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**Mainspring Energy Comments on Solicitation Concept Advancing
Clean, Dispatchable Generation (23-ERDD-01)**

Additional submitted attachment is included below.

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September 1, 2023

California Energy Commission
Docket Unit, MS-4
Docket No. 23-ERDD-01
715 P Street
Sacramento, California 95814

Re: *Draft Solicitation Concept of Clean Dispatchable Generation Initiative (23-ERDD-01)*

Mainspring Energy, Inc., (“Mainspring”) files these comments in response to the California Energy Commission’s Draft Solicitation Concept of Clean Dispatchable Generation Initiative (“solicitation concept”) released on August 9, 2023.

About 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 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.

Modular and scalable, Mainspring’s linear generators can be deployed near load, either customer- or grid-sited. 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 energy grid. Our local linear generators add capacity and resilience to the grid while also providing enhanced flexibility to help avoid renewable curtailment.¹

I. Executive Summary

Mainspring thanks the California Energy Commission (“Commission”) for the opportunity to provide comments on the solicitation concept. Through these comments we recommend:

¹ For additional information on technical specifications and performance benefits, visit <https://www.mainspringenergy.com/technology/>.

- Linear generators have the greatest potential to provide grid benefits for immediate deployment as part of Electric Program Investment Charge (“EPIC”) efforts to modernize California’s grid in the near- and medium-term;
- The Commission should evaluate near- and medium-term technical targets holistically and stackably, and particularly value technologies that can provide both primary and backup power;
- The target Technology Readiness Level for Group 1 should be Levels 7 and above;
- Projects in the biogas sector are a particularly valuable opportunity to demonstrate locally-sited clean distributed generation.

II. Responses to Questions Posed to Stakeholders in the Draft Solicitation Concept

A. Which renewable fuels and/or generation technologies have the greatest potential for providing grid benefits in the near-term (5 years) and medium-term (10 years) that should be prioritized for funding?

Linear generators have strong potential to provide grid benefits during the near- and medium-term for a number of reasons. First, linear generators are dispatchable, able to quickly ramp up/down thereby providing both primary power (which encompasses capacity, energy, and ancillaries) and backup power – including ramping to full load from standby within ~10 seconds. Because they are dispatchable, linear generators can firm variable renewables to maximize the value of co-located solar or wind and thereby help accelerate adoption of these resources. And, by virtue of being fuel flexible due to advances in robust power electronics, linear generators are highly cost-effective as they can operate on hydrogen, ammonia, biogas, natural gas, and propane. This means they can be deployed immediately to provide capacity and load reduction to the grid using traditional fuels, and seamlessly transition to zero-carbon fuels once they become widely available. Regardless of fuel, Mainspring’s linear generators produce power without combustion, resulting in ultra-low nitrogen oxide (“NOx”) emissions, improving local air quality. 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 expensive transmission & distribution investment.

Linear generators have already been recognized by the CEC in a number of settings, including the Distributed Electricity Backup Assets program and Clean Energy Reliability Investment Plan, as well as the solicitation concept itself.^{2,3} California has established aggressive targets to combat the climate crisis, and clean distributed generation resources like linear generators are essential to ensuring that greenhouse gas emissions reductions can be achieved without sacrificing affordability, year-round reliability, and multi-day resilience. Mainspring appreciates the Commission acknowledging linear generators as a resource in a number of proceedings and programs, and looks forward to continuing to deploy our technology to demonstrate and maintain reliability in the grid of the future.

B. What are the near-term and medium-term technical targets (e.g., costs, efficiency, ramp rate, emissions, etc.) to advance technologies from Groups 1 and 2 to a higher TRL? What should be the starting and target TRLs for these two groups?

² California Energy Commission, “Proposed Draft DEBA Program Guidelines”, p. 3. August, 2023.

³ California Energy Commission, “Clean Energy Reliability Investment Plan”, p. 16. March 2, 2023.

