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Todd R. Campbell, MEM, MPP  
Director of Public Policy

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Via e-mail: mansingh@arb.ca.gov

Manisha Singh, Lead Policy and Regulatory WG  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95812

**Re: Thirty-Day Changes to the Low Carbon Fuel Standard Regulation and the Detailed California-Modified GREET Pathway for Liquefied Natural Gas (LNG) from North American and Remote Natural Gas Sources.**

Dear Ms. Singh,

Clean Energy would like to thank the California Air Resources Board (CARB) staff for providing this opportunity to comment on the July 2009 draft version of the proposed Low Carbon Fuel Standard (LCFS). Clean Energy views the LCFS as a critical piece of regulation that will ultimately transform the state's transportation carbon intense fuel market to a low, and ultimately an ultra low, carbon market. Clearly, if the state and the nation are to achieve their collective goals of reducing greenhouse gases by 83% in 2050, vehicles will need to operate on such fuels as efficiency improvements through platforms that run partially or totally on batteries are unlikely to meet the milestones required to wave of the climate crisis that the world currently faces. Therefore, we wholeheartedly support the development and adoption of the LCFS and hope to work with CARB to promote a national adoption of a LCFS in the years to come.

Upon review of the proposed draft LCFS document released in July of 2009, Clean Energy would like to offer to CARB its full support. However, there are some areas that Clean Energy believes need to be amended so that more accurate reporting and credit generation can occur. As you are well aware, the more carbon credits that can be generated from credible record keeping and accounting that reflects the actual carbon emissions being reduced, the more healthy the LCFS market will be and the less CARB staff will have to modify the program in the coming years. Therefore, Clean Energy would like to provide recommended changes in the following areas: the credit generation opt-in provision; Deficit Carryover; Recordkeeping and Auditing; EER value for heavy-

duty NGVs; and modification/recommendations for CARB's proposed liquefied natural gas pathway from North American and remote natural gas sources.

**§95480.1 (b): Credit Generation Opt-In Provision.**

Clean Energy has several and significant concerns over the LNG pathway analysis released July 20, 2009 relating to "North American natural gas, liquefied in California and used in California" by CARB as the pathway fails to evaluate or capture the efficiencies that one would find at an LNG facility like our facility located at Boron, California. That said, using CARB's very conservative number of 83.13 gCO<sub>2</sub>e/MJ to represent "North American natural gas, liquefied in California and used in California", a 12.2% reduction in carbon is still maintained when compared to CARB's February 28, 2009, estimates of "ultra low sulfur diesel from average crude refined in California" at 94.71 gCO<sub>2</sub>e/MJ.

Although it is not clear what existing facility or facilities CARB staff has based this analysis on to ultimately propose a 83.13 gCO<sub>2</sub>e/MJ figure to represent the entire Industry, it is clear that LNG facilities such as Clean Energy's LNG plant located in Boron, California, was not included in CARB's estimate. Based on preliminary figures performed by CARB staff, the carbon content of the LNG produced by Clean Energy's LNG plant are closer to CARB's February 28, 2009 estimate for "compressed natural gas from North American natural gas" and therefore are significantly lower than CARB's proposed industry-wide estimate. In other words, if CARB based their numbers for "North American natural gas, liquefied in California and used in California" using Clean Energy's LNG plant in Boron, California, there would be no question that the "North American natural gas, liquefied in California and used in California" pathway would receive the same "opt-in provision" allocated to electricity, hydrogen, hydrogen blends, fossil CNG derived from North American sources, biogas CNG, and biogas LNG under §95480.1 (b).

During the CARB's August 4, 2009 workshop covering the proposed changes to the LCFS regulatory language, Clean Energy did ask CARB staff why "North American natural gas, liquefied in California and used in California" pathway did not receive the "opt-in provision" status since even CARB's estimate achieves a 12.2% reduction in carbon content. The response was that CARB staff had to review the issue and expressed concerns over providing this status to fuels that were perceived to be relatively close to the 10.0% carbon reduction goal. The specific reason for concern by CARB staff was that the energy economy ratio (EER) would still need to be applied as outlined under Table 5 in §95485. Although Clean Energy again takes strong issue with CARB's proposed 0.9 EER value for CNG or LNG for "Heavy-Duty/Off-Road Applications", applying CARB's EER value to the Agency's proposed pathway value for "North American natural gas, liquefied in California and used in California", the result still comes out to an 11.0% carbon content reduction: a full 1.0% reduction below the 10.0%

goal of the LCFS that is required in year 2020.<sup>1</sup> If CARB used Clean Energy's LNG plant figures, the "opt-in" provision requirements would be easily met.

