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BIOFUELS & RENEWABLES

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Chairman Mary Nichols and Board Members
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814
Submitted electronically to http://www.arb.ca.gov

RE: Low Carbon Fuel Standard
Cost Containment Provision

November 11, 2014

Dear Chairman Nichols and Board Members,

Thank you for the opportunity to provide comments regarding the readoption of the California Low Carbon Fuel Standard and, in particular, the cost containment provision currently under review and discussed at the public workshop on October 27, 2014.

While we provide a good deal of detail and explanation to our comments in this document, to be as clear as possible and to state it as prominently as possible in this document in no uncertain terms, we believe that the $200/MT level is *well below* the marginal cost of reducing the weighted average carbon intensity of California's transportation fuel pool. If the cost containment provision is implemented as proposed, it will guarantee that *the LCFS will ultimately fail* as a prescriptive market-based economic policy due to very simple and predictable microeconomic principles: consumption of gasoline (and the corresponding creation of LCFS deficits) will be too high and the supply of LCFS credits will be too low.

As we demonstrate below, the success of the LCFS in later years is dependent not on an increase in the availability of low-carbon fuels and the credits therefrom, but instead will rely more on reducing the number of deficits created from high-carbon fuels which will come from reducing demand for those fuels and increasing the **infrastructure** (namely, the number of alt-fuel vehicles) available for their consumption. Given consumers' highly inelastic structural preferences for consuming E10 California Reformulated Gasoline (hereafter, "gasoline") due to their lack of capacity to consume any other fuel, we believe that the price cap associated with ARB's proposed cost containment mechanism should be **$1000/MT or more** in order to achieve these reductions by 2020.

Company Background

GHI Energy is a registered Energy Service Provider in California and provides natural gas procurement services and LCFS credit monetization to several public CNG fleets consuming more than 1,600 dekatherms per day, including large public transit agencies, public school bus fleets, and municipalities. We are actively expanding our customer base and each month our customers create increasing quantities of LCFS credits for sale into the program.

GHI is a strong supporter of the Low Carbon Fuel Standard and the goal to decarbonize transportation fuels in California and throughout the world and we applaud ARB for its actions in pursuing this goal by incentivizing the consumption of alternative fuels and the expansion of renewable fuel infrastructure. The LCFS has been a successful and elegantly constructed market-based program that provides flexibility – and therefore economic efficiency – to both fuel consumers and producers.

To this end, we would like to express our great concern over the proposed LCFS cost containment "credit clearance" mechanism that would set a de facto price cap at $200/MT per LCFS credit[1]. While ARB's wish to protect consumers and producers from pricing spikes and to introduce market stability is laudable, if the price for LCFS credits is artificially set to a level that is too low – below the marginal cost of reducing demand for high-carbon fuel – there will not be sufficient incentives to either low-carbon fuel suppliers or high-carbon fuel consumers to positively change their present behavior away from high-carbon fuels towards lower-carbon alternatives.

Our detailed comments about the proposed $200/MT price cap are summarized below. At no point in this document do we attempt to present our opinions as scientific or based on proprietary research; our only goal is to publicly comment that the price cap proposals from staff are inconsistent with the existing research and contrary to accepted microeconomic principles.

1) The 2012 National LCFS Study Warns That A Price Cap Must Be Carefully Selected Based on the Marginal Cost of Reducing Emissions

The 2012 National LCFS Study[2] (hereafter the "National Study") cited by staff as one of its primary references for its cost containment mechanism, specifically warns against setting a price cap too low below the marginal cost of emissions reductions saying, "Careful selection of a ceiling price is necessary to ensure the overall integrity of an LCFS program. A low price ceiling will mean the mechanism is triggered more frequently and, in extreme cases, may convert an LCFS program into a carbon tax regime, as was observed in the Danish ETS program between 2000 and 2003."[3] The report then goes on to describe the failure of the Danish price cap as being due to, "[The] ceiling [being] fixed at a level sufficiently below the marginal cost."[4]

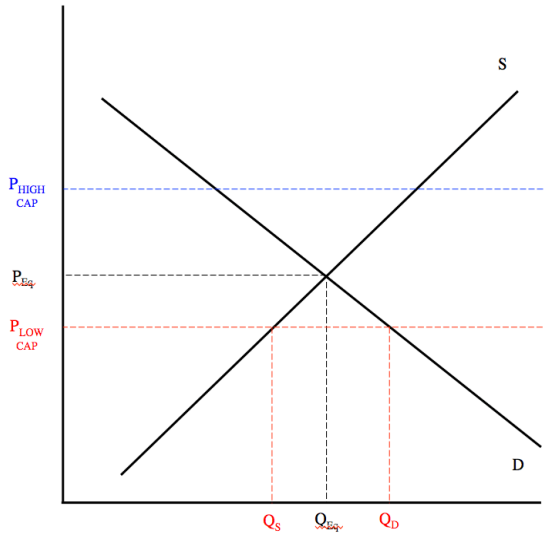
This is demonstrated in the chart below, where the equilibrium price for LCFS credits, as in any competitive market, is at the intersection of the supply and demand curves. If the LCFS price cap is too low (red line), it will cause a mismatch of supply and demand for credits and too few credits will be produced to match the deficits created from high-carbon fuels. This was ultimately the fatal flaw in the Danish ETS described above.

