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**Eos Energy Comments in Response for Information for Long
Duration Energy Storage Demonstration Solicitation**

Additional submitted attachment is included below.



February 16, 2024

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 23-ERDD-08
715 P Street
Sacramento, CA 95814-5512

Re: Eos Energy Comments in Response for Information for Long Duration Energy Storage Demonstration Solicitation CEC Docket Number 23-ERDD-08

Eos Energy Enterprises (Eos) is pleased to respond to the California Energy Commission's Request for Information (RFI) on Long Duration Energy Storage (LDES).

Established in 2008, Eos has been on a mission to accelerate the shift to clean energy with positively ingenious solutions that transform how the world stores power. Our breakthrough Znyth[®] aqueous zinc battery was designed to overcome the limitations of conventional lithium-ion technology. Eos is proud to provide a commercially available, American made, performance and price-competitive energy storage systems.

The Eos energy storage solution can be a critical component of California's energy transition to renewables.

Respondent Characteristics

Eos Energy Enterprises (Eos) is a for-profit company that designs, manufactures, and deploys battery storage solutions for the utility, commercial and industrial, and renewable energy markets. We offer stationary battery storage solutions that operate in markets requiring 4-12+ hour dispatch windows. Our flagship product is the Eos Znyth DC battery system designed to meet the requirements of the grid-scale energy storage market. Eos Energy Enterprises, Inc. was founded in 2008 and is headquartered in Edison, NJ with manufacturing facilities located in Turtle Creek, PA.

Energy Storage Solution and Company Highlights:

- Designed and manufactured in America.
- Fully recyclable and non-flammable
- 350+ team members
- Zinc electrolyte-based chemistry – Zero rare earth minerals required.
- All major manufacturing components can be sourced within 5 hours of manufacturing plant.
- Technology optimized for 4–12+ hour discharge.
- 95 patents pending, issued, or published in 24 countries.
- Scaling to gigawatt-hour annual production capacity.
- Financeable and bankable technology.

Eos has clear and compelling advantages over lithium-ion storage technology including 100% discharge depth versus lithium's 10-90%, 3 times the discharge rate of lithium's typical 1-4-hour maximum, wider operating temperatures and much lower degradation over the battery's lifetime (<3% over 20 years whereas lithium is 2-3% per year). The Eos storage solution can be a critical component in rural and remote energy infrastructure and supports the LDES market needs.

Request for information – responses to questions:

As the RFI instructions requested, Eos will opine to the questions below in order:

Question 1. According to the California legislation that authorized the LDES program, all demonstration projects must have a system capacity of a minimum of 1 MW for at least 8 hours. Given this requirement and the current state of your non-Li LDES, which of the following system sizes could you deliver in the next 18 months to 2 years? Additionally, which system size would help your technology reach the 200-400 MWh system size in the next 3-6 years?

- System size of 8-10 MWh
- System size of 10-20 MWh
- System size of 20-30 MWh

Eos Response: Eos can deliver all the sizes requested in the next 18 months to 2 years. All sizes and deployments will help support Eos' continued capacity growth.

Question 2. What would be the range of the estimated project costs in a direct current (DC) configuration for demonstrating each of the three different system sizes listed in question 1 for your non-Li LDES system as a function of the location of deployment? Additionally, what would be the life expectancy of the demonstrated project? Would it be considered pre-commercial or commercial, and have an expected life of 10-20 years or longer? Please explain.

Eos Response: Eos' project costs would be similar (\$/kWh) to commercial project costs we see in the markets today for shorter duration projects. Our systems will deliver for 20+ years and still maintain ~97% of the original capacity. Our extremely low operating costs provide significant project benefits over the project's lifetime. Eos products are commercially available today.

Question 3. For the system sizes listed in question 1, what is the maximum amount of match funding that a technology provider and selected end customer can contribute towards one of the proposed future grants - 20%, 30%, 40%, or higher?

Eos Response: Depending on the application and available revenues the Eos and a project development partner could contribute up to 50% of project costs.

Question 4. What type of incentives can be leveraged to make a LDES system demonstration more attractive from a financial standpoint? What will be the maximum amount of incentive that a technology provider and selected end user could obtain for the system sizes listed in question 1?

Eos Response: The incentive amounts required would be a function of the LDES application and potential revenues. Eos products fully qualify for the Investment Tax Credit (ITC) domestic content adder of 10% so utilizing the ITC along with any CEC grant would most likely be enough incentive for a successful project.

Question 5. Considering that California is aggressively planning to procure energy storage and has already approved over 8 GWs of Li-ion systems, when do you anticipate your non-Li system will be able to compete with Li-ion systems in terms of price and performance for a future commercial solicitation if the price range is \$350-\$450 per kilowatt-hour (kWh) delivered in a DC configuration? Please explain.

Eos Response: Eos products are commercially available today and being deployed in California today in the price range noted in the question.

Question 6. What demonstration system size would be needed to persuade you to at least partially automate the majority of your LDES system manufacturing capability to deliver a future order in the range of 200-400 MWh in a 12-24-month delivery window?

- a. What is the largest system on a kWh basis you have fielded and have been operating to date?
- b. What is the largest system on a kWh basis that you have a firm order to deliver in the next 12-18 months?

Eos Response: Eos is fully committed to automating our manufacturing line and growing our production capacity. [With a conditional commitment from the Department of Energy for a nearly \\$400MM loan to help achieve this growth, Eos is in a leadership position when it comes to LDES manufacturing growth.](#) As Eos is a publicly traded company, all information we have shared on projects and customers can be found in the [investor relations section of our website](#).

