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Catherine H. Reheis-Boyd
President

April 28, 2014

Via web: http://www.ARB.ca.gov/lispub/comm2/bcsubform.php?listname=proposed-sp-ws&comm_period=1

Ms. Edie Chang (echang@ARB.ca.gov)
Deputy Executive Officer
California Air Resources Board
1001 I Street, Sacramento, CA

Re: Comments on Draft Proposed Update AB 32 Scoping Plans

Dear Ms. Chang:

The Western States Petroleum Association (WSPA) appreciates the opportunity to submit these comments on the Draft Proposed Update to the AB 32 Scoping Plan (Update) required under passage of AB 32. As you are aware, WSPA represents 27 companies that explore for, develop, refine, market and transport petroleum and petroleum products and natural gas in the Western U.S. Many of our members have extensive operations in the State and would be affected by plans, programs, and policies outlined by the Update.

The Update is required under AB 32 to review the existing Scoping Plan's measures under two criteria: 1) whether the measures achieve maximum feasible GHG emission reductions and 2) whether they are cost effective. California emits less than 1% of global GHG emissions. Therefore California's actions cannot mitigate global greenhouse gas levels without participation by all key nations in meaningful solutions. Pursuing post-2020 targets associated with the goals already under discussion in the Governor's Executive Order will require deep and broad changes across California's electrical and transportation sectors, residential and commercial infrastructures and in societal behavior. If ARB wishes to pursue post-2020 GHG emission goals, then it must first be authorized to do so by the Legislature, and any actions that follow from new statutory authority must include a level of accountability to both encourage broader action from outside its borders and limit impact on California's economy.

WSPA is particularly concerned about several issues. First, the Update should focus on progress toward the 2020 target with a thorough evaluation of the status of regulations adapted to date including resulting emission reductions, as well as those needed to achieve the 1990 levels. Lessons learned in

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implementing current regulations must be part of this analysis. Also, as part of this analysis, ARB should consider the recommendations of authoritative experts in evaluating post-2020 policy options. While ARB may broadly define aspirational goals, at this time no statutory authority exists that would allow ARB to set new and enforceable post-2020 targets or to implement any new programs and plans to meet those new targets.

The Update lacks a thorough and objective technical review and economic analysis, both required by law, to ascertain the success of on-going AB 32 implementation efforts. We feel that these analyses should be performed before any planning document is adopted and prior to the enactment of new emission reduction goals by the Legislature or formulation of new program requirements by ARB. The analysis must also address California's dependence on other jurisdictions taking climate actions or other conditions that must be met prior to, or coincident with, development of an aggressive plan for post-2020 GHG and short-lived climate pollutant emission reductions.

WSPA is also concerned that the Update, as written, is filled with aspirational goals. The Update is devoid of any analysis regarding costs, cost-effectiveness, commercial or technological feasibility, or any analysis of specific steps needed to attain those goals. The lack of detail poses a unique challenge to stakeholders. How, for example, are stakeholders supposed to evaluate a plan that lacks implementation details? If the scoping plan is too vague to support economic analysis, how can it be suitable for planning? How can Plan elements have costs that are undefinable, yet be considered sufficiently feasible to be included as a blue print for the next 20 or 30 years? Perhaps equally problematic, the Update includes more stringent targets that are unreasonable given that the current 2020 LCFS target is infeasible.

WSPA and others have shared with ARB the concern that the Update will likely trigger CEQA challenges to future programs that will lead to barriers to economic development. This could occur, for example, if local or regional agencies incorporate the aspirational targets cited in the Update as mandates within their local planning documents.

These issues must be addressed to ensure meaningful action and reduce the potential for adverse impact on the California economy. We provide additional detail in the discussion below.

The Update Should Recognize Progress toward Achieving the AB 32 2020 Goal

ARB should focus on achieving the 2020 goals as outlined by AB 32. In fact, given that the State is within 4% of meeting the targeted 1990 levels specified in AB 32 - ARB should review the incremental steps needed to fully implement 2020 requirements.
However, instead of focusing on achieving the 2020 mandate, the draft Update indicates that ARB and other state agencies are moving ahead with the development of 2030 and 2050 emission reduction goals without statutory authority. We have commented previously that the ARB has no statutory authority to implement GHG controls beyond 2020. Any such plans would have to be developed under new authority approved by the Legislature and signed by the Governor. The effort to move beyond 2020 goals is also unwise given the potential for adverse economic impacts in California – especially given the diminished interest in GHG control demonstrated by other regional, national and international governments.

