Thank you for this opportunity to comment on the draft of the California Air Resources Board 2022 Scoping Plan Update. Much that is in this document is stated in vague and nebulous terms. It would allow the public better insight to state more particulars without necessarily getting too technical or jargon filled.

My greatest criticism is of the target being set at Net Carbon Neutrality. The reality of the increased carbon dioxide and other greenhouse gases in our atmosphere has been readily evident in this past week's news. There's a massive wildfire in New Mexico, flooding in Montana, a continuing heat wave in the Southeast of the United States, above average rainfall and flooding in Bangladesh and a continuing litany of high temperature records being broken. We cannot meekly accept the current situation and carbon dioxide levels as the norm. The target for addressing anthropogenic climate change must be to return the atmosphere to safer, lower levels of carbon dioxide concentrations which demands targeting the goal of becoming carbon negative.

Another criticism is a seeming reliance on technologies that will not help in reducing carbon dioxide emissions. A 2019 study of a Carbon Capture plant and a Direct Air Capture plant showed:

> A net of only 10.8% of the Carbon Capture plant's CO2-equivalent (CO2e) emissions and 10.5% of the CO2 removed from the air by the Direct Air Capture plant are captured over 20 years, and only 20–31%, are captured over 100 years.
>
> Using wind to power the equipment reduces CO2e relative to using natural gas but still allows air pollution emissions to continue and increases the total social cost relative to no carbon capture.
>
> Spending on capture rather than wind replacing either fossil fuels or bioenergy always increases total social cost substantially.
>
> Once fossil fuel emissions end, Carbon Capture and Direct Air Capture social costs need to be evaluated against the social costs of natural reforestation and reducing nonenergy halogen, nitrous oxide, methane, and biomass burning emissions.
>
> M. Z. Jacobson, Energy Environ. Sci., 2019, DOI: 10.1039/C9EE02709B.

Instead of using renewable energy to power carbon capture schemes, and especially if fossil fuel energy is being used, the non-emitting energy sources would be better used replacing and retiring polluting, carbon dioxide emitting power plants thus reducing emissions at the source.

Current Forestry Best Management Practices (BMP) dictates a 50 year or less harvest cycle. The amount of carbon sequestered by this practice is far below the amount of carbon sequestration possible when compared to 80 year or longer harvest cycles. CalFire oversees

forestry on private lands and publicly owned forest land and could contribute to the effort of reducing carbon dioxide emissions by changing its recommendations for the length of harvest cycle. A 2018 study on Land use strategies to mitigate climate change found logging was the largest source of carbon emissions accounting for 35% of total emissions. California likely has a similar large amount of carbon emissions being produced by logging as well. The study found:

> Reforestation, afforestation, lengthened harvest cycles on private lands, and restricting harvest on public lands increase net ecosystem carbon balance 56% by 2100, with ***the latter two actions contributing the most***. (emphasis added)
>
> Cobenefits include increased water availability and biodiversity of forest species.
>
> Law, Beverly & Hudiburg, Tara & Berner, Logan & Kent, Jeffrey & Buotte, Polly & Harmon, Mark. (2018). Land use strategies to mitigate climate change in carbon dense temperate forests. Proceedings of the National Academy of Sciences. 115. 201720064. 10.1073/pnas.1720064115.

With California suffering a megadrought which is being compared to a past megadrought that lasted over 200 years, the cobenefit of increased water availability would be very welcome.

The window of time available to avert a greater climate catastrophe is very short and the more rapidly California responds to this threat the better the future will be. Much heat is already captured in the oceans which will remain for millennia. With more numerous and more destructive hurricanes forecast, choosing earlier target dates for avoiding even more heat capture in the oceans will only benefit our civilization. All possible means of reducing carbon emissions must be pursued and implemented. Now is not the time to dawdle.

Frank Toriello