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January 31, 2000

Blanca S. Bayó, Director
Records and Reporting
Florida Public Service Commission
4075 Esplanade Way, Room 110
Tallahassee, Florida 32399-0850

By Hand Delivery

000002-PU

Re: FPL/Gas Engine-Driven Chiller Research Project Research Findings

Dear Ms. Bayó:

Enclosed for filing on behalf of Florida Power & Light Company (FPL) are the original and fifteen (15) copies of FPL's Gas Engine-Driven Chiller Research Project Research Findings.

If you or your Staff have any questions regarding this filing, please contact me.

Very truly yours,

Charles A. Guyton

AFA
APP
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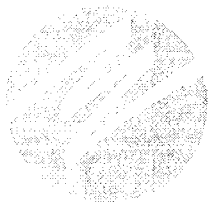
CAG/ld
cc: Robert V. Elias, Esq.
TAL_1998/33289-1



FPL

Natural Gas End-Use Technology R&D Plan

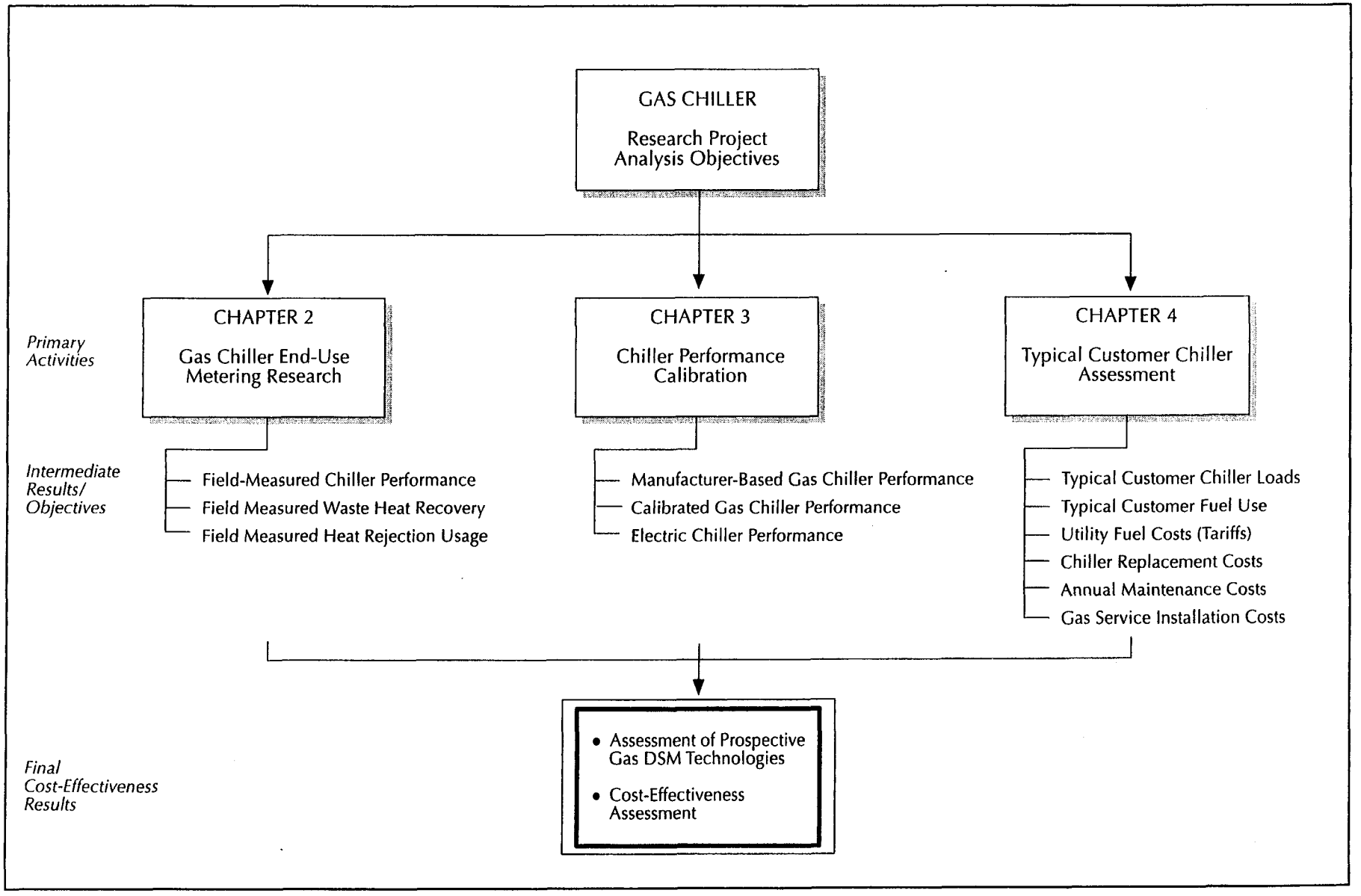
Gas Engine-Driven Chiller Research Project

Research Findings

Florida Power & Light
November 1999

1. INTRODUCTION

Exhibit 1-1
Overview of the FPL Natural Gas Chiller Research Project
Report Structure and Analysis Objectives



RESULTS OF THE FLORIDA POWER AND LIGHT (FPL) NATURAL GAS (GAS) CHILLER RESEARCH PROJECT ARE PRESENTED IN THIS REPORT.

The report is organized as follows, with the analysis results from each chapter supporting the objectives listed in the facing exhibit:

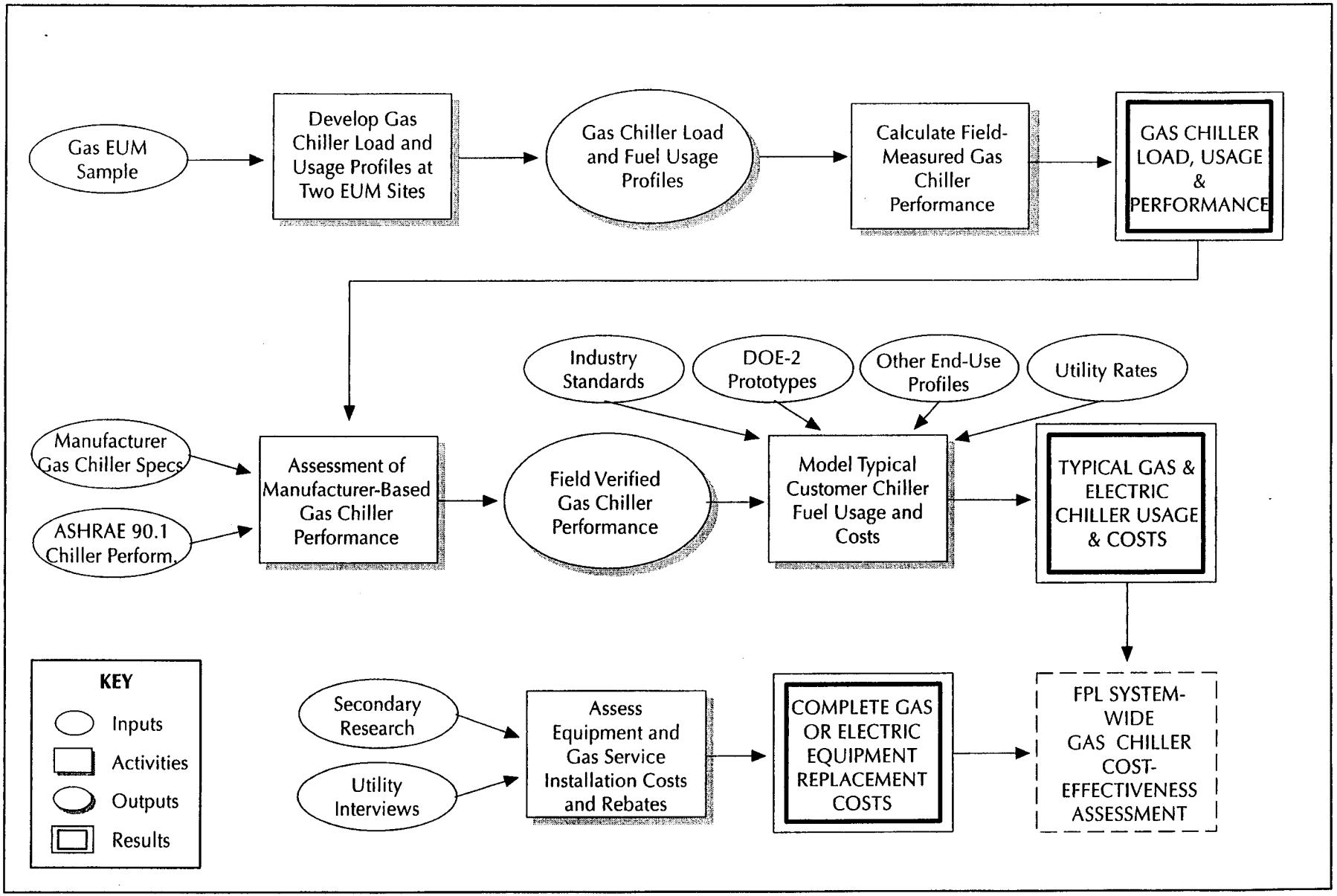
- Following this introduction, the remainder of this chapter describes the research approach by presenting the key analysis components and data sources.

- In Chapter 2, the methods and results are presented from the chiller end-use metering (EUM) assessment. This assessment consists of an in-depth analysis of chiller loads and gas/electric consumption, measured using the FPL gas research EUM sample.

- Chapter 3 presents the gas chiller (cooling) performance assessment, comparing manufacturer-based equipment performance ratings with field-measured performance derived in the Chapter 2 chiller EUM assessment.

- In Chapter 4, typical customer chiller usage profiles are developed using FPL evaluation sources, and integrated comparisons are made for several customer segments of the cost to install and operate gas and competing electric technologies.

Exhibit 1-2
Analysis Steps Supporting the FPL Gas Chiller Research Project



THE PURPOSE OF THIS PROJECT IS TO ASSESS THE FEASIBILITY OF GAS APPLIANCE FUEL SWITCHING IN FPL'S SERVICE TERRITORY, BY DEVELOPING THE BEST AVAILABLE ESTIMATES OF CUSTOMER PAYBACK AND COST-EFFECTIVENESS FOR AVAILABLE CHILLER TECHNOLOGIES IN THE FLORIDA MARKET.

- The methods used incorporate the costs to purchase and install new chiller equipment (including the costs to obtain gas utility service), equipment rebates that are offered by FPL and the Florida gas utilities, monthly gas and electric usage, FPL system peak hour electric demand, and electric and gas utility rates.

- The end product supports an FPL service-territory specific cost-effectiveness assessment for all stakeholders, to identify new DSM technologies.

- As illustrated in the facing exhibit, three primary objectives were identified at the outset of this project to ensure a successful assessment of gas chiller fuel switching opportunities.

  - **Chiller End-Use Metering Research.** Two gas chiller sites were monitored and analyzed to determine cooling loads and the corresponding gas and electric fuel usage. The ratio of load delivered to fuel use describes the efficiency (or performance) of gas-fired chiller appliances, and is called the coefficient of performance, or COP.

  - **Gas Chiller Performance Assessment.** Chapter 2 chiller load and fuel usage profiles are used to support the Chapter 3 chiller performance calibration.

  - **Typical Customer Chiller Assessment.** Typical customer chiller loads (and gas and electricity use estimates) are derived for gas chiller and competing electric technologies, for each of four business types, by Department of Community Affairs (DCA) climate zone. The integration of these estimates with utility rates and equipment costs are used to evaluate the economic feasibility of gas chiller fuel switching.

DETAILED COST-EFFECTIVENESS RESULTS ARE PROVIDED AT THE CONCLUSION OF CHAPTER 4.

Exhibit 1-3
Facility/Plant Description and Monitoring Approach

Facility, Plant or Metering Description	EUM Site 1	EUM Site 2
Facility Characteristics		
Primary Facility Function	Recreation	Nursing Home
City	Sarasota	Kendall
DCA Climate Zone	Central	South
Plant Characteristics		
Chiller Type	Air-source screw	Water-source screw
Heat Recovery Present?	Yes	Yes (but not used)
Monitoring Points		
Chiller kW	●	●
Condenser Pump kW		●
Tower Fan kW		●
Condenser Fan kW	●	
Radiator Fan kW	●	
Chiller Gas Flow (Btu)	●	●
Chilled Water Load (Btu)	●	●
Heat Recovery (Btu)	●	
Chilled Water Flow (gpm)	●	●
Heat Recovery Engine Coolant Flow (gpm)	●	
Chilled Water Supply Temperature (F)	●	●
Chilled Water Return Temperature (F)	●	●
Condenser Water Return Temperature (F)		●
Ambient (Entering Coil) Air Temperature (F)	●	

GAS CHILLER METERING EQUIPMENT WAS INSTALLED IN THIS RESEARCH EFFORT TO VERIFY GAS EQUIPMENT PERFORMANCE IN THE FLORIDA CLIMATE (WHERE THE COOLING SEASON DURATION IS EXTENSIVE).

The facing exhibit shows the monitoring approach used to measure chiller gas use, electricity usage, and cooling loads at two customer sites.

- The monitoring points shown support a continuous assessment of gas cooling efficiency (or performance) and (where applicable) heat recovery throughout the 12-month monitoring period.

- There are two components of performance measurement: the input or fuel use for a particular interval, and the output or cooling load delivered by the system.

  - To ensure a complete assessment of the fuel usage at each site (and the key differences in usage between gas and electric systems), the following data points were monitored:
    .. Chiller gas and electric usage
    .. Condenser system electric usage
    .. Radiator fan electric usage (to reject engine waste heat)

  - The chilled water loads (output) were measured both directly (chilled water Btu load) and indirectly, using the chilled water flow and chilled water supply and return temperatures.

  - At one of the sites, engine waste heat recovery was measured. Although the system at this site was designed to recover heat, monitoring results have shown that engine waste heat was rarely used. At the second site they have stopped using the heat recovery option completely.

  - Data were also collected that describe the "ambient" conditions under which each chiller performed – the condenser water return temperature at Site 2 and the entering coil air temperature at Site 1.

GAS CHILLER END-USE METERING METHODS AND RESULTS ARE DISCUSSED IN DETAIL IN CHAPTER 2.

Exhibit 1-4
*Manufacturer-Based Gas Chiller Performance**

Percent of Full Rated Load	Performance w/o Heat Recovery			Performance w/ Heat Recovery			Potential Percent COP Improvement w/ Heat Recovery (%)
	Chiller Load (Tons)	Gas Use (kBtuh)	Gas Only COP	Engine Heat Recovery Potential (kBtuh)	Exhaust Heat Recovery Potential (kBtuh)	Potential Gas Only COP	
Site 1 Air-Source TECOCHILL CH-120AC							
25%	30	243	1.48	38	29	1.76	18
50%	60	426	1.69	93	70	2.07	23
75%	90	854	1.26	244	183	1.76	40
100%	120	1749	0.82	500	375	1.32	61
Site 2 Water-Source TECOCHILL CH-150							
25%	37	264	1.68	45	34	1.98	18
50%	75	449	2.00	100	75	2.39	19
75%	112	842	1.60	238	179	2.09	31
100%	150	1499	1.20	430	323	1.70	42

* Performance under ARI-550 part load conditions.

GAS CHILLER SYSTEMS ARE VERY SIMILAR TO ELECTRIC CHILLERS, FROM THE STANDPOINT OF THE VAPOR COMPRESSION PROCESS, THE HEAT REJECTION/CONDENSER PROCESS, AND THE USE OF CHILLED WATER (VIA A CHILLED WATER COIL AT THE AIR HANDLER) TO MEET THE BUILDING LOADS.

The key difference is the compression drive type -- a variable speed natural gas engine serving the gas chiller, and a (normally constant speed) electric motor in a conventional (electric) chiller system.

- As demonstrated in the facing exhibit, the use of heat recovery greatly influences the overall system efficiency of a gas chiller.
  - Building process loads (such as hot water service) can be met using the engine coolant and engine exhaust as a heat source.
  - Design professionals do not normally consider specifying a gas chiller system unless heat recovery is viable. According to manufacturer data, chiller performance is theoretically improved by 20 to 60 percent, which varies with chiller part load.
- The gas engine also requires either a radiator to reject the remaining engine waste heat or additional use of the condenser tower to reject heat. In either case, these additional heat rejection processes result in increased fan and pump electric usage.
- Chiller performance is a function of part load, the chilled water setpoint temperature, and either the outdoor air or condenser water return temperature, in an air- and water-source plant, respectively. Customer usage patterns, building dimension and composition, and internal gains affect part load; FPL commercial building simulation prototypes—modified for use with DOE-2 energy simulation software (and calibrated using FPL Commercial Sector Survey load shapes) – capture these typical customer attributes.

CHILLER PERFORMANCE CALIBRATION IS PRESENTED IN CHAPTER 3, AND CHILLER MODELING METHODS AND RESULTS ARE DISCUSSED IN DETAIL IN CHAPTER 4.

Exhibit 1-5
DOE-2 Prototype Summary

Building Characteristics	Prototype Description by Business Type			
	Large Office	**Large Retail**	**Hotel/Motel**	**School**
Dimensions				
Conditioned Floor Area (sqft)	100,000	86,870	140,000	72,966
Number of Stories	5	1	7	1
Story Height (ft)*	14	17	9	12
Insulation				
Roof U-Value (Btu/hr-sqft-deg F)	0.07	0.07	0.05	0.05
Wall U-Value (Btu/hr-sqft-deg F)	0.08	0.13	0.09	0.09
Glazing				
Glass Type	single-pane tinted	single-pane tinted	single-pane tinted	single-pane tinted
Glass U-Value (Btu/h-sqft-deg F)	1.1	1.1	1.1	1.1
Glass Shading Coefficient	0.5	0.5	0.5	0.5
Glass Area (percent of wall area)	25	3	23	13
Central Plant and Controls				
Air Distribution	constant volume	constant volume	variable air volume	constant volume
Chiller Type	screw compressor	screw compressor	screw compressor	screw compressor
Number of Chillers	2	2	3	2
Capacity of Each Chiller (Tons)	175	150	150	125
Cooling Thermostat Setting (deg F)	75	74	76	76
Night and Weekend Setup (deg F)	85	80	none	off
Heating Type	electric resistance	electric resistance	electric resistance	electric resistance
Heating Thermostat Setting (deg F)	70	70	72	70
Night and Weekend Setback (deg F)	55	60	none	55
Internal Gains				
Occupancy (sqft/person)	150	217	235	82
Lighting (Watts/sqft)	1.25	1.83	1.83	1.89
Equipment (Watts/sqft)	1.25	0.45	0.00	0.50
Schedule	7 AM to 6 PM	10 AM to 9 PM	24 Hr	8 AM to 3 PM
External Gains				
Infiltration (air changes/hour)	0.1	0.2	0.2	0.1
Ventilation (cfm/person)	5.0	5.0	7.0	5.0

* Includes plenum if applicable

THE DOE-2 PROTOTYPES THAT WERE MODELED IN THIS GAS RESEARCH PROJECT ARE PRESENTED IN THE FACING EXHIBIT. THESE BUSINESS TYPE-SPECIFIC MODELS WERE USED TO ESTIMATE COOLING LOADS WITHIN A PARTICULAR CLIMATE ZONE, FOR BOTH COMPETING ELECTRIC AND GAS CHILLER SYSTEMS.