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The original Scoping Plan is built on the premise of outlining the policy, strategy, and specific measures necessary to achieve only the 2020 goal of reducing GHG emissions to 1990 levels:

> *"This plan calls for an ambitious but achievable reduction in California's carbon footprint. Reducing greenhouse gas emissions to 1990 levels means cutting approximately 30 percent from business-as-usual emission levels projected for 2020, or about 15 percent from today's levels.*[1]
>
> *"AB 32 requires a return to 1990 emission levels by 2020. The Scoping Plan is designed to achieve that goal."*[2]
>
> *"While the measures needed to meet the 2050 goal are too far in the future to define in detail…"*[3]

More importantly, the statutory language from AB 32 requires ARB to do the following (in part):

" 38561. (a) On or before January 1, 2009, the state board shall prepare and approve a scoping plan, as that term is understood by the state board, for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions from sources or categories of sources of greenhouse gases *by 2020 under this division*. (emphasis added)
(b) The plan shall identify and make recommendations on direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for sources and categories of sources that the state board finds are necessary or desirable *to facilitate the achievement of the maximum feasible and cost-effective reductions of greenhouse gas emissions by 2020*. (emphasis added)
(d) *The state board shall evaluate the total potential costs and total potential economic and noneconomic benefits of the plan for reducing greenhouse gases to California's economy, environment, and public health*, using the best available economic models, emission estimation techniques, and other scientific methods. (emphasis added)
(h) *The state board shall update its plan for achieving the maximum technologically feasible and cost-effective reductions of greenhouse gas emissions at least once every five years*. (emphasis added)

Taken collectively, it is clear from both the statutory language and the ARB-stated purpose of the Scoping Plan that not only is ARB required to limit the Scoping Plan Update to measures necessary to meet the overall 2020 goal (paragraph a, b, and d), but that a revised technology and economic analysis is required every 5 years (paragraph h). ARB has failed in this Scoping Plan Update to satisfy these requirements. Not only is the Update lacking the analysis of the technical necessity and economic impact of the existing GHG reduction measures, but it strays beyond 2020 by discussing additional GHG reduction measures to meet 2030 and 2050 goals. The consideration of additional GHG reductions measures with no assessment of the effectiveness of the current reduction measures is unacceptable. Unless ARB revises this Update to include the technical/economic analysis and limit this analysis to meeting 2020 goals, ARB has failed to comply with the statutory language of AB32.

[1] Original Scoping Plan, Dec 2008, Executive Summary, Pg ES-1
[2] Original Scoping Plan, Dec 2008, Executive Summary, Pg ES-12
[3] Original Scoping Plan, Dec 2008, Pg 117

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We cannot support ARB's proposal to embark on an extreme mission without the necessary authority, without a strong technical basis and without consideration of the economic consequences of such actions on California's citizens and business community.

Update Misses an Opportunity to Incorporate Lessons Learned to Date

The Update is an important opportunity to incorporate new scientific, economic and technical studies that have been commissioned by stakeholders and ARB, alike, since passage of AB 32 in 2006. It would provide ARB an opportunity to modify aspects of the Scoping Plan as a result of experience gained in the State, in the U.S. and elsewhere. In addition, the update would allow ARB to identify any regulatory actions that might be needed for implementation of the 2008 Scoping Plan and provides an opportunity for ARB and interested stakeholders to identify elements that need to be postponed or need further study prior to implementation.

WSPA is concerned that instead of reviewing what has worked and what could be improved, the ARB has embarked upon an even more challenging, and poorly documented, post-2020 journey without taking any time to review the lessons learned over the past 5 years. Even more problematic, as indicated below, ARB provides no economic analysis of the potential implications of embarking on this effort. While the Update is advertised as a framework for integrating state and local climate change activities, it is lacking documentation on the benefit, cost, and legislative support for such programs, plans, incentives, etc. The plan needs to be based on technically feasible and cost effective approaches that are clearly defined rather than a series of aspirational visions of the future.

