Demand Response Engineering Analysis of El Dorado Irrigation District's El Dorado Hills Sub-System

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Prepared for:
El Dorado Irrigation District

Date: October 12, 2004

INTRODUCTION AND SUMMARY

Efficiency Analysts International (EAI) was retained by the El Dorado Irrigation District (EID) to conduct a demand response engineering analysis of the EID El Dorado Hills Sub-System. The purpose of this analysis is to identify opportunities to implement demand response measures at EID with an emphasis on participating in some of the new Pacific Gas and Electric (PG&E) Demand Response Programs and assist the state of California in meeting peak electrical demands. EAI relied on an assessment methodology which has been proven successful in assisting water agencies in the identification of opportunities to reduce peak period energy demand. Through a detailed understanding of the operational components and behavioral patterns of the agency operations, it is possible to identify behavioral and physical modifications within the system which, when implemented, will result in significantly decreased peak period electrical demand and lower energy costs.

The following sections of this report summarize the results of our analysis and describes operational and physical changes possible with the existing system, as well quantifying the relative magnitude of the potential for peak period electrical demand response that is available to EID for their El Dorado Hills potable water system (El Dorado sub-system).

Results/Cost Savings

Under existing conditions and with the existing system with the Oak Ridge #2 Tank (under construction) available, EID can drop over 1,725 KW under peak water demand conditions without compromising water deliveries, and more at lower water delivery demands. Using the Gold Hill Intertie on an emergency basis, EID can drop over 2,000 KW under peak water demand conditions without compromising water deliveries. Providing these levels of participation in the Critical Peak Pricing (CPP) Program will save EID between $15,000 to $20,000 over an entire summer, in addition to providing much needed electrical demand reductions to PG&E. In addition, EID can participate in CPP and DBP programs simultaneously. Participation in the Demand Bidding Program (DBP) of these amounts will save EID $225-300 per hour during a Day-ahead DBP event, and $750-1000 per hour in a Day-of DBP event. Both of these amounts are in addition to over $50,000 available for performance based incentives for participation in these programs.

Under the utility technical assistance program, EID is eligible for payments of up to $50/kW for curtailed load: $25/kW when the estimated EID load drop is certified in this report by us, and another $25/kW that is performance based, paid when 50% of estimated load is dropped while participating in either the CPP or DBP programs. This latter performance bonus is in addition to the cost savings estimated in the previous paragraph. EID's participation in these programs can result in the following savings:

- $51,375 for the technical assistance report, plus,
- $51,375 for performance based incentives, plus,
- $15,000-20,000 for a complete season of CPP participation, plus,
- $225-$300 per hour during a Day-ahead DBP event, and $750-$1000 per hour in a Day-of DBP event.

Recommendations:

- Participation in the CPP and DBP programs is for a very limited duration. The CPP and DBP calls are rare events, approximating 50 to 100 hours over the year. CPP is limited to 12 days between May and October. Additionally, as these programs are structured now, there is virtually no risk to EID from participation in these programs.

- We recommend that EID sign up to participate in the Demand Bidding Program (DBP) now. It will allow EID to gain confidence and familiarity in its ability to shift electrical demand out of the peak periods in response to a utility call during the upcoming winter, a period of traditionally lower water demand. This can be done under the DBP protocol, which has virtually no risk for EID.

- Prior to next summer (May 2005) based upon its experience over the winter in demand shifting, and based upon what new facilities are operational, EID should determine the amount that they are willing to participate in the Critical Peak Pricing (CPP) program for the summer of 2005.

- EID can conservatively participate in the DBP program with up to 1,500 kW now, and should be able to provide over 2000 kW of curtailment during CPP events in the summer of 2005 from the following facilities;

- PG&E Acct #3751780690 Folsom Lake Raw Water Pumping Station
- PG&E Acct #3751780357 El Dorado Hills WTP and Effluent Pumping Station
- PG&E Acct # 3751780735 Oak Ridge Booster Pump Station

- Finally, we recommend that EID implement a performance bonus for the operators in El Dorado Hills Sub-system that is based upon a share-the-savings from participation in these programs. We have provided a conservative estimate of the available load drop within this system, but our experience has been that the operators can find even more savings than we have predicted. Participation in these programs will require extra work, and extra effort on the part of these operators. For example, on CPP or DBP days, treatment plant operators will need to stay into the evening in order to refill available storage. This extra effort should be rewarded, particularly because the potential benefits to the district (and the state) are so large. A share-the-savings approach (e.g., operators get 10% of the realized dollars savings from these programs) will result in a bonus of approximately $7,500 shared among the operators after a complete year of participation in DBP and CPP, but district savings of over $70,000, based upon our conservative assumptions. And the State of California will be able to count upon EID's assistance in keeping the lights on during periods of electrical system stress.