[1] With regards to the specific proposed "credit clearance" structure dealing with rolling year-to-year regulated party compliance issues, we are

[2] University of California, Davis et al: "National Low Carbon Fuel Standard" July 2012.

[3] University of California, Davis et al: "National Low Carbon Fuel Standard Policy Design Recommendations" July 2012. page 65

[4] University of California, Davis et al: "National Low Carbon Fuel Standard Policy Design Recommendations" July 2012. page 65



A unique feature of the LCFS credit market is that demand for LCFS credits is not an independent function of consumer preferences for the consumption of credits themselves, or for the consumption of the underlying low-carbon fuel creating them. Rather, demand for LCFS credits is actually a function of consumer preferences for the consumption of *high*-carbon fuels, such as gasoline and diesel. In this regard, the price for LCFS credits is therefore a sort of Pigouvian tax on high-carbon fuel consumption and the marginal cost of emissions reductions is the point where demand for high-carbon fuels is reduced. We believe that it is only logical that consumers "pay the price" both literally and metaphorically for their consumption of high-carbon fuel and that the ultimate regulated parties, the refiners and high-carbon fuel suppliers, will logically pass compliance costs along to consumers as a cost of doing business[5].

This is the reasoning behind the caution advised in the National Study with regards to determining the price cap level in a cost containment mechanism. If the selected price cap level is below the price at which overall consumption of high-carbon fuels (i.e. deficits created) is reduced enough to match the supply of credits available – the cost that consumers need to see to influence their behavior – the LCFS will fail to achieve its goal of reducing the carbon intensity of the overall fuel pool.

As we will demonstrate later, the cost of reducing consumption of high-carbon fuels is very likely to be much greater than $200/MT.

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[5] We take exception to Mr. Waugh's comment at the October 27th workshop that it is an "extreme assumption" that refiners would pass on the cost of their LCFS compliance obligation (the cost of credits purchased) to consumers. It is, in fact, a very ***basic*** assumption of economics that manufacturers will embed their entire cost of production, including compliance costs, into the price of a finished good, in this case, gasoline, whenever they are able. Any refiner who does not pass along this compliance cost will go out of business very quickly if every gallon of gasoline sold incurs a marginal increase in cost that is not recovered in the sales price charged. Petroleum refining is an extremely low-margin business and California refiners and petroleum industry groups have expressly stated time and again that these types of environmental costs get passed along to consumers whenever possible.

Some sources have argued that refiners may choose to delay the passing along of these costs in a sort of crude game theory, reasoning that if they allow the over-creation of a large number of deficits, the LCFS could eventually collapse under its own weight when their simply are not enough credits available to cover the number of deficits in the program. In this regard, a low price cap on the price of credits plays right into the hands of these refiners, by limiting the pain felt and not incentivizing them to find creative compliance solutions as a market based program like the LCFS is designed to encourage, which is all the more reason for ARB to be cautious when putting a limit on LCFS credit prices.

2) ARB Can Still Institute a Price Containment Mechanism So Long As The Maximum Price Is Above Average Cost of Emissions Reduction

ARB's desire to institute a long-term cost containment mechanism is laudable and likely a prudent course of action, *provided that the price cap selected is not too low to disincentivize good behavior*. A sufficiently high enough price cap – higher than the marginal cost of carbon reductions, as shown by the blue line in the chart above – will achieve the goals outlined by Staff at the October 27th workshop: stability, predictability, and a reduction of volatility. However, as we demonstrate below, it is extremely important that staff determines this price cap level in light of the structural factors inherent to demand for high-carbon fuels. If the selected price cap is too low, it will actually serve to harm the LCFS market and prevent the overall reduction of high-carbon fuel consumption. It is very likely that at the $200/MT level, the market will simply "cap out" within the next few years as demand for high-carbon fuels continues unabated and, as the LCFS tightens each year, creates more and more deficits being chased by fewer and fewer credits. In this circumstance, while the *price* paid for LCFS credits will be limited, actual compliance will fall short because the true *costs* of compliance are not being met.

