July 6, 2023

Mark Sippola, Ph.D.
California Air Resources Board (CARB)
1001 I Street
Sacramento, CA 95814

Re: Ductor Comments on the Joint Cap-and-Trade Program Workshop

Dear Dr. Sippola:

Thank you for the opportunity to comment on the June 14, 2023, Joint Cap-and-Trade Program Workshop. As recently discussed in our comments related to the Second Workshop for SB 596 Cement Sector Net-Zero Emissions Strategy,[1] Ductor strongly supports CARB's efforts to decarbonize industry, including by increasing the use of biogas in hard-to-abate sectors like cement, thermal power generation, or other industrial operations.

About Ductor

Ductor was founded in 2009 with the ambitious aim of creating a solution that would help solve today's environmental challenges in the energy and agriculture sector. Today we build, own, and operate turnkey microbiological facilities, turning organic resources from the agricultural sector into sustainable fertilizers and biogas. With two plants in Mexico and Germany and numerous projects in the pipeline, including in the U.S. and California, we are living up to our purpose and unlocking bio-resources to make food sustainable and energy clean.

Ductor's technology transforms nitrogen-rich organic resources from agriculture, aquaculture, and other organic origins into renewable energy and fertilizers. We specialize in feedstock that cannot be used directly in conventional anaerobic digestion and biogas facilities. This feedstock is fed into the Ductor pre-process, where an IP-protected consortium of microorganisms and the IP-protected Ductor process converts them via fermentation and subsequent ammonia recovery into organic and sustainable liquid nitrogen fertilizer. The feedstock is further processed in the anaerobic digestion stage of the facility to generate biogas, which is upgraded to pipeline quality. The digestate is further processed into fertilizing and soil-improving products.

[1] https://ww2.arb.ca.gov/system/files/webform/public_comments/4276/SB%20596%20Comments.%20Ductor.pdf

Ductor's technology targets the poultry sector, which is growing globally to meet the increasing demand for white meat and egg products. Driven by population growth, urbanization, and rising incomes, global per-capita consumption of poultry meat increased from 3.1 kg to 15 kg between 1964 and 2013, while global per-capita consumption of eggs grew from 4.7 kg to 9.2 kg. The poultry sector generates a large quantity of litter consisting of manure, egg wash water, waste bedding, waste food, and feathers. The amount of litter depends on the frequency of the removal of litter, which varies from country to country. According to USDA, in the United States, as much as 1.4 billion tons of manure is produced by the 9.8 billion heads of livestock and poultry produced yearly. Due to growing environmental and social concerns associated with poultry litter management, storage, land application, and its associated emissions, alternative treatment options are becoming much more attractive and required.

Evaluate strategies to accelerate industrial decarbonization and use of biogas through the Cap-and-Trade Program

The Low Carbon Fuel Standard (LCFS) has proven a successful model for developing biogas supplies from a broad array of sources and for use in the transportation sector. CARB should work to develop similar mechanisms in the Cap-and-Trade program to develop biogas projects to supply cement and other industrial facilities that rely on liquid and gaseous fuels to produce high temperature heat and cannot be easily electrified. Ductor encourages CARB to evaluate strategies that can be deployed to rapidly develop biogas supplies for industrial applications and other stationary sources through target setting, allowance allocation, and other elements of the Cap-and-Trade Program.

Consider new offset protocols, including for N_2O-avoiding projects and use of renewable fertilizers

California and CARB have pursued a wide array of strategies to address greenhouse gas emissions from most sources and sectors. However, for the most part, California has not pursued strategies to address N_2O emissions, despite the fact that it is one of the most potent, and *long-lived* greenhouse gases. Consider that, for all the focus on reducing methane emissions as a potent short-lived climate pollutant (and rightly so), N_2O, with a global warming potential of about 300, is even 10 times more impactful than methane over 100 years. And as a long-lived gas that will persist for centuries in the atmosphere, compared to about a decade for methane, N_2O emissions today will continue to drive climate impacts for more than 10 times as long as methane emissions will.

According to CARB's greenhouse gas inventory, the majority of N_2O emissions in the state come from agriculture, including about 45% from fertilizer use and 12% from livestock manure.[2] These sources of N_2O emissions can be addressed and significantly reduced, and Ductor is actively developing projects to do so. We encourage CARB to consider strategies to significantly reduce N_2O emissions and to additionally reduce CH_4 emissions, especially from agriculture, and

[2] https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/ghg_inventory_scopingplan_2000-20n2o.pdf

including through the development of offset protocols for sustainable management of poultry manure and production and use of renewable fertilizers derived from manure.

Other comments on the workshop

Ductor supports the proposed evaluations and scenarios presented at the workshop, as part of a thorough evaluation of the Cap-and-Trade program and potential amendments. We also:

- Support Quebec's consideration of updating global warming potential values to reflect the latest science.
    - We encourage CARB and California to consider a similar change to ensure the program continues to use the best science and data and delivers expected climate outcomes.
- We support CARB incorporating carbon capture and sequestration (CCS) and carbon dioxide removal into the program. Additionally, we encourage CARB to:
    - Develop new CCS protocols to allow the greatest potential for innovation and the most opportunity for carbon capture, removal, and climate benefits, and
    - Define bioenergy with CCS as carbon removal and develop appropriate offset protocols to incorporate it into the program.

Thank you again for the opportunity to comment on the workshop. We appreciate your work during this busy time and support CARB's efforts to transition California to a net-zero and net-negative emissions economy as soon as possible. We look forward to continuing to engage in this process and related forums at CARB. Please do not hesitate to reach out with any questions about Ductor or these comments.

Sincerely,

Bernard C. Fenner
CEO, Ductor Corporation
President, Ductor Americas, LLC