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STATE OF CALIFORNIA

ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of: The Application for Certification for the ALAMITOS ENERGY CENTER	Docket No. 13-AFC-01

Testimony of Bill Powers, P.E.
Alamitos Energy Center Final Staff Assessment
Docket 13-AFC-01

Prepared for Los Cerritos Wetlands Land Trust

October 21, 2016

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1.0 Introduction

My testimony has been prepared on behalf of the Los Cerritos Wetlands Land Trust and addresses the inadequate alternatives analysis in the September 2016 Final Staff Analysis (FSA) prepared by the California Energy Commission (CEC) for the Alamitos Energy Center (AEC). I am a registered professional mechanical engineer in California with over 30 years of experience in the energy and environmental fields. I have been involved with the permitting of five 50 MW peaking turbine installations in California, as well as numerous gas turbine, microturbine, and engine cogeneration plants around the state. I organized conferences on permitting gas turbine power plants and dry cooling systems for power plants as chair of the San Diego Chapter of the Air & Waste Management Association. I am the author of the March 2012 strategic energy plan for the Bay Area titled "Bay Area Smart Energy 2020." The plan uses the state's Energy Action Plan as the framework for accelerated introduction of local renewable and cogeneration distributed resources to reduce greenhouse gas emissions from power generation in the Bay Area by 50 percent by 2020. I am the author of numerous articles in Natural Gas & Electricity Journal on use of distributed solar photovoltaics (PV) in urban areas as a cost-effective substitute for new gas turbine peaking capacity.

2.0 FSA Alternatives Analysis is Inadequate

The FSA errs by analyzing alternatives in isolation, determining that energy efficiency, demand response, or battery storage are not adequate substitutes for the proposed project by themselves, and errs for failing to acknowledge the alternative of contracting for existing reliable combined cycle capacity to serve the LA Basin. The FSA correctly identifies that (p. 6-9) "State energy policies includes a loading order for electric generation that prefers and maximizes cost-effective, reliable, and feasible energy efficiency, demand response programs and measures, and renewable generation to supplant the need for new fossil fuel-fired generation, " and that (p. 6-11) Section 454.5 (b)(9)(C) of the California Public Utilities Code addresses requirements for an electrical corporation's proposed procurement plan, including the requirement to "first meet its unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible." Yet the FSA sidesteps California law by failing to combine preferred resources, specifically demand response and battery storage, and utilize existing combined cycle capacity that will otherwise be mothballed, to fulfill all project objectives at much less cost and environmental impact than would be incurred if the proposed AEC project is built.

2.1 Demand Response Largely Meets Project Objectives

The FSA does recognize that demand response (DR) can largely meet the project objectives, stating (p. 6-13):

DR has attributes that can partially meet some of the AEC's project objectives by: 1) contributing to or reducing the need for capacity-related reliability services, including an array of ancillary services (regulation and spinning reserves), and 2) reducing the need for flexible generation if called upon during hours in which ramping needs are highest. When such programs reduce loads in the West LA Basin, they reduce local capacity requirements. DR programs can facilitate the integration of renewable resources by meeting incremental needs for regulation and reserves and reducing ramping needs.

The one critique that FSA directs toward DR is it cannot eliminate the need for all natural gas generation such as AEC because some level of reliable energy is necessary and therefore, demand response is not a viable alternative to the generation (p. 6-13). The FSA does not examine how much gas-fired generation is already operational in the LA Basin and whether this operational capacity is sufficient to meet the CAISO's 25 percent local generation requirement under all forecast demand conditions.[1] Absent such an analysis, the FSA establishes no basis for asserting that the gas-fired threshold capacity for the LA Basin that it terms "some level of reliable energy" has not already been met.

The FSA alternatives analysis also implies that DR would not be available in sufficient quantity to meet the peak reliability need addressed by the proposed project. In fact, the Public Utilities Commission's (PUC) Track 4 decision scoping memo assumed that approximately 800 MW of will be added in the LA Basin by 2018 that has not yet been credited by CAISO as available capacity to meet local LA Basin reliability need.[2] A simple definitional adjustment may be all that is necessary to convert these "second contingency" DR assets into "first contingency" DR assets that are fully credited as first-tier reliability assets in the LA Basin. The steps necessary to convert these anticipated DR assets in the LA Basin from second contingency to first contingency is not addressed in the FSA alternatives analysis.