THE NEED

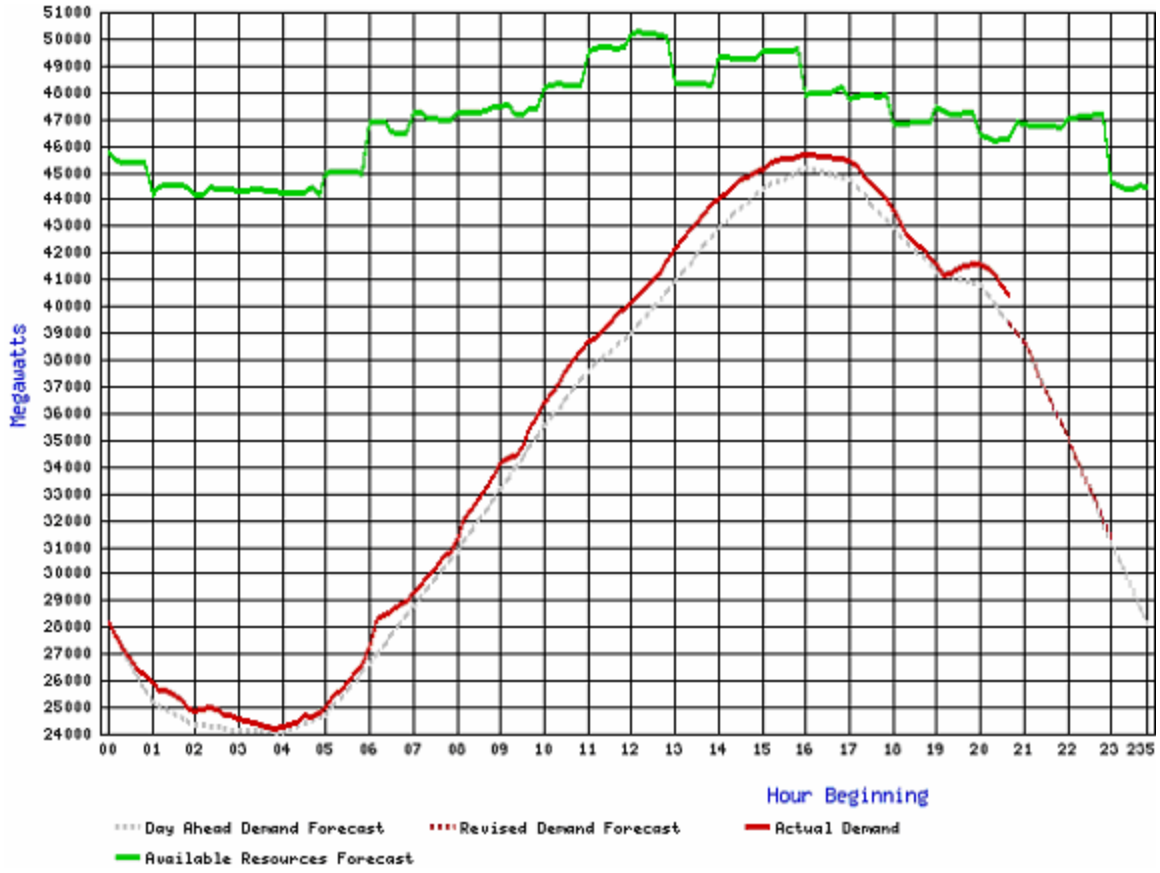
California is relying more and more on customer demand response to meet electrical needs in the state, as load growth accelerates and construction of new generation facilities slows. The California Public Utilities Commission just adopted D04-09-060, which approved significant increases in energy-efficiency programs and established savings goals for the states utilities for 2004 through 2013. The decision orders the state's regulated utilities—San Diego Gas & Electric, Pacific Gas & Electric, Southern California Edison and Southern California Gas—to achieve a combined savings of 1,838 GWh of electricity by 2005. By 2013, the electricity-savings goal would hit 2,631 GWh annually. In capacity, this translates into 971 MW in 2005; 1,816 MW in 2010; 3,026 MW in 2013. The order establishes a definite preference for demand resources in utility procurement: "cost-effective conservation and energy efficiency

are first in the IOUs' resource loading order— that is, energy efficiency is evaluated for cost-effectiveness and procured before supply-side resources are to be factored into the procurement plan,".

In a similar vein, the California Energy Commission just issued its draft of the Integrated Energy Policy Report: 2004 Update – the state's energy policy guidelines. It says that California will need to aggressively increase demand-response programs. Demand response was the central solution advocated: "Rapidly deploying demand-response programs in the state is the most effective approach to address peak demand for the summers of 2005-2008". The CEC recommended that both investor-owned and municipal utilities to "work aggressively to attain the 2007 statewide goal of meeting 5 percent of peak demand through demand-response programs." This equals about 1,900 MW for the IOUs and 2,600 MW for the entire state. "The committee recommends significantly increased efforts to achieve existing demand-response goals for the summer of 2005 through 2007, and accelerating and expanding demand-response goals wherever possible,".

The need for demand response can be seen in Figure 1, the peak load day for the summer of 2004. Note that at 4 pm California only had about 2,000 MW of reserve generation, a margin uncomfortably low. If a major power plant or transmission line had gone down that afternoon, California would have been in trouble. If demand response could reduce the electrical demand from 3 to 5 pm, it would greatly alleviate the stress on the California system. That is the purpose of these demand programs, to provide short term, limited duration demand reductions in response to California system needs.

Figure 1. California ISO Load and Resources - September 8, 2004



THE ANALYSIS

Process Overview

The EID El Dorado Hills Sub-system Demand Response Analysis was performed using the Water Resources Energy Management System (WREMS) software. WREMS utilizes a systems optimization approach and relies on a network simplex implementation of a minimum-cost network flow solution. The WREMS analysis is based on the spatial and temporal flow balance of all operational entities, which comprise the water system. By analyzing operational and energy demand data, a unique, “minimum cost” solution is obtained for any particular operational scenario.

A pre-requisite to the development of the WREMS systems optimization model requires that the physical and operational parameters of all major operating entities, which comprise the

EID El Dorado Hills Sub-system be defined. These parameters were defined through data provided by EID staff. A summary of this data is presented in primary pumping facilities is presented in Table 1.

Table 1. El Dorado Hills Pumping Facilities

Booster Pump Station	Service Area	PG&E Electric Tariff	Pump Number	Pump HP	Load/Demand (kW)	Specific Energy (kWh/Gal)	Flow (gpm)
EDH Raw Water Submersible Pumping Station	EDH WTP	E20S	1	100	74.57	0.0005966	2083.2
			2	100	74.57	0.0005966	2083.2
			3[1]	150	111.86	0.0006905	2700
			4[1]	150	111.86	0.0006905	2700
			5[1]	150	111.86	0.0006905	2700
EDH Raw Water Pump Vault	EDH WTP	E20S	1	200	149.14	0.0009943	2500
			2	200	149.14	0.0009943	2500
			3	500	372.85	0.0010357	6000
			4	500	372.85	0.0010357	6000
			5[2]	0	0.00	0.0000000	6000
960 Zone Effluent Booster Pump Station	Highland View Service Zone	E20S	1[3]	100	74.57	0.0007768	1600
			2[1]	150	111.86	0.0007457	2500
			3[4]	150	111.86	0.0005178	3600
			4[4]	200	149.14	0.0006611	3760
			5	300	223.71	0.0011652	3200
			6	300	223.71	0.0010357	3600
820 Zone Effluent Booster Pump Station	Lake Hills Service Zone	E19S	1	125	93.21	0.0007398	2100
			2	125	93.21	0.0007398	2100
			3[5]	0	0.00	0.0000000	2100
Lower Highland View Booster Pump Station	Highland View Service Area		1	25	18.64	0.0007768	400
			2	25	18.64	0.0007768	400

