VERMONT

State of Vermont
Department of Environmental Conservation

AGENCY OF NATURAL RESOURCES

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March 24, 2008

Mary D. Nichols, Chairman
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Vermont Comments on California Air Resources Board Staff 2008 Proposed Amendments to the Zero Emission Vehicle Program Regulations

Dear Chairman Nichols:

The State of Vermont appreciates the opportunity to offer comments in response to the proposed ZEV Program Amendments referenced above. Vermont first adopted the California LEV Program in 1996, and currently includes Light-Duty and Medium-Duty Vehicles along with ZEV and Section 1961.1, the Greenhouse Gas equivalent requirements. In November 2005, Vermont became the first of twelve States outside California to adopt the California greenhouse gas standards. In 2007, we successfully defended adoption in the Federal District Court for Vermont. While that decision is now under appeal, the Vermont commitment to the LEV program remains firm. We hold as essential the technology-forcing foundation of LEV, which encourages the development of alternative fuel sources.

Vermont's comments focus on the following proposed amendments:

1) the proposed expansion and extension of the Travel Provision, and its impacts on Gold and Silver+ PHEV vehicle numbers in Vermont and other Section 177 States,

2) the impact that the proposed extension of the Travel Provision will have on hydrogen refueling infrastructure development,

3) the proposed increased NEV credits, and

4) proposed EAER credit calculation for AT PZEVs

We strongly urge the Board to decline any extension and expansion of the Travel Provision. We believe that technology and the market have advanced significantly since the Expert Panel began it's

otherwise far-reaching and exhaustive review in the Spring of 2006[1], and that the likely dilution of Section 177 State ZEV numbers will result in negative impacts on consumer appetite and market development. During the 2003 ZEV Amendment process, Vermont and the other existing Northeast LEV states argued for the existing 2011 sunset date for the Type III travel provision, and additionally instituted Alternative Compliance Procedures (ACP) with credit multipliers to accommodate manufacturers. There are no compelling reasons to now retreat on the 2011 sunset date, much less expand coverage for up to nine additional model years for Type I, 1.5, II, III and IV ZEVs. The proposed Travel Provisions add restrictive provisions to the program that will result in vehicle blackouts in Section 177 States.

Small states like Vermont will be particularly affected, as fuel cell electric vehicle (FCEV) and battery electric vehicle (BEV) credits from placements in California will be used by manufacturers to meet their ZEV obligations in other states. Any vehicle placed in one state that counts in all effectively reduces the absolute number of vehicles going to any state where it was not placed. The practical upshot is that the incentive to place Silver+ PHEVs, which can be used to backfill the Gold ZEV requirements, becomes drastically weakened.

We would also point out that the growing number of Section 177 States requires the assistance of California, the early adopting States and regional organizations like the Northeast States for Coordinated Air Use Management (NESCAUM) to coordinate their efforts. In its recent documentation of the greater benefits of California's greenhouse gas emissions standards as compared with the recently adopted federal CAFÉ standards, the ARB emphasized the importance of the combined greenhouse gas reductions from vehicles in California and all the 177 LEV states. We urge the ARB to consider the proposed ZEV amendments in the same light – the interest and demand for ZEVs in California and the other LEV states combined, will accelerate the commercialization and widespread availability of ZEVs.

Vermont understands the concern advanced by Staff that the number of ZEVs required nationally may eventually be as large as the number required in California itself. However, the practical provisions already included in Section 177 state LEV programs significantly mitigate potential burdens on manufacturers. Such provisions include: phased ZEV implementation schedules, previously banked credits including historical credit multiplier options under ACPs, and the multiple options for vehicle types earning ZEV credits. In addition, manufacturers always have the ability to gauge and expand their market and reduce their costs in volume production, by utilizing the time-honored automotive sales technique of establishing waiting lists if and when needed. The argument that manufacturers would either restrict their offerings or be unable to supply larger demand is in fact the antithesis of a healthy prescription to technology advancement, air quality improvements, public health, and job creation. To illustrate how rapidly relevant technology is developing, and how quickly paper-based studies can become dated, we identify selected Expert Review Panel comments, followed by a description