2.2 Existing Unused Combined Cycle Capacity Is Available to Provide "Reliable Energy"

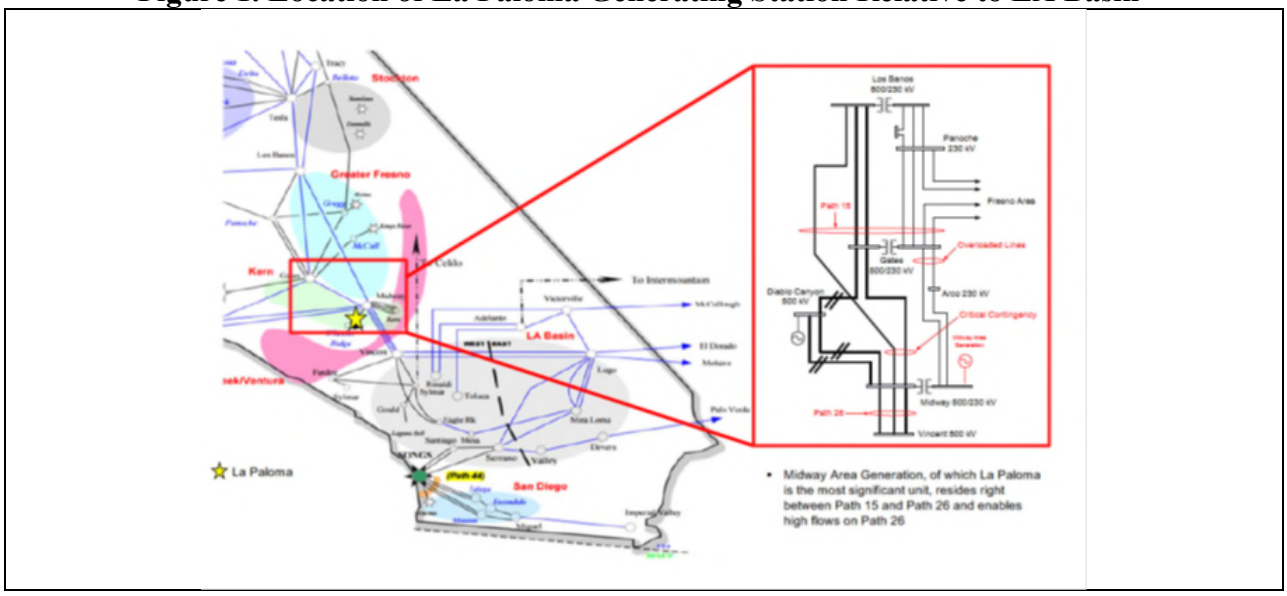
The FSA does not consider combining DR with existing, soon-to-be-mothballed regional combined cycle capacity as a single alternative to the proposed project. CAISO is currently advising that the 965 MW La Paloma Generating Station, a combined cycle power plant located in Kern County on the primary north-south transmission trunkline serving the LA Basin, should be mothballed due to lack of demand for the plant's output. Due to its location, La Paloma's natural gas supply is not dependent on Aliso Canyon natural gas storage supply. CAISO stated in the spring of 2016 that it faced the real prospect of curtailing electric service in the LA Basin due to limited supply from generators located in the LA Basin who rely on Aliso Canyon supply,

[1] **Exhibit 2**: FERC, *re California Independent System Operator Corporation - Order Approving Stipulation and Consent Agreement*, Docket No. IN13-4-000, December 14, 2012, p. 2.
[2] **Exhibit 3**: CPUC, R.12-03-014 (Track 4) Revised Scoping Ruling and Memo of the Assigned Commissioner and Administrative Law Judge, May 21, 2013, Attachment A, pp. 6-7.

and to limited flow from north to south along Path 26 (the transmission trunkline from Kern County to LA Basin).

As shown in Figure 1, La Paloma sits on Path 26, the main north-south transmission trunk line into the LA Basin. The transmission lines assumed out-of-service during a 1-in-10 year peak demand reliability event are located to the southeast of the LA Basin.[3] Therefore, the Path 26 transmission trunk line would be fully operational during the 1-in-10 year reliability event and power from La Paloma would be fully deliverable to the LA Basin during the event.