3) Staff's Selection of the $200 Credit Price Appears Arbitrary, Poorly Sourced, and Not Based on The Marginal Cost of Reducing Emissions

In reviewing the 2012 National LCFS Study[6] cited by staff as its primary reference for the $200/MT price cap level, we can find no basis for the $200/MT price cap level. Instead, the $200/MT price cap appears to have been arbitrarily selected and not based on the actual relevant content of the study. As near as we can tell, this study only mentions the $200/MT figure one time, as a sample point within a larger discussion of the hypothetical LCFS value of low carbon electricity production[7], and does not, at any other point in the paper, present the $200/MT figure as a possible equilibrium price in the LCFS credit market or as a economically-derived solution to the marginal cost of carbon reductions under an LCFS.

Similarly, the November 2013 study of cost-containment mechanisms prepared specifically for ARB by Lade and Lin[8] also does not assert that the $200/MT level is the marginal cost of compliance, only that in a hypothetical exercise considering a range of supply elasticities, $200/MT is a level that maximizes the production of cellulosic ethanol relative to traditional ethanol[9]. In fact, nowhere in the Lade and Lin document is an attempt made to derive the marginal cost of reductions.

Finally, our review of the literature supporting the British Columbia LCFS compliance penalty of $200/MT, the final source cited by staff, also failed to find an economic basis of any kind, only what seems to be an number chosen by an anonymous regulator for what could have been any number of different reasons. Furthermore, we would like to point out that even if this penalty amount was scientifically derived, local supply and demand factors and consumer preferences in the fuel market in British Columbia would likely be much different than those same factors in the California market, not

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[6] University of Calfornia, Davis et al: "National Low Carbon Fuel Standard" July 2012.

[7] University of Calfornia, Davis: "National Low Carbon Fuel Standard Technical Analysis Report" July 2012. page 31

[8] Lade and Lin, University of California at Davis: *A Report on the Economics of California's Low Carbon Fuel Standard & Cost Containment Mechanisms,* November 2013.

[9] Lade and Lin, University of California at Davis: *A Report on the Economics of California's Low Carbon Fuel Standard & Cost Containment Mechanisms,* November 2013. Page 27.

to mention differences in foreign exchange and commodity prices (i.e. Canadian Dollars) that would also be present.

4) Determining The Marginal Cost of Reducing Emissions Must Consider Both Supply *AND* Demand.

Because aggregate transportation demand, and, correspondingly, transportation *energy* demand, is constant, at least in the short run, the consumption of low-carbon fuels cannot be additive to overall fuel consumption and any increase in the consumption of high-carbon fuels must come instead *in place* of high-carbon fuels. This means that LCFS compliance relies not only on increasing the availability of low-carbon fuels, but also on reducing the consumption of high-carbon fuels to create enough "room" for lower-carbon alternatives. (Lade and Lin touch on this scenario early in their paper[10] and then interestingly never return to it). The marginal cost of compliance, therefore, is not just the marginal cost of producing high carbon fuels, the exclusive focus of the Lade and Lin paper, but is also equally dependent on the marginal cost of incentivizing high-carbon fuel consumers to change to consumption of low-carbon fuels which is only possible by consuming fuels in a vehicle fleet that is constituted much differently than that found in California today. Holland et al state this disclaimer very prominently early in their findings[11].

In this regard, we find the Lade and Lin study, which is otherwise fair and thorough, to be seriously deficient and ultimately flawed as a policy basis for the cost containment mechanism, because, like Holland et al, they make no allowance for the ethanol blend wall and instead ignore the existing constraints in the gasoline fuel market[12] and assume that low-carbon biofuels are perfect substitutes for gasoline. If gasoline and high ethanol blends were perfect substitutes, then any discussion of reducing consumption of gasoline would be irrelevant and the entire marginal cost of LCFS compliance would be identical to the low-carbon supply curve. This is not true in reality however, because the existing light-duty fleet in California is ***highly*** constrained by the ethanol blend wall and there is simply no way for those existing vehicles – by some estimates over 98% of the entire light-duty fleet[13] – to consume low carbon fuels in any proportion greater than 10% by volume[14]. Accordingly, the marginal cost of LCFS compliance will be driven by the marginal cost of reducing demand for gasoline[15], which by definition must be the marginal cost of persuading consumers to replace these E10-constrained vehicles with alternative fuel-vehicles that can consume low-carbon fuels. While the assumption of perfect substitutability is probably acceptable in a purely academic study (i.e. Holland et al), when used as a basis for policy, ignoring the current constraints of the light-duty fuels market is, quite simply, utterly irresponsible.

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[10] Lade and Lin, University of California at Davis: *A Report on the Economics of California's Low Carbon Fuel Standard & Cost Containment Mechanisms,* November 2013. Page 10.

[11] Holland et al: "Greenhouse Gas Reductions under Low Carbon Fuel Standards?" National Bureau of Economics Working Paper 13266, (July 2007) page 28.

