July 9, 2021

California Air Resources Board

Dear California Air Resources Board:

Thank you for accepting these comments submitted by Clean Air Task Force (CATF), the Institute for Governance & Sustainable Development (IGSD), the Climate Reality California State Coalition, and the Environmental Investigation Agency (EIA) on the California 2022 Scoping Plan (Carbon Neutrality by 2045). As we detail below, the workshop presentations presented strong plans and progress on renewables and electrification of the transportation and building sectors. Noticeably absent, however, was a proposal to accelerate the phaseout of Short-Lived Climate Pollutants (SLCPs aka "super pollutants" – methane, black carbon [BC] soot from combustion, and hydrofluorocarbon [HFC] refrigerants). The importance of more rapidly reducing SLCPs cannot be overemphasized, or overvalued, and should be further stressed in the 2022 Scoping Plan. SLCPs are responsible for about 40% of global climate forcing and reducing SLCPs rapidly is the only short-term option available to slow warming in the next decades[1] to reduce the risk of crossing climate tipping points and keeping the planet to the 1.5°C global warming pathway established by the Paris Agreement. California can also make significant strides to advance its environmental justice agenda and targets by further buttressing strategies to more rapidly reduce SLCPs.

Positives: Renewables, electrification, as well as public health, equity, and economic impacts

The energy consulting group E3 modeled three scenarios to achieve carbon neutrality by 2045 (a 400 $MMTCO_2e$ annual reduction), with varying reliance on CO_2 removal strategies (e.g., land-based carbon sequestration and direct air capture of CO_2) ranging from 33-80 $MMTCO_2e$ per year.[2] Least regrets strategies for reaching carbon neutrality include:

- Energy efficiency in buildings (doubled by 2030 relative to 2015), industry, and agriculture.
- Widespread transportation and building electrification – 100% sales of zero emission passenger and medium-duty vehicles, 93% heavy-duty vehicles, and 100% heat pumps by 2035.
- Zero carbon electricity (75% by 2030, 100% by 2045).
- Investment in zero carbon fuel options for hard to decarbonize sectors where electrification is not practical (e.g., industry is fully decarbonized through a mix of green hydrogen, carbon capture, and electrification by 2045).
- Pursuing reductions in non-combustion emissions such as methane and hydrofluorocarbon refrigerants (e.g., total waste biomass is utilized for diesel and jet fuel, as well as renewable natural gas by 2045).
- Investment and research into CO_2 removal strategies.

[1] United Nations Environment Programme & Climate & Clean Air Coalition (2021) *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions*; *See also* Ocko et al. (2021) Acting rapidly to deploy readily available methane mitigation measures by sector can immediately slow global warming, *Environmental Research Letters 16* 054042, doi: 10.1088/1748-9326/abf9c8.

[2] Energy and Environmental Economics, Inc. (October 2020) Achieving Carbon Neutrality in California: PATHWAYS Scenarios Developed for the California Air Resources Board.

An initial analysis by CEC, CPUC, and CARB suggests that SB 100 targets (60% renewable in 2030, 100% in 2045) are technically achievable through multiple pathways, but construction of clean electricity generation and storage facilities must be sustained at record-setting rates (3x for solar and wind, 8x for battery storage).[3] Diversity in energy resources and technologies lowers overall costs.

A low carbon transportation scenario by the University of California achieves 2045 carbon neutrality but requires aggressive policies (100% ZEV car and truck sales by 2040, 100% low-carbon fuels, 15% VMT reduction vs BAU).[4] These policies will result in cost savings starting in 2030.

CPUC noted that the electric sector is the only one to see significant progress, with a 48% GHG decrease from 2008 to 2018.[5]

An analysis by UCSB found that low carbon scenarios reduce pollution-related deaths and morbidity.[6] Production quotas/severance tax generates equity co-benefits: as total air pollution exposure falls, a greater share of that benefit flows to disadvantaged communities.