While there are a number of both near- and medium-term technical targets worth considering to advance technologies to a higher Technology Readiness Level (“TRL”), notably the ability to immediately provide both primary and backup power, these should be evaluated holistically and stackably, rather than on a single metric. For example, a customer calculates total cost of ownership based on a combination of capital and operating costs. Further essential values are the effective useful life of a system, ramp rate, emissions, and start-up time, as well as fuel flexibility and ability to provide both primary and backup power. Success for clean dispatchable generation is an amalgamation of these metrics, and may be weighted differently depending on a customer site, local needs, etc.

In developing this solicitation concept, it is important that the Commission does not over-index on one or two metrics. Rather, all of these metrics drive value in tandem and may demonstrate value in varying degrees for a given project site. Incentivizing clean distributed generation technologies capable of stacking value across a range of metrics enables increased reliability in California’s grid of the future while reducing costs and the risk of stranded assets. Particularly in light of the recent proliferation of diesel and gas-powered backup generators, it is essential that the Commission appropriately value fuel-flexible technologies to prevent energy users from purchasing single-fuel resources that become stranded assets as technology, as well as energy, environmental, and air quality regulations advance. Fuel-flexible technologies represent the most prudent investment of state funds, enabling operators to continue utilizing resources as cleaner fuels become available and as resiliency issues require – increasing overall project cost-effectiveness. This is true both currently, by utilizing fuels such as biogas, as well as into the future as production of clean hydrogen ramps up as a means to increase and store renewable energy production.

Similarly, the Commission should explicitly value operationally-flexible generation resources that are able to start and stop quickly, and vary power output (load follow) to meet demand and firm renewables – while providing both primary and backup power. Maximizing the value of onsite variable renewables with a resource that can be available at any time to meet the needs of the customer, without a significant land use requirement, enables grid flexibility. Given the current and future proliferation of variable renewables, the Commission rightly advances this solicitation concept to incentivize clean *dispatchable* generation that represents an essential element of a modern energy grid. By evaluating resources that provide value across these many metrics in a stackable fashion, the Commission can appropriately incentivize technologies to advance in TRL level while driving broad and varied value in California’s evolution toward a cleaner grid.

The starting and target TRL for Group 1 should be Levels 7 and above, with a focus on accelerating adoption of market-ready clean, distributed generation at scale rapidly to benefit California’s grid. Focusing on TRL 7 or above will minimize technical risk of projects and maximize the use of state funds for projects that provide true, realized value.

C. Which end-use sectors, facilities, or communities are expected to be most positively impacted by these types of projects?

Projects in the biogas sector (especially landfills, dairies, and wastewater treatment facilities) are particularly important in demonstrating the value of locally-sited clean dispatchable generation for a number of reasons. First, many of these facilities produce much more fuel than can be used onsite (which is often flared when unused), representing a ready source of power that can be used to help meet peak demand on the system. Second, biogas projects are capital intensive and often require incentives to meet investor requirements. Facilities that are in a position to use excess fuel and turn it into power that can be exported to the grid (rather than flaring the gas) are often ineligible for state incentives (e.g. the Self

Generation Incentive Program (“SGIP”). Third, biogas projects require a strong revenue source to offset the high capital costs. This might work for projects such as some dairy biogas facilities that produce electricity that is competitive in the Low-Carbon Fuel Standard (“LCFS”) market – a market where economically viable carbon credits can be generated and add to the revenue of a project. However, power generated from many biogas facilities, especially landfills, does not produce enough revenue to be economically competitive relative to other LCFS-eligible projects, which drives investment interest away. Market-based Power Purchase Agreements (“PPA”) alone are insufficient to achieve investor return requirements. In summary, biogas projects require incentives –notably those being made available through this solicitation– to become economically viable. This draft solicitation can drive valuable capacity investments for the grid, while improving local resilience, and help mitigate peak load growth for this important segment of facilities ineligible for other incentives.

III. Conclusion

Mainspring appreciates the opportunity to comment on this important solicitation concep, and looks forward to collaborating in the future.

Sincerely,

/s/ Serj Berelson

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