

August 19, 2009

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Clerk of the Board
Air Resources Board
1001 "I" Street, 23rd Floor
Sacramento, California 95814

Subject: Comments on the Modified Text for the LCFS Regulation

Dear Sir/Madam:

Thank you for the opportunity to submit comments on the Modified Text and Additional Documents for the Adoption of a Regulation to Implement the Low Carbon Fuel Standard (LCFS) made available on July 20th.

The Linde Group is a world leading gases and engineering company with more than 50,000 employees working in around 100 countries worldwide. In the 2008 financial year it achieved sales of USD\$17.7 billion. Linde is focused on finding ways to reduce our dependence on fossil fuels and our emission of greenhouse gases by developing alternative energy solutions. These include alternative energy technologies using hydrogen, biogas, LNG and other sustainable replacements for gasoline, diesel and other oil products. With respect to natural gas, Linde has a portfolio of LNG capabilities, including small scale and large scale LNG plants and LCNG and LNG fueling stations. We operate fifteen gases production plants and employ over 200 people in California.

Linde and Waste Management formed a joint venture to develop a Landfill Gas to Liquefied Natural Gas facility at the Altamont Landfill in the Bay Area using technology from the Gas Technology Institute (GTI). We expect to produce over 13,000 gallons of Very Low Carbon Fuel (VLCF) in the form of LNG starting in 2009 making it the largest landfill gas to LNG plant in the world. It will reduce carbon emission by nearly 30,000 tons annually at full production and is built for a minimum 15 year life which means we can deliver these benefits for many years to come.

Linde fully supports the implementation of a low carbon fuels standard and stands ready to participate in this new marketplace. In general, Linde is in agreement with the proposed regulation and has participated with CARB staff during the development of this regulation. We have a remaining concern with the additional LCFS pathway recently made available on Liquefied Natural Gas (LNG) from Landfill Gas (LFG).

We believe it is critical to develop an LCFS pathway that represents the most current technology being used to develop LNG from LFG because waste-stream fuels like this present such an enormous opportunity to produce much needed fuel for our economy, while simultaneously reducing carbon dioxide emissions for the environment. Linde would like to reinforce to the Board the importance of this regulation and the positive impact it will have upon a brand-new

transportation fuel industry. The production of Biogas/Biomethane from landfill waste streams offers one of the lowest carbon intensity fuels currently known to the transportation sector.

As mentioned above, Linde has already begun the startup of a new LFG to LNG production facility at Waste Management's Altamont Landfill in the Bay Area. We have noticed that the initial LFG-to-LNG pathway released by CARB on July 20th does not account for the technological breakthroughs Linde and Waste Management have developed together for Altamont.

Specifically, our liquefaction process is built around a mixed refrigerant cycle (MRC) that is significantly more efficient than the simple cascade cycle referenced in the current CARB pathway document. This increased efficiency means that LNG can be produced using much less energy than the example in the current pathway. Less energy required for liquefaction translates to fewer greenhouse gas (GHG) emissions being produced and thus, a lower carbon intensity for the fuel produced.

Further, the current CARB pathway also assumes that the energy used in the purification and liquefaction process will be generated onsite by engines using pipeline natural gas. While this might be the case with some biomethane production facilities, our Altamont purification system and liquefier is using power generated by onsite engines using biogas that is being pulled directly from the landfill's gas collection system. Biogas has a much lower carbon intensity than pipeline gas because it benefits from the flaring credit inherent with landfill gas fuels.

Recommendation

Given that Linde and Waste Management will soon be the largest producers of LNG from landfill gas in California, we recommend that CARB should publish an LFG-to-LNG pathway that accounts for the latest technologies we are now using. We understand the value of having a generic pathway for LFG-to-LNG, but *we respectfully recommend that CARB immediately publish a new "sub-pathway" for LFG-to-LNG that accounts for facilities using mixed refrigerant liquefaction systems and onsite biogas energy production.* We firmly believe this sub-pathway should be included in the current rulemaking process and we (Waste Management and Linde) stand ready to assist CARB in any way we can to make this happen.

We have worked closely with CARB staff through the LCFS process and we look forward to continuing our work together on this LFG pathway. Please contact me if you have any questions regarding the information provided in this letter or wish to discuss these matters further.

Sincerely,



Mike Beckman
Vice President, West Market
Linde LLC

cc: Dean Simeroth, CARB
Floyd Vergara, CARB