2

Utility Baseline Analysis/Rates:

This section of the Comprehensive Energy Analysis (CEA) Report serves to document and discuss the use of electricity and natural gas at the San Mateo County Community College District (SMCCCD) with respect to the following topics:

1. Historical electricity and natural gas usage and cost information including a comparison of the SMCCCD usage with similar facilities.

2. Evaluation of the District's electrical procurement contract with Enron Energy Services and the economic effect of the termination of said contract in March 2003.

3. Development of electrical and natural gas usage baselines and rates for evaluation of the recommended Energy Conservation Measures (ECM's).

4. Evaluation of On-site Generation technologies at the three main campuses: College of San Mateo, Cañada College, and Skyline College.

Background

The San Mateo CCCD provided CMS Viron Energy Services with up to four years of historic electricity usage and cost data in Excel files and in paper copies of invoices. This data was reviewed for completeness, reorganized into a format that is easy to use and easy to understand, and analyzed for historical trends.

The data was processed to establish the unit cost and the load factor for each account on a monthly basis. The unit cost is the total monthly charges ($) divided by the total monthly energy used (kWh). The unit cost is expressed as "$/kWh" (e.g., $0.1323/kWh), and is an excellent indicator of potential billing anomalies and whether alternate rates should be considered for analysis. The lower the unit cost, the better. A single abnormally high unit cost on a monthly bill indicates a possible billing error for that month. A sustained high unit cost over many months suggests an alternate rate may save money.

Load factor is defined as the ratio of the energy that would have been used had energy been consumed at a uniform level equal to the maximum demand throughout the billing period to the energy actually consumed during the billing period. A load factor of one, or unity, is ideal. Typical office buildings in Northern California have a load factor of around 40% to 60%, for example. Load factor is important because of design and sizing considerations that must be applied to onsite generation equipment analysis.

The PG&E data, along with industry-standard engineering estimation techniques, was also used to develop representative estimated San Mateo County Community College District summer and winter weekday disaggregated diurnal (hourly demand profile) load curves. This utility data provides a snapshot view of the aggregate monthly usage of the San Mateo County Community College District's facilities and equipment during a typical weekday and are useful in estimating savings from demand responsiveness programs, onsite generation equipment such as solar photovoltaic, gas turbine (and micro-turbine), gas reciprocating engines or wind turbine systems.

Historical Electricity & Gas Usage

The SMCCCD currently spends almost $2,200,000 annually on electricity and natural gas at the College of San Mateo, Cañada College, Skyline College, and the District Headquarters collectively. This translates to an annual utility cost of $2.05 per square foot of building area and places the District's utility usage approximately 24% higher than comparable educational facilities with similar weather patterns. This above-average usage can be directly attributed to the age of the facilities, the maintenance of the equipment and the lack of adequate control strategies.

An analysis of the District's annual usage trends since 1998 shows that electricity usage is increasing 3.4% annually and natural gas usage 5.8% annually. Without intervention and implementation of a comprehensive energy savings program, the electricity and gas usage levels can be expected to increase significantly as the existing infrastructure decays further.

Existing Utility Procurement Contracts

Electricity

Currently, the SMCCCD benefits from a "Direct Access" electricity procurement contract with Enron Energy Services that is administered by the Community College League of California. This contract has shielded the District from the recent volatility in California's de-regulated marketplace but is set to expire in March 2003.

These "Direct Access" contracts are the focus of much discussion and contention within the utilities marketplace. The California Public Utilities Commission has issued a draft Decision on the pending matter of the actual suspension date for the Direct Access program in California. The draft CPUC Decision, R02-01-011, dated January 25, 2002 states:

> "The method by which a UDC is notified that one of its customers desires to be served by an ESP or desires to return to UDC bundled service is when the ESP (usually) or the customer (rarely) files a DASR with the serving utility. Similarly, a DASR is required to inform the utility that a contract has been assigned, or renegotiated, or terminated or extended, or has had additional locations incorporated. Merely suspending direct access

> on a date certain does not, by itself, notify interested parties how their contracts will be affected. Of course, when the Legislature suspended direct access and delegated to the Commission the duty to determine the effective date of the suspension, we had the discretion to suspend all direct access contracts as of a date certain, without exception. We did not do so. Rather, we permitted those contracts executed on or before the suspension date to remain in effect. However, to avoid substantial cost shifting, it would be unfair to bundled customers to permit direct access contracts to continue through renewals, assignments, and add-ons. **Therefore, we find that direct access contracts executed on or before July 1, 2001 s hall continue in force through their initial termination date and then be suspended until DWR no longer supplies power pursuant to Water Code § 80110.**" (emphasis added)

