



July 5, 2017

California Independent System Operator  
P.O. Box 639014  
Folsom, CA 95630  
Via e-mail to [regionaltransmission@caiso.com](mailto:regionaltransmission@caiso.com)

Re: Comments of Amber Kinetics on Moorpark Subarea Local Capacity Alternative Analysis Study

To Whom It May Concern,

Amber Kinetics applauds CAISO's decision to review alternatives to the Puente Power Project in meeting local energy and related needs for the Moorpark Subarea, and appreciates this opportunity to provide comments.

Amber Kinetics is a California company founded out of engineering research at UC Berkeley. In 2012, it received a CEC grant under the PIER program to help commercialize its flywheel design. It has developed a grid- and microgrid-scale flywheel capable of generating cost-effective, 4+ hour duration, long-life, low risk energy storage to supply capacity, energy and ancillary services. Amber Kinetics' technology can store energy for optimal dispatch, replace or defer fossil fuel peaking generation or transmission and distribution upgrades, and provide frequency regulation and spinning reserves. We provide these comments to make the CAISO aware of the unique characteristics of the Amber Kinetics technology as it evaluates the options available in its study.

Amber Kinetics' mechanical form of energy storage fills the load profile need for a long-duration, high utilization capacity resource. In this respect, it is the opposite of batteries: the higher the utilization, the lower the unit cost. Its distinct advantages relative to other storage technologies are:

- Unlimited 24/7 cycling – intra-day or intra-hour; No dispatch constraints;
- No degradation over its 30+ year life regardless of # of cycles or operating demands;
- 4-hour cycle can be extended w/o efficiency loss by reducing output or stacking units;
- \$0/kWh Variable O&M; first to dispatch;
- Scheduled maintenance of 1 day every 10 years;
- No fire, hazardous material, or disposal risk;

Amber Kinetics' units have over 20,000 hours of run-time and systems in commercial operation

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32920 Alvarado-Niles Rd., Ste. 250, Union City, CA 94587

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or under contract. Attached are: a) our Model M160 Data Sheet (40 kw/160 kWh; 0.2 acres/MW), b) an illustrative lay-out for a 10 MW/40MWh project, and c) a background package on the Company and technology.

We offer the following brief comments in the spirit of bringing cutting-edge information to your analysis in hopes of contributing to the design a robust study of alternatives to the Puente Power Project. We encourage CAISO to:

- Review the technical capabilities of the Amber Kinetics flywheel energy storage technology, particularly in comparison to Li-ion batteries;
- Capture the capabilities of unconstrained dispatch, unlimited daily cycling, zero degradation, \$0/kWh VOM, and near-zero maintenance in your models; and
- Explicitly consider the impacts of implementing Amber Kinetics flywheels in each of the three scenarios presented during the June 30, 2017 Preferred Resource Scenarios Stakeholder Call.

Sincerely,

A handwritten signature in blue ink that reads 'Bill Golove'.

Bill Golove  
VP, Business Development  
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