Assembly Bill (AB) 3187, the CPUC is considering allowing utilities to recover their investments in biomethane interconnection infrastructure through utility rates.[26] The failure to include these economic costs and their likely impacts on ratepayers in the Core Scenario diminishes the value of a No-Combustion Study Scenario by artificially inflating the benefits of biomethane. While the Joint Agencies' draft results presentation compares the TRC and average cost per kWh for the two scenarios, this comparison is critically biased by the failure to include both social and economic costs of biomethane production.

The Joint Agencies justify the exclusion of biomethane and other drop-in renewable fuels by claiming that cost and supply data are inadequate and the technologies are not commercially available.[27] However, the maturity of the relevant technologies,[28] as well as the relatively fixed potential supply, should aid modeling efforts. National Renewable Energy Laboratory analysis for California has shown how current potential biomethane supply can be readily approximated by current fugitive methane emissions, as well as how the spatial distribution of existing dairies and pipeline infrastructure can help parameterize costs.[29] In addition, the International Energy Agency has performed extensive modeling of global biomethane costs and supply through 2040.[30] At the same time the Joint Agencies disclaim the modeling potential of biomethane, each respective agency is working to help ensure that biomethane technologies *are* commercially available by helping create and expand the market for renewable natural gas.[31] Going far beyond the basic market incentives created by Cap-and-Trade and the Low Carbon Fuel Standard, the state is directly subsidizing biomethane development through CDFA and Joint Agency programs.[32] The state is investing heavily in the capture, processing, and combustion of fugitive methane emissions from dairies; hence, the public and the Joint Agencies should at least

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[21] Cal. Energy Comm'n, *Adopted 2019 Integrated Energy Policy Report* A-11 (2020).
[22] Cal. Dpt. Food and Ag., *Report of Funded Projects (2015-2018)* 3 (Jan. 2019).
[23] Cal. Energy Comm'n, *supra* note 11
[24] Cal. Energy Comm'n, *Adopted 2019 Integrated Energy Policy Report*, A-9 (2020), the standard estimated useful lifetime of such digester systems. *See* Five Points Pipeline, L.L.C., *Pilot Project Solicitation Application* 571 (2018).
[25] Lakeside Pipeline, L.L.C., *Pilot Project Solicitation Application* 33 (2018).
[26] Cal. Energy Comm'n, *supra*, at A-10.
[27] Cal. Pub. Util. Comm'n, *2021 Senate Bill 100 (SB 100) Joint-Agency Report Modeling Framework and Scenarios Overview* 4 (Aug. 31, 2020).
[28] *See e.g.,* Five Points Pipeline, L.L.C., *supra* note 10, at 24.
[29] *See* Ali Jalalzadeh-Azar, *A Technoeconomic Analysis of Biomethane Production from Biomethane Delivery*, NATIONAL RENEWABLE ENERGY LABORATORY (October 18, 2010).
[30] *See* IEA, *Outlook for Biogas and Biomethane: Prospects for Organic Growth* (2020).
[31] *See id.*, at A-8–A-9 ("State policies spurred much of this progress.").
[32] *Id.*

understand the serious capital and social costs of this strategy. It is imperative for the Joint Agencies to incorporate these costs into their SB 100 models.

IV. The Joint Agencies' Zero-Carbon Definition Fails to Account for the Impacts of Leaks from Natural Gas and Biomethane Infrastructure.

We disagree with the Joint Agencies' definition of "zero-carbon resources." Nothing in the plain language of SB 100 restricts the definition of "zero-carbon" to onsite impacts only. Rather, the statute states that the SB 100 goals are intended to provide benefits including reduction of air pollution and greenhouse gas emissions in California.[33] Thus, it is important to consider the full *lifecycle impacts* of all energy resources, including those that create air pollution or greenhouse gas emissions. Such lifecycle impacts include leaks that occur from natural gas and biomethane infrastructure.