Question 7. How can funded LDES projects better prioritize benefits for under-resourced (low-income and disadvantaged) communities and Tribes? Should benefits to under-resourced communities and Tribes be strict requirements in the solicitation or incentivized through solicitation scoring criteria bonus points? Should match fund requirements be reduced or potentially eliminated? What are the potential barriers to the funding and development of successful LDES projects in under-resourced and tribal communities? Please explain. Specific examples are welcomed.

Eos Response: Eos does not have an opinion on specific requirements surrounding this question but the energy transition should certainly benefit underserved communities. We have proudly participated in [microgrids for Tribes](#).

Question 8. Should demonstration projects be required to be located in Tier 2 or 3 High Fire-Threat District areas (as defined by the CPUC2)? Or should these siting locations be incentivized through solicitation scoring criteria bonus points? Please explain.

Eos Response: Eos's BESS is non-flammable and is a great application for any area; our non-flammability and safety profile is amplified in high fire threat areas. Eos supports BESS flammability education in all areas.

Question 9. Do demonstration projects provide more value in certain service territories (i.e. investor-owned utilities, publicly-owned utilities, community choice aggregators, rural electric cooperatives, and electric service providers)? If so, why?

Eos Response: *Demonstration projects provide value in all areas but one of the primary reasons the need for LDES is growing is due to the retirements of fossil fuel base load generation being replaced with intermittent renewable energy. A demonstration suggestion would be to pair the LDES with a PV or wind plant to show how LDES can help optimize these systems and provide benefit to the “duck curve”.*

Question 10. Is there any preference for behind-the-meter or front-of-the-meter demonstrations for the system size ranges listed in question 1? If so, why? a. For a behind-the-meter installation, does your LDES technology have any advantages to the utility regarding the utility interconnection agreement? b. If you are considering a front-of-the-meter configuration, have you applied for a CAISO reservation? If so, when would that reservation become effective?

Eos Response: *Eos does not have a preference as our BESS technology is appropriate for both scenarios.*

Question 11. Are you considering a project for which the interconnection agreement is already approved?

Eos Response: *Eos does not have specific project identified for this RFI. If selected, Eos will work with our development partners and the CEC to identify the projects best suited for the demonstration.*

Question 12. What would be the typical footprint range needed to deploy certain LDES systems for the three system size ranges listed in question 1?

Eos Response: *Eos’s typical system density is ~3 kWh/ft²*

Question 13. When a GFO is posted, proposals are generally due to the CEC within 8 to 12 weeks, and the CEQA process is generally required for the CEC to award grant funding to a project. The CEC has learned from the initial LDES projects that the LDES systems have a greater footprint than systems exempted from CEQA. Therefore, an environmental impact report or negative declaration is normally required for the potential projects, as are other actions required by CEQA. For the system size ranges listed in question 1, how long would it take to complete the CEQA process (and the National Environmental Policy Act (NEPA) if applicable) for your LDES system, and approximately how much would these processes cost?

Eos Response: *Eos systems are safe and fully recyclable, and our footprint is similar to lithium systems when the required fire setbacks imposed on lithium are taken into account and therefore, we do not expect any deviations in time and cost of the CEQA process.*

Question 14. Is it reasonable to require that all GFO applicants complete discretionary permitting and CEQA through their local public agency before submitting a proposal for a project in the sizes defined in question 1? Please explain.

Eos Response: *At this time, Eos does not have an opinion on this permitting question.*

Question 15. If the timeline and costs are not feasible, what preliminary CEQA studies or information would you recommend be completed before proposals are submitted to the CEC? Additionally, how long

would it take to complete the preliminary CEQA studies or information for your proposed LDES technology for the system size ranges listed in question 1?

Eos Response: *At this time, Eos does not have an opinion on this permitting question.*

Question 16. What environmental process would be required if your project were not subject to CEQA? Additionally, how long would it take to complete the environmental process for your proposed LDES technology for the system size ranges listed in question 1?

Eos Response: *Eos projects should not require any additional environmental permitting processes beyond today's standard requirements.*

Question 17. As stated in the "Background" section of this RFI, the funds are provided by GGRF, and therefore, CEC is required to track GHG reductions provided by the installed systems. a. What combination of LDES and renewables is needed to maximize the GHG reductions from a project? b. Is there a difference in what your technology can provide in GHG reductions if installed in a behind-the-meter or front-of-the-meter configuration?

Eos Response: *Eos products have 84% lower GHG footprint & Carbon payback time 2.4x lower than Li-ion.*

Question 18. What lessons have you learned from the LDES projects you have demonstrated, deployed, or operated to date? What major technical, economic, or policy barriers have affected the demonstration, deployment, or operation of LDES systems in the last two to four years? What are some potential solutions to these barriers? How can future funding from this GFO help solve these barriers?

Eos Response: *Deployed Eos projects have proven the economic benefits our technology brings to LDES projects. One barrier is that many LDES technologies are treated like lithium systems when it comes to permitting and specific but not holistic operational profiles and sometime identified as RFP requirements (such as looking at round trip efficiency while not considering auxiliary power consumption). Helping AHJs and RFP writings understand the differences will allow more participation of LDES technologies in more projects.*

Question 19. Are there any additional comments or input you want the CEC to consider as they develop this future GFO?

Eos Response: *Not at this time.*

Respectfully submitted,

Andrew E. Meserve
Eos Energy Enterprises LLC