

**DOCKETED**

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Memorandum

**To:** Commissioner Kourtney Vaccaro, Presiding Member  
Commissioner Andrew McAllister, Associate Member

**Date:** August 4, 2022

**From: California Energy Commission**  
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**Subject: ISSUES IDENTIFICATION REPORT AND PROPOSED SCHEDULE FOR THE GEM ENERGY STORAGE CENTER (21-AFC-02)**

In its *Notice of Public Site Visit and Informational Hearing, and Committee Order* filed August 1, 2022 (TN 244282), the Gem Energy Storage Center Committee ordered California Energy Commission (CEC) staff to file no later than August 4, 2022, "a proposed schedule for conducting the certification process and an Issues Identification Report summarizing the major issues that Staff believes will be presented in the matter."

Project Description

The Gem Energy Storage Center (GESC or project) would be a nominal 500- megawatt (MW), 4,000 MW-hour (MWh), advanced compressed air energy storage (A-CAES) facility capable of charging and discharging daily. GESC would compress air into a purpose-built underground cavern, using electricity from the grid, most likely off-peak, excess, or surplus electricity. The heat from the air compression process would be captured and stored in an aboveground thermal storage system. The compressed air would then be stored in the cavern under the pressure of a hydrostatic head created by an onsite, aboveground water reservoir. When electricity is needed by the grid, the compressed air would be released using the hydrostatic head pressure, re-heated using the stored thermal energy, and directed through aboveground turbine-generators to produce electricity. GESC's major equipment would consist of five all-electric air compressor trains, five 100-MW air-driven power turbine generators, heat exchangers, thermal heat storage, an underground compressed air storage cavern, an aboveground water reservoir, auxiliary aboveground support facilities, and a 10.9-mile interconnection to the existing Southern California Edison Whirlwind Substation.

Staff Discovery Efforts

Staff commenced its discovery efforts upon receiving confirmation of the Executive Director's recommendation that the application be considered complete at the July 13,

2022, Business Meeting. Staff filed Data Request Set 1 on July 26, 2022, which included data requests covering the following technical areas: Air Quality and Greenhouse Gas Emissions, Alternatives, Biological Resources, Geological Hazards and Resources, Land Use, Noise and Vibration, Paleontological Resources, Project Overview, Transportation, and Transmission System Engineering. Staff has also started drafting additional data requests for Set 2, which will cover the technical area of Cultural Resources and possibly additional topics.

### Issues Identification

Based on staff's analysis of the project as it is presently described in the applicant's materials filed in the docket, staff would like to draw the Committee's attention to potential issues in the technical areas of Biological Resources, Cultural Resources/Tribal Cultural Resources, Geological Resources, Land Use, Transmission System Engineering, and Transportation which could significantly affect staff's schedule for preparing its Preliminary Staff Assessment (PSA). Given the current status of the discovery effort, staff is unable to make definitive statements for the rest of the technical areas to be addressed in the PSA.

**Biological Resources.** The applicant did not conduct complete biological resources surveys. This includes protocol surveys for several special-status species and mapping all the state waters on the project site and transmission line route. For some special-status species, no surveys were conducted (i.e., desert kit fox, American badger, Mohave ground squirrel, and Crotch bumble bee). For desert tortoise and western burrowing owl, surveys were conducted over 1 year ago and had negative results. Many of the surveys did not follow established protocols or some areas within the survey area have yet to be surveyed. Therefore, new surveys or additional surveys are required (i.e., desert kit fox, American badger, Mohave ground squirrel, Crotch bumble bee, desert tortoise, western burrowing owl, Swainson's hawk, western Joshua tree, all cacti species, and rare plants), which would largely start in 2023 at the earliest. The assessment of state waters is another example where the correct protocols were not used and therefore the results are not reliable as there is likely more state waters than mapped. New surveys following appropriate survey protocols are needed to determine locations of state waters for a streambed alteration permit (subsumed within a potential CEC license, if issued) and mitigation if avoidance is not possible. Without complete baseline data, staff cannot definitively say whether project impacts are significant or can be mitigated to a less than significant level.