- The prototypes described in the facing exhibit were adapted, for DOE-2 software compatibility, from simulation models used in FPL ventilation research. They provide four business type models, one for each of four building segments that are commonly served by chilled water systems.

- Three primary weather stations were used to model typical weather in FPL service territory. The Daytona Beach, Vero Beach, and Miami weather stations are used to represent the Department of Community Affairs (DCA) North, Central, and South climate zones, respectively.

- Simulations with these prototypes, in conjunction with typical weather data, yield hourly estimates of chilled water loads for typical FPL customers.

  - Gas and electric chiller performance characteristics were subsequently applied to these DOE-2 based loads, using an outdoor temperature bin model.

  - The gas usage and gas-only coefficient of performance (COP) of the two chillers monitored, under various part load conditions, were carefully compared with manufacturers' specifications. These findings suggest that the manufacturers' specifications are accurate, and therefore these performance data were applied directly to the modeled loads. Given an absence of manufacturer specifications for gas chiller electric usage, average electric usage from the monitored data was used directly to model gas chiller electric consumption as a function of chiller part load.

  - Electric chiller performance is modeled in chapter 4 using state-of-the-art methods from ASHRAE 90.1 and proposed chiller plant coefficients that are to be used in near-term revisions to ASHRAE 90.1.

  - The resulting fuel use estimates are subsequently used in the Chapter 4 cost-effectiveness assessment.

Exhibit 1-6
Gas Chiller and Competing Equipment
Installed Costs and Maintenance Costs
For Customers with Existing Gas Service

Business Type	Chiller System Type	Chiller Installed Cost ($)	Utility Rebate ($)	Gas Connection Charge ($)	Total Installed Cost ($)	Incremental* Gas Chiller Installed Cost ($)	Annual Maintenance Charge** ($)
Large Offices	Gas Air-Source Chiller	302,094	13,773	-	288,321	-	21,814
	Electric Air-Source Chiller (1.23 kW/ton)	176,094	-	-	176,094	112,227	11,550
	Electric Air-Source Chiller (1.22 kW/ton)	178,894	4,200	-	174,694	113,627	11,550
	Gas Water-Source Chiller	321,781	13,773	-	308,008	-	23,214
	Electric Water-Source Chiller (0.80 kW/ton)	195,781	-	-	195,781	112,227	12,950
	Electric Water-Source Chiller (0.67 kW/ton)	227,631	6,650	-	220,981	87,027	12,950
Large Hotels	Gas Air-Source Chiller	388,406	13,994	-	374,412	-	43,869
	Electric Air-Source Chiller (1.23 kW/ton)	226,406	-	-	226,406	148,006	14,850
	Electric Air-Source Chiller (1.22 kW/ton)	230,006	5,400	-	224,606	149,806	14,850
	Gas Water-Source Chiller	413,719	13,994	-	399,725	-	45,669
	Electric Water-Source Chiller (0.80 kW/ton)	251,719	-	-	251,719	148,006	16,650
	Electric Water-Source Chiller (0.67 kW/ton)	292,669	8,550	-	284,119	115,606	16,650
Retail Businesses	Gas Air-Source Chiller	258,938	13,744	-	245,194	-	24,266
	Electric Air-Source Chiller (1.23 kW/ton)	150,938	-	-	150,938	94,256	9,900
	Electric Air-Source Chiller (1.22 kW/ton)	153,338	3,600	-	149,738	95,456	9,900
	Gas Water-Source Chiller	275,813	13,744	-	262,069	-	25,466
	Electric Water-Source Chiller (0.80 kW/ton)	167,813	-	-	167,813	94,256	11,100
	Electric Water-Source Chiller (0.67 kW/ton)	195,113	5,700	-	189,413	72,656	11,100
Schools	Gas Air-Source Chiller	215,781	14,106	-	201,675	-	16,535
	Electric Air-Source Chiller (1.23 kW/ton)	125,781	-	-	125,781	75,894	8,250
	Electric Air-Source Chiller (1.22 kW/ton)	127,781	3,000	-	124,781	76,894	8,250
	Gas Water-Source Chiller	229,844	14,106	-	215,738	-	17,535
	Electric Water-Source Chiller (0.80 kW/ton)	139,844	-	-	139,844	75,894	9,250
	Electric Water-Source Chiller (0.67 kW/ton)	162,594	4,750	-	157,844	57,894	9,250

* Incremental costs are in excess of costs for competing equipment, when a customer selects a gas chiller.
The incremental cost shown above is for the installation of:
two (2) 175-ton chillers in large offices,
three (3) 150-ton chillers in large hotels,
two (2) 150-ton chillers in retail businesses,
and two (2) 125-ton chillers in schools.
The incremental cost for the 1.22 kW/ton air-source and the 0.67 kW/ton water-source equipment includes both FPL and gas utility rebates.
Consistent with nonparticipant actions, FPL rebates are excluded for the 1.23 kW/ton air-source and the 0.80 kW/ton water-source equipment.

** The annual maintenance charge is the cost to maintain the chillers described above, by business type.

THE INSTALLED COST OF A GAS CHILLER GENERALLY EXCEEDS THAT OF STANDARD EFFICIENCY COMPETING ELECTRIC SYSTEMS BY $360/TON, AND COSTS AN ADDITIONAL $210/TON OVER COMPETING HIGH EFFICIENCY ELECTRIC SYSTEMS.

In addition, annual maintenance costs for the gas chillers are greater than those of competing systems, because they cover engine replacement and the annual "tune-up" that is needed to maintain the engine.

- Chiller installed costs were obtained from Means and EPRI sources, for conventional electric chillers and for high efficiency (program qualifying) chillers, respectively.
  - FPL rebates are factored into the first costs for the air-source equipment rated at 1.22 kW/ton and the water-source equipment rated at 0.67 kW/ton.
  - The efficiency ratings were derived from previous chiller program evaluation results, using the BES for program qualifying equipment and a detailed baseline assessment of nonparticipant replacement actions.
- Direct comparisons are drawn between electric and gas chiller costs for air-source, as well as for water-source systems.
- The gas utility rebates and customer connection charges vary regionally, depending upon the representative utility supplying each DCA climate zone. For all cost comparisons presented in this report, gas utility rebates are applied and it is assumed that each customer already has gas service, providing the gas systems with an analytical advantage over competing electric equipment.

Exhibit 1-7
Gas Chiller and Competing Equipment Operating Costs
And Gas Chiller Savings and Payback
For Customers with Existing Gas Service

Business Type	HVAC System Type	Chilled Water Plant Usage and Impacts					Chilled Water Plant Costs				Annual Gas Chiller Operating Cost Savings** ($)	Simple Payback*** (years)
		Annual Natural Gas Use (Therms)	Annual Electricity Use (kWh)	Annual Electricity Impact* (kWh)	Summer Demand Impact* (kW)	Winter Demand Impact* (kW)	Annual Natural Gas Costs ($)	Annual Electricity Costs ($)	Annual Gas and Electric Utility Costs ($)	Annual Gas Chiller Utility Bill Savings ($)		
Large Offices	Gas Air-Source Chiller	65,452	195,768	-	-	-	38,025	14,247	52,272	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	755,658	559,890	205.60	-	-	64,251	64,251	11,979	1,715	65
	Electric Air-Source Chiller (1.22 kW/ton)	-	750,247	554,479	203.66	-	-	63,761	63,761	11,490	1,226	93
	Gas Water-Source Chiller	60,214	186,719	-	-	-	35,123	13,554	48,676	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	757,720	571,001	186.63	-	-	64,036	64,036	15,359	5,095	22
	Electric Water-Source Chiller (0.67 kW/ton	-	657,991	471,272	154.24	-	-	55,012	55,012	6,336	(3,929)	no payback
Large Hotels	Gas Air-Source Chiller	79,703	208,981	-	-	-	45,728	14,131	59,859	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	968,541	759,561	204.11	6.92	-	66,822	66,822	6,963	(22,055)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	961,544	752,564	202.26	6.84	-	66,324	66,324	6,465	(22,554)	no payback
	Gas Water-Source Chiller	77,802	264,606	-	-	-	44,905	17,830	62,735	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	1,048,665	784,059	177.41	23.37	-	70,831	70,831	8,096	(20,923)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	912,772	648,166	147.11	18.98	-	61,586	61,586	(1,149)	(30,168)	no payback
Retail Businesses	Gas Air-Source Chiller	65,233	158,275	-	-	-	38,719	11,335	50,055	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	726,135	567,860	161.61	28.87	-	56,667	56,667	6,612	(7,754)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	720,582	562,307	160.07	28.52	-	56,224	56,224	6,169	(8,197)	no payback
	Gas Water-Source Chiller	61,361	139,057	-	-	-	36,704	9,945	46,650	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	710,419	571,362	137.27	57.03	-	53,583	53,583	6,933	(7,433)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	609,132	470,075	112.91	46.39	-	45,876	45,876	(774)	(15,140)	no payback
Schools	Gas Air-Source Chiller	29,151	67,269	-	-	-	16,901	5,486	22,387	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	300,639	233,370	94.10	5.94	-	29,965	29,965	7,578	(707)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	298,375	231,106	93.21	5.86	-	29,718	29,718	7,331	(954)	no payback
	Gas Water-Source Chiller	26,352	68,154	-	-	-	15,428	5,544	20,971	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	314,713	246,559	83.92	25.15	-	30,672	30,672	9,700	1,415	79
	Electric Water-Source Chiller (0.67 kW/ton	-	271,771	203,617	69.29	20.23	-	26,261	26,261	5,290	(2,995)	no payback

* Impacts are the reduction in annual or peak hour usage for customers that fuel switch from a conventional chiller system to a gas chiller.

** Annual operating cost savings include annual utility bill savings and annual maintenance costs.

*** Simple payback is calculated as the ratio of incremental first cost (investment) to annual savings.

CHILLER END-USE RESEARCH RESULTS INDICATE THAT A SWITCH TO A GAS CHILLED WATER SYSTEM FROM ELECTRIC IS NOT CURRENTLY COST-EFFECTIVE, GIVEN THE VERY HIGH INSTALLED COSTS OF GAS SYSTEMS.

As illustrated in the facing exhibit, gas chillers have a substantially higher first cost, and, given no heat recovery, higher annual operating costs than do competing electric systems. However, individual customers that are able to take advantage of the substantial heat recovery potential of the gas engine systems, will have more favorable results. For the purposes of this evaluation, the gas chiller technology is assessed in the absence of heat recovery because of the site-specific nature of process loads and the knowledge that the ability to make use of waste heat varies dramatically from site to site.

- Because gas chiller operating costs (annual utility costs and maintenance costs), in the absence of heat recovery, are generally greater than electric chiller operating costs, payback for the initial investment is rarely achieved.

- These results are based on an assessment that assumes natural replacement customer actions, rather than discretionary retrofit. That is, it is assumed that a customer who is considering a fuel switch to gas will be replacing the chiller system, regardless of fuel choice.

- Site-specific cost-effectiveness assessments are recommended for the gas engine driven chiller technology due to the swing in performance that can be achieved through heat recovery and the dramatic differences in site-to-site heat recovery potential. Many sites have little or no ability to use waste heat.

NEXT THE BENEFITS OF HEAT RECOVERY ARE DEMONSTRATED, HIGHLIGHTING THE TECHNICAL POTENTIAL AVAILABLE TO A CUSTOMER THAT CAN USE WASTE HEAT TO MEET PROCESS LOADS, AND THE EFFECT OF HEAT RECOVERY ON GAS CHILLER COST-EFFECTIVENESS.

Exhibit 1-8
Gas Chiller and Competing Equipment Operating Costs and Savings For Customers with Heat Recovery

Business Type	HVAC System Type	Chilled Water Plant Costs				Annual Gas Chiller Operating Cost Savings** ($)	Heat Recovery Savings		Annual Gas Chiller Operating Cost Savings with Heat Recovery ($)	Simple Payback**** (years)
		Annual Natural Gas Costs ($)	Annual Electricity Costs ($)	Annual Gas and Electric Utility Costs ($)	Annual Gas Chiller Utility Bill Savings ($)		Technical Potential Savings*** (Therms)	Technical Potential Savings*** ($)		
Large Offices	Gas Air-Source Chiller	38,025	14,247	52,272	-	-	-	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	64,251	64,251	11,979	1,715	29,473	14,278	15,993	7
	Electric Air-Source Chiller (1.22 kW/ton)	-	63,761	63,761	11,490	1,226	29,473	14,278	15,504	7
	Gas Water-Source Chiller	35,123	13,554	48,676	-	-	-	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	64,036	64,036	15,359	5,095	21,515	11,938	17,033	7
	Electric Water-Source Chiller (0.67 kW/ton)	-	55,012	55,012	6,336	(3,929)	21,515	11,938	8,009	14
Large Hotels	Gas Air-Source Chiller	45,728	14,131	59,859	-	-	-	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	66,822	66,822	6,963	(22,055)	42,088	27,303	5,248	21
	Electric Air-Source Chiller (1.22 kW/ton)	-	66,324	66,324	6,465	(22,554)	42,088	27,303	4,749	24
	Gas Water-Source Chiller	44,905	17,830	62,735	-	-	-	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	70,831	70,831	8,096	(20,923)	35,073	22,844	1,921	58
	Electric Water-Source Chiller (0.67 kW/ton)	-	61,586	61,586	(1,149)	(30,168)	35,073	22,844	(7,324)	no payback
Retail Businesses	Gas Air-Source Chiller	38,719	11,335	50,055	-	-	-	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	56,667	56,667	6,612	(7,754)	33,940	22,489	14,735	8
	Electric Air-Source Chiller (1.22 kW/ton)	-	56,224	56,224	6,169	(8,197)	33,940	22,489	14,292	8
	Gas Water-Source Chiller	36,704	9,945	46,650	-	-	-	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	53,583	53,583	6,933	(7,433)	28,283	18,848	11,415	10
	Electric Water-Source Chiller (0.67 kW/ton)	-	45,876	45,876	(774)	(15,140)	28,283	18,848	3,708	30
Schools	Gas Air-Source Chiller	16,901	5,486	22,387	-	-	-	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	29,965	29,965	7,578	(707)	12,950	8,460	7,753	14
	Electric Air-Source Chiller (1.22 kW/ton)	-	29,718	29,718	7,331	(954)	12,950	8,460	7,506	15
	Gas Water-Source Chiller	15,428	5,544	20,971	-	-	-	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	30,672	30,672	9,700	1,415	10,792	7,096	8,511	13
	Electric Water-Source Chiller (0.67 kW/ton)	-	26,261	26,261	5,290	(2,995)	10,792	7,096	4,101	27

* Impacts are the reduction in annual or peak hour usage for customers that fuel switch from a conventional chiller system to a gas chiller.

** Annual operating cost savings include annual utility bill savings and annual maintenance costs.

*** Technical potential savings are calculated assuming a chiller COP improvement of 30 percent for air-source equipment and 25 percent for water-source equipment. That is, the magnitude of process loads that are met in each building model are equivalent to 30 (or 25) percent of the building cooling load. This percent improvement in performance is consistent with the technical potential presented in Exhibit 1-4 and observed chiller loading in the DOE-2 models. It is assumed that the heat recovery would be used in place of a gas boiler operating at an efficiency rating of 0.80.

**** Simple payback is calculated as the ratio of incremental first cost (investment) to annual savings with heat recovery. For competing equipment and DCA climate combinations that have higher gas chiller annual operating costs (including annual maintenance costs and heat recovery savings), payback for the gas chiller investment cannot be achieved.

FOR CERTAIN CUSTOMER SEGMENTS, AND USING HEAT RECOVERY, IT IS THEORETICALLY POSSIBLE TO RECOVER THE INITIAL INVESTMENT IN THE GAS CHILLER TECHNOLOGY IN AS LITTLE AS SEVEN YEARS.

Because the ability to recover heat is site-specific, and because the theoretical recovery potential varies dramatically with chiller part load (as documented in Exhibit 1-4), it is recommended that customers conduct site-specific cost-effectiveness assessments before making investment decisions surrounding gas engine-driven chiller installations.

- The theoretical heat recovery presented in this report is based upon the assumption that each site is able to recover 100 percent of the heat made available by the chiller throughout an entire year of typical customer central plant cooling. The monitored data presented in at the end of chapter 2 clearly demonstrate that actual heat recovery may be substantially smaller than anticipated at the time of system design.

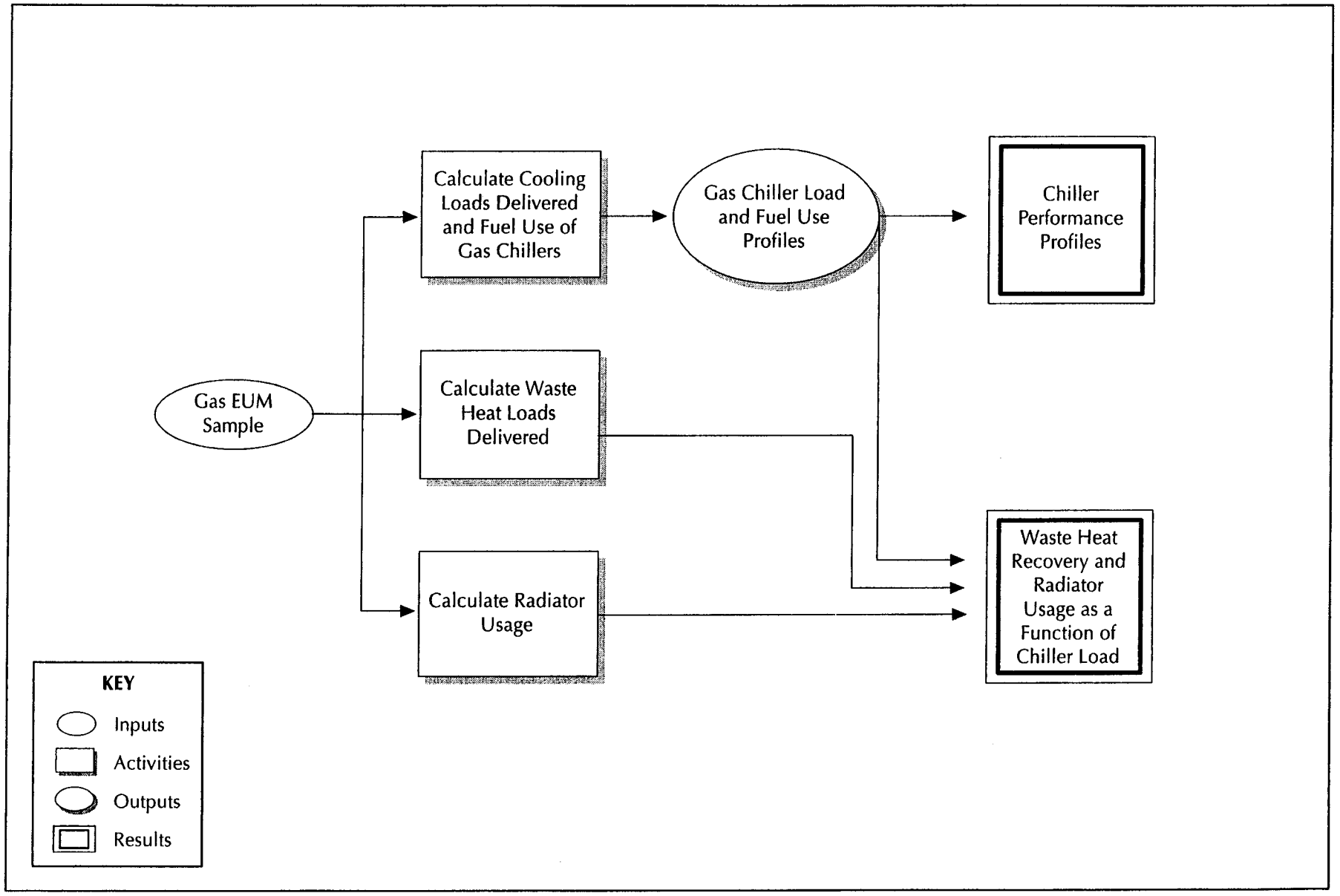
- These heat recovery figures also assume that process loads will be met using both the engine coolant system and the engine exhaust. Many sites with heat recovery only make use of the engine coolant source.