Figure 1. Location of La Paloma Generating Station Relative to LA Basin[4]



Given CAISO's representations that customer curtailments may occur (in the LA Basin) due to some units' limited fuel availability, it would appear counterproductive to LA Basin grid reliability to not protect against such occurrences by maintaining the operational status of La Paloma. La Paloma would not affected by potential LA Basin fuel supply disruptions. All that is needed to keep La Paloma operational is a contract, at a fraction of the cost of a new combined cycle power plant, that assures it is available to run when needed to assure grid reliability.

CAISO advised in its response to the complaint filed by La Paloma with FERC in June 2016 that the company could seek approval from the CPUC for a "cold lay-up" of its units as a response to insufficient revenue from power sales or contracts to maintain profitability.[5] CAISO

[3] **Exhibit 4**: CPUC, Track 4 2012 Long-Term Procurement Proceeding Final Decision, D.14-03-014, March 2014, p. 24. The SCE LA Basin N-1-1 reliability outage event involves the Southwest Power Link (SWPL) and the Sunrise Powerlink (SPL).

[4] **Exhibit 5**: La Paloma Generating Company LLC, *Complaint of La Paloma Generating Company, LLC Requesting Fast Track (FERC) Processing, Shortened Time Period, and Waivers*, Docket No. EL16-88-000, June 17, 2016, Appendix B.

[5] **Exhibit 6**: CAISO, *Answer of the California Independent System Operator Corporation to (FERC) Compliant*, Docket No.EL16-88-000, July 7, 2016, pp. 7-8.

went on to state that Calpine Corporation is seeking such relief for the Sutter Energy Center for at least the balance of 2016. The Sutter plant is of a similar vintage and technology type to the La Paloma facility, and its owners have claimed economic issues similar to those claimed by La Paloma.

CAISO asserts that La Paloma's only argument is that it will experience unexpected losses. CAISO also asserts that losses are part of a competitive market. If the Southern California competitive power cannot economically support an existing 965 MW high efficiency combined cycle plant that reliably serves the LA Basin by avoiding any dependency on Aliso Canyon natural gas supply, it is difficult to see a scenario where a new AEC combined cycle plant with substantially higher fixed costs than La Paloma can survive economically without far greater ratepayer financial support than that being sought by La Paloma to remain operational.

2.3 La Paloma Combined Cycle Units Are As Efficient As Proposed AEC Combined Cycle Plant

The La Paloma Generating Station FSA prepared by the CEC in April 1999 identifies the peak load efficiency of the combined cycle units as 55.9 percent.[6] The AEC FSA identifies the full-load efficiency of the AEC combined cycle plant as "approximately 56 percent."[7] There is no significant difference in the efficiency of the La Paloma combined cycle units or the AEC combined cycle plant.

2.4 Substantial Economic Benefit Achieved By Maintaining Existing La Paloma Combined Cycle Capacity Online

La Paloma states it needs $39 million a year from a reliability-must-run contract to maintain financial viability.[8] La Paloma is a 965 MW summer capacity plant. Therefore, the annual reliability capacity contract for La Paloma would cost: ($39,000,000/year) ÷ 965,000 kW = $40.41/kW-yr. In contrast to La Paloma, the revenue requirement for a new combined cycle unit is four times higher at $165.20/kW-yr.[9] The cost of maintaining La Paloma in operational status is one-quarter the cost, $40.41/kW-yr versus $165.20/kW-yr, of the proposed AEC combined cycle plant.

2.5 A Combination DR + La Paloma Alternative Would Remove Air Emissions from LA Basin

An alternative composed of DR in the LA Basin and La Paloma combined cycle capacity outside the LA Basin would eliminate project-related air emissions in the LA Basin.

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[6] **Exhibit 7**: CEC, Final Staff Assessment, *La Paloma Generating Station, Application for Certification 98-AFC-2*, April 1999, p. 368.
[7] CEC, AEC FSA, p. 5.3-3.
[8] Exhibit 5: pdf p. 21.
[9] Ibid, pdf p. 40.