The Joint Agencies' proposed interpretation of the "zero-carbon resources" language in SB 100 does not account for leaks from biomethane and natural gas infrastructure. The agencies define zero-carbon resources to include generation sources that (1) are RPS-eligible and (2) have "zero onsite greenhouse gas emissions."[34] However, the SB 100 modeling excludes "de minimis emissions" when considering onsite emissions and acknowledges that natural gas generation may result in above-zero emissions.[35] This interpretation of "zero-carbon resources" leads the agencies to undercount the greenhouse gas emissions of energy sources such as natural gas and biomethane. The language of SB 100 does not include combustion sources or biomethane as "zero-carbon" resources, and its legislative history provides no support for the continuation of fossil fuel generation.

The risk of leaks from natural gas and biomethane infrastructure is not hypothetical, and such leaks are certainly not merely "de minimis emissions." Researchers found greenhouse gas emissions leaked from the oil and natural gas supply chain at rates 63% higher than regulator estimates.[36] At least two major leaks from natural gas infrastructure in California have caused extensive public health damage and greenhouse gas emissions in recent years. In 2014, local officials discovered that a flare waste gas pipeline in Arvin, California was leaking, and perhaps had been for up to two years.[37] The leak resulted in releases of chemicals including methane, benzene, n-hexane, and heptane, and it required the evacuation of dozens of residents for eight

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[33] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 2 Pub. Util. Code § 399.11, subd. (b)(2)–(3).

[34] Cal. Pub. Util. Comm'n, *2021 Senate Bill 100 (SB 100) Joint-Agency Report Modeling Framework and Scenarios Overview* 2 (Aug. 31, 2020).

[35] *Id.* at 2 n.3.

[36] Alvarez, R., Zavala-Araiza, D., Lyon, D., Allen, D., Barkley, Z., Brandt, A., Davis, K., Herndon, S., Jacob, D., Karion, A., Kort, E., Lamb, B., Lauvaux, T., Maasakkers, J., Marchese, A., Omara, M., Pacala, S., Peischl, J., Robinson, A., Shepson, P., Sweeney, C., Townsend-Small, A., Wofsy, S. and Hamburg, S., 2018. Assessment of methane emissions from the U.S. oil and gas supply chain. *Science*, p. 7204.

[37] 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-af8b-ec615157561b.html.

months.[38] Residents experienced symptoms including nosebleeds, headaches, coughing, and dizziness, and air sample testing of homes near the leak site revealed air concentrations up to 53% gas.[39] County testing showed the toxic gas leak led to dangerous levels of methane and benzene in and around several homes.[40] Testing also revealed that "significant amounts of gas" contaminated soil around the flare pipeline and caused human health risks through release of toxic chemicals.[41] Not long after, "the largest methane leak in U.S. history" began in Porter Ranch, California.[42] Between October 2015 and February 2016, the Aliso Canyon natural gas storage facility released at least 109,000 tons of methane, forcing the relocation of thousands of residents for several months.[43] After finding many patients with symptoms including headaches, nausea, stomach aches, dizziness, and trouble breathing following the leak, a local physician analyzed blood samples and found signs of bone marrow suppression in samples from Porter Ranch residents, which is associated with exposure to benzene and can lead to anemia and leukemia.[44]

In addition to the severe public health impacts, these leaks resulted in significant greenhouse gas emissions. The methane leaked from Aliso Canyon was the equivalent of emissions from 500,000 cars driving around Los Angeles for a year.[45] The California Air Resources Board acknowledged that this leak of "a potent greenhouse gas" increased California's methane emissions by roughly 20% during the leak's several-month duration.[46] These leaks belie the Joint Agencies' assumption that natural gas and biomethane are "zero-carbon" sources of energy. The proposed metric considering only "onsite" greenhouse gas emissions is misleading because leaks of highly potent methane occur through the energy delivery infrastructure.

There are no state or federal regulations requiring testing of pipelines such as the one that leaked in Arvin, because they are less than four inches in diameter and not a transportation or

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[38] *Id.*; 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.

[39] Brown, *supra* note 17.