Again, as mandated by AB32, the Update must focus on implementation, progress and plans for policies and regulations necessary to achieve the emission reductions required by AB 32. We request that CARB revise the Update to include such analyses. The aspirational goals of recent Executive Orders do not belong in the AB 32 Scoping Plan and thus should not be included in this Update.

Notwithstanding ARB's Lack of Statutory Authority, if it Continues to Proceed with Establishing Post-2020 goals, ARB Must Conduct Thorough Cost and Feasibility Analyses and Establish Objective Conditions Before Developing a Plan for Post-2020 GHG and Short-Lived Climate Pollutant Emission Reductions

The Update does not address the need for thorough analysis of possible programs or policies nor does it show how the ARB would feasibly and reliably implement program elements. Further, the ARB is making recommendations on post-2020 GHG and short-lived climate actions without considering whether such recommendations would be meaningful or effective. California's actions should be made conditional on actions being taken by other regions. In undertaking this Update, ARB is assuming authority without taking accountability because the Update does not include evaluation of commercial feasibility or the economic consequences of the Agency's broad brush recommendations.

Prior to undertaking a plan for post-2020, the Update must include commercial feasibility, scalability, and economic impacts analysis to account for the results of ARB's recommendations. Any meaningful approach to considering post-2020 pathways must at a minimum adhere to the following principles:

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1. California's post-2020 GHG and short lived emissions programs must be conditional on substantial action by other jurisdictions. A conditional policy can promote action by others and will reduce the likelihood that California will incur large economic impacts without any real environmental benefit.
2. Legislation must only authorize the most cost-effective state policies. Given today's economic reality, pursuing less than cost effective policies would only serve to further isolate California from potential partners. Other jurisdictions will not choose to follow excessively costly programs which will fail over the long term. For example, establishing sector based targets result in higher costs for all compared to a well-designed cap and trade or other market mechanism. Market-based approaches such as cap and trade programs are more efficient and less costly than direct measures such as the low carbon fuel standard because they allow compliance flexibility.[1]
3. Participation by other states and nations in cross-jurisdictional trading markets is critical to establish a cost-effective program in California. However, all participants must have sufficiently developed climate change programs - which meaningfully expand the scope of the marketplace - and a common verification standard for qualifying and trading emission offsets. Absent these features, cross-jurisdictional market participation would not be cost-effective and could jeopardize the capital investments of market participants. California is one of the most energy efficient states in the country, and the state's participation in any cross jurisdictional trading market would be beneficial only if it resulted in improved efficiency and reduced costs to the consumer.
4. California must display true leadership by establishing incentives for innovation. Market incentives for innovation in low carbon technologies are critical to meet potential post 2020 goals. Programs which pick preferred existing technologies discourage research, development and innovation in new technologies and should be avoided.
5. Cap and trade programs must include measures to address trade exposure. In a patchwork of differing programs, more stringent programs and unnecessary auctions create competitive disadvantage resulting in leakage of investment, growth and ultimately jobs from California.
6. Long term cost containment programs must be developed with a hard price cap and other viable cost-containment mechanisms.

The Post-2020 Element of the Update is Likely to Trigger CEQA Disputes

The draft Environmental Assessment released by ARB on March 14 will likely lead to an erroneous conclusion that the goals, ideas and strategies described in the Update are enforceable. In other words, perceived mandates from the Updated Scoping Plan may impact local land use or air district permitting decisions. For example, the Update notes that "An Environmental (CEQA) Assessment will be prepared covering "foreseeable methods of compliance" and "feasible mitigation measures". This type of CEQA assessment is triggered when agencies are contemplating a project decision, and have led to permitting disputes for particular facilities (i.e., the SANDAG lawsuit on the

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implementation of the 2010 Scoping Plan). The preparation of an Environmental Assessment document, while a useful tool in an actual regulatory context is inappropriate in this context and leads to concern that ARB or others could erroneously consider the Update as having regulatory effect, when, in fact, it does not.