Shortcomings: Short-Lived Climate Pollutants (SLCPs)

In contrast to the progress and vision on renewables and electrification of the transportation and building sectors, noticeably absent, was a proposal to accelerate the phaseout of Short-Lived Climate Pollutants (SLCPs aka "super pollutants" – methane, black carbon [BC] soot from combustion, and hydrofluorocarbon [HFC] refrigerants), which are: responsible for about 40% of global climate forcing, the only option to sustainably slow warming in the next decades to reduce the risk of crossing climate tipping points, and contribute to air pollution health effects.[7] While California was one of the first jurisdictions to set comprehensive SLCP targets in 2016 (SB 1383, Lara), since then nine other states and the U.S. EPA have adopted HFC reductions, and Colorado and New Mexico have adopted even more sweeping rules on oil and gas methane than California. This California leadership has been invaluable but as Governor Newsom recently announced from the site of California wildfires, we need to do more, we need to do it better, and we need to do it faster. Scientific consensus on the pathway to containing global warming to 1.5C by the end of the century centers on successful implementation of rapid SLCP reduction strategies. California, and CARB in particular, has shown before, and can now continue to show the way forward toward achieving rapid and deep SLCP reductions by 2045.

The E3 modeling uses 100-year GWPs for SLCPs instead of 20-year GWPs. This is not consistent with the State's own SLCP strategy, which uses 20-year GWPs, or indeed with clear warnings from the scientific community about the need to slow the rate of warming to reduce the harmful impacts of climate change now and over the coming decades. The result is that this modeling de-emphasizes the impact of short-lived climate forcers and therefore masks the inadequacy of the measures that CARB has identified to reduce methane, HFCs, black carbon, and tropospheric ozone. Recognizing this problem, CARB must:

[3] 2021 SB 100 Joint Agency Report (March 2021) Achieving 100 Percent Clean Electricity in California: An Initial Assessment.
[4] University of California Institute of Transportation Studies (April 2021) Driving California's Transportation Emissions to Zero.
[5] Simon Baker – Director of Cost, Rates & Planning (June 8, 2021) CPUC Perspectives on Scoping Plan Update.
[6] University of California at Santa Barbara (April 2021) Enhancing equity while eliminating emissions in California's supply of transportation fuels.
[7] Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants.

- Continue to set appropriate, but aggressive, targets for reductions of SLCPs (attaining and building on the 2030 targets).
- Assess whether existing targets are aggressive enough (given identification of new mitigation technologies) and whether progress towards those targets is adequate.
- Continue identifying additional SLCP mitigation approaches/technologies.
- When appropriate, invest in research to accelerate development of SLCP mitigation approaches/technologies, especially for challenging sectors such as agricultural methane.

California's worsening climate emergencies such as intense record-setting heat, persistent drought, and recurring wildfires further stress the urgency that California immediately deepen SLCP mitigation strategies, all the while tackling the disproportionate needs of disadvantaged communities, by promoting actions that not only work to advance towards GHG emissions targets, but that also seek to correct historical environmental injustices. These may include, for example, complimenting SCLP and fast action climate mitigation strategies with avoided warming actions and the introduction of urban canopy and/or porous surfaces, both of which serve to reduce urban heat, reduce air pollution, improve public health, and foster local socio-economic development.

Methane Super-Emitters

CARB's GHG emission inventory shows no progress on methane reduction in any sector through 2018, the latest year available. California is a founding member of Carbon Mapper, a $100 million effort to deploy a hyperspectral satellite constellation with the ability to pinpoint, quantify, and track methane and CO_2 "super-emitters". Based on a statewide airborne survey and another one in the Four Corners, and assumption of similar super-emitter distributions in other key regions around the world, this could translate to as much as 8–11% of global GHG forcing.[8] However, this effort was only mentioned obliquely at the 2022 Scoping Plan workshop, and there is no evidence that California is putting into place the infrastructure or started the regulatory process to use the anticipated 2023 launch of the first satellite as an enforcement tool for leaks in landfill methane collection systems, dairy digesters, natural gas compression stations, and other oil and gas activities. For an example of the mitigation opportunities, the California Methane Survey estimated emissions from 564 methane point sources (0.2% of 272,000 infrastructure elements surveyed) in California to be equivalent to 34% to 46% of the state's methane inventory for 2016. Successful mitigation focused on these super-emitters alone could achieve most, if not all, of the 2030 methane reduction target of 40%. A relatively small number of these sources, only 10%, contributed ~60% of the observed point source emissions and should be the focus of immediate mitigation.

