

## DOCKETED

<b>Docket Number:</b>	13-AFC-01
<b>Project Title:</b>	Alamitos Energy Center
<b>TN #:</b>	216579
<b>Document Title:</b>	Los Cerritos Wetlands Land Trust Comment on PMPD
<b>Description:</b>	N/A
<b>Filer:</b>	ELIZABETH LAMBE
<b>Organization:</b>	Los Cerritos Wetlands Land Trust
<b>Submitter Role:</b>	Intervenor
<b>Submission Date:</b>	3/15/2017 10:29:08 PM
<b>Docketed Date:</b>	3/16/2017

In re:

Application for Certification for the:  
Alamitos Energy Center

Docket No. 13-AFC-01

**INTERVENOR LOS CERRITOS WETLANDS LAND TRUST**  
**Comments on Presiding Member's Preliminary Decision**

Submitted by:

Elizabeth Lambe, Executive Director, Los Cerritos Wetlands Land Trust

March 15, 2017

On behalf of the Los Cerritos Wetlands Land Trust (Land Trust), we are submitting summary comments on the Alamitos Energy Center AEC) Presiding Member Proposed Decision (PMPD). We hope to submit more detailed comments with full citations by March 20, in time for your consideration of the closed session meeting to discuss the PMPD. The Land Trust very much appreciates Commissioner Douglas' recommendation to file summary comments by the March 15 deadline, and supplement those comments in the following days.

### **1. The Project Objectives Stated in the Presiding Member's Proposed Decision Are Overly Restrictive and Preclude Any Solution Other Than the Proposed Project**

The project objectives are far too specific and in their current form and preclude any alternative other than gas-fired generation at the Alamitos site. The fundamental objective(s) of the project are: 1) provide capacity to meet Los Angeles Basin Local Reliability Area requirements as defined in the CPUC Track 4 LTPP proceeding, and 2) have the ability to ramp up and down through a wide range of electrical output to allow the efficient integration of renewable energy sources into the electrical grid. As such, the project objectives must be modified to a more generic format that describes fundamental objectives and does not add non-essential ancillary objectives whose sole purpose to assure that the exact project proposed by AES can meet the project objectives listed in the PMPD. Below are recommended modifications to the AEC project objectives, with additional language in bold type and deletions in strikethrough.

*The Applicant's supplemental application for certification (SAFC) identifies the AEC's primary objective to design a project that provides local area capacity at the existing AGS site. In addition to this primary objective, the Applicant also identifies these basic project objectives:*

- *Develop a project capable of providing **either** energy, ~~generating~~ capacity, and ancillary electrical services (voltage support, ~~spinning reserve, inertia~~), to satisfy Los Angeles Basin Local Reliability Area requirements and transmission grid support, particularly in the western subarea of the Los Angeles Basin.*
- *Provide fast starting and stopping, flexible **resource controllable** ~~generation~~ with the ability to ramp up and down through a wide range of electrical output to allow the efficient integration of renewable energy*

sources into the electrical grid, and replace older, OTC and less efficient generation.

- ***If a physical resource, preference is given to development on a brownfield power plant site ~~and use~~ using existing infrastructure, including ~~the~~ such infrastructure as existing switchyard and related facilities, the SCE switchyard and transmission facilities. If a gas-fired physical resource to be located at the Alamitos site, preference is given to use the Southern California Gas Company natural gas pipeline system, LBWD water connections, process water supply lines, and existing fire suppression and emergency service facilities.***
- ***If a gas-fired physical resource to be located in the LA Basin, use qualifying technology under the South Coast Air Quality Management District's (SCAQMD) Rule 1304(a)(2) exemption that allows for the replacement of older, less-efficient electric utility steam boilers with specific new generation technologies on a megawatt-to-megawatt basis (that is, the replacement megawatts are equal or less than the megawatts from the electric utility steam boilers).***

The project objectives as written in the PMPD require the use of the existing Alamitos site land and infrastructure, including transmission, natural gas supply, and water supply, for 400 MW of simple-cycle gas turbine capacity with no corroboration of need for this 400 MW of capacity by the CPUC or any other government entity. The environmental permitting associated with new gas-fired capacity can take one-and-a-half to two years, as has been the case with the current AEC application. The project objective requiring use of the Alamitos site, and pre-approval of 400 MW of additional gas-fired capacity beyond the CPUC 640 MW authorization, represent an unwarranted and unjustifiable advantage to AES if any new gas-fired capacity is ultimately deemed necessary in the LA Basin by the CPUC in future LTPP proceedings. The pre-placing of environmental authorization for 400 MW of additional capacity at the Alamitos site is anti-competitive. It will make the roadblocks to a competing and possibly more cost-competitive bid insurmountable should another 400 MW of gas-fired capacity in the LA Basin be authorized by the CPUC in the future.

## **2. The Presiding Member's Proposed Decision Fails to Analyze the Demand for the Facility**

The Presiding Member's Proposed Decision (PMPD) includes a foundational assumption that the Commission is prohibited from considering demand for the proposed 1040 megawatt (MW) gas-fired facility. That assumption is contrary to state law.

Warren-Alquist Act section 25009 is a statement of legislative intent that was written in the late 1990s during major revisions to California's regulation of the energy industry. *See* Cal. Pub. Res. Code § 25009. This section of the Act expresses the legislature's intent to allow market forces to define the need for new generation in the State.

However, subsequent legislation in 2002, AB 57 (2002), codified at Public Utilities Code § 454.5, re-asserted the state's authority and duty to determine the demand for new generating capacity and explicitly created a new mandate for the California Public Utilities Commission. *See* AB 57, 2002 State Assemb., Reg. Sess. (Cal. 2002), codified at Pub. Util. Code § 454.5. The era of reliance on market forces to determine need for facilities like the proposed AEC came to an end in 2002 with passage of AB 57, and section 25009 of the Warren-Alquist Act, and the rationale for the inappropriateness to consider need for facilities like the proposed AEC, ended with it.

The Alamos Energy Center (AEC) Supplemental Application for Certification (SAFC) must be denied on these grounds alone. And the absence of a determination of need for the capacity described in the AEC SAFC further underscores the LORS inconsistencies and inadequate Alternatives analysis, as described below.

### **3. Licensing the Alamos Energy Center Would Be Inconsistent with State Energy Policy and Would Undermine Mandated Agency Coordination Towards the Achievement of Statewide Climate and Emissions Goals**

Allowing AES to develop new gas-fired generation without attempting to first develop preferred resources for this project would be inconsistent with the loading order, a fundamental state policy requiring coordinated action among state energy agencies and ensuring that new generation be first met in the preferential order defined in the Energy Action Plan. *See* California Energy Action Plan 4 (2003). The "loading order," as

established in the Energy Action Plan and created by the California Energy Commission (CEC) in coordination with other state energy agencies, dictates that grid reliability should be first accomplished with preferred resources like energy efficiency, demand response, renewable generation before resorting to greenhouse-gas emitting plants like the AEC. *See* Cal. Energy Comm'n, *Implementing California's Loading Order for Electricity Resources* (2005). And recently the CPUC has found that battery storage also qualifies as a preferred resource to gas-fired generation. The CEC cannot license the 1040 MW AEC as described in the Supplemental Application for Certification because it is not consistent with the loading order.

The loading order sets out a hierarchy of preferred resources for all "new generation" in the state. As described by the CEC, the loading order "calls for (1) decreasing electricity consumption by increasing energy efficiency and conservation, (2) reducing demand during peak periods through demand response and (3) *meeting new generation needs first with renewable and distributed generation resources and then with clean fossil-fueled generation.*" Cal. Energy Comm'n, *Implementing California's Loading Order for Electricity Resources* 1 (2005) (emphasis added). Similarly, the 2003 Energy Action Plan states, "[R]ecognizing that new generation is both necessary and desirable, the agencies would like to see these needs met first by renewable energy resources and distributed generation." *See* California Energy Action Plan 2 (2003). California Energy Action Plan 4 (2003). Although the Presiding Member's Proposed Decision (PMPD), argues that the loading order is only meant to guide the planning and procurement process overseen by the CPUC and not the CEC review of the AEC application, the CEC's own staff report and the clear language of the Energy Action plan dictate otherwise. The loading order applies to any "new generation" and beyond merely the utility procurement process. Because the loading order has not been applied to the 400MW in Power Block 2, The CEC cannot license the AEC project.