CARB Should Acknowledge Practical Limitations in the Post-2020 Update Elements

WSPA appreciates ARB's willingness to engage us in ongoing discussions on the purpose and proper interpretation of the post-2020 elements in the proposed Update documents. Our most recent meeting with ARB staff on April 22 was particularly enlightening in terms of ARB's views on these issues. For example, ARB staff characterized the proposed Update as an "interim process document" that will be followed in future years by a more detailed plan. Staff also stated that conceptual post-2020 measures identified in the proposed Update may or may not be undertaken depending upon the results of further research on the technical feasibility and cost-effectiveness of each measure. In response to our concerns about how conceptual post-2020 measures in a Board-approved Plan might be viewed by the Legislature and other state, regional and local government bodies, especially in the context of a CEQA environmental assessment, ARB indicated that it does not view these measures as being enforceable in a regulatory context. While these clarifications are somewhat reassuring, they do not appear in the draft documents developed for this Update.

To avoid future misinterpretation and unintended outcomes, WSPA recommends that ARB include prominent language in both the Update and the Environmental Assessment documents clearly describing the practical limitations of the post-2020 elements.

Goals must be practically and Commercially Achievable

The Draft Update contains sweeping statements that the target of 80% reduction by 2050 can be met technically and cites seven studies. While we agree that there may be improvements or possibly some breakthroughs in technologies in the next 30 years, several of the studies that are cited rely on technologies that are not commercially feasible and/or are not feasible in California. These include nuclear and a significant supply of biofuels that does not impact food supply nor yield higher lifecycle GHG emissions.

The studies also include some unrealistic assumptions, such as Load Balancing with low or zero emissions to enable reliable, continuous electric power with very high portions of solar and wind energy. Potential savings from energy efficiency are overstated, because they are estimated at the "technical potential" without considering barriers to implementation such as lack of space for heat integration, lack of structural integrity to support energy recovery devices, etc. Several of the studies mention the need for "significant innovation and advancements in multiple technologies", "technologies that are not yet commercialized", or state that achieving the goal would "require dramatic changes".

In most of the studies where costs of decarbonized electricity are assessed, it is routinely assumed that costs for renewables and CCS will decrease markedly. In some cases, costs of fossil fuels are projected to increase. These questionable assumptions lead to statements that assert or imply that the 2050 goal can be achieved "cost-effectively". Conversely, one study included an economic model and concluded that the 2050 goal might be achieved but would yield an 8% to 17% cost increase at a carbon price of $107-225/tonne.

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ARB Should Incorporate Results of Studies by Transportation Sector Experts

As requested by the U.S. Secretary of Energy, the National Petroleum Council recently completed a study which examined opportunities to accelerate future prospects for transportation fuels to reduce U.S. GHG emissions from transportation by 50% by 2050.[4] The study brought together leading technical authorities from industry and academia in 14 different areas key to the future of transportation, including energy security and policy, agriculture, batteries, economics, energy efficiency, fuel cells, EVs and engines. It included viewpoints from more than 300 participants with the objective to develop a realistic forward-looking integrated evaluation of the options. The study concluded that several technological hurdles must be overcome to meet a 50% reduction in GHG emissions for the transportation sector by 2050.

Key findings include:

- Natural gas vehicles have strong economic potential, particularly for heavy duty vehicles
- Electric vehicles are challenged by battery issues such as battery cost, energy density, capacity degradation and longevity
- 12 "Top Priority" Technological hurdles were identified showing the breadth of invention needed
- A broad portfolio of technology options provides the opportunity to benefit from potential disruptive technologies
- Infrastructure challenges must be overcome for wide-scale commercialization
- Fuel economy for internal combustion engines can be dramatically improved
- Internal combustion engines will be dominant for years to come

This study underscores the dangers of preselecting measures at this early stage. The assumptions that come from presupposing technology winners and losers will affect the research, development, and deployment decisions of innovators and businesses, which could stall or even discourage the very development of low carbon technology breakthroughs that ARB seeks.

ARB Should Consider the Recommendations of Authoritative Experts in Evaluating Post-2020 Policy Options

WSPA maintains that this Update is the wrong vehicle for the ARB to express its post-2020 climate change policy vision. We recommend that the ARB create a separate forum for this discussion, and begin to address the many deficiencies in its current vision and the challenges identified by authoritative experts and research organizations.