Survey data and other information is requested in Data Request Set 1, but the timing for special-status surveys would, at the earliest, occur in the winter (February 2023) to early summer of 2023 depending on the species' appropriate survey period. That means survey data would not be available to staff until mid to late summer of 2023; thereby impacting CEC's ability to process the GESC AFC in the 12-month time frame established by the Warren-Alquist Act.

**Cultural Resources/Tribal Cultural Resources.** The AFC and cultural resources technical report submitted by the applicant included correspondence with Native American tribes identified by the Native American Heritage Commission (NAHC) as having interest in the project area. The correspondence is included within TN 240771 (Appendix 5.3A). The applicant's consultant, PaleoWest, logged the responses received from tribes and recorded the following information.

Jairo Avila, Tribal Historic Preservation Officer (THPO) for the Fernandeno Tataviam Band of Mission Indians (FTBMI), spoke in a phone call with Dr. Kyle Knabb (PaleoWest), and regarding which Dr. Knabb noted, "In addition to archaeological resources, he indicated that there are significant landscape features within the project area, including Willow Springs, Fairmont Butte, and Little Butte. The Buttes were raw material sources in prehistory. These landscape features are significant resources to the tribe."

Additionally, in a letter dated 10/1/21, Mr. Rambo, a Cultural Resources Representative for the Tejon Indian Tribe, indicates to Dr. Knabb that there are numerous documented prehistoric sites within the vicinity of the project – "most prominently near/surrounding Willow and Bean Springs – about which the Tribe maintains ethnographic data via its "Aboriginal Placename Geodatabase." For example, the aboriginal Kitanemuk placename for the prehistoric village at Willow Springs is: šěševyəq".

Mr. Rambo further states, "Consequently, the Tribe is duly concerned about the Project's potential to impact significant TCRs [tribal cultural resources] affiliated with the Tribe and is hereby respectfully requesting to initiate Tribal Consultation with representatives from PaleoWest, the Project Proponent and/or the Lead Agency."

Staff will initiate consultation with the tribes identified by the NAHC per the requirements of CEQA and the CEC's tribal consultation policy. Staff will investigate the extent of cultural landscape features and TCRs in the project vicinity, the eligibility of these and other cultural resources, and potential impacts of the Gem facility to cultural resources that qualify as historical resources, unique archaeological resources, or TCRs (as defined by CEQA).

**Geological Hazards and Resources.** In a typical scenario, geotechnical data collection activities would be conducted prior to the filing of an AFC to confirm a viable project site for the intended use. In the present case, geotechnical work is a much more prominent feature of the project, given its technology, and the GESC applicant filed its AFC without completing all this work in advance. The applicant filed its AFC with CEC on December 1-3, 2021. Hydrostor subsequently submitted a Conditional Use Permit (CUP) application to Kern County on April 1, 2022. That CUP application described the exploratory work proposed to be conducted as "geologic evaluation in the form of exploratory boreholes using conventional portable drill rigs" and further defined the proposed activity as follows:

“The exploratory boreholes will consist of approximately 12 shallow boreholes that can reach depths of approximately 50 to 150 feet. Approximately 6-8 deep boreholes down to 2,200 ft deep may be necessary to refine the understanding of the site subsurface conditions based on initial findings.”

The overall schedule for conducting such activities is described as follows:

“The shallow borehole study in totality is expected to require approximately 10 – 12 days including setup, demobilization and return of the Site to pre-existing conditions. Each deep borehole is estimated to require 50 – 60 days from start to finish with an anticipated one week downtime during the boring activity to allow for crew relief. During these times there would be no boring activity.”

Hydrostor’s application for a CUP does not include an estimate of the anticipated completion date for the exploratory activity, nor any discussion of scenarios where the applicant might achieve their site characterization objectives with fewer than the anticipated 6-8 deep boreholes.