[12] Lade and Lin, University of California at Davis: *A Report on the Economics of California's Low Carbon Fuel Standard & Cost Containment Mechanisms,* November 2013. Page 26.

[13] California Energy Commission, Energy Almanac: *Statistics and Data on Ethanol and E85 as Transportation Fuels,* retrieved Nov 14, 2014. http://energyalmanac.ca.gov/transportation/ethanol.html

[14] We ignore the possibility of E15 consumption because a.) there is a myriad of external regulatory and commericial factors preventing its widespread introduction in California in the next 5 years and b.) compliance scenarios for E15 are more or less the same as those for E10 and a 5% increase in the consumption of mid-CI ethanol likely won't bring enough credits into the market to offset the increasing per-gallon deficits created by gasoline consumption.

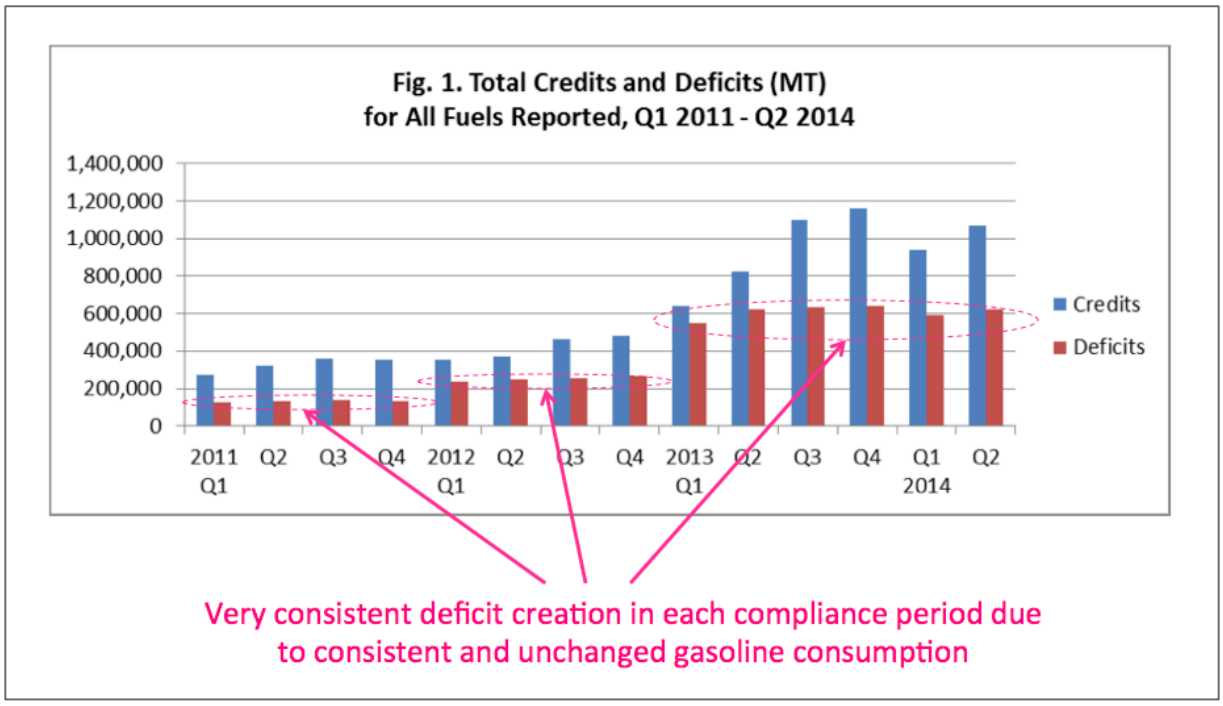
[15] We agree with Lade and Lin that LCFS reductions from the diesel sector are irrelevant to overall marginal compliance because of 1.) inherent structural differences between the two sectors that drive the relative ease of compliance and 2.) the relative size of the two sectors, where gasoline consumption in California is 3-4 times as large as diesel. Accordingly, we will ignore compliance options from diesel vehicles.

Staff's "Illustrative Compliance Scenario" presented on October 27 tacitly acknowledges the requirement of alternative-fuel vehicles by specifically forecasting an increase in the size of the light duty electric vehicle fleet, but then, when discussing the cost containment mechanism curiously ignores the need to account for or estimate the cost of incentivizing that switchover, apparently assuming instead that these changes to the vehicle fleet will happen organically and lead to spontaneous LCFS compliance in later years.

