

## **Potrero Hill Power Plant Study**

*Requested by the City and County of San Francisco  
and the California Independent System Operator  
Conducted by Pacific Gas & Electric*

July 19, 2007

At the request of the CAISO and the City and County of San Francisco, PG&E completed a study showing that a combination of transmission reconducting, demand response, and the Transbay Cable projects are viable options to the Potrero Power Plant and it is continuing to explore these options.

### **San Francisco Load Serving Capability Key Points**

- The scope and timing of transmission system upgrades in San Francisco is driven by operation of the Potrero Power Plant
- To meet the Local Capacity Requirement planning criteria adopted by the CAISO, system changes are required to eliminate the CAISO's Reliability Must Run contract for Potrero
- The LCR planning criteria requirement is that no unplanned customer outages can occur during the highest load period expected to occur only once in 10 years at the same time that two of the highest capacity 115kV lines are out of service.
- Without Potrero, the planning criteria cannot be met today
- Two sets of upgrades have been proposed to eliminate the CAISO's RMR contract with Potrero:
  - Transbay + Reconductoring + Demand Side Management
  - CCSF Peaker Project + Transbay
- Both sets of upgrades require the Potrero RMR contract to remain in place until at least the Spring of 2010 (the estimated operating date for the Transbay project)

#### **Transbay + Reconductoring + Demand Side Management**

- The Transbay project is common to both sets of upgrades
- The reconductoring component involves removing underground cables from existing pipes in San Francisco and installing new, higher capacity cables on four 115kV circuits in San Francisco
- The new, higher capacity cables use a technology that was installed in pipe-type cable systems in eastern U.S. utilities at 230kV and 345kV

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- No trenching or excavation is required for this work and the project is exempt under GO131D

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- The Demand Side Management component includes a demand response element and an energy efficiency element
  - Demand Response
    - Using a dedicated implementation team, PG&E will target high peak usage customers for automated demand response technology (e.g. A/C cycling) that can be tested and proven to be available when needed
    - PG&E expects to deliver at least 4 MW per year of demand reduction beginning in 2008 totaling at least 20 MW by 2012
  - Energy Efficiency
    - PG&E is currently delivering 10 MW of demand reduction annually in San Francisco through energy efficiency programs
    - The current demand forecast includes this 10 MW reduction through 2008 and includes only 5 MW per year in 2009 and beyond (CEE funding is only approved through 2008)
    - PG&E expects CEE funding to continue at current levels beyond 2008 and that it will continue to deliver at least the current 10 MW per year reduction (a 5 MW reduction above what is reflected in the demand forecast)
    - With no change in the current funding, PG&E expects to deliver a total additional demand reduction of 20 MW by 2012 through CEE
- The Transbay + Reconductoring + Demand Side Management option is expected to meet the LCR planning criteria through 2015 with the current 1 in 10 year demand forecast

### CCSF Peaker Project + Transbay

- This set of solutions was approved by the CAISO Board in the Fall of 2005
- The CAISO has stated that CCSF Peaker Project + Transbay option will meet the LCR planning criteria through at least 2020.
- However, the SFPUC staff has indicated publicly that it only intends to operate the peakers for about 10 years and to replace the peakers with a new transmission solution after that

### Long Term Transmission System Upgrades

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- A number of potential transmission system upgrades have been identified
- The current list of potential projects include:
  - Installation of a new 230kV AC line from Embarcadero substation to Potrero substation and adding a 230/115kV transformer at Potrero to tie the 115kV and 230kV systems in San Francisco together
  - Installation of a new 230kV AC line from Moraga substation to Potrero or other location in San Francisco
  - Installation of a new High Voltage DC line from Newark substation to a location in San Francisco
- These projects would all require CPCNs

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### Reference Material

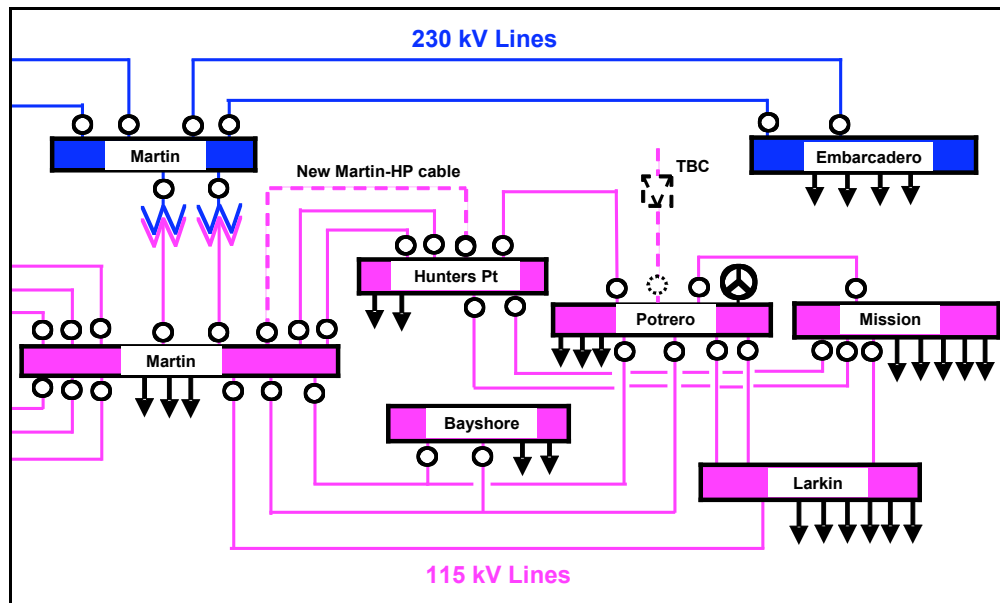


Figure 1: San Francisco Transmission System

Table 2: San Francisco Load Serving Capability (LSC) for Various Generation and Transmission Scenarios

