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Clean Transportation Program Feedback (Monahan Letter)

Commissioner Monahan has asked for comment on her letter of August 1, 2019 about Clean Transportation Program proprieties. She mentions the state's overall goal of reaching carbon neutrality by 2045, and the program's complementary goals of:

1. Promoting economic development
2. Increasing alternative fuel use, and
3. Reducing petroleum dependence.

1 Overall Approach: Focus on Zero Emission Transportation

She proposes altering the previous version of the 2019 CTP Investment Plan by increasing allocations to electric vehicle infrastructure and hydrogen vehicle infrastructure, and reducing investments in alternative liquid fuels from those previously discussed and incorporated into the plan. Commissioner Monahan asks if this set of changes to the previous plan is the best use of CTP funds this year.

I support the general goal of increasing EV adoption, but my answer is no, for two broad sets of reasons.

The **first** has to do with sound process. The previous investment plan was subject to broad public discussion and (prudently) had taken into account the most recent history of investment in different technologies and pathways, which had heavily emphasized EV and hydrogen pathways, especially infrastructure. In my view the previous allocations in the February investment plan represented sound policy and good public process.

Changes to the investment plan at this relatively late date and with this altered set of allocations undermines previous efforts by staff and also by advisory committee members over two different meetings where investment plan modifications had been extensively discussed. It fails to account for focused allocations in previous years on EV and hydrogen pathways, at the expense of investment in a broader set of alternatives, continues that unbalanced emphasis, and invalidates previous advisory committee input, discussion and apparent board agreement. It creates policy instability. As such, it is poor public process. Better would have been to address the need for different allocations in the next investment plan, and a more transparent process.

The **second** reason is that the CTP is not the best state program to focus primarily on infrastructure investment for favored technologies and it should not reflect technology bias. The CTP's greatest value has been its largely unique role in the energy policy realm as an investor in innovation across a broad spectrum of alternative fuel and transportation pathways. Until recent years, it has been largely neutral in its allocations. This has been wise policy.

Continued overemphasis on electrification and hydrogen pathways is a form of rigidity. Rigidity leads to a loss of resilience. An important example of overly rigid thinking in the transportation sector is the long-term focus within the European Union on vehicle fuel economy as the primary goal of transportation policy. Vehicle fuel economy is now and was then an unarguable good, but the unforeseen result in the EU of this nearly exclusive concern was the creation of an efficient LDV diesel fleet as the dominant form of LDV transportation. Car industries, supporting industries, and countless related businesses became committed to this pathway. When the adverse pollution and GHG effects of this emphasis were identified, the costs of altering policy and the inertia of changing large-scale, vital

industries and infrastructure only then became apparent and are much more significant as a result. The problem was not diesel technology per se, but the resulting policy-driven overemphasis on one primary solution to transportation needs. In contrast, the US has had an easier pathway to reducing GHG emissions from transportation fuels to date, and greater relative success, because of its reliance on both ethanol and alternative diesel fuels, which support a number of pathways and alternatives. For diesel alternatives especially, the lower proportional demand for diesel fuels in the US has allowed for supplies of alternative fuels to make a much larger proportional contribution to emissions reductions as a result, compared to the EU, without the EU's greater dependence on palm oils as feedstocks.

All technologies have some downsides, even if not immediately apparent, as implementation problems develop and scale expands. These include resource constraints, or new insights that arise and lead to new problem boundary conditions and judgements about optimality. This will be no less the case with electrification and hydrogen use if overly emphasized in policy in California. Unintended effects always occur, which either are not obvious, are discounted or ignored early in policy implementation. That is why a policy of neutrality in investment is always wisest.

Why biomass?

There are many other reasons not to discount biomass based technologies. One is that prudent biomass use can have many essential benefits for the environment and public welfare. Having an energy, and especially a fuel market to help pay for multiple public goods derived from improved landscape management associated with biomass production and use is essential for the development of those uses. It is essential for reducing the costs of better managing landscapes in the future in response to climate change. The most obvious example is the use of forest and other woody biomass for fuels and power. California faces near term catastrophic losses of forest biomass and associated ecosystem benefits. California's forests are becoming net sources of emissions compared to net sinks. Terrestrial carbon sequestration in forests is an important worldwide strategy to reducing global carbon emissions. It was prominent in the recent Paris Climate Agreement and makes up a large portion of nationally defined commitments for most nations. California has affirmed its intention to remain committed to the Paris Agreement but is a distinctive outlier in this regard.

The consequences to public health of catastrophic wildfires and particulate emissions are well known. These serious public health effects are concentrated among the residents of the Central Valley, where many disadvantaged communities are located. It is essential to find uses for woody biomass that also reduce petroleum dependence and preserve carbon storage in woody ecosystems while reducing long-term, perhaps irreversible damage to these ecosystems. This is at least as urgent as other climate objectives.