It is a well-established fact that California cannot impact climate change on its own, regardless of the extent of in-state emission reductions. Accordingly, ARB's post-2020 climate change policy vision harbors considerable economic risk for California, and if pursued in isolation offers no hope of achieving any actual climate change benefits. While the Administration's desire to inspire action on a global scale is laudable, it must proceed with great care to ensure that the policy path it defines for the

[4] http://www.hydrogen.energy.gov/pdfs/htac_nov12_11_boccanfuso.pdf ; Link to full report. http://npc.org/ click on 'Transportation' under 'Reports' in the left column.

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state is economically sustainable and serves as a model for cost-effective climate policy that other jurisdictions are likely to embrace.

In a recent report entitled "Beyond AB 32: Post-2020 Climate Policy for California, dated January 7, 2014, Dr. Todd Schatzky and Professor Robert N. Stavins offer advice on how ARB should approach post-2020 climate policy setting. Their report includes several recommendations that would help accomplish the dual goals noted above, including:

- Avoiding firm long term emission targets – preserve flexibility to adjust targets based on emerging cost-benefit information;
- Condition more aggressive targets on reciprocal actions by other states and countries to create incentives for other jurisdictions to act and to minimize leakage risks;
- Emphasize policies that promote innovation over those that mandate particular emission reduction technologies; and
- Expand cost-containment measures, such as development of new offset protocols.

Importantly, the report also recommends that ARB "carefully assess the environmental and economic performance (as well as distributional implications) of existing policies in the AB 32 scoping plan to determine whether existing policies should be modified or eliminated, and whether new policies should be developed." This report suggests that the approach ARB selected to achieve the 2020 mandate may not be the right approach for a post-2020 climate policy.
In the interest of minimizing in-state economic fallout and actually achieving meaningful climate benefits, these recommendations should be carefully considered by ARB as it proceeds to define a post-2020 climate policy for California.

ARB Should Conduct an Economic Impact Assessment of Post-2020 Climate Change Mitigation Measures

Section VI. A. of ARB's revised draft Update indicates that the assessment of economic impacts for "the long-term regulatory portfolio" is complicated by regulatory and climate uncertainty and insufficient information on the performance and cost of existing AB 32 measures (Proposed Update, February 10, 2014, pp. 136). Consequently, ARB indicates that it does not intend to conduct an "ex-ante" economic impact assessment of post-2020 measures as a part of this Update. Yet similar circumstances existed in 2008, when ARB conducted an assessment of the potential economic impacts of measures it had identified as necessary to meet the 2020 emission reductions required by AB 32. Hence, it seems clear that ARB is compelled to perform an assessment for post-2020 efforts.

Moreover, in October of 2013, ARB received a report from the Lawrence Berkeley National Laboratory (developed pursuant to ARB Agreement No. 12-329), which lays considerable groundwork for a post-2020 economic impact analysis. The LBNL report is revealing both in terms of the post-2020 policy scenarios it identifies for each GHG-emitting sector and the conclusion that additional policies will be necessary to achieve the 2050 emission reduction target identified in recent Executive Orders[5]. We note that ARB is credited in the report as having given "extensive input" into the

[5] "None of the scenarios are able to meet the 2050 GHG target of 85 MtCO2/yr, with emissions ranging from 188 to 444 MtCO2/yr, so additional policies will need to be developed for California to meet this stringent future target." **Estimating**

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identification of the various policy scenarios. At a minimum, the policy scenarios and the model (California Greenhouse Gas Inventory Spreadsheet) developed by LBNL to evaluate potential GHG emission impacts provide a baseline set of assumptions that can be used to estimate the potential macro-economic impacts of achieving the 2030 mid-term target envisioned by ARB.

Even if it is only preliminary and subject to significant uncertainties, a prospective economic impact assessment is still necessary to inform post-2020 climate change policy decisions and reduce the potential for regrettable outcomes. It will impart greater clarity to the mechanisms by which ARB seeks to achieve post-2020 emission reductions and how these actions might affect climate change stakeholders. Absent such clarity, ARB is more vulnerable to criticism about the feasibility of its post-2020 vision.