Licensing the AEC project without first applying the loading order to the entire proposed 1040MW project, including the 400MW in Power Block 2, and ensuring that

preferred resources are used to the maximum extent possible would be in derogation of the CEC's commitment to the loading order and the clear policy directives of the Energy Action Plan. In its adoption of the Energy Action Plan, the CEC made a commitment to ensuring that the development of the state's energy system was in the public's best long-term interest and to actively guiding this development. *See California Energy Action Plan 2 (2003)*. The CEC explicitly committed to only "license . . . new energy facilities that are consistent with the reliability, economic, public health, and *environmental* needs of the state." *Id.* (emphasis added). It further committed to ensuring "continuing progress in meeting the state's environmental goals and standards, including minimizing the energy sector's impact on climate change." *Id.* The loading order sets out clear directives that new generation must be met with renewable and preferred resources to the fullest extent possible; it would be a contravention of the CEC's commitment to the loading order and an impermissible departure from clearly endorsed state policy if the CEC attempted to license the AEC.

The Energy Action plan is clear that the loading order is intended to "guide decisions made by the agencies jointly and singly." *See California Energy Action Plan 4 (2003)*. Not only would licensing the AEC project be inconsistent with the directive that the loading order guide CEC decisions, it would impermissibly undermine the explicit goal of agency coordination in achieving state climate and emissions reductions goals. Post energy-crisis amendments to the Warren-Alquist Act (the CEC's enabling act) explicitly illustrate the intent of the legislature to ensure coordination with other state energy agencies. Section 25300 (e) states "[t]he Legislature further finds and declares that one of the objectives of this act is to encourage cooperation among the various state agencies with energy responsibilities." Cal. Pub. Res. Code § 25300(e)." The Energy Action Plan acknowledged that "[a]chieving the overall goal and implementing the proposed *actions require close cooperation between the state's energy agencies*" and requires the implementation of "common principles and strategies." *Id.* at 3 (emphasis added). The Plan explicitly highlighted the need to ensure against allowing the actions of one

agency to undermine the actions of another in executing this directive. It states “[t]he result must be a set of interrelated actions that complement each other . . . and *eliminate the costs and conflicts that would occur if each agency pursued isolated, uncoordinated objectives.*” *Id.* at 3 (emphasis added). The CEC’s intent to treat the AEC application (specifically the 400MW Power Block 2) in a vacuum, divorced from any consideration of the CPUC’s procurement order and any attempt to independently apply the loading order, is a clear case of pursuing isolated and uncoordinated objectives. The Energy Action Plan requires that the CEC “implement the action plan in its individual proceedings [and] in concert with” the actions of other state energy agencies; it has clearly failed to do so. *Id.*

The Committee, in the PMPD, itself inadvertently highlights the need to ensure that it implements the loading order in this application. In discussing its reasoning for not considering coordination with the results of the CPUC procurement process, the CEC notes that AEC “may sell its power to an entity not regulated by the CPUC,” in which case it would avoid the application of the loading order by the CPUC. *PMPD* at 3-16. This highlights the fact that if the CEC does not perform its role in implementing the loading order in this application, then the loading order may never be applied to the AEC. It is clear that it was not the intent of the Energy Action Plan to allow facilities to fall through the cracks and avoid consistency with the loading order by allowing an agency to selectively shirk its role in the implementation of the loading order. This goes beyond a simple lack of coordination, it is case of the CEC actively undermining the achievement of the goals set out by the Energy Action Plan and loading order.

The CPUC applied the loading order in SCE’s procurement process and in approving SCE’s contract with AES for 640MW of gas-fired generation. Licensing the 1040MW AEC would subvert the loading order as the CUC applied it to SCE and AES, since SCE would not have been able to contract with AES for the 400MW of additional gas-fired generation under the CPUC-approved procurement contract. AES, instead, here attempts to obtain a license for gas-fired generation it would almost assuredly attempt



to sell to SCE in the future (since AES is located in SCE's service territory). If AES attempts to sell this additional capacity to an entity outside of the CPUC jurisdiction, as has been suggested it could, this would only further subvert the loading order by ensuring the project is never reviewed for conformity with the loading order. Allowing and facilitating AES to subvert the loading order would be in derogation of the CEC's commitment and duty to ensuring adherence to the loading order. In order for the loading order to be implemented and for statewide energy and environmental goals to be met, the CEC must ensure that the loading order is applied to the proposed new generation at the AEC.

#### **4. Licensing the Alamitos Energy Center Would Violate Section 25525 Of the Warren-Alquist Act Because the Facility Does Not Conform with All Applicable Laws, Ordinances, Regulations and Standards**

##### **A. The CEC Failed to Consider All Applicable LORS**

The Warren Alquist Act, the enabling act of the California Energy Commission, clearly states that the Commission cannot license any facility which is not in conformity with all applicable laws, ordinances, regulations, and standards ("LORS"). Section 25525 of the Act states "[t]he commission may not certify a facility contained in the application when it finds . . . that the facility does not conform with *any* applicable state, local, or regional standards, ordinances, or laws . . . ." Cal. Pub. Res. Code § 25525 (emphasis added) (alteration in original). The CEC cannot legally license the 400MW simple-cycle gas turbine portion (Power Block 2) of the Alamitos Energy Center because doing so would not conform with the loading order and the CEC's commitment to the loading order).

Nothing in the Warren-Alquist Act gives guidance as to the proper interpretation of "applicable" and whether it should include all state climate policies relating to electric generation or merely those that apply to siting. Although the CEC would argue (as it already has in the PMPD) that the loading order and other climate policies are not applicable because they do not directly apply to individual power plants, further

examination of the Warren-Alquist Act and the Energy Action Plan would indicate otherwise. Section 25007 of the Warren-Alquist Act (the CEC's enabling Act) crystallizes an intent to "assure statewide environmental . . . goals." Cal. Pub. Res. Code § 25007. In the PMPD, the CEC attempts to promulgate a plant-in-a-vacuum theory of LORS consistency, arguing that the LORS consistency requirement only includes LORS directly applicable to individual plants. The focus on the assurance of "statewide" environmental goals belies this argument. If in fact the consistency requirement of the Warren-Alquist Act were intended to only consider LORS attaching to individual plants, and not anything beyond specific siting and land use LORS, then the mention of assurance with statewide environmental goals would be out of place; if it were not allowed to consider consistency with other LORS, it would not be able to assure *statewide* environmental goals are met. It is clear that the Legislature intended the CEC ensure consistency with LORS that mandate statewide benefits.

Further, although the CEC impliedly argues in the PMPD that the loading order only applies to the utility procurement process as carried out by the CPUC, this does not comport with the definition of the loading order as set out in the Energy Action Plan and as recognized by the CEC itself in its 2005 Staff Report. *See Implementing California's Loading Order for Electricity Resources* 3-16 (2005). Nothing in the Energy Action Plan supports the notion that the loading order only applies to utility procurement. As discussed above, the Energy Action Plan sets out the loading order for all "new generation," and makes no mention any limitation to merely the utility procurement process; the word "procure" does not appear even once in the Energy Action Plan. CEC cannot argue that the loading order only applies to the utility planning and procurement process.

There is nothing to support the CEC's claim that the scope of the LORS consistency requirement is limited to "rules of general applicability that would apply to the project but for the Energy Commission's exclusive jurisdiction." PMPD at page 3-16. The CEC points to the Code of Regulations to support this claim, but the section it cites merely

states that the PMPD must include “a description of all applicable state, regional, and local laws, ordinances, regulations and standards, and the project's compliance with them.” Cal. Pub. Res. Code § 1745.5 (b) (3). It does not give grounds for supporting the proposition that LORS only include rules of general applicability that apply only to the individual facility site.

AES has submitted an application for certification of 400MW of gas-fired generation without any consideration of first meeting this desired generation capacity with preferred resources like renewable generation or battery storage. Because AES did not attempt to first meet its unmet resource needs with these preferred resources, and thus is not in conformity with all LORS, CEC cannot legally license the AEC facility.