There are many other important biomass uses with positive landscape and public health effects. The argument made by staff and board members that projects of this type are being supported by other sources of funds is contrary to the experience of the CTP program, which has been an essential part of the innovation landscape, and has been consistently oversubscribed. The same arguments about alternative sources of funding can be made about vehicle electrification and hydrogen development. The costs of poor landscape management often remain unaccounted as do the potential benefits of improved management, including non-economic benefits. This is a reason why programs like the CTP are needed to support innovation in biomass- related pathways with many co-benefits.

Even more importantly, biomass use for energy is a pathway leading to negative emissions technologies (NETs) in the near term. The scientific literature emphasizes that near term Carbon Capture and Sequestration (CCS) is essential to meet the climate management goal of 2.0 degrees C, and avoiding excess temperature effects on the earth's life-support systems. Indeed, most current scientific literature underscores the need for CCS and the need for a rapid adoption of CCS technology. The most available pathways are associated with bioenergy (called Bioenergy with Carbon Capture and Sequestration, BECCS). Such approaches were considered essential for the Paris Agreement, which back-loaded carbon reduction by participants under the assumption that CCS would become available at some future date to offset current and continuing emissions. But engineering based CCS technologies are highly uncertain and not a sure bet. Some opportunities for BECCS are available in the near term in California, perhaps with support from the CTP, and there are already deeply carbon negative biofuels. The state will probably not reach its ambitious climate goals without significant BECCS projects within the state and the use of carbon negative biofuels.

Because of the multiple benefits from biomass to energy pathways, the CEC should place greater emphasis on projects with beneficial landscape and human health effects. It should find better ways to reward those potential projects with the most and best identified co-benefits. This would include any contributions to the state's goal of developing a robust bio-economy, supported by many sectors of the state's diverse communities.

#2. ZEV infrastructure Priorities

Heavy duty truck electrification. This would be better spent on improved natural gas vehicles and alternative fuels. Heavy duty transportation will remain best served by alternative liquid fuels due to favorable energy density. In the heavy duty sector (also air and marine), success is unlikely in the near to mid-term for electrification and greater good will come from intermediate steps and a gradual transition, which will occur in any case.

Let markets and other programs subsidize EV and hydrogen infrastructure in this sector at a reasonable pace of development, or at least focus only on the hydrogen pathway. Renewable hydrogen will in part have to come from biomass to be sustainable. CTP has already invested significant resources in this area, and is better used to support diverse solutions and new innovations, including biomass to hydrogen solutions.

#3. Equity

Concerns for fairness in the application of climate related policies and programs and for the distribution of benefits to people from low income or otherwise disadvantaged communities are reasonable. Consulting organized groups who claim to reflect or embody the concerns of such groups is also reasonable. What is unreasonable, is the expectation that such individuals and groups have useful insights into complex policy issues associated with transportation policy, technology development, and the evolution of a low carbon economy. The blanket assertion made on behalf of such groups at the August 5 meeting that CTP funds should exclusively support EV and HFCEV vehicles and infrastructure, without any evidence of thoughtfulness or presentation of reasons suggests incompetence or naïveté on their part.

Climate concerns typically rank low on most surveys of public concern. Aggressive climate policies have large upfront costs but long-term (slow) returns. Disadvantaged communities have much more pressing issues to address to improve their well-being. One is the high cost of EVs and FCHEVs, and the state's energy policies in general. The state and federal subsidy program for EVs has almost exclusively benefited the financially well-off in the state. Low income people, of whatever ethnic background, are more likely to buy older used cars, which will not be EVs of FCEVs. In largely rural areas like many of those in the San Joaquin Valley and mountainous and desert regions of the state, EVs are impractical and will remain so. Subsidizing the cost of such vehicles has a limit as a public policy approach, as noted in the Bloomberg analysis (presented on August 5, 2019) of between 2 and 4 % of vehicles sold, a target already reached in California. The cost of clean transportation is an issue, especially in the SJV. It would be better to focus instead on GHG reductions through alternative fuels and improved ICE engines to meet the needs of such populations. That the individuals chosen to reflect the sentiments of this undoubtedly diverse minded community would casually dismiss all alternatives but the least practical and most costly is surprising.

The state has recently formally asserted an interest in developing a robust bioeconomy, marked by a well-attended meeting on this subject last November in Berkeley, which I helped organize. This effort has been led so far by the CARB, and supported by directors from the central valley region particularly. Generally biomass based processes have the largest direct employment effects, and must be located near disadvantaged rural populations, leading to local job creation and improved prosperity. Creating new, good paying jobs is the best way to offset the otherwise high costs of the state's energy policies, which fall most heavily on disadvantaged, poorer populations and areas of the state. When combined with potential reduction in harmful pollution from wildfires and open burning of woody biomass, additional advantages accrue. All the complementary goals highlighted by Commissioner Monahan are met by such projects.

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