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Earthjustice Comments on Near-Zero Biomethane Vehicles

Additional submitted attachment is included below.

EARTHJUSTICE

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Re: Docket No. 20-IEPR-02 Commissioner Workshop on Near-Zero Emission Vehicles and Low-Carbon Fuels

Introduction and Summary

As of writing, California is buckling under an unprecedented heat wave, which, paired with anomalistic thunderstorms and historic drought, have triggered wildfires across the region.[1] Smoke and extreme heat have pushed the already-unhealthy California air to even more dangerous levels in the nation's most polluted air basins.

The largest contributor to these dual crises of climate change and air pollution is our State's combustion-based transportation system. Even before this week's extreme weather, progress fighting air pollution was backsliding,[2] and greenhouse gas emissions from transportation continue to increase.[3] Achieving health-based air quality standards, achieving the Governor's goal of 5 million ZEVs by 2030, and achieving the objectives explicitly outlined in Senate Bill (SB) 350 all require accelerating widespread transportation electrification.

There is significant potential to do so, given that zero-emission solutions are already economically and technologically compelling in a large share of the vehicle market.[4] But to date, public investment has not matched the magnitude of the vehicle and infrastructure deployment necessary. The economic impacts of the COVID-19 pandemic means the State must focus limited public dollars to maximize scalable solutions for clean air and the climate. **The only way to maintain the impact of CEC investment and policy guidance consistent with**

[1] Tony Barboza *et al*, "From 'firenadoes' to record heat, California extreme weather a glimpse of future" (Aug. 18, 2020) https://www.latimes.com/california/story/2020-08-18/california-heat-wave-brings-extreme-weather-and-a-glimpse-at-our-future-with-climate-change

[2] Los Angeles Times, *Editorial: Smog is Making a Comeback in Southern California. That's Beyond Unacceptable* (Jul. 3, 2019) https://www.latimes.com/opinion/editorials/la-ed-smog-gets-worse-20190703-story.html,

[3] Andrew Goetz et al, *Urban Goods Movement and Local Climate Action, Assessing Strategies to Reduce Greenhouse Gas Emissions from Urban Freight Transport*, (April 2019) at 3 http://transweb.sjsu.edu/sites/default/files/1796_Goetz_Alexander_Urban-Goods-Movement-Greenhouse-Gas-Emissions.pdf

[4] *See, e.g.*, MarketWatch, "New Advances in Zero Emissions Vehicles Offer Promise for Work Fleets" (Jul. 17, 2019)https://www.marketwatch.com/press-release/new-advances-in-zero-emissions-vehicles-offer-promise-for-work-fleets-2019-07-17

California's commitments is to focus on technologies that advance the transition to a zero-emissions transportation system.

We are well beyond the point of subsidizing technologies that lock in 10 to 12 additional years of combustion. Far from offering a "bridge" to zero-emissions, splitting limited resources with vehicles we will eventually need to retire is a dead-end investment. Moreover, the viability of climate-friendly combustion vehicles is undermined by the miniscule supply of low-cost, low-emission feedstocks. These limited supplies of biofules are being promised to several other sectors as a way to reduce climate pollution.

Too often, the CEC, CPUC, and CARB have siloed discussions of biofuel and biomethane production from the local impacts of the industrial agriculture and livestock production practices on which it relies. When unjust and ecologically harmful sources of biomethane are screened out, the total remaining supply is lowered, the cost is increased, and the need for selective use in hard-to-electrify sectors becomes even more evident. This, in turn, reinforces the need to accelerate deployment of low-cost, ZE solutions in road transportation and goods movement.

Recommendations

1. **The Commission Should Align Investment and Policy Guidance around Accelerating Widespread Transportation Electrification**

This includes ending the practice of splitting limited state dollars on near-zero vehicles and infrastructure which have dubious environmental benefit, and primarily serve the financial interests of a small industry segment. Instead, the Commission should make every effort to enable a direct shift to zero-emissions for the large uptick in truck turnover expected in the early 2020s.

2. **The IEPR Should Adopt a Framework for Screening Out Environmentally Harmful Sources of Biomethane**

The IEPR should provide a realistic view of the in-State supply of biogenic fuel which is actually environmentally beneficial to produce, by screening out sources which could perversely increase GHGs and/or local environmental injustice.