Oil and Gas Methane

AB 1496 (Thurmond, 2015) required CARB to: "Consult with federal and state agencies, independent scientific experts, and any other appropriate entities to gather or acquire the necessary information for the purpose of carrying out a life-cycle greenhouse gas emission analysis of natural gas produced and imported into the state using the best available and cost-effective scientific and technical methods." And "Update relevant policies and programs to incorporate the information gathered and acquired". A major multi-institution study led by the Environmental Defense Fund (EDF) found considerable methane leakage from the U.S. oil and natural gas supply chain, ~60% higher than the U.S. EPA inventory estimates because

[8] Duren et al. (2019) California's methane super-emitters, *Nature*, 575: 180-184, doi: 10.1038/s41586-019-1720-3.

current inventory methods miss emissions that occur during abnormal operating conditions.[9] The California Methane Survey found similar high-emitting behavior in all oil and gas sectors, but it's not clear that current emission inventories account for these emissions, nor that current enforcement and mandatory GHG reporting programs have been reviewed to address the prevalence of this abnormal emissions behavior. Has CARB conducted the required life-cycle analysis, and considered the emission inventory, mandatory GHG reporting, mitigation, and enforcement implications?

The EDF-led study published in *Science* concluded that "methane emissions of this magnitude, per unit of natural gas consumed, produce radiative forcing over a 20-year time horizon comparable to the CO_2 from natural gas combustion". California's CO_2 emissions from in-State electricity generation (35 $MMTCO_2e$) using natural gas, and the industrial (15 $MMTCO_2e$), residential (24 $MMTCO_2e$), and commercial (11 $MMTCO_2e$) sectors are equivalent to 20% of California's total GHG emissions in 2018. In the same way that California bans electricity imports from coal combustion and other high-emitting sources, it should consider natural gas procurement standards or other actions to incentivize or require producers to identify and fix methane leaks. The impact on state/national policies and methane emissions could be enormous as many leaks are fixable and cost-effective, and California is already involved in satellite super-emitter surveillance activities that could provide independent third party data to help implement such a program.

Need to strengthen oil and gas methane regulations

California must update its regulations on separator and tank systems. CARB's current rules require control for any separator and tank system which has potential emissions over 10 tons of methane per year (17 C.C.R. §95668(a)(6)-(7)), unless the throughput of hydrocarbon liquids in the tank is less than 50 barrels per day (§95668(a)(2)(A)). Neither the emissions threshold for control (10 metric tons methane per year) nor the throughput exemption are in line with leading regulations.

For many years, U.S. EPA has required control for any new or modified storage tank emitting more than 6 tons of VOC per year. See 40 CFR §60.5365a(e) and §60.5365(e). Several states require control for both new and existing storage tanks, including at lower threshold's than U.S. EPA's. For example, Colorado requires control of any new or existing tank with VOC emissions over 2 tons per year (see Colorado Air Quality Control Commission Regulation No. 7 at D.I.D.3), while New Mexico has proposed very similar rules, with the same threshold, for its new and existing tanks. In developing its regulations for new and modified tanks, U.S. EPA estimated that tank emissions typically contain more than four times more VOC, by weight, than methane,[10] so standards requiring control of tanks emitting 2 to 6 tons per year of VOC are generally far more stringent than CARB's standard requiring control of only tanks emitting at least 10 tons per year of methane.

Additionally, other states and U.S. EPA do not limit the control requirement to tanks with throughput above a threshold, as CARB does.

[9] Alvarez et al. (2018) Assessment of methane emissions from the U.S. oil and gas supply chain, *Science*, 361(6398): 186-188, doi: 10.1126/science.aar7204.

[10] See for example EPA's estimates of VOC and methane emissions from storage tanks in Table 3.3 of the Regulatory Impact Analysis for NSPS Subpart OOOO (July 2011), available at https://www3.epa.gov/ttn/ecas/regdata/RIAs/oilnaturalgasfinalria.pdf. The ratio of VOC emissions to methane emissions from tanks is 4.6.