We are frustrated that a rigorous analysis – or any analysis at all as near as we can tell – of demand-side LCFS factors and the effect they may have on the cost of LCFS compliance, in particular the marginal cost of transforming the existing light duty vehicle fleet and reducing consumption of high-carbon fuel, is conspicuously absent from Staff's work regarding the LCFS cost-containment mechanism and its justification for choosing the $200/MT level. Staff does not appear to have attempted at all to find the true marginal cost of carbon reductions under the LCFS and, as mentioned above, just arbitrarily selected the $200/MT level based on selectively chosen pieces of data in the sources cited.

5) Evidence to Date Shows That Consumers Are Very Insensitive to LCFS Credit Price So Far

Because gasoline vehicles are not being exchanged on a frequent basis, gasoline consumption and the subsequent creation of LCFS deficits will remain constant in the short run. This can be observed very easily in ARB's latest *Q2 LCFS Data Summary* where the creation of LCFS deficits is constant from quarter to quarter at any given LCFS compliance level, while credit creation rates have varied wildly from quarter to quarter due to fluctuating fuel mixes and pathways in reaction to credit prices. However, note that even at the high level of $85 per ton in Q3 2013, there was no noticeable effect on the production of LCFS deficits because, even at $85 per ton, the cost of LCFS deficits per gallon was less than one cent per gallon of CARBOB and was imperceptible to gasoline consumers and did not influence their decision to consume high-carbon fuel.

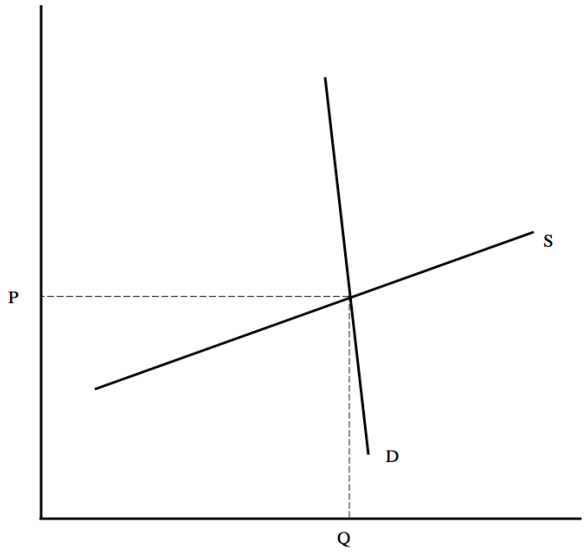


It becomes self-evident, then, that the main constraint of any successful solution to the LCFS equation is therefore ***not*** the supply of low-carbon fuels but rather the demand for high-carbon gasoline, or, put another way, the success of the LCFS program depends on reducing gasoline consumption and the number of gasoline deficits created therefrom.

Considering that the current fleet of light duty vehicles in California can only produce deficits and has an ownership cycle of five years or more, turnover from one vehicle type to another (i.e. gasoline to low-carbon) will occur slowly and gradually, and have a corresponding long-run sticky effect on deficit creation. Until the current vehicle fleet is replaced with vehicles that can consume higher quantities of alternative fuels, deficit creation will remain constant and will be a constraint to LCFS success.

Because the consumption of each gallon of gasoline incurs a compliance cost (i.e. the purchase of a credit to offset the deficit that was created), simply allowing consumers to bear the full cost of compliance, a cost embedded in the production cost of the fuel, whatever that may be, should be sufficient to achieve the necessary reduction in gasoline consumption. If ARB is unwilling, for whatever reason, to allow that to happen, then the LCFS will fail because consumers will not sufficiently reduce their consumption of gasoline.

It is highly likely that the supply and demand chart looks something like the following for LCFS credits, with a very steep, highly inelastic demand curve and somewhat flat, much more elastic supply curve, representing the fundamental characteristics of the underlying fuels:



In a market such as this, the highly elastic supply curve means that there are tremendous increases in the availability of low-carbon fuels as price increases, while the demand for high-carbon fuels decreases at a much slower rate for the same change in price. While a large increase in price likely does result in some "windfall profits" for low cost low-carbon fuel suppliers (something we heard said more than once at the October 27 workshop), those profits are a necessary condition of solving for the LCFS equation when one considers that those same high prices are required to have a meaningful negative effect on the demand for gasoline and the creation of deficits.

6) The True Cost of Reducing Demand for High-Carbon Fuels is Likely Closer to $600MT Under ARB's Recent Optimistic "Illustrative Scenario", Or More Under Less Optimistic Scenarios

As discussed above, we believe that the marginal cost of LCFS carbon reductions **is equal to the marginal cost of reducing demand for gasoline**. This is due to the well-documented[16] [17] [18]low elasticity of consumer demand for gasoline, which, quite simply put, means that any move along the demand curve for gasoline requires a change in price that is disproportionate to the change in quantity (i.e. the slope of the curve itself). This low elasticity is due to the fuel-inflexibility of the existing light-duty vehicle fleet and exogenous factors that influence the composition of the light-duty fleet, such as very granular autonomous ownership (i.e. many different owners each with their own preferences), the prevalence of multi-year financing arrangements that limit short-term turnover, and the prevalence of existing gasoline infrastructure that is unsuitable for repurposing with lower-carbon fuels. Furthermore, as demonstrated by Lin and Prince, in periods of high volatility in gasoline prices, as the California market has demonstrated in the past ten years, elasticity tends to decrease even further and consumers become less sensitive to changes in price[19].