3. **The IEPR Should Look Beyond Road Transportation to Identify Optimal End Uses for the Limited Supply of Low-Carbon Fuels**

Myopically examining low-carbon fuels in the context of on-road transportation could imperil other, more challenging decarbonization objectives. To the extent that the CEC continues to take a role in supporting low-carbon fuels, the focus should be limited to funding and research for hard-to-electrify end-uses such as industrial processes, air and maritime transport, and chemical feedstocks.

1. Widespread Transportation Electrification Is the Clearest Path to Meeting State Climate and Air Quality Targets

As early as 2012, CARB's *Vision for Clean Air* stated plainly that California's climate and air quality goals would not be met but for a near complete transformation to zero-emission (ZE) technologies. Recent pathway studies confirm the point. A working paper by Lawrence Berkeley National Laboratories projects that a truck sales schedule consistent with California's carbon-neutrality goals would require roughly 400,000 ZEV medium- and heavy-duty vehicles on the road in 2030—the same date 100% of truck sales would need to be ZE. The 2030 combustion-phase out date is consistent a recent draft report on pathways for achieving carbon neutrality done by Energy and Environmental Econmoics ("E3") for CARB:[5]

> "The use of fossil natural gas and biomethane for CNG trucks is phased out in the Balanced scenario and the Zero Carbon Energy scenario. The Balanced scenario assumes a complete transition to hydrogen fuel cell and electric truck sales by 2035. In the Zero Carbon Energy scenario, this transition to 100% hydrogen fuel cell and electric truck sales occurs by 2030."

Even the "High-CDR" scenario, which as the report explains, relies on uncertain assumptions about the ability for large-scale carbon dioxide removal, envisions a near-total phase-out of combustion vehicle sales by 2040.

Table 3. Transportation sector mitigation measures by scenario

Scenario	Assumptions
High CDR	100% BEV sales for LDV by 2035 100% BEV sales for MDV by 2040 45%/48% BEV/CNG sales for HDV by 2040, 7% diesel sales remaining for long-haul 50% rail electrification, no aviation electrification
Balanced	100% BEV sales for LDV by 2035 100% BEV sales for MDV by 2035 45%/48% BEV/HFCV sales for HDV by 2035, 7% diesel sales remaining for long-haul 75% rail electrification, no aviation electrification
Zero-Carbon Energy	100% BEV sales for LDV by 2030 100% BEV sales for MDV by 2030 50%/50% BEV/HFCV sales for HDV by 2030 75%/25% rail electrification/hydrogen, 50% of in-state aviation electrified

a. Zero-Emission Trucks are Ready for Deployment In a Broad Range of Applications

Some panelists at the Commissioner Workshop expressed a need for the CEC to increase support for low-NOx trucks fueled with biomethane as a way to secure near-term air quality

[5] Amber Mahone et al, "Draft – Achieving Carbon Neutrality in California" (Aug 2020) at 39 https://ww2.arb.ca.gov/sites/default/files/2020-08/e3_cn_draft_report_aug2020.pdf

benefits because, in their view, zero-emission options were not yet suitable or available. As an initial matter, the argument that Low-NOx trucks have a commercial suitability advantage over ZEVs only underscores the need for the CEC to "graduate" these technologies from State support. Vehicles that incrementally lower pollution rather than eliminate it should not be the focus of limited State funds.

Were the State anywhere near exhausting deployment of ZE options where they are already highly suitable, then relying on lighter-polluting combustion options might merit discussion. Of course, this is not the case—the State remains far from realizing even a fraction of the total potential ZEV deployment possible just with technologies commercially available today. CARB's Zero-Emission Market Assessment, which shows that more than 70 percent of Class 4-7 trucks, and roughly 30 percent of Class 2b-3 and Class 8 trucks are highly suitable (i.e. score 1 or 2 out of 10) for electrification.[6] The report goes on to state that "further advances in ZE technology will increase these percentages."

