To: California Air Resources Board

From: Californians for a Sustainable Climate

Date: October 30, 2015

Re: Draft Short-Lived Climate Pollutant Reduction Strategy document (September 2015)

**Dear California Air Resources Board,**

On behalf of Californians for a Sustainable Climate, we’d like to thank the California Air Resources Board (ARB) for this opportunity to submit comments in response to the Draft Short-Lived Climate Pollutant Reduction Strategy document (September 2015). Our comments reflect our reading of the source materials cited, including the IPCC reports, UNEP/WMO reports, and additional selected studies on SLCPs.

**I. Commendations**

First, we would like to congratulate the ARB for drafting this very important and visionary strategy document. Scientific findings of the past decade have made it abundantly clear that we cannot prevent the Earth from crossing the +2°C threshold without addressing the threat posed by short-lived climate pollutants (SLCPs) along with the longer-lived greenhouse gases (GHGs).

As you have pointed out in great detail, the state of California has both the opportunity and the obligation to set an example that can be replicated, through a combination of regulations and deployment of a variety of off-the-shelf and emerging technologies. California’s position as one of the world’s largest economies, its leadership within the Under 2 MOU subnational group, and its continuing commitment to technology innovation and environmental stewardship make our state an ideal proving ground for these critical next steps.

**II. Concerns and Recommendations**

***Big Picture***

In setting its goals and establishing its strategy, ARB is clearly attempting to weigh the art of the possible (the *realpolitik*) against the urgency of impending climate temperature tipping points. Its focus on the +2°C threshold is consistent with the internationally recognized target agreed upon during the COP 2009 talks in Copenhagen. We would argue, however, that the urgency side of this equation is even greater than has been fully acknowledged, and that as a result, the timeframe for effective action is even shorter than most people recognize.

The problem is straightforward: as we increase global radiative forcing, global mean temperatures will continue to rise. There is a direct relationship between global radiative forcing and temperature rise. The world has already reached a level of +2.3 watts per square meter (W/m2). If we were able to hold global radiative forcing at this level, global mean temperature would level off somewhere above +1.5°C (likely in the range of +1.7 to 1.8°C). However, the sad truth is that global radiative forcing is continuing to rise, and is projected to reach +2.6 W/m2 *within 10 years*, which will push the Earth’s temperature to +2°C by or before 2050. And by 2035, if radiative forcing continues its rise at its current rate, global temperatures will reach catastrophic levels of +4°C and more by or before 2100, a temperature not seen in millions of years nor ever experienced by humans.

This important cause-effect connection between radiative forcing and temperature, and the lag time between the two, eludes most planners, who are focused on the temperature alone. The upshot is that *we need to act much more aggressively, much more quickly*, *than the timeframes suggested within the current ARB Draft Strategy, if California is to play an effective role in holding the planet below dangerous temperature thresholds.* This urgency suggests that we need to expand the range of strategies that could be deployed, not only within California, but also well beyond our state borders, to identify options that could be implemented at a scale sufficient to cap this rise in radiative forcing.

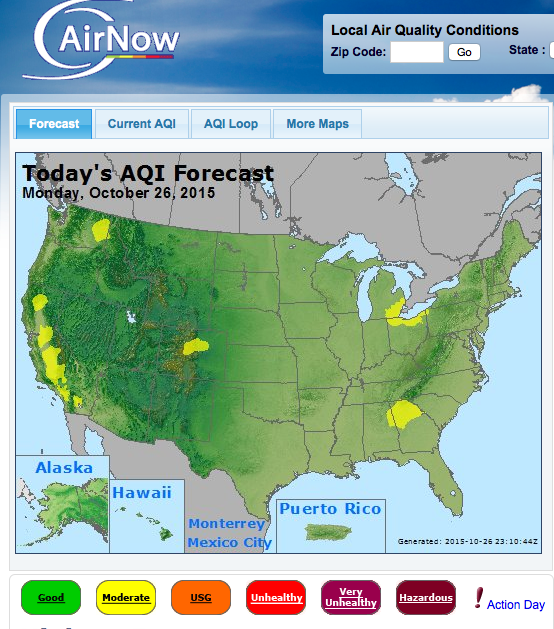
Finally, it is noteworthy that many countries, especially small island states and others with low-lying land subject to near-term inundation from sea level rise, have argued that +1.5°C rather than +2.0°C should be our maximum temperature target. The Earth has not been this hot (+1.5°C) for 10,000 years; at this temperature, significant environmental disruption and economic and social dislocation will be well underway. Moreover, given feedback loops set into motion in regions such as the Arctic (e.g., methane releases from thawing permafrost and dissolving of clathrate deposits trapped in shallow seabeds), it may well be impossible by the time we cross +1.5°C to prevent the Earth from heating up to +2.0°C and beyond.

**Recommendation:** California ARB should undertake a Radiative Forcing analysis of each of its SLCP and GHG emissions reduction/mitigation strategies to determine which strategies can be deployed at the scale and within the timeframe needed to head of forcing levels of +2.6 W/m2 and greater within the next 10 years and beyond. In addition, California should take a further leadership stand by considering strategies sufficiently scaled to help stabilize global mean temperature below +1.5°C.