More Stringent 2030 LCFS Targets are Unreasonable when the Current LCFS Target in 2020 is Infeasible

The LCFS discussion in the Update suffers from the same deficiencies as the rest of the document – it consists of largely aspirational goals without any real plan for how to achieve them or an assessment of the attendant costs. If the current 2020 target of 10% proves infeasible, which appears likely, it seems unreasonable for ARB to consider moving to an even more aggressive, and perhaps equally infeasible, 15-20% reduction target by 2030. Moreover, CARB staff is embarking on an analysis of alternative fuel availability to establishing a more realistic LCFS compliance curve and this Update should not pretend to know the outcome of that work and assert a future target.

The Update should address issues that have emerged to date (i.e., technical feasibility, economic impacts, progress toward expected production of low carbon fuels), to inform changes to the existing regulations that may be necessary simply to achieve the 2020 emission reduction mandate. Analysis of these issues may also inform speculation of possible post 2020 policy strategies, but that discussion is not germane to this Update and should be addressed in a different context. In any event, the ARB should not embark on new, fixed targets until further progress has been made on current requirements. This is especially important given ARB's admission that "we must continue working to figure out the right mix of policies and incentives for increasing reductions in the carbon content of transportation fuels. (p. ES-6)"

WSPA recommends that CARB remove any reference to LCFS reduction obligation beyond 2020 and focus the discussion on the LCFS status to date.

Proposal to Develop Control Measures on Oil and Gas Production Operations is Premature

In Table 6, Summary of Recommended Actions by Sector (page 1030, ARB included a recommendation to develop a control measure for methane and CO2 emissions from oil and gas production, processing and storage tanks. ARB states that a survey of the oil and gas extraction sector on equipment involving compressor seals, storage tanks, valves, flanges and connectors "… are the basis for developing a new measure in 2014 to reduce fugitive GHG emissions from these operations."

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Although ARB believes there is a need to develop a new regulation to control methane and CO2 emissions associated with the oil and gas industry, it is important to note that over the past 30-plus years, air districts with oil and gas operations have implemented strict prohibitory regulations to control hydrocarbon (HC) and volatile organic compound (VOC) emissions. These controls range from vapor recovery to extensive Inspection and Maintenance (I&M) programs for many of the aforementioned types of oil and gas equipment, including storage tanks, valves, flanges and seals.

Before moving forward with developing a new regulation, WSPA recommends that ARB work with the oil and gas industry to determine whether any fugitive methane and CO2 emissions are of sufficient magnitude to justify the need for additional regulation. Finally, ARB should conduct a cost-benefit analysis that would show whether the cost for controlling fugitive methane emissions would justify the considerable resource investment to develop, implement and enforce a new fugitive methane regulation.

Transportation Sector Discussion Does Not Acknowledge Widely Recognized Challenges

WSPA has several concerns relating to the ARB discussion on transportation. First, the document fails to analyze or consider the economics of the proposed activities. Of particular concern is the economics of ZEV for heavy duty vehicles. The plan mentions a ZEV mandate for heavy duty vehicles just after the Plan acknowledges that it has not progressed due to challenges in cost, range, payload and infrastructure.

Second, the ZEV Action Plan[6] is referenced in the February Scoping Plan. While the Action Plan acknowledges that up-front cost and operational limitations (i.e., short range and long charge times) of ZEV's are barriers, these barriers are not mentioned in the Scoping Plan. We note that the ZEV Action plan does not include economic analysis which is an essential element in any analysis of future policy options.

Finally, we note that the ZEV review[7] is also cited as key reference document. That document contains perspectives on ZEV from technology experts as requested by ARB in 2009. Here is one comment from Dr. Menahem Anderman of Advanced Automotive Batteries that indicates that there may be underestimation of cost:

[6] The ZEV Action Plan can be found at http://opr.ca.gov/docs/Governor%27s_Office_ZEV_Action_Plan_%2802-13%29.pdf.