To enable rapid and widespread transportation electrification in accordance with State climate and air quality goals, the CEC should continue to focus on scaling ZEV adoption in high-suitability segments while spurring innovation and generating "lessons-learned" to accelerate commercial availability of additional segments.

b. The Early 2020s Are a Critical Window for Mass Deployment of Zero-Emission Trucks

A study by the UCLA Luskin Center finds that because of an anticipated bump in truck retirements, due to natural turnover and the State Truck and Bus Rule's 2023 deadline, the Ports "have a significant opportunity for early [zero-emission] adoption."[7] They estimate that more than 4,500 trucks could retire in 2022, and the majority of the remaining trucks will turnover later in the 2020s. Rather than rely on two sharp fleet transitions—first to natural gas and then to zero-emissions—the Ports can "leapfrog" directly to a [zero-emission]-majority fleet in the early 2020s. In doing so, they can avoid the substantial investments in natural gas trucks, fueling infrastructure, and operator training that would largely end up stranded. **This best-case scenario for the Ports, and the low-income and minority communities living adjacent to them, can be realized through early and aggressive action by the CEC and its partners to advance large deployments and rapid infrastructure buildout.**

c. The Economic Case for Zero-Emission Trucks Is and Will Increasingly Be Compelling

The positive relationship between ZEV deployment and economy-wide savings is well-documented. By strengthening the Advanced Clean Truck rule, CARB's modified economic impact report showed a higher ZE truck sales generate an additional $1 billion in economic

[6] CARB, Appendix E: Zero Emission Truck Market Assessment, at 5 https://ww3.arb.ca.gov/regact/2019/act2019/appe.pdf.

[7] https://innovation.luskin.ucla.edu/wp-content/uploads/2019/08/Zero-Emission_Drayage_Trucks.pdf at 5

savings through 2040 as lower fuel and operational costs are passed on to California businesses and consumers (not including health or environmental benefits).[8]

To maximize these benefits and meet the State's crucial air quality and climate commitments, substantially more ZEV trucks need to be deployed at a much faster rate than current State policy has allowed. The IEPR should focus on how to achieve these higher deployment levels and build out the foundation for transportation solutions that scale toward a fully zero-emission future. The CEC's block grant solicitation for large deployments of medium-and heavy-duty ZE fueling infrastructure projects is a welcome step in that direction.[9]

2. Incentivizing Low-NOx Trucks and Infrastructure is at Cross Purpose with California's Climate and Air Quality Objectives

a. Climate Impacts

Greenhouse gas emissions from unabated gas use are incompatible with achieving net-zero emissions. Now, a growing body of research has highlighted the extreme global warming potential of methane—the main constituent of gas—as well as the pervasive problem of methane leakage across the gas delivery system. Importantly, methane leakage issues are not limited to fossil gas. Whether methane is synthetic, biogenic, or fracked, when it leaks from pipelines and fueling stations, it will result in the same negative climate impact once in the atmosphere.

While some panelists highlighted the potential for Low-NOx trucks paired with biomethane to be considered carbon-negative, this conclusion relies on the flawed assumption that most biomethane is produced by capturing inevitable, ordinarily occuring fugitive methane. In fact, new studies estimate that capturable waste methane (e.g. from uncontrolled landfills and wastewater treatment plants) is less than 1% of current gas demand.[10] Beyond these sources, methane must be intentionally produced, which poses inevitable methane leakage that is GHG-additional.

b. Air Quality Impacts.

Even Low-NOx CNG vehicles continue to emit high levels of particle and NOx pollution. Recent studies have shown evidence of high levels of ultrafine particle pollution less than 2.5 nm.[11] CNG vehicles can also emit high levels of ammonia, which contribute to secondary particle pollution.[12] Furthermore, comparing the lifecycle emissions impact (e.g. well-to-wheels)

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[8] CARB, Updated Cost and Benefits Analysis for the Proposed Advanced Clean Trucks Regulation - Attachment C, at 21 https://ww3.arb.ca.gov/regact/2019/act2019/30dayattc.pdf.