[40] 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.

[41] Bedell & Cox, *supra* note 18.

[42] *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-aliso-canyon/2286869/.

[43] *Id.*

[44] 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-leak-blowout-health-benzene-nordella.php.

[45] Sharon McNary, *After Aliso; How the worst gas leak in US history forced Angelenos to rethink their energy supply*, LAist (Oct. 23, 2019), https://laist.com/projects/2019/after-aliso/.

[46] Cal. Air Res. Bd., *Aliso Canyon Methane Leak Climate Impacts Mitigation Program* 1 (March 31, 2016), https://ww2.arb.ca.gov/sites/default/files/2020-07/arb_aliso_canyon_methane_leak_climate_impacts_mitigation_program.pdf ("In addition to the leak's many effects on local residents, the emissions from Aliso Canyon will contribute to global warming and its detrimental consequences for the environment.").

production line.[47] State officials have acknowledged they are unaware of the location of all such pipelines, some of which are more than 150 years old, and that it would be impracticable to require testing.[48] Not only have such leaks already occurred, but the lack of regulations and testing suggests they may continue to occur, resulting in far more than "de minimis" emissions.

The agencies should either look beyond "onsite emissions" to determine whether a source is zero-carbon or expand the definition of "onsite" to include the entire lifecycle impacts of energy production, including the infrastructure that carries natural gas and biomethane from suppliers to users. The Joint Agencies' failure to consider the financial and other lifecycle costs of natural gas and biomethane, including leaks, distorts their modeling in favor of these dirtier resources at the expense of the no-combustion scenario. The SB 100 modeling excluded technologies with insufficient data available or those "that are incompatible with state policies and environmental and public health priorities" from the core modeling scenarios.[49] The Joint Agencies should extend this logic to consider the full lifecycle of impacts, including significant impacts from leaks. This approach should not only lead the agencies to exclude biomethane from SB 100 modeling but also to exclude biomethane as a resource eligible to meet SB 100 goals, as it is not truly a zero-carbon resource. Instead, expanding biomethane is incompatible with state policies established in SB 100 and California's environmental and public health priorities.

V. The Current SB 100 Model Inaccurately Portrays Cost Data and Fails to Meet the Statutory Requirement to Consider Water and Air Quality Impacts.

The Joint Agencies must include water quality and air quality impacts in their SB 100 model.[50] As indicated in the SB 100 Draft Results presentation, the model includes Rate Impacts, Workforce Impacts, and Land Use Impacts, but omits Air Pollutants/Air Quality Impacts, and makes no mention of Water Quality Impacts.[51] Consequently, the Joint Agencies skew the model towards higher polluting technologies by omitting the social costs to air and water quality.[52]

Importantly, the plain language of SB 100 requires the Joint Agencies 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."[53] By omitting local air pollutants from the model, the Joint Agencies simply cannot meet this 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

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[47] Brown, *supra* note 17; Bedell & Cox, *supra* note 18.
[48] Brown, *supra* note 17.
[49] Cal. Pub. Util. Comm'n, *supra* note 15, at 8.
[50] Gill, *supra* note 8, at 4.
[51] *Id.*
[52] See David Keiser *et. al.*, *The Social Cost of Water Pollution*, Resources Magazine (May 16, 2019), <https://www.resourcesmag.org/archives/social-cost-water-pollution/>.
[53] Sen. Bill No. 100 (2017–2018 Reg. Sess.) § 2, subd. (b)(3).

consideration the economic and environmental costs and benefits[.]"[54] Deterioration in water quality due to the implementation of SB 100 would cause water shortages that inevitably would increase the rates charged to Californians. The Joint Agencies should include both Water Quality and Supply, and Air Quality Impacts in their SB 100 model to meet the explicit requirements of the statute.