To this end, two academic studies of LCFS programs estimate the cost of carbon reductions – the hypothetical cost of LCFS credits – while taking gasoline demand elasticity into account, to be anywhere between $300 per ton, assuming high gasoline demand elasticity[20], to more than $12,000 assuming lower gasoline demand elasticity[21]. Using the compliance curves presented at the October 27th workshop, these amounts would translate into an additional cost per gallon of gasoline of approximately $0.36 and $14.47, respectively by 2020.

Using an estimated elasticity of demand for gasoline equal to -0.5 (which is squarely in the middle of all the published estimates cited here), a similar but much simpler exercise can be performed that demonstrates that the expected required E10 reduction in ARB's (very optimistic) Illustrative "Gradual Line" Scenario could necessitate an LCFS credit price of approximately $605/MT. Should growth in light duty electric vehicles or some other ultra low-carbon fuel not occur, the required decease in gasoline consumption will need to be even larger (to reduce the number of created deficits even further).

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[16] Holland et al: "Greenhouse Gas Reductions under Low Carbon Fuel Standards?" National Bureau of Economics Working Paper 13266, (July 2007) page 28.

[17] Canes and Murphy: "Economics of a National Low Carbon Fuel Standard", George C. Marshall Institute. 2007. Page 12.

[18] Lin and Prince: *Gasoline price volatility and the elasticity of demand for gasoline, UC Davis Working Paper*. 2013.

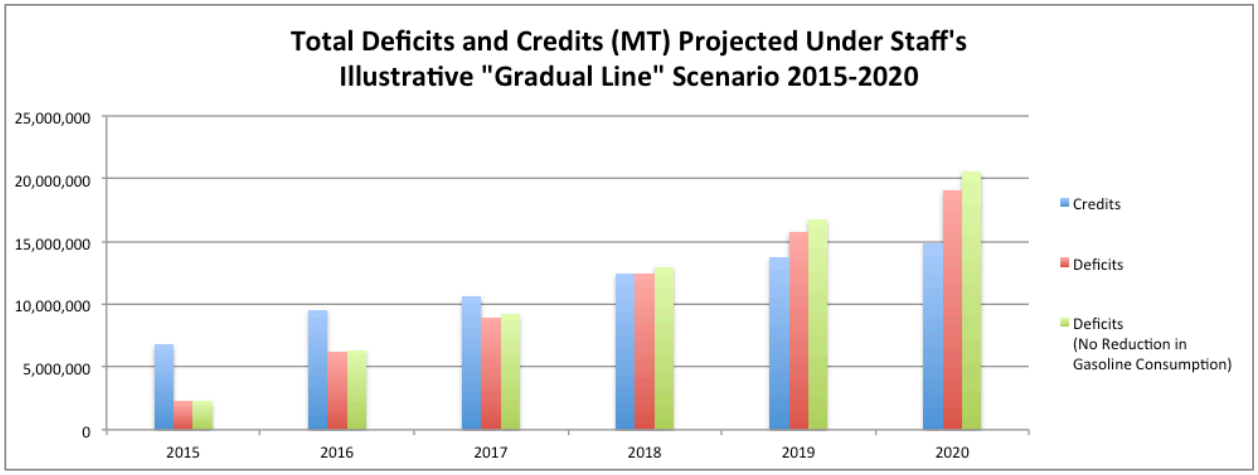
[19] Lin and Prince: *Gasoline price volatility and the elasticity of demand for gasoline, UC Davis Working Paper*. 2013. Page 3.

[20] Canes and Murphy: "Economics of a National Low Carbon Fuel Standard", George C. Marshall Institute. 2007. Page 13.

[21] Holland et al: "Greenhouse Gas Reductions under Low Carbon Fuel Standards?" National Bureau of Economics Working Paper 13266, (July 2007) page 47.