- If process loads are smaller than the output of the heat recovery equipment then excess heat must be rejected by a radiator or cooling tower.

THIS CONCLUDES CHAPTER 1. GAS CHILLER END-USE METERING RESEARCH IS PRESENTED NEXT.

2. GAS CHILLER END-USE METERING RESEARCH

Exhibit 2-1
Overview of Gas Chiller End-Use Metering Research



THIS CHAPTER PRESENTS THE GAS CHILLER END-USE METERING (EUM) RESEARCH APPROACH.

Gas chillers were monitored at two end-use metering (EUM) sites. These sites were equipped with monitoring equipment to measure cooling loads (calculated directly from the EUM data), engine waste heat recovery (from one of the sites), heat rejection usage, and fuel usage. The major outputs of this effort were:

- Gas chiller load profiles.
- Gas chiller performance profiles, demonstrating gas chiller usage (electricity and gas) as a function of building load and outdoor temperature.
- Engine waste heat recovery and engine radiator usage as a function of chiller load.

THIS CHAPTER DESCRIBES THE METHODS USED TO CREATE THESE OUTPUTS, WHICH WERE SUBSEQUENTLY USED FOR THE GAS CHILLLER MODEL CALIBRATION, DESCRIBED IN CHAPTER 3.

Exhibit 2-2
Features of Gas Engine Driven Chillers

Attributes	Feature	York Triathlon Characteristics
General Attributes	Variable Speed Engine	Good part-load performance using a variable speed engine-drive, when compared with constant speed electric chiller compressor unloading strategies.
	On-Peak Demand Charges	Gas engine chillers reduce electric bills, due to the decrease in kWh's used, especially the reduction in usage during the on-peak period (and the subsequent reduction in demand charges).
	First Costs and Maintenance Costs	The cost to install and maintain a gas engine-driven chiller is greater than that of a conventional electric chiller. To be an economically feasible technology for a particular customer, reduced monthly chiller operating costs and savings due to heat recovery must offset these additional up-front expenses.
Heat Recovery	Hot Water, Heating, and Regenerating Desiccant Dehumidification Systems	Heat from the engine water jacket and exhaust can be recovered to heat water, provide space heating, or other process loads in a building. Sites that are well suited for gas chiller installations/heat recovery are those with large process (often hot water loads), like many institutional buildings (i.e., hospitals) or industrial buildings with process loads.
Engine Heat Rejection	Radiator	Even in systems with heat recovery, the remaining engine jacket heat must be rejected to protect the engine from overheating. This is often achieved using a radiator, similar to that serving a car engine, which requires the additional operation of electric fans.
	Cooling Tower	Water-source chillers often achieve heat rejection using the cooling towers that also serve the condenser water system.

GAS ENGINE-DRIVEN CHILLERS NOW ACCOUNT FOR 1 PERCENT OF THE CHILLER MARKET BY VOLUME OF UNITS SOLD AND 3 PERCENT BY SALES VALUE,[1] HAVING RECENTLY BEEN "RE-INTRODUCED" TO THE MARKET, FOLLOWING A DRAMATIC TRANSITION TO AN "ALL-ELECTRIC" MARKET DURING THE LAST FORTY YEARS.

- The chiller market in the 1940's was dominated by gas-fired equipment. During the 1950's and 60's this market transitioned to electric motor-driven systems due to the improved reliability of electric motor drives.
  - Through efforts spearheaded by the Gas Research Institute (GRI) and the American Gas Cooling Center (AGCC), working in cooperation with equipment manufacturers', new gas engine-driven systems have been reintroduced in the market.
  - This research effort investigated the appropriateness of gas engine-driven chillers in the Florida climate, through a comparison of their cost-effectiveness with competing electric chiller systems.
- The facing exhibit identifies the unique attributes of the gas engine-driven chiller technology, concentrating on the specialized features that yield improved/a reduction in performance, and those that affect customer-based cost-effectiveness.
- In certain applications gas chillers may be an alternative to traditional electric chiller technologies, normally requiring site-specific use of heat recovery from the engine coolant and exhaust systems, in order to compete cost-effectively with traditional electric systems. Engines must reject heat (via a radiator or cooling tower) to prevent overheating and engine damage. This heat can be used in some applications to offset process loads, thus improving the efficiency of a gas chiller installation dramatically.

NEXT, THE PERFORMANCE CHARACTERISTICS OF THE MONITORED GAS CHILLERS ARE COMPARED WITH COMPETING ELECTRIC SYSTEMS.

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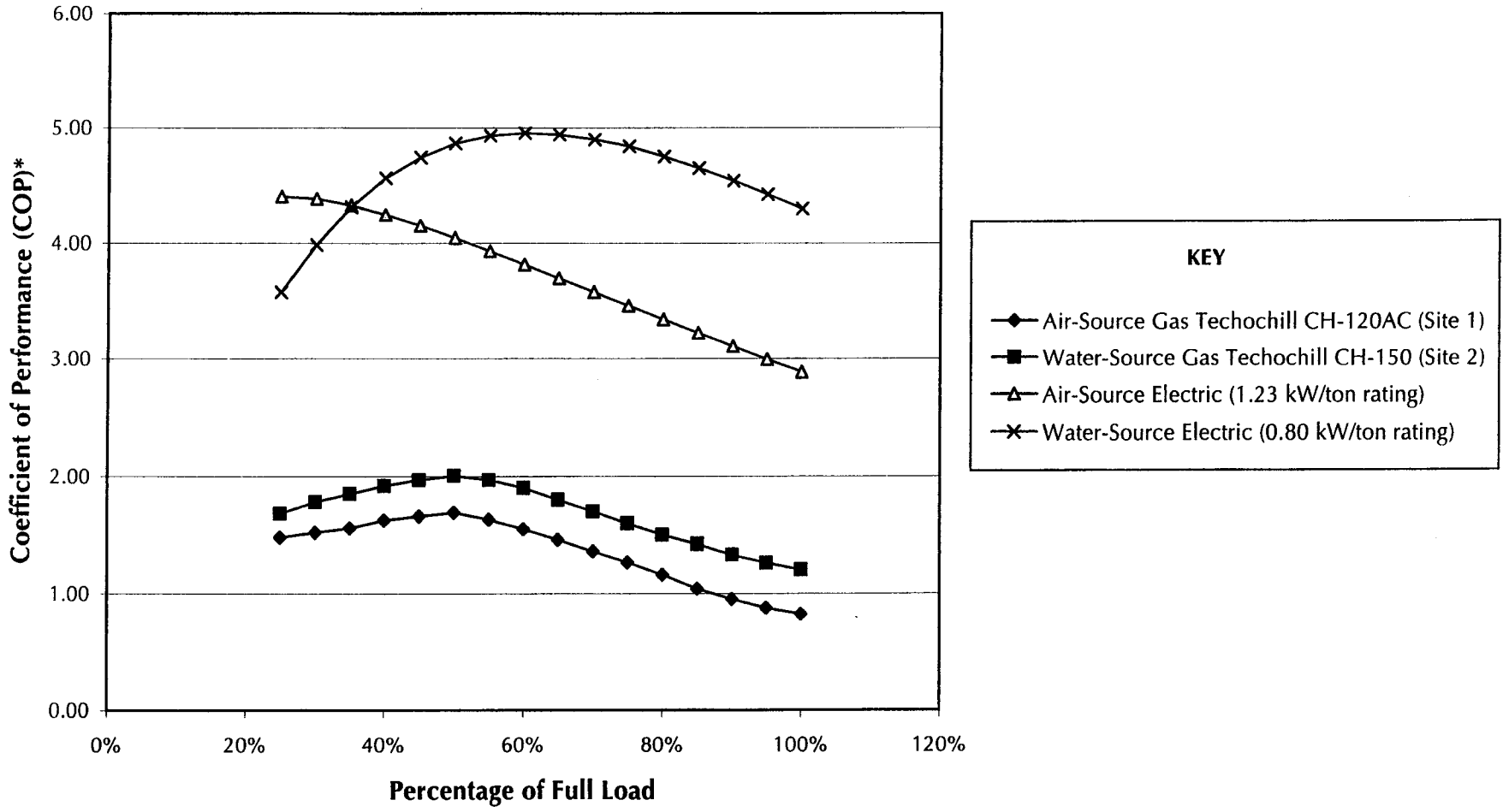
[1] US Market for Central Plant Air Conditioning, BSRIA Report 11973/3, January 1998.

Exhibit 2-3
Performance Comparison Between Gas Chillers And Competing Electric Chillers
Under ARI 550 part load conditions



* The COP Shown for gas chillers is a gas-only COP.

MANUFACTURER-BASED CHILLER PERFORMANCE DATA ARE AVAILABLE FOR GAS CHILLERS AND COMPETING ELECTRIC CHILLERS. GAS ENGINE-DRIVEN CHILLERS WERE MONITORED FOR A ONE YEAR PERIOD IN ORDER TO VERIFY THE MANUFACTURER-BASED PERFORMANCE CURVES.

- As shown in the facing exhibit, the performance data available for the gas chillers that were monitored provides a clear assessment of expected gas usage as a function of chiller part load.
  - Although gas chillers also use electricity, this usage was not well documented in the in the manufacturer product literature. For this reason, modeled gas chiller electric performance (in this study) relies in-part on the EUM data collected.
  - Similar data, as shown, are also available for electric chillers.
- In addition to the cooling performance shown here, manufacturers of gas chillers also provide data regarding waste heat recovery potential, a critical component of site-specific cost-effectiveness. Heat recovery data were collected at one site, to verify manufacturer-based performance data.

Exhibit 2-4
Facility/Plant Description and Monitoring Approach

Facility, Plant or Metering Description	EUM Site 1	EUM Site 2
Facility Characteristics		
Primary Facility Function	Recreation	Nursing Home
City	Sarasota	Kendall
DCA Climate Zone	Central	South
Plant Characteristics		
Chiller Type	Air-source screw	Water-source screw
Heat Recovery Present?	Yes	Yes (but not used)
Monitoring Points		
Chiller kW	●	●
Condenser Pump kW		●
Tower Fan kW		●
Condenser Fan kW	●	
Radiator Fan kW	●	
Chiller Gas Flow (Btu)	●	●
Chilled Water Load (Btu)	●	●
Heat Recovery (Btu)	●	
Chilled Water Flow (gpm)	●	●
Heat Recovery Engine Coolant Flow (gpm)	●	
Chilled Water Supply Temperature (F)	●	●
Chilled Water Return Temperature (F)	●	●
Condenser Water Return Temperature (F)		●
Ambient (Entering Coil) Air Temperature (F)	●	

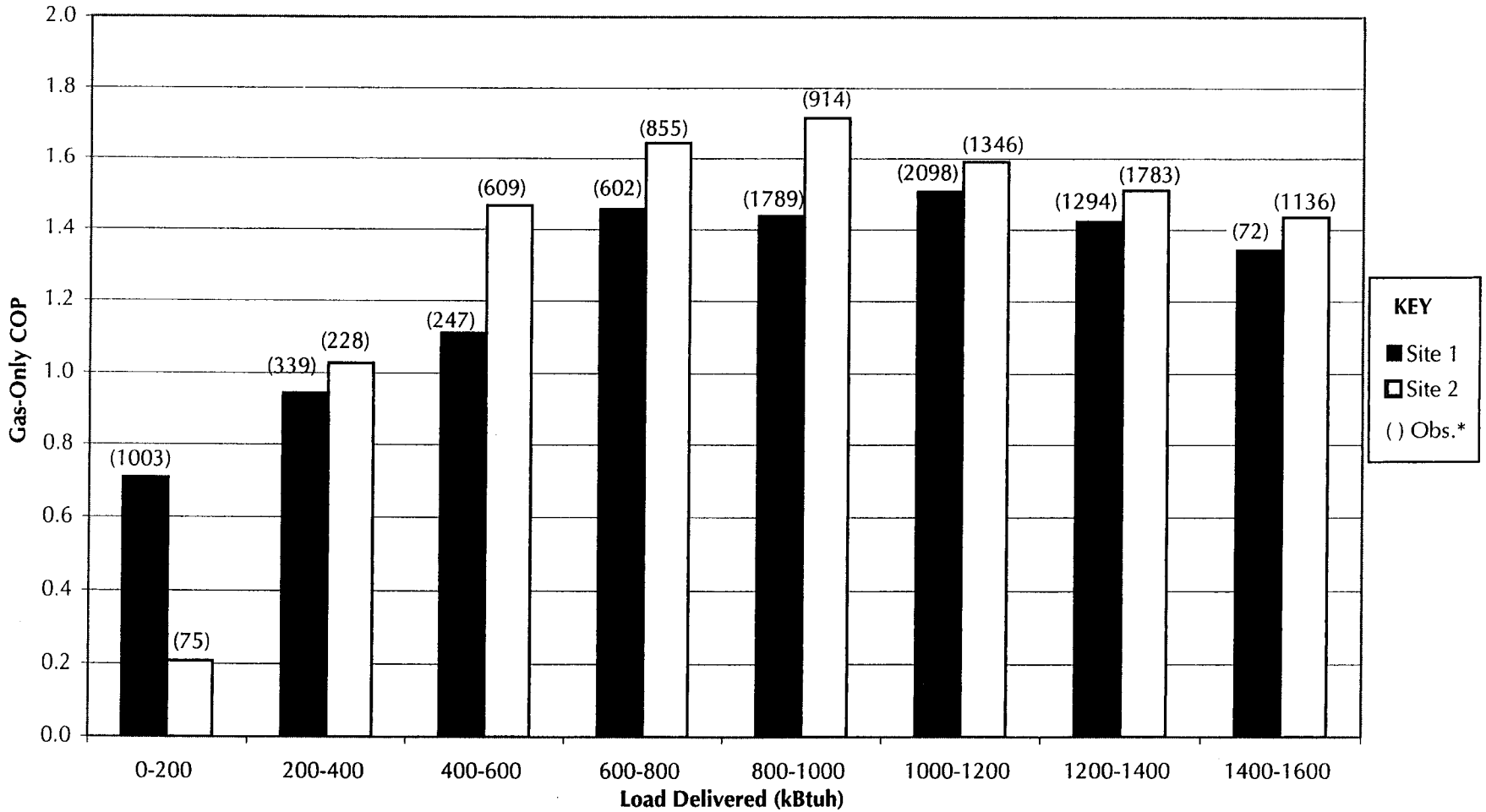
TWO GAS ENGINE DRIVEN CHILLERS WERE SELECTED FOR METERING, ONE AIR-SOURCE WITH HEAT RECOVERY, AND THE OTHER WATER-SOURCE WITH HEAT RECOVERY DEACTIVATED.

Sites for monitoring were identified based upon information supplied by the gas utilities. It was crucial that the sites selected have an existing gas chiller in-place in order to keep project costs to a minimum.

- The purpose behind the monitoring effort was to measure and verify manufacturer performance data for gas chillers in the Florida climate (where the cooling season duration is extensive). To ensure greater coverage of the technology studied, both an air-source and water-source chiller were selected.
  - Site 1 is an air-source unit that includes heat recovery, and uses a radiator fan system to reject excess engine waste heat.
  - Site 2 is a water-source unit, and uses the condensing tower system to reject excess engine waste heat, instead of a radiator. Although initially designed for heat recovery, heat recovery is not used at this site.
- The Site 1 and 2 monitoring efforts support a continuous assessment of gas chiller performance throughout the entire monitoring period.
- There are three components of performance measurement: the input or fuel use for a particular interval, the output or cooling load delivered by the system, and the heat recovery obtained from the engine coolant system. The facing exhibit lists each of the channels monitored to obtain these performance measurement objectives.

THE NEXT THREE PAGES SUMMARIZE THE FIELD-MEASURED PERFORMANCE DATA THAT WERE OBTAINED IN THIS PROJECT.

Exhibit 2-5
Measured Gas-Only COP vs. Load Delivered
By Site



* The number of hourly end-use metering observations contributing to each mean.

GAS CHILLER PERFORMANCE IS PRIMARILY A FUNCTION OF THE PART LOAD OF THE CHILLER AND THE "AMBIENT" CONDITIONS EXPERIENCED BY THE CHILLER.

- Air-source chiller ambient performance is modeled as a function of chilled water supply temperature (the condition experienced at the evaporator) and the outdoor dry-bulb temperature (at the condenser).
- Water-source ambient performance is also modeled as a function of chilled water supply temperature, but performance is also affected by the entering condenser water temperature, rather than outdoor dry-bulb.
- To verify manufacturer claims of performance under part load and ambient conditions, comparisons are drawn in Chapter 3 between product data and observed/field-verified gas chiller performance.

NEXT FIELD-MEASURED ELECTRIC USAGE IS PRESENTED FOR EACH MONITORED GAS CHILLER PLANT.

