

**DOCKETED**

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## **Demand Side Grid Support (DSGS) Program Proposed Draft Guidelines**

*Additional submitted attachment is included below.*



**Michaels**Energy

March 22, 2024

California Energy Commission  
715 P Street  
Sacramento, CA 95814

**REFERENCE:**

Docket No. 22-RENEW-01: Demand Side Grid Support (DSGS) Program Proposed Draft Guidelines, Third Edition

**Dear Commission Members and Staff:**

Michaels Energy appreciates the opportunity to comment on the Demand Side Grid Support (DSGS) Program Proposed Draft Guidelines, Third Edition. Michaels Energy manufactures thermal energy storage (TES) systems in California for use in refrigerated storage applications. When refrigeration equipment in TES-equipped facilities is controlled in response to a demand response signal or a peak period, Michaels' proprietary thermal energy storage system can yield utility-scale energy storage for eight to ten hours. Our solution utilizes food-safe materials and, unlike Li-ion batteries and other electrical storage technologies, does not present a fire hazard or even require an additional grid connection.

These TES systems allow energy-intensive refrigeration equipment to be shut down during times of high electrical grid stress. During peak periods when chilling equipment is shut down, the pre-cooled phase change materials (PCMs) undergo phase transitions that absorb substantial amounts of thermal energy while holding temperatures constant. This provides stable temperatures within refrigerated spaces for extended periods—over 8 hours—without the need for energy-intensive cooling equipment. Refrigeration equipment can be re-started during off-peak hours when electricity is more affordable, and the refrigeration systems run more efficiently to recharge the TES system. Essentially, adding thermal energy storage allows refrigeration systems to act as a long-duration battery, providing a cost-effective, behind-the-meter solution for demand and energy management.



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In the following pages, Michaels responds to the Demand Side Grid Support (DSGS) Program Proposed Draft Guidelines, Third Edition.

We urge the CEC to include thermal energy storage systems as eligible for the Demand Side Grid Support (DSGS) Program under Option 3 - Market-Aware Behind-the-Meter Battery Storage Pilot. Thermal energy storage “batteries” alleviate grid stress without requiring additional grid connections or posing a fire hazard. They use much more sustainably sourced and disposed of materials and have four times the service life of lithium-ion batteries.

Our behind-the-meter solution employs PCMs to reduce both the energy requirements and peak demand of low and medium-temperature refrigeration systems. Target markets include businesses with commercial and industrial refrigeration systems. These large loads are typically coincident with existing grid peaks. We believe that when using TES, the best value is achieved behind the meter for these reasons:

- There’s no additional interconnection requirement. TES serves load-shifting purposes without the costly and time-consuming permitting processes required by grid-connected batteries.
- The commercial sector’s refrigeration needs have high energy use intensity, and TES can shift peak loads to coincide with times of maximal solar PV generation. These low-cost, high-return projects can be used for permanent load shifting or demand response.
- The loading order mandated by the State prioritizes reducing electrical demand through energy efficiency and demand response, which is aligned with the results this technology produces.
- TES can help meet state and local equity objectives and requirements because systems can be deployed in refrigerated warehouses within disadvantaged/underserved communities without affecting the local environment.
- It opens a more economical and faster way to provide storage and resiliency to Load Serving Entities (LSEs). The overall capital cost of an 8-to-10-hour TES



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system is around \$150 per kWh, which is less than half of the current cost of Li-ion systems. The Levelized Cost of Energy (LCOE) for TES for 20 years is between \$20-\$50/MWh, which is also much less expensive than \$200/MWh for Li-ion battery technologies.

- Compared to electrochemical batteries, thermal energy storage has lower costs, improved overall system round-trip efficiency, and is made with recyclable and environmentally friendly materials. This supports California quickly diversifying away from Li-ion battery technologies in the next five years as the primary storage medium on the grid.
- Thermal Energy Storage does not require the complexity of permitting and CEQA environmental assessments of typical electrical batteries. Discretionary permitting for thermal energy storage projects is quite simple. An electrical permit may be required to install revenue-grade electrical metering but would not be required for the TES system itself. TES often does not require building modifications and is, at most, a simple retrofit. Michaels Energy's design is customer-installable and easy to scale.

TES equipment also has resiliency benefits in refrigerated warehouses that may have no backup power sources or backup power sources (such as diesel) that cause or exacerbate air pollution issues in environmental justice communities.

From a materials perspective, TES systems are significantly more environmentally sustainable than almost any other battery solution. PCMs primarily consist of salt water and recyclable containers, making the materials substantially more environmentally friendly. The PCM form factors for this project have a useful life of 20 years, as compared to grid scale lithium-ion batteries, which have a useful life of approximately five years.

We welcome the opportunity to further discuss how TES can be integrated into this program under Option 3 and address any questions or concerns you may have. Please feel free to reach out to schedule a meeting at your earliest convenience.



**Michaels**Energy

Thank you for your consideration and the opportunity to contribute to advancing the Demand Side Grid Support (DSGS) Program for California.

Sincerely,

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