***Specifics***

**1.** Although we appreciate ARB’s rationale for choosing the AR4 GWP-20 value for methane (i.e., p. 23-4, consistency with UNFCCC reporting requirements), California should nonetheless adopt a leadership position by utilizing the much more up-to-date, scientifically supported AR5 GWP-20 value. This is essential to properly incentivize industries to mitigate this dangerous greenhouse gas while simultaneously capturing it for beneficial uses. For UNFCCC reporting purposes, the state can easily recalculate methane emissions and mitigation using AR4 values.

**Recommendation:** Use the AR5 GWP-20 value of 84 for methane, assuming that ARB decides to break out tropospheric ozone separately (see next item for discussion). Otherwise, use the value of 104 for methane (GWP-10), which is sufficient to encompass methane’s direct impacts as well as its indirect effects from the formation of tropospheric ozone and destruction of negative climate forcers (i.e., climate coolants – see more below).

**** 2.** ARB’s discussion of tropospheric ozone (TO) formation within the discussion of methane (pp. 24-25) is a good start, but doesn’t go nearly far enough. Note that even though TO resides in the atmosphere for just a few weeks (lifetime about 22 days[[1]](#footnote-1)), its annualized potency is more than 1,000-times that of carbon dioxide.

As reflected in this snapshot figure, California’s TO concentrations are among the worst in the US (<http://www.airnow.gov/>). TO is associated not only with a host of human health problems (as described by ARB), but is also contributing to regional ambient air temperature increases, especially over the Central Valley and LA basin. (For instance, OMNI satellite data have shown static air columns from TO build-up to reach 2.5 W/m2.) Hotter temperatures, in turn, impact agricultural production, and increase the installation and use of air conditioning in commercial, industrial and residential applications, along with the greenhouse gas (GHG) emissions associated with this increased electricity demand. As such, it is not enough to focus on the rise in global TO levels due to methane alone.

**Recommendation:** The TO formed in California attributable to carbon monoxide, volatile organics, and nitrogen oxides must also be accounted for if California is to effectively incentivize mitigation of this dangerous SLCP. And as ARB has noted with black carbon mitigation, there are enormous co-benefits, in terms of economics and human health, associated with reduced emissions of TO precursors. The avoided emissions of CO2 that can be attained by preventing the need for extra air conditioning and cooling could also be substantial relative to other CO2 mitigation strategies.

**3.** A major omission of the ARB Draft Strategy is the failure to account for short-lived emissions that have a net climate cooling effect (i.e., negative climate forcers). Sulfate aerosols in particular have had a marked, though unintended, cooling effect on the planet, preventing global climate temperatures from rising even faster. As clean air regulations are implemented to eliminate these criteria pollutants, temperatures will correspondingly increase. From an accurate accounting standpoint, it is *essential* that ARB track changes on this side of the climate balance sheet in order to have a clearer understanding of the total SLCP and long-lived GHG mitigation effort needed to achieve the goal of preventing the planet from crossing the dangerous +2°C tipping point.

**Recommendation:** ARB should include an accounting of negative climate forcers, or “climate coolants,” in its calculations, and GHG/SLCP emission reduction targets should be modified to balance out any projected loss of coolants.

**4.** While ARB is used to focusing on California’s annual emissions climate footprint, a more accurate portrayal and understanding of our states’ true climate impact (and opportunities to reduce this impact) would take into account the *cumulative radiative forcing* of methane emissions over their approximate 12-year atmospheric lifetime, not to mention the cumulative forcing associated with the long-lived GHGs over time. In other words, the actual 2015 climate footprint comprises not only all of the emissions this year and their effects, but also that portion of all emissions from previous years that is still in the atmosphere and still contributing to climate change.

**Recommendation:** ARB shouldrecalculate California’s carbon footprint to take into account all SCLPs (including regional TO formation), all negative climate forcers, and effects from past emissions and releases. Among the many sources of such emissions and releases, the state should also include carbon dioxide formerly sequestered in forests and agricultural lands that is still in the atmosphere contributing to climate change. (Additionally, from a long-term CO2 mitigation standpoint, the state should consider incentivizing the forest product industry now to increase harvest rotation timetables to allow trees to grow larger, protecting habitats while sequestering more carbon. The state should also continue to review alternative, drought tolerant fiber options as another avenue for protecting forests, and double down on its efforts to support agricultural practices that increase carbon sequestration.)

**5.** ARB has stated that it can “match the goals of the Obama Administrations to reduce methane emissions from oil and gas by 40-45% by 2025” (p. 57). However, since oil and gas production in California is on the rise, this could still translate into more emissions overall over time, depending on the rate of growth of the industry and the phase-in period and success of methane capture efforts.