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[1] "At the 2003 Zero Emission Vehicle (ZEV) Regulation hearings, the California Air Resources Board (ARB) directed staff to establish an independent expert review panel (Panel) to examine the status of ZEV technologies and to advise the Board. The Panel was constituted in early 2006 and carried out its work between May 2006 and March 2007." **Status and Prospects for Zero Emissions Vehicle Technology - Report of the ARB Independent Expert Panel 2007,** April 13, 2007.

of subsequent developments that clearly indicate accelerating time tables and/or meeting development milestones. An attachment to our comments lists further news articles highlighting rapidly-changing and vibrant electric drive technology and market developments.

Example A) The Panel wrote: "Medium energy/power Li Ion technology has sufficient performance for PHEVS and small full performance battery electric vehicles (FPBEV), and it can be expected to meet the life requirements for FPBEVs, in the view of the Panel. Recent test results indicate good potential to also deliver the very demanding cycle life for PHEVs. The projected costs for shorter range PHEV Li Ion batteries are about $3500-4000 in mass production; this is generally less than the fuel cost savings expected over the life of the vehicle. Low volume cell production and prototype battery fabrication is underway in Asia and Europe, and limited fleet demonstrations are underway or planned."[1]

*Comment: We would comment that these observations are not dated **per se**, but rather that the price of gasoline has risen inexorably, to the point where fuel cost savings over the life of the vehicle should further offset battery costs. To the extent that further development of battery lease arrangements occurs, then effective battery cost to the consumer correspondingly decreases. This is typified in current news events by the electric car plan partnership between the Renault-Nissan Alliance, the state of Israel and Project Better Place from California.*[2]

Example B) The Expert Panel Report further noted: "The major impediment to engagement in developing Li Ion batteries for PHEVs appears to be that the PHEV battery requirements are insufficiently defined at this time. GM's apparent interest in PHEVs (tied to Li ion availability) might stimulate efforts to develop Li Ion technology for PHEV applications. The Panel found no major battery manufacturer interest in high energy Li Ion batteries for FPBEV applications."[3]

Comment: In fact, not only has GM made production-based business decisions about Li Ion batteries and entered into partnership agreements with at least two battery manufacturers, but this has been further reinforced by similar agreements between other vehicle manufacturers and battery suppliers. Toyota has taken the step long-predicted by industry observers as pivotal to electric vehicle advancement of assuming battery production "in house".

FPBEV development has itself leapt forward, illustrated by the recent announcement by Norwegian electric-car company Think Global that it plans to bring its five-seat crossover concept vehicle, called the Think Ox, to the U.S. market as early as 2010. Reportedly, the car will have a top speed of 85 mph and a range of 125 miles on one charge, and has been designed specifically for the United States market.[4] *An article in Greentech Media*[5] *further noted: "In February, Gartner analyst Thilo Koslowski said the stream of announcements of alternative-vehicle partnerships shows that companies are "heading in the right direction" because they are focusing on setting up supply and distribution chains -- an important step toward mass production and distribution. "*

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[1] page 3, **Expert ZEV Panel Final Report**, April 13, 2007
[2] reference FORBES, March 9, 2008 and numerous other media reports
[3] Page 4, **Expert Panel Report**
[4] Green Tech Media, March 6, 2008, Automotive News, Electric Car Progress, GE, and others circa-March 5-6, 2008
[5] Op cit

Example C) The Expert Panel also wrote that: "The Panel's projection is that PHEVs with modest energy storage capacity will be derived from HEVs and will proliferate rapidly, stimulating further development and cost reduction of energy batteries and leading to commercially viable PHEVs and, in the longer term, FPBEVs. While PHEVs will continue to grow rapidly, as they have no functional limitations, FPBEVs will grow more slowly due to customer acceptance of limited range and long recharge time. NEVs are commercially viable now and will continue to grow, but will grow slowly due to limited functionality. CEVs will become commercially viable in Japan and Europe in the not too distant future due to lower hurdles for BEVs to overcome. CEVs may be offered in the U.S. as energy batteries continue to mature, but growth will be slow due to functional limitations of BEVs in general, and the specific limitations of CEVs, especially urban freeway driving."