Therefore, CARB should revisit its standards for separator and tank systems, lowering the control threshold to one in line with Colorado's, and entirely removing the exemption for tanks with throughput below 50 barrels per day.

California must update its standards for pneumatic controllers. CARB standards allow operators to continue installing and operating new intermittent bleed pneumatic controllers that vent hydrocarbon gas to the atmosphere, and allow operators to continue using older continuous bleed pneumatic controllers that vent to atmosphere. While CARB's standards require some monitoring to ensure that these controllers do not emit excessively, independent research has demonstrated that this it is difficult to accurately monitor controllers for excess emissions. Many controller malfunctions leading to excess emissions were only detected with multi-day observations of controller behavior.

Moreover, even properly operating gas-drive pneumatic controllers emit significant amounts of methane – and this pollution is completely unnecessary, since there are several proven, in-use approaches to control valves and processes at oil and gas sites (including those not on the electrical grid), which entirely avoid the emissions associated with gas-driven venting controllers.

Recognizing this, several jurisdictions have regulations for pneumatic controllers in place that are more effective than CARB's at reducing emissions. Colorado prohibits the use of any emitting controller, intermittent bleed or continuous bleed, at any new or expanded site, and requires operators, over the next two years, to replace a substantial portion of venting gas-driven controllers at existing sites with non-emitting technologies. See Colorado Air Quality Control Commission Regulation No. 7 at D.III.C.4. And New Mexico has recently proposed a similar set of regulations (see proposed New Mexico Administrative Code at 20.2.50.122).

CARB should follow a similar path and prohibit the use of venting pneumatic controllers (whether intermittent- or continuous-bleed) at new and expanded sites and require operators to begin retrofitting existing sites to eliminate emissions from pneumatics.

Dairy and Livestock Methane

California research institutions – especially UC Davis – are recognized globally for the key role they are playing in testing and evaluating additives and other measures to reduce methane from enteric fermentation. In January 2021, Kebreab and Feng from UC Davis completed a CARB-contracted assessment of methane reduction tools in California's agricultural sector: Strategies To Reduce Methane Emissions From Enteric And Lagoon Sources. The authors recommend 3-NOP for use, pending FDA approval and additional study of a number of other additives.

There is some optimism that the 2030 dairy sector targets of a 40% reduction (from 2013) may be feasible. According to CARB's June 2021 draft Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target, the dairy and livestock sector is projected to achieve just over half of the annual methane emissions reductions necessary to achieve the target by 2030 through modifications to manure management systems – primarily using anaerobic digesters – and additional reductions through assumed 0.5% annual decreases in animal populations. Meeting the 2030 target will require considerably more emissions reductions from additional manure management projects, implementation of enteric mitigation strategies that are not currently approved for market use, or a combination of both over the next few years. Accordingly, CARB recommends a minimum funding amount of at least $100

million but as much as $500 million per year for five years to significantly accelerate manure management methane emissions reduction projects.

Enteric Fermentation

While acknowledging the importance of reduced emissions from enteric fermentation, CARB notes that enteric methane mitigation strategies are not yet commercially available. At the same time, they are optimistic that scientifically proven, cost-effective, safe, and consumer-accepted enteric methane mitigation strategies with long-term effectiveness and resistance to rumen adaptation ***may be*** commercially available within the next three to five years, providing critical additional tools for the sector to meet the 2030 target. This hope is included in a staff assumption toward a statewide adoption rate of a viable feed additive: approximately 14% per year starting at 2024, reaching a 100% adoption rate by the entire sector by 2030. This adoption is projected to occur without California funding, despite the acknowledgement that "availability of proven strategies is the prime barrier for enteric mitigation strategies."

The June 2021 draft analysis is spot on in describing the state of knowledge and challenges with a number of additives but does not describe mechanisms to overcome the challenges.