**Recommendation:** ARB should set caps on emissions from the oil and gas industry.

**6.** In the discussion of dairy cattle, ARB points out the importance of considering lifecycle emissions (p. 61). In addition to the example provided here, we would raise the point that the lifecycle of every hamburger consumed in California includes the enteric fermentation emissions associated with beef cattle, regardless of whether that beef is raised in California or not. Or from a larger perspective, our consumption of any product in California may have global climate consequences from production beyond the state borders. ARB has already set similar precedents of this nature. For example, through the Airborne Toxic Control Measure (ATCM 93120), ARB holds producers selling hardwood plywood, particleboard, and medium density fiberboard (MDF) products into California accountable for their formaldehyde emissions. In addition, ARB’s existing Low Carbon Fuel Standard includes “well-to-wheels” lifecycle emissions.

**Recommendation:** ARB should consider broadening its strategies to include regulations related to products manufactured out of state but sold in-state, to help ensure that California is not tacitly endorsing high-GWP emissions. This calculation should include, for instance, the climate impacts of fugitive methane emissions from imported natural gas from those states that have less strict controls on such emissions from wells and landfills.

**7.** Finally, while ARB has described many important mitigation initiatives, and presented many new promising options, we believe that much more emphasis should be placed on the process of prioritization to ensure that taxpayer dollars can achieve the greatest climate bang for the buck.

**Recommendation:** Each strategy should be reviewed not simply in terms of its percentage of reduced climate emission(s) relative to a given baseline year (whether that year is 1990, 2005, 2013, etc.), but in terms of the actual radiative forcing reduction achieved. Such an approach would be far more consistent with the Representative Concentration Pathway (RCP) scenario approach presented in the IPCC Fifth Assessment (AR5) report. This approach would also avoid the pitfalls and large built-in uncertainties that climate scientists have identified when attempting to use GWPs to aggregate all gases, particulates, and aerosols under a common carbon dioxide equivalency.

**III. Summary**

The Draft Strategy document’s opening statement makes it clear that the California Air Resources Board (ARB) understands the existential nature of this crisis:

*It is clear that the impacts of climate change are already upon us. California continues to suffer through historic temperatures, drought, and wildfires, and the State faces the prospect of an epochal El Niño season in the coming winter. Each year seems to bring a new global temperature record, and new evidence suggests sea levels are rising much faster than predicted. What was once, and remains, a generational problem of CO2 balance in the atmosphere has now become an immediate threat to our California lifestyle.*

We agree that time is of the essence, and that our actions and choices over the next few years will determine whether the Earth crosses dangerous climate tipping points. That said, the time left to take meaningful action is even shorter than widely understood, and as a result, the range of options available to tackle this challenge sufficient to stabilize climate change below dangerous temperature thresholds is narrowing rapidly.

As Californians, we have always led the nation and the world with innovative answers to difficult challenges, and we have the ability to meet this challenge as well, given sufficient understanding of the urgency of the problem, the scale of solutions needed, and the timeframe required for action. We wish to encourage the ARB in its efforts to continue refining its SLCP and larger AB 32 implementation strategy moving forward, and have offered these comments and recommendations to reinforce the urgency of the situation in California and globally, and to suggest specific steps forward.

We welcome an opportunity to stay closely engaged in this process as it moves forward.

**IV. Signing on behalf of Californians for a Sustainable Climate**

Californians for a Sustainable Climate is an alliance of engaged California citizens deeply concerned about climate change. We come from many walks of life, and are all active in our local communities on environmental issues. We are seeking to encourage our government representatives and agencies to identify and adopt the most successful, cost-effective strategies to combat the climate crisis, based on the most up-to-date science, with solutions scaled sufficiently to achieve results in the time required. Please note that while some memberships and affiliations are listed, we do not speak for any of these individual organizations.

*Bayard Fox, Environmental Defense Fund member, Sierra Club member, Greenpeace member, Nature Conservancy member, Public Citizen member*

*Bill Dyer, Napa Land Trust member, Sierra Club member*

*Chris Benz, Napa Land Trust hike leader and member, Sierra Club member*

*Darlene Scott, Pacific Crest Trail Association member*

*David Mahaffey, Doctors Without Borders member*

*Diane Dulmage, Acterra member*

*Eric Murray, Sierra Club member*

*Jim Stewart, Earth Day Los Angeles Organizing Director*

*Linda Brown, Defenders of Wildlife member, Nature Conservancy member, Napa Land Trust member, Sierra Club life member*

*Marc Pandone, Sierra Club member, Napa County Watershed Information Center and Conservancy board member, Professor at Solana Community College*

*Malcolm Dean, Member of US Sub TAG to ISO TC 207/SC 5 (life cycle assessment), president of San Francisco Hunyuan Tai Chi Academy*

*Margret Smetana, Napa Can Do*

*Nancy Tamarisk, Sierra Club member*

*Phill Blake, Napa Land Trust member, Sierra Club member*

*Roger Hartwell, Advisory Board of Friends of the Napa River, former biologist for East Bay Municipal Utility District*

*Sharon Parham, Democrats of Napa Valley*

1. Lifetime is defined as the “e-folding time”, the time in which the original concentration drops to 1/e or about 37 per cent of the initial concentration. [↑](#footnote-ref-1)