Omitting the social costs of air and water quality from the model skews the results to include higher polluting technologies than would otherwise be included.[55] The exclusion of social costs penalizes true zero carbon technologies that have minimal social impacts and benefits technologies with high social costs by not reflecting the risks to air or water quality and supply in the projected average costs to transition.[56] The current model uses the TRC test to provide projected average costs for different 2045 scenarios.[57] Currently, 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).[58] If 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. Ignoring these impacts also fails to consider local effects from energy generation that have significant consequences for many Californians, especially those in DACs. The Joint Agencies' failure to include both factors in the model disregards the substantial economic and public health impacts of California's energy choices.

Furthermore, the Joint Agencies should consider water quality and supply impacts because 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.[59] 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,[60] but also affect combustion-based facilities, in particular with regard to water quality and supply and resultant water customer bills. As we mentioned in our previous comment, two gas-fired power plants have notified the CEC

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

[55] See Keiser et. al., *supra*; Moore *et al.*, *New science of climate change impacts on agriculture implies higher social cost of carbon* (Nov. 20, 2017) Nature p. 1-9 <https://www.nature.com/articles/s41467-017-01792-x>.

[56] See Skumatz, Non-Energy Benefits/Non-Energy Impacts (NEBs/NEIs) and their Role & Values in Cost-Effectiveness Tests: State of Maryland(Mar. 31, 2014) Skumatz Economic Research Associates, Inc. (SERA) <https://www.energyefficiencyforall.org/resources/non-energy-benefits-non-energy-impacts-nebs-neis-and-their-role-and-values/>.

[57] Gill, *supra* note 8, at 23, 35.

[58] *Id.*

[59] *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>.

[60] Bliss, *One Way the California Drought Is Contributing to Climate Change* (Feb. 16, 2016) City Lab, <https://www.citylab.com/equity/2016/02/how-california-drought-is-contributing-to-climate-change/462951/>.

that they may face reliability concerns due to a lack of water available for cooling.[61] Any accurate SB 100 analysis must encompass a lifecycle analysis of water quality and water supply impacts and NEBs associated with California's energy choices.

VI. The SB 1383 Dairy Pilot Projects Underscore the Importance of Considering Social Costs of Biomethane Production, Including Water Quality Impacts.

Pursuant to SB 1383, the CPUC has awarded substantial grants to six pilot projects to demonstrate the feasibility of injecting biomethane from dairy waste digesters into natural gas pipelines.[62] An examination of the pilot applications, however, highlights the need for many of the changes to modeling and consideration of local impacts noted above.

First, as discussed in Section III, the dairy biomethane pilot projects will incur significant capital and maintenance costs. For just the three pilots which included this information, PG&E and SoCalGas have proposed to invest upwards of $32 million to install purification and interconnection infrastructure, in addition to significant recurring maintenance costs.[63] Such costs incurred at the feasibility stage underscores that biomethane capital costs must be included in the Joint Agencies' modeling, especially as costs of a similar scale may be passed on to ratepayers in future dairy biomethane projects.

Depending on local ambient temperatures and existing manure-management practices, operation of an anaerobic digester can significantly expand a dairy's energy requirements. To operate a digester, a dairy and its partners generally must run additional pumping, gas upgrading, and compression systems and must also heat the digester to maintain ideal temperatures. For instance, under PG&E's proposal, the Van Exel dairy projects a 208% increase in energy use, including a nearly 14-fold increase in electricity use and a 50% increase in diesel use.[64] This increase in the energy intensity of California's dairy industry following expanded biomethane production further demonstrates that the exclusion of biomethane significantly detracts from the accuracy of the SB 100 models.

