

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

APPROVED MINUTES

Air Quality Planning Committee Meeting
1:00 p.m., Monday, April 4, 2005

- 1. Call to Order – Roll Call.** 1:10 a.m. Present: John Holtzclaw, Ph.D., Chairperson; Harold Brazil, Irvin Dawid, Emily Drennen, Fred Glueck, Kraig Kurucz, Kevin Shanahan.
- 2. Public Comment Period.** There were no public comments.
- 3. Approval of Minutes of February 9, 2005.** Mr. Brazil requested that he be listed as “Present.” Mr. Glueck moved approval of the minutes as corrected; seconded by Mr. Brazil; carried unanimously.
- 4. California Hydrogen Highway Blueprint.** Dr. Shannon Baxter-Clemmons, Special Advisor on Hydrogen and Renewables, California Environmental Protection Agency (Cal-EPA) stated that the draft Blueprint was officially released on March 30, 2005. The first presentation on the Blueprint was given to the National Hydrogen Association last week. This is the second such presentation.

The Blueprint’s inception can be traced to January 6, 2004 when California Governor Arnold Schwarzenegger declared that he intended to promote hydrogen power and a hydrogen highway, and environmental health and economic growth simultaneously. His Executive Order S-7-04 designated 21 interstate freeways in the state as the Hydrogen Highway Network (“H2 CA Net”). He asked Cal-EPA to be the lead agency in developing the Blueprint for its development and implementation. The Governor perceives this approach as having energy security benefits as well. To date, three hydrogen stations have been formally designated as part of the H2 CA Net. There are 16 hydrogen stations in the State, but the other 13 are not yet sufficiently accessible to the public to be declared part of the H2 CA Net.

For assistance and oversight in developing the Blueprint, Cal-EPA put together an advisory panel of over 200 individuals from interest and stakeholder groups, each participating on a voluntary basis. These were allocated among five topic teams that developed independent reports, detailing an approach to the topic and offering roll-out strategies, assessing the status of technology, how to site the stations throughout the state, assessing societal benefits, economic challenges, implementation issues with regard to standards, codes and risk assessment, and public education.

The draft Blueprint contains seven reports. Volume I concerns policy documentation. Volume II addresses technical issues. Together, these represent the consensus of the advisory panel and its recommendations to the Governor. Five independently produced topic team reports follow.

The goal of the H2 CA Net is to diversify the sources of transportation energy used and to provide environmental and economic benefits. A phased approach will make use of existing alternative fuels and emerging technologies to help develop hydrogen use and to bridge the gap between today’s alternative fuel technologies and hydrogen technologies of the future.

Its initial Phase I goal is to have 50-100 fueling stations throughout California, 2000 light-duty fuel cell vehicles (FCVs), 10 heavy-duty FCVs and five stationary or off-road applications. Phase II aims to establish 250 hydrogen fueling stations in a lower-usage mode, 10,000 light-duty FCVs, 100 heavy-duty FCVs, and 60 stationary and off-road vehicle applications. Phase III aims to double the number of light duty vehicles on the road to 20,000, achieve a number of at least 300 heavy-duty FCVs on the road as well as 400 stationary and off-road vehicle applications in operation.

Regarding station build up, the Blueprint contains an action plan and a biennial review process. The action plan is identified in Volume I and calls for the Governor to provide funding, while emphasizing public/private partnerships to build stations and procure vehicles. Societal benefit goals include increasing renewable energy sources and minimizing greenhouse gas emissions. Station build up will begin in urban centers and thereafter spread outward into California.

Cal-EPA and the Bush Administration differ on the station mix criteria. The former seek a diversity of hydrogen producing technologies whereas the latter emphasizes production from coal combustion processes. The advisory panel members agree that renewable energy sources for hydrogen production are to be emphasized, and note that renewable energy sources and hydrogen are reciprocally interconnected in a variety of ways. Also, the lowest cost option is not necessarily to be preferred, inasmuch as other technologies that will be available in the not-to-distant future will become increasingly important. Use of existing stations is highly emphasized along with the development of new ones. The advisory panel also recommends making maximum use of the existing natural gas infrastructure and believes that 50 stations can be established in California by the year 2010. Phase II plans for 250 hydrogen fueling stations which, in urban areas, could be accessible within 5 minutes. Bridging stations would be established between the Bay Area and Los Angeles.

The Blueprint calls for \$53.5 million in funding from the Governor over the next five years for this program. Cost-sharing schemes and incentives for FCVs have been discussed. A major challenge remains in finding ways to sustain the income needed to support the program beyond this time frame. The advisory panel believes that, if the vehicles can be manufactured the infrastructure can be created to meet the need, investment in infrastructure is manageable.

