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Low Carbon Fuel Standard Advisory Panel Meeting Summary April 26, 2011 • 9 a.m. – 3:30 p.m. Cal EPA Building, 1001 I Street, Coastal Room

Opening Remarks, Panel Chair, Richard Corey

Richard commented that staff will front-load more of the work adding more meetings sooner in the schedule and that for this meeting we want to continue discussing at a high level. The workplan incorporated many panel comments that will guide us as we move forward. The expectations for this morning are to address the following (with respect to the workplan): Are we asking the right questions; in terms of fundamental approach, are there other approaches or resources to evaluate; and are there particular areas where panel members have specific information or particular interest to partner with ARB (outlines, white papers, etc.)? We are not going to answer the questions outlined in the topics today and some of the topic questions may not have answers this year and that is okay. We are requesting written feedback on today's activities by Friday, May 6, 2011. In addition to posting feedback to the website, please email the material to Michelle Buffington (mbuffing@arb.ca.gov) to make sure it is included.

Panelist Comments

For the below topics, the notes are intended to briefly capture major points/comments made by members of the Panel during the discussion.

Topic 1 – Progress against Targets

- Discussed a range of 3- to 5-year time frame for looking at whether regulated parties can meet the targets. Some also suggested looking past 2016. Staff will consider both near- and long-term targets. The analysis for this topic will be tied into other topics and appear throughout the report that we draft for the Board for December 2011.
- How will panelists access the data for these analyses?
- What is the market mechanism for connecting the supply of low carbon fuels with the demand by regulated parties? Is it an exchange, a free market mechanism? Staff responded that the regulation sends the signal. There may be other concepts that strengthen the signal and should be raised. Staff pointed out that there is a topic dedicated to markets that might address this.
- One panelist suggested that there are three primary targets that should be subjective: Percentage change in carbon intensity, total carbon (underlies the need and value of the program and its justification) and comparing actual versus estimated carbon intensity. There are also six secondary targets: supplies (quantitative), cost, degree of investment, degree of infrastructure maturity and

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how it overlaps with the need, degree of match or mismatch between vehicle and what is available (fuel), and market exchange status.

- It is already too late to look at meeting targets for this year when we are a quarter in. Our ability to comply in the next five years is very dependent on what is available right now.
- When shortages occur (credits, fuels, etc.), regardless of cost, how does the program respond?
- How will data collected through the LRT be used to instruct this topic? Does ARB have any plan to make the quarterly credit/deficit balance publicly available? Will that information be available to the public in the same way that EPA makes information available? Staff responded that it is critical that the information be publically available, but the question is how to protect any business confidential data.

Topic 2 – Compliance Schedule

- One panelist recommended not just looking at a shortage in the market pushing back compliance but also making it more aggressive if there is more availability.
- What would be the impact on consumers of inaction if a problem is discovered and the compliance schedule would not be delayed? Staff responded that if it there is a problem (i.e. inability to supply, cost is prohibitive) staff would work with stakeholder to consider a range of options including adjusting the compliance schedule.
- Consider ramifications on transportation fuels if compliance targets cannot be met.
- There are other low carbon markets. To what degree is fuel being produced but not coming to California? The market overall might be getting better but are we seeing it?
- Panelists pointed out that the questions have a passive phrasing. Need to communicate a more active assessment on plans to anticipate and respond to issues.
- An ARB Board member took a moment to comment that the broader cumulative comment in reaction to multiple earlier comments: Motivation is to stimulate innovative and investment in low carbon fuels. It is not business as usual. We are not tracking business as usual. ARB and the State are very strongly committed to sticking with these targets. Only as a last resort would we change the targets. If we have weak targets or a belief that ARB won't stick them, investment won't flow. Only as a last resort under extraordinary circumstances would these targets ever change. Do not get into the mindset of tweaking it at the margin.
- What happens if we have a problem beyond the timeframe of this panel's participation? How can we create structures to buffer against that? Other factors that can impact the compliance schedule: biodiesel, NOx.
- The question isn't *will* companies comply; it is *how* will they comply? The question will be: What is it going to cost?