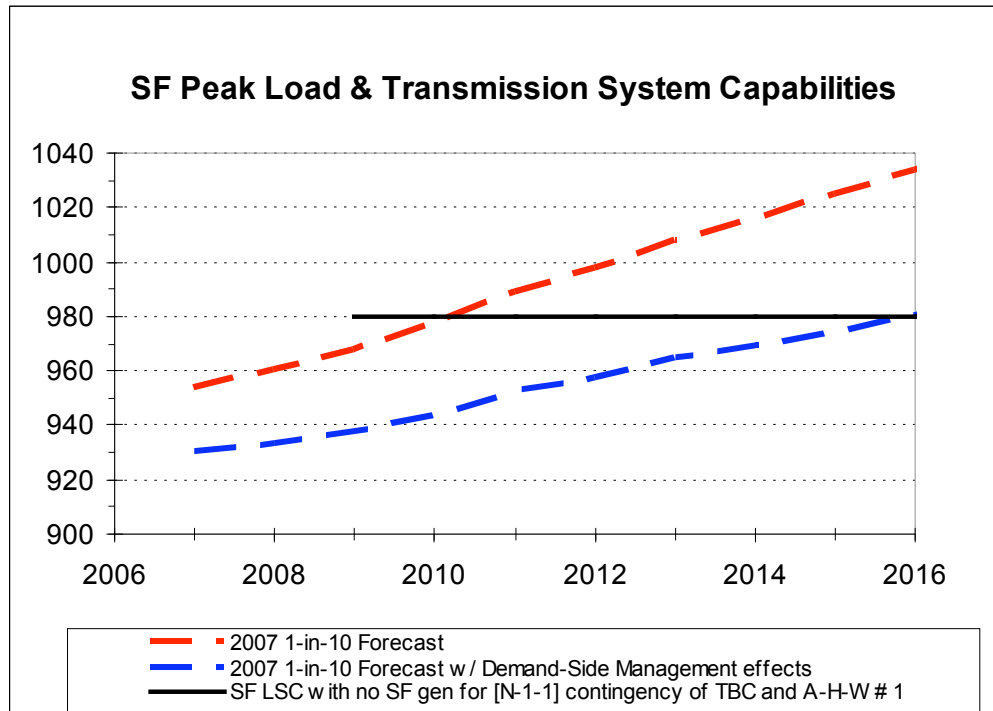
Row #	TBC	Potrero PP	3rd Martin - Hunters Point Cable	CCSF Peakers	115 kV SF Import Cables Emerg. Ratings	L-1/G-1		N-1-1	
						LSC (MW)	SF-Gen (MW)	LSC (MW)	SF-Gen (MW)
1	No	Retired	Installed	Installed	Yes	1,063	96	983	144
<b>1a</b>	<b>No</b>	<b>Retired</b>	<b>Installed</b>	<b>Installed</b>	<b>Reconducted</b>	<b>1,140</b>	<b>96</b>	<b>1,080</b>	<b>144</b>
<b>1b</b>	<b>No</b>	<b>Retired</b>	<b>Installed</b>	<b>No</b>	<b>Yes</b>	<b>890</b>	<b>0</b>	<b>750</b>	<b>0</b>
<b>1c</b>	<b>No</b>	<b>Retired</b>	<b>Installed</b>	<b>No</b>	<b>Reconducted</b>	<b>970</b>	<b>0</b>	<b>840</b>	<b>0</b>
2	No	Retired	No	Installed	Yes	904	96	768	144
3	Yes ; L-1	Retired	No	Installed	Yes	1,291	96	981	144
4	Yes ; L-1	Retired	Installed	Installed	Yes	1,383	96	1,163	144
<b>4a</b>	<b>Yes ; L-1</b>	<b>Retired</b>	<b>Installed</b>	<b>No</b>	<b>Reconducted</b>	<b>1,250</b>	<b>0</b>	<b>980</b>	<b>0</b>
5	Yes ; L-1	Retired	Installed	Installed	No	1,226	96	1,040	144

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**Figure 2: Forecasted Peak Load in San Francisco with and without Demand Side Management Programs**

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**Risks**

The risks associated with meeting electric system reliability with transmission alone are largely associated with the technology used in the transmission solutions. With no generation within the City, the 55-mile, underwater DC cable will be a critical component in the transmission system. The California System Operator is in the process of evaluating the reliability of this system in cooperation with the Transbay Cable project team.