Exhibit 2-6
Measured Gas Chiller Plant
Electricity Usage as a Function of Chiller Part Load

Chiller Plant Component	Measured Air-Source Techochill CH-120AC Performance at Site 1 (kW) by Part Load Ratio Category							
	0.1	**0.2**	**0.3**	**0.5**	**0.6**	**0.8**	**0.9**	**1.0**
Chiller	0.54	0.79	0.98	1.43	1.41	1.39	1.49	1.54
Condenser Fans	0.53	2.94	4.19	5.00	6.90	10.30	12.31	12.46
Radiator Fans	0.97	0.97	0.98	0.95	1.21	1.32	1.50	1.49
Summed Plant Usage	2.04	4.71	6.15	7.37	9.52	13.01	15.30	15.49
Number of Observations*	1,003	339	247	602	1,789	2,098	1,294	72

Chiller Plant Component	Measured Water-Source Techochill CH-150 Performance at Site 2 (kW) by Part Load Ratio Category							
	0.1	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**
Chiller	3.01	3.71	3.76	3.80	3.81	3.83	3.83	3.82
Condenser Pumps	4.34	1.68	2.29	4.51	9.07	9.69	9.60	10.10
Tower Fans	4.27	5.90	5.93	6.10	6.34	6.25	6.12	6.29
Summed Plant Usage	11.62	11.30	11.99	14.42	19.22	19.77	19.55	20.21
Number of Observations*	75	228	609	855	914	1,346	1,783	1,136

* The number of hourly end-use metering observations contributing to each mean.

FOR THE EQUIPMENT MONITORED, MANUFACTURER-BASED GAS CHILLER PERFORMANCE DATA WERE NOT AVAILABLE SURROUNDING ELECTRIC USAGE, ONLY GAS.

For this reason, results shown in the facing exhibit are used directly (in conjunction with modeled building loads) to assess gas chiller electric usage in the chapter 4 typical customer chiller assessment.

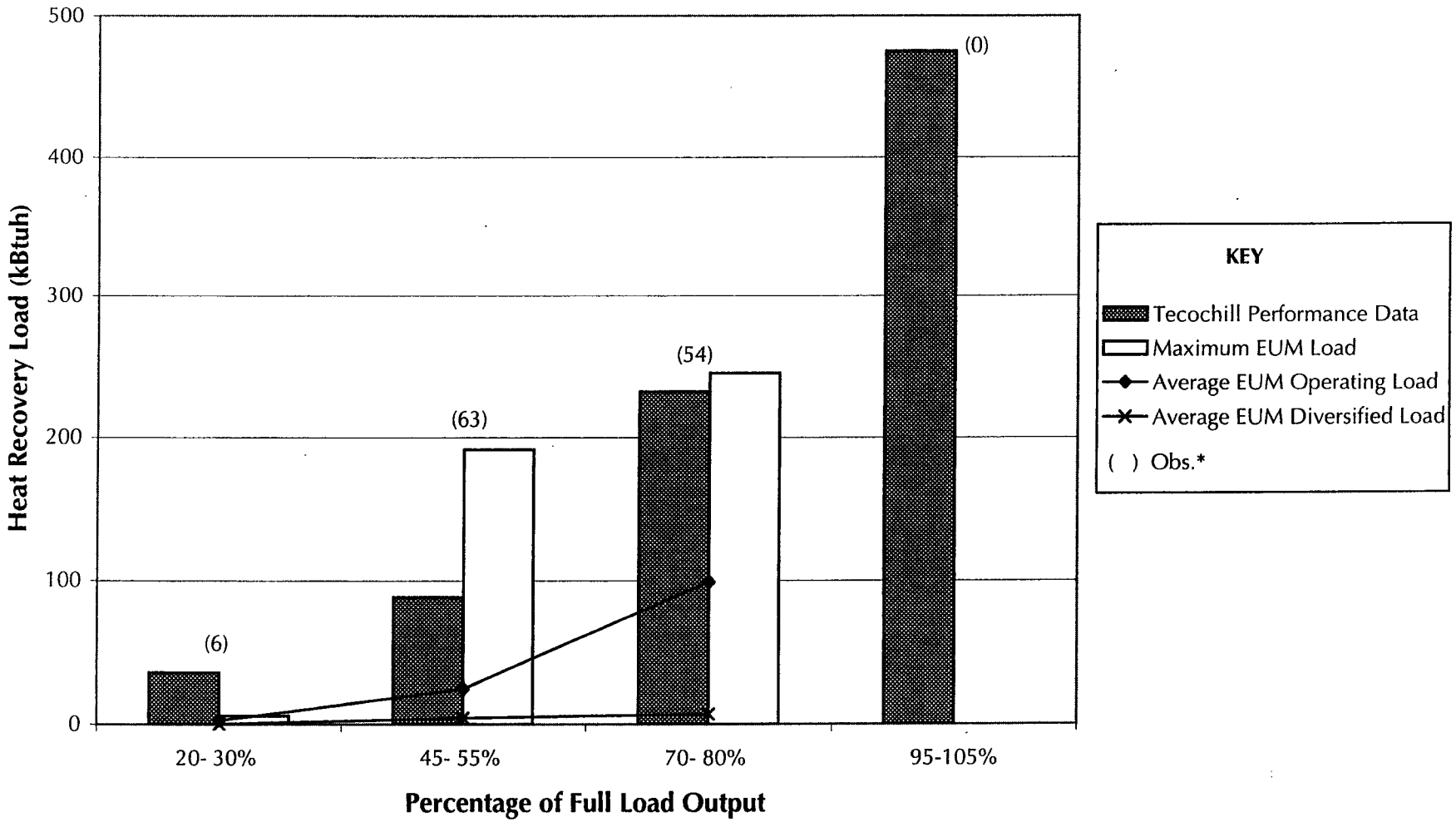
- The radiator fan usage and gas chiller usage modeled in the chapter 4 typical customer assessment is taken directly from this result, and applied based upon the DOE-2 part load for any particular interval and the capacity of the chilled water system.

- For air-source systems, chapter 4 DOE-2 analyses are used to generate the chilled water supply usage (kW) for both gas and electric chillers.

- For water-source systems, chapter 4 DOE-2 analyses are used to generate not only the chilled water supply usage, but also the condenser water and tower fan usage for both gas and electric chillers.

THE PERFORMANCE OF COMPETING ELECTRIC CHILLERS ARE DEMONSTRATED IN THE CHAPTER 3 CHILLER PERFORMANCE CALIBRATION. NEXT, SITE 1 HEAT RECOVERY RESULTS ARE PRESENTED.

Exhibit 2-7
Average and Maximum Heat Recovery Load vs. Tecochill Performance Data
Site 1



* The number of hourly end-use metering observations contributing to each mean.

A KEY PARAMETER AFFECTING THE ECONOMIC VIABILITY OF GAS CHILLER FUEL SWITCHING IS THE OPPORTUNITY TO MEET PROCESS LOADS AT A PARTICULAR SITE USING ENGINE AND EXHAUST WASTE HEAT RECOVERY.

The facing exhibit demonstrates the technical potential for engine waste heat recovery from the 120 ton air-source chiller installed at Site 1, and the observed levels of heat recovery at that site under various part load conditions.

- Although heat recovery can be used to boost the overall performance of a gas chiller, the full potential for heat recovery will not necessarily be achieved at all sites, as demonstrated by Site 1.

- The observed heat recovery performance at this site exemplifies the uncertainty surrounding true performance at a particular site, and the necessity to examine the opportunities for heat recovery on a site-by-site basis. That is, since site-specific heat recovery is needed to demonstrate customer-based cost-effectiveness then the gas chiller technology is clearly not suitable for all customers, and may require a customer with large process loads and a clear ability to meet those loads using engine/exhaust waste heat.

  - Heat recovery was sporadic at this site. During chiller operation, the heat recovery system provided hot water only 13 percent of the time.

  - Even when the heat recovery system was in operation, only 34 percent of the potential waste heat (available through the engine coolant system) was, on average, used.

THIS CONCLUDES THE PRESENTATION OF FIELD-MEASURED GAS CHILLER PERFORMANCE. NEXT, AND SIMILAR TO THE HEAT RECOVERY PRESENTATION SHOWN HERE, COMPARISONS ARE DRAWN BETWEEN FIELD MEASURED GAS USAGE AND MANUFACTURER-BASED PERFORMANCE, YIELDING FIELD CALIBRATED GAS CHILLER PERFORMANCE.

3. CHILLER PERFORMANCE CALIBRATION

Exhibit 3-1
*Manufacturer-Based Gas Chiller Performance**

Percent of Full Rated Load	Performance w/o Heat Recovery			Performance w/ Heat Recovery			Potential Percent COP Improvement w/ Heat Recovery (%)
	Chiller Load (Tons)	Gas Use (kBtuh)	Gas Only COP	Engine Heat Recovery Potential (kBtuh)	Exhaust Heat Recovery Potential (kBtuh)	Potential Gas Only COP	
Site 1 Air-Source TECOCHILL CH-120AC							
25%	30	243	1.48	38	29	1.76	18
50%	60	426	1.69	93	70	2.07	23
75%	90	854	1.26	244	183	1.76	40
100%	120	1749	0.82	500	375	1.32	61
Site 2 Water-Source TECOCHILL CH-150							
25%	37	264	1.68	45	34	1.98	18
50%	75	449	2.00	100	75	2.39	19
75%	112	842	1.60	238	179	2.09	31
100%	150	1499	1.20	430	323	1.70	42

* Performance under ARI-550 part load conditions.

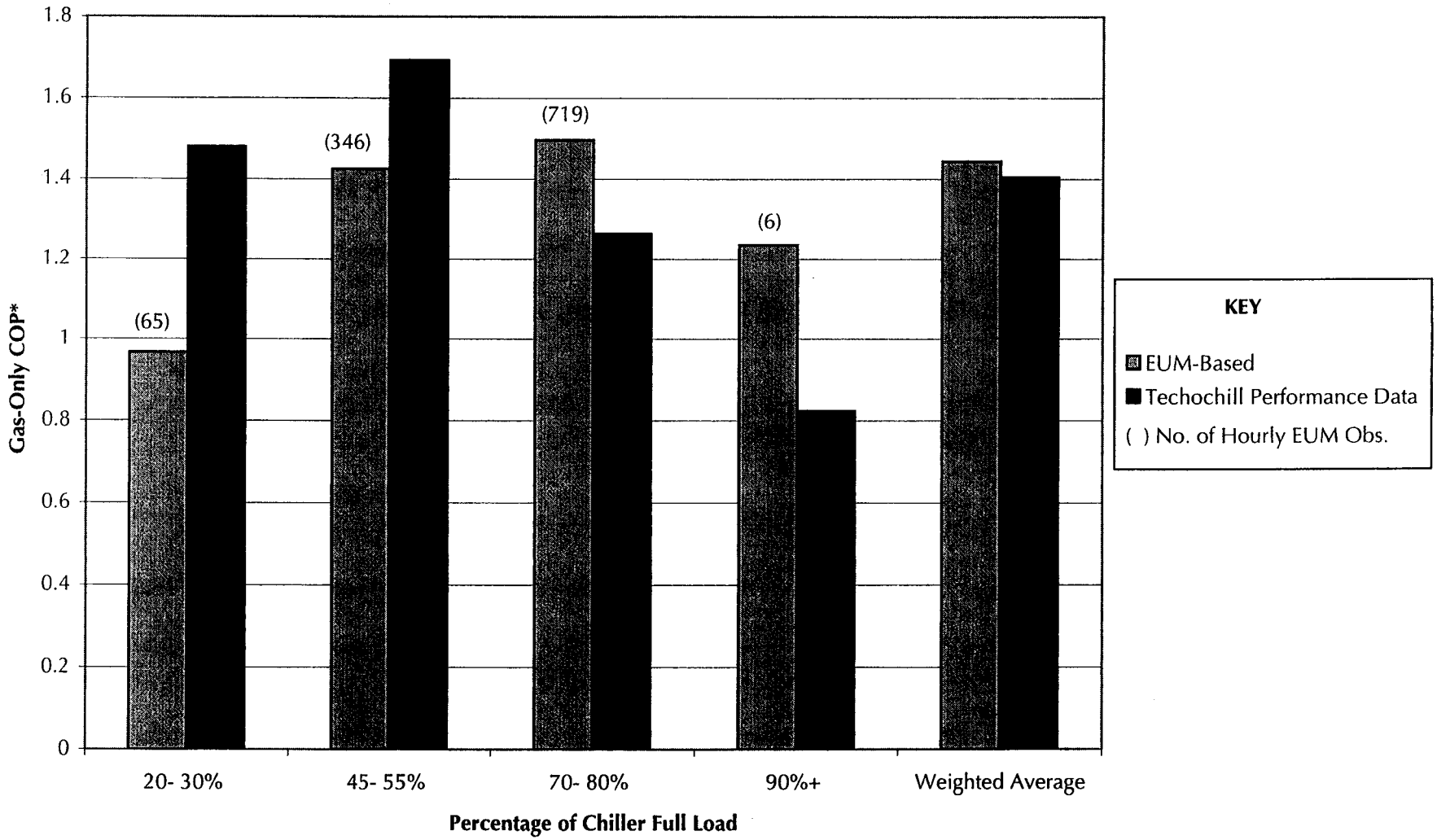
GAS CHILLER SYSTEMS ARE VERY SIMILAR TO ELECTRIC CHILLERS, FROM THE STANDPOINT OF THE VAPOR COMPRESSION PROCESS, THE HEAT REJECTION/CONDENSER PROCESS, AND THE USE OF CHILLED WATER (VIA A CHILLED WATER COIL AT THE AIR HANDLER) TO MEET THE BUILDING LOADS.

The key difference is the compression drive type -- a variable speed natural gas engine serving the gas chiller, and a (normally constant speed) electric motor in a conventional (electric) chiller system.

- The use of heat recovery greatly influences that overall system efficiency of a gas chiller.
  - Building process loads (such as hot water service) can be met using the engine coolant and engine exhaust as a heat source.
  - Design professionals do not normally consider specifying a gas chiller system unless heat recovery is viable. According to manufacturer data, chiller performance is theoretically improved by 20 to 60 percent, which varies with chiller part load.
- The gas engine also requires either a radiator to reject the remaining engine waste heat or additional use of the condenser tower to reject heat. In either case, these additional heat rejection processes result in increased fan and pump electric usage.
- Chiller performance is a function of part load, the chilled water setpoint temperature, and either the outdoor air or condenser water return temperature, in an air- and water-source plant, respectively. Customer usage patterns, building dimension and composition, and internal gains affect part load; FPL commercial building simulation prototypes—modified for use with DOE-2 energy simulation software (and calibrated using FPL Commercial Sector Survey load shapes) – capture these typical customer attributes.

IN ADDITION TO THE GAS CHILLER PERFORMANCE PRESENTED AT THE BEGINNING OF THIS CHAPTER, TYPICAL ELECTRIC CHILLER PERFORMANCE IS ALSO NEEDED FOR THE CHAPTER 4 TYPICAL CUSTOMER ASSESSMENT. THE METHODS USED TO DERIVE TYPICAL ELECTRIC CHILLER PERFORMANCE PROFILES ARE DESCRIBED AT THE END OF THIS CHAPTER.

Exhibit 3-2
Site 1 Comparison of EUM-Based and Techochill CH-120AC Performance



* Performance under ARI 550 part load conditions.

THE EUM-BASED RESULTS SUGGEST THAT THE GAS-ONLY COP FOR THIS 120-TON AIR-SOURCE CHILLER IS SLIGHTLY MORE DESIRABLE THAN MANUFACTURER-BASED PERFORMANCE.

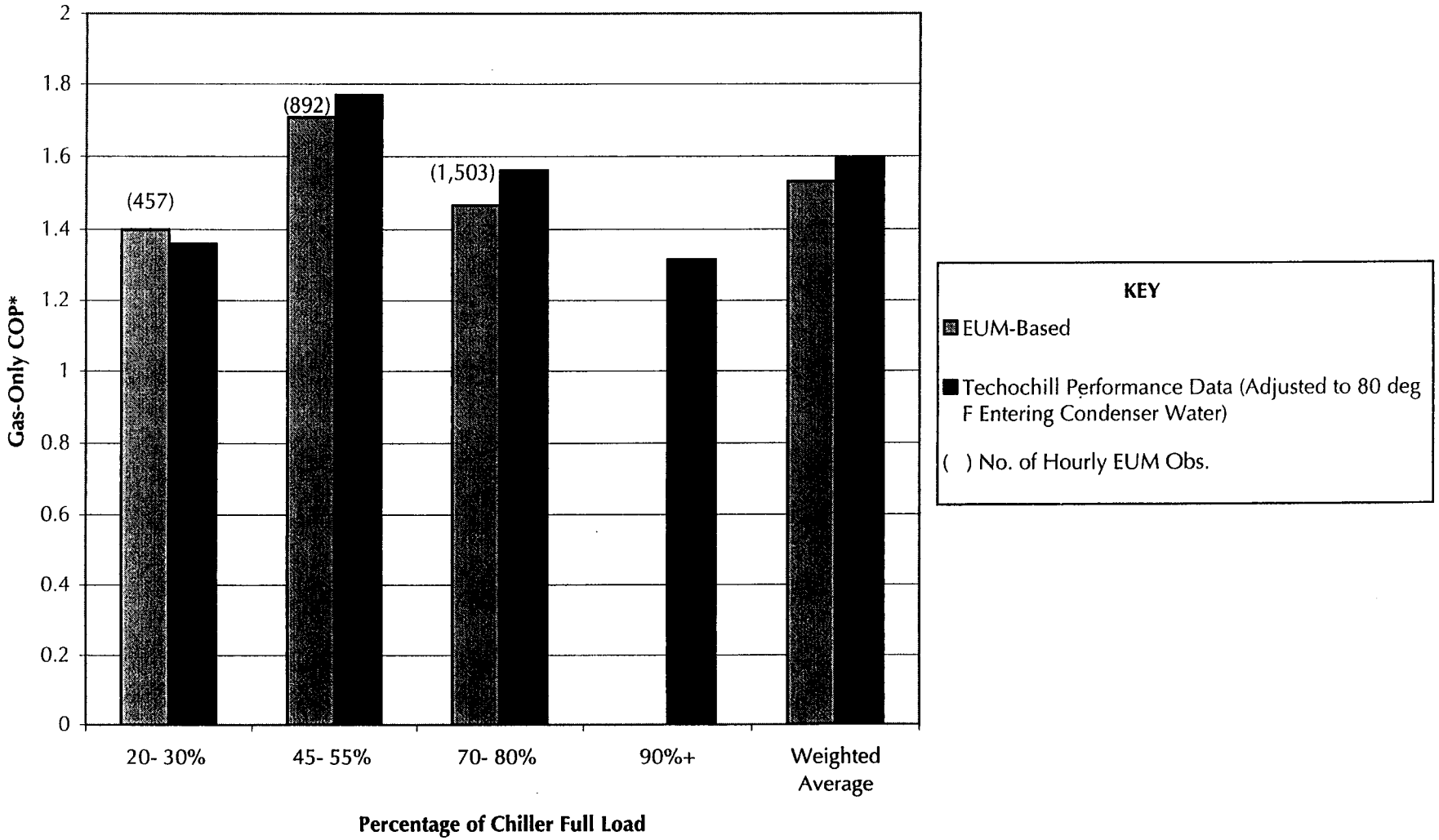
Opportunities exist to improve the overall performance through heat recovery, although, as demonstrated in Chapter 2, there are uncertainties surrounding the level of recovery that can be achieved site-to-site.