**B. The Presiding Member’s Proposed Decision Fails to Include an Affirmative Finding of Consistency with Climate LORS**

Warren-Alquist Act Section 25523 (d)(1) requires the final decision to include an affirmative finding that the facility will conform with state standards or laws. Cal. Pub. Res. Code § 25523(d)(1). But the PMPD fails to make that affirmative finding.

Approval of the AEC SAFC would be inconsistent with state laws and policies to mitigate climate change. The Energy Action Plan embodies several state laws addressing climate change and creates a “loading order” to enforce those laws.

The SAFC states:

Consistent with the Energy Action Plan, as drafted by the CEC and the CPUC, the AEC will assist in meeting the state’s goal of ensuring that electric energy in the state is “adequate, affordable, technologically advanced, and environmentally sound.” It will also assist in meeting greenhouse gas reduction targets under the Global Warming Solutions Act of 2006 (AB 32), and will help utilities integrate renewable energy into their systems as required under California’s RPS. The AEC will also provide needed electric generation capacity with improved efficiency and operational flexibility to help meet southern California’s long-term electricity needs and Clean Air objectives. SAFC at 1-7.

The PMPD, however, contradicts this statement and asserts that the Energy Action Plan and the loading order are not “applicable” LORS. *PMPD* at 3-16. The Energy Action Plan includes “individual and joint” duties for the CEC and CPUC. *See California Energy Action Plan (2003)*. For just one example, the CEC has the “individual” duty to set standards for assets to be counted toward the Renewable Portfolio Standards (RPS), and the CPUC “individually” uses those standards in approving procurement plans for electric corporations. These “individual” duties result in a “joint” application of the loading order. However, licensing a gas-fired generation plant prior to a determination of need, and a finding of consistency with the loading order by the CPUC, undermines the agreement negotiated between the agencies to “jointly” apply the loading order. That is, it would be inconsistent with the procedural and substantive standards established in the Energy Action Plan to approve a license for a facility that is inconsistent with what the CPUC has already considered and approved.

In the CPUC Decision enforcing the loading order and approving the contract for 640 MW of gas-fired generation at the Alamitos site, the State clearly found that any additional capacity needs in the Western LA Basin must be met with preferred resources, not additional gas-fired generation. Exh # 3044. Therefore, the State of California has already decided and applied the loading order through the CPUC procurement process, and the CEC license decision must be “jointly” applied to ensure consistency with the laws the CPUC enforced in that decision.

The Applicant states that the excess capacity in Phase 2 of the AEC would be subsequently approved, implying an after-the-fact analysis would show consistency with the loading order: *“The simple-cycle CTGs will meet the capacity needs anticipated to be identified in future procurement authorizations through the CPUC LTPP process.”* SAFC at 1-2 (emphasis added). Alternatively, the PMPD asserts the excess capacity could be sold to “an entity not regulated by the CPUC.” *PMDP* at 3-14. Contrary to the statement in the PMPD arguing the facility is consistent with the Energy Action Plan, quoted above, neither of these assertions is satisfactory to ensure the facility license is consistent with

the climate laws and standards embodied in the Energy Action Plan and loading order. The Energy Commission decision on the AEC SAFC must include an affirmative finding that the facility described in the application is consistent with applicable laws, ordinances, regulations and standards. Sheer speculation on the demand for the excess capacity, whether through a future LTPP process, or through an unidentified entity that is not regulated by the CPUC, is not an affirmative finding of consistency with state laws, regulations and standards. In fact, these statements are evidence of the absence of a finding of consistency in the PMPD.

The SAFC must be denied until the Applicant can identify a need for 1040MW of gas-fired generation that is consistent with the state's climate action laws and regulations as reflected in the resource authorizations in the CPUC's LTPP process.

### **C. The AEC Would Be Inconsistent with the CAISO Tariff LORS**

To meet the AEC basic objective of grid reliability and "fast start and stop" capabilities cited in the SAFC, the AEC must be consistent with the state standards established in the CAISO Tariff Section 40.3.1.1.

The proposed facility cannot meet the CAISO response time standard applicable to local capacity grid reliability resources and consequently is inconsistent with the stated objectives of the proposed facility.

The SAFC states:

As a modern, efficient gas-fired generation plant located at a critical grid location at an existing power plant site, the AEC will satisfy these resource and reliability needs. With the additional flexible fast start and stop characteristics of the technology employed, the AEC will also provide essential grid support as the electrical system integrates increasing amounts of intermittent renewable energy sources. In recognition of its critical grid reliability benefits, the AEC combined-cycle CTGs were selected by Southern California Edison (SCE) in its Local Capacity Requirements Request for Offer (LCR RFO) on November 5,

2014. SAFC at 1-2.

But, while it is true that SCE accepted an offer for combined-cycle technology, the make and model were not identified in the LCR RFO, as implied in the SAFC, and therefore no way for any party to determine whether or not the combined cycle CTGs could comply with the CAISOs response time requirement for local capacity grid reliability resources. *Id.* The make and model of combined cycle CTG chosen by AES in the SAFC, GE Frame 7FA.05, does not have the “fast start characteristics” necessary to meet the CAISO response time requirement of 30 minutes defined in the CAISO Tariff Section 40.3.1.1.

SCE rejected all demand response bids it received in the LCR RFO because they could not meet the 30-minute response time defined in the CAISO tariff. In fact, SCE and CAISO held bidders to a maximum response time, from dispatch signal to full load, of 20 minutes. The reason given for the de facto 20-minute response time requirement was to accommodate time lag associated with communications between the dispatcher and the resource.

The PMPD states the AEC combined cycle CTGs will operate up to 4,100 hours per year, equivalent to a capacity factor of 47 percent. *PMPD* at 1-6. This means that the units will be offline most of the time during the course of the year. The time it takes the GE Frame 7FA.05 to go from fuel ignition to full power on a cold start, meaning the unit has been offline at least 48 hours prior to the dispatch order, is 60 minutes. *See* FSA Part 2, 4.7-28. (“These conditions are expected to occur if the equipment has been non-operational for 48 hours. It can take up to 60 minutes from fuel initiation for the equipment to reach a base load operating rate.”). The PMPD assumes that there will be up to 15 cold starts per month, and up to 80 cold starts per year. *See* PMPD, Appendix-A, at 75 (pdf p. 547). The GE Frame 7FA.05 cannot meet CAISO Tariff Section 40.3.1.1. Therefore the CEC must make a finding of overriding considerations to approve the AEC combined cycle CTGs when they cannot meet the primary project objective of providing local grid reliability capacity for the LA Basin.

In contrast, there is a specific type of combined cycle technology that can meet the 30-minute response time identified in CAISO Tariff Section 40.3.1.1. A Canadian company, Innovative Steam Technologies (IST), manufactures a once-through steam turbine best suited for aeroderivative gas turbines like the GE LM6000 that can reach full power output in approximately 30 minutes from a cold start. Telephone communication between B. Powers, Powers Engineering, and P. Plaisier, IST, Inc. (Feb. 15, 2017); T. Koivu - IST, Inc., *New Technique for Steam Injection (STIG) Using Once Through Steam Generator (GTI/OTSG) Heat Recovery to Improve Operational Flexibility and Cost Performance*, Presented at the 17th Symposium on Industrial Application of Gas Turbines at 25 fig. 11 (Oct. 2007). This technology is in use in the LA Basin. A 71 MW combined cycle unit consisting of a LM6000 gas turbine and IST once-through steam generator owned by Pasadena Water & Power (PWP) became operational in December 2016. Pasadena Water & Power, Glenarm Repowering Project: <http://www.ci.pasadena.ca.us/waterandpower/GT5>; List of IST Projects, provided by P. Plaisier, IST, Inc. (Feb.15, 2017). Nine of these PWP units would provide 639 MW of capacity, essentially the same 640 MW capacity as the combined cycle plant proposed by AES at AEC. Combined cycle technology is not inherently incapable of achieving full power in 30 minutes. However, the specific combined cycle technology chosen by AES for the AEC is inherently incapable of reaching full power in 30 minutes.