By promising to employ their biomethane as R-CNG fuel on-site and off-site, convert earthen-lined waste lagoons to double-lined digesters with leak detection, and cover otherwise open-pit lagoons, the applicants have claimed that these projects will lead to broad

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[61] 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>.
[62] *See* Cal. Energy Comm'n, *supra*.
[63] Merced Pipeline, L.L.C., *Pilot Project Solicitation Application* 38 (2018). Five Points Pipeline, L.L.C., *supra*, at 28. Lakeside Pipeline, L.L.C., *supra*.
[64] Van Exel Dairy, *Pilot Project Solicitation Application* 24 (2018).

environmental benefits, from reduced criteria pollutants to water savings.[65] However, the pilot applications reveal that environmental issues will persist in and may even worsen in surrounding communities, especially if biomethane production grows to the industry norm. As long as government incentives ensure that operating digesters on dairies is profitable, the market will tend to favor expansion or intensification of polluting practices at existing dairies and promote clustering and expansion of dairies, leading to increased environmental and water impacts.[66] For the purposes of capital intensive biomethane operations, these applications consider a dairy with a herd size around 2,000 a small dairy.[67] Yet in 2018 the average herd size of U.S. dairies was just 234 cows, and even in California, the average herd size was only 1,250 milking cows.[68] In addition, the economics of injecting utility-grade biomethane into natural gas pipelines requires multiple large dairies to pool their biogas resources, favoring the geographic concentration of dairies, and subsequently, increasing the cumulative impact of pollution on local neighboring communities. Further concentration and intensification of California's dairy industry around disadvantaged communities is a likely consequence of significant procurement of biomethane from California's dairies. The Joint Agencies' consideration of equity must address the concerns of these DACs in dairy producing regions.

In addition, this potential for increased intensity and concentration of California dairies raises concerns about water quality and supply. While the lining and covering of dairy waste lagoons to create digesters reduces water evaporation and provides leak protection, the dairies themselves are major sources of water consumption and contamination. Since 2010, the 45 dairies participating in the pilot projects have been cited by the state water board for 67 violations.[69] The vast majority of these violations fall under Class 2, generally meaning they pose a moderate, indirect, or cumulative threat to water quality."[70] For example, the L & J Vanderham Dairy, was cited for four Class 2 violations in 2017: excessive nutrient application in crop fields, excessive standing water, excessive standing leachate, and dead, decomposing animals in the production area.[71] The dairy biomethane pilot applications thus underscore the importance of considering these impacts, especially to water quality and supply, in SB 100 implementation.

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[65] *See, e.g.*, Five Points Pipeline, L.L.C., *supra* at 56–58.
[66] Once digesters are installed, the dairy has a financial incentive to increase herd size to maximize digester output.
[67] *See* Merced Pipeline, L.L.C., *supra* note 45, at 67.
[68] Jim Dickrell, Licensed Dairy Farm Numbers Drop to Just over 40,000, FARM JOURNAL'S MILK (Feb. 21, 2018) (https://www.milkbusiness.com/article/licensed-dairy-farm-numbers-drop-to-just-over-40000).
[69] *See* State Water Res. Control Bd., *California Integrated Water Quality System Project*: *Violation Report (Facilities)*(https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?vioReportType=Violation&reportID=7606649&inCommand=drilldown&reportName=PublicVioFacilityReport).
[70] *See* State Water Res. Control Bd., *California Integrated Water Quality System Project*: *Violation Report* (https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?OWASP_CSRFTOKEN=EZJB-Y5Q2-OEHA-CI9J-QPED-EUWO-G6QE-9HY1).
[71] *See* State Water Res. Control Bd., *California Integrated Water Quality System Project*: *Violation Report* (https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?reportID=3464505&inCommand=drilldown&reportName=PublicVioDetailReport&group=&facID=235180).

VII. The Joint Agencies Should More Clearly and Extensively Incorporate Demand Side Resources into SB 100 Modeling.

The Joint Agencies should clarify exactly how demand-side resources are incorporated in the model.[72] It appears that demand side resources are limited to a fixed input with the assumptions of 2GW shed demand response, 39 GW of customer solar in 2045, and the general concept of energy efficiency.[73] Further, the Joint Agencies found the scope of the 2045 goal only included utility supplied and Department of Water Resources loads, not self-generation.[74] Previously, the California Energy Commission had noted that demand met by self-generation was 10% of the 2018 California Electricity Loads (5% from PV self-generation).[75] That self-generation is not included in the current model.[76] This interpretation and its subsequent consequences in the SB 100 model fail to consider demand-side alternatives that are actively being explored by the CPUC and investor owned utilities (IOUs). The Joint Agencies should more thoroughly address demand-side resources in future SB 100 models to accurately portray all viable options for meeting California's energy needs.