- For the purposes of the Chapter 4 typical customer assessment, the manufacturer-based gas-only equipment performance figures were adopted, and were not modified in any way using field-derived performance.

- As described in Chapter 2, electricity usage was not available from the manufacturers, and Chapter 4 typical customer gas chiller models rely upon field-measured performance of the chiller itself, the condenser fans, and the engine waste heat radiator fans.

SITE 2 MANUFACTURER AND FIELD-MEASURED GAS-ONLY COP'S ARE COMPARED NEXT.

Exhibit 3-3
Site 2 Comparison of EUM-Based and Techochill CH-150 Performance



* Performance under ARI 550 part load conditions.

THE EUM-BASED RESULTS SUGGEST THAT THE GAS-ONLY COP FOR THIS 150-TON WATER-SOURCE CHILLER IS SLIGHTLY LESS DESIRABLE THAN MANUFACTURER-BASED PERFORMANCE.

Similar to Site 1, based upon Site 2 results, the manufacturer-based gas-only equipment performance figures were adopted, and were not modified in any way using field-derived performance.

- As described in Chapter 2, chiller electricity usage was not available from the manufacturers, and Chapter 4 typical customer gas chiller models rely upon field-measured performance of the chiller itself.
- Although water-source gas chillers are often equipped with engine waste heat rejection through the tower (as was the case with Site 2), the amount of tower usage due to chiller refrigerant waste heat rejection and that dedicated to the engine could not be differentiated. For this reason, ton-normalized electric usage from the Site 1 radiator is used to model the Chapter 4 typical customer water-source gas chiller heat rejection usage.

NEXT, THE DERIVATION OF TYPICAL ELECTRIC CHILLER PERFORMANCE IS DEMONSTRATED FOR USE IN THE CHAPTER 4 TYPICAL CUSTOMER CHILLER ASSESSMENT.

Exhibit 3-4
Electric Chiller Performance Modeling
Using State-of-the-Art ASHRAE 90.1 Methods

Chiller Ratings:	
Nominal Efficiency (kW/ton)	1.23
Nominal Capacity (tons)	150
Rated Chiller Load (kW)	184.5

Current Data			Calculated Values				Efficiency		
Chiller Load (tons)	Entering Coil Dry Bulb Temp	Supply Water Temperature	Current Capacity	Part Load Ratio	Part Load Adjustment to EIR	Ambient Adjustment to EIR	Energy Input Ratio (EIR)*	COP	kW/Ton
150	97	44	149	1.000	0.991	1.029	0.3568	2.80	1.255
138	92	44	153	0.917	0.89	0.96	0.3275	3.05	1.152
125	87	44	157	0.833	0.80	0.90	0.3014	3.32	1.060
113	82	44	161	0.750	0.71	0.84	0.2783	3.59	0.979
100	77	44	165	0.667	0.62	0.79	0.2582	3.87	0.908
88	72	44	169	0.583	0.54	0.74	0.2411	4.15	0.848
75	67	44	172	0.500	0.46	0.71	0.2270	4.40	0.798
63	62	44	176	0.417	0.38	0.68	0.2162	4.63	0.760
50	57	44	180	0.333	0.31	0.65	0.2092	4.78	0.736
38	52	44	183	0.250	0.23	0.63	0.2075	4.82	0.730

* EIR = EIRrated x EIR-FT x EIR-FPLR / PLR

Chiller Plant Coefficients -- Electric Air-Cooled Chillers (source Mark Hydeman October 2, 1997 Proposed Changes to the ACM Manual -- Central Plant Cooling Equipment)

CAPFT	-0.09465	0.03834	-0.00009	0.00378	-0.00001	-0.00015
EIR-FT	0.13546	0.02293	-0.00016	-0.00235	0.00013	-0.00019
EIR-FPLR	0.03649	0.73474	0.21995	-	-	-

CAP-FT = A + (B x CHWS) + (C x CHWS x CHWS) + (D x DB) + (E x DB x DB) + (F x CHWS x DB)
This describes the change in capacity as a function of the chilled water supply temperature (CHWS, or Tout) and entering coil dry-bulb temperature (DB, or Tin)

EIR-FPLR = A + (B x PLR) + (C x PLR x PLR)
This describes the change in EIR as a function of part load conditions (PLR, the part load ratio).

EIR-FT = A + (B x CHWS) + (C x CHWS x CHWS) + (D x DB) + (E x DB x DB) + (F x CHWS x DB)
This describes the change in EIR as a function of the chilled water supply temperature (CHWS, or Tout) and the entering coil dry bulb temperature (DB, or Tin).

source of equations: ASHRAE/IES Standard 90.1-1989 User's Manual - November 1992.

ELECTRIC CHILLER PERFORMANCE IS MODELED IN CHAPTER 4 USING STATE-OF-THE-ART METHODS FROM ASHRAE 90.1 AND PROPOSED CHILLER PLANT COEFFICIENTS THAT ARE TO BE USED IN NEAR-TERM REVISIONS TO ASHRAE 90.1.

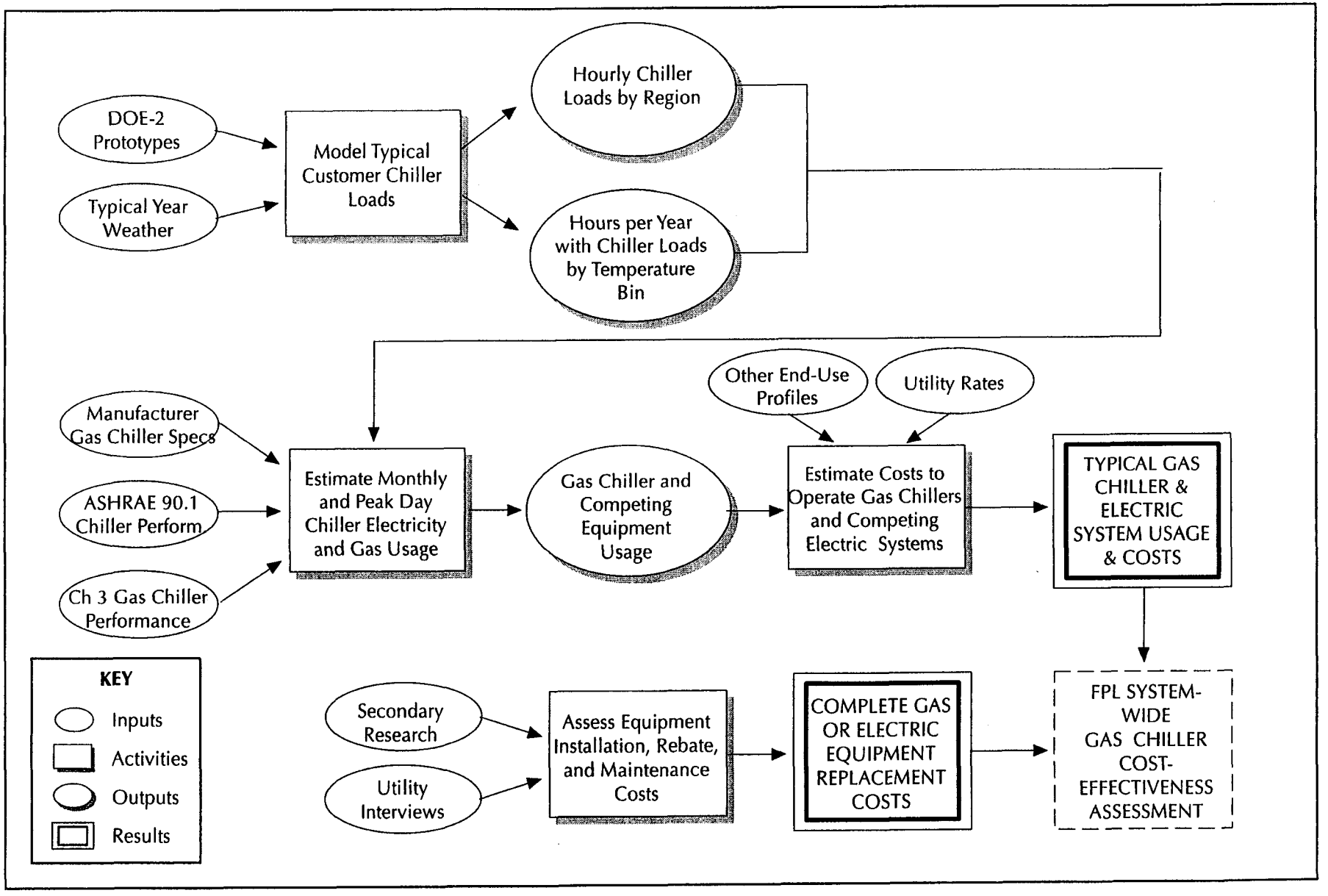
Although the coefficients shown here are for an air-source screw chiller, coefficients are also available for water-source technologies, and scroll, reciprocating and centrifugal machines.

- A key factor affecting chiller performance is the current part load of that unit. Different types of chillers have optimal performance under varying part load conditions.
- Also of crucial importance to the performance of a chiller are the "ambient" conditions that it performs under.
  - For air- and water-source systems, a crucial ambient condition is the chilled water setpoint (supply) temperature.
  - For air-source equipment the outdoor temperature or entering coil dry bulb temperature affects performance, while for a water-source chiller the condenser return water temperature drives performance.

NEXT, CHAPTER 4 TYPICAL CUSTOMER ASSESSMENTS ARE PRESENTED THAT INCLUDE THE USE OF FIELD-CALIBRATED GAS CHILLER PERFORMANCE AND ELECTRIC CHILLER PERFORMANCE ESTIMATES FROM THIS CHAPTER.

4. TYPICAL CUSTOMER CHILLER ASSESSMENT

Exhibit 4-1
Analysis Steps Supporting the Typical Customer Chiller Assessment



THE ULTIMATE PURPOSE OF THIS PROJECT IS TO ASSESS TYPICAL CUSTOMER PAYBACK AND COST-EFFECTIVENESS FOR A GAS CHILLER FUEL SWITCH (VS COMPETING ELECTRIC CHILLER TECHNOLOGIES) IN THE FLORIDA MARKET.

- The end product supports a FPL service territory-wide cost-effectiveness assessment for all stakeholders, to identify new DSM technologies.
- The remainder of this chapter presents first the typical customer cooling model attributes and then the gas chiller cost-effectiveness results.
  - **Model Attributes.** The data sources and intermediate results that were used to calculate cost-effectiveness findings are examined.
    - .. First typical customer cooling load estimates are derived using DOE-2 models.
    - .. Then, gas chiller performance data (augmented with the Chapter 2 end-use metering results) are integrated with these cooling loads in a temperature bin model that supports typical customer natural gas and electricity usage.
    - .. In parallel, electric chiller performance is modeled using state-of-the-art methods from ASHRAE 90.1 and proposed chiller plant coefficients that are to be used in near-term revisions to ASHRAE 90.1.
  - **Final Results.** All the costs applicable to a customer's chiller system replacement are provided, and payback calculations are presented.
    - .. First costs to install new equipment are presented (equipment and labor costs, including rebates and gas connection charges).
    - .. Costs to operate those systems are calculated using current utility rates.

Exhibit 4-2
DOE-2 Prototype Summary

Building Characteristics	Prototype Description by Business Type			
	Large Office	**Large Retail**	**Hotel/Motel**	**School**
Dimensions				
Conditioned Floor Area (sqft)	100,000	86,870	140,000	72,966
Number of Stories	5	1	7	1
Story Height (ft)*	14	17	9	12
Insulation				
Roof U-Value (Btu/hr-sqft-deg F)	0.07	0.07	0.05	0.05
Wall U-Value (Btu/hr-sqft-deg F)	0.08	0.13	0.09	0.09
Glazing				
Glass Type	single-pane tinted	single-pane tinted	single-pane tinted	single-pane tinted
Glass U-Value (Btu/h-sqft-deg F)	1.1	1.1	1.1	1.1
Glass Shading Coefficient	0.5	0.5	0.5	0.5
Glass Area (percent of wall area)	25	3	23	13
Central Plant and Controls				
Air Distribution	constant volume	constant volume	variable air volume	constant volume
Chiller Type	screw compressor	screw compressor	screw compressor	screw compressor
Number of Chillers	2	2	3	2
Capacity of Each Chiller (Tons)	175	150	150	125
Cooling Thermostat Setting (deg F)	75	74	76	76
Night and Weekend Setup (deg F)	85	80	none	off
Heating Type	electric resistance	electric resistance	electric resistance	electric resistance
Heating Thermostat Setting (deg F)	70	70	72	70
Night and Weekend Setback (deg F)	55	60	none	55
Internal Gains				
Occupancy (sqft/person)	150	217	235	82
Lighting (Watts/sqft)	1.25	1.83	1.83	1.89
Equipment (Watts/sqft)	1.25	0.45	0.00	0.50
Schedule	7 AM to 6 PM	10 AM to 9 PM	24 Hr	8 AM to 3 PM
External Gains				
Infiltration (air changes/hour)	0.1	0.2	0.2	0.1
Ventilation (cfm/person)	5.0	5.0	7.0	5.0

* Includes plenum if applicable

THE DOE-2 PROTOTYPES THAT WERE MODELED IN THIS GAS RESEARCH PROJECT ARE PRESENTED IN THE FACING EXHIBIT. THESE BUSINESS TYPE-SPECIFIC MODELS WERE USED TO ESTIMATE COOLING LOADS WITHIN A PARTICULAR CLIMATE ZONE, FOR BOTH COMPETING ELECTRIC AND GAS CHILLER SYSTEMS.

- The prototypes described in the facing exhibit were adapted, for DOE-2 software compatibility, from simulation models used in FPL ventilation research. They provide four business type models, one for each of four building segments that are commonly served by chilled water systems.

- Three primary weather stations were used to model typical weather in FPL service territory. The Daytona Beach, Vero Beach, and Miami weather stations are used to represent the Department of Community Affairs (DCA) North, Central, and South climate zones, respectively.

- Simulations with these prototypes, in conjunction with typical weather data, yield hourly estimates of chilled water loads for typical FPL customers.

  - Gas and electric chiller performance characteristics are applied to these DOE-2 based loads using an outdoor temperature bin model.

  - The gas and electric chiller performance curves used in this study are based upon the performance results that were presented in Chapters 2 and 3.

Exhibit 4-3
Typical Large Office Monthly Cooling Loads
By DCA Climate and Outdoor Temperature Bin

DCA Climate Zone	Temperature Range	Average Hourly DOE-2 Operating Chiller Load (tons)	Number of Hours per Month with Chiller Loads (hours)												Annual Total Chiller Load Hours (hours)	Annual Total Diversified Load (ton hours)
			Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec		
North	35 - 39	10.74	1	-	-	-	-	-	-	-	-	-	-	-	1	11
	40 - 44	10.74	-	-	-	-	-	-	-	-	-	-	1	-	1	11
	45 - 49	9.79	1	-	-	-	-	-	-	-	-	-	-	1	2	20
	50 - 54	10.30	1	1	1	-	1	-	-	-	-	-	-	-	4	41
	55 - 59	10.38	1	1	-	1	1	-	-	-	-	-	-	1	5	55
	60 - 64	24.75	11	6	6	5	5	-	-	-	1	5	7	10	57	1,411
	65 - 69	64.60	52	53	50	44	21	6	2	3	5	28	45	54	361	23,318
	70 - 74	168.91	49	35	72	66	49	46	35	46	45	71	72	48	633	106,955
	75 - 79	165.81	29	27	57	92	104	73	62	73	57	100	69	31	775	128,570
	80 - 84	156.79	15	20	26	52	138	159	109	127	157	114	45	16	977	153,157
	85 - 89	193.58	3	3	7	12	54	112	171	152	136	25	2	3	679	131,439
	90 - 94	210.93	-	-	2	6	8	27	56	42	9	-	-	-	151	31,808
	95 - 99	210.19	-	-	-	-	1	6	8	4	1	-	-	-	20	4,274
Total			163	146	220	277	382	429	443	447	411	345	241	163	3,667	581,068
Central	40 - 44	8.96	-	1	-	-	-	-	-	-	-	-	-	-	1	9
	45 - 49	9.26	-	1	-	-	-	-	-	-	-	-	-	1	2	19
	50 - 54	8.95	1	1	1	-	-	-	-	-	-	-	1	1	5	45
	55 - 59	9.13	1	1	1	1	1	-	-	-	-	-	-	1	6	55
	60 - 64	26.05	9	8	8	4	2	2	-	-	-	3	6	9	52	1,355
	65 - 69	61.55	53	54	50	28	12	2	-	2	3	13	30	44	292	17,989
	70 - 74	159.92	68	62	70	75	40	35	24	32	31	40	60	75	610	97,615
	75 - 79	161.75	64	56	94	106	99	70	55	67	53	95	107	67	932	150,781
	80 - 84	155.56	28	32	44	89	175	147	114	120	156	185	87	25	1,203	187,059
	85 - 89	198.26	4	5	11	15	68	153	199	187	176	52	5	3	877	173,814
	90 - 94	207.31	-	-	-	5	6	18	54	44	11	1	2	-	141	29,320
	95 - 99	208.11	-	-	-	-	-	-	7	3	-	-	-	-	9	1,873
Total			228	221	279	323	403	428	452	454	431	389	299	225	4,131	659,933
South	45 - 49	10.19	-	-	-	-	-	-	-	-	-	-	-	1	1	10
	55 - 59	10.37	1	1	-	-	-	-	-	-	-	-	1	-	3	31
	60 - 64	24.40	7	5	6	8	3	-	-	-	-	1	4	7	40	973
	65 - 69	67.98	45	44	33	16	10	-	-	-	-	5	22	38	211	14,372
	70 - 74	152.63	83	80	71	47	20	6	3	5	5	26	50	72	467	71,325
	75 - 79	163.48	106	73	119	123	97	67	46	55	70	96	117	114	1,083	176,979
	80 - 84	151.10	55	62	83	135	199	171	154	162	175	185	136	62	1,580	238,795
	85 - 89	193.72	7	5	17	27	104	174	208	192	187	106	17	2	1,047	202,876
	90 - 94	209.07	-	-	1	8	13	34	70	72	17	4	-	-	217	45,466
	95 - 99	200.40	-	-	-	-	-	1	7	3	-	-	-	-	10	2,071
Total			303	269	331	364	446	452	487	490	453	424	346	296	4,661	752,899

THE DOE-2 PROTOTYPES USED IN THIS STUDY WERE CALIBRATED USING COOLING BUSINESS TYPE-SPECIFIC HOURLY PROFILES FROM THE FPL COMMERCIAL SECTOR SURVEY (CSS).

This calibration included both an energy and demand component. CSS monthly cooling energy usage was verified, along with CSS hourly load shapes for a set of summer and winter near-peak days.

- Chiller plant profiles were developed for each of four business type models: large offices, retail businesses, large hotels, and schools.