Additional detail on the CAISO Tariff Section 40.3.1.1 LORS violation represented by selection of the GE Frame 7FA.05 as a LA Basin local capacity grid reliability resource is provided in **Attachment A** to these PMPD comments. An off-the-shelf solution to this LORS violation would be the substitution of the 640 MW combined cycle capacity with resources that AES is pursuing in the AEC application, 400 MW of LMS100 simple cycle units, and the 200 MW of additional battery storage AES is seeking to locate at the Alamitos site through the City of Long Beach permitting process. This alternative substantially reduces the air pollution emissions and GHG impacts of the AEC project while meeting all project objectives. CEC Docket No. 13-AFC-01, Intervenor Los

**5. The Alternatives Analysis in the PMPD is Incomplete and Insufficient**

**A. The Alternatives Analysis in the PMPD Failed to Consider a Reasonable Range of Alternatives In Its Consideration of Generation Technology Alternatives and Failed to Adequately Implement the Loading Order In This Consideration**

The CEC is required to include in its PMPD "an assessment of . . . a reasonable range of alternatives that could lessen or avoid" the environmental effects of a proposed project. Cal. Code Regs. tit. 20, § 1745.5 (b)(2)(B). The PMPD failed to adequately assess a reasonable range of alternatives because it did not consider whether alternative generation technologies, specifically lower-emitting resources like renewable generation and battery storage, could satisfy the basic objectives of the project while resulting in lower net emissions. Although the CEC would argue that it did in fact consider these resources, its assessment was deceptively incomplete, only considering whether an alternative generating technology could replace the need for all proposed natural gas capacity. PMPD at 3-10. In its assessment of each of the potential alternatives, the PMPD failed to consider whether the alternative could eliminate the need for a portion of the total proposed gas capacity, which would lessen or avoid the potential environmental and emissions effects of using gas-fired capacity for the totality of the proposed project. Additionally, the PMPD failed to consider whether a combination of alternative generation technologies could together completely eliminate the need for all gas-fired generation. Finally, the CEC subverted the analysis of generation alternatives by obfuscating the consideration of alternatives for Power Block 1 and Power Block 2. CEC implicitly relied on the fact that some portion the objectives of Power Block 1 included baseload power and reliability, which renewables are not able to meet, to reject any consideration of renewable generation for any smaller portion of the project. Allowing AES to use the basic objective of baseload reliability for some portion of one part of its project to escape review of alternative generation technologies sets an



impermissible precedent which would undermine the entire purpose of the required alternatives analysis.

The PMPD recognizes “that the Energy Commission must consider both state policy on how to best meet electrical demand and the ability of alternative technologies to achieve project objectives and contribute to maintaining system reliability.” PMPD at 3-6.

Implicitly tying the loading order to this alternatives analysis, CEC acknowledges that “[p]referred resources can provide many of the services provided by dispatchable, natural gas-fired generation.” PMPD at 3-9. The PMPD goes on to state that energy efficiency, demand response, renewable generation, and energy storage can each partially meet the objectives of the AEC by replacing generation capacity and serving as a substitute for gas-fired generation. *Id.* at 3-9 – 3-12. CEC fully acknowledged that many of these preferred resources can “partially meet the project objectives” and that only “some amount” of natural gas is needed for reliability. PMPMD at 3-10. The logical conclusion of CEC’s own statement is that preferred resources can in fact be used as an alternative for gas-fired generation, given that only “some” (less than the full proposed amount) is necessary for the reliability objectives of the project and that the alternatives can meet some partial percentage of the project objectives.

CEC essentially admits that some nonzero amount of alternative generation technologies could be used, in conjunction with whatever amount of natural gas is actually necessary for reliability, to fully meet the project objectives without any sacrifice to reliability of the project. The PMPD, however, summarily rejects any use of these alternatives because they each individually “cannot eliminate the need for all natural gas generation.” PMPMD at 3-10. This is inadequate and flimsy ground for failing to consider whether a combination of natural gas and any one of these alternative generating technologies could fully meet project objectives while lessening or avoiding environmental impacts of the proposed project. The CEC itself said that it would “be relevant to our alternatives analysis if we had found that the AEC will have significant effects that could be mitigated or avoided by a smaller facility that met basic

project objectives.” PMPD at 3-15. Project Objectives could be met by a smaller gas-fired facility used in conjunction with preferred resources, which would mitigate and avoid the impacts of a much larger gas-fired facility. Additionally, CEC fails to consider whether a portfolio of alternative resources could be used together (as opposed to independently as CEC considered) to meet a partial percentage the project objectives, or potentially even the entirety of the proposed project without any need for gas-fired generation.

CEC rejected the Land Trust’s previous argument that CEC was required to consider a portfolio of options, arguing that CEC had not adequately demonstrated that a portfolio of resources “would meet most of the project’s basic objectives.” PMPD at 3-17. CEC premises its rejection of alternative generation technologies almost entirely on the grounds that “some” gas-fired generation is needed for reliability; given that the preferred alternatives were rejected merely on those grounds, it seems that (other than whatever amount of gas-fired generation is needed for reliability) the alternatives would meet most of the projects basic objectives if used in combination with each other or with some lower amount of natural gas. CEC attempts to dismiss the need for further considering these alternatives, stating that “[w]e find that the range of alternatives examined is reasonable”. PMPD at 3-18. However, this is plainly not sufficient. The Supreme Court of California has explicitly stated that “all reasonable alternatives to proposed projects” must be assessed. *Citizens of Goleta Valley v. Bd. of Supervisors*, 52 Cal. 3d 553, 564, 801 P.2d 1161 (1990). Although the CEC invoked the “rule of reason” to argue that it need not consider these alternatives, the Supreme Court has recognized that the rule of reason does undermine the requirement that all reasonable alternatives be considered. CEC has a nondiscretionary mandate to consider a full range of all alternatives that could feasibly accomplish most of the basic project objectives, which includes the use of a combination of alternative generation technologies. “The range of potential alternatives to the proposed project shall include those that could feasibly

accomplish most of the basic objectives of the project ." Cal. Code Regs. tit. 14, § 15126.6 (emphasis added).

The use of a combination of alternative technologies, either used in conjunction with gas-fired generation or replacing it entirely, is well within the "reasonable range" of alternatives. The CEC rejected the Land Trust's suggestion of the use of a portfolio on the grounds that the Trust failed to demonstrate that a portfolio or alternative generation technologies or a combination of preferred resources and some amount of gas-fired generation could meet most of the project's basic objectives. PMPD at 3-17.

For example The PMPD misrepresents the "demand response with existing La Paloma combined cycle" alternative proposed by LCWLT, stating that because La Paloma is outside the LA Basin it cannot meet the local grid reliability support project objective. PMPD, at page 3-17. Demand response would meet the local grid reliability need in the LA Basin, not generation from La Paloma. As LCWLT witness Powers stated in the Phase 1 hearing: *TN214529\_20161118T162258\_*, Transcript of Phase 1 Evidentiary Hearing, November 15, 2016, at 58.

10 Two, in my opening testimony I talked about 800  
11 megawatts of demand response available. The Staff looked at  
12 997 megawatts of demand response, both numbers from the Long-  
13 Term Procurement proceeding.  
14 And we also have a nearly 1000-megawatt combined  
15 cycle unit in La Paloma. Part of my thinking in that opening  
16 testimony was the demand response is to be used on that peak,  
17 1-in-10-year reliability day to shed the same types of  
18 services that would be provided by these turbines. Ancillary  
19 services, spinning reserve, cut down on reliability  
20 requirements. And La Paloma's available to provide bulk  
21 power. Combined, that's 2,000 megawatts. It's not that  
22 La Paloma and 800 to 1,000 megawatts of DR are necessary to  
23 offset this proposal. These are just tools that are  
24 available in combination to meet the need.

LCWLT properly asserts that demand response in combination with the existing La Paloma combined cycle units can meet all of the substantive project objectives described in the PMPD.

A current power generation glut exists in California due to too much existing combined cycle capacity, not too little. Los Angeles Times, *Californians are paying billions for power they don't need*, February 5, 2017 (available at <http://www.latimes.com/projects/la-fi-electricity-capacity>). That is why existing high efficiency combined cycle units, like the Sutter Energy Center and La Paloma Energy Center, are in the process of being mothballed.<sup>57</sup> The construction of a new 640 MW combined cycle unit at Alamitos will shift air emissions currently generated at combined cycle units outside the LA Basin, like La Paloma, into the LA Basin. It will also increase natural gas demand on the SoCalGas LA Basin pipeline system that is currently constrained by the loss of the Aliso Canyon natural gas storage field. CEC Docket No. 13-AFC-01, Intervenor Los Cerritos Wetlands Land Trust Part Two Opening Brief, January 9, 2017, at 15. Use of the existing La Paloma combined cycle project to provide bulk generation to SCE/LA Basin and renewable energy ramping support would eliminate the justification for constructing 640 MW of combined cycle capacity at Alamitos to serve these same objectives.