In particular, energy efficiency programs have a long history of successful implementation and should be more heavily factored into the SB 100 model. In 2018, United States gas and electric demand-side management expenditures totaled $8.3 billion resulting in 28,944 GWh of gross incremental electric savings in 2017.[77] California ranks second in the United States for total energy consumption, yet ranks forty-eighth in consumption per capita, indicating a strong reliance on energy efficiency.[78] California has publicly announced three core energy efficiency goals, namely: doubling energy efficiency savings by 2030; removing and reducing barriers to energy efficiency in low-income and disadvantaged communities; and reducing greenhouse gas emissions from the buildings sector.[79] The CPUC reported that in 2019 over $639 million was spent on energy efficiency, resulting in the reduction of over 1.6 million tons of carbon dioxide.[80] More energy efficient appliances, such as heat pump water heaters, can

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[72] Gill, *supra* note 8, at 8.
[73] *Id.*
[74] Cal. Pub. Util. Comm'n, *supra* at 5.
[75] *Id.* at 4.
[76] *Id.* at 5.
[77] Arlene J. Lanciani, *2018 State of the Efficiency Program Industry*, Consortium for Energy Efficiency 8 (May 2019) <https://library.cee1.org/system/files/library/13981/CEE_2018_AnnualIndustryReport.pdf>.
[78] Michael Kenney et. al, *2019 California Energy Efficiency Action Plan*, California Energy Commission 15 (Nov. 2019), Publication Number: CEC400-2019-010-SF, <https://ww2.energy.ca.gov/business_meetings/2019_packets/2019-12-11/Item_06_2019%20California%20Energy%20Efficiency%20Action%20Plan%20(19-IEPR-06).pdf>
[79] *Id.* at 1, 5-6; see also Sen. Bill No. 350 (2015–2016 Reg. Sess.).
[80] Cal. Pub. Util. Comm'n, *What is the impact of CPUC Energy Efficiency Programs? 2019 Results and 2020 Look Ahead*, (2020) <https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442465530>.

also shift the demand curve to require less energy to be supplied.[81] The Joint Agencies should more clearly incorporate well-established demand-side interventions, such as energy efficiency programs, into the SB 100 model.

The Joint Agencies should include current self-generation options to meet demand in the SB 100 model to reflect California's well-funded, ongoing programs in support of self-generation. It is unclear how the current SB 100 model incorporates self-generation, but it appears the model only reflects a projected 39 GW of customer solar in 2045, with no self-generation factored into the model in 2020.[82] Yet, the CPUC's Self-Generation Incentive Program (SGIP) currently provides incentives to support distributed energy resources through rebates for qualifying distributed energy systems installed on the customer's side of the utility meter.[83] The CPUC has authorized more than $1 billion in funding for SGIP.[84] PG&E similarly provides funding for renewable energy development in disadvantaged communities as a result of Assembly Bill 327.[85] Self-generation provides resiliency to the grid, particularly in light of recent blackouts caused by wildfires.[86] The exclusion of self-generation from the model prevents the Joint Agencies from accurately portraying the full suite of potential solutions to meet California's energy needs and the requirements of SB 100. We urge the Joint Agencies to clarify and likely expand the inclusion of demand side resources into the SB 100 model.