Furthermore, the CPUC provides policy direction to the investor-owned utilities (IOU's) as to how they should administer the change in policy governing Direct Access agreements and customers who were being served by ESP contracts that originated prior to July 1, 2001. Eight administrative requirements are listed in the draft Decision. For SMCCCD, and the other Community Colleges who have the same service, the most pertinent of the administrative rules affecting the future of the procurement agreement with Enron is item 8., shown below:

> "8. Direct access contracts may not be assigned after June 30, 2001, to either a new ESP or a new retail end use customer.
>
> *The direct access contracts which we have reviewed have clauses which permit assignment to another ESP or to another retail end use customer. AReM, and others, argue that if the contract permits assignment it must be honored even if the assignment takes place after the suspension date. We do not agree. First, the new ESPs agreement to serve the customer is a new arrangement for direct access service in violation of Ordering Paragraph 7 of D.01-09-060."*

On March 21, 2002 the CPUC issued a decision allowing current Direct Access agreements to remain in effect until their stipulated expiration date. The CPUC reserved the right to impose "exit fees" on Direct Access customers to reimburse the DWR for the procurement of wholesale electricity. The decision further states that the exit fees would "… provide a full contribution to the recovery of DWR procurement costs."

The same CPUC decision states that existing Direct Access customers may elect to renew their contracts. However, with Enron Energy Services mired in bankruptcy and no other entity renewing existing contracts, it is highly probable that the SMCCCD will be forced to convert to full market electric rates with Pacific Gas & Electric (PG&E) in April 2003. If the District's electrical usage level remains unaltered, the SMCCCD can expect their annual utility expenditures to increase $600,000 due to this rate reassignment.

Natural Gas

The SMCCCD currently contracts with the School Project for Utility Rate Reduction (SPURR) for procurement of natural gas commodities that are delivered by PG&E. For the past eighteen months, the retail natural gas market has been undergoing a major upward and downward swing due to supply constraints, wholesale price volatility, increased demand due to new power plant construction, and due to a significant pipeline failure at the end of the 2000 calendar year. As a result of the recent gas accord, and due to many retail gas marketers pulling out of the California market, the value of SPURR as a gas aggregator has diminished as compared to two or three years ago. We investigated and compared PG&E's vs. SPURR's procurement charges and the total gas charges (or retail price) for the past three years. Figure 2-1 be low shows the variation in cost per Therm of these two suppliers.

Among the gas procurement or contract options available to the District, CMS Viron recommends that the District pursue alternate gas supply arrangements to better mitigate the forward commodity price risk associated with SPURR. We have investigated both collar and hedge contracts as possible options for the District to consider. These would complement the increased natural gas use associated with onsite combined heat and power production and provide a solid financial risk protection from the kind of market volatility as seen in the past few years.