There are two materially different arguments levelled by the Land Trust, which CEC fails to distinguish. The land Trust primarily challenges the failure of the CEC to carry out its affirmative mandate to consider a reasonable range of alternatives. The Land Trust has no obligation in this context to demonstrate fully-detailed alternative project specifics; it merely alleges in the first instance that CEC failed to adequately consider the full range of alternatives, including those preferred resources it tacitly acknowledged in the PMPD as able to meet a partial percentage of the project. The CEC conflates the requirements of Section 1745 and Section 1745.5. Cal. Code Regs. tit. 20, § 1745; Cal. Code Regs. tit. 20, § 1745.5. Section 1745.5 sets out the CEC's affirmative mandate to consider a reasonable range of alternatives, while Section 1745 sets out a burden of making a reasonable showing for those parties proposing precise alternatives

to the specific “manner” of design of the facility. The Land Trust previously and specifically recommended the consideration of the La Paloma facility as a proposed alternative, but the CEC cannot refuse to consider a reasonable range of alternatives on the grounds that it believes this one particular proposal was adequately demonstrated. This is not an analysis of “all possible” alternatives, as the CEC claims, but is instead clearly within the range of reasonable alternatives. PMPD at 3-17. The CEC must fulfill its mandate to consider a range of reasonable alternatives, which includes the use of a combination or portfolio of referred resources.

**B. The PMPD Analysis of Project Alternatives is Inadequate Because It Failed to Consider How Best to Meet Electric Demand**

As mentioned above, the PMPD must analyze demand for gas-fired generation to meet the basic objective of the proposed project – namely, grid reliability in the Western LA Basin. The demand analysis is part and parcel to the project alternative analysis.

As the PMPD states :

In evaluating generating technology alternatives, the Energy Commission must consider both state policy on how to best meet electrical demand and the ability of alternative technologies to achieve project objectives and contribute to maintaining system reliability.

But the PMPD did not follow that directive to consider “state policy on how best to meet demand.” The PMPD’s failure to follow its own directive result in both a failure to find LORS consistency with the state policies on “how best” to meet electric demand, as well as an inadequate and overly restricted alternatives analysis.

Further, the PMPD brief analysis of alternatives of preferred resources to achieve the basic objective of grid reliability discounts each alternative resource individually. By finding that none of these alternatives will, in and of itself, meet the basic objectives of grid reliability in the Western LA Basin, the PMPD failed to analyze whether these environmentally superior alternatives were feasible in combination.

The PMPD then compounds the restrictive analysis problem by requiring overly broad qualities of a resource to meet the basic objective of grid reliability, unnecessarily precluding any alternative but gas-fired generation to ensure grid reliability in the Western LA Basin.

For example, the PMPD discounts energy efficiency because :

Energy efficiency programs are thus capable of reducing the need for energy and capacity-related reliability services that conventional natural gas-fired generation facilities, such as the AEC, would provide. However, energy efficiency cannot eliminate the need for all natural gas generation because some amount of electric reliability services (e.g., regulation, spinning reserves, load following, frequency response, and voltage support) is necessary. Therefore, we find that energy efficiency is not a viable alternative to the generation AEC would provide."

Similarly, the PMPD finds:

- *"DR cannot eliminate the need for all natural gas generation facilities";*
- *"Renewable energy cannot eliminate the need for all natural gas generation";*
- *"[Energy storage] cannot eliminate the need for all natural gas generation facilities because some amount of electric reliability services...". Id. at 3-13.*

The PMPD concludes that:

Preferred resources can provide many of the services provided by dispatchable, natural gas-fired generation. However, where preferred resources cannot ensure reliability, because they lack necessary operating characteristics or are not available in sufficient quantities (e.g., reliability services, such as regulation, spinning reserves, load following, frequency response, and voltage support), the CPUC has found that the procurement of clean, efficient natural gas-fired generation is necessary and is consistent with the state's loading order.

The PMPD reference to the CPUC fails to acknowledge that the analysis of preferred resources is exactly what the CPUC performed in the Western LA Basin LTPP. And the CPUC decision embodies a cumulative package of resources: some already available in the LA Basin but supplemented by the contracts approved in the decision. The combination of available resources collectively meet the AEC SAFC basic objective of grid reliability with no more than 640MW of gas-fired generation at Alamitos.

Further, as discussed above in the discussion of the CAISO Tariff LORS, the combined-cycle units are not considered a “baseload” resource and are incapable of “fast start and stop” characteristics as defined by CAISO. Therefore, it is unclear whether these units can adequately supply “reliability services, such as regulation, spinning reserves, load following, frequency response, and voltage support” that the PMPD found reason enough to discount preferred resources as alternatives to gas-fired generation.

## **6. Conclusion**

The SAFC must be denied.

The PMPD defines overly restrictive project objectives that can only be met by the proposed AEC project. The PMPD does not document demand for the 1040MW facility, contrary to today’s law. The PMPD ignores the reality that the proposed GE Frame 7FA.05 combined cycle CGTs violate the CAISO Tariff Section 40.3.1.1 response time requirement for local grid reliability resources. Local grid reliability was the basis for the CPUC’s authorization for 640 MW of gas-fired generation at the Alamitos site. The authorization of 1,040 MW of gas-fired generation in the PMPD is unsupported by any evaluation of need for the additional 400 MW of generation, will give AES an insurmountable competitive advantage if 400 MW of additional gas-fired capacity is identified as needed by the CPUC at some point in the future, and is inconsistent with the State’s climate laws. The PMPD misrepresents the combined demand response and existing La Paloma combined cycle alternative to the proposed project and otherwise fails to adequately document and analyze environmentally preferred alternatives.

## **Attachment A to LCWLT Comment on AEC PMPD**

### **I. 640 MW Combined Cycle AEC Phase I Violates Grid Reliability Response Time LORs and Cannot Meet Primary Grid Reliability Project Objective**

The CEC must make a finding of “overriding considerations” to approve a proposed project that triggers a LORS violation. In this case, the LORS violation is fundamental. The AEC project is primarily justified as a grid reliability resource capable of responding quickly, in less than 30 minutes, in the event a 1-in-10 year peak demand condition and the sequential loss of two major transmission lines. The proposed 640 MW combined cycle Phase I component of the Alamos Energy Center cannot the response time requirement in CAISO Tariff Section 40.3.1.1, as interpreted by CAISO, under any startup scenario (cold, warm, or hot).

The CEC response in the PMPD to the applicability of this LORS violation is a non sequitur. The PMPD states at p. 5.3-5 that:

The (CAISO) tariff section (40.3.1.1) cited concerns only the California ISO Operator’s obligations in performing the annual Local Capacity Technical Study and has no applicability to power plant facilities, nor does it make any mention of a 20 minute response time.<sup>20</sup> The AEC will not violate any reliability LORS.

CAISO Tariff Section 40.3.1.1 defines the critical performance requirement, response time, for resources qualifying as grid reliability assets in local reliability areas like SCE’s LA Basin. CAISO makes explicit, in the Local Capacity Technical Study, its interpretation of Tariff Section 40.3.1.1:<sup>1</sup>

Accordingly, when evaluating resources that satisfy the requirements of the CAISO Local Capacity Technical Study, the CAISO assumes that local capacity resources need to be available in no longer than 20 minutes so the CAISO and demand response providers have a reasonable opportunity to perform their respective and necessary tasks and enable the CAISO to reposition the

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<sup>1</sup> Exhibit 3081. CAISO, 2017 *Local Capacity Technical Analysis Final Report And Study Results*, April 29, 2016. pp.15-16.



system within the 30 minutes in accordance with applicable reliability criteria.