Booster Pump Station	Service Area	PG&E Electric Tariff	Pump Number	Pump HP	Load/Demand (kW)	Specific Energy (kWh/Gal)	Flow (gpm)
Upper Highland View Hydro Pump Station	Highland View Hydro Zone		1	3	2.24	0.0007457	50
			2	3	2.24	0.0007457	50
Highland Hills Hydro Pump Station	Highland Hills Hydro Zone	A6P	1	3	2.24	0.0012428	30
			2	3	2.24	0.0012428	30
			Fire Pump	25	18.64	0.0004780	650
Ridgeview Hydro Pump Station	Ridgeview Service Area	A6P	1	7.5	5.59	0.0015535	60
			2	25	18.64	0.0007768	400
			3[6]	25	18.64	0.0006214	500
Oakridge Tank Booster Pump Station	El Dorado Hills Service Area 3	A6P	1	75	55.93	0.0018643	500
			2	125	93.21	0.0017262	900
			3	125	93.21	0.0017262	900
Gillette Hydro Pump Station	Gillette Hydro Zone		1	0.75	0.56	0.0002330	40
			2	0.75	0.56	0.0002330	40
Southpoint Booster Pump Station	Southpoint Service Area	A1P	1	7.5	5.59	0.0015799	59
			2	7.5	5.59	0.0015799	59
			3	15	11.19	0.0015535	120
			4	75	55.93	0.0012428	750
Monte Vista Booster Pump Station	Salmon Falls Service Area		1	20	14.91	0.0013509	184
			2	20	14.91	0.0013509	184

Notes:
(1) replaced with 200 hp pumps.
(2) 500 hp pump installed.
(3) replaced with a 150 hp pump.
(4) replaced with 300 hp pump.
(5) 125 hp pump installed.
(6) VFD installed.

The existing storage facilities parameters are presented in Table 2. Additional storage capacity is planned for the EID El Dorado Hills Sub-system in the near future. An additional 5

MGal storage facility is currently under construction to supplement the existing Oak Ridge Tank. This tank (Oak Ridge #2) was included in the analysis.

EID also plans to add a Promontory Point tank (2.6 MGal) in 2005 and has planned upgrades to its main line (Silva Valley), and the White Rock Road/Valley View line. None of these upgrades were included in the analysis, due to the uncertainty of their availability by the beginning of the summer next year (May 2005). These additions will further enhance the ability of EID to contribute on peak electrical demand savings.

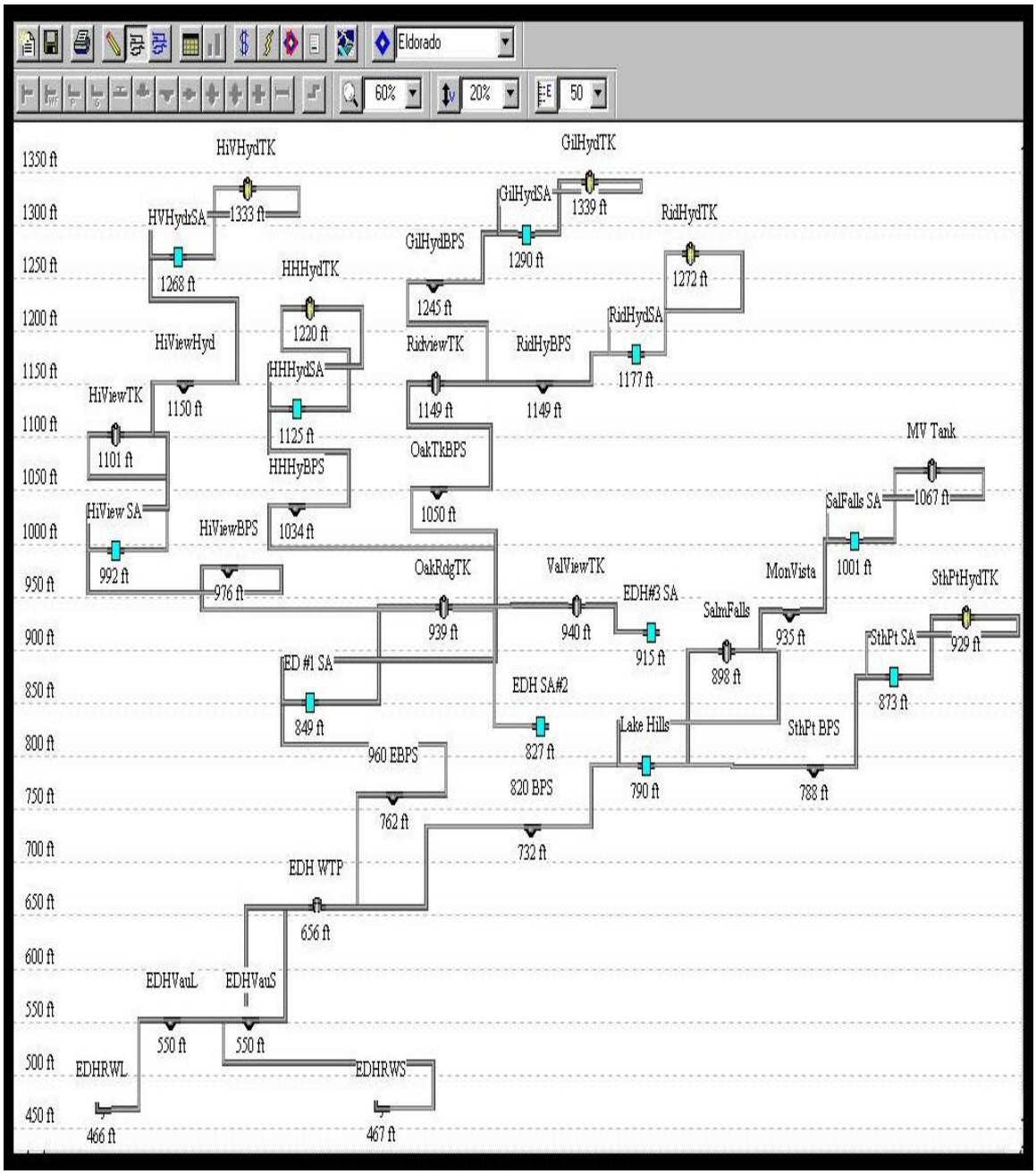
Table 2. El Dorado Hills Storage Facilities

Reservoir ID	Storage Capacity (Gal)	Incremental Storage (Gal/Ft)	Overflow Height (Ft)	Max. Operating Level (Ft)	Min. Operating Level (Ft)
EDH WTP Effluent Storage	800,000	80,000	10	9	7
Oak Ridge Reservoir	3,000,000	75,000	40	37.5	24
Ridge View Reservoir	1,000,000	33,333	30	27.5	20
Valley View Reservoir	3,000,000	100,000	30	28	24
Salmon Falls Reservoir	2,000,000	50,000	40	37	25
Monte Vista Reservoir	100,000	4,348	23	20	16
Highland View Reservoir	250,000	10,870	23	20	16
Oak Ridge #2 Reservoir	5,000,000	100,000	50	45	30
2005 Promontory Point Reservoir (not included in analysis)	2,000,000	50,000	40	37	25

A visual representation of the principal EID El Dorado Hills Sub-system operational entities is presented as Figure 2. The hydraulic interconnectivity of the system is also depicted. This

hydraulic schematic is also representative of the WREMS system optimization model for the system.