2.6 Battery Storage Is a Viable Alternative to 400 MW of Combustion Turbines at AEC

Battery storage was identified by Southern California Edison (SCE) in its November 2014 application, which included the proposed 640 MW combined cycle plant at AEC, as a superior least-cost best-fit source over combustion turbine capacity to meet peak demand need.[10] Battery storage technology responds more quickly than a gas turbine and can store and release intermittent renewable energy. The FSA identification of battery storage as "not a viable alternative to the generation AEC would provide" is nonsensical in the context of the proposed 400 MW of combustion turbine capacity proposed for AEC. SCE has identified battery storage as superior to combustion turbines in general, and has issued a contract to AES for 100 MW of battery capacity at the Alamitos site in particular, in addition to 640 MW of combined cycle capacity.[11] In October 2016 the City of Long Beach issued its draft mitigated negative declaration for a total of 300 MW of battery storage capacity at the AEC site.[12] AES is currently proposing to construct 300 MW of battery storage at the AEC site "*to supporting the use of intermittent renewables, like wind and solar, and providing greater reliability to the grid*."[13] The AES 100 MW battery installation must be able to provide at least four hours of rated capacity per day of output.[14] These attributes are functionally similar to the project objectives identified for the low usage combustion turbine element of the proposed AEC project (p. 6-25): "*fast start and dispatch flexibility in order to support southern California grid load balancing and renewable energy integration*." The FSA should be amended to identify battery storage as a viable alternative to combustion turbines at the AEC.

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[10] **Exhibit 8**: Southern California Edison, Application A.14-11-012, *Testimony of Southern California Edison Company on the Results of Its 2013 Local Capacity Requirements Request For Offers (LCR RFO) for the Western Los Angeles Basin*, November 21, 2014, pp. 57-58. "All (least-cost best-fit model) draws contained significant amounts of in-front-of-meter energy storage (Draw 1 had over 400 MW and Draw 25 had over 900 MW). . . SCE (then) limited the amount of in-front-of-meter energy storage that could be selected to 100 MW . . . Initially, in conjunction with the (100 MW) in-front-of-meter energy storage constraint, the optimization selected a higher amount of gas-fired generation. This was largely due to the (100 MW) limitation on in-front-of-meter energy storage, and gas-fired generation being the next economic resource in terms of net present value (NPV)."

[11] Exhibit 8: Table VII-24, Summary of Energy Storage Selected Offers, p. 74.

[12] **Exhibit 9**: City of Long Beach, *Public Review Draft Initial Study/Mitigated Negative Declaration - Alamitos Generating Station Battery Energy Storage System (BESS) Project*, October 2016, p. 1-1 and p. 2-7. "The proposed Alamitos Generating Station Battery Energy Storage System (BESS) Project (herein referenced as the "project") involves construction of a 300-megawatt battery energy storage facility at the existing AES Southland Energy, LLC (AES) Alamitos Generating Station within the City of Long Beach. . . Overall, construction is proposed to commence in 2019, with completion of the first 100-megawatt battery containment building completed in late 2020 and commercial operation beginning the same year."

[13] **Exhibit 10**: AES, *Fact Sheet - About the AES Alamitos Modernization Project*, 2015.

[14] **Exhibit 11**: Southern California Edison, Application A.14-11-012, *Attachments A-D to Testimony of Southern California Edison Company on the Results of Its 2013 Local Capacity Requirements Request For Offers (LCR RFO) for the Western Los Angeles Basin*, November 21, 2014, Attachment D, p. D-23 and D-42. "CPUC RA capacity rules require that a resource be able to provide four hours of capacity over three consecutive days to qualify as an RA resource . . . AES ES Alamitos, LLC: 100 MW of ES expected capacity from a single contract for a battery facility in Long Beach, California capable of providing its Contract Capacity for a 4-hour period."

3.0 Conclusion

The FSA alternatives analysis is inadequate for failing to combine preferred resources, specifically DR and battery storage, and utilize existing combined cycle capacity that reliably serves the LA Basin and that will otherwise be mothballed, to fulfill all AEC project objectives at much less cost and environmental impact than would be incurred if the project evaluated in the FSA is built.