The PMPD assertion that the purpose of CAISO Tariff Section 40.3.1.1 is to serve as a form of cookbook for conducting local capacity studies, and has no applicability on the performance characteristics of power plant facilities, has no merit. The grid reliability design condition is very specific: the 1-in-10-year hot day with the sequential loss (within 30 minutes of each other) of two large transmission lines.<sup>2</sup> A power plant that cannot reach full power in 30 minutes does not meet the response time window defined in CAISO's grid reliability design case, and is by definition not "reliable." The CEC identifies CAISO tariff grid reliability requirements as LORS applicable to its certification proceedings.<sup>3</sup> CAISO Tariff Section 40.3.1.1 is an applicable LORS by the CEC's own description of the universe of applicable LORS. The PMPD assertion that the 640 MW combined cycle unit response time does not violate the CAISO Tariff Section 40.3.1.1 LORS is wrong.

Preferred resources, specifically demand response bids that had not confirmed the ability to meet the CAISO Tariff Section 40.3.1.1 response time requirement, were rejected by SCE and CAISO as nonconforming with a basic performance requirement defined by CAISO for grid reliability resources. Grid reliability is fundamental project objective for AEC, and this objective cannot be met with the combined cycle technology proposed by AES.

An environmental impact of the inability of the first phase 640 MW combined-cycle unit to comply with the CAISO response time LORS of full power in 20 minutes or less following a dispatch order (CAISO Tariff 40.3.1.1) is excessive startup air pollution emissions compared to simple cycle gas-fired generation alternative that can meet dispatch timeline

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<sup>2</sup> FSA Part 2, p. 4.1-189.

<sup>3</sup> CEC webpage, "Laws, Ordinances, Regulations and Standards in Siting Cases," March 9, 2017: [http://www.energy.ca.gov/public\\_adviser/lors\\_faq.html](http://www.energy.ca.gov/public_adviser/lors_faq.html). "CAL-ISO: Cal-ISO Reliability Criteria also provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to *all existing and proposed facilities interconnecting* to the Cal-ISO controlled grid."

in CAISO Tariff 40.3.1.1.

The FSA Part 2 specifically states that the duration of a cold startup of the 640 MW combined-cycle block is 60 minutes from ignition to full load for a cold start, and 30 minutes from ignition to full load for a warm start or a hot start:<sup>4</sup>

- Cold Start Event: The combustion turbine and steam generation system are at ambient temperature at the time of startup. These conditions are expected to occur if the equipment has been non-operational for 48 hours. It can take up to 60 minutes from fuel initiation for the equipment to reach a base load operating rate.
- Warm Start Event: The combustion turbine and steam generation system have been non-operational between 10 and 48 hours. It can take up to 30 minutes from fuel initiation for the equipment to reach a base load operating rate.
- Hot Start Event: The combustion turbine and steam generation system have been non-operational up to 10 hours. It can take up to 30 minutes from fuel initiation for the equipment to reach a base load operating rate.

The AES project manager acknowledged that only a portion of the combined cycle unit could meet the CAISO tariff, stating:<sup>5</sup>

The generators that are attached to the gas turbine qualify under that tariff. Those are fast starting gas turbines. They can reach full load in ten minutes. The steam turbine lacks, as heat has to be put into the steam system, so it lags. It's slower. It doesn't meet that fast-start resource. So two out of the three on the combined cycle, two out of the three generators or resources meet that tariff.

AES has proposed a Phase I gas-fired resource at Alamitos that can only provide about two-thirds of the gas-fired generation grid reliability, under CAISO's definition of a grid reliability resource in CAISO Tariff Section 40.3.1.1, that was approved by the CPUC. This means that only about 420 MW of the 640 MW of gas-fired generation grid reliability resource approved by the CPUC at the Alamitos site, to assure grid reliability in the LA Basin, can be met by the proposed combined cycle unit, as pointed-out by LCWLT witness Powers:<sup>6</sup>

The simple-cycle component of the combined-cycle unit can, in fact, meet the response time standard. You have a situation where you have a 640-megawatt grid reliability project wherein only maybe 400 or 420 megawatts can actually meet your project objective, grid reliability.

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<sup>4</sup> FSA Part 2, p. 4.7-28. None of this information is included in the PMPD.

<sup>5</sup> December 20, 2016 AEC hearing transcript, p. 80, lines 14-21.

<sup>6</sup> Ibid, p. 81, lines 12-17.

SCE ratepayers will be paying for 640 MW of grid reliability from the AEC combined cycle unit and only getting 400 to 420 MW.

The PMPD acknowledges that the CPUC determines the need for new generation capacity to meet grid reliability needs, stating:<sup>7</sup>

In tandem with California ISO planning, the CPUC conducts its biennial Long Term Procurement Plan (LTPP) proceeding, in which it determines how much new natural gas-fired generation is required and should be financed by the state's investor owned utilities. In estimating the need for new "least-cost best-fit" generation capacity or specifically for new NGFG over the 10-year planning horizon, the CPUC first assumes the timely development of all cost-effective preferred resources.

Through the LTPP proceeding and subsequent "least-cost, best-fit" financial modeling conducted by SCE, the CPUC approved a SCE power purchase agreement for 640 MW of gas-fired generation at the Alamitos site for the specific purpose of assuring grid reliability in the LA Basin.<sup>8</sup> This is first project objective for the AEC as stated in the PMPD:<sup>9</sup>

Develop a project capable of providing energy, generating capacity, and ancillary electrical services (voltage support, spinning reserve, and inertia) to satisfy Los Angeles Basin Local Reliability Area requirements and transmission grid support, particularly in the western subarea of the Los Angeles Basin.

Yet the relatively slow startup of the combined cycle unit, during a time when the air pollution control systems of the combined cycle unit are either not operational or partially operational, result in higher startup air emissions from the combined cycle unit than fast-start simple cycle units. This was summarized by LCWLT witness Powers at the FSA Part 2 hearing:<sup>10</sup>

MR. POWERS: This is not legal argument. This is Air Quality. The LMS100s (simple cycle units) emit much less on startup than the combined-cycle unit does.

HEARING OFFICER CELLI: Right.

MR. POWERS: Therefore, it is an issue of the only reason they're emitting more on startup is because their startup takes quite a bit longer on the combined-cycle units.

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<sup>7</sup> PMPD, p. 3-7.

<sup>8</sup> Exhibit 3044, TN 212764-2. CPUC, D.15-11-041, *Decision Approving, In Part, Results of Southern California Edison Company Local Capacity Requirements Request for Offers for the Western LA Basin Pursuant to Decisions 13-02-015 and 14-03-004*, November 19, 2015, p. 5 and p. 26.

<sup>9</sup> PMPD, p. 2-8.

<sup>10</sup> FSA Part 2 hearing transcript, December 20, 2016, p. 83, lines 2-8.

Fundamentally the combined cycle unit is emitting more air pollutants at startup than a fast-start simple cycle unit because of its relatively slow startup characteristic that does not conform with the grid reliability resource response timeline established in the relevant CAISO tariff.

According to the final 2016 decision in the CPUC proceeding that authorized 640 MW of gas-fired generation at Alamos, any resource bidding into SCE's request for offers for resources to provide grid reliability in the LA Basin must provide full output within 20 minutes of dispatch. The CPUC final decision states:<sup>11</sup>

We find SCE's inclusion of a 20-minute response time condition for demand response resources procured through this RFO reasonable given the circumstances<sup>12</sup>. . . . CAISO stated that it required the 20-minute response time condition for demand response in local areas for reliability reasons.<sup>13</sup>

As a result of this determination by the CPUC, demand response resources that could not be fully available within 20 minutes of dispatch by CAISO were rejected as grid reliability resources in the LA Basin by the CPUC. Demand response resources are at the top of the loading order, and are required by law to be developed to the maximum extent feasible.<sup>14</sup> This same 20-minute response time condition applies to all grid reliability resource in the LA Basin, including combined cycle units.

CAISO specifically requires grid reliability resources to provide full load output within 20 minutes to meet the requirements of CAISO Tariff Section 40.3.1.1.<sup>15</sup> CAISO states:<sup>16</sup>

Tariff Section 40.3.1.1, requires the CAISO, in performing the Local Capacity Technical Study, to apply the following reliability criterion:

Time Allowed for Manual Adjustment: This is the amount of time required for the Operator to take all actions necessary to prepare the system for the next Contingency. The time should not be more than thirty (30) minutes.

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<sup>11</sup> Exhibit 3080. CPUC, D.16-05-043, *Order Modifying Decision 15-11-041 and Denying Rehearing of the Decision as Modified*, May 26, 2016.