[9] https://www.energy.ca.gov/solicitations/2020-07/gfo-20-603-block-grant-medium-duty-and-heavy-duty-zero-emission-vehicle

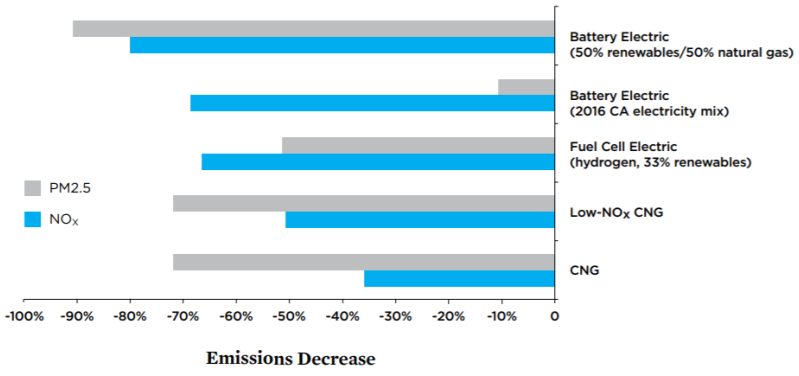
[10] Emily Grubert, At Scale, Renewable Natural Gas Systems Could be Climate Intensive: The Influence of Methane Feedstock and Leakage Rates, Envtl. Research Letters (2020) (in press), https://doi.org/10.1088/1748-9326/ab9335

[11] Transport&Environment, Compressed natural gas vehicles are not a clean solution for transport (June 16, 2020) https://www.transportenvironment.org/sites/te/files/publications/2020_06_TE_CNG_particle_report.pdf

[12] Id.

of Low-NOx CNG vehicles to battery-electric vehicles reveals the significant residual air pollution left unmitigated.[13]

FIGURE ES-3. Reducing Particulate Matter and Nitrogen Oxide Emissions by Switching to Electric Buses



Life cycle emissions of particulate matter (PM) and nitrogen oxides (NO_x) for battery electric, fuel cell electric, and compressed natural gas transit buses are low relative to a diesel bus.

Notes: PM2.5 emissions refer to particles with diameters 2.5 micrometers and smaller. Comparison based on emissions from 40-foot transit buses.

3. Given the Finite Supply and High-Cost of Genuinely Sustainable, Low-Carbon Fuels, Their Use Should Be Reserved for Hard-To-Decarbonize Sectors.

According to a study by the American Gas Foundation ("AGF"), even after fully ramping up the production of renewable gas over two decades, non-fossil gas could supply just 6% to 13% of current gas demand.[14] Yet some panelists and industry groups continue to advocate for *expanding* gas demand into the transportation sector, where it has proven to be a poor fuel. This fact is implicit in what gas vehicle proponents said at the workshop: even with LCFS credits, advocates conceded that the vehicles are unpopular with fleets and customers without this massive state subsidy.

The cost-effectiveness calculations presented at the Commissioner workshop give the illusion that low-NOx biomethane trucks are a relatively favorable mitigation strategy. This calculation suffer from two major conceptual flaws. The first is that they rely on the assumption that avoided greenhouse gases could not have otherwise occurred but for the use of biomethane as a

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[13] *See, e.g.* Sara Chandler et al, Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public Health in California, (Updated May 2017) at 3 https://www.ucsusa.org/sites/default/files/attach/2016/10/UCS-Electric-Buses-Report.pdf

[14] AGF, Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment (Dec. 2019), https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Executive-Summary-Final-12-18-2019-AS-1.pdf. The AGF Study estimates total resource potential in 2040 to be between 1,660 tBtu (low scenario) and 3,780 tBtu (high scenario). According to the U.S. Energy Information Administration ("U.S. EIA"), total US Gas Consumption in 2018 equals 30,075 tBtu. U.S. EIA, Natural Gas Explained, https://www.eia.gov/energyexplained/natural-gas/useof-natural-gas.php (last visited May 29, 2020). RNG resource potential therefore ranges from 6% (1,660 tBtu / 30,075 tBtu) to 13% (3,780 tBtu / 30,075 tBtu).

transportation fuel. This is almost entirely due to the extremely low carbon intensity score of agricultural waste—specifically dairy manure. This assumption absolves the polluters themselves (e.g. industrial dairy producers) of the methane they generate, and treats the pollution as a collective problem for California to subsidize the clean-up of.

The second is that these cost-effectiveness analyses are myopic in their scope and time horizons. Cost-effectiveness calculations for low-NOx biomethane vehicles do not reflect the opportunity cost of using renewable fuel sources in sectors with fewer low-cost options and higher GHG intensity. Further, they do not account for the long-term cost-effectiveness of investing in solutions that cannot be scaled to meet future goals.