Kern County ultimately approved a CUP for a 90-day term which would allow for the drilling of two deep boreholes, and the applicant has commenced work under that CUP. It is our understanding that the applicant does not expect to complete the work identified under the existing CUP within the 90-day time frame available under the CUP and has initiated discussions with the County to explore an extension of the 90- day time frame in order to complete the currently permitted work. At Kern County’s request, CEC staff sent a letter to the county on July 26, 2022, expressing that the data collection activities currently underway and planned at the Gem site are important and will provide necessary information to support the CEC staff’s analysis of the GSEC AFC.

To the degree that such exploratory activity might impact CEC’s ongoing evaluation of the GESC AFC, it is important for CEC staff to discern and understand the anticipated overall duration of the applicant’s geotechnical evaluation activities, since it is possible that the work may impact CEC’s ability to process the GESC AFC in the 12-month time frame established by the Warren-Alquist Act.

We also note for the Committee’s attention that Data Requests Set 1 included numerous data requests which outline the specific information that CEC staff is seeking to complete its evaluation of the geological resources technical area prior to the publication of its PSA. These data requests identify several areas of geologic hazards that require clarification or geotechnical analyses to determine if potential impacts could be mitigated to less than significant. Some of the information CEC staff seeks may only become available as a result of the additional subsurface exploration activity.

The project is contingent on identifying favorable rock (loosely defined as “sound bedrock”) to host the deep compressed air chamber; however, no definition or criteria for “sound bedrock” has been provided. The applicant has not identified how “sound bedrock” will be judged and identified.

The applicant has noted that some of the onsite soils may be susceptible to liquefaction and that liquefaction generally occurs in the upper 100 feet of soil. If groundwater is deeper than 100 feet, the possible impacts imposed by liquefaction are less than significant. However, the applicant also notes that at the time the AFC was prepared, there was not any site-specific subsurface information available to evaluate the likelihood and risk of liquefaction to occur at greater depths, which may impact the construction and operation of the proposed GES. Damage to the casing/lining of the deep shafts that access the underground cavern could result in loss of the confinement of the overlying aquifers and the surface reservoir. Liquefaction effects along the deep vertical shafts should be considered, and potential effects on their casing/lining.

The applicant has identified the embankment dam for the hydrostatic compensation reservoir as requiring slope stability analysis and engineering design. In addition to typical slope stability analysis modes of static, pseudo-static (seismic), steady-state seepage, and rapid drawdown, staff needs to understand if the applicant's design team considered, or will consider, rapid drawdown along with seismic loading, since the reservoir would cycle on a frequent basis.

The applicant has stated that reservoir induced seismicity and compressed-air-induced seismicity would not be problematic. However, the compressed air chamber and hydrostatic compensation reservoir would undergo cycles of pressurization and depressurization that will produce cyclic changes in the rock stress field that could be significant. The applicant has not identified the in-situ stress field, nor provided the techniques that will be used to determine the in-situ stress field or how stress changes will be modeled. In addition, geologic structures (faults, shear zones, joint sets) have not been identified or characterized to input into a sensitivity/threshold analysis to identify potential fracture orientations that could be affected by cyclic stress changes (nor has general stability of the deep compressed air chamber been discussed/analyzed). Without this additional information, staff cannot determine if induced seismicity affects would be significant.

Typically, these concerns would be addressed in a geotechnical report for the project that presents detailed calculations to support their conclusions. However, the field work for the geotechnical investigation has just begun and given the permitting issues described above it is unlikely that the work will be concluded within the 12-month time frame established by the Warren-Alquist Act for evaluating and reaching a decision on an AFC. Without the information requested in Data Requests Set 1, staff cannot definitively say whether project impacts are significant or can be mitigated to a less than significant level.