[7] http://www.arb.ca.gov/msprog/zevprog/2009zevreview/2009zevreview.htm (Refer to Attachment B)

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4. Cost

In our current multiclient study we put considerable effort into analyzing battery cost based on: i) ab initio cost models utilizing realistic cell and pack designs and quotations for materials from several key materials suppliers, and ii) several actual cost estimates given by major battery makers to major car makers. When we apply our base estimates to the volumes studied by the CARB 2007 Technology Panel, we obtain considerably

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higher battery cost estimates for EVs, namely $500 to $700/kWh in 2015, for the 500-MWh case (a plant producing 20,000 packs averaging 25kWH each annually), and $375 to $500 per kWh for a plant producing 2,500MWh (100,000 25kWh packs annually) for the 2018-2020 timescale.

We focused our study on data from the major materials, cell, and pack producers and avoided projections from less experienced companies. This may explain the higher pricing in comparison with the CARB Panel study. Also, we and our information sources priced in what we believed will be necessary to meet the most important criteria for commercialization, namely safety, reliability, manufacturability, and durability. (In this connection we suggest avoiding the use of Tesla data as criteria for battery cost. Tesla uses computer cells that have a life expectancy on the order of 2 to 4 years, and there are no data in the public domain to project their durability and reliability in a vehicle battery. Tesla may have a business motivation other than profitability to sell an aftermarket battery option with the original vehicle.)

The cost of PHEV batteries per nominal kWh, depending on duty cycle, is expected to be 20% to 30% higher than that of EV batteries. However, since their usable capacity is likely to remain between 55% and 70% of nominal, as opposed to 80% to 90% for EV batteries, their effective cost is about 60% to 100% higher.

To demonstrate that this issue is not simply one person's opinion, we point out another view from ZEV Review panelist, Dr. David Greene of ORNL:

the time frame envisioned by the ZEV program. A key conclusion of the MIT study that figures prominently in the staff's assessment of future potential concerning batteries does not appear to be fully integrated into the overall analysis. The projections of the MIT study do not indicate that batteries are ever likely to achieve the cost reductions and energy densities necessary to be competitive with internal combustion engine hybrid vehicles (HEVs or PHEVs) or with the projected future FCVs. This may imply that either further breakthroughs not anticipated in the DOE technology goals will be needed, or durable policies will need to be developed to support the commercial success of BEVs.

In addition, we note he two other panelists (Dr. Joan Ogden, Professor and Research Director, University of California, Davis and Dr. Giorgio Rizzoni, Professor and Research Director, Ohio State University) also have several critical comments on ARB's ZEV plan.

- The 3rd reference is the Vision for Clean Air. It is a planning and policy document, not an economic study. Bottom line is there are no economics in the revised Scoping Plan Update, nor in its supporting documents.

- Hydrogen/Fuel Cell Electric vehicles are mentioned. ARB needs to better articulate how these contribute to GHG emission reductions. In particular, what hydrogen source is assumed for hydrogen-powered vehicles, Is CO2 from hydrogen production captured? Are fugitive hydrogen emissions considered? (Hydrogen has a high Global Warming Potential).

- The first recommendation on Vehicle technology suggests a 5% per year decrease in GHG emissions. This is almost a 50% reduction from 2017 to 2020. The Greenblatt study (October 2013) suggests that this level of improvement is not feasible for HDV's and is only achievable for LDV's in the most aggressive "Potential technology and market futures" scenario.

	5% per year decline													
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
LDV Emissions MMTCO2e	120	114	108	103	98	93	88	84	80	76	72	68	65	62
HDV Emissions MMTCO2e	36	34	32	31	29	28	26	25	24	23	22	20	19	18

WSPA recognizes that the Update to the Scoping Plan is a unique and complex undertaking that will take time and continued discussion. WSPA supports a robust dialog with Stakeholders and ARB that will inform the development of future Updates to the Scoping Plan. We remain convinced that only through this process can the State derive a reasonable, cost-effective and technically feasible approach to control of greenhouse gases. Should you have any questions, feel free to contact me or Mike Wang of WSPA Staff (mike@wspa.org; cell: 626-590-4905)

Sincerely,

cc: Mary Nichols (Mnichols@arb.ca.gov)

ARB Board members

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