Figure 2. Schematic of El Dorado Hills Potable Water System (from WREMS Simulation)



A summary of the "Peak Period" demand data for each of the major facilities comprising the EID El Dorado Hills Sub-system is presented in Table 3. The majority of the combined "Peak Period" demand is associated with three facilities. These include the Folsom Lake Raw Water pumping station; the El Dorado Hills water treatment plant (WTP) and treated water pumping station; and the Oak Ridge Booster Pump Station.

Table 3. Peak Period Demand Analysis (Summer Demand Period 2003)

Demand Period	Max Daily Flow (MGal)	Peak Period Demand (kW)									
		Folsom Lake Intake	EDH WTP & Pumping Facilities	Oak Ridge BPS	Ridge View BPS	South Point BPS	Lower Highland View BPS	Upper Highland View BPS	Highland Hills Hydro BPS	Gillette Hydro BPS	Monte Vista BPS
May-03	10.36	867	729	258	9	11	19	3	3	1	15
June-03	14.23	1296	936	171	11	10	19	3	3	1	15
July-03	14.63	1251	975	170	11	7	19	3	3	1	15
August-03	13.26	1236	969	171	13	13	19	3	3	1	15
September -03	11.30	1341	903	258	9	10	19	3	3	1	15

Demand Response Opportunities

The EID El Dorado Hills subsystem operations were modeled under a range of water demand scenarios so that a comprehensive evaluation could be made of the existing operational efficiency. In addition, this comparative analysis facilitated the identification of electrical demand response opportunities under a significant range of operational scenarios. A summary of the operational scenarios which were evaluated and a subsequent comparison of actual vs. possible peak period electrical demand are presented in Table 4. The base case scenario is with both Oak Ridge reservoirs available. We have also included a peak day analysis with the Gold Hill Intertie available. While the Gold Hill Intertie is intended to be used for emergency purposes only, it is our opinion that a CPP or DBP event is, by definition, an electrical emergency and Gold Hill could be used during one of these events.

Table 4. Load Reduction Potential

Design Day Demand (MGal)	EID Actual Peak (kW)	WREMS Potential Peak (kW)	Potential Load Reduction w/ Oak Ridge #2 (kW)
10.00	2059	397	1662
11.50	2212	397	1815
12.50	2303	397	1906
13.25	2367	531	1836
14.00	2427	531	1896
14.25	2445	603	1842
14.50	2465	740	1725

Design Day Demand (MGal)	EID Actual Peak (kW)	WREMS Potential Peak (kW)	Potential Load Reduction w/ Oak Ridge #2 and Gold Hill Intertie (kW)
14.5	2465	410	2055

The results of the demand response analysis indicate that the composite El Dorado Hills subsystem demand varies from approximately 2059 kW to 2465 kW during the summer. These days correspond to customer water demand periods, which can range from 10 MGal to 14.5 MGal/day. This upper demand represents the current peak day capacity of the EID El Dorado Hills Sub-system. Our systems optimization modeling; a comprehensive analysis of the historical operating records; and interviews with EID operations staff, indicate this peak period demand can be reduced between 1662 kW to 1725 kW, for the specified range of water demands (i.e. 10 – 14.5 MGal), during the summer peak period (i.e., 12:00 to 6:00pm), and still safely meet water delivery requirements. Use of the Gold Hill Intertie on an emergency basis will increase EID electrical demand reductions to 2055 kW[1]. These reductions in peak period demand can be achieved primarily through more flexible use of existing storage.

A graphical representation of the relationship between daily water demand and "Peak Period" system power demand is presented as Figure 3. A review of this data illustrates that under higher water demand scenarios, the opportunity for "Peak Period" demand reduction is

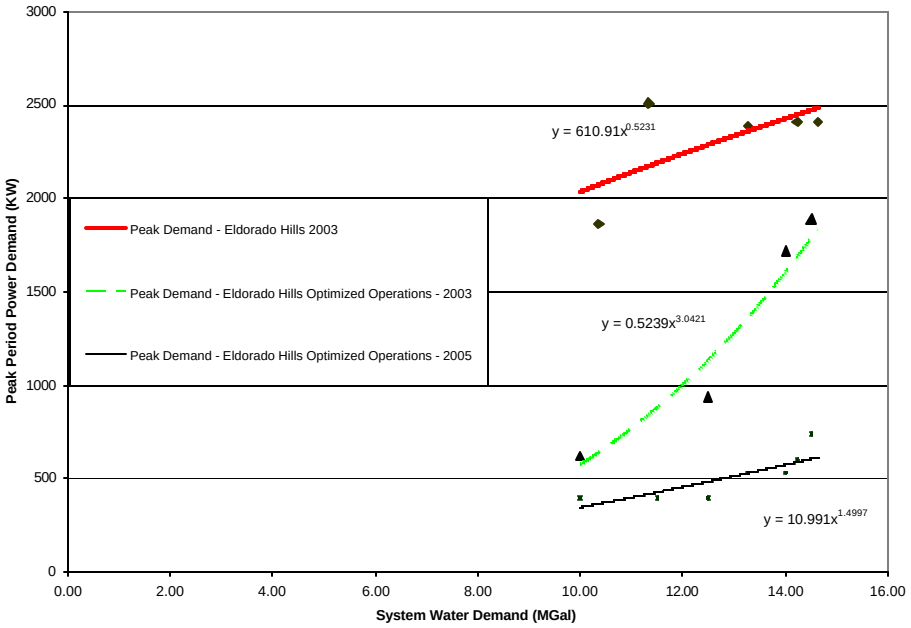
[1] The ability to use the Gold Hill Intertie is dependant upon, in part, the amount of residential development in the area over the next several years.

lessened as the system is run harder to meet water demands. The opportunity for maximum peak electrical demand reductions occurs on days when water demand is between 12 MGal and 14 MGal.

The resultant opportunity for load response, the EID El Dorado Hills Sub-system can respond to a request for load reduction from PG&E with existing and planned storage. EID can reduce almost all of its electrical demand in response to calls for curtailment for short periods of time. Peak period demand electricity use can be reduced to 740 kW during the summer peak period (i.e., 12:00 to 6:00pm), with minimal changes to the current operating scheme, a curtailment of 1725 kW. The use of the Gold Hill Intertie provides an additional 330 kW of electrical demand reduction.

Because the probability of the EID customer demand for peak water demands will not necessarily coincide with the PG&E request to curtail on CPP or DBP events, conservatively EID could participate in the Demand Bidding Program with a load of 1500 kW, and based upon their experience over the winter in demand shifting, and based upon what new facilities are operational, EID should be able to participate in the Critical Peak Pricing (CPP) program for the summer of 2005 with 2.0 MW of peak demand curtailment.