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- It is very central to assess potential indirect systemic effect of food market (example collapsing corn crops). This could affect a need for adjustment. Need to track drought, yield, and fertilizer conditions to the extent that it affects this.
- Keep discussion of high carbon intensity crude oil in mind.
- Are there any regulatory or process barriers that impact the compliance schedule and are there any solutions to those barriers?

Topic 3 – Lifecycle Assessment

- Connect topic 3 back to topic 2. As we go forward with lifecycle there are companies popping up and we might end up with an over-compliance situation that we need to recognize and use to this program's advantage.
- What resources are needed to perform a validation of a majority of pathways?
- If there are changes to lifecycle (like indirect land use) we don't want them to happen too frequently.
- We don't want to create an incentive to create new modeling efforts, etc. There might be a benefit for having a review process for newly published studies.
- What about other effects not fully considered: water use, farming intensity, review adequacy? There is no real mention of sustainability in here. Staff acknowledge that sustainability plays a role in this topic and has been exploring water use, flaring intensity, and other topics that are not intrinsically in the LCA.
- Water use has nothing to do with CIs. Lower CIs need to reflect current technological improvements.
- We need to be cautious in how we balance rapid advances in science with need for certainty. No one wants this regulation to be two, three or even five years behind the science.

Topic 4 – Advances in Production

- Consider not only the advances in fuel production but also feedstock production.
- Update the projections. How do projections from 2007/2008 look today? Do we have what we thought we would have now? Staff responded that an update would include data collected since the implementation of the LCFS. For example, one source of data is the biorefinery registration information. Some corn ethanol plants have lower carbon intensity than we anticipated.
- How will we determine cost-effectiveness? Propose that cost-effectiveness also goes back to regulatory approach of cost to societal impact and not just direct consumer impact.
- Is it a fair point to make here that you are saying you are going to make a projection for the fuels we are interested in?

Topic 5 – Ultralow Carbon Fuels

- We need a consideration for limitations on the number of vehicles that use those fuels. You may have plenty of fuel but if there aren't enough vehicles that use it, it doesn't help.

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- Linkages should also spread to uncertainty (drought, automobile technology, etc.) and how that influences investment. We need to wrestle with the best way to arm ARB and make the regulation durable through a myriad of difficulties to give confidence to people and investors.
- Are the mechanisms consistent with a fuel-neutral based program? Will incentives affect the ability to reach the 10 percent target?
- We need to consider the regulatory impacts of other entities (like electricity) when they make changes.
- Investment needs to look beyond production capacity to transport, storage and delivery. How much capacity will be needed in the State to move these low carbon fuels from producer to consumer? What are those impacts?
- Are there any policies that can ensure participation? Compliance schedules will eventually require participation, but there is a vital need to incentivize those fuels early on to create a robust supply.
- Linkage between this topic and topic 3. Also pointed to the workgroups and how they could feed into questions.

Topic 6 – Supply and Commercialism

- The California Energy Commission forecasts for fuel and vehicle by vehicle types. Strongly advise against using Board of Equalization data (data is below demand because they only track taxable diesel).
- Add fuel and feedstock prices to the first bullet.
- It would be helpful to include comparisons to other states' programs and a quick survey of international programs (Europe and South America in particular).
- We need consistency with EPA estimations.
- Add a bullet point with a timeline that shows the amount of time between an idea and actual commercialization. The time lag isn't reflected here.
- There is an importance to trying to plot out next five years because most of that availability can already be determined with data we have. 80-90 percent of capability is already known.
- There is a benefit to establishing metric of materiality for fuels and technologies (for example how much it takes to reduce carbon intensity by one percent). So if it increases by one percent each year, we're going to need that much more reduction on our end. It will help categorize where some technologies are in their development. It will help us identify which available technologies matter.
- In terms of a five-year forecast, there are some things in place, but other things are still pending. Like regulatory changes or fixes that could dramatically change availability.
- In the spirit of enabling people to participate, a panelist challenged the group to think: "Is this a barrier to supply and commercialization or is it a barrier in underdeveloped credit market system or regulation?"