The conclusions concerning the CA H2 Net are as follows:

- The CA H2 Net is a broad initiative for diversifying transportation energy use and for providing environmental and economic benefits.
- The CA H2 Net should be implemented in Phases.
- CA H2 Net will continue to put California in a world class leadership position and position the State for the successful introduction of hydrogen technologies to meet transportation, power generation, and other energy demands in the future.
- The biennial review of the Blueprint will evaluate the pace with which introduction can occur.
- The State-led public-private partnership should begin work to implement the Action Plan.
- The State needs to initiate a funding source.

In response to questions from the Committee members, Dr. Baxter-Clemmons stated:

The auto manufacturers require no convincing that the fuel cell is the future of the vehicle market. One manufacturer forecasts a global approach to the fuel cell vehicle (FCV), in which the basic structure of the FCV would be the same in terms of the frame and fuel cell location, and only the external body would differ—being tailored to each country in which the FCV is sold. This will enable mass production in the largest possible scale and enhance FCV economic attraction. Auto manufacturers have declared they will build a certain number of FCVs, and there is an increasing demand for them in Japan, Germany, Singapore, etc. The incentives created in California will send a message—in particular, to Japan—and although such incentives will not significantly draw down the cost of the vehicle, they will nevertheless assist as mass production capability increases.

The Department of Energy does not believe there is a shortage of the platinum that will be the primary component of the fuel cell, and the amount of platinum needed for a fuel cell decreases exponentially over time as technology improves. Phase III of the Blueprint will establish a basis for broad commercialization, with 20,000 FCVs planned for operation. This is a small percentage of the 20 million cars now driven in California, and some observers believe it will be three decades before the benefits of the Blueprint become manifest. Nevertheless, if the approach to a hydrogen transportation system is not started now, it will never come to fruition.

The history of alternate fuel and electric vehicles has been variously assessed. Electric vehicles still have a rather limited range, and General Motors recently held a symbolic “funeral” for its electric vehicle. Although hydrogen power requires an additional step in which electricity is used to produce hydrogen, never before have all of the stakeholders—environmentalists, car and fuel companies, and government—agreed on a technology that represents the future. Challenges remain with respect to renewable energy sources that are used to make the hydrogen and whether to use these to support existing infrastructure, the power grid or other applications.

The extent to which funding can be obtained for the Blueprint, and how hydrogen could be taxed, requires further discussion. A revenue bond has been suggested. The free market impact must also be considered where prices vary per kilogram, depending on the source producing the hydrogen. Transportation costs also factor in, along with taxes and possible renewable fuel subsidy.

Hydrogen stations may be variously used for both stationary and mobile source power, depending on whether the fuel cell is low or high temperature through electrolysis. Hydrogen stations in the early years of the Blueprint will be “delivered hydrogen” and will diversify from that point on.

Air Districts can assist with public education about the Blueprint, both in terms of short- and long-term goals regarding environmental and economic benefits, program safety, the various phases of the approach, and related aspects. Advocacy of more hydrogen fuel stations in the local Air District jurisdiction would be important, particularly in collaborating with fuel companies, local, regional and state government, and fire department staff. The Bay Area AQMD could be a major player in the development of the H₂ CA Net, and Cal-EPA would welcome working with staff.

Dr. Baxter-Clemmons offered to provide further information to Mr. Shanahan regarding cost comparison of a therm of natural gas in a natural gas vehicle in comparison with the same therm of natural gas delivered down the H₂ CA Net in order to produce hydrogen, and get it to a hydrogen fueling station. References and diagrams can be found in the report issued on the Internet (cf. p. 14, Volume I).

The cost of using bio-gas for vehicles, which occurs in Sweden, is decreasing, but it is not at a point at which it is cost-competitive. The H2 CA Net does not want to abandon near-term options for alternative fuels and vehicles. The approach to FCV's is not exclusive, and the societal benefits will increase as 20,000 such cars are on the road by the year 2015. If society wants hydrogen fuel as the basis for its transportation, it will have to start now and plan for the long-term.

5. **Committee Member Comments/Other Business.** Mr. Dawid commended the minutes from February 9, 2005 meeting for their accuracy and detail, and inquired as to a possible referral from the Board of Directors to the Advisory Council on diesel emission at ports. Peter Hess, Deputy Air Pollution Control Officer, clarified for the Committee that this matter had been referred to another Committee of the Governing Board.
6. **Time and Place of Next Meeting.** 9:30 a.m., Wednesday, June 8, 2005, 939 Ellis Street, San Francisco, California 94109.
7. **Adjournment.** 2:20 p.m.

James N. Corazza

James N. Corazza
Deputy Clerk of the Boards

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