Even assuming outstanding improvements to production costs and new supplies of biomethane are unlikely to alter a fundamental point: low-carbon fuels are best reserved for applications that lack a low-cost path to direct electrification. Most of road transportation is not such an application—indeed E3's carbon neutrality shows that electrification of trucks is one of California's lower-cost mitigation options, generating net cost savings.[15] In optimizing their use, the advantages of renewable fuels (e.g., flexible, combustible, dispatchable) should be weighed against their disadvantages (e.g., cost, leakage, limited supply) and the availability of alternatives such as electrification. Rather than look myopically at the use of low-carbon fuels for road transportation, we urge the CEC to focus on socially optimal use cases for liquid/gaseous renewable fuels, such as delivering high industrial heat for steel production or powering air or marine transportation. Because battery-electric vehicles offer superior efficiency and eliminate end-use pollution, direct electrification should be pursued to the maximum extent feasible.

4. Incentivizing Fuel Production from Sources of Industrial Agriculture Can Perversely Increase Environmental Injustice and GHGs

a. Dairy Manure

The Commission should categorically exclude support for fuel production from livestock waste at confined animal feeding operations (CAFOs). Anaerobic digestion does not anaerobic digestion does not control other sources of harmful pollution associated with CAFOs such as local air and water pollution, nor do they address the increased risk of antibiotic resistance or the devastating impacts to animal welfare. Neither the market nor existing safeguards require CAFOs to cover the costs of environmental and human health costs that they impose on nearby communities.[16] The existing regulatory regime, weak though it is, is notoriously poorly enforced.

The ultra-low CI score given to agriculture waste treats methane from CAFO manure lagoons as an ordinarily occurring or inevitable consequence of raising livestock. This is a flawed assumption. Dairy production is not an inevitable source of methane pollution. Large and rising emissions of methane from the dairy and swine industry are a human-induced problem, and a relatively recent one. From 1990 to 2017, methane emissions from dairy manure rose 134

[15] Amber Mahone et al, Draft – Achieving Carbon Neutrality in California (Aug 2020) at 88 https://ww2.arb.ca.gov/sites/default/files/2020-08/e3_cn_draft_report_aug2020.pdf
[16] D.Lee Miller et al, CAFOs – What We Don't Know is Hurting Us, (Sept. 2019) at 7 https://www.nrdc.org/sites/default/files/cafos-dont-know-hurting-us-report.pdf

percent.[17] This has happened even while the national dairy animal population has decreased since 1990.[18] The reason, according to the U.S. EPA, is that the industry has become more concentrated in certain areas, such as California, and "the shift toward larger dairy cattle and swine facilities since 1990 has translated into an increasing use of liquid manure management systems, which have higher potential CH_4 [methane] emissions than dry systems."[19]

Thus, the generation of methane from manure lagoons is the result of industrial livestock management decisions (namely confinement, concentration, and liquid-based manure storage) and a regulatory environment that permits these practices to continue despite their significant air and water quality impacts.

As panelist Phoebe Seaton explained, markets for biogas produced from expensive anaerobic digesters function to reinforce industrial, CAFO-based livestock industry, and may have the perverse effect of intensifying herd consolidation and lagoon-manure management in the San Joaquin Valley. Biomethane production depends on massive operations, and only makes economic sense for CAFOs that produce large amounts of manure handled through wet storage lagoons.[20] Thus, markets for biogas create new revenue streams for the largest, most intensively polluting farms, while smaller, pasture-based, or more sustainably managed farms are left out. As a result, policies that support biomethane from dairies can perpetuate the well-documented harms that dairies inflict on nearby communities— Every well monitored near dairies in the Central Valley Dairy Representative Monitoring Program showed nitrate levels above the maximum contamination limit.[21]

As the Commission continues to explore the role of biomethane from agricultural waste, we encourage them to center the expertise and livelihoods of communities on the frontlines of factory farming and industrial agriculture pollution in California's San Joaquin Valley. **The Commission cannot continue to craft energy investment and policy strategies that sideline the lived experience of California's disadvantaged communities.**

b. Gasification of Energy Crops

The Commission should also distinguish low-carbon fuels from those produced by energy crops. Biofuels from energy crops have notoriously poor climate benefit. The vast majority of biofuels come from corn ethanol, whose carbon intensity per megajoule ranges from