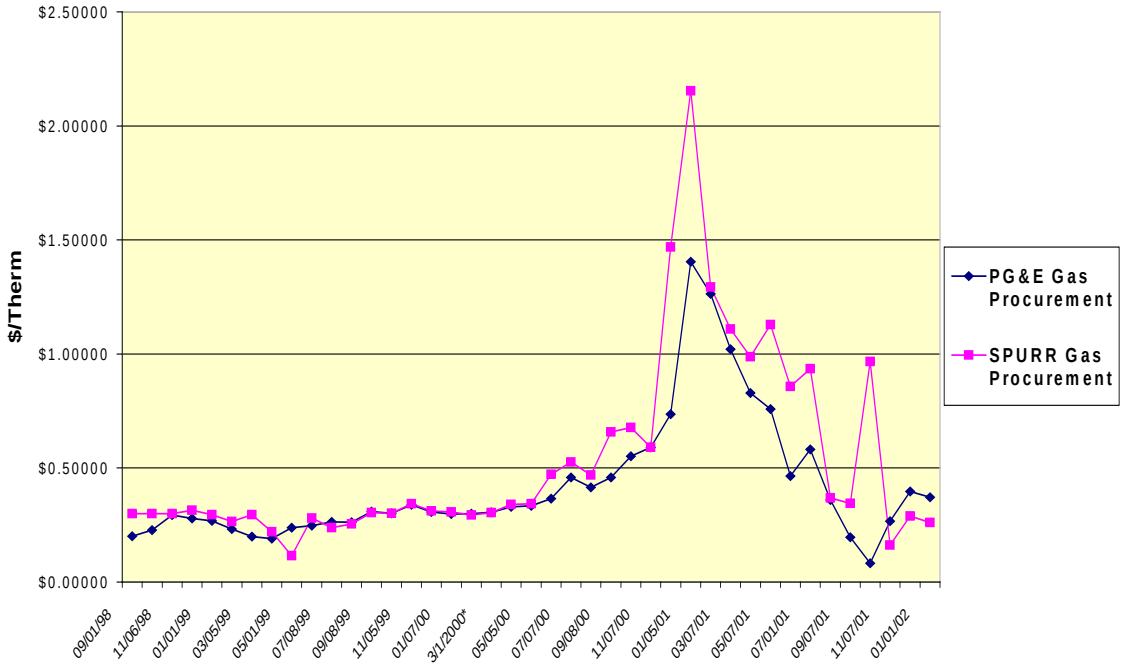

Fig. 2-1: Natural Gas Procurement Comparison

Baselines & Rates

Electric Rates

Electricity to the San Mateo County Community College District is billed according to the following PG&E utility tariffs as shown below:

- District Headquarters Building - Schedule A-10
- Cañada & Skyline Colleges - Schedule E-19P
- College of San Mateo - Schedule E-20P

Schedule A-10 is a demand-metered schedule with a maximum demand charge and flat seasonal energy rates for accounts using less than 500 kW of electric demand. A facility must consume a minimum of 50,000 kWh/year to be eligible for the A-10 rate. The advantage of the A-10 rate over the A-1 rate, for example, is the significantly lower energy charge. This is offset on the other hand by the demand component of the rate. The A-10 rate is not well suited to facilities that experience short-term periods of high demand but have usage that is relatively constant otherwise.

Schedule E-19P is a rate tariff for accounts between 500 kW and less than 1,000 with three-period summer and two-period winter TOU demand and energy charges.

Schedule E-20P is a rate tariff for electric accounts with 1,000 kW and greater electric load for at least 5 months in the preceding 14 months. The tariff has three-period summer and two-period winter TOU demand.

This CEA used the following rate structures for the purposes of evaluating the economic savings from the implementation of CMS Viron's recommended Energy Conservation Measures. These rates reflect the 2002 PG&E tariff structures as approved by the CPUC.

Rate	Customer Charge (/month)	Demand Charge (per kW)					Energy Charge (per kWh)				
		Summer			Winter		Summer			Winter	
		On-Peak	Mid-Peak	Off-Peak	Mid-Peak	Off-Peak	On-Peak	Mid-Peak	Off-Peak	Mid-Peak	Off-Peak
A-10	$75.00	$5.50			$1.65		$0.16253			$0.11024	
E-19P	$140.00	$11.80	$2.65	$2.55	$2.65	$2.55	$0.16473	$0.09999	$0.08814	$0.10831	$0.08913
E-20P	$310.00	$11.80	$2.65	$2.55	$2.65	$2.55	$0.16341	$0.09368	$0.09184	$0.10171	$0.09266

Note: Summer is defined as the period from May 1 through October 31, and Winter is defined as the period between November 1 and April 30.

By applying these 2002 PG&E rates against the historical electrical usage at all three campuses and the District Headquarters, CMS Viron has been able to calculate an average electric rate for

each location that blends the summer and winter rates with the proportional demand and energy charges. The College of San Mateo E-20P blended rate is $0.126 per kWh, the Skyline and Cañada College E-19P blended rates are $0.132 per kWh, and the District Headquarters A-10 blended rate is $0.144 per kWh. These blended rates will be used to calculate the economic effects of the recommended ECM's throughout this CEA report.

Natural Gas Rates

Cañada and Skyline College as well as the District Headquarters are supplied natural gas by PG&E at the GNR-1 rate tariff. The unit cost of this tariff has varied recently from a low of $0.47 per Therm to a high of $1.08 per Therm. The College of San Mateo is supplied natural gas based on the SPURR agreement with the unit cost varying from $0.34 per Therm to $2.12 per Therm. This volatility is due to the fact that the natural gas marketplace is deregulated and subject to market conditions such as weather, commodity supply, international instability, etc.

CMS Viron expects that the District will be able to distance themselves from this volatility in natural gas pricing by securing long-term collar or hedge contracts through CMS Energy – Marketing, Services & Trading. Based on current market conditions (as of 4/23/02), long-term gas contracts are available at a unit cost of $0.50 per Therm. This is the average rate used throughout this CEA report to calculate the economic impact of natural gas impacted ECM's.

Baselines

To be able to accurately determine the effectiveness of the Energy Conservation Measures (ECM's), CMS Viron has developed baselines for the existing electric and natural gas usage levels at all three campuses and the District Headquarters.

