

State of California
State Energy Resources Conservation and Development Commission

In the Matter of:)	Docket # 09-AFC-03
)	
Mariposa Energy Project)	
)	Robert Sarvey's Rebuttal Testimony
)	Alternatives
_____)	Exhibit 408

Turbine Selection

The Staff's Assessment properly concludes that the potential use of 186.9 AFY of surface water a year is a significant impact and does not comply with State Water Laws related to power plant cooling. The applicant is proposing the use of the GE LM-6000 PC turbine which utilizes water for NO_x control and power augmentation. Roughly two thirds of the water consumption for the MEP is for NO_x abatement and the other third is for power augmentation.¹ GE has several variants of the LM -6000 which incorporate DLE technology which provide superior NO_x control without the use of water. By incorporating LM-6000 turbines utilizing the DLE technology the project can eliminate the potential use of up to 130.2 AFY of water a year while lowering emissions of NO_x to 15 ppm before post combustion controls. The turbine the applicant is proposing would reduce NO_x concentrations to only 25 ppm before post combustion controls. The turbine variant would provide superior NO_x control and eliminate 69% of the projects water usage.

Another new variant of the LM -6000 is the LM -6000 PH. which also uses water for power augmentation and not NO_x control. If a plant operating profile includes constant starts and stops, as well as part power operation, the savings in water can be substantial. Additionally, with improved water optimization at part power comes improved fuel efficiency seen through improved heat rate of the gas turbine.^{2[2]} All this leads to

¹[1] Supplemental Staff Assessment Water Resources Testimony Page 4.12-7 Table 3

²[2] See FDOC TABLE 1. COMPARISON OF GE LM6000 SPRINT WATER-INJECTED AND DLE COMBUSTION TECHNOLOGIES Page 8 http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-11-24_BAAQMD_FDOC_TN-59081.pdf

improved operating costs for the power producer and lower greenhouse gas emissions, NOx emissions.³

Staff's testimony is that it does not have adequate information to evaluate fuel consumption, reliability, and capital costs associated with these LM-6000 gas turbine model variants.⁴ The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report*, and State Water Resources Control Board Resolution 75-58, can only approve the use of fresh water for cooling purposes by power plants it licenses where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. The newer LM-6000 turbines variants have the ability to lower greenhouse gas emissions, reduce NOx emissions during startup, and reduce the projects water usage by over two thirds. The new turbine technology is environmentally superior and Staff has not demonstrated that the new turbine technology is economically unsound. Staff's analysis does not comply with Energy Commission Policy or State Water Resources Control Board Resolution 75-58.

Fast Start Technology

The LM6000 standard 10 minute start time can be improved to just 5 minutes. "By properly maintaining the package purge requirements, and by keeping the lube oil 'warm', approximately 2 minutes can be removed from the 10-min start sequence. Then the gas turbine acceleration rate to full load can be increased from 12MW/min to 50MW/min, reducing the time from sync idle to full load from 4 minutes down to approximately 1 minute. This reduced start time greatly enhances the LM6000's ability to get online quickly to support a reduction in load from the wind farm due to sudden

³ APPLICATION OF THE LATEST AERODERIVATIVE GAS TURBINE TECHNOLOGY Authors: Edward Wacekt, Warren Ferguson, *General Electric* http://www.iagtcommittee.com/symposium_2009/papers/203%20paper%20final.pdf Page 2

⁴ Supplemental Staff Assessment December 2010 SOIL & WATER RESOURCES Page 4.12-23

changes in wind conditions”⁵ and also greatly reduces start up and shut down emissions for all pollutants.

No Project Alternative

The CPUC adopted PG&E’s current Long Term Procurement Plan in D.07-12-052. Under its adopted LTPP, the CPUC authorized PG&E to procure 800-1200 MW plus an additional 312 MW to replace the failed Eastshore and Bullard Projects for a total of 1,112- 1,512 MW. Subsequently in A. 09-09-021 the CPUC decided that PG&E’s procurement authority should be limited to 1138- 1188 MW.⁶ The decision to limit PG&E’s procurement to that level was based on the CEC’s 2009 IEPR forecast of peak demand.⁷ The CEC Staff’s most recent demand report the “Revised Short Term Peak Demand Forecast for 2011-2012” predicts that PG&E’s demand in its service territory is 912 MW less than the forecast from the 2009 IEPR.⁸ Unfortunately for the ratepayers PG&E signed contracts for 1,743 MW of new generation in a successful attempt to fatten their ratebase. The 1,743 MW is 555 MW more than the CPUC authorized in D. 10-07-045.

⁵ APPLICATION OF THE LATEST AERODERIVATIVE GAS TURBINE TECHNOLOGY Authors: Edward Wacekt, Warren Ferguson, *General Electric* http://www.iagtcommittee.com/symposium_2009/papers/203%20paper%20final.pdf Page 7

⁶ PG&E’s procurement to the bottom of the range established in D.07-12-052, we determine that PG&E should procure between 950 - 1000 MW of new generation resources. D. 10-07-045 Page 33
http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/121605.pdf

⁷ D. 10-07-045 Page 52 Finding of FACT Number 11 and 12. [“11. No party in this proceeding disputes that the CEC’s 2009 IEPR forecast of peak demand for the PG&E planning area in 2015 is less than in the 2007 CEC forecast relied upon in D.07-12-052. 12. Given reporting errors and changes in demand in its service territory, PG&E only needs to procure 950 - 1000 of its previously approved MW allotment.”]
http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/121605.pdf

⁸ Garcia-Cerrutti, Miguel, Tom Gorin, Chris Kavalec, Lynn Marshall. 2010. *Revised Short-Term (2010-2012) Peak Demand Forecast* Draft Staff Report. California Energy Commission, Electricity Supply Analysis Division. Publication Number: CEC-200-2010-011-SD
<http://www.energy.ca.gov/2010publications/CEC-200-2010-011/CEC-200-2010-011-SD.PDF> Page 14

The impacts to ratepayers are significant. Overprocurement burdens ratepayers by making them pay for assets that will be underused. According to the CAL-ISO 2010 summer assessment PG&E currently enjoys a 38.5 % Planning Reserve margin in its service territory.

Table 1

Summer 2010 Supply & Demand Outlook			
Resource Adequacy Planning Conventions	ISO	SP26	NP26
Existing Generation ¹	49,807	23,326	26,481
Retirements (known/expected) ²	(6)	0	(6)
High Probability CA Additions	1,086	1,057	29
Hydro Derates	0	0	0
Net Interchange (Moderate)	10,100	9,200	2,050
Total Net Supply (MW)	60,988	33,583	28,555
Demand (1-in-2 Summer Temperature)	47,139	27,198	21,154
DR & Interruptible Programs ³	2,403	1,668	734
Planning Reserve⁴	34.5%	29.6%	38.5%
¹ as of 3/22/2010 (refer to Table 8)			
² as of 3/22/2010 (refer to Table 8)			
³ (refer to Table 9)			
⁴ Planning Reserve calculation (Total Net Supply + Demand Response + Interruptibles)/ Forecast Demand)-1.			

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This 38.5 % Planning reserve margin does not include an additional 2,919 MW of approved projects some of which is currently under construction.¹⁰ There currently is no need for the Mariposa Project and recent analyses conducted by the CEC demonstrate that the MEP is not needed any time in the near future.

9 CAL-ISO 2010 Summer Loads and Resources Operations Preparedness Assessment May 10, 2010 Page 4 <http://www.caiso.com/2793/2793ae4d395f2.pdf>

10 Oakley, Mairposa, Colusa, Russell City, GWF Tracy Combined Cycle, Los Esteros Upgrade