Figure 3. Comparative Analysis of Peak Period Load Reduction Potential



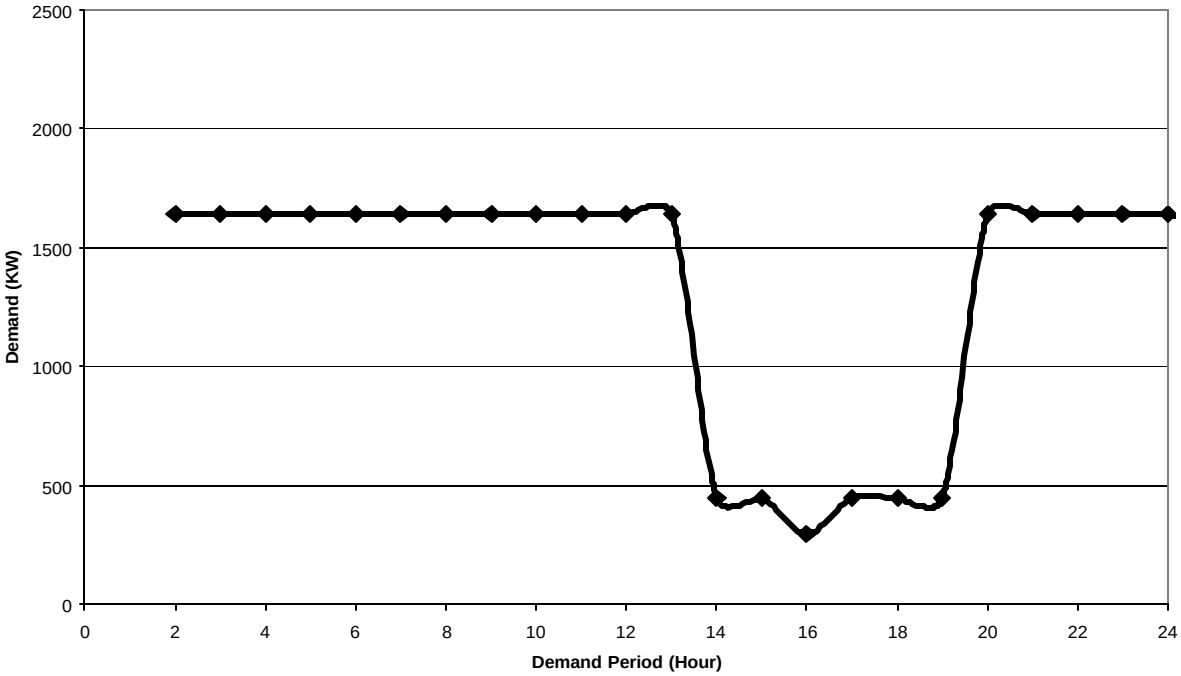
We have included as Figures 4 and 5 a graphical representation of the 24-hour demand profile for the Folsom Lake Raw Water pumping station and the El Dorado Hills WTP and treated water pumping station under an operation strategy whereby the existing storage facilities are utilized to minimize "Peak Period" demand[2].

Also included in these figures is the hourly recorded electrical use at these facilities on September 15, 2004, a 12 MGal day. Note that EID is currently dropping 1,000 kW of electrical demand from the Folsom pumping facilities and 480 kW from the water treatment plant throughout the day. This is the current system, without the additional 5 MGal Oak Ridge #2 reservoir available. What the optimization does is shift the electrical drop, most of what is currently already being done, out of the on peak period.

[2] These figures are operations without the Gold Hill Intertie operating. The use of Gold Hill Intertie increases electrical load drop potential by an additional 330 kW.

Figure 4. Folsom Lake Raw Water Pumping Station Hourly Electrical Demands Demand Response Profile (14.5 MGal Demand)