SB 1383 requires that only incentive-based mechanisms are authorized for enteric emissions reductions until CARB, in consultation with CDFA, determines that another mechanism is cost-effective, considering the impact on animal productivity and must be scientifically proven to reduce enteric methane emissions, and that adoption of the enteric emissions reduction method would not damage animal health, public health, or consumer acceptance. CARB staff are expected to track potential strategies to reduce enteric methane emissions, analyze their cost effectiveness, and assess the likelihood of consumer acceptance. This wait-and-see-what-emerges approach is unlikely to be the best and quickest route to Identify effective mitigation mechanisms and ensure that they are developed into commercial products available at the scale needed to substantially reduce statewide enteric methane. The approach not only threatens the ability of the dairy sector to meet 2030 targets but will make it almost impossible to achieve net zero by 2045.

Rather than simply tracking these mitigation approaches, CARB should commit additional resources, similar to the amount needed for manure management, and establish a publicly-supported program to identify methods to reduce methane from enteric fermentation that are verifiable and do not damage animal and public health or consumer acceptance. CARB and CDFA should work together on key elements of the program. At a minimum, it would cover multiple life stages and should:

- Be conducted over the full life-cycle of the animal.
- Account for any GHG implications of the intervention on a life-cycle basis, such as changes in milk/meat production, changes in emissions from manure (in storage or after field application), etc.
- Test interventions (and controls) on significant size herds.
- Ideally, studies should be funded by CARB/other governments/other third parties, rather than by firms developing potential interventions.
- Ideally, studies should be designed to be as blind (to researchers) as possible.

A California program could draw from the leadership of the New Zealand Agricultural Greenhouse Gas Research Centre. New Zealand has invested in research to reduce methane from enteric fermentation for

many years, given that ruminants are their largest source of methane emissions, and the country has set significant near-term methane reduction targets: reducing biogenic methane emissions by 24% to 47%, with no new household gas connections by 2025. And from the Department of Agriculture, Food and the Marine in Ireland and the ERA-GAS consortium in the EU, which are supporting development of novel farm-ready technologies to reduce methane emissions from pasture-based agricultural systems, including feed additive (3-NOP, seaweeds, oils, halides) impacts on animal productivity and consumer safety, improved animal health, lifetime performance/age at slaughter (to reduce lifetime methane emissions), and animal breeding (to emit less methane).

At the same time, CARB must begin exploring policy designs that will lead to widespread adoption of mitigation approaches, should they prove safe, effective, and not lead to other environmental impacts beyond their ability to reduce methane emissions. Furthermore, mitigation approaches (such as subsidies) must be carefully tailored to avoid detrimental effects such as incentivizing farms to increase herd sizes, which could result from poorly designed subsidy that creates a substantial per-head profit.

Manure Management

To meet 2045 net zero targets, there will need to be methane capture at nearly every one of California's 1400 dairy farms. This will be challenging, as anerobic digesters favor large operations. This means that attention and resources also need to be devoted to providing effective technologies on a smaller scale. The June 2021 draft Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target recommends a minimum funding amount of at least $100 million per year for five years to significantly accelerate project development by offsetting capital costs and economic risks for manure management methane emissions reduction projects. CDFA and the Senate Bill 1383 Dairy and Livestock Working Group project that as many as 200 digesters may need to be built in order to contribute to the reduction of manure methane by 40% from dairies. This requires an increase between now and 2030 of nearly 160 digesters, up from 41 currently in operation in 2021 (U.S. EPA AgSTAR Livestock Anaerobic Digester Database).

The UC Office of the President funded a $3.89 million, 6-campus study on dairy methane emissions, the first comprehensive, facility-scale inventory of methane emissions (see this overview paper). The CEC is funding a $1m study on dairy digesters with the same researchers to determine pre- and post-digestor emissions of methane and other air pollutants. These results and additional efforts should be incorporated into the June 2021 draft analysis.

CARB's goals regarding manure management must be focused on methane reductions and reducing air pollution and other impacts on local communities particularly from large dairy operations. Methane recovered from digesters is a valuable source of energy, but harnessing this energy is secondary to preventing methane emissions. So-called renewable natural gas (RNG), in which agricultural methane is upgraded for injection into existing gas pipeline systems, is just one option for utilization of agricultural methane, the other option is electricity generation (for either on-site use or with a grid connection). There simply is not sufficient methane from manure management to replace a significant portion of the fossil natural gas used in California. We do not support subsidizing infrastructure to upgrade gas from digesters and transport that gas to pipeline systems. Among other problems, such schemes are likely to be expensive and inefficient, relative to electrification, as a means to reduce consumption of fossil natural gas. Additionally, these schemes raise significant concerns about creating a market (which would seek similar subsidies) for methane from gasifiers using woody biomass as an input.

