November 3, 2020

Arpit Soni
Manager, Alternative Fuels Section
Air Resources Board
1001 I Street
Sacramento, CA 95812

(Letter submitted electronically as Comment to LCFS Public Workshop via LCFSWorkshop@arb.ca.gov)

Request to Integrate Bio-oil Sequestration into Low Carbon Fuel Standard

Dear Mr. Soni,

This letter is submitted by Stripe in support of Charm Industrial, Inc.'s ("Charm Industrial" or "Charm") Low Carbon Fuel Standard ("LCFS") proposal. Charm Industrial is an early-stage hardware startup in San Francisco working to return the atmosphere to pre-Industrial Revolution CO_2 levels of 280 ppm. Charm is focused on identifying the most innovative and impactful carbon reduction technologies. Here at Stripe, we support Charm's mission and perspective that bio-oil sequestration has tremendous potential to affirmatively reduce the presence of greenhouse gases ("GHG") in the atmosphere. Stripe is therefore requesting that the California Air Resources Board ("CARB") integrate bio-oil sequestration into the Low Carbon Fuel Standard ("LCFS") as described in detail by Charm's comment letter. Stripe is an active buyer of negative emissions from Charm, has rigorously reviewed and analyzed their lifecycle analysis with a broad panel of noteworthy and respected scientists, and plans to continue purchasing additional negative emissions from bio-oil sequestration in the future.

Stripe

Stripe is the leading global payments platform and privately held company with a valuation over $36B. Stripe was the first company globally to announce a negative emissions carbon removal program. Stripe purchased $1m of carbon removal purchases in 2019 and announced the selected vendors in 2020. In October 2020, Stripe further expanded their program to allow customers to participate in purchasing negative emissions through their platform. Stripe's early efforts here are intended to galvanize a worldwide response to fund the removal of carbon from the atmosphere.

California Policy Requires Decarbonization of the Transportation Sector

Pursuant to SB 32 and AB 197, California must reduce its GHG emissions 40% below 1990 levels by 2030 necessitating dramatic GHG reductions compared to current policies. Transportation emissions are the dominant GHG emissions source, constituting 41% of

California's total GHG emissions of 424.1 $MMTCO_2e$.[1] Transportation GHG emissions have clearly emerged as the most difficult sector to decarbonize with transportation's rising from 35% of California's GHG emissions in 2015 to 41% in 2017.[2]

Pursuant to Governor Brown's Executive Order B-55-18, California has a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter in addition to statewide targets of reducing GHG emissions including SB 32 and AB 197.[3]

To identify negative emissions pathways that physically remove CO_2 from the atmosphere and that can enable California to meet its goal of achieving carbon neutrality by 2045, the Lawrence Livermore National Laboratory developed a recently published report entitled, Getting to Neutral, Options for Negative Carbon Emissions in California (the "Getting to Neutral Report").[4] The Getting to Neutral Report identifies the conversion of waste biomass to bio-oil to advanced biofuels as the most important of the three primary pillars for California to reach 125 million tons of negative emissions annually.

Bio-oil Sequestration has Garnered Attention from Decarbonisation Experts

While nascent, Charm Industrial's strategies relating to bio-oil sequestration have already garnered attention from decarbonisation experts and development funding from companies relying on these experts to advance the most promising long-term technologies. To guide our investment decisions at Stripe, we convened a panel of expert reviewers that includes: Dr. Jennifer Wilcox (Professor, Worcester Polytechnic Institute), Dr. Phil Renforth (Associate Professor, Heriot-Watt University), Dr. Steven Hamburg (Chief Scientist, Environmental Defense Fund), Dr. Jane Zelikova (Chief Scientist, Carbon180), Andrew Bergman (PhD candidate, Harvard), Dr. Bill Anderegg (Assistant Professor, University of Utah), Dr. Colin McCormick, and Dr. Zara L'Heureux.[5] Stripe was Charm Industrial's first customer and established an agreement with Charm to purchase 416 tons of carbon storage at $600 per ton.

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[1] Air Resources Board, Public Workshop on the Transportation Sector to Inform Development of the 2030 Target Scoping Plan Update, September 14, 2016, https://www.arb.ca.gov/cc/scopingplan/meetings/091316/FINAL%20Scoping%20Plan%20Transport%20Workshop.pdf (last viewed September 19, 2016), at slide 11 and 14.

[2] Presentation of Executive Officer Richard Corey, slide entitled "Transportation Remains a Key Focus," presented at Argus Biofuels & Carbon Markets Summit, October 22, 2019, at slide 11.

[3] Executive Order B-55-18, available at https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf

[4] Sarah E. Baker, Joshuah K. Stolaroff, George Peridas, Simon H. Pang, Hannah M. Goldstein, Felicia R. Lucci, Wenqin Li, Eric W. Slessarev, Jennifer Pett-Ridge, Frederick J. Ryerson, Jeff L. Wagoner, Whitney Kirkendall, Roger D. Aines, Daniel L. Sanchez, Bodie Cabiyo, Joffre Baker, Sean McCoy, Sam Uden, Ron Runnebaum, Jennifer Wilcox, Peter C. Psarras, Hélène Pilorgé, Noah McQueen, Daniel Maynard, Colin McCormick, Getting to Neutral: Options for Negative Carbon Emissions in California, January, 2020, Lawrence Livermore National Laboratory, LLNL-TR-796100, available at https://www-gs.llnl.gov/content/assets/docs/energy/Getting_to_Neutral.pdf (footnotes omitted).

[5] Id., "Stripe's first negative emissions purchases," at https://stripe.com/blog/first-negative-emissions-purchases#recognition-footer

Similarly, Shopify invests a minimum of $5M annually in the most promising solutions to fight climate change.[6] Shopify has identified ten industries that have the potential to reverse climate change including carbon removal.[7] Charm was selected to receive funding from Shopify in its Frontier Portfolio for Biomass. Charm's co-founder, Shaun Meehan, was quoted on the Shopify website and described Charm's process as follows: "Over the past century, humans have extracted and burned hundreds of gigatons of fossil fuels, increasing atmospheric CO_2 from 280 to 415 ppm. Charm has developed a new, patent-pending method to help reverse that: bio-oil sequestration."[8]

Here at Stripe, we look forward to purchasing more of the carbon removals that Charm will produce utilizing bio-oil sequestration.

Conclusion

Thank you for your consideration of our input to this LCFS rulemaking informal workshop. Please contact me if further input on this issue would be helpful to your process. We appreciate California's leadership in the US on decarbonization policy.

Sincerely,

Nan Ransohoff
Head of Climate, Stripe
November 4, 2020

Cc: Peter Reinhardt, Charm Industrial Inc.

[6] Shopify Website, "Shopify's Sustainability Fund," at https://www.shopify.com/about/environment/sustainability-fund?itcat=sustainability-fund&itterm=inter-bottom-nav-biomass
[7] Id., "Shopify Blog," at https://www.shopify.com/blog/sustainability-fund
[8] Id., "Frontier Portfolio Biomass," at https://www.shopify.com/about/environment/sustainability-fund/biomass?itcat=sustainability-fund&itterm=inter-main-page-cards-index