PG&E ID#3751780690
Folsom Lake Raw Water Pumping Station



Recorded Electrical Use – September 15, 2004

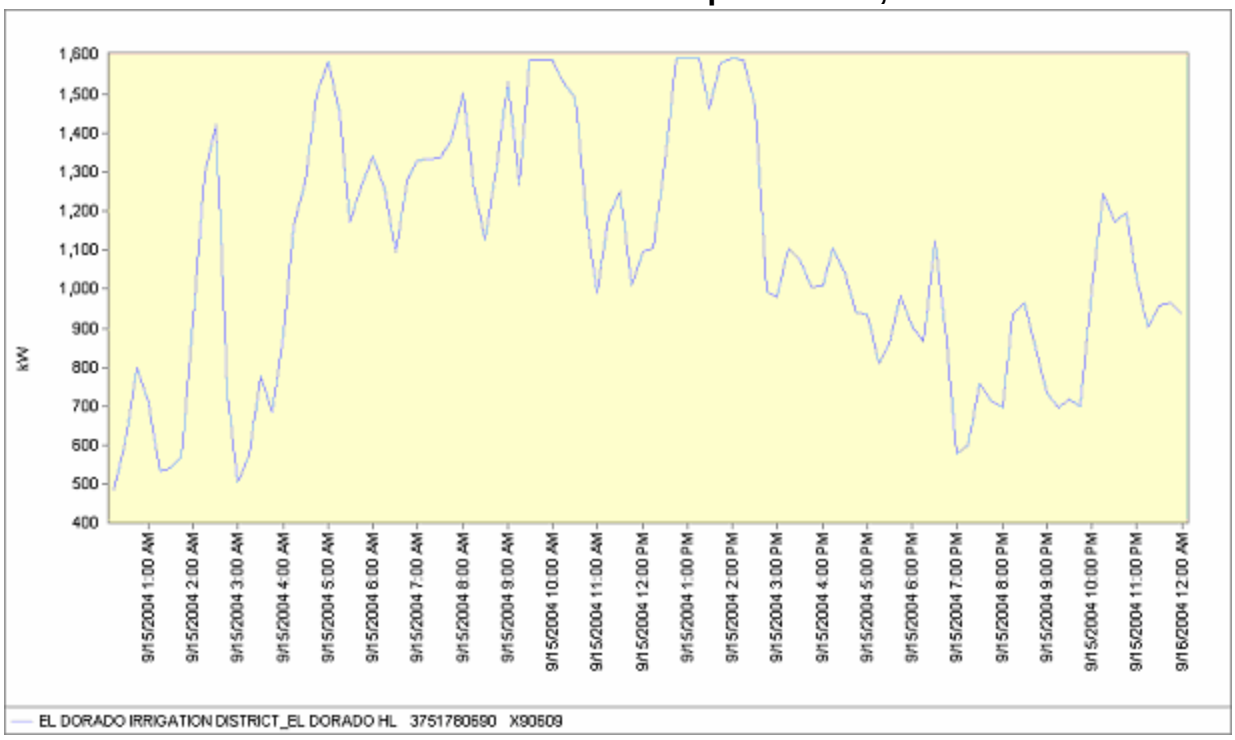
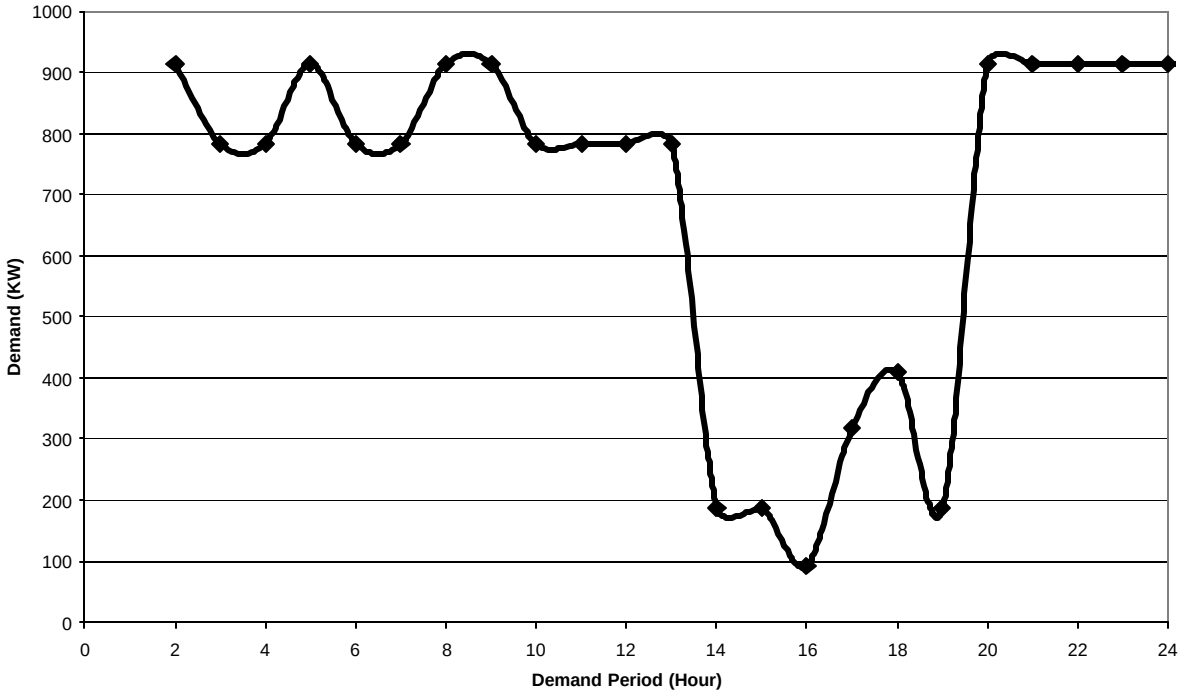


Figure 5. Treatment Plant Hourly Electrical Demands
Demand Response Profile (14.5 MGal Demand)

PG&E ID #3751780585
EID EDH WTP & Treated Water Pumping Facilities



Recorded Electrical Use – September 15, 2004

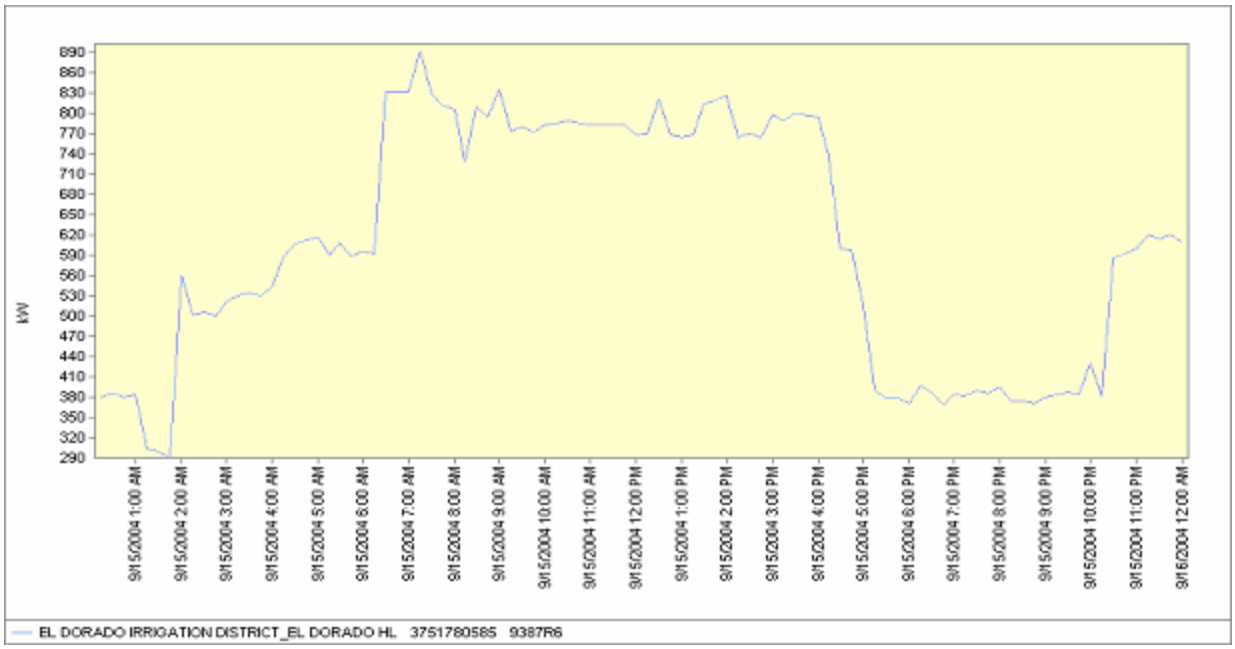
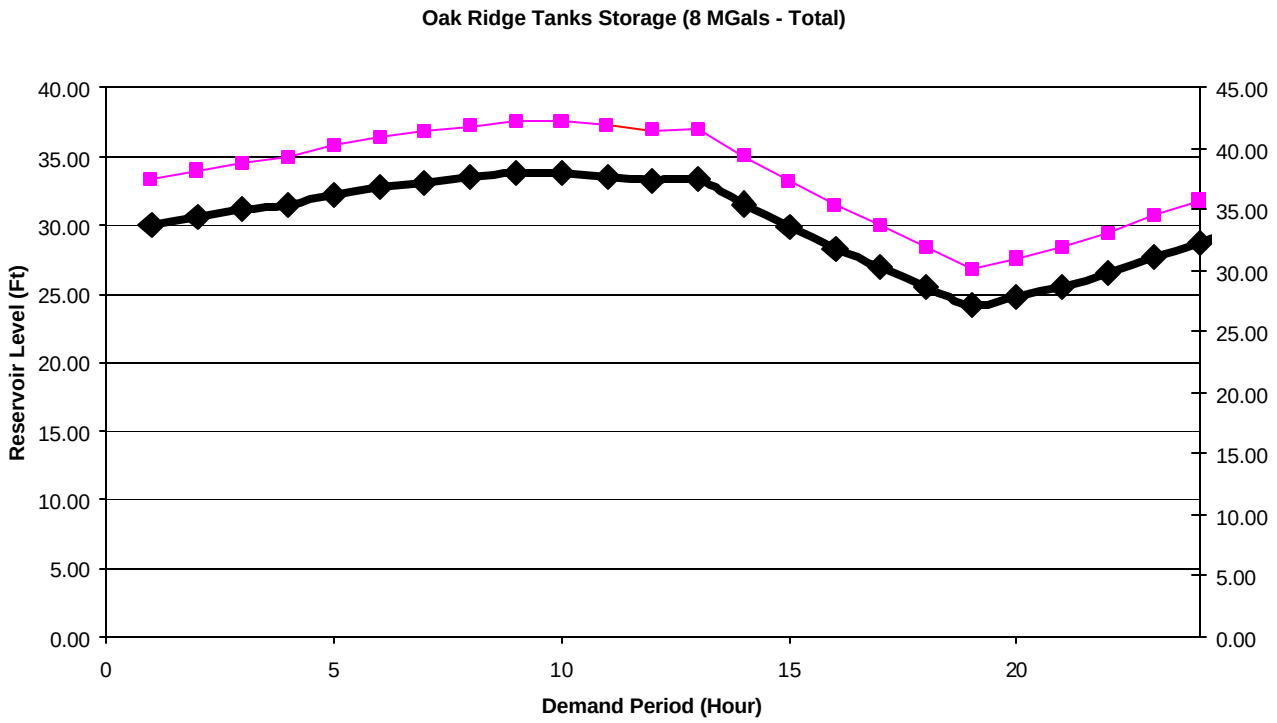