- To ensure that these modeled chiller plant loads also represent consumption under typical weather conditions, simulations were conducted for the five year period 1990-1994 using National Oceanic and Atmospheric Administration (NOAA) weather files in DOE-2 compatible format.

- The resulting DOE-2 cooling loads were then prepared for use in an hourly outdoor temperature bin model according to the following methods for each of three (DCA climate-specific) regions and four business type models.
  - Gas and electric chiller performance data from Chapters 2 and 3 were then applied to each hourly chiller load, yielding hourly estimates of chiller electric and gas usage for each year.
  - Gas chiller radiator fan usage and other auxiliary (pumps and controls) electric usage were modeled as a function of chiller part load, using results from Chapter 2.
  - Chiller plant electric usage for chilled water pumps, condenser water pumps and tower fans were modeled directly using DOE-2 hourly estimates.

IN ORDER TO CALCULATE TYPICAL CUSTOMER UTILITY BILLS, TOTAL USAGE FOR OTHER END USES MUST BE ESTIMATED. ON THE FOLLOWING PAGE, END-USE ESTIMATES ARE PRESENTED THAT WERE DERIVED USING COMMERCIAL SECTOR SURVEY RESULTS, AND THAT WERE USED TO ESTIMATE CUSTOMER UTILITY COSTS.

Exhibit 4-4
Typical Large Office Customer Monthly UECs

End-Use	Monthly Electricity Usage (kWh)												Annual Total
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
Space Heating	3,239	2,074	795	425	-	-	-	-	0	265	1,080	4,225	12,103
Ventilation	16,669	14,847	15,637	15,229	16,603	15,995	16,429	16,670	16,433	16,616	15,647	17,214	193,987
Water Heating	1,306	1,150	1,226	1,162	1,239	1,176	1,160	1,214	1,185	1,245	1,187	1,327	14,577
Cooking	2,080	1,830	2,091	1,902	2,084	2,122	1,950	2,202	2,011	2,163	1,973	2,085	24,491
Refrigeration	2,198	1,939	2,002	1,966	2,062	1,942	2,025	2,001	1,983	2,041	2,009	2,258	24,426
Ext. Lighting	2,985	2,589	2,836	2,736	2,814	2,665	2,760	2,784	2,707	2,843	2,800	3,078	33,599
Int. Lighting	38,493	33,885	36,388	34,418	36,756	36,079	35,425	37,273	35,683	37,526	35,646	39,070	436,643
Office Equipment	10,358	9,121	9,414	8,974	9,564	9,117	9,066	9,414	9,149	9,616	9,226	10,543	113,561
Miscellaneous	4,111	3,622	3,791	3,664	3,866	3,826	3,886	3,944	3,823	3,978	3,864	4,204	46,578
Motors	11,328	9,976	10,835	10,252	10,957	11,120	10,900	11,491	10,820	11,393	10,832	11,511	131,414
Air Compress.	286	252	262	248	266	265	261	274	258	272	260	291	3,193
Process	-	-	-	-	-	-	-	-	-	-	-	-	-

TO ACCURATELY EXAMINE UTILITY BILL COSTS FOR COMPETING CHILLER PLANT SYSTEMS, IT IS NECESSARY TO ALSO ESTIMATE THE TYPICAL CUSTOMER ELECTRICITY USAGE FOR OTHER END USES.

This is necessary because there are fixed costs, such as the customer charge, that are billed every month regardless of the amount of gas or electricity used, and because utility charges are sometimes tiered (where charges increase as the volume of fuel use increases).

- All hourly end-use estimates were summed, including the chiller plant estimates described on the previous page, yielding hourly total gas and electric fuel usage estimates for typical customers by business type and DCA climate zone.

- By incorporating the other end-use usage estimates for each business type, like those listed in the facing exhibit for the large office business segment, accurate estimates were obtained for customer electric energy charges ($ per kWh used) and demand charges ($ per kW used).

NEXT, THE CHILLER COST-EFFECTIVENESS RESULTS ARE PRESENTED.

Exhibit 4-5
Gas Chiller and Competing Equipment
Installed Costs and Maintenance Costs
For Large Office Customers with Existing Gas Service

DCA Climate Zone	Chiller System Type	Chiller Installed Cost ($)	Utility Rebate ($)	Gas Connection Charge ($)	Total Installed Cost ($)	Incremental* Gas Chiller Installed Cost ($)	Annual Maintenance Charge** ($)
North 0.87%	Gas Air-Source Chiller	302,094	15,000	-	287,094		21,814
	Electric Air-Source Chiller (1.23 kW/ton)	176,094	-	-	176,094	111,000	11,550
	Electric Air-Source Chiller (1.22 kW/ton)	178,894	4,200	-	174,694	112,400	11,550
	Gas Water-Source Chiller	321,781	15,000	-	306,781		23,214
	Electric Water-Source Chiller (0.80 kW/ton)	195,781	-	-	195,781	111,000	12,950
	Electric Water-Source Chiller (0.67 kW/ton)	227,631	6,650	-	220,981	85,800	12,950
Central 10.35%	Gas Air-Source Chiller	302,094	3,150	-	298,944		21,814
	Electric Air-Source Chiller (1.23 kW/ton)	176,094	-	-	176,094	122,850	11,550
	Electric Air-Source Chiller (1.22 kW/ton)	178,894	4,200	-	174,694	124,250	11,550
	Gas Water-Source Chiller	321,781	3,150	-	318,631		23,214
	Electric Water-Source Chiller (0.80 kW/ton)	195,781	-	-	195,781	122,850	12,950
	Electric Water-Source Chiller (0.67 kW/ton)	227,631	6,650	-	220,981	97,650	12,950
South 88.77%	Gas Air-Source Chiller	302,094	15,000	-	287,094		21,814
	Electric Air-Source Chiller (1.23 kW/ton)	176,094	-	-	176,094	111,000	11,550
	Electric Air-Source Chiller (1.22 kW/ton)	178,894	4,200	-	174,694	112,400	11,550
	Gas Water-Source Chiller	321,781	15,000	-	306,781		23,214
	Electric Water-Source Chiller (0.80 kW/ton)	195,781	-	-	195,781	111,000	12,950
	Electric Water-Source Chiller (0.67 kW/ton)	227,631	6,650	-	220,981	85,800	12,950
FPL System Weighted Average for Large Offices	Gas Air-Source Chiller	302,094	13,773	-	288,321		21,814
	Electric Air-Source Chiller (1.23 kW/ton)	176,094	-	-	176,094	112,227	11,550
	Electric Air-Source Chiller (1.22 kW/ton)	178,894	4,200	-	174,694	113,627	11,550
	Gas Water-Source Chiller	321,781	13,773	-	308,008		23,214
	Electric Water-Source Chiller (0.80 kW/ton)	195,781	-	-	195,781	112,227	12,950
	Electric Water-Source Chiller (0.67 kW/ton)	227,631	6,650	-	220,981	87,027	12,950

* Incremental costs are in excess of costs for competing equipment, when a customer selects a gas chiller.
The incremental cost shown above is for the installation of two (2) 175-ton chillers.
The incremental cost for the 1.22 kW/ton air-source and the 0.67 kW/ton water-source equipment includes both FPL and gas utility rebates.
Consistent with nonparticipant actions, FPL rebates are excluded for the 1.23 kW/ton air-source and the 0.80 kW/ton water-source equipment.

** The annual maintenance charge is also the cost to maintain two (2) 175-ton chillers.

THE INSTALLED COST OF A GAS CHILLER GENERALLY EXCEEDS THAT OF STANDARD EFFICIENCY COMPETING ELECTRIC SYSTEMS BY $360/TON, AND COSTS AN ADDITIONAL $210/TON OVER COMPETING HIGH EFFICIENCY ELECTRIC SYSTEMS.

In addition, annual maintenance costs for the gas chillers are greater than those of competing systems, because they cover engine replacement and the annual "tune-up" that is needed to maintain the engine.

- Chiller installed costs were obtained from Means and EPRI sources, for conventional electric chillers and for high efficiency (program qualifying) chillers, respectively.
  - FPL rebates are factored into the first costs for the air-source equipment rated at 1.22 kW/ton and the water-source equipment rated at 0.67 kW/ton.
  - The efficiency ratings were derived from chiller program evaluation results, using the BES for program qualifying equipment and a detailed baseline assessment of nonparticipant replacement actions.
- Direct comparisons are drawn between electric and gas chiller costs for air-source, as well as for water-source systems.
- The gas utility rebates and customer connection charges vary regionally, depending upon the representative utility supplying each DCA climate zone. For all cost comparisons presented in this report, gas utility rebates are applied and it is assumed that each customer already has gas service, providing the gas systems with an analytical advantage over competing electric equipment.

THE FINDINGS SHOWN IN THE FACING EXHIBIT REPRESENT A TYPICAL LARGE OFFICE CUSTOMER, LIKE THAT PRESENTED IN EXHIBIT 4-2. THE RESULTS FOR RETAIL BUSINESSES, LARGE HOTELS AND SCHOOLS IS CONTAINED IN THE ATTACHMENT TO THIS CHAPTER.

Exhibit 4-6
Gas Chiller and Competing Equipment Operating Costs
And Gas Chiller Savings and Payback
For Large Office Customers with Existing Gas Service

DCA Climate Zone	HVAC System Type	Chilled Water Plant Usage and Impacts					Chilled Water Plant Costs				Annual Gas Chiller Operating Cost Savings** ($)	Simple Payback*** (years)
		Annual Natural Gas Use (Therms)	Annual Electricity Use (kWh)	Annual Electricity Impact* (kWh)	Summer Demand Impact* (kW)	Winter Demand Impact* (kW)	Annual Natural Gas Costs ($)	Annual Electricity Costs ($)	Annual Gas and Electric Utility Costs ($)	Annual Gas Chiller Utility Bill Savings ($)		
North	Gas Air-Source Chiller	50,887	154,615	-	-	-	28,142	11,252	39,395	-	-	
0.9%	Electric Air-Source Chiller (1.23 kW/ton)	-	582,285	427,670	235.03	-	-	52,329	52,329	12,934	2,670	42
	Electric Air-Source Chiller (1.22 kW/ton)	-	578,111	423,496	232.81	-	-	51,926	51,926	12,531	2,267	50
	Gas Water-Source Chiller	47,344	146,296	-	-	-	26,269	10,606	36,876	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	594,703	448,407	202.65	-	-	53,853	53,853	16,978	6,714	17
	Electric Water-Source Chiller (0.67 kW/ton)	-	516,452	370,156	167.64	-	-	46,130	46,130	9,255	(1,009)	no payback
Central	Gas Air-Source Chiller	57,881	168,629	-	-	-	37,610	12,258	49,869	-	-	
10.4%	Electric Air-Source Chiller (1.23 kW/ton)	-	660,487	491,858	219.11	-	-	58,020	58,020	8,151	(2,113)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	655,714	487,085	217.02	-	-	57,572	57,572	7,703	(2,561)	no payback
	Gas Water-Source Chiller	53,665	159,804	-	-	-	34,954	11,579	46,533	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	668,912	509,108	202.96	-	-	58,362	58,362	11,829	1,565	79
	Electric Water-Source Chiller (0.67 kW/ton)	-	579,996	420,192	167.90	-	-	49,925	49,925	3,392	(6,872)	no payback
South	Gas Air-Source Chiller	66,478	199,338	-	-	-	38,170	14,508	52,678	-	-	
88.8%	Electric Air-Source Chiller (1.23 kW/ton)	-	768,459	569,122	203.73	-	-	65,094	65,094	12,416	2,152	52
	Electric Air-Source Chiller (1.22 kW/ton)	-	762,962	563,624	201.82	-	-	64,600	64,600	11,921	1,657	68
	Gas Water-Source Chiller	61,104	190,255	-	-	-	35,229	13,813	49,042	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	769,677	579,422	184.56	-	-	64,798	64,798	15,755	5,491	20
	Electric Water-Source Chiller (0.67 kW/ton)	-	668,477	478,222	152.52	-	-	55,692	55,692	6,650	(3,614)	no payback
FPL System Weighted Average for Large Offices	Gas Air-Source Chiller	65,452	195,768	-	-	-	38,025	14,247	52,272	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	755,658	559,890	205.60	-	-	64,251	64,251	11,979	1,715	65
	Electric Air-Source Chiller (1.22 kW/ton)	-	750,247	554,479	203.66	-	-	63,761	63,761	11,490	1,226	93
	Gas Water-Source Chiller	60,214	186,719	-	-	-	35,123	13,554	48,676	-	-	
	Electric Water-Source Chiller (0.80 kW/ton)	-	757,720	571,001	186.63	-	-	64,036	64,036	15,359	5,095	22
	Electric Water-Source Chiller (0.67 kW/ton)	-	657,991	471,272	154.24	-	-	55,012	55,012	6,336	(3,929)	no payback

* Impacts are the reduction in annual or peak hour usage for customers that fuel switch from a conventional chiller system to a gas chiller.

** Annual operating cost savings include annual utility bill savings and annual maintenance costs.

*** Simple payback is calculated as the ratio of incremental first cost (investment) to annual savings.

CHILLER END-USE RESEARCH RESULTS INDICATE THAT A SWITCH TO A GAS CHILLED WATER SYSTEM FROM ELECTRIC IS NOT CURRENTLY COST-EFFECTIVE, GIVEN THE VERY HIGH INSTALLED COSTS OF GAS SYSTEMS.

As illustrated in the facing exhibit, gas chillers have a substantially higher first cost, and, given no heat recovery, higher annual operating costs than do competing electric systems. However, individual customers that are able to take advantage of the substantial heat recovery potential of the gas engine systems, will have more favorable results. For the purposes of this evaluation, the gas chiller technology is assessed in the absence of heat recovery because of the site-specific nature of process loads and the knowledge that the ability to make use of waste heat varies dramatically from site to site.

- Because gas chiller operating costs (annual utility costs and maintenance costs), in the absence of heat recovery, are generally greater than electric chiller operating costs, a reasonable payback length to recover the initial investment is rarely achieved.

- These results are based on an assessment that assumes natural replacement customer actions, rather than discretionary retrofit. That is, it is assumed that a customer who is considering a fuel switch to gas will be replacing the chiller system, regardless of fuel choice.

- Site-specific cost-effectiveness assessments are recommended for the gas engine driven chiller technology due to the swing in performance that can be achieved through heat recovery and the dramatic differences in site-to-site heat recovery potential. Many sites have little or no ability to use waste heat.

- Operating costs and paybacks for retail businesses, large hotels and schools is contained in the attachment to this chapter.

THIS CONCLUDES CHAPTER 4. THE ATTACHMENT TO THIS CHAPTER IS PRESENTED NEXT.

ATTACHMENT

Exhibit 4-7
Gas Chiller and Competing Equipment
Installed Costs and Maintenance Costs
For Large Hotel Customers with Existing Gas Service

DCA Climate Zone	Chiller System Type	Chiller Installed Cost ($)	Utility Rebate ($)	Gas Connection Charge ($)	Total Installed Cost ($)	Incremental* Gas Chiller Installed Cost ($)	Annual Maintenance Charge** ($)
North 5.91%	Gas Air-Source Chiller	388,406	15,000	-	373,406		43,869
	Electric Air-Source Chiller (1.23 kW/ton)	226,406	-	-	226,406	147,000	14,850
	Electric Air-Source Chiller (1.22 kW/ton)	230,006	5,400	-	224,606	148,800	14,850
	Gas Water-Source Chiller	413,719	15,000	-	398,719		45,669
	Electric Water-Source Chiller (0.80 kW/ton)	251,719	-	-	251,719	147,000	16,650
	Electric Water-Source Chiller (0.67 kW/ton)	292,669	8,550	-	284,119	114,600	16,650
Central 9.19%	Gas Air-Source Chiller	388,406	4,050	-	384,356		43,869
	Electric Air-Source Chiller (1.23 kW/ton)	226,406	-	-	226,406	157,950	14,850
	Electric Air-Source Chiller (1.22 kW/ton)	230,006	5,400	-	224,606	159,750	14,850
	Gas Water-Source Chiller	413,719	4,050	-	409,669		45,669
	Electric Water-Source Chiller (0.80 kW/ton)	251,719	-	-	251,719	157,950	16,650
	Electric Water-Source Chiller (0.67 kW/ton)	292,669	8,550	-	284,119	125,550	16,650
South 84.90%	Gas Air-Source Chiller	388,406	15,000	-	373,406		43,869
	Electric Air-Source Chiller (1.23 kW/ton)	226,406	-	-	226,406	147,000	14,850
	Electric Air-Source Chiller (1.22 kW/ton)	230,006	5,400	-	224,606	148,800	14,850
	Gas Water-Source Chiller	413,719	15,000	-	398,719		45,669
	Electric Water-Source Chiller (0.80 kW/ton)	251,719	-	-	251,719	147,000	16,650
	Electric Water-Source Chiller (0.67 kW/ton)	292,669	8,550	-	284,119	114,600	16,650
FPL System Weighted Average for Large Hotels	Gas Air-Source Chiller	388,406	13,994	-	374,412		43,869
	Electric Air-Source Chiller (1.23 kW/ton)	226,406	-	-	226,406	148,006	14,850
	Electric Air-Source Chiller (1.22 kW/ton)	230,006	5,400	-	224,606	149,806	14,850
	Gas Water-Source Chiller	413,719	13,994	-	399,725		45,669
	Electric Water-Source Chiller (0.80 kW/ton)	251,719	-	-	251,719	148,006	16,650
	Electric Water-Source Chiller (0.67 kW/ton)	292,669	8,550	-	284,119	115,606	16,650

* Incremental costs are in excess of costs for competing equipment, when a customer selects a gas chiller.
The incremental cost shown above is for the installation of three (3) 150-ton chillers.
The incremental cost for the 1.22 kW/ton air-source and the 0.67 kW/ton water-source equipment includes both FPL and gas utility rebates.
Consistent with nonparticipant actions, FPL rebates are excluded for the 1.23 kW/ton air-source and the 0.80 kW/ton water-source equipment.