Comment: It appears likely that PHEVs with modest EAER will be sold in California markets by 2010-2011. In addition, city electric vehicles (CEV) will not only be commercially viable in Japan and Europe but within the same time frame in the U.S. as well, reference the announcement by Nissan of having a strong CEV(possible FPBEV with 75 mph and >100 mile range) in California by 2010[6] (also reported as 2012[7]). An Automotive News article of March 10, 2008, "The first production vehicles will be for regional areas like California," said Masahiko Tabe, Nissan's manager of advanced vehicle engineering. "We will later expand the EV all over the world."

Example D) The Expert Panel further noted: "In the longer term, there appear to be good prospects for reduction of Li Ion battery costs for all applications through a combination of approaches that are likely to include development of new electrode materials with lower costs and/or higher capacities, cost reductions of inactive cell materials (especially separators and electrolyte salts) through improved and larger-scale production processes, lower costs of balance-of-system components, and advanced large-scale manufacturing processes."[8]

Comment: We would note that, expanding on the Gartner analyst comments cited above in discussion of THINK, as a nuts-and-bolts illustration of the Expert Panel's time line, Japanese firm Ashai Kasei has announced it is building a second Li Ion separator plant, expanding its capacity to supply worldwide battery separator markets. According to news reports "Controlling about half the global market, Asahi Kasei is the world's top producer of lithium ion rechargeable battery separators."[9]

Example E) The Expert Panel predicted: "Investments by all types of Li Ion battery manufacturers in PHEV and small BEV batteries are likely to increase, possibly substantially, once automobile manufacturers commit resources and plans to the development and introduction of such vehicles."[10]

Comment: Since the Report was written, this has been the case – automobile manufacturers have committed resources, profoundly accelerated development, and announced multiple ZEVs for the consumer market in the near term.

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[6] Automotive News, March 10, 2008
[7] Automotive Business Review, March 14, 2008
[8] Expert Panel Report, page 49
[9] Trading Markets/UK, February 28, 2008
[10] Expert Panel Report, page 65

Finally, in discussion of recent electric vehicle technology changes, we would note that the Tesla Roadster is now in production, and that Tesla has scheduled a five-passenger sedan for 2010 production in quantities of 10,000+ annually.[11] Just announced is the introduction of the Indian electric vehicle, the Tara Tiny, selling for only $2450, less expensive even than the Tata Nano, and reportedly intended for export to the U.S. [12]

In consideration of Type III and IV FCEVs, and holding to the promised 2011 sunset of the Travel Provisions, Vermont wishes to point out that it has an electrolyzer H2 refilling station situated at the hub of a nascent Northeast Hydrogen Highway connecting Montreal, Burlington, Vermont, Albany, Boston, Portland, New York City and Washington. The lack of incentive for manufacturers to place FCEVs in Vermont is arguably setting back infrastructure development and public awareness. To extend the Travel Provision to 2017 would be to significantly delay, if not derail, fuel cell progress in the Northeast.

We would further ask the Board to deliberate carefully on increasing NEV credits. While Section 3.5 of the ISOR refers to research showing reduced cold start emissions due to NEV deployment, the background document appears to be an industry-sponsored survey of owners. The history of earlier NEV credit stockpiling should be sufficient to raise concern. We urge the Board to; at least, direct Staff to develop precise methodology to link credits with demonstration of effective and long-term NEV deployment.

In the Board's consideration of the proposed EAER credit calculation for AT PZEVs, we request clarification regarding whether the current HEV strategy of controlling battery State of Charge (SOC) within narrowly-defined ranges to maximize battery life, has been accounted for in the proposed amendments, as the ISOR and proposed regulatory language are subject to varying interpretations. Narrowly-controlled SOC, if further applied to PHEVs, could in itself serve as a brake on battery development if the range of utilized SOC is not expanded through credit mechanisms.