While Clean Energy can understand why CARB would not include LNG fuel pathways that do not achieve a full 10.0% carbon reduction after applying the appropriate EER for a specific vehicle application, even conservative analysis based on unidentifiable and unverified data passes CARB's carbon reduction threshold for 2020. Therefore, CARB must include the "North American natural gas, liquefied in California and used in California" pathway under the list of "opt-in" fuels based on its own conservative data and the knowledge that the actual LNG fuel being processed in California and delivered to California fleets far surpasses the carbon content threshold to qualify for such exemption. To not do so would mischaracterize and potentially harm California's existing LNG production industry dedicated to vehicle transportation, send a damaging message to our clients and potential markets, and would ultimately undermine the very goals that the LCFS is attempting to achieve. As we discussed with CARB staff, we will continue to work with CARB to verify their preliminary analysis, but the evidence for this pathway to receive a formal "opt-in" status is substantive and conclusive.

**§95481(a)(5): Updated Biogas Definition.**

Clean Energy would like to thank CARB staff for the addition of "anaerobic decomposition and thermo-chemical decomposition" to the biogas definition found under §95481(a)(5).

**Former §95481(a)(34) and (35): Deletion of Oil Sands and Oil Shale.**

Clean Energy is curious as to why these definitions were deleted from the LCFS regulatory language as these fuel sources are likely to be used in the future marketplace.

**§95484. (b)(3): Deficit Carryover.**

Clean Energy is disappointed that CARB appears to have ignored prior comments submitted by not including a subsection (C) under - §95484. (b)(3). *Deficit Carryover* - that requires any regulated party with a negative credit balance to purchase available credits generated and up for sale on the LCFS trading floor before that regulated party can carryover its deficit to the next year. Public statements have been made by many regulated parties that currently dominate California's Transportation Fuel Industry that they would resist purchasing any credits from their competition: California's emerging Low Carbon Fuel Industry. Clean Energy and other regulated parties who can offer low to ultra low carbon fuel solutions have asked CARB to make this requirement within the LCFS regulatory language. Failure to do so may make accounting for LCFS credits less attractive for companies like Clean Energy who's fuels are within the "opt-in" category

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<sup>1</sup> Note that an 8.0% carbon reduction is not required by the LCFS until 2019 for both gasoline and diesel fuels, further demonstrating that even with the use of CARB's very conservative estimates for the North American natural gas liquefied and used in California pathway and a non-reflective EER value, this pathway is still more than adequate in terms of compliance.

because CARB has simply provided the dominant players in California's transportation fuel market too much flexibility. Such an outcome could be disastrous as it could threaten the LCFS market and the very goals of the LCFS goals if most companies decide not to account for credits generated. Again, we urge CARB staff to add a subsection (C) that would disallow the carryover of negative credit balances if LCFS credits are available for sale on the LCFS market.

**§95484. (d): Recordkeeping and Auditing. General Comment / Recommendation.**

Clean Energy fully understands and supports the importance of recordkeeping and auditing of low carbon fuel production and assignment to customers and is more than willing to demonstrate its production of biomethane, an ultra low carbon fuel, from existing and future biomethane production facilities. Clean Energy also supports the requirement to demonstrate a physical pathway, in our case a pipeline, that connects the point of production to the point of delivery to the customer. That said, Clean Energy opposes any requirement under the LCFS's regulatory language that requires a regulated party to pay for the actual physical transfer of molecules through an agreed upon physical pathway if a commodity swap can be established and documented between two parties. Such swaps are common practice within the Industry and accepted by the Federal Energy Regulatory Commission and should also be accepted under the final regulatory language of the LCFS.