**Land Use.** For land use, a project may have a significant effect on the environment if it conflicts with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. There are potential issues of non-compliance with laws, ordinances, regulations, and standards (LORS). In its review letter dated May 19, 2022 (TN 243152) in response to CEC staff's request for agency participation letter dated March 15, 2022 (TN 242326), the Kern County Planning and

Natural Resources Department stated that the proposed project is not a permitted use within the current residential zoning for the project site and stated that rezoning and a Conditional Use Permit (CUP) would be required. Although the CEC has exclusive authority over the proposed project and a CUP from Kern County is subsumed by the CEC, if a noncompliance with LORS is identified, the CEC must consult with the appropriate agency and attempt to correct or eliminate the noncompliance. To that end, the applicant must request from Kern County a zone change on all three parcels from the Estate (E) Zone District to the Agriculture (A) Zone District. CEC staff will consult with Kern County to ensure that the findings that would have been required for a CUP in the Agriculture (A) Zone District, but for the CEC's exclusive authority, as well as any conditions proposed by Kern County to ensure LORS compliance, are considered in the PSA. The general purpose of zoning regulations is to ensure compatibility with land uses, avoid impacts on the environment, and preserve and protect health and safety. As explained above, if the project conflicts with a land use regulation, such as a zoning designation, a significant environmental impact could result

**Transmission System Engineering.** The GESC Application for Certification stated that the GESC may be interconnected to a future Los Angeles Department Water and Power (LADWP) Rosamond Substation. The LADWP Interconnection Studies have not been provided to staff to review. The Interconnection Studies are required for staff to determine the potential need for downstream transmission facilities. If the studies show the project would cause any transmission line overloads which might require transmission line reconductoring or other significant downstream upgrades, a general CEQA analysis will be required. The environmental analysis of potential upgrades could cause a delay in the licensing process for the GESC. Staff has submitted Data Requests requesting the Interconnection Studies.

**Transportation.** On May 22, 2022, the Kern County Planning and Natural Resources Department submitted a comment letter on the Gem Energy Storage Center project. Comment number three addressed Tehachapi Willow Springs Road and Sweetser Road which provide direct access to the site and are classified as Future Expressway and Secondary (Collector) Highway in the Rosamond-Willow Springs Specific Plan. In response, CEC staff prepared a data request asking the applicant to confirm if the GESC, or any component thereof, would encroach within these access road dedications. If the project encroaches into the road dedications, a Specific Plan Amendment would be required to delete or down grade the alignment requiring a hearing before the Board of Supervisors during their quarterly General Plan Amendment meetings (i.e., April, June, September, and December).

### Project Schedule

As staff is currently gathering information, it is not possible for staff to produce a definitive estimate for publication of the PSA. Staff will communicate updates regarding the progress of its analysis in future status reports.

Although this is an AFC, staff recommends that the Scheduling Order for this proceeding include similar language included in recent scheduling orders for small power plant exemption proceedings to account for the significant amount of discovery anticipated in this proceeding. The recommended language would state that publication of the PSA will occur no later than 60 days after staff notifies the Committee in a status report that staff has received complete and satisfactory answers to its data requests and thus has no further data requests.

Given the unique schedule-related challenges discussed in the Issues Identification section above, staff intends to file a motion to extend the discovery period beyond the 180-day limit described in California Code of Regulations title 20, section 1716.

Staff proposes the following schedule:

Application deemed complete	7/13/2022
Data Request Set 1 filed	7/26/2022
Tribal Consultation Letters sent	7/26/2022
Staff Memo re: Issue ID and Schedule filed	8/4/2022
Data Requests Set 2 filed	TBD
Committee Info Hearing and Site Visit	8/11/2022
Staff's PSA published (60 days after staff acknowledgement that it has no further data requests)	TBD
Deadline for comments on staff's PSA (30 days per Warren-Alquist Act)	TBD
Staff files FSA including responses to comments on PSA (60 days after comment deadline)	TBD
Evidentiary hearing related testimony and activities	TBD
Committee proposed decision	TBD
Commission Decision at Business Meeting	TBD