Figure 6 depicts the simulated hourly tank level profile for the Oak Ridge #1 and #2 storage tanks. Available storage in the tanks can be used to meet the on peak afternoon demands during CPP/DBP days and reduce electrical pumping demands during these periods.

Figure 6. Hourly Reservoir Levels



PG&E Critical Peak Pricing And Demand Bidding Programs

Critical Peak Pricing (CPP)

A copy of the PG&E tariff sheets for this program is included in Attachment 1. CPP offers a customer lower electricity prices during the summer in return for curtailment during the called CPP days. The CPP period is only during the summer period that starts May 1 and ends October 31, and is limited to 12 CPP events or less.

The noon to 6:00 p.m. weekday peak period is the target for load shifting. In simple terms, the customer on the E20S rate will get a discount of 3.6034 cents/kWh during the peak period, and 0.372 during the partial peak period all summer (approximately 123 days) in exchange for higher rates during the peak period for a maximum of 12 days per summer. Furthermore, there is a bill protection option available which, at the end of 14 months, PG&E will calculate your bill under CPP and under your existing tariff, and the customer will never pay more than they would have under their existing tariff.

EID will be notified by 5 p.m. the prior day when a CPP event is called. CPP events will generally be triggered by temperature, but may also be activated by PG&E system conditions such as high system demand, low generation supply, system emergency testing or high market prices. CPP participants will be notified through PG&E's InterAct II by 5:00 p.m. the business day before when PG&E determines that a CPP event is to be called.

Electrical usage during summer peak hours is discounted on all summer days when no CPP events are called. For any usage that occurs weekdays between noon and 6:00 p.m. on a designated CPP day there are higher "critical peak" on-peak energy charges. Within the critical peak period, there will be two higher priced time periods:
Moderate Price Period - Noon to 3:00 p.m., when customers will be charged approximately three (3x) times their normal (otherwise applicable) rate schedule part-peak energy rate and
High Price Period - 3:00 p.m. to 6:00 p.m., when customers will be charged approximately five times (5x) their normal (otherwise applicable) rate schedule on-peak energy rate.

The customer specific "10-Day Rolling Average Energy Usage" is determined on an hourly basis using the customer's average energy usage for the three (3) highest total energy usage days out of the 10 days prior to the CPP event.

There are a number of incentives available for participation in this program. A Bill Protection Incentive option provides EID with 100 percent protection against paying energy rates greater than you pay now under your current rate schedule for the first 14 consecutive months of program participation. The Technical Assistance Incentive Program, offered by PG&E allows you to earn pay for professional technical assistance that assesses how to respond to curtailment requests for on-peak demand reductions. CPP participants may elect to receive one or all of these incentives

The Technical Assistance Incentive allows CPP participants the opportunity to earn a cash incentive for professional technical assistance that enhances their ability to respond to power reduction during CPP Events. A cash incentive, of up to $50 per kW, (not to exceed the cost of the engineering study), is broken into two parts. Participants will receive 50 percent, or up to $25 per of the incentive for potential on-peak power reductions upon certification by a CEC-approved professional engineering firm. To receive the remaining half of the Technical Assistance Incentive, customers will have to demonstrate that their actual power reduction is equal to at least 50 percent of their certified power reduction per CPP event as averaged over the summer months.

Participants in the CPP program must agree to allow the California Energy Commission (CEC), or its contracted agent, to complete any site surveys or site visits for measurement and evaluations, as well as completing all program surveys.

PG&E Demand Bidding Program (DBP)

The Demand Bidding Program (E-DBP) pays EID an incentive to reduce its electric load according to a voluntary bid EID makes for a scheduled load reduction. A copy of the PG&E rate sheets is included as Attachment 2. Under this program, customers receive a credit equal to $0.15 per kWh or greater for reducing load during a Day-Ahead DBP event or $0.50 per

kWh for reducing load during a Day-Of DBP event. To participate in this program, you must commit to reduce a minimum of at least 100.

When energy curtailment becomes necessary due to forecasted Day-Ahead hourly market prices equal or exceed $0.15 kWh or due to system emergency, Pacific Gas and Electric Company will request load reduction bids from customers. Customers seeking to participate in the E-DBP can submit bids for a proposed level of curtailment.