Baseline selection can be complex. Usage levels can be temporarily influenced by broken equipment, rolling blackouts, mandatory and voluntary conservation efforts, etc. As an example, the District's electricity and natural gas usage dropped an average of 7.4% during the first quarter of 2001 due to temporary conservation efforts. The usage levels have since returned to pre-2001 levels and are expected to remain at current levels.

The annual electric baselines were selected based on the average of all data between 1998-2001. The annual natural gas baselines at Skyline College and the District Headquarters were also selected based on the average of all data from 1998-2001. However, the annual natural gas baselines for Cañada College and the College of San Mateo were selected based on the average of only the 1998-2000 data. This is due to the 2001 data being skewed by the implementation of a temporary heating hot water reset strategy that has since been abandoned. The following charts reflect the various annual baselines that were analyzed for this CEA report:

Electricity (kWh):

	CSM	Canada	Skyline	HQ	*Totals*
CEA Baseline	5,950,248	2,701,803	3,487,945	626,269	12,766,265
Average all data	5,950,248	2,701,803	3,487,945	626,269	12,766,265
Average 1998-2000	6,033,615	2,714,094	3,532,384	639,290	12,919,383
Average last 2 years	5,921,617	2,723,103	3,446,285	606,550	12,697,555
Average last 12 months	5,722,228	2,658,158	3,333,328	581,682	12,295,396

Natural Gas (Therms):

	CSM	Canada	Skyline	HQ	*Totals*
CEA Baseline	547,473	174,877	296,014	17,146	1,035,510
Average all data	537,370	165,728	296,014	17,146	1,016,258
Average 1998-2000	547,473	174,877	297,633	17,330	1,037,313
Average last 2 years	518,358	155,999	287,885	16,688	978,930
Average last 12 months	518,837	139,612	288,637	16,203	963,289

These baselines were calculated based only on the usage at the utility meters that will be impacted by the ECM's. Those meters are as follows:

Location	Electric		Gas	
	Account	Meter	Account	Meter
College of San Mateo	KRNT590001	9280R4	FRNA300171	42061261
Canada College	QRNT131001	6686R2	QRN0983301	452325V
Skyline College	MRBT231261	6692R7	MRBA200211	4849349X
District Headquarters	LRNT257001	C22100	LRN3355701	47240457

Both the annual electric and natural gas baselines are represented graphically as follows:

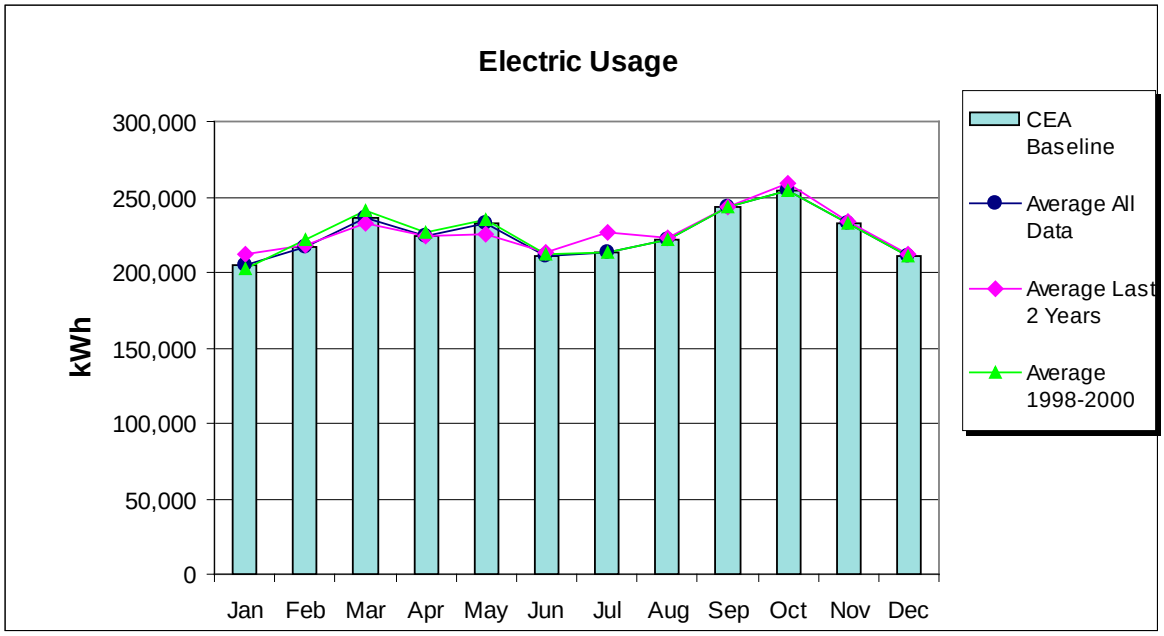

Figure 2-2: Cañada College Electric History and Baseline

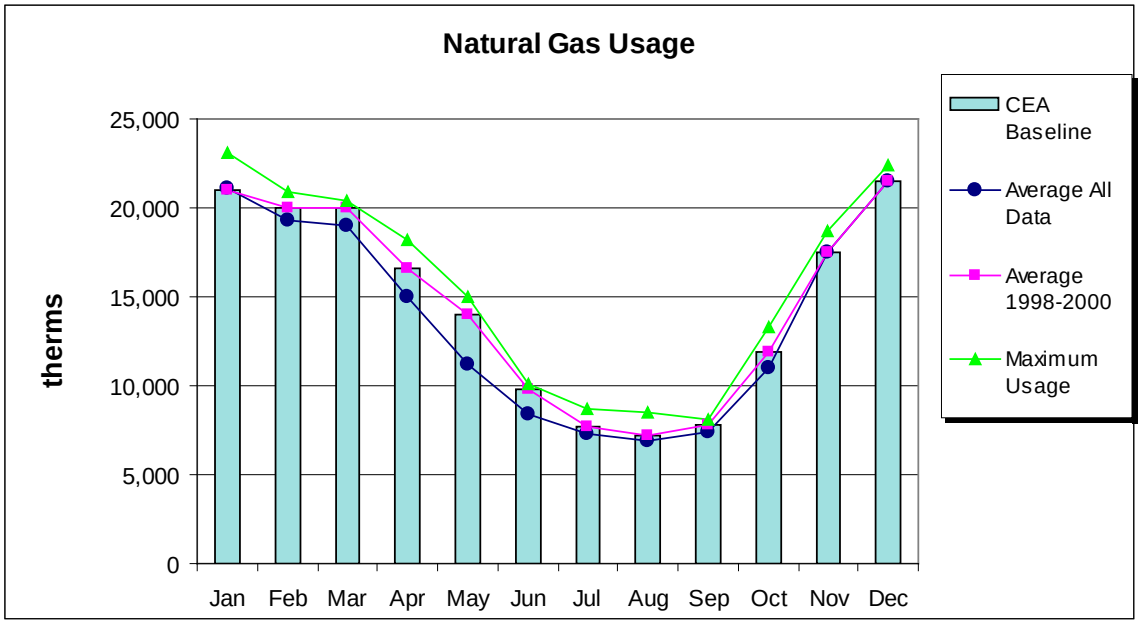

Figure 2-3: Cañada College Natural Gas History and Baseline

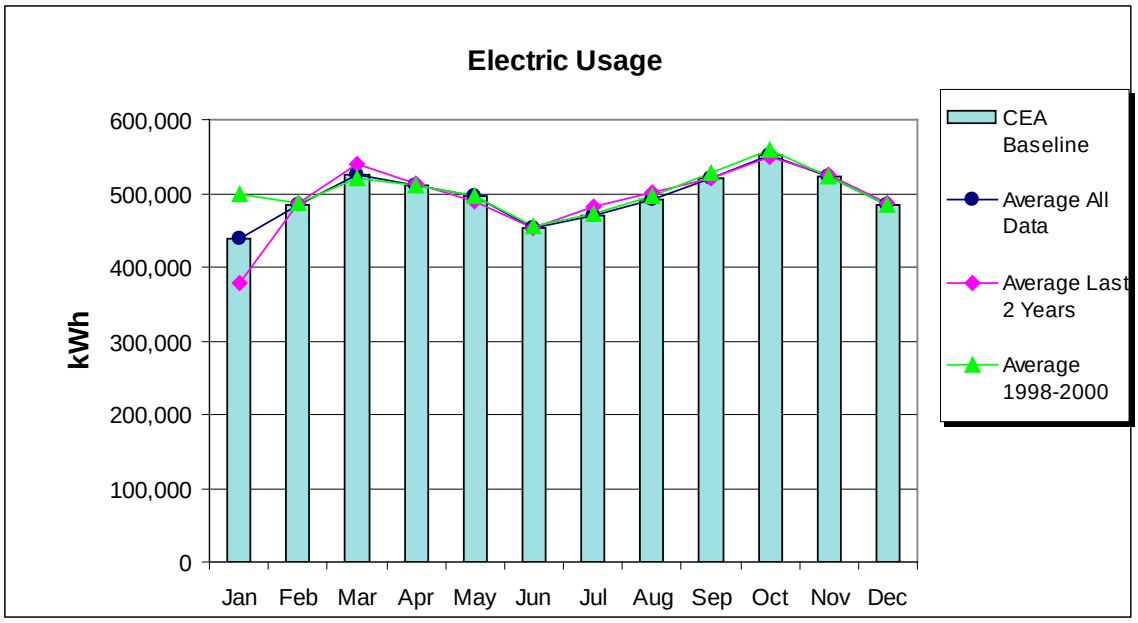

Figure 2-4: College of San Mateo Electric History and Baseline

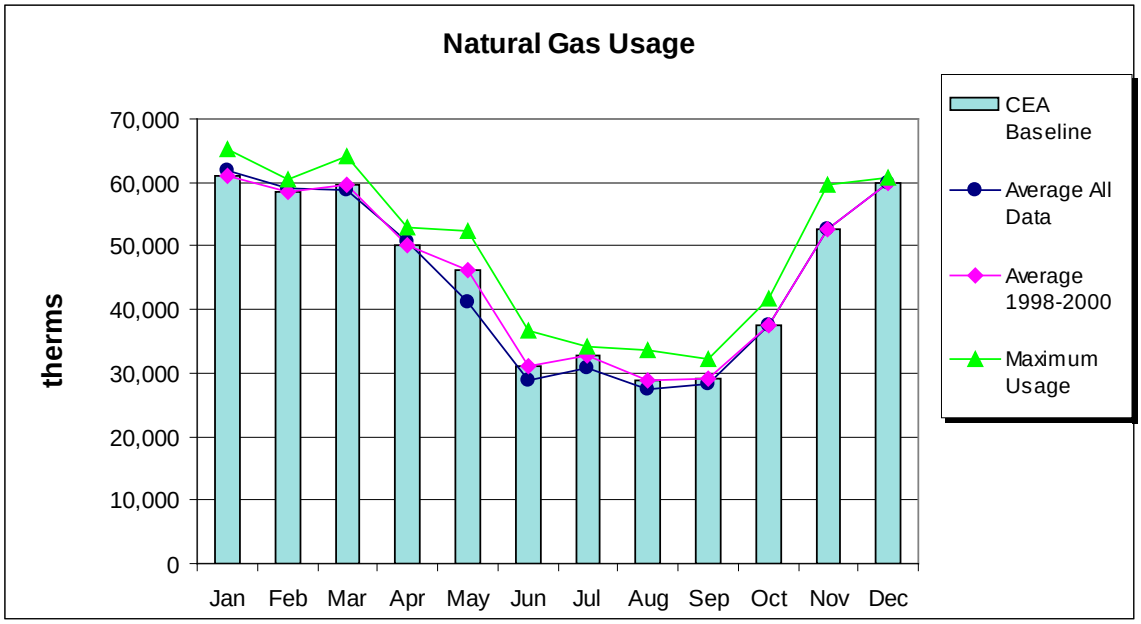

Figure 2-5: College of San Mateo Natural Gas History and Baseline

