

Dear Chairperson Liane Randolph:

Thank you for the opportunity to comment on additional Scoping Plan alternatives for 2022.

In general the extent of the consequences of climate change that we are experiencing already makes it clear that we have to accelerate change in every sector. So I believe the Carbon Neutral by 2035 is worth setting as our goal. That is 14 years from now. It is difficult to imagine the severity of climate change in 14 years. And even if we achieve carbon neutrality by then things will get worse for 25 to 30 years. We don't really have a choice do we?

Specifically, on phasing out oil and gas extraction we need to set a limit. The sooner the better, so 2035 if not earlier. The IEA has said that there is already more than enough oil and gas and coal under production to take us past the 1.5C threshold. CCS will be necessary but it should not offset or permit the continuation of refineries.

The same reasoning applies to electricity generation. We need to be all renewables by 2030 so that the changes to electrify transportation and housing will actually move us toward our goal.

In residential housing, appliance in existing buildings should be all electric when new by 2030 and all electric by retrofit except in a relatively few big ticket items where it makes more sense to replace with electric at end of life.

On cement and steel I don't think the options provided are sufficient. We may need to use carbon capture and sequestration, but I believe that technological changes in production will obviate most of this need.

Low carbon fuels should not exist after 2035. Biomass is not carbon neutral in the short term and probably will not be in the long run. In addition, biomass waste should be used for alternatives that sequester carbon rather than combusting it.

In a similar way, only electrolytic hydrogen made from solar or wind should be used in creating hydrogen. This is an area of great research activity and should be encouraged by CA. Other forms of hydrogen generation should not be supported in any way by the state as ultimately those sources of hydrogen (e.g., hydrogen created from biomass) will be producing greenhouse gas emissions.

For non-combustion methane production, Option B is necessary. Ultimately the number of cattle in the world must be reduced drastically, especially CAFOs. But in the meantime there is no realistic alternative to digesters for all large farms and large landfills. A large increase in funding for AMMP is also required.

HFC options are not appropriate. By 2025-2027 there will be options available for refrigeration, air conditioning, and refrigerated transportation with GWP of 15 or less. These should be required on a time table that gives manufacturers a change to provide options to the market. The biggest problem is the existing bank of HFCs. Especially for supermarkets the state will need to massively increase incentives in order to have the stores with GWP of 1450 to 4000 switch to natural refrigerants. These stores are too low margin to pay for the change themselves and since systems are almost never replaced in entirety (just piecemeal as components burn out), we will get nowhere if we wait for "end of life" replacement. This is one area where CARB should increase ambition quite radically, including setting a goal of reducing HFCs from the 2013 level by 85% in 2030 and 95% by 2035.

Carbon removal from the aid does not seem to be a technology that CA can set realistic goals for at this point in time.

Respectfully,
Daniel Chandler, Ph.D.