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ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

September 9, 2020

Ms. Rajinder Sahota
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Ms. Sahota,

Thank you for the opportunity to provide comments on the draft report to the California Air Resources Board from E3, "Achieving Carbon Neutrality in California." Below are comments specific to this draft report, followed by overarching comments on CARB's approach to achieving carbon neutrality (net-zero emissions) by 2045.

EDF commends California for moving toward a 100% clean future on a timeline consistent with the best science and recommendations from the Intergovernmental Panel on Climate Change. To avoid the worst impacts of climate change, we must achieve net-zero carbon emissions by mid-century at the latest. Setting binding targets is an essential step, as well as ensuring that California's regulations, including a declining limit on greenhouse gas emissions, provide the greatest level of certainty that the economy will in fact emit less carbon than is removed from the atmosphere by 2045. This is where California's leadership is more important than ever: to pioneer the policy pathway that guarantees net-zero emissions in a way that both encourages economic growth and ensures environmental justice.

Strategies for direct emission reductions

As the focus of the draft E3 report is on energy and non-combustion GHG mitigation, EDF is providing comments on specific sectors and strategies considered in the draft report.

Buildings

EDF appreciates CARB's recognition that the state needs to find new ways to aggressively decarbonize buildings. Buildings are one of the largest remaining sources of greenhouse gas emissions and more needs to be done to reduce these emissions. Depending on ownership model and building stock type, different technologies and economic considerations should be taken into account.

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EDF encourages CARB to consider dividing buildings into the following categories, and consider the different policy tools needed for each of the bullets below:

- New construction vs. existing buildings.
- Residential vs. Non-Residential buildings
    - For Non-Residential buildings, prioritize heating equipment (HVAC, water, etc.) and find other things for commercial/industrial processes
    - For Residential buildings, consider the building type:
        - single-family
        - multi-family (low rise)
        - multi-family (high rise)
    - For Residential buildings, consider ownership model
        - Owner-occupied, with occupants having high-to-moderate income
        - Owner-occupied, with occupants having low-income (and receiving utility bill assistance) or located in a disadvantaged community
        - Renter, high-to-moderate income
        - Renter, low-income or located in disadvantaged community
        - Property is in a deed-restricted building (including but not limited to Section 8 housing)
- Has the building received a recent energy efficiency upgrade where the equipment has not yet reached the expected useful life? (I.e. would California be wasting ratepayer money by pre-maturely switching heating related equipment?)

Because renters will likely be unwilling to invest in over-improving a landlord's property, CARB may want to consider non-electrification strategies to decarbonize a building as a near term strategy until the equipment could be switched over to full electrification.

Appliance and building standards for heating and cooking should be determined by the California Energy Commission through Title 20/Title 24 standards. In the "Balanced" scenario, the shorter-term timeframe will mean that there will need to be more assistance to get a home ready to be all-electric, with particular support for low-income customers and those located in disadvantaged communities. While some of the resources for this investment will likely continue to come from ratepayers, CARB should identify other sources of public support to truly meet the level of investment required. CARB may want to utilize different financing mechanisms for the different building stock/occupant profiles identified above to create the most amount of leverage possible.

One final point to note related to the buildings sector is that the "Zero Carbon Energy" scenario assumes that the gas distribution grid will be fully retired by 2045. EDF does not see this as a realistic assumption without major stranded assets.[1] The California Public Utilities Commission has a long term planning docket[2] open to address this topic, and CARB should consider how to

[1] See EDF's Managing the Transition paper available at www.edf.org/strandedassets for ways to manage the stranded asset risk.
[2] Rulemaking 20-01-007

manage the transition to ensure there are not unintentional impacts to low income customers who may not be able to afford to be early adopters.

Electricity

SB 100 requires that 100% of California's electricity be zero-carbon by 2045, and this should be the basis for assumptions regarding the electricity sector in the draft report. Specifically, the "High CDR" scenario appears to violate SB 100's 100% carbon neutral mandate, and this should not be used as an assumption. For the "Balanced" and "Zero Carbon Energy" scenarios, CARB should not feel compelled to assume 5% firm, dispatchable generation as that will be determined by the Energy Commission and CPUC's Integrated Resource Plan. EDF has done extensive internal modelling, publication of which is forthcoming, and believes that there are lots of potential ways to get to a carbon neutral electric grid. The level of firm, dispatchable generation will be thoroughly discussed and challenged in the Integrated Resource Plans, and for the purposes of this study CARB should not presuppose a specific level of firm dispatchable generation. Instead, the focus should remain on achieving a zero-emission grid, and ensure that there is a minimum of 60% renewable portfolio standard and the other 40% is zero emission electricity.