CARB's primary policy goal should be to minimize methane emissions, not on getting biomass derived methane into the pipeline system. Accordingly, CARB should work with operators of digesters to find schemes for utilizing methane from digesters for useful energy (such as providing heat or generating electricity) that are consistent with the CARB's mandate to protect and improve air quality. The policy mechanism should consider lifecycle emissions of RNG, including emissions associated with upgrading biogas and methane leakage from gas distribution system. And, the policy mechanism should consider the energy sources displaced by the utilized methane, i.e., RNG displaces fossil gas in pipelines, and the displacement by additional electricity generation depends on facility.

The California Methane Survey found four dairy digesters (of 25 surveyed) with high methane leaks of 50-500 kg/hr in 2016 and 2017. The 2022 Scoping Plan and June 2021 draft analysis should address what enforcement activities and other leak detection safeguards CARB and CDFA have in place to determine whether the diary digesters are capturing methane as intended.

As with enteric methane, CARB should also explore policy designs for digesters that efficiently reduce methane emissions without significantly subsidizing large, profitable animal operations, especially in ways that place them at a competitive advantage over smaller operations.

Half the projected 2030 reductions (26% of the target for this sector) are due to assumed herd reductions (0.5% per year). USDA reports a 2% increase in the number of milk cows in the U.S. from 2011 to 2020, and a corresponding 14% increase in milk production, which seems at odds with the assumed 0.5% annual decline in California unless the dairy cows and their associated methane emissions are being moved to another state lacking a comprehensive methane mitigation program. In the same way that CARB allows methane offsets to be generated with projects in other states because methane is a global climate pollutant, CARB and CDFA should be responsible for mitigating these emissions.

Landfill Methane

The California Methane Survey described 30 landfills and two composting facilities as some of the largest outliers in the overall methane sources surveyed in 2016 to 2018 – representing 41.3% of total point source methane detected, equivalent to 14% to 19% of the state's total methane inventory for 2016. However, the SLCP presentation from 2022 Scoping Plan Workshop does not describe this dataset and what is being done to address obvious shortcomings in the State's current landfill methane mitigation enforcement program. CARB needs to review its landfill gas regulations and local air district enforcement programs to discern why significant methane emissions were detected from landfills that should have been effectively controlling emissions under the current regulations. These regulations should be updated to ensure that this situation does not continue.

Landfill methane can be utilized as either "renewable natural gas" (RNG) or for electric generation (for either on-site use or with a grid connection). As noted in the Manure Management section above, the policy goal should be to minimize methane emissions, not on getting methane into pipeline system. The policy should consider full lifecycle emissions as well as consider the displaced energy source.

HFCs

We agree with E3's conclusion in the report titled Achieving Carbon Neutrality in California that additional efforts are necessary to mitigate HFC emissions in California. We disagree with E3's assessment that products are unavailable. Since E3 authored Section 2.4.6.1 on F-gases, the American Innovation and

Manufacturing Act phasing down HFCs was passed and was signed into law, codes and standards have been updated, and the U.S. EPA has listed as acceptable many new alternative lower-GWP refrigerants for heating, ventilation, and air conditioning. See EPA Significant New Alternatives Policy Program Rule 23, for instance. See also ClimateFriendlyCooling.com, which lists thousands of energy efficient products that use low-GWP refrigerants that are available for purchase today.