Average CA E10 Price in 2014 ($/gallon)[22]	$3.70	A
Required Total Decrease in E10 per ARB Illustrative "Gradual Line" Scenario 10/27/14[23]	-7.50%	B
Approximate Elasticity of Gasoline Demand per sources cited above	-0.5	C
Required Percentage Increase in Average E10 Price	15%	D = B / C
Required Absolute Increase in Average E10 Price ("LCFS Premium") per gallon ($/gallon)	$0.56	E = A x D
Approximate 2020 Deficits per Gallon E10 per ARB Illustrative "Gradual Line" Scenario 10/27/14[24] (MT/gallon)	-0.000912	F
Implied Necessary LCFS Credit Price (cost of deficit)	**$605**	**G = E / F**

The chart below shows the graphical balance of credits and deficits in the Illustrative Scenario described above in a format to Staff's regularly released LCFS Compliance Report. Note that this scenario assumes only a minimal reduction in gasoline consumption in later years, but even then, deficits outnumber credits by almost 20% by 2020. If these modest reductions in gasoline consumption don't occur, there will then be almost 7 million **more** deficits, even under this optimistic scenario, before taking into account the very aggressive assumptions of electric vehicle growth and penetration of other ultra low-carbon fuels contributing to the large credit bank forecasted by Staff. Should those additional credits not materialize without a reduction in gasoline consumption, the LCFS will not achieve its goals.



[22] http://www.californiagasprices.com/retail_price_chart.aspx retrieved 11/14/14

[23] http://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/102714compliancecurves.xlsx

[24] Estimated from calculations provided by staff. Our own calculations are attached to this letter.

(As an aside, in our discussions with other parties, we have also heard several times something along the lines of "the cost of Cap and Trade allowances will make up the difference." Considering that the Cap and Trade cost per gallon of gasoline is approximately 9 cents today and likely to stay in that range for several years[25], combined with the fact that the underlying fundamental economics of the Cap and Trade program will primarily affect very large stationary sources before mobile sources, we are reluctant to agree with that assertion and put the success of the LCFS program at the mercy of activities in the Cap and Trade market. We feel that from ARB's perspective, it would only be prudent as well to incentivize gasoline reductions under the LCFS that could themselves both lead to success in the LCFS and also contribute towards the success of the Cap and Trade program.)

7) A Cap On Prices is Not a Cap On Actual Costs

We would also like to remind ARB of the basic economic truism that a *price* in a market is not equivalent to a *cost*, especially if that market is constrained in some way from allowing prices to reflect actual costs. Whether or not ARB caps LCFS credit prices will have no effect on the true cost of LCFS compliance.

Given the fuel blend and infrastructure status quo of the California fuel pool, the true cost of complying with the LCFS and moving towards the de-carbonization of California transportation is not just the price paid by regulated parties to purchase LCFS credits or to supply alternative fuels, it also includes the cost of economic activities towards that end, such as the purchase of new vehicles, the construction of low-carbon infrastructure, and the decommissioning or repurposing of refineries, among other things. These costs are independent of the price of LCFS credits and will be mostly unknown until after they have already occurred and the LCFS program has already succeeded. Quite simply, however, if these costs are not fully realized in the LCFS credit market, and credit prices are artificially constrained enough to not properly reflect them, then the program will not succeed because suppliers and consumers will not find common ground.

The microeconomic definition of a price is that a price is a market's means of conveying information among participants, both suppliers and consumers. For instance, in a freely functioning LCFS marketplace, the price for LCFS credits should reflect the marginal cost of necessary activities to supply LCFS credits and to eliminate LCFS deficits and should provide incentives to both suppliers and consumers to engage in economic activity relative to that market price. A cap on LCFS credit prices would only hinder this conveyance of information and will have no effect whatsoever on the true cost of complying with the LCFS. For reasons we have explained elsewhere, we believe the $200/MT price level proposed is far below the true equilibrium cost of compliance and therefore will lead to the failure of the LCFS program due to an undersupply of credits and an over-demand for credits (i.e. over-creation of deficits).

While prices often *reflect* costs in a free marketplace, the opposite is not true: economic costs *don't reflect prices and are not determined or affected by prices*, contrary to the wishful thinking of regulators and politicians. Prices are only an indicator of costs, not a determinant, and while there may be some political benefit in trying to hide the outward appearance of costs by putting a very public limit on prices in a marketplace, *these actual **costs** remain unchanged* regardless of what the public price may be. And, if the costs are not paid, the necessary market activities for ultimate

[25] http://energyathaas.wordpress.com/2014/07/07/whats-the-worst-that-could-happen/

compliance will not occur. The cost of complying with the LCFS is whatever it may be, regardless of the market price of LCFS credits.

8) Because The LCFS Is Driven by Demand-Side Considerations, Supply-Side Issues Are Likely Secondary

Because the supply of alternative fuels is so much more elastic than the demand for gasoline (+1.0 to +2.0)[26], so long as the LCFS credit price is allowed to rise sufficiently enough, there will be more than enough supply of low-carbon fuels to meet the deficits created by gasoline. However, because energy demand is constant, the ultimate solution to the LCFS will likely require a lower supply of alternative fuels than might otherwise be expected, provided that prices are allowed to rise sufficiently enough to reduce petroleum demand. Staff's worries about "alternative fuel availability" are mostly ungrounded provided that the credit price is allowed to rise sufficiently high enough. Only if the price is capped too low will undersupply be a problem, as demonstrated in the supply and demand chart above.