In conclusion, we urge the Board to engage in an on-going and structured discussion with Staff and the States to ensure identicality, effectiveness, and coordinated progress towards clean air, reducing climate change, public health, and consumer-interest goals. Vermont is engaged in the process and anxious to continue and expand the relationship.

Sincerely,

Harold Garabedian, Acting Director

[11] Tesla Motors, March 17, 2008
[12] Product Review, March 17, 2008

Attachment to Vermont Comments on Proposed ZEV Amendments, Board Hearing March 27, 2008: Additional Recent News Articles Illustrating Rapid Developments

GM to Begin Road Tests of Volt Batteries in July
Summary: Decision on lithium-ion battery supplier will come in second half of 2008.
Source: Reuters
Published: 14 Mar 2008

BMW Weighing Decision on Electric Car for USA Market
Summary: BMW will be considered large OEM in US by 2012, requiring it tougher emissions standards, thus the interest in selling electric cars. Can a partnership with Think be far behind?
Source: Forbes
Published: 11 Mar 2008

Toyota iQ To Get Plug-In Drive, Reports UK Publication
Summary: The pre-production model of the car on display at 2008 Geneva Auto Show is said to have a 500cc 'plug-in hybrid powertrain' with production to commence in 2009.
Source: Auto Industry/UK
Published: 06 Mar 2008

GE to Invest in Electric Car Company and Battery Maker
Summary: GE Energy Financial Services announced it has invested in A123Systems to help the company roll out batteries for Think. Pictured are Think A306 models.
Source: General Electric
Published: 05 Mar 2008

Hitachi to Provide GM with Next Generation Lithium Ion Packs
Summary: The new batteries will make the GM Hybrid System nearly three times more powerful than the system it replaces. Pictured is 2009 Saturn Vue Green Line with Two-mode hybrid drive.
Source: General Motors
Published: 05 Mar 2008

GM Upgrades Hybrid Drive with Electric-Only Propulsion Capability
Source: Wall Street Journal
[Mar 04, 2008]
SYNOPSIS: GM will upgrade its system with more powerful lithium-ion batteries, which will allow the 'mild hybrid' system to travel on electric power only at low speeds.

Geneva Auto Show Features Hybrids Juiced Up on Lithium
Summary: From the submersible sQuba to Mercedes luxury hybrid, more cars are being powered by lithium ion batteries.
Source: Int'l Herald Tribune
Published: 04 Mar 2008

Conti's Lithium Battery to Power New Mercedes Hybrid
Summary: The power-to-weight ratio of the battery is 1,900 watts per liter. It has high ampere-hour efficiency, long service life, and is reliable even at very low temperatures, says Mercedes.
Source: Reuters
Published: 03 Mar 2008

Cracking the Battery Barrier
Summary: The global battery market is enormous -- some $55 billion -- and as the need for renewable energy story grows, it spells opportunities for tech-savvy start-ups.
Source: Forbes
Published: 03 Mar 2008"It's totally a race," says Ken Lawler, general partner with Battery Ventures, a venture capital firm in Silicon Valley. "We're all trying to get our products out first to become the new industry leader."

Think Electric Car Maker Hits the Accelerator
Summary: The first 500 electric cars are scheduled to start being delivered to customers in March 2008.
Source: Business 2.0
Published: 03 Mar 2008

Hybrid Technologies Announces Lithium Battery Advance
Summary: Batteries using the new cathode material will allow electric vehicles to be driven over 200 miles compared to the current 120 to 140 mile range and operates at a wide voltage range of 4.3V to 2V, the company claims.
Source: Hybrid Technologies, Inc.
Published: 26 Feb 2008

Clean Energy Investments: You Ain't Seen Nothing Yet.
Summary: Figures for investment in clean energy in 2007 broke all records, with growth surpassing 40% year-on-year, and 2008 looks to be even more active.
Source: New Energy Finance Ltd
Published: 22 Feb 2008