The most important strategy to reduce HFCs and other F-gases in the near-term is to prevent end-of-life emissions by spurring collection, reuse, & destruction of these super-pollutant chemicals, helping California—and the country—make significant reductions in F-gas emissions. Currently, the majority of HFCs get vented due to lack of economic incentive to recover and recycle or destroy them. Two mechanisms CARB has control over to help make this happen are the new Refrigerant Recovery, Reclamation, and Reuse (R4) Program and the Compliance Offset Protocols for the California Cap & Trade Program. CARB's recently announced R4 Program has potential to be expanded to significantly scale up HFC reclamation for use in new and existing refrigeration and air conditioning equipment, thereby reducing emissions and demand for newly produced HFCs. It should be expanded beyond the temporary requirements in the recently approved HFC regulation, to include a more comprehensive post-2025 reclamation program.

The other very important mechanism is the Compliance Offset Protocols for the California Cap & Trade Program. Adding HCFCs to the existing CFC (Ozone Depleting Substance) protocol will incentivize destruction of these substances. Fortunately, within this past year, the Compliance Offset Protocol Task Force recommended expanding the Ozone Depleting Substance Protocol to include HCFCs as eligible. This action is extremely important. Adding these chemicals to the Offset Protocol should be prioritized at the highest levels so it is quickly completed. By adding HCFCs to the CFC Compliance Offset Protocol, California can solve this enormous problem and make an extremely important, positive impact on climate protection.

An additional important action that the State could do is to make sure that HFC mitigation efforts administered by CARB —such as the F-gas Reduction Incentive Program—are funded according to the science. F-gas emissions currently make up 5% of the California's GHG emissions using the 100-year GWPs, and closer to 10% using the more appropriate 20-year GWPs that CARB uses (but E3 failed to use) when evaluating short-lived climate pollutants. Yet they have historically received less than 0.001% of the state's climate mitigation budget. As explained on page 5 of CARB's Short-Lived Climate Pollutant Strategy, "Recognizing how damaging SLCPs can be over the short term, 20-year GWPs are used to quantify emissions of SLCPs, as opposed to 100-year GWPs." If funding was allocated in proportion with F-gas contributions to the state's emissions (5% using 100-year GWPs, nearly 10% using 20-year GWPs) it would suggest that funding to reduce these super pollutants should be on the order of $50-100 million per year.

In addition to, and in alignment with the principles of the F-Gas Reduction Incentive Program, directing priority funding to smaller, independently-owned supermarkets/facilities can be targeted to achieve HFC reductions, and ancillary benefits, in the most disproportionately burdened communities. Implementing efficient, low-GWP cooling, in the residential and commercial sectors of disadvantaged communities can have significant local socio-economic benefits, including increased energy cost savings, improve grid reliability, improve air quality and public health, and provide much-needed cooling in the context of record-setting heatwaves and wildfires across the West.

CARB is close to finalizing the regulations necessary to meet the 2030 HFC target, but the workshop presentation for SLCPs did not include projections to 2045 considering the Kigali Amendment to the

Montreal Protocol. Without these projections it is not possible to fully evaluate what further needs to done.

Black Carbon

There have been clear reductions in BC (see satellite analysis for southern California), but the Scoping Plan workshop presentation for SLCPs did not include projections to 2045 considering electrification of transportation and other sectors. Without these projections it is not possible to fully evaluate what further needs to done.

As black carbon is a key component of PM2.5, with significant health impacts, it is critical that reduction strategies direct benefits to the most disproportionately burdened communities. AB 617 is a landmark bill that has allowed for innovative community emissions reductions programs, but more action is needed to improve public health and achieve avoided warming and emissions reductions goals. Accelerated and deepened SLCP strategies can play an important role, not only in working to rapidly reduce GHGs, but also advance CARB's engagement and programs with AB617 communities.

AB 617 communities living in the vicinity of ports can also be specifically targeted for fast action mitigation on SLCP reductions to leverage greater GHG emissions reductions while tackling socio-economic inequality and environmental injustice. A disproportionate number of portside communities in California have been identified as SB 535 Disadvantaged Communities, many of which rank in the 95th-100th percentiles for air pollution burden in the state.[11] While much progress has already been made thanks to stricter fuel standards, shore power requirements for ships and truck engine retrofit regulations, communities near ports and freight corridors, for example, remain relative hotspots based on satellite analyses, and exhibit higher rates of asthma and lung disease as a result. To more effectively serve the needs of these communities while achieving air quality goals, California's black carbon emission reduction strategy should specifically target and emphasize port-related emissions sources. AB 617 programs, as well as existing enforcement programs, could be leveraged to facilitate these efforts and to catalyze dialogue between communities and government and business stakeholders at the ports.

