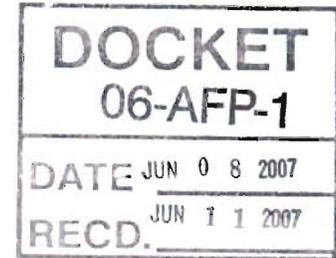


June 8, 2007

Bob Giebeler
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California Energy Commission
Dockets Office MS-4
RE: Docket No. 06-AFP-1
1516 Ninth Street
Sacramento, CA 95814-5512



Copy:

Dr. Robert Sawyer, CARB
Jackalyn Pfannenstiel, CEC

Subject: Alternative Fuels Transportation Plan, 06-AFP-1

Dear Commissioners and fellow Scientists:

After participating in many CEC meetings and workshops in the last year regarding AB1007, land use, electric power generation and renewables, please find my comments below after the May 31st AB1007 workshop:

- I) **Transparency and good Science:** In order for the guidance of the CEC and CARB to be effective in public policy making, appropriately complete scientific analysis and transparency thereof for peer review is essential. Work to date on AB1007 has been deficient to varying degrees. I believe it is the responsibility of the CEC and CARB support this goal, and police this matter with stakeholders. Issues of concern are detailed below.
- II) **Land use, food and water:** Many people have expressed concern about breaching our food and water supplies in the interest of alternative fuel, and it is part of the AB 1007 analysis, but more analysis needs to be done. For example we have a nation-wide corn for food shortage today because of the diversion to ethanol. California cannot sanction policies such as this.
- III) **Quantification of alternative fuels and prioritization:** Little data has been presented about how much alternative fuels could be produced within the

constraints of II) above, and declining natural gas supplies. A quantitative comparison of all the alternatives to existing petrol usage would facilitate prioritization. We need to pursue all viable opportunities, but they may not all be able to “get through the gate” at the same time.

- IV) **Development status and prioritization:** Clearly some alternatives are low risk and available today, and others are long term, or even worse, long term and carry high technical risk. The Commission must prioritize efforts accordingly, accommodating both short and long term solutions, and most importantly effectively plan the necessary public energy infrastructure, a huge long-term investment. This task is exceedingly difficult.
- V) **Cost versus energy efficiency; subsidies and price volatility:** Many of the analyses that have been presented focus more on energy cost, and not on energy efficiency. This method is nearly useless in view of energy price volatility and energy subsidies and taxes. We need a level playing field to make good decisions. In any case reasonable estimates conclude alternative energy prices will be significantly higher, provided the full life-cycle costs are included. Constraining energy cost will be self-defeating.
- VI) **Customer preference versus legislative mandate:** Many analyses have focused on customer acceptance. Our Customers deserve every consideration for convenience, reliability and affordability for energy alternatives, but ultimately the crisis may limit what can offered, and more aggressive legislation beyond AB1007 (and AB32) may be necessary. The Commission and ARB need to have the will to advise the legislator accordingly.
- VII) **The synergy of efficiency and renewables:** What renewables estimates have been offer in CEC workshops in the last year suggest only a small percentage, i.e. 20%, of petrol use can be displaced. The compliment is that efficiency improvement is between 50 and 70%. The two together start to make sense, and efficiency is *critical*.
- VIII) **Natural gas supplies and uses:** Natural gas has been proposed in AB 1007 workshops as a alternative fuel, a principal feed stock for electric power for electric cars, and as a feed stock for alternative fuels. Unfortunately little analysis of supplies and reserves has been presented. Reserves are rapidly declining in North America, and LNG carries significant political interruption and price risks. Embarrassingly enough the May CEC report “Natural Gas Market Assessment” (CEC-200-20007-009-SD) addresses none of the AB1007 potential requirements, nor does it address the long term nat-gas supply and reserves issues, other than to state “U.S. production has been relatively flat for the last several years even though natural gas prices and the number of natural gas wells drilled annually have both increased dramatically”. These efforts need to be integrated more effectively for the 2007 IEPR .

- IX) **Electric power supplies and uses:** Many potentially valuable electric power based vehicle fuel scenarios have been presented in the AB 1007 venue. EV and PHEV's might be a great solution if we had significant non-coal, non-nat-gas electric power. And electrifying our truck-stops and ports would be no less than Saintly, in view of the incredible pollution in these locations, affecting low income people the most. Unfortunately there are many problems in the viability of these plans.