** The annual maintenance charge is also the cost to maintain three (3) 150-ton chillers.

Exhibit 4-8
Gas Chiller and Competing Equipment
Installed Costs and Maintenance Costs
For Retail Customers with Existing Gas Service

DCA Climate Zone	Chiller System Type	Chiller Installed Cost ($)	Utility Rebate ($)	Gas Connection Charge ($)	Total Installed Cost ($)	Incremental* Gas Chiller Installed Cost ($)	Annual Maintenance Charge** ($)
North 1.94%	Gas Air-Source Chiller	258,938	15,000	-	243,938		24,266
	Electric Air-Source Chiller (1.23 kW/ton)	150,938	-	-	150,938	93,000	9,900
	Electric Air-Source Chiller (1.22 kW/ton)	153,338	3,600	-	149,738	94,200	9,900
	Gas Water-Source Chiller	275,813	15,000	-	260,813		25,466
	Electric Water-Source Chiller (0.80 kW/ton)	167,813	-	-	167,813	93,000	11,100
	Electric Water-Source Chiller (0.67 kW/ton)	195,113	5,700	-	189,413	71,400	11,100
Central 10.21%	Gas Air-Source Chiller	258,938	2,700	-	256,238		24,266
	Electric Air-Source Chiller (1.23 kW/ton)	150,938	-	-	150,938	105,300	9,900
	Electric Air-Source Chiller (1.22 kW/ton)	153,338	3,600	-	149,738	106,500	9,900
	Gas Water-Source Chiller	275,813	2,700	-	273,113		25,466
	Electric Water-Source Chiller (0.80 kW/ton)	167,813	-	-	167,813	105,300	11,100
	Electric Water-Source Chiller (0.67 kW/ton)	195,113	5,700	-	189,413	83,700	11,100
South 87.85%	Gas Air-Source Chiller	258,938	15,000	-	243,938		24,266
	Electric Air-Source Chiller (1.23 kW/ton)	150,938	-	-	150,938	93,000	9,900
	Electric Air-Source Chiller (1.22 kW/ton)	153,338	3,600	-	149,738	94,200	9,900
	Gas Water-Source Chiller	275,813	15,000	-	260,813		25,466
	Electric Water-Source Chiller (0.80 kW/ton)	167,813	-	-	167,813	93,000	11,100
	Electric Water-Source Chiller (0.67 kW/ton)	195,113	5,700	-	189,413	71,400	11,100
FPL System Weighted Average for Retail Businesses	Gas Air-Source Chiller	258,938	13,744	-	245,194		24,266
	Electric Air-Source Chiller (1.23 kW/ton)	150,938	-	-	150,938	94,256	9,900
	Electric Air-Source Chiller (1.22 kW/ton)	153,338	3,600	-	149,738	95,456	9,900
	Gas Water-Source Chiller	275,813	13,744	-	262,069		25,466
	Electric Water-Source Chiller (0.80 kW/ton)	167,813	-	-	167,813	94,256	11,100
	Electric Water-Source Chiller (0.67 kW/ton)	195,113	5,700	-	189,413	72,656	11,100

* Incremental costs are in excess of costs for competing equipment, when a customer selects a gas chiller.
The incremental cost shown above is for the installation of two (2) 150-ton chillers.
The incremental cost for the 1.22 kW/ton air-source and the 0.67 kW/ton water-source equipment includes both FPL and gas utility rebates.
Consistent with nonparticipant actions, FPL rebates are excluded for the 1.23 kW/ton air-source and the 0.80 kW/ton water-source equipment.

** The annual maintenance charge is also the cost to maintain two (2) 150-ton chillers.

Exhibit 4-9
Gas Chiller and Competing Equipment
Installed Costs and Maintenance Costs
For School Customers with Existing Gas Service

DCA Climate Zone	Chiller System Type	Chiller Installed Cost ($)	Utility Rebate ($)	Gas Connection Charge ($)	Total Installed Cost ($)	Incremental* Gas Chiller Installed Cost ($)	Annual Maintenance Charge** ($)
North 1.61%	Gas Air-Source Chiller	215,781	15,000	-	200,781		16,535
	Electric Air-Source Chiller (1.23 kW/ton)	125,781	-	-	125,781	75,000	8,250
	Electric Air-Source Chiller (1.22 kW/ton)	127,781	3,000	-	124,781	76,000	8,250
	Gas Water-Source Chiller	229,844	15,000	-	214,844		17,535
	Electric Water-Source Chiller (0.80 kW/ton)	139,844	-	-	139,844	75,000	9,250
	Electric Water-Source Chiller (0.67 kW/ton)	162,594	4,750	-	157,844	57,000	9,250
Central 7.01%	Gas Air-Source Chiller	215,781	2,250	-	213,531		16,535
	Electric Air-Source Chiller (1.23 kW/ton)	125,781	-	-	125,781	87,750	8,250
	Electric Air-Source Chiller (1.22 kW/ton)	127,781	3,000	-	124,781	88,750	8,250
	Gas Water-Source Chiller	229,844	2,250	-	227,594		17,535
	Electric Water-Source Chiller (0.80 kW/ton)	139,844	-	-	139,844	87,750	9,250
	Electric Water-Source Chiller (0.67 kW/ton)	162,594	4,750	-	157,844	69,750	9,250
South 91.38%	Gas Air-Source Chiller	215,781	15,000	-	200,781		16,535
	Electric Air-Source Chiller (1.23 kW/ton)	125,781	-	-	125,781	75,000	8,250
	Electric Air-Source Chiller (1.22 kW/ton)	127,781	3,000	-	124,781	76,000	8,250
	Gas Water-Source Chiller	229,844	15,000	-	214,844		17,535
	Electric Water-Source Chiller (0.80 kW/ton)	139,844	-	-	139,844	75,000	9,250
	Electric Water-Source Chiller (0.67 kW/ton)	162,594	4,750	-	157,844	57,000	9,250
FPL System Weighted Average for Schools	Gas Air-Source Chiller	215,781	14,106	-	201,675		16,535
	Electric Air-Source Chiller (1.23 kW/ton)	125,781	-	-	125,781	75,894	8,250
	Electric Air-Source Chiller (1.22 kW/ton)	127,781	3,000	-	124,781	76,894	8,250
	Gas Water-Source Chiller	229,844	14,106	-	215,738		17,535
	Electric Water-Source Chiller (0.80 kW/ton)	139,844	-	-	139,844	75,894	9,250
	Electric Water-Source Chiller (0.67 kW/ton)	162,594	4,750	-	157,844	57,894	9,250

* Incremental costs are in excess of costs for competing equipment, when a customer selects a gas chiller.
The incremental cost shown above is for the installation of two (2) 125-ton chillers.
The incremental cost for the 1.22 kW/ton air-source and the 0.67 kW/ton water-source equipment includes both FPL and gas utility rebates.
Consistent with nonparticipant actions, FPL rebates are excluded for the 1.23 kW/ton air-source and the 0.80 kW/ton water-source equipment.

** The annual maintenance charge is also the cost to maintain two (2) 125-ton chillers.

Exhibit 4-10
Gas Chiller and Competing Equipment Operating Costs
And Gas Chiller Savings and Payback
For Large Hotel Customers with Existing Gas Service

DCA Climate Zone	HVAC System Type	Chilled Water Plant Usage and Impacts					Chilled Water Plant Costs				Annual Gas Chiller Operating Cost Savings** ($)	Simple Payback*** (years)
		Annual Natural Gas Use (Therms)	Annual Electricity Use (kWh)	Annual Electricity Impact* (kWh)	Summer Demand Impact* (kW)	Winter Demand Impact* (kW)	Annual Natural Gas Costs ($)	Annual Electricity Costs ($)	Annual Gas and Electric Utility Costs ($)	Annual Gas Chiller Utility Bill Savings ($)		
North 5.9%	Gas Air-Source Chiller	69,300	199,633	-	-	-	38,657	13,444	52,101	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	835,654	636,021	235.73	1.08	-	58,290	58,290	6,189	(22,830)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	829,706	630,073	233.61	1.06	-	57,860	57,860	5,759	(23,260)	no payback
	Gas Water-Source Chiller	70,012	251,747	-	-	-	39,343	16,904	56,247	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	973,431	721,684	179.05	4.69	-	66,025	66,025	9,778	(19,241)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	848,082	596,336	148.49	3.64	-	57,433	57,433	1,186	(27,833)	no payback
Central 9.2%	Gas Air-Source Chiller	74,403	204,565	-	-	-	48,266	13,799	62,065	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	905,877	701,312	221.51	3.21	-	62,602	62,602	538	(28,481)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	899,357	694,792	219.51	3.16	-	62,136	62,136	71	(28,947)	no payback
	Gas Water-Source Chiller	73,998	257,767	-	-	-	48,197	17,336	65,533	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	1,000,493	742,727	179.34	13.74	-	67,802	67,802	2,269	(26,750)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	871,590	613,823	148.73	10.94	-	58,990	58,990	(6,543)	(35,562)	no payback
South 84.9%	Gas Air-Source Chiller	81,001	210,109	-	-	-	45,946	14,215	60,160	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	984,578	774,468	200.02	7.73	-	67,873	67,873	7,713	(21,306)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	977,456	767,347	198.21	7.64	-	67,367	67,367	7,206	(21,813)	no payback
	Gas Water-Source Chiller	78,757	266,241	-	-	-	44,937	17,948	62,885	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	1,059,117	792,876	177.09	25.71	-	71,494	71,494	8,609	(20,410)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	921,734	655,492	146.84	20.91	-	62,156	62,156	(728)	(29,747)	no payback
FPL System Weighted Average for Large Hotels	Gas Air-Source Chiller	79,703	208,981	-	-	-	45,728	14,131	59,859	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	968,541	759,561	204.11	6.92	-	66,822	66,822	6,963	(22,055)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	961,544	752,564	202.26	6.84	-	66,324	66,324	6,465	(22,554)	no payback
	Gas Water-Source Chiller	77,802	264,606	-	-	-	44,905	17,830	62,735	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	1,048,665	784,059	177.41	23.37	-	70,831	70,831	8,096	(20,923)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	912,772	648,166	147.11	18.98	-	61,586	61,586	(1,149)	(30,168)	no payback

* Impacts are the reduction in annual or peak hour usage for customers that fuel switch from a conventional chiller system to a gas chiller.

** Annual operating cost savings include annual utility bill savings and annual maintenance costs.

*** Simple payback is calculated as the ratio of incremental first cost (investment) to annual savings.

Exhibit 4-11
Gas Chiller and Competing Equipment Operating Costs
And Gas Chiller Savings and Payback
For Retail Customers with Existing Gas Service

DCA Climate Zone	HVAC System Type	Chilled Water Plant Usage and Impacts					Chilled Water Plant Costs				Annual Gas Chiller Operating Cost Savings** ($)	Simple Payback*** (years)
		Annual Natural Gas Use (Therms)	Annual Electricity Use (kWh)	Annual Electricity Impact* (kWh)	Summer Demand Impact* (kW)	Winter Demand Impact* (kW)	Annual Natural Gas Costs ($)	Annual Electricity Costs ($)	Annual Gas and Electric Utility Costs ($)	Annual Gas Chiller Utility Bill Savings ($)		
North	Gas Air-Source Chiller	59,020	155,654	-	-	-	34,139	11,106	45,245	-	-	
1.9%	Electric Air-Source Chiller (1.23 kW/ton)	-	659,349	503,694	183.01	27.37	-	52,054	52,054	6,809	(7,557)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	654,367	498,713	181.25	27.03	-	51,647	51,647	6,402	(7,964)	no payback
	Gas Water-Source Chiller	57,846	137,609	-	-	-	33,823	9,800	43,623	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	684,980	547,371	142.32	57.06	-	51,631	51,631	8,008	(6,358)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	587,651	450,043	117.07	46.70	-	44,222	44,222	599	(13,767)	no payback
Central	Gas Air-Source Chiller	62,537	158,050	-	-	-	41,438	11,299	52,737	-	-	
10.2%	Electric Air-Source Chiller (1.23 kW/ton)	-	696,890	538,840	171.93	28.95	-	54,677	54,677	1,940	(12,426)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	691,581	533,532	170.27	28.60	-	54,248	54,248	1,511	(12,855)	no payback
	Gas Water-Source Chiller	59,931	139,242	-	-	-	39,939	9,936	49,875	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	700,868	561,626	141.71	58.97	-	52,958	52,958	3,083	(11,283)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	601,173	461,931	116.55	48.00	-	45,369	45,369	(4,505)	(18,872)	no payback
South	Gas Air-Source Chiller	65,683	158,359	-	-	-	38,504	11,345	49,849	-	-	
87.8%	Electric Air-Source Chiller (1.23 kW/ton)	-	731,007	572,648	159.94	28.90	-	57,000	57,000	7,151	(7,215)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	725,413	567,054	158.42	28.54	-	56,555	56,555	6,706	(7,660)	no payback
	Gas Water-Source Chiller	61,605	139,067	-	-	-	36,392	9,950	46,342	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	712,090	573,022	136.65	56.81	-	53,699	53,699	7,357	(7,009)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	610,531	471,463	112.39	46.19	-	45,971	45,971	(370)	(14,736)	no payback
FPL System Weighted Average for Retail Businesses	Gas Air-Source Chiller	65,233	158,275	-	-	-	38,719	11,335	50,055	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	726,135	567,860	161.61	28.87	-	56,667	56,667	6,612	(7,754)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	720,582	562,307	160.07	28.52	-	56,224	56,224	6,169	(8,197)	no payback
	Gas Water-Source Chiller	61,361	139,057	-	-	-	36,704	9,945	46,650	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	710,419	571,362	137.27	57.03	-	53,583	53,583	6,933	(7,433)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	609,132	470,075	112.91	46.39	-	45,876	45,876	(774)	(15,140)	no payback

* Impacts are the reduction in annual or peak hour usage for customers that fuel switch from a conventional chiller system to a gas chiller.

** Annual operating cost savings include annual utility bill savings and annual maintenance costs.

*** Simple payback is calculated as the ratio of incremental first cost (investment) to annual savings.

Exhibit 4-12
Gas Chiller and Competing Equipment Operating Costs
And Gas Chiller Savings and Payback
For School Customers with Existing Gas Service

DCA Climate Zone	HVAC System Type	Chilled Water Plant Usage and Impacts					Chilled Water Plant Costs				Annual Gas Chiller Operating Cost Savings** ($)	Simple Payback*** (years)
		Annual Natural Gas Use (Therms)	Annual Electricity Use (kWh)	Annual Electricity Impact* (kWh)	Summer Demand Impact* (kW)	Winter Demand Impact* (kW)	Annual Natural Gas Costs ($)	Annual Electricity Costs ($)	Annual Gas and Electric Utility Costs ($)	Annual Gas Chiller Utility Bill Savings ($)		
North	Gas Air-Source Chiller	23,517	60,675	-	-	-	13,229	4,920	18,149	-	-	
1.6%	Electric Air-Source Chiller (1.23 kW/ton)	-	247,448	186,773	108.29	0.13	-	25,131	25,131	6,982	(1,303)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	245,621	184,946	107.28	0.11	-	24,927	24,927	6,779	(1,507)	no payback
	Gas Water-Source Chiller	22,042	63,567	-	-	-	12,537	5,144	17,681	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	280,366	216,799	85.24	3.75	-	27,655	27,655	9,974	1,689	66
	Electric Water-Source Chiller (0.67 kW/ton	-	242,387	178,821	70.39	2.37	-	23,651	23,651	5,971	(2,315)	no payback
Central	Gas Air-Source Chiller	26,351	63,842	-	-	-	17,215	5,188	22,403	-	-	
7.0%	Electric Air-Source Chiller (1.23 kW/ton)	-	275,017	211,175	99.40	0.36	-	27,878	27,878	5,475	(2,810)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	272,960	209,119	98.46	0.34	-	27,651	27,651	5,248	(3,037)	no payback
	Gas Water-Source Chiller	24,217	65,555	-	-	-	15,925	5,315	21,240	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	297,426	231,870	83.02	3.81	-	29,106	29,106	7,866	(419)	no payback
	Electric Water-Source Chiller (0.67 kW/ton	-	256,951	191,395	68.53	2.41	-	24,876	24,876	3,636	(4,649)	no payback
South	Gas Air-Source Chiller	29,465	67,648	-	-	-	16,941	5,519	22,460	-	-	
91.4%	Electric Air-Source Chiller (1.23 kW/ton)	-	303,541	235,893	93.45	6.47	-	30,210	30,210	7,750	(535)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	301,253	233,605	92.56	6.38	-	29,961	29,961	7,501	(784)	no payback
	Gas Water-Source Chiller	26,591	68,434	-	-	-	15,441	5,568	21,009	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	316,643	248,210	83.97	27.17	-	30,845	30,845	9,836	1,551	72
	Electric Water-Source Chiller (0.67 kW/ton	-	273,425	204,991	69.32	21.91	-	26,413	26,413	5,405	(2,881)	no payback
FPL System Weighted Average for Schools	Gas Air-Source Chiller	29,151	67,269	-	-	-	16,901	5,486	22,387	-	-	
	Electric Air-Source Chiller (1.23 kW/ton)	-	300,639	233,370	94.10	5.94	-	29,965	29,965	7,578	(707)	no payback
	Electric Air-Source Chiller (1.22 kW/ton)	-	298,375	231,106	93.21	5.86	-	29,718	29,718	7,331	(954)	no payback
	Gas Water-Source Chiller	26,352	68,154	-	-	-	15,428	5,544	20,971	-	-	
	Electric Water-Source Chiller (0.80 kW/ton	-	314,713	246,559	83.92	25.15	-	30,672	30,672	9,700	1,415	79
	Electric Water-Source Chiller (0.67 kW/ton	-	271,771	203,617	69.29	20.23	-	26,261	26,261	5,290	(2,995)	no payback

* Impacts are the reduction in annual or peak hour usage for customers that fuel switch from a conventional chiller system to a gas chiller.

** Annual operating cost savings include annual utility bill savings and annual maintenance costs.

*** Simple payback is calculated as the ratio of incremental first cost (investment) to annual savings.

A. UTILITY RATES

Exhibit A-1
Summary of Gas Rates
Daytona and Miami

Company:	Peoples Gas	
Rate:	General Service (GS)	
	with Load Profile Enhancement (LE) Rider	
Service:	Natural Gas	
BTU Value:	1,100 Btu per cubic foot	
Seasons:	Summer	April through October
	Winter	November through March
Customer Charge:		$17.00 Per Month
Energy Charge:	Summer	$0.097500 Per Therm
	Winter	$0.243740 Per Therm
PGA & ECCRA		$0.344100 Per Therm
Taxes:	Utility Tax	10.00%
	Franchise Tax	6.03% Daytona
		6.61% Miami
	Sales Tax	2.58%

COMMERCIAL RATES USED TO ASSESS THE COST-EFFECTIVENESS OF GAS ENGINE-DRIVEN CHILLERS AND COMPETING ELECTRIC SYSTEMS ARE PRESENTED IN THIS APPENDIX.

- Natural gas rates were obtained from each of two gas utilities (serving three representative cities) in FPL service territory. Comparable FPL rates were also obtained.

- The cities selected represent each of the DCA climates, North (Daytona Beach served by Peoples Gas), Central (Melbourne served by City Gas), and South (Miami served by Peoples Gas).