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[17] U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017 – Agriculture*, at 5-9, https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-chapter-5-agriculture.pdf.
[18] Id.
[19] Id.
[20] Markus Lauer *et al.*, *Making Money from Waste: The Economic Viability of Producing Biogas and Biomethane in the Idaho Dairy Industry*, Applied Energy, Vol. 222 (July 15, 2018), https://www.sciencedirect.com/science/article/pii/S0306261918305695.
[21] J.P. Cativiela et al., Summary Representative Monitoring Report (Revised*), CVDRMP, at 6 (Apr. 19, 2019), https://www.waterboards.ca.gov/centralvalley/water_issues/confined_animal_facilities/groundwater_monitoring/srmr_20190419.pdf

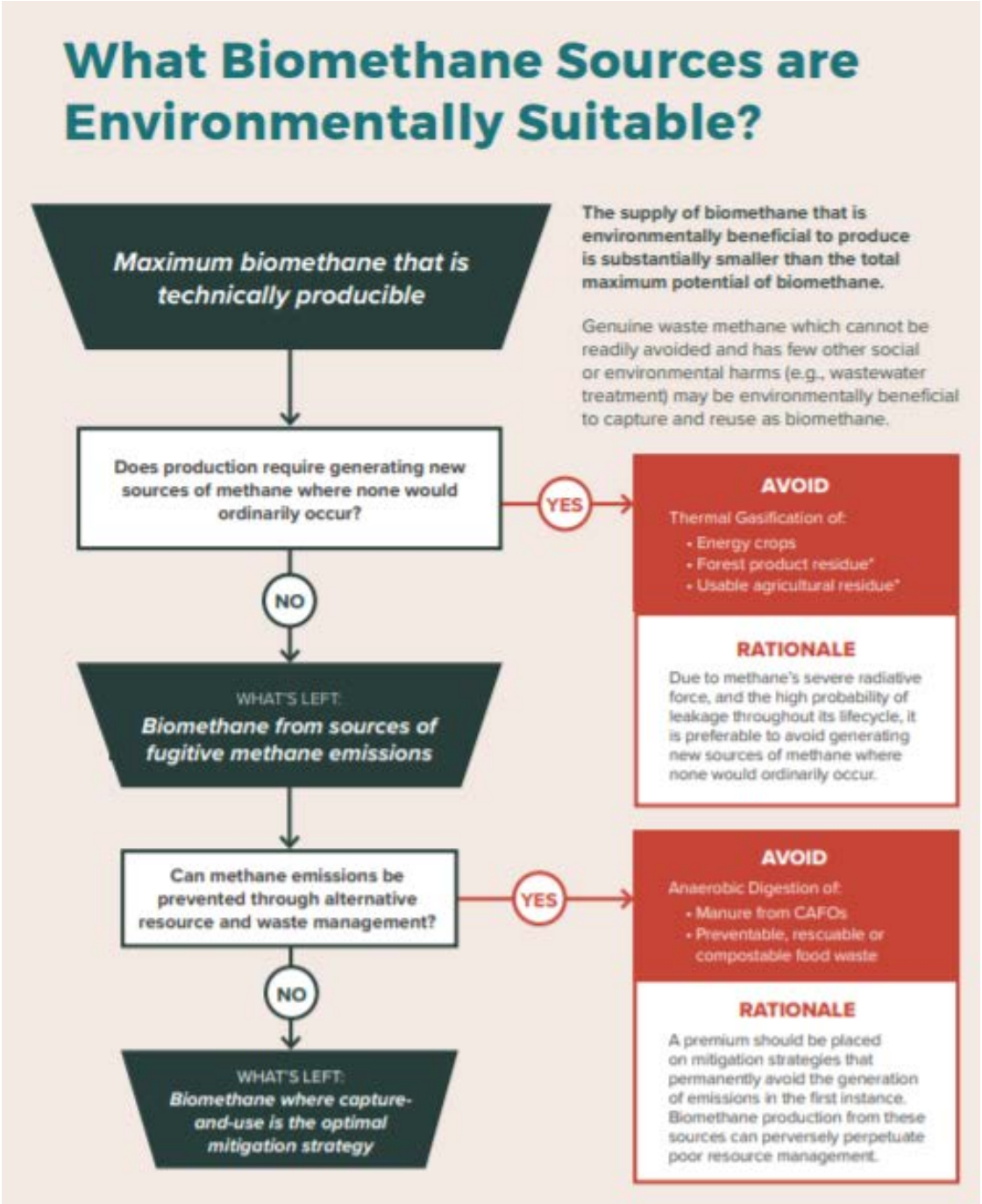
3 to 4 times higher than California's current grid.[22] The gap continues to widen as California marshals toward a carbon-free grid. The climate impact of biofuels from energy crops are likely hardly better, and in some cases even worse, than fossil fuels. By diverting arable land from food to energy production, biofuel demand drives land-use change that transforms forests and grasslands—natural carbon sinks—into cropland. According to the U.S. EPA's own assessment, the Renewable Fuel Standard—has resulted in the conversion of between 4 and 8 million acres of land, completely nullifying and overwhelming any climate benefit the program might have had.[23]