EDF does encourage CARB to think beyond technology that is currently commercially available to achieve greater emission reductions. These options may include, but are not limited to long duration seasonal storage, carbon dioxide removal, expanded use of geothermal, importing out of state nuclear, or zero-emission fuels in conventional turbines.

Transportation

EDF commends CARB for its recent adoption of the Advanced Clean Truck rule. This is a significant step forward in reducing greenhouse gas emissions and conventional pollutants from medium and heavy-duty trucks. CARB should ensure that the medium and heavy duty zero-emission vehicle sales targets in the draft E3 report align with the newly adopted ACT rule. Specifically, the "High CDR" scenario only assumes 45% HD ZEV sales by 2035, which does not appear to align with CARB's existing commitment to achieve 100% HD ZEV sales by 2045. Under any scenario, it is essential that CARB pursue electrification of heavy-duty vehicles as quickly as possible, and provide the necessary support for independent truckers to make this transition.

Air quality and environmental equity

The draft E3 report has laid out several deep decarbonization scenarios and considered a host of strategies under each, effectively illustrating what it will take for California to achieve carbon neutrality. But it falls short in considering a robust analysis of the air quality and broader equity implications of each scenario beyond assuming that overall air quality will improve under all of the scenarios. Air quality and equity considerations are listed as areas for further study, but EDF recommends that this analysis be conducted and included in the final E3 report.

In draft form, the report relies on various assumptions about air quality and health impacts specifically, and these assumptions should clearly outlined, and tested to further inform the various scenarios. For instance, the "High CDR" scenario is believed to have the highest risk for air quality and human health and the "Zero Carbon Energy" scenario the lowest risk. It would be useful to understand the data and analysis that informs those conclusions.

Additionally, air quality is not the only facet of equity that needs to be considered in the context of deep decarbonization scenarios. Energy affordability, access to energy and household energy security, ability to upgrade home energy sources, and siting of new facilities or technologies are all also equity issues that should be evaluated. Improving air quality and addressing environmental equity are essential to a just carbon neutrality strategy and should be a centerpiece of CARB's analysis – they are fundamental to determining the path forward to achieve California's climate goals.

Thank you for your consideration of these comments. EDF is happy to discuss these further and looks forward to continued engagement in planning for securing a net-zero emissions future in California.

Role of carbon dioxide removal

While carbon dioxide removal is not the focus of the draft E3 report, one of the key questions raised in it is how to consider the tradeoffs between achieving additional energy-sector greenhouse gas reductions, versus relying on carbon dioxide removal. Indeed, this balance is critical in successfully, equitably, and economically achieving carbon neutrality on the timeline science demands.

To achieve economy-wide carbon neutrality by 2045, California needs to sharply reduce greenhouse gas emissions from all sectors. Such reductions should be pursued rapidly. But it is also clear that some emissions reductions will be extremely difficult to achieve, such as from agriculture. It is also possible that reductions from certain, limited industrial processes would be extraordinarily expensive. As such, additional measures that are capable of removing carbon dioxide from the atmosphere can play a valuable role in securing the net reductions necessary as quickly as possible. California has significant opportunities for nature-based solutions to achieve some of this carbon dioxide removal, but will also need to explore emerging negative emission technologies. Part of the consideration of negative emission technologies should also include an analysis of any supply chain constraints, including whether or not by building more renewable energy to power this technology it is limiting the ability to build additional grid-connected renewables, which would be preferable. Both nature-based and technology-based strategies will require careful and deliberate consideration of environmental integrity, and impacts on local communities, water resources, and ecosystems.

To be clear, carbon dioxide removal is not a substitute for direct emission reductions. Rather, this approach should be utilized to account for the last tranche of emissions that may prove exceedingly expensive to abate—at least on the timeline necessary. The draft E3 report study does not address specific strategies to remove carbon dioxide from the atmosphere, but does

consider different levels of carbon dioxide removal as part of each decarbonization scenario. Scenarios that emphasize greater direct emission reductions, such as the “Balanced” and “Zero Carbon Energy” scenarios, are more akin to this approach of reducing emissions first and then using carbon dioxide removal strategies.

Sincerely,

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