For Day-Ahead DBP event, participating customers will have until 4 p.m. on the day before a proposed curtailment event to submit bids via the E-DBP website. Upon evaluation from Pacific Gas and Electric Company, you will be notified of bid acceptance by 5 p.m. of the same day. You must bid a minimum of two consecutive hours throughout the day.

For Day-Of system emergency DBP event, participating customers will be notified the day of the event, and must reduce to their hourly Committed Load Reduction Level within one hour of notification.

For accepted bids, E-DBP will receive credit equal to or exceed of $0.15 per kWh for Day-Ahead DBP event load reductions or credit of $0.50 kWh for Day-Of DBP event below Customer Specific Energy Baseline (CSEB). CSEB is determined on an hourly basis using the average energy for the three (3) highest total energy usage days out of the ten (10) similar days prior to a DBP event excluding other DBP days or days the customer was paid to reduce load or days when a customer was subject to a rotating outage.

DBP participants will receive a bill credit is their reduction is a least 50 percent of what they offered to curtail in their bid. There are no penalties for not meeting your specified curtailment bid.

There are incentives available for participation in this program. The Technical Assistance Incentive Program, offered by PG&E, allows you to earn cash for professional technical assistance that enhances your ability to respond to curtailment requests for on-peak demand reductions (see CPP discussion).

CONCLUSION AND RECOMMENDATIONS

Based on the results of this system Demand Response Analysis, it is our opinion that EID can benefit from participation in the CPP/DBP tariffs and assist the State of California in meeting its peak electrical demands. This conclusion is based on the results of our systems optimization modeling of the El Dorado Hills Sub-system, as well as how EID is currently operating this system during the summertime.

It is recommended that EID operations staff develop operational protocols, which will provide specific instructions in the event that EID is called upon to curtail load under the requirements of the DBP program, and test these curtailment options over the next winter. Prior to next summer (May 2005) based upon their experience over the winter in demand shifting, and based upon what new facilities are operational, EID should determine the amount that they are willing to participate in the Critical Peak Pricing (CPP) program for the summer of 2005.

Under existing conditions EID can respond with a load curtailment of approximately 1500 kW, depending on the level of EID customer demand for water on the day that the request is made, with no reduction in water deliveries. Next summer, with additional storage facilities, EID can drop between 1600 and 1900 kW, depending upon the customer demand for water. Use of the Gold Hill Intertie can increase this curtailment by an additional 330 kW. Peak water day electrical demand reductions are 1725 to 2055 kW, depending upon the Gold Hill Intertie use.

The PG&E accounts to be included in the program should include the following:

- PG&E Acct #3751780690 Folsom Lake Raw Water Pumping Station
- PG&E Acct #3751780357 El Dorado Hills WTP and Effluent Pumping Station
- PG&E Acct # 3751780735 Oak Ridge Booster Pump Station

EID can participate in the DBP program with 1,500 KW now, and should be able to provide 2.0 MW of curtailment during CPP events in the summer of 2005

Figures 4 and 5 show that EID is currently dropping close to 500 kW at the treatment plant and 1,000 kW at the Folsom Lake Pumping Facility daily. Participation in the DBP or CPP programs will simply mean that EID will shift the electrical load reductions they are already experiencing into the peak period based upon a utility call for reductions.

Providing these levels of participation in the Critical Peak Pricing (CPP) Program will save EID between $15,000 to $20,000 over an entire summer (12 CPP events), in addition to providing much needed electrical demand reductions to PG&E. In addition, participation in the Demand Bidding Program (DBP) of these amounts will save EID $225-300 per hour during a Day-ahead DBP event, and $750-1000 per hour in a Day-of DBP event. Higher amounts of curtailment will result in higher payments. These are in addition to a performance based incentive that can exceed $50,000 for participation in these programs.

Recommendations

Demand Curtailment Programs Participation

For the remainder of this year EID can participate in the PG&E Demand Bidding Program (DBP) with 1500 kW for the following accounts:

- PG&E Acct #3751780690 Folsom Lake Raw Water Pumping Station
- PG&E Acct #3751780357 El Dorado Hills WTP and Effluent Pumping Station
- PG&E Acct # 3751780735 Oak Ridge Booster Pump Station.

As Attachment 2 shows, participation in the DBP has virtually no risk for EID, and will allow considerable exposure and experience in responding to utility curtailment calls. Additionally, here is a low expectation of DBP being called very often during the upcoming winter months.

CPP Program Participation – 2000 kW next summer

EID will have almost nine months to experiment with load shifting prior to next summer. EID should be able to provide 2000 kW of curtailment in the CPP program next summer, maybe even more if some of the planned facilities (main line upgrade, Promontory Point Reservoir) are completed prior to May of 2005. EID should sign up for the Bill Protection Incentive to ensure that, in the unlikely event that EID is not able to occasionally meet its CPP curtailment level, EID won't pay more than it would have if it had not volunteered to participate in this program.

Operator Incentives

Finally, we recommend that EID implement a performance bonus for the operators in El Dorado Hills Sub-system that is based upon a share-the-savings from participation in these programs. We have provided a conservative estimate of the available load drop within this system, but our experience has been that the operators can find even more savings than we have predicted. Participation in these programs will require extra work, and extra effort on the part of these operators, such as staying longer during the evenings on CPP or DBP days. This extra effort should be rewarded, particularly because the potential benefits to the district (and the state) are so large.

A share-the-savings approach (e.g., operators get 10% of the realized dollars savings from these programs) will result in a bonus of approximately $7,500 shared among the operators

after a complete year of participation in DBP and CPP, but district savings of over $70,000, based upon our conservative assumptions. And the State of California will be able to count upon EIDs assistance in keeping the lights on during periods of electrical system stress.

Sincerely,

EFFICIENCY ANALYSTS INTERNATIONAL

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Public Version

AFFADAVIT

I, Blaine T. Reely (PhD, PE), stipulate that I am a registered engineer in California and do hereby certify that based upon my analysis and simulation of the El Dorado Irrigation District (EID) El Dorado Hills potable water Sub-System that EID can curtail up to 2,055 kW of peak electrical demand when the Oak Ridge #2 reservoir becomes operational, using the Gold Hill Intertie on an emergency basis. Planned additional storage and pipeline improvements will increase this amount. In the interim, EID can curtail up to 1,500 kW without compromising water deliveries, depending upon water demand.

Witness my signature and California Engineers Stamp.

Blaine T. Reely, PhD, PE

California Engineers stamp

breely@xanalysts.com

I concur:

Lon W. House, PhD, CEM
lonwhouse@waterandenergyconsulting.com

ATTACHMENT I. PG&E CPP Tariff

ATTACHMENT I. PG&E DBP Tariff Sheets