CARB staff has argued the position that requiring a regulated party to pay for the physical transfer of molecules from the point of production to the point of delivery assures that California will receive ultra low carbon fuel in California. However, once biomethane enters the pipeline system, there is no physical difference between a biomethane molecule and fossil-based molecule in terms of chemical structure. Clearly, well-to-wheel analysis establishes the ultra low carbon benefits derived from biomethane and CARB should want to adopt policies that encourage further production of such ultra low carbon fuels. That said, CARB's position actually hampers or handicaps larger production of biomethane as the regulatory language requires the regulated party to pay a middleman to "physically transfer" molecules from point A to point B when, in reality, this is unnecessary if a physical swap can be established. What should matter more to CARB is that regulated parties under the LCFS produce more ultra low carbon fuels, not less, and designate such production through contracts to California customers.

CARB staff has argued that allowing physical swaps as Clean Energy suggests might open up the option to perform swaps to other Industries such as ethanol or biodiesel. Clean Energy respectfully disagrees. Unlike ethanol and biodiesel, biomethane that is pipeline quality has an established pathway via use of the existing pipelines. Neither ethanol or biodiesel to date have national pipelines that can deliver fuel to California customers. Railways are also very different from pipelines. Natural gas pipelines carry natural gas. They do not carry other product. Railways carry all sorts of product, not just ethanol or biodiesel. In other words, even if Clean Energy didn't pay for the physical transfer of a biomethane molecule from Dallas to California, it is still possible that the biomethane molecule could reach California. Not so with railways as freight requires a

destination. We therefore ask that CARB modify the regulatory language to allow for physical swaps within natural gas pipeline systems as the failure to do so would only harm the Industry and hurt CARB's LCFS goals for 2020 and beyond.

**§95485: Energy Economy Ratio (EER) for Natural Gas Heavy-Duty Engines.**

Clean Energy and other stakeholders, including Westport Innovations, have provided numerous comments and data that continue to challenge CARB's proposed EER value of 0.9 for "Compressed or Liquefied Natural Gas Used in a Heavy-Duty Spark Ignited or Compression Ignition Engine" within the LCFS regulatory language. In fact, a value of 0.9 does not accurately represent either of the above referenced engine strategies and CARB staff has responded that the weakened EER value reflects the aging heavy-duty vehicle fleet population that use natural gas, either as LNG or CNG, and may not be as efficient as today's natural gas heavy-duty vehicle models.

This reasoning by CARB staff to penalize natural gas vehicles based on the Industry's aging fleet population is inherently flawed and biased against an otherwise abundant, clean and low to ultra-low carbon fuel for the following reasons:

- (1) CARB's position does not account for aging diesel vehicle populations that may not achieve an EER of 1.0 as the regulation only makes reference to a new diesel engine's EER. This is extremely problematic since the Oil Industry wants to update the EER value when new diesel technology comes on line. How does CARB allow one Industry to have a pass on aging fleets and then stick another Industry with a deficit? This needs correction.
- (2) CARB's position punishes a low to ultra low carbon fuel that has been providing greenhouse gas benefits for years regardless of what the aging California natural gas heavy-duty fleet's efficiencies could be. In fact, because heavy-duty NGVs have been delivering low carbon fuel benefits for over a decade, CARB should allow for greater flexibility by providing an EER that is more reflective of newer spark-ignited or compression natural gas engines. CARB's position not to do so appears to disadvantage natural gas heavy-duty applications exclusively.
- (3) CARB's position punishes a low carbon to ultra low carbon fuel based on an aging population of heavy-duty natural gas vehicles but does not apply this to other low carbon solutions like electric vehicles. For example, has CARB included the EER values for Toyota RAV4 EVs into their current EER analysis to generate a 3.0 EER value? It seems to be very unlikely.

CARB staff must apply EER values across the board evenly. The current EER value within the proposed regulatory language for heavy-duty NGVs is punitive and unfairly biased and, if allowed to remain without modification, will further damage this vehicle class in the future.