9) Worries About "Credit Hoarding" Are Ungrounded in Economic Reality

Speaking frankly, we feel that Staff's stated concern about credit "hoarding" belies a certain level of willful economic blindness about the proper function of forward prices in a market-based regulatory scheme such as the LCFS.

As explained above, the purpose of prices in a market is to convey information between market participants, and, in a forward market, to specifically convey information about future periods. If LCFS credit holders believe that a higher credit price will be available in a future period and are refusing to sell in the present, then this is a signal to all market participants that the current price is too low given expectations about the future. In this case, the credit purchaser is then presented with the choice of either paying the future price today (likely at some small discount due to avoided carrying costs) or finding alternative compliance means at a lower cost, either through investing in new alternative fuel infrastructure or lowering his compliance obligation by reducing the rate of deficit creation. This was the entire intent of having infinitely-lived "bankable" LCFS credits in the first place (i.e. with no vintage), so as to allow inexpensively created credits from current periods to be used for compliance in future periods when similar compliance activities will be more expensive. In fact, the 2012 National Study cited by Staff extolls the virtues of banking as a means of leveling out compliance costs among multiple periods[27] and makes no mention whatsoever of "hoarding" as a risk from a bankable credit trading system.

"Hoarding" is not a problem if prices are allowed to move freely because the supply and demand for credits will eventually find an equilibrium price in the present period that will facilitate the necessary transaction to occur. We believe that this concern is the product of disingenuous refiners trying to sabotage the LCFS and is not a legitimate economic problem with the regulation as it is currently designed. That Staff even considers this "concern" to be a serious issue in a market-based emissions

[26] Holland et al: "Greenhouse Gas Reductions under Low Carbon Fuel Standards?" National Bureau of Economics Working Paper 13266, (July 2007) page 28.
[27] University of California, Davis: "National Low Carbon Fuel Standard Technical Analysis Report" July 2012. page 26

trading system with unlimited banking is itself highly troubling. We find it quite puzzling that staff's Illustrative Scenario relies heavily on a large bank of LCFS credits while Staff's cost containment mechanism and concerns about "hoarding" seek to simultaneously gut the economic value of overproducing credits in early periods when they are inexpensive.

Summary

Based on the reception we received while participating in the October 27th workshop, we fully expect these comments to be disregarded by Staff as and more or less ignored in ARB's final cost-containment regulation. Nonetheless, we feel compelled to at least make these arguments one final time because the cost containment proposals made so far – the willful disregard for the role that reductions in high-carbon fuel demand play in finding a solution to the LCFS – will virtually guarantee the eventual failure of the LCFS program, regardless of whether Staff's predictions about the availability of alternative fuels and vehicles are borne out.

We urge the Board to reconsider its intention to implement a price cap on LCFS credit prices at all, but, if the Board still feels such a cap is necessary for political (or whatever other) reasons, to select a higher price cap that has been more rigorously determined via a robust economic analysis, taking into account both supply and demand factors. It is only through sound economic reasoning and an acknowledgement of reality can the LCFS truly be expected to success in the future.

Sincerely,

John M Greene
President

	Assumed 2020 CI	2020 Volume (MMG)	Percent of Total	Adj Total of CI	
Corn Ethanol	69.18	700	48.8%	33.75	
Cane Ethanol	46.12	400	27.9%	12.86	
Sorghum/Corn Ethanol	69.18	100	7.0%	4.82	
Misc Corn Ethanol	84.32	0	0.0%	0.00	
Sorghum/Corn/Wheat Ethanol	59.03	75	5.2%	3.09	
Cellulosic Ethanol	20.00	100	7.0%	1.39	
Molasses Ethanol	22.09	60	4.2%	0.92	
		1435		56.82	WTD AVG CI OF AVERAGE ETHANOL

CI of

	MJ/gal		MJ/gal	g/MJ	g/gal
CARBOB MJ/Gal	119.53	90%	107.58	100.5	10811.49
Ethanol MJ/Gal	81.51	10%	8.15	56.8	462.98
Weighted Average E10 MJ/Gal			115.73		11274.47
				97.42	WTD AVG CI OF E10

2020 "Gradual Line" Gasoline Standard (g/MJ)	89.54
Blended CI of E10	97.42
CI Delta per MJ	-7.88
MJ/Gallon E10	115.73
Deficits per Gallon E10 (MT/gal)	-0.000912