<sup>12</sup> *Ibid*, p. 18.

<sup>13</sup> *Ibid*, p. 19.

<sup>14</sup> Public Utilities Code Section 454.5(b)(9)(C). "The electrical corporation shall first meet its unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible."

<sup>15</sup> Exhibit 3081. CAISO, 2017 *Local Capacity Technical Analysis Final Report and Study Results*, April 29, 2016.

<sup>16</sup> *Ibid*, pp.15-16.

Accordingly, when evaluating resources that satisfy the requirements of the CAISO Local Capacity Technical Study, the CAISO assumes that local capacity resources need to be available in no longer than 20 minutes so the CAISO and demand response providers have a reasonable opportunity to perform their respective and necessary tasks and enable the CAISO to reposition the system within the 30 minutes in accordance with applicable reliability criteria.

The 2012 CPUC LTPP final decision did not use the term “combined cycle,” only “gas-fired generation,” as noted in the PMPD.<sup>17,18</sup> The CPUC decision authorizing the 640 MW combined cycle unit at AEC does not identify the make or model of the combined cycle unit authorized, only that combined cycle technology generally would be utilized.<sup>19</sup> As a result there was insufficient information in the CPUC authorization to determine whether or not the 640 MW combined cycle unit could meet CAISO Tariff Section 40.3.1.1 response time requirement. Only in the CEC AEC proceeding is the make and model of the combined cycle unit specified. It is a GE Frame 7FA.05 combined cycle unit.<sup>20</sup>

The GE Frame 7FA.05 combined cycle unit cannot comply with CAISO’s definition of compliance with CAISO Tariff Section 40.3.1.1. This is non-compliance with an applicable LORS that results in elevated startup air emissions. The inability of the combined cycle unit to reach full load within 20 minutes of a dispatch call means: 1) elevated startup air emissions will continue beyond the CAISO-mandated 20-minute maximum startup period permitted for resources intended to serve as grid reliability resources, thereby subjecting local residents and the SCAQMD to elevated startup emissions that would not be emitted during startup of complaint grid reliability gas-fired resources, and 2) the combined cycle unit should not qualify as grid reliability resources due to startup timelines that exceed 20 minutes.

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<sup>17</sup> PMPD at p. 3-7.

<sup>18</sup> CPUC, 2012 LTPP Track 4 Decision, D.14-03-004, March 13, 2014.

<sup>19</sup> Exhibit 3044, CPUC, D.15-11-041, November 19, 2015, p. 23. “SCE entered into separate GFG (gas-fired generation) contracts with AES Alamos Energy, LLC and AES Huntington Beach Energy, LLC for two CCGTs (combined cycle gas turbines).”

<sup>20</sup> PMPD, p. 6.2-1.

In contrast, there is a specific type of combined cycle technology that can meet the 30-minute response time identified in CAISO Tariff Section 40.3.1.1. A Canadian company, Innovative Steam Technologies (IST), manufactures a once-through steam turbine best suited for aeroderivative gas turbines like the GE LM6000 that can reach full power output in approximately 30 minutes from a cold start.<sup>21,22</sup> This technology is in use in the LA Basin. A 71 MW combined cycle unit consisting of a LM6000 gas turbine and IST once-through steam generator owned by Pasadena Water & Power (PWP) became operational in December 2016.<sup>23,24</sup> Nine of these PWP units would provide 639 MW of capacity, essentially the same 640 MW capacity as the combined cycle plant proposed by AES at AEC. Combined cycle technology is not inherently incapable of achieving full power in 30 minutes. However, the specific combined cycle technology chosen by AES for the AEC is inherently incapable of reaching full power in 30 minutes.

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<sup>21</sup> Telephone communication between B. Powers, Powers Engineering, and P. Plaisier, IST, Inc., February 15, 2017 (attached).

<sup>22</sup> T. Koivu – IST, Inc., *New Technique for Steam Injection (STIG) Using Once Through Steam Generator (GTI/OTSG) Heat Recovery to Improve Operational Flexibility and Cost Performance*, Presented at the 17th Symposium on Industrial Application of Gas Turbines, October 2007, Figure 11, p. 25 (attached).

<sup>23</sup> Pasadena Water & Power, Glenarm Repowering Project: <http://www.ci.pasadena.ca.us/waterandpower/GT5/> (attached).

<sup>24</sup> List of IST Projects, provided by P. Plaisier, IST, Inc., February 15, 2017 (attached).

# Powers Engineering Memo

To: Alamitos Energy Center file

Date: February 15, 2017

Contact: Peter Plaisier, Proposals Team Lead, Innovative Steam Technologies, Inc.,  
(519) 740-0757 x220

Subject: Response time of combined cycle unit equipped with IST once-through steam generator (OTSG) technology

Pages: 1

From: Bill Powers

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**Q: Can GE Frame 7FA combined cycle unit be equipped with IST OTSG to achieve a 30-minute response time to full load?**

A: Investment in metallurgy is high on a big machine like the Frame 7FA. The large amount of metal slows response time to full load operation.

**Q: What is the ideal gas turbine size range for IST OTSG technology to maximize response time from cold start?**

A: The maximum combustion turbine capacity is up to about 100 MW. The largest combined cycle unit equipped with IST OTSG technology is a 75 MW GE Frame 6FA. The IST OTSG “sweet spot” is an aeroderivative unit in the 40 to 60 MW capacity range, such as the GE LM6000. Maximum response time from a cold start is achieved by selecting an aeroderivative gas turbine in the 40 to 60 MW capacity range.

**Q: Can you provide operational examples of this best-case response time design?**

A: Yes. For example, Pasadena Water & Power just completed construction of an LM6000 combined cycle unit (Glenarm Project) equipped with an IST OTSG. This unit can achieve full load operation from a cold start in approximately 30 minutes.

*Paper No: 07-IAGT-2.2*

# **INDUSTRIAL APPLICATION OF GAS TURBINES COMMITTEE**

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**New Technique for Steam Injection (STIG)  
Using Once Through Steam Generator (GTI/OTSG) Heat Recovery  
to Improve Operational Flexibility and Cost Performance**

by

**Timothy G Koivu MEng.**

of

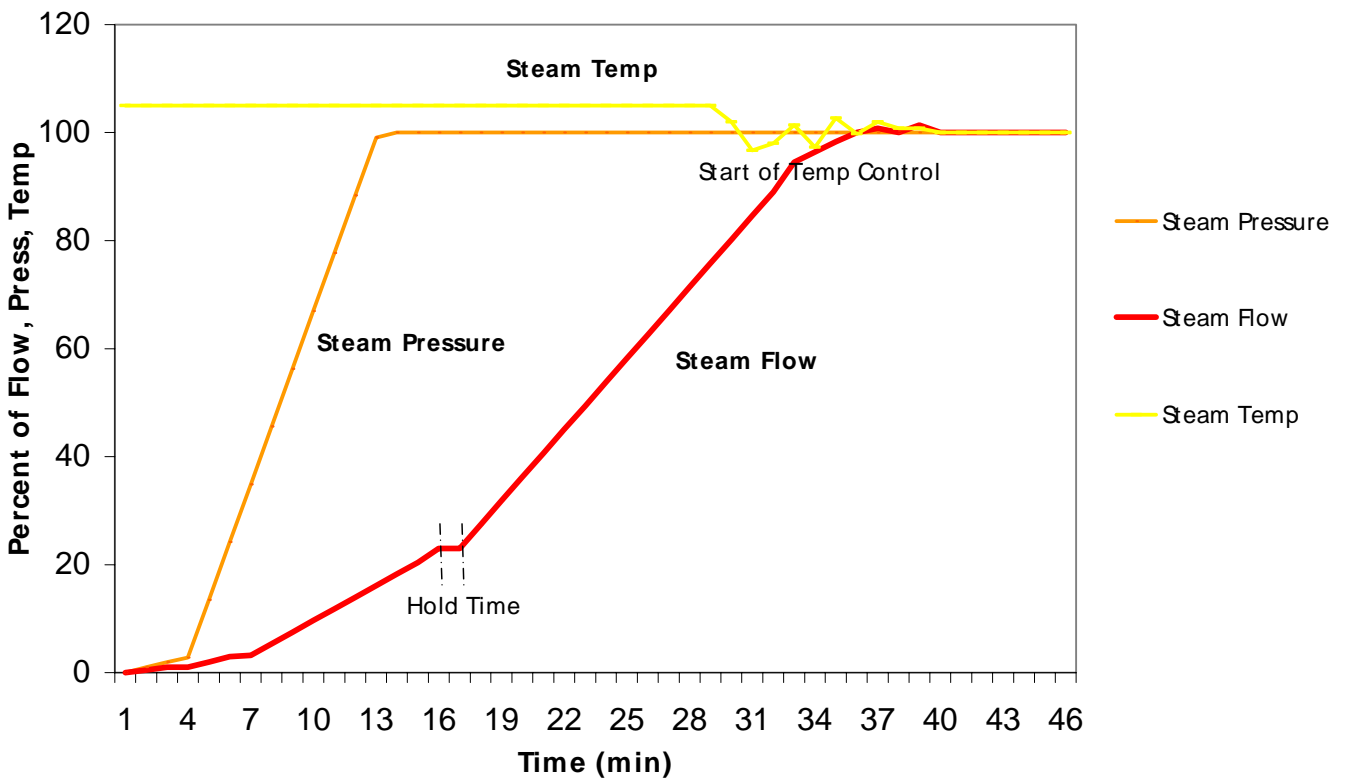
**Innovative Steam Technologies  
(AECON Construction Inc.)**