VIII. The Core Scenario Resource Build Rates Inappropriately Backload the Deployment of Solar Resources.

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.[87] Accordingly, solar energy is a crucial resource to meet the ambitious policy goals laid out in SB 100. However, the core modeling scenarios backload the deployment of solar energy, pushing the most ambitious

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[81] *See Heat Pump Water Heaters*, Dep't of Energy, <https://www.energy.gov/energysaver/water-heating/heat-pump-water-heaters>.
[82] Gill, *supra* note 3, at 8.
[83] Cal. Pub. Util. Comm'n, <https://www.cpuc.ca.gov/sgip/>.
[84] Cal. Pub. Util. Comm'n, *SGIP Fact Sheet - Program Overview*, <https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/News_Room/NewsUpdates/2020/SGIP_factsheet_050520.pdf>.
[85] PG&E, <https://www.pge.com/en_US/for-our-business-partners/energy-supply/electric-rfo/wholesale-electric-power-procurement/disadvantaged-communities.page?WT.mc_id=Vanity_dacrfo>; see Assembly Bill No. 327 (2013–2014 Reg. Sess.) § 1, subd. (a).
[86] *Distributed Solar PV for Electricity System Resiliency*, National Renewable Energy Laboratory, <https://www.nrel.gov/docs/fy15osti/62631.pdf>; see also *Economic Benefits of Increasing Electric Grid Resilience to Weather Outages* (Aug. 2013) President's Council of Economic Advisers and the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability, <https://www.energy.gov/sites/prod/files/2013/08/f2/Grid%20Resiliency%20Report_FINAL.pdf>;
[87] 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

deployment out beyond 2030, missing a crucial opportunity to address both the urgent demands of climate change and the needs of DACs. As has already been discussed in our June 12, 2020 comment to the Joint Agencies, combustion sources and the associated social costs are disproportionately located in DACs, meaning that delaying the deployment of solar energy resources also continues this disproportionate impact on DACs.

The social costs associated with combustion sources of energy are well established, including in our June 12, 2020 comment. We will not repeat that analysis here. However, it is worth reiterating the relative NEBs of solar energy, which the joint agency would be delaying with its current backloaded scenarios. The land use and environmental impacts of carbon based energy sources (including local air and water pollution impacts) far outweigh the local impacts from solar development.[88] Solar generation offers significant advantages when it comes to land use impacts.[89] Rooftop solar can eliminate the need for transmission construction.[90] With respect to distributed solar in particular, the economic benefits to local communities are significant, helping to bring the economic and employment benefits of energy generation to the local communities that consume the energy.[91] These are the NEBs that the Joint Agencies have modeled, yet as proposed, the Core Scenario will not maximize these benefits until 2030.

Solar prices have dramatically declined over time and it is reasonable to expect future declines in costs as well, which would allow the Joint Agencies to reduce the projected costs of the deployment of solar energy if they push the deployment window out as well.[92] However, the near term NEBs and avoided social costs of installing solar energy sooner rather than later would outweigh the relative economic costs. If the scenarios were to include a more comprehensive and honest assessment of the NEBs and social costs associated with both combustion and solar energy resources, solar would become significantly more cost competitive, especially in DACs. In addition, the relative economic costs of solar will continue to decrease as we experience greater economies of scale with a faster build out of solar resources across the state.

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[88] Allred, *Ecosystem services lost to oil and gas in North America* (Apr. 24, 2015) Science, <https://science.sciencemag.org/content/348/6233/401.full>.

[89] 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.pdf>.

[90] Hoffakcer, *Land-Sparing Opportunities for Solar Energy Development in Agricultural Landscapes: A Case Study of the Great Central Valley, CA, United States* (Dec. 19, 2017) Environmental Science & Technology, <https://pubs.acs.org/doi/abs/10.1021/acs.est.7b05110>.

[91] 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>.

[92] Donohoo-Vallett, *The Future Arrives for Five Clean Energy Technologies – 2016 Update*, US Department of Energy, <https://www.energy.gov/sites/prod/files/2016/09/f33/Revolutiona%CC%82%E2%82%ACNow%202016%20Report_2.pdf>.

We thank the Joint Agencies' staff for the extensive work completing the current SB 100 modeling results. For the foregoing reasons, we request that the Joint Agencies modify the Core Scenario and subsequent modeling to exclude combustion and adequately consider NEBs and social costs as detailed in this and our prior comment.

In health,

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