Topic 7 – Impact on State Fuel Supplies

- Linkage to topic 15. There is a direct relationship with bullet 5 information.

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- Is there sufficient fuel to meet consumer needs year by year?
- As we change the fuel supply is there adequate funding to maintain/ensure fuel quality? We need to make sure there are resources to ensure that new fuels meet quality standards.
- We need to address conventional fuels. If we do not have adequate low carbon fuels to mix with our regular product, we won't be able to sell our regular product.
- The California Energy Commission does major staff analysis, history and projections on demand for California, Nevada, Arizona – imports, exports, refinery capacity, crude oil. This information will dovetail into these categories. CEC will share.

Topic 8 – Revenue and Consumers

- Under the British system there is a “buy-out price” compliance option. Has that been discussed in the California plan? It puts an implicit maximum compliance cost on operators.
- Is the low carbon fuel impacting state revenues? How? Specifically, what about fuel tax revenue that goes to the State? How will revenues be made up if we sell fuels that are not taxed or taxed differently? Is this being communicated to consumers when they make choices about purchasing low carbon fuel vehicles?

Topic 12 – Economics and Environment

- Make the cost analysis with the proper understanding of the incremental carbon reduction costs.
- Look at potential environmental impacts, not just retrospective.
- Lack of clarity between relationship with LCFS and changes to fuel in general. How does E15 work with LCFS? Staff responded that the federal government has established limited options for E15. ARB expressed concerns on record regarding air quality and consumers. This is something we will continue to participate in. If we establish a specification, it will require a modification to a regulation and a full public vetting process.
- We should consider the impacts of E15 that go beyond vehicles to other machines like chainsaws, lawnmowers, etc. We need to make sure that changes to the fuel don't impact them as well.
- What would have happened without AB 32? How can you tease out which investments are directly related to LCFS from other risk loving investment in California? And how do we move forward with that type of analysis?
- What are the holistic benefits of homegrown fuels? Should we also consider indirect benefits? What about protecting Organization of the Petroleum Exporting Companies (OPEC) versus homegrown fuels that don't need transport?
- Do we need to reevaluate the economic analysis that said it would save consumers money? If we are going to evaluate consumer impact we need a discussion on how much is too much?
- Include an assessment in avoided wealth transfers.

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- Within the construct of environmental analysis, we should assess multimedia impacts and the comingling effect between different complying fuels.
- Staff reminded Panel that these questions are useful and important. As we move forward, we don't have the information for some of these questions and it is early in the process. It might be that we set up how to obtain the type of information we need to capture moving forward. We don't want to create an expectation that is unachievable on the kind of analysis that can be done. How we answer it is as important as the question itself.
- Look at the leadership impact of LCFS. Incentives can be in a broader analysis. The R&D incentives and impacts on global fuel prices ultimately benefit consumers.
- When looking at other states exploring LCFS, we need to consider increased competition for limited resources and the economic impacts of that. Also suggested that when we examine costs/benefits we need to look at the tradeoffs. How are costs and benefits helping achieve the State's goals? We need to look at costs/benefits together instead of separately.
- In addition to looking at the economics of production we should not overlook high-value R&D. That is a tremendous economic value. Staff responded that this type of information would be very helpful in this analysis.

Topic 13 – Harmonization

- Is there any real net reduction in the GHGs if we just take in other state's low carbon fuels?
- Will we be getting a report from the national LCFS group doing work in this area? Staff responded that we are planning to get that report. We are also looking for stakeholders to provide more information on this topic.
- Consider not only what other programs exist but their decision-making processes to get there. Recommend including an understanding of how harmonization would relate to the decision-making process.
- Staff commented that we need to also look at degrees of harmonization and common assumptions in terms of this discussion.
- Are we harmonizing with other ARB programs: ZEV regulations, LEV regulations, GHG regulations, etc.? Staff responded that there is clear linkage to GHG programs. There is a complimentary relationship of strategies under the scoping plan to reach 20 percent reduction. There are other linkages with programs that encourage and promote low carbon emissions.
- There are revisions to ZEV to meet the mandate. Are those scenarios and estimates tied into the availability and estimates of credits available in this program? Staff responded that we looked at different compliance scenarios. There are many different pathways to get there.

