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Clerks' Office  
California Air Resources Board  
1001 I Street  
Sacramento, California 95814

**Re: *Proposed Amendments to the Low Carbon Fuel Standard***

Mainspring Energy, Inc. ("Mainspring") appreciates the opportunity to submit comments to the California Air Resources Board ("CARB") on the Proposed Amendments to the Low Carbon Fuel Standard ("LCFS") released December 19, 2023. Specifically, we appreciate the development of a biogas book-and-claim pathway under a Tier 2 framework and respectfully request amendments to expand eligibility for biomethane to electric vehicle ("EV") charging as well as transition biogas-to-electricity book-and-claim pathway for EV charging to a Tier 1 pathway to meet help California's/CARB's (e.g. Advanced Clean Fleet) EV deployment goals.

*Background on Mainspring*

Driven by its vision of the affordable, reliable, net-zero carbon grid of the future, Mainspring has developed and commercialized a new power generation technology —the linear generator— delivering local power that is dispatchable and fuel-flexible. Mainspring's linear generator offers a unique non-combustion capacity and energy solution that simultaneously addresses the critical need of reducing greenhouse gas and criteria pollutant emissions, while also enhancing grid reliability and resilience. Linear generators use a low-temperature, uniform non-combustion reaction that maintains peak temperatures below the levels at which NO<sub>x</sub> forms (1500°C), resulting in near-zero NO<sub>x</sub> emissions at all loads – including during start-up. This contrasts with the combustion of a fuel with a non-homogenous flame-front, a process that results in higher temperatures and high NO<sub>x</sub> emissions. California's South Coast Air Quality Management District recently adopted linear generator-specific requirements in the form of Proposed Rule 1110.3, highlighting the low NO<sub>x</sub> operation of this technology.<sup>1</sup>

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<sup>1</sup> South Coast Air Quality Management District, "Rule 1110.3 Emissions From Linear Generators", Adopted November 3, 2023

Modular and scalable, Mainspring’s linear generators can be deployed near load, either customer- or grid-sited, with the ability to immediately generate electricity from a range of renewable fuels – including both 100% hydrogen and ammonia (a hydrogen carrier). Mainspring’s inverter-based technology offers a full range of valuable grid benefits including fast (and unlimited daily) starts/stops, a wide dispatch range from minimum to maximum load, quick ramping, and in many cases on-site fuel storage which allows linear generators to firm renewables for short or extended periods of time, thereby facilitating the continued rapid adoption of a reliable renewable energy grid. Our locally-sited linear generators add capacity and resilience to the grid while also providing enhanced flexibility to help avoid renewable curtailment.<sup>2</sup> Finally, by virtue of their modular size (20.5’ x 8.5’ x 9.5’) linear generators are space- and land-efficient and can be sited in load pockets, deferring or completely avoiding expensive transmission and distribution investment.

### *Comments and Proposed Amendments*

Mainspring appreciates the development of the Proposed Amendments to the LCFS and the opportunity to provide our comments and recommendations. **We thank CARB for developing a book-and-claim pathway for biomethane to EV charging, and respectfully request an amendment to expand the eligibility to allow book-and-claim for biomethane via renewable natural gas and hydrogen (meeting all appropriate deliverability and other requirements) used by offsite systems generating electricity exclusively for EV charging services as well.** Doing so will expand the pool of available low-carbon intensity (“CI”) electricity as a transportation fuel that is essential to meeting the growing demand from medium- and heavy-duty fleets – including through CARB’s own Advanced Clean Fleet (“ACF”) regulation. To further streamline this pathway, **Mainspring recommends that the biogas-to-electricity book-and-claim pathway for EV charging should be transitioned to a Tier 1 pathway to meet California’s/CARB’s (e.g. ACF) EV targets.** Enabling low-CI electricity to be used for EV charging more readily facilitates the deployment of charging infrastructure – particularly for medium- and heavy-duty vehicles– that is necessary to meet state, climate, and energy goals.

Specifically, we respectfully suggest the following amendments (underlined) regarding book-and-claim accounting accessibility for biomethane and hydrogen for EV charging pathways.

#### **95488.8(i)(2)**

“(2) Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen or to generate Electricity. Indirect accounting may be used for RNG used as a transportation fuel or to produce hydrogen or to generate electricity for transportation purposes (including hydrogen that is used either in the production of a transportation fuel or in the generation of electricity exclusively for transportation purposes), provided the conditions set forth below are met:

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<sup>2</sup> For additional information on technical specifications and performance benefits, visit <https://www.mainspringenergy.com/technology/>.

- (A) RNG injected into the common carrier pipeline in North America (and thus commingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production, or as a fuel source for electric generation for the exclusive purpose of EV charging, without regards to physical traceability. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.
- (B) To substantiate RNG quantities injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG or as an input to hydrogen production, or electric generation for the exclusive purpose of EV charging, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of RNG (in MMBtu or Therms) with corresponding quantities of natural gas withdrawn: unredacted monthly invoices showing the quantities of RNG (in MMBtu) sourced and the contracted price per unit; and the unredacted contract by which the fuel pathway holder obtained the environmental attributes.

**95488.8(g)(1)(A)(2)**

“Biomethane supplied using book-and-claim accounting pursuant to section 95488.8(i)(2) and is claimed as feedstock in pathways for bio-CNG, bio-LNG, bio-L-CNG, hydrogen via steam methane reformation, and electricity generation;”

These amendments enable a wide range of applications to which linear generators can be deployed in meeting CARB’s and California’s EV deployment goals. As an example, deploying linear generators to immediately power EV charging stations enables fleet operators to utilize biomethane to meet CARB’s ACF Rule. The mass adoption of medium- and heavy-duty (“MHD”) fleet EVs to meet the ACF Rule necessitates a sizable amount of additional capacity at a time when our current grid strains to meet even existing demand. Currently, utility timelines to install the capacity necessary to power and interconnect MHD projects is multiple years, driven by supply chain constraints arising from the period needed to manufacture and deliver new appurtenant equipment (e.g. the switchgear and transformers necessary to serve this new load), the volume of interconnection applications utilities are receiving, and other factors.

However, California cannot afford to wait for supply chain issues to be resolved, nor interconnection processes to be reformed to meet the ACF Rule. This is especially true for MHD EVs that need significant additions in charging capacity (routinely requiring multiple megawatts for each charging facility) and which are often replacing diesel-powered trucks operating in disadvantaged communities. Linear generators can immediately power EV charging stations, operating as microgrids before utility interconnection, and then serving as biogas- or renewable natural gas-powered clean resilience and

flexible load after utility interconnection takes place. Prior to utility interconnection, microgrids can provide immediate power to get charging infrastructure up and running, accelerating the timeline for vehicle electrification and achievement of ACF Rule requirements, while also accelerating the impact of improved air quality for disadvantaged and under-resourced communities. After interconnection, microgrids provide much-needed clean and resilient capacity to the grid while displacing the need for polluting diesel backup generators for use during extreme weather and grid events. Without clean resilience, basic services provided by the growing number of EVs could come to a halt during grid outages.

*Conclusion*

Utilizing low-CI electricity through book-and-claim accounting can help overcome a range of key barriers to rapidly accelerate the reduction in carbon intensity of transportation fuels for medium and heavy-duty EV fleets. Mainspring appreciates the opportunity to comment on these important Proposed Amendments and looks forward to continuing to collaborate with CARB staff in the future.

Sincerely,

/s/ Serj Berelson

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