**Cambridge, Ontario, Canada**



After approximately thirty minutes of ramp time, the feed-water flow rate has reached 85% to 90% of the design flow rate. At this point the feed-water flow rate is brought into closed loop control based on the superheater steam temperature feedback signal. After a further five minutes, the temperature of the steam produced by the OTSG is in full temperature control. Full steam production is available after thirty-five minutes time.

### Typical Cold Start - Single Pressure OTSG



**Figure 11:** OTSG Start-up Curve for a Typical Gas Turbine

City of Pasadena website, March 15, 2017: <http://www.ci.pasadena.ca.us/waterandpower/GT5/>

# THE CITY OF PASADENA

## GLENARM REPOWERING PROJECT



[Project Description](#)

[Power Plant Location](#)

[Objectives Of The Glenarm Power Plant Repowering Project](#)

[Features and Benefits](#)

[How It Works](#)

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## PROJECT DESCRIPTION

In December 2016, Pasadena Water and Power completed the Glenarm Repowering Project, an extensive power plant upgrade that includes the replacement of a 51-year old steam generating unit, Broadway 3 with a more efficient combined cycle turbine unit known as Gas Turbine 5 (GT-5). Now fully operational, GT-5 provides Pasadena with 71 MW (approximately net 68 MW) of clean, natural-gas fueled power that is the most efficient and environmentally “clean” unit in its class.

GT-5's quick-start capability provides Pasadena with the flexibility needed to help maintain electric reliability as it can generate power within minutes as opposed to the 72-hour start up time needed for Broadway 3. It also operates at the lowest emissions limits of any generator in its class.

With its powerful combination of flexibility, efficiency, and low emissions, GT-5 provides the upgraded infrastructure needed to embrace advances in renewable resources while generating local, reliable power. The project is a key component of PWP's Power Integrated Resource Plan, which sets a 20-year strategy to provide reliable and environmentally responsible electric service to Pasadena while reducing its dependence on outside energy sources.

Additional information regarding the Glenarm Repowering project can be located by [clicking here](#).

## POWER PLANT LOCATION

The City of Pasadena's power plant is located on a 14 acre site in the southwestern portion of the City. The site consists of two groups of generating facilities bisected by the Los Angeles County Metropolitan Transportation Authority (Metro) Gold Line tracks: the Glenarm Plant to the west of the Gold Line and the Broadway Plant to the east.

## OBJECTIVES OF THE GLENARM POWER PLANT REPOWERING PROJECT

- Maintain the City's ability to generate power locally, when needed, to make up for an electricity shortfall resulting from import or distribution system limits;
- Reduce operating, maintenance, and fuel expenses for the local plant;
- Meet generating capacity planning and operation requirements to support the reliability of the regional power grid operated by the California Independent System Operator (CAISO); and
- Provide a flexible generation source to accommodate unexpected changes in load or generation and provide backup for intermittent renewable resources like wind and solar.

## FEATURES AND BENEFITS

- Clean, highly efficient, natural-gas fueled 71 MW combined cycle unit
- Less emissions per kWh of energy produced
- Rapid start and shut down, to generate electricity as needed
- Provides a stable source of power as a backup for intermittent renewable resources
- Lowers dependency on outside sources for energy
- Lowers carbon footprint

## HOW IT WORKS

The upgraded unit is a combined cycle unit that combines gas turbine and steam technologies into one unit.

### Gas Turbine

A gas turbine, similar to those used in jet airplanes, compresses air and mixes it with natural gas, then burns the resulting air-fuel mixture. The combustion gas expands through the turbine blades which spin and drives the electric generator. The generator converts mechanical energy into electricity.

### Steam Turbine

Exhaust heat from the gas turbine passes into a once-through steam generator (OTSG). The OTSG is a boiler that uses the heat from the exhaust gas to convert the water into steam. The steam is then delivered to the steam turbine to produce additional energy for the generator, therefore creating additional electricity.

## LOCAL HIRING

The Glenarm Repowering Project utilized a Local Participation Plan which focuses on the inclusion of local business and residents into the potential contracting and hiring opportunities. The plan calls for 15% of the subcontracting and procurement on the project to be satisfied by Pasadena businesses; and 25% of the payroll to be satisfied by Pasadena residents. The local subcontracting and procurement component is facilitated through a good-faith effort. The local hiring component is facilitated through a Project Labor Agreement with the Los Angeles and Orange County Construction and Building Trades.

Through the Project Labor Agreement between ARB, Inc., and the Los Angeles and Orange County Building and Construction trades, the City was able to secure a local hiring goal of 25% of the certified payroll for the project. Separately, there is a goal of 15% local subcontracting and procurement. As of July 2016, Pasadena residents account for 20.01%, or \$2,159,340.10 of the reported certified payroll, and Pasadena businesses account for 34.50% or \$2,289,390.20 of the total contracting and procurement.



**Once Through  
Steam Generator  
Combined Cycle Sites**

IHI South Hedland Power Station South Hedland - Australia 2014	Shell International Exploration and Production Inc. Confidential Confidential - USA 2014	General Electric Glenarm Combined Cycle Pasadena, California - USA 2014	Quanta ML&P Plant #2 Expansion Anchorage, Alaska - USA 2013	Atlantic Power Nipigon Repowering Nipigon, Ontario - Canada 2013
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<b>Gas Turbine</b>	2 x LM6000 PF Sprint	4 x LM2500+G4	1 x LM6000 PG	2 x LM6000 PF Sprint	1 x LM2500
<b>Turbine Output (MW)</b>	46	28	54	46	25
<b>Exhaust Mass Flow (lb/hr)</b>	976,197	642,861	1,097,944	1,054,769	571,615
<b>Fuel</b>	Nat gas, #2 Oil	Gas	Nat Gas	Nat Gas	Nat Gas
<b>Exhaust Temp (°F)</b>	873	1023	918	856	932
<b>Firing Temp (°F)</b>	NA	1400	NA	NA	1500
<b>HP Steam</b>					
<b>Steam Flow (lb/hr)</b>	100,794	131,166	130,556	99,921	156,192
<b>Press/Temp (psi/F)</b>	846/842	667/842	416/878	727/790	660/765
<b>IP Steam</b>					
<b>Steam Flow (lb/hr)</b>	NA	NA	NA	NA	NA
<b>Press/Temp (psi/F)</b>	NA	NA	NA	NA	NA
<b>LP Steam</b>					
<b>Steam Flow (lb/hr)</b>	30,159	NA	NA	26,191	NA
<b>Press/Temp (psi/F)</b>	78/410	NA	NA	123/482	NA
<b>Feedwater Temp (F)</b>	156	122	104	107	123
<b>Surface Area (sq ft)</b>	352,658	38,902	233,415	253,630	109,512
<b>Emissions Control:</b>					
<b>Nox, ppm</b>	N/A	N/A	2.0	2.5	N/A
<b>CO, ppm</b>	N/A	N/A	2.0	3.0	N/A