Finally, we would ask that CARB staff consider accurate EER values for captured fleets that fuel at private facilities not available to the general public. We believe the existing EER would punish these facilities unfairly and measurably.

**Detailed California-Modified GREET Pathway for Liquefied Natural Gas (LNG) from North American and Remote Natural Gas Sources:**

Clean Energy appreciates the fact that the staff has developed several LNG pathways for the LCFS in response to gas industry recommendations made at the April Board meeting. Three LNG pathways were released and published on July 20, 2009. Unfortunately, none of the pathways developed by CARB staff properly reflects the situation for LNG production and delivery to customers in California. The carbon contents of these pathways do a major disservice in capturing the low carbon potential of LNG as a California transportation fuel.

Of the three pathways, the only pathway that is closest to representing the current situation in California is the “North American NG, Liquefied in CA and used in CA” pathway that has a calculated LNG carbon content of 83.13 gCO<sub>2</sub>eq/MJ. This pathway models a small (5,000 metric ton/year), inefficient (80% conversion efficiency) LNG plant of which there is only one plant in California.

The efficiency of small scale liquefaction is notoriously poor. An 80% efficient small scale liquefier contributes 15.79 gCO<sub>2</sub>eq/MJ to the carbon content of LNG fuel. Larger, state of the art liquefiers are higher in conversion efficiency and contribute 7.40 gCO<sub>2</sub>eq/MJ to the carbon content of LNG.

Clean Energy has the largest LNG production plant in California that has been operational since November 2008. It is a 100,000 metric ton/year plant (soon to expand to 150,000 metric ton/year) with a conversion efficiency that equals or exceeds the efficiency of the large scale off-shore liquefiers CARB staff has modeled in two of their LNG pathways. CARB staff has modeled the conversion efficiency of the Boron plant and has determined that the carbon content of the resulting LNG fuel would be about 73 gCO<sub>2</sub>eq/MJ. This 73 gCO<sub>2</sub>eq/MJ is more appropriate for an LNG pathway than the 83.13 gCO<sub>2</sub>eq/MJ that CARB has included in their currently released pathways. In their analysis of the “North American NG, Liquefied in CA and used in CA” pathway – CARB should have modeled a generic large LNG production facility rather than the small facility it did model.

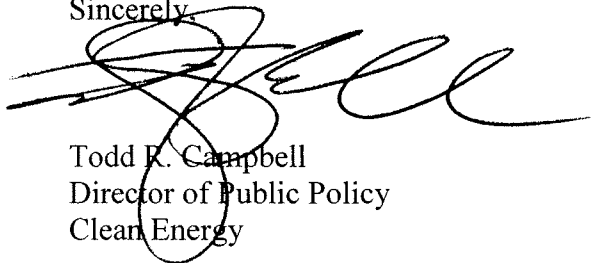
It is unfortunate that CARB staff has in the time since the April Board meeting not modeled the largest state-of-the-art LNG production facility in California. As a result, none of the LNG pathways recently published properly reflects the low carbon viability of California based LNG production from North American natural gas. Instead of representing LNG as a clear “low carbon fuel” that deserves opt in status under the LCFS – and sending clear signals to the marketplace that California produced LNG does offer significant GHG benefits – more time has to pass for CARB to publish yet another pathway. Clean Energy respectfully requests that CARB modify the LNG pathways published on July 20th to reflect the same low carbon production technology for

California based LNG plants as used in their calculations of Overseas Liquefaction (e.g. 7.40 gCO<sub>2</sub>eq/MJ for both overseas production and California production). This will give a much more realistic picture of the low carbon potential of LNG than the current published pathways.

## **Conclusion**

Clean Energy would like to thank CARB staff for the opportunity to comment on the revised LCFS regulatory language and recent LNG pathway within the 30 day comment period. Although we support CARB's establishment of an LCFS that will promote low carbon fuel use throughout California and beyond, it is clear that CARB staff must make several modifications to ensure that the goals and spirit of the regulation are realized.

Sincerely,

A handwritten signature in black ink, appearing to read 'Todd R. Campbell', is written over the printed name and title.

Todd R. Campbell  
Director of Public Policy  
Clean Energy