In order to ascertain a more useful assessment of the truly sustainable supply of low carbon fuels, the Commission should adopt a framework for screening out sources that can inadvertently increase GHGs, or perversely incentivize continued and avoidable pollution. Below, we provide a potential framework developed by Earthjustice and Sierra Club for identifying the potential supply of environmentally beneficial biomethane or biofuels.

[22] Dr. Jeremy Martin, Perspectives on Low Carbon Fuels in a Clean Transportation Future, at slide 2, available at: https://efiling.energy.ca.gov/getdocument.aspx?tn=234045

[23] U.S. EPA, Biofuels and the Environment: The Second Triennial Report to Congress, at 37 (June 29, 2018), https:// cfpub.epa.gov/si/si_public_record_report.cfm?Lab=IO&dirEntryId=341491

Framework for Screening Environmentally Harmful Biomethane Sources[24]



[24] Sasan Saadat et al, Rhetoric vs. Reality: The Myth of "Renewable Natural Gas" for Building Decarbonization (July 2020) at 10 https://earthjustice.org/sites/default/files/feature/2020/report-decarb/Report_Building-Decarbonization-2020.pdf

Conclusion

The Commission Should Continue to Align Investment and Policy Guidance around Accelerating Widespread Transportation Electrification

We welcome the Commission's strides forward by prioritizing funding towards zero-emission infrastructure in both the 2019-2020 Investment Plan Update and the 2020-2023 Investment Plan Update. We hope the Commission will continue on this course, and end thepractice of splitting limited state dollars on near-zero vehicles and infrastructure which have dubious environmental benefit, and primarily serve the financial interests of a small industry segment. Instead, the Commission should make every effort to enable a direct shift to zero-emissions for the large uptick in truck turnover expected in the early 2020s.

The IEPR Should Adopt a Framework for Screening Out Environmentally Harmful Sources of Biomethane

The IEPR should provide a realistic view of the in-State supply of biogenic fuel which is actually environmentally beneficial to produce, by screening out sources which could perversely increase GHGs and/or local environmental injustice. The report by Gladstein, Neandross & Associates underscores this point. All current and planned biomethane facilities in California through 2024 will only produce 119 million diesel gallon equivalents (DGE) of biomethane—enough to supply roughly 13,700 trucks.[25] With California's truck population at roughly 1.3 million, this equates to roughly .1% of California trucks.

The IEPR Should Look Beyond Road Transportation to Identify Optimal End Uses for the Limited Supply of Low-Carbon Fuels

Myopically examining low-carbon fuels in the context of on-road transportation could imperil other, more challenging decarbonization objectives. To the extent that the CEC continues to take a role in supporting low-carbon fuels, the focus should be limited to funding and research for hard-to-electrify end-uses such as industrial processes, air and maritime transport, and chemical feedstocks. In the meantime, biofuels could be used to reduce emissions from these sectors.

Sincerely,

Sasan Saadat
Adrian Martinez
Earthjustice

[25] Gladstein, Neandross & Associates, An Assessment: California's In-State RNG Supply for Transportation 2020-2024 (July 2020) https://www.bioenergyca.org/wp-content/uploads/2020/07/GNA-Report-CA-RNG-Supply-Assessment-July-2020.pdf