The first major issue is transparency in the data regarding electric power in California, an issue that has come up in workshops. We cannot conclude anything about real efficiency, both production and transmission until this matter is addressed.

Secondly, the very aggressive renewables portfolio hoped for and outlined in the above Natural Gas Market Assessment has been behind schedule, and there is no commitment process in place to insure they do develop on schedule.

In addition, renewables intermittency present an even larger challenge in managing our electric grid, also duly noted in CEC workshops.

Thirdly, 30% of California's power is Coal based, and there will be pressure to eliminate this component until the longer-term "low carbon coal" option is available.

Fourthly, reliance on cheap hydroelectric from the northern states in the long term is not viable. Climate change and the associated migration of the population to the North West may eliminate this component.

Fifthly, in spite of the publicity of one-million solar roofs, PV's remain extremely expensive (mostly the energy cost of manufacturing), and have an unknown lifetime. There has been discussion in CEC workshops of reducing the required life-time to ten years, in which case they would become a net-negative energy source.

Lastly, the necessary future additions of renewables, co-generation, time-dependent rate meters for everyone, and thermal storage for air-conditioning largely level the grid load demand, so energy is no more efficient or cheaper for plug-in's at night. Supplemental demand and load leveling is natural gas fired, and this is the fuel that needs to be compared to EV and Plug-in options.

- X) **Vehicle efficiency comparisons:** As presented in my publications for the March 2nd workshop, I believe the comparative vehicle efficiencies published by TIAX in conjunction with the CARB are significantly inaccurate, principally regarding the comparison of Conventional, Hybrid, and Plug-in

hybrid cars. I understand from TIAX that they are publishing revised reports beyond June 8, and I look forward to the following issues being addressed.

My research on existing state-of-the-art hybrid technology suggests that for the temperate climate in California would allow between a 50 to 70% reduction in energy usage in light duty vehicles, constituting 70% of ground transportation energy usage. This hybrid technology is developed and not likely to see near-term enhancements.

Critical to this observation is that a driving venue model specifically for California is essential, as our climate and congestion factors have a major impact in the analysis. Current EPA mileage estimates are ridiculously inaccurate, and do not allow technological alternatives to be assessed.

Additionally, the CARB technical plan to address AB32 green-house gas emissions is suggesting a set of enhancements that are far inferior to the current state-of-the-art in hybrid technology

- XI) **Plug-in hybrid and EV realities:** Plug-in's have become the most popular concept, but the scientific and practical basis is questionable at best.

First, as noted in May 31 meeting, batteries are still the major limiting factor in life, cost (energy cost of manufacturing), and weight, an exponential detractor to vehicle efficiency. A better battery is a high risk venture and may be 10 years off. One positive remark in the May 31st meeting about Tesla are without full-cycle foundation; Tesla admits the battery may only last 30,000 miles, and its cost is about \$30,000-that's a dollar a mile.

Secondly, the problems noted in IX) regarding electric power production need to be considered.

Thirdly, the infrastructure to "plug in" significant number of cars does not exist. If you look at the high population centers, most cars are not in a garage where they can be plugged in, particularly for low to middle income people.

Lastly, the bottom line in energy tank to wheels efficiency is that a hybrid is about the same as for nat-gas fired electric power at the plug, so why not just make a nat-gas powered hybrid? A plug-out hybrid might make more sense than a plug-in.

- XII) **Hydrogen economy:** A review of current issues and research clearly show this may be the solution for the "next generation". There is a lot of critical research in progress to address major problems, however there is no significant near-term displacement of fossil fuel consumption. Note the poor energy efficiency noted by ILEA for Hydrogen cars using existing technology in the March 2nd workshop.

XIII) **Expediency and longevity:** The energy and climate change situation we are facing is likely extremely critical, and we need to be looking for near-term, proven solutions as a first step that have longevity so we don't have to throw them out in a few years. In addition, we need to plan the longer term solutions so that we lay the necessary infrastructure, and not have to through it out because we were basing it on poor science.

Sincerely,

A handwritten signature in black ink, appearing to be 'Bob Giebeler', written in a cursive style.

Bob Giebeler
Senior member, Institute of Electrical and Electronic Engineers