October 20, 2021
To: California Air Resources Board
From: Muriel Strand, P.E.
Re: 2022 Scoping Plan Update - Scenario Inputs Technical Workshop September 30, 2021

Reflection on the 4 existing alternatives leads me to conclude that an additional alternative should be attempted, to complement the one selected from the current 4 alternatives.

The 4 alternatives described during the workshop are based on statutory prescriptions for outcomes in terms of emissions reductions and various major types of existing sources. These prescriptions are based on changes in the magnitude but not the basic structure of our current material culture.

Taking our current fossil fuel infrastructure and processes as the 'initial condition' of the 4 draft alternatives described, future modeling of the selected alternative would be relatively straight-forward though I am sure quite complex. However, our current system is already not working for many thousands of poor and homeless, and shows few signs of working better for them any time soon.

The additional alternative that would be very informative for policy-makers and citizens alike is a model that backcasts from our desired final condition. Further, the specified 'final condition' would be based on the independent variables of our real economic priorities. 'We can't solve our problem with the same mindset that created it.' I have attempted to outline our real economic priorities here: https://www.researchgate.net/publication/333581837_Is_it_true_that_'Small_Is_Beautiful' and I'm sure the information needed to put flesh on that skeletal outline is available now.

Almost all climate policy attention has been focused on BAU-lite, replacing fossil energy sources with partially renewable sources. But **design step #1 is missing:**

What is our goal?
What have we been using the fossil energy for?
What is the most adroit way to meet our needs in the absence of plastic, engines, motors, and other devices which have appeared only in the last few centuries?
What are the essential tasks and jobs for a sustainable society?

Fundamental change in basic infrastructure design is the most effective and least painful way to create the required magnitude of avoided GHG emissions; bandaids won't work when surgery is needed. Citizens need a realistic, complete and affordable vision of where we want to end up, with a believable path thereto, in order to convince them to change.

Disaggregating major components of retail energy prices—bulk energy, staff costs, and equipment maintenance—within the models' calculations can help by analyzing physical energy costs separately from human work. **The historically unprecedented ratio between fuel energy prices and human energy prices must be included in model analysis in order to recalibrate our systems for efficient use of human energy**, where efficiency's output is – basic human physical needs.

All models' input, calculations and output should account prices in embedded kwhr and GHGs as well as dollars. California's portion of the $650 billion/year* in US fossil fuel subsidies should be included in the models, as that amount is significant to the scale of the market.

As well, **the sustainable discount rate that should be used in the models is zero.** On a societal and global level, the future is as valuable as the past. Thus, fossil fuels should not be seen as stranded assets, but rather as assets that will be safe and thus usable again in several centuries, perhaps half a millennium.

I recommend excluding nuclear power, both fission and fusion, and carbon capture & storage from the final scenario/s. These all require high energy, high power inputs. Depending on pie in the sky is not a conservative engineering policy.

Thank you for the opportunity to comment.

* Can Nuclear Fusion Put the Brakes on Climate Change? New Yorker, Oct. 11, 2021, p.24
https://www.newyorker.com/magazine/2021/10/11/can-nuclear-fusion-put-the-brakes-on-climate-change