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Topic 6 there is no way to know what the taxes will be when these fuels are commercially successful. We don't even know what the tax situation will be in this State by the end of the year let alone beyond. That is a highly speculative enterprise. Segue

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to Topic 12. If you look at the battle over the economic impact of AB 32 and the direct and indirect impact on land use, it raises the paradox of the more we know the muddier it gets. At some point you're extrapolating and speculating. Due diligence *is* required but there has got to be some real significant reason to go back and revisit that issue because it is so complex.

Topic 9 – Public Health Impacts

- How are fuels already being produced in the State and conventional fuels being regulated? What standards are being applied?
- From an infrastructure standpoint, what is the mechanism by which these fuels will get to the end user? Staff responded that this is where checks and balances come into play. There is a structure in place to see how the market is developing, a structure to see how impacts are mitigated. Part of that is coordination with local districts and with the CEQA process with new infrastructure. The harder question is what elemental changes are related to fuel standards and what are related to other reasons. Include the impact of bulk storage and transport, not just production.
- Will the siting documents impact which biofuels we will produce in the State? If these concerns (public health / air quality) are going to result in fewer biofuels being produced in State we need to talk about that.
- If you build multiple facilities in the same area you need to look at public impact from things like truck traffic, bulk terminals, etc.
- What are the means of ensuring regulatory compliance as accurately as possible but using the resources of the State to put together that analysis? There are a lot of disincentives working in California. To meet the goals we need to look at that.
- We need to look at multimedia. New fuels require new chemical registration. Those are other tools that should be expected.
- Add a bullet to address health benefits. Some of the low carbon fuels will burn cleaner than existing fuels.
- Recommend restating the idea of cumulative assessment in the areas most impacted by air quality.

Topic 10 - Air Quality Impacts

- Capture improvements in air quality. A lot of biofuels have different toxicity and biodegradation levels that should be captured here.
- Cumulative effects research will help identify areas disproportionately impacted by air quality when looking at locations for new facilities.
- Include criteria particularly for biodiesel and other fuels; not just mass emission but particle number and NOx mitigation numbers to fully offset the impact.

Topic 11 – Hurdles and Barriers

- Consider barriers resulting from federal law. Also recommended adding a lead-off question that would lay out typical permit and construction timelines for

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biorefinery and major infrastructure. Knowing how long it takes to permit and build would help know when fuels would be available.

- Infrastructure barriers should reflect the supply chain from the refinery to the fuel tank. Each step has different issues throughout the supply chain.
- Is this where we would capture barriers or hurdles for hydrogen infrastructure? Staff responded that hydrogen has a role in the future. Calling it out would be appropriate.
- What barriers are created due to lack of coordination between different California agencies that if they were coordinated would further advance low carbon fuels? Each organization has a view of their part of the process and increased coordination would further advance low carbon fuels. What coordination would we need to improve that process? Staff pointed out that all of the state agencies related to fuel do work together. We meet regularly and deal with each other personally. Hopefully that will alleviate some of those concerns
- How LCFS can influence barriers for consumers/users?