A recent CARB analysis shows 90% declines in black carbon emissions from on-road heavy-duty diesel trucks, but an increasing relative contribution from high-emitters (3% of trucks cause half of all black carbon emissions) due to diesel particle filter failures. These should be addressed through enhancements to existing enforcement programs.

Another major source of black carbon, and PM2.5, in AB 617 eligible communities is biomass power plants. Biomass power plants are exempt under Cap-and-Trade,[12] and are often a major source of black carbon emissions. For example, the AB617 inventory process in Stockton revealed that the DTE biomass power plant is the largest stationary emitter of PM2.5 in the city.[13] While these facilities are stationary facilities under the jurisdiction of regional Air Districts, CARB has the opportunity to strengthen regulations and emissions standards, and improve air quality immediately in EJ communities burdened by biogenic combustion. In the short-term, controlling particulate matter emissions from biomass facilities could clean the air and improve public health in EJ communities, advancing justice for the communities disproportionately burdened by Cap-and-Trade regulations.[14]

[11] Disadvantaged Communities Map
[12] Biomass-Derived Fuels Guidance for California's Mandatory GHG Reporting Program
[13] Stockton CERP Source Apportionment
[14] See:

Other Issues

Effectiveness of Incentive Programs

The California State Auditor concluded that "CARB has not collected or evaluated sufficient data to allow it to determine whether or how its incentive programs, which pay consumers in exchange for purchasing low- and zero-emission vehicles, reduce GHG emissions beyond what CARB's regulations already require", and "CARB has not consistently collected or analyzed data to determine whether some of its programs provide the socioeconomic benefits that CARB has identified for those programs, such as maximizing participants' economic opportunities".[15] KQED reported on February 18, 2021 that "Newsom administration officials said this week that they will evaluate the role of California's landmark cap-and-trade program as the state examines its strategies for tackling climate change over the next decade and others".[16] However, these issues were not addressed as part of the contracted modeling reports or in the CARB workshop presentations.

To promote more equal access to electric and zero-emissions truck incentive and voucher programs, CARB should promote initiatives like the Hybrid Vehicle Incentive Program and the Truck Loan Assistance Program and actively engage and assist independent owner operators in the application process. These individuals make up the vast majority of drayage truck drivers at ports in California, and due to a lack of language ability or access to grant assistance, are often at a disadvantage for receiving funding than larger trucking fleet operators who are better able to craft competitive applications. In addition to more rapidly improving the air quality in pollution-burdened portside communities, this would harmonize CARB's truck incentive programs with broader socioeconomic goals in the state and also keep small business owners compliant with changing emissions requirements.

Carbon Offsets

New research (not peer reviewed) reports that 20-38% of California's forest carbon offsets were over-credited and not achieving real climate benefits, totaling 20-39 $MMTCO_2e$ worth $280-530 million.[17] Has CARB evaluated this research and are program adjustments needed?

Aliso Canyon Climate Impacts Mitigation Program

The Aliso Canyon methane leak resulted in 109,000 MT (2.725 $MMTCO_2e$) of excess methane emission that need to be mitigated by the Southern California Gas Company. CARB recommended that the mitigation program focus primarily on reducing methane emissions from the agriculture (including dairy) and waste (landfill and wastewater) sectors. However, the last publicly available progress report (2nd quarter of 2020) indicates no progress. What is the status of meeting these reductions?

- A Preliminary Environmental Equity Assessment Of California's Cap-and-Trade Program
- Cap-and-trade? Not so great if you are black or brown

[15] California State Auditor (February 23, 2021) California Air Resources Board: Improved Program Measurement Would Help California Work More Strategically to Meet Its Climate Change Goals.

[16] KQED (February 18, 2021) California Says It Will Review Cap-and-Trade Amid Growing Criticism.

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We greatly appreciate the opportunity to comment on this important proposal and thank CARB for its leadership on these key climate and public health issues.

Respectfully submitted,

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