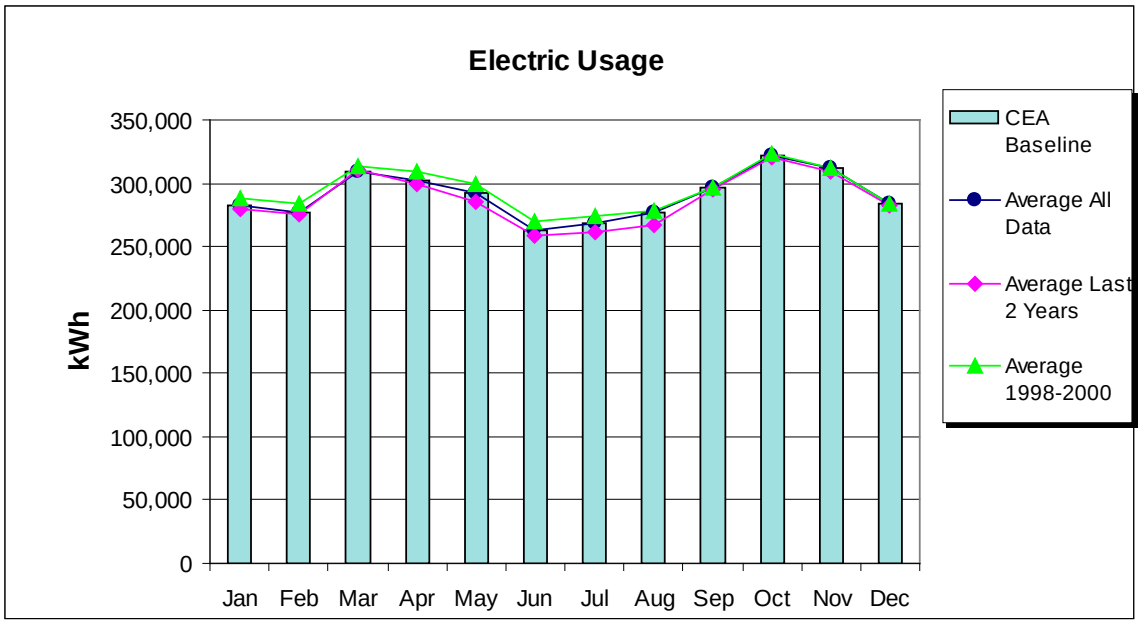

Figure 2-6: Skyline College Electric History and Baseline

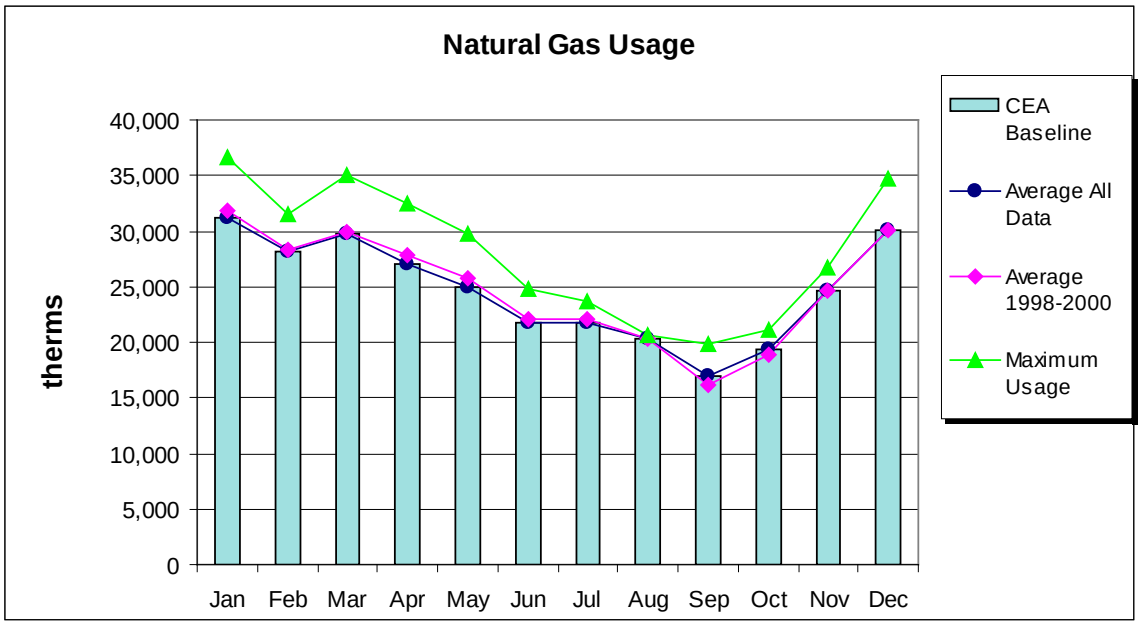

Figure 2-7: Skyline College Natural Gas History and Baseline

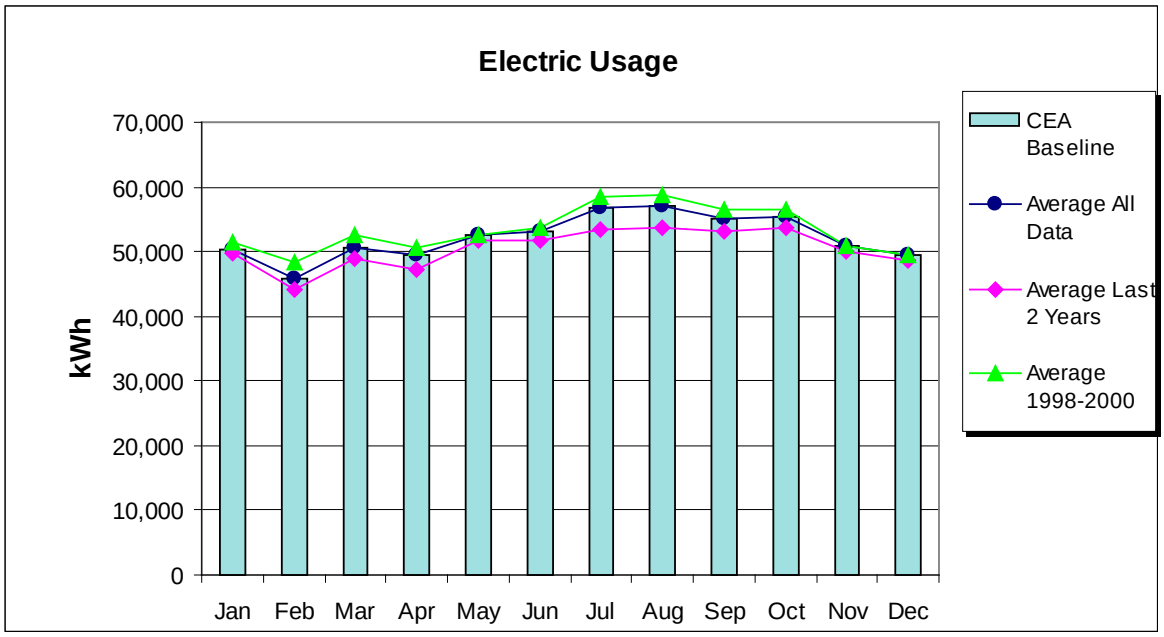

Figure 2-8: District Headquarters Electric History and Baseline

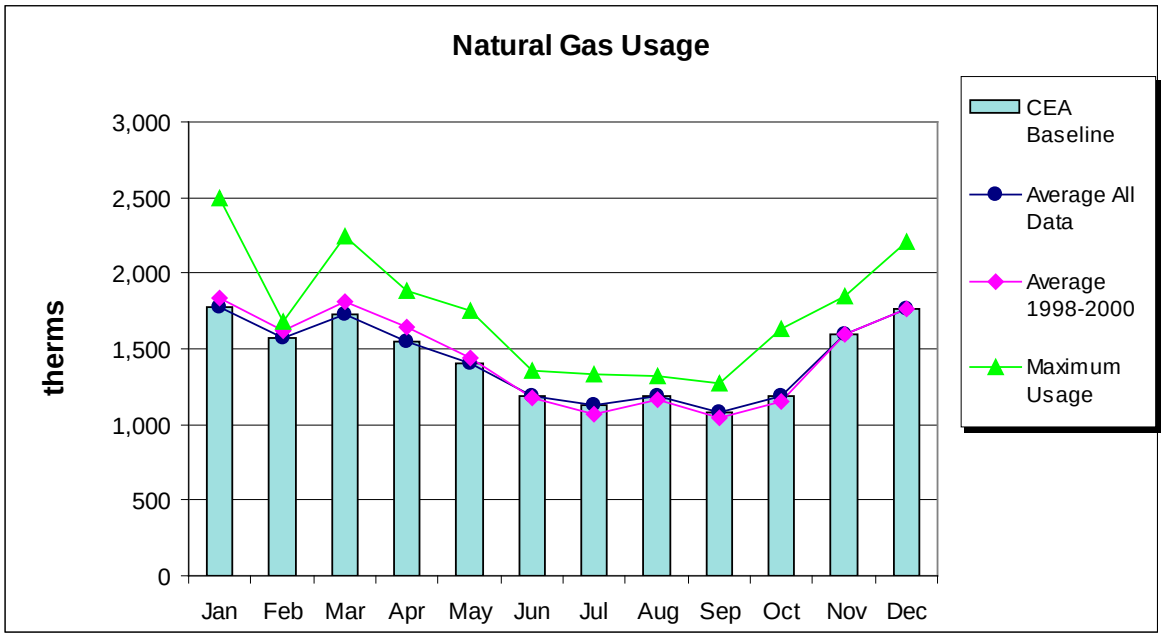

Figure 2-9: District Headquarters Natural Gas History and Baseline

On-site Generation Evaluation

For the combined heat and power analysis, representative summer and winter weekday diurnal (hourly demand profile) load curves disaggregated by meter for all San Mateo County Community College District accounts were produced using the PG&E provided historic usage data, along with industry-standard heuristics and other engineering estimation techniques. Natural gas profiles were also produced to reflect the daily and hourly use profiles for estimating combined heat and power requirements on the heating loops at Skyline and CSM.

Since the actual electrical output (kWh) of the cogen system can be accurately modeled, the savings estimate will be calculated using the actual PG&E rate tariff rather than the blended rate outlined previously.