Topic 14 – High Carbon Intensity Crude Oil

- Does the differentiation of crude oil in the California LCFS result in any of the following: an increase in the volumes of low carbon fuel used in the State, incentives to produce low carbon fuels, or net global GHG reduction? Staff responded that the expectation is to reduce GHGs with an emphasis on California. However, the program is having impacts that go well beyond California.
- How does this policy impact energy supply and security?
- Topics links to topics 1, 2, 7 and probably others. Look at the environmental impacts of HCICO.
- We need to address that idea that if there is no accounting mechanism for petroleum getting dirtier over time, then what is the purpose for the LCFS? If there is no accounting principle for petroleum, what is the fairness to other low carbon fuels if we don't count for petroleum getting dirtier? How can we best signal improvements to the production of oil and actually credit for that without leakage?
- If you don't measure it, you don't control it. We need to determine the feasibility of tracking crude import carbon content as determined by API gravity. We need to determine the potential to update the baseline crude oil carbon content annually to enhance carbon accounting.
- The full fuel lifecycle does consider all effects. If you do something here, will something happen somewhere else in the world, and what is the net effect of that? If we don't take something here but they take it somewhere else, it is still out there and it counts. If you prohibit high carbon crude from coming here, it will be refined and be sent somewhere else. If it is shipped across the Pacific, then you've got more transportation emissions, so you're actually creating more leakage by not using it here.

Topic 15 – Credit Trading Market

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- How is the federal RIN program helpful to the LCFS credit market? Perhaps we can learn something from how this system works.
- Credit markets are good for shorter-term transactions. The flow of capital through credits and into compliance should be watched.
- Credit integrity is essential to a viable system. Federal RINs, especially cellulosic RINs will be a crucial tracking tool. Can tracking of federal RINs enhance the integrity of a credit market? Is there a potential of shuffling federal RINs to California, which will undercut the benefit?
- Indefinitely banked credits discourages market growth where you have aggressive and transparent trading, especially where you have credits earned by oil companies based on their investments where they exceed their requirement. To encourage people to trade, banking those indefinitely slows down the market.
- Links to topic 1 – scarcity of compliance tools for a brief period of time.
- We are in the second year of LCFS and there is no credit market, but AB 32 already has a trading market. Is there a broad liquid market for low carbon fuel standard?
- What is the timeline for developing a credit market? Non-liquid fuel providers may not be in position to sell credits for compliance. We need to ensure that all alternative fuel providers can play in this market.
- Are there any difficulties for smaller players getting access to trading?
- Most parties are planning to comply on their own. We don't expect a need for a trading market yet.
- What are some of the parameters we need to set up a market? We need to protect against market power or cornering of the market if the crunch time does come. We could also look at partnerships with third parties to set up these markets quickly and efficiently to not reinvent the wheel.
- It would be helpful to show realistic compliance scenarios. Are there possibilities of compliance based on credits today?

Workflow Process

- Michelle walked the group through continuing workflow process (slide 4). After this meeting, panelists still have three more opportunities to discuss the work being developed.
- Panel will review Topic 5 outline today. Topic 9 and 10 outlines are in development for pending release. Some outline releases might fall between meetings but comments are still incorporated into final product so don't wait to provide comments until meetings if the release falls between meetings.

Draft – Topic 5 Outline

Michelle walked the panel through the document layout. Opened discussion to panel about the process and outline specifics. The comments made on Topic 5 today will adjust this document.

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Process Questions

- Panelists asked: What if there are disagreeing positions on the panel? How will you (ARB) handle that? Staff responded that the Board will be very interested in knowing if there is a consistent opinion. There will likely be a spectrum. We will convey that to the Board but not sure exactly how within the report. They are looking for a broad-based examination.

Mapping/Document/Content Questions

- Panelists pointed out that this reads as “how” we do this, not “whether” we do this. There should be some discussion upfront about market-based fuel neutral performance based approach/standard. A lot of these are the antithesis of doing that. I think we need a discussion on whether this is viable at all. Staff responded that this is trying to get a good handle on what ultralow fuels are available. Direction from the Board was not to look at this as a replacement for the 10 percent. It is to better understand what the potential for ultralow fuels are and the incentives to increase production and volume of those fuels. Part of this was a creativity mechanism to incent in additional ways.
- Panelists suggested that we break this topic out on a fuel-by-fuel basis and discuss the barriers and then available incentives for each fuel.
- Panelists commented that in section that deals with investment we need a little more teasing apart of investment to give the Board a meaningful sense of how these technologies are developing and when they can produce fuels. Investment that goes into a large-scale production facility—that is a potent signal. If it is a major multinational is investing in a technology that is far short of saying they are ready to build a large-scale facility. Further down the scale would be venture capital in an idea. The nature of the investment is important to consider. Just tallying all of the press about investment isn’t a good read on what is going on.
- Panelists suggested each ultralow fuel will have its own set of issues so can we list the incentives as examples?
- One panelist believes the purpose of this chapter is a survey of the market today and what the market thinks it can use. Ask what incentives these companies are currently utilizing rather than talking about new ones. The definition to being included would be a fuel that could play a meaningful role by 2020 and meets the 60 percent.
- Panelists suggested that we need to clearly define the principles that lead to ARB applying incentives. What are the principles that would lead to removing those incentives? That might help keeping this performance based but still recognizing the need for different incentive structures.

Clarification Questions

- Panel was confused over the 60 percent threshold. How would you normalize that? Staff responded that the 60 percent was just a starting point. We needed a

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point for staff to know what to examine so they wouldn't have to cover everything. We might need to discuss which fuels to discuss.

- Panelists commented that part of the RFS performance isn't reflected. It is very important that we don't fall into trap of incenting the same for people who meet different standards. People who exceed 60 percent should not get the same incentives as people who only meet 60 percent.
- Panelists commented that using 60 percent creates a false sense of similarity with RFS. And that if you're trying to identify what you need for the ultimate success of the program, 60 percent won't even come close. Staff responded that 60 percent was simply a starting point to identify fuels that could potentially fit into the ultralow carbon fuel category.
- One panelist suggested that to the extent that it is useful we need to identify what we mean by new technologies for reduction. Sixty percent is low-carbon, but not ultralow carbon.
- Panelist comments that CI is not the only component, but that volume is important too. We should conclude that volume, not necessarily an ultralow CA CI, is what is important. Panelist recommends incenting ultralow carbon with some sense of scalability (maybe 5,000 barrels per day). We need to consider adding a volume threshold in addition to a percentage.
- Panelists commented that there are three components: Technology, getting it to the marketplace, and customer has to want it, buy it, and use it. It won't be real if the consumer won't buy it. How do we get a realistic feel for that? We could waste a lot of time and money on things that people won't buy.
- Panelist recommended a spreadsheet (graph) with a compliance schedule on one axis and gallons on the other to see how many gallons we need to comply each year. This would help us see which fuels and which incentives work. Is that possible for the next meeting? Panelist volunteered to work on this.
- Panelists suggested that we might want to identify higher risk low carbon options that might need a push. In the short term they won't be profitable but they pay off in the longer term. I think you need to think through how those incentives could work for very low carbon high risk fuels. In the pros and cons you could identify things.

Next Steps

If you have any comments on this summary please provide them to Michelle Buffington by June 29, 2011.

Next panel meeting is Thursday, June 30th and Friday, July 1st

ARB will:

- Follow up with volunteers from the panel.
- Distribute outlines for topics 9 and 10.
- Begin writing the white paper for topic 5.

June 30th / July 1st Meeting

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- There is interest in starting later than 9 a.m. and considering 10 a.m. start.
- Please indicate whether you will be here remotely or in person by June 6th. If you do not let us know by that deadline, you cannot participate as a panelist, only as a public member.

Panelist requested that future meetings not end at close of business on Friday afternoons for those who have to travel.

Closing Comments

The workplan informs the outlines. The outlines inform the white papers. The white papers inform the report. Today' key expectations: Have we posed the correct questions, have we identified an effective approach to inform those questions and in which specific areas can the panel weigh in to assist on those topics? We have taken notes on who volunteers to follow up on a range of topics through phone calls. We have a lot to do between now and June. We will do our best to get documents to you. But stepping back, I think this workplan and this meeting has been very useful. Your contribution is valued.