Exhibit A-2
Summary of Gas Rates
Melbourne

Company:	City Gas Company of Florida	
Rate:	Commercial and Industrial Firm Service (CS) with Load Profile Enhancement Discount (ED)	
Service:	Natural Gas	
BTU Value:	1,100 Btu per cubic foot	
Seasons:	Summer	April through October
	Winter	November through March
Customer Charge:		$17.00 Per Month
Energy Charge:	Summer	$0.101295 Per Therm
	Winter	$0.202590 Per Therm
PGA & ECCRA:		$0.408400 Per Therm
Taxes:		10% Utility Tax
		6% Franchise Tax
		6% Sales Tax

Exhibit A-3
Summary of Electric Rates
Daytona Beach, Melbourne, and Miami

	Company:	Florida Power and Light	
	Rate:	General Service Demand (GSD-1) (21-499 kW)	
Customer Charge:			$35.00 Per Month
Demand Charge:		First 10 kW	$0.00 Per kW
		All Remaining kW	$6.25 Per kW
Capacity Charge:			$1.89 Per kW
Energy Charge:			$0.018930 Per kWh
Non-Fuel Adjustments			$0.002100 Per kWh
Fuel Cost Adjustment			$0.019800 Per kWh
Taxes			
	Tax		1.03%
	Franchise Factor	Miami & Melbourne	5.76%
		Daytona Beach	5.55%
	Main Tax		10.00%
	Florida Sales Tax	Melbourne & Daytona Beach	6.00%
		Miami	
		First $5,000	6.50%
		All Remaining $	6.00%

B. SUMMARY OF NATURAL GAS END-USE RESEARCH EXPENDITURES

Exhibit B-1
Summary of Natural Gas End-Use R&D Expenditures
Actual Costs Compared to FPSC Approved Amounts

PROJECTS	FPSC APPROVED AMOUNT	EXPENDITURES	SAVINGS
Administration	(1)	$148,856	
Gas Chiller	$1,140,000	$166,429	
Gas Heat Pump	$250,000	$144,158	
Gas Desiccant	$45,000	$5,184	
Gas Water Heating	$246,000	$131,399	
Gas DX	$239,000	$12,044	
Total	$1,920,000	$608,069	$1,311,931

(1) The FPSC approved amounts included the administration costs in each project. Actual administration expenditures were not tracked at a project level.

THE GAS END-USE RESEARCH PROJECT WAS COMPLETED SIGNFICANTLY UNDER BUDGET

Submission of this report concludes FPL's Natural Gas End-Use Technology Research Project.

Because FPL was able to solicit customers who already had the gas technologies installed, we were able to significantly reduce the costs for this project. In fact, for the entire Gas End-Use research, the only gas technology FPL had to install was two gas heat-pumps, which were replaced at the request of the participants by electric heat-pumps at the completion of the research project.

Several additional factors combined to reduce the actual expense of the research. One was the joint petition by FPL and Peoples Gas to discontinue the Gas Engine Driven DX Air Conditioning after a joint analysis determined the technology was not cost-effective in Florida. Finally, because the gas end-use technologies under consideration were not cost-effective, FPL did not undergo any of the costs associated with the market research to determine the market potential for these technologies.

C. GAS ENGINE-DRIVEN CHILLER COST-EFFECTIVENESS

Exhibit C-1
Gas Chiller vs Competing Equipment Cost-Effectiveness
Participant Test and Rate Impact Test

Gas Technology	Competing Electric Technology	Rate Class	CASE ONE			CASE TWO		
			Participant Test	RIM Ratio	Participant Incentive Level	Participant Test	RIM Ratio	Participant Incentive Level
Air-Source Gas Engine-Driven Chiller	Electric Air-Source Chiller (1.23 kW/ton)	GSD	1.01	0.466	$ 2,215.00	0.53	0.962	$ -
		GSLD	1.01	0.463	$ 2,305.00	0.51	0.992	$ -
Water-Source Gas Engine-Driven Chiller	Electric Water-Source Chiller (0.80 kW/ton)	GSD	1.01	0.455	$ 2,530.00	0.52	0.956	$ -
		GSLD	1.01	0.452	$ 2,640.00	0.5	0.989	$ -

GAS ENGINE-DRIVEN CHILLER END-USE RESEARCH RESULTS INDICATE THAT A SWITCH TO A GAS COOLING SYSTEM IS NOT CURRENTLY BENEFICIAL TO BOTH UTILITY AND THE PARTICIPANT GIVEN THE HIGH FIRST COSTS OF THE EQUIPMENT.

As illustrated in the facing exhibit, gas engine-driven chillers -- both air-source and water-source -- are not a cost-effective solution for the utility and the participant.

In Case 1 the participant incentive levels were set to ensure a participant ratio of 1.01, however, in that scenario the measure failed the RIM test with a ratios between 0.463 and 0.466 for the air-source chiller and between 0.452 and 0.455 for the water-source chiller for the two rate classes.

In Case 2 the participant incentive levels were set to $0 in order to maximize the RIM ratio. For each technology and each rate class both the Participant Test and the RIM ratio were below 1.0.

The following CPF runs indicate that it is not possible for the technology of gas engine-driven chillers to be cost-effective for both the participant and the utility.

- **Air-Source Gas Engine-Driven Chiller** -- CPF run for GSD rate class with 1.23 kW/ton air-source chiller as competing technology

- **Air-Source Gas Engine-Driven Chiller** -- CPF run for GSLD rate class with 1.23 kW/ton air-source chiller as competing technology

- **Water-Source Gas Engine-Driven Chiller** -- CPF run for GSD rate class with 0.80 kW/ton air-source chiller as competing technology

- **Water-Source Gas Engine-Driven Chiller** -- CPF run for GSLD rate class with 0.80 kW/ton air-source chiller as competing technology

D. APPENDIX -- CPF RUNS

ATTACHEMENT D-1
AIR-SOURCE GAS CHILLER
GSD RATE - CASE 1

INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.86	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.11	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,364.2	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	30	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	2,215	0	2,303	66	44	769	170	0	939
2001	0	0	0	0	134	85	0	350	0	350
2002	0	0	0	0	134	85	0	359	0	359
2003	0	0	0	0	137	85	0	368	0	368
2004	0	0	0	0	138	85	0	378	0	378
2005	0	0	0	0	140	85	0	388	0	388
2006	0	0	0	0	141	84	0	399	0	399
2007	0	0	0	0	143	83	0	409	0	409
2008	0	0	0	0	144	84	0	421	0	421
2009	0	0	0	0	144	83	0	433	0	433
2010	0	0	0	0	152	81	0	445	0	445
2011	0	0	0	0	154	78	0	457	0	457
2012	0	0	0	0	156	78	0	470	0	470
2013	0	0	0	0	158	78	0	484	0	484
2014	0	0	0	0	161	78	0	498	0	498
2015	0	0	0	0	162	77	0	513	0	513
2016	0	0	0	0	165	76	0	527	0	527
2017	0	0	0	0	165	77	0	543	0	543
2018	0	0	0	0	167	76	0	558	0	558
2019	0	0	0	0	169	76	0	575	0	575
2020	152	2,215	0	2,367	172	75	1,334	591	0	1,926
2021	0	0	0	0	174	75	0	608	0	608
2022	0	0	0	0	176	75	0	626	0	626
2023	0	0	0	0	178	74	0	644	0	644
2024	0	0	0	0	180	74	0	663	0	663
NOM	239	4,430	0	4,669	3,809	1,953	2,103	11,877	0	13,980
NPV	97	2,199	0	2,296	1,266	707	849	3,720	0	4,569

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	726	25	0	50	31	10	24	2	142	142	142
2006	696	24	0	48	20	10	24	11	137	126	268
2007	661	23	0	45	20	10	24	9	132	111	379
2008	628	21	0	43	20	10	24	8	127	98	477
2009	596	20	0	41	20	10	24	7	123	87	564
2010	566	19	0	39	20	10	24	6	118	77	641
2011	537	18	0	37	20	10	24	5	114	68	709
2012	508	17	0	35	19	10	24	4	110	60	769
2013	480	16	0	33	18	10	24	3	106	53	822
2014	453	15	0	31	17	10	24	3	102	47	869
2015	425	15	0	29	16	10	24	3	98	41	911
2016	397	14	0	27	15	10	24	3	94	36	947
2017	370	13	0	25	14	10	24	3	90	32	979
2018	342	12	0	24	12	10	24	3	85	28	1,007
2019	314	11	0	22	11	10	24	3	81	24	1,031
2020	286	10	0	20	10	10	24	3	77	21	1,053
2021	259	9	0	18	9	10	24	3	73	19	1,071
2022	231	8	0	16	8	10	24	3	69	16	1,087
2023	203	7	0	14	6	10	24	3	65	14	1,101
2024	176	6	0	12	5	10	24	3	61	12	1,113
2025	151	5	0	10	10	10	24	(3)	58	10	1,123
2026	132	5	0	9	15	10	24	(9)	55	9	1,133
2027	117	4	0	8	15	10	24	(9)	53	8	1,140
2028	101	3	0	7	14	10	24	(9)	50	7	1,147
2029	86	3	0	6	13	10	24	(9)	48	6	1,154
2030	70	2	0	5	13	10	24	(9)	46	5	1,159
2031	55	2	0	4	12	10	24	(9)	43	5	1,164
2032	39	1	0	3	11	10	24	(9)	41	4	1,168
2033	23	1	0	2	11	10	24	(9)	39	4	1,171
2034	8	0	0	1	10	10	24	(9)	37	3	1,174

IN SERVICE COS ($000)	727
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	26	26	24	24	22	22	2	54	0	0	0	2	(11)
2006	7.22%	51	77	24	48	22	45	11	54	0	0	0	11	0
2007	6.68%	47	124	24	73	22	67	9	54	0	0	0	9	10
2008	6.18%	44	168	24	97	22	90	8	54	0	0	0	8	18
2009	5.71%	40	208	24	121	22	112	7	54	0	0	0	7	25
2010	5.29%	37	245	24	145	22	135	6	54	0	0	0	6	31
2011	4.89%	34	280	24	170	22	157	5	54	0	0	0	5	35
2012	4.52%	32	312	24	194	22	179	4	54	0	0	0	4	39
2013	4.46%	31	343	24	218	22	202	3	54	0	0	0	3	42
2014	4.46%	31	375	24	242	22	224	3	54	0	0	0	3	46
2015	4.46%	31	406	24	267	22	247	3	54	0	0	0	3	49
2016	4.46%	31	437	24	291	22	269	3	54	0	0	0	3	53
2017	4.46%	31	469	24	315	22	292	3	54	0	0	0	3	56
2018	4.46%	31	500	24	339	22	314	3	54	0	0	0	3	60
2019	4.46%	31	532	24	363	22	337	3	54	0	0	0	3	63
2020	4.46%	31	563	24	388	22	359	3	54	0	0	0	3	67
2021	4.46%	31	595	24	412	22	381	3	54	0	0	0	3	70
2022	4.46%	31	626	24	436	22	404	3	54	0	0	0	3	74
2023	4.46%	31	658	24	460	22	426	3	54	0	0	0	3	77
2024	4.46%	31	689	24	485	22	449	3	54	0	0	0	3	80
2025	2.23%	16	705	24	509	22	471	(3)	54	0	0	0	(3)	78
2026	0.00%	0	705	24	533	22	494	(9)	54	0	0	0	(9)	69
2027	0.00%	0	705	24	557	22	516	(9)	54	0	0	0	(9)	61
2028	0.00%	0	705	24	582	22	538	(9)	54	0	0	0	(9)	52
2029	0.00%	0	705	24	606	22	561	(9)	54	0	0	0	(9)	43
2030	0.00%	0	705	24	630	22	583	(9)	54	0	0	0	(9)	35
2031	0.00%	0	705	24	654	22	606	(9)	54	0	0	0	(9)	26
2032	0.00%	0	705	24	678	22	628	(9)	54	0	0	0	(9)	17
2033	0.00%	0	705	24	703	22	651	(9)	54	0	0	0	(9)	9
2034	0.00%	0	705	24	727	22	673	(9)	54	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(12)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	54
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	26	2	703	24	(11)	739	713	726
2006	7.22%	51	11	678	48	0	713	678	696
2007	6.68%	47	9	654	73	10	678	644	661
2008	6.18%	44	8	630	97	18	644	612	628
2009	5.71%	40	7	606	121	25	612	581	596
2010	5.29%	37	6	582	145	31	581	551	566
2011	4.89%	34	5	557	170	35	551	522	537
2012	4.52%	32	4	533	194	39	522	494	508
2013	4.46%	31	3	509	218	42	494	467	480
2014	4.46%	31	3	485	242	46	467	439	453
2015	4.46%	31	3	460	267	49	439	411	425
2016	4.46%	31	3	436	291	53	411	383	397
2017	4.46%	31	3	412	315	56	383	356	370
2018	4.46%	31	3	388	339	60	356	328	342
2019	4.46%	31	3	363	363	63	328	300	314
2020	4.46%	31	3	339	388	67	300	273	286
2021	4.46%	31	3	315	412	70	273	245	259
2022	4.46%	31	3	291	436	74	245	217	231
2023	4.46%	31	3	267	460	77	217	190	203
2024	4.46%	31	3	242	485	80	190	162	176
2025	2.23%	16	(3)	218	509	78	162	140	151
2026	0.00%	0	(9)	194	533	69	140	125	132
2027	0.00%	0	(9)	170	557	61	125	109	117
2028	0.00%	0	(9)	145	582	52	109	93	101
2029	0.00%	0	(9)	121	606	43	93	78	86
2030	0.00%	0	(9)	97	630	35	78	62	70
2031	0.00%	0	(9)	73	654	26	62	47	55
2032	0.00%	0	(9)	48	678	17	47	31	39
2033	0.00%	0	(9)	24	703	9	31	16	23
2034	0.00%	0	(9)	0	727	0	16	0	8

* Column not specified in workbook

(1) YEAR	(2) NO.YEARS BEFORE IN-SERVICE	(3) PLANT ESCALATION RATE	(4) CUMULATIVE ESCALATION FACTOR	(5) YEARLY EXPENDITURE (%)	(6) ANNUAL SPENDING ($/kW)	(7) CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	646	646	646
EQUITY AFUDC	54		
DEBT AFUDC	27	27	
CPI			58
TOTAL	727	673	705

* Column not specified in workbook

INPUT DATA -- PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMENT FUEL COST (C/kWh)	PROGRAM kW EFFECTIVENESS FACTOR	PROGRAM kWh EFFECTIVENESS FACTOR
1998	0	0	2.00	2.23	2.10	0.00	1.00	1.00
1999	0	0	2.23	2.53	2.39	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.81	2.64	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.24	3.00	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.07	2.89	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.16	2.88	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.41	3.10	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.65	3.30	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.76	3.39	3.34	1.00	1.00
2007	1,000	1,000	3.13	4.01	3.56	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.92	3.48	3.45	1.00	1.00
2009	1,000	1,000	3.15	4.04	3.58	3.60	1.00	1.00
2010	1,000	1,000	3.14	4.10	3.57	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.25	3.79	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.40	3.86	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.53	3.97	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.64	4.04	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.71	4.08	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.78	4.11	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.96	4.27	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.22	4.50	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.49	4.71	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.67	4.88	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.81	4.98	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.96	5.10	4.97	1.00	1.00
2023	1,000	1,000	4.53	6.13	5.24	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.31	5.38	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	142	51	7	192	287	104
2006	137	53	8	201	304	94
2007	132	55	8	207	322	80
2008	127	57	8	209	318	84
2009	123	59	8	210	328	72
2010	118	62	8	204	313	79
2011	114	64	8	207	326	68
2012	110	67	9	213	331	67
2013	106	70	9	219	334	70
2014	102	72	9	226	337	72
2015	98	75	9	230	339	73
2016	94	78	9	234	340	75
2017	90	81	10	241	353	68
2018	85	85	10	248	373	55
2019	81	88	10	257	394	43
2020	77	92	11	265	415	29
2021	73	95	11	270	423	27
2022	69	99	11	277	431	26
2023	65	103	12	312	441	51
2024	61	107	12	312	453	40
NOM	2,005	1,513	186	4,734	7,160	1,278
NPV	610	370	47	1,213	1,842	398

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	50	0
2001	15	3	18	9	15	24	115	0
2002	14	4	18	9	15	25	109	0
2003	14	4	17	9	16	25	113	0
2004	13	4	17	8	17	25	122	0
2005	12	4	16	8	17	25	131	0
2006	12	4	16	8	18	26	135	0
2007	12	4	16	8	19	26	145	0
2008	11	4	16	7	20	27	142	0
2009	11	5	15	7	20	27	146	0
2010	10	5	15	7	21	28	149	0
2011	10	5	15	6	22	28	154	0
2012	9	5	15	6	23	29	160	0
2013	9	5	14	6	24	30	165	0
2014	9	6	14	6	25	30	169	0
2015	8	6	14	5	26	31	172	0
2016	8	6	14	5	27	32	174	0
2017	7	6	14	5	28	32	181	0
2018	7	7	14	4	29	33	191	0
2019	6	7	13	4	30	34	201	0
2020	6	7	13	4	31	35	208	0
2021	6	7	13	4	32	36	213	0
2022	5	8	13	3	34	37	219	0
2023	5	8	13	3	35	38	225	0
2024	5	8	13	3	37	40	232	0
NOM.	223	134	357	145	579	725	4,021	0
NPV	90	39	129	58	169	228	1,237	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	939	0	1,027	0	0	50	0	50	(977)	(823)
2001	0	0	350	0	350	0	42	115	0	157	(192)	(971)
2002	0	0	359	0	359	0	42	109	0	151	(208)	(1,119)
2003	0	0	368	0	368	0	42	113	0	155	(213)	(1,257)
2004	0	0	378	0	378	0	42	122	0	164	(214)	(1,385)
2005	0	0	388	0	388	104	42	131	0	277	(111)	(1,446)
2006	0	0	399	0	399	94	42	135	0	272	(127)	(1,510)
2007	0	0	409	0	409	80	42	145	0	267	(142)	(1,575)
2008	0	0	421	0	421	84	42	142	0	268	(153)	(1,640)
2009	0	0	433	0	433	72	43	146	0	261	(171)	(1,707)
2010	0	0	445	0	445	79	43	149	0	271	(174)	(1,768)
2011	0	0	457	0	457	68	43	154	0	265	(192)	(1,831)
2012	0	0	470	0	470	67	44	160	0	271	(199)	(1,891)
2013	0	0	484	0	484	70	44	165	0	279	(205)	(1,948)
2014	0	0	498	0	498	72	44	169	0	285	(213)	(2,001)
2015	0	0	513	0	513	73	45	172	0	289	(223)	(2,053)
2016	0	0	527	0	527	75	46	174	0	295	(233)	(2,103)
2017	0	0	543	0	543	68	46	181	0	296	(247)	(2,151)
2018	0	0	558	0	558	55	47	191	0	293	(265)	(2,198)
2019	0	0	575	0	575	43	48	201	0	291	(283)	(2,245)
2020	0	152	1,926	0	2,078	29	48	208	0	285	(1,792)	(2,515)
2021	0	0	608	0	608	27	49	213	0	290	(319)	(2,560)
2022	0	0	626	0	626	26	50	219	0	295	(331)	(2,602)
2023	0	0	644	0	644	51	52	225	0	328	(316)	(2,639)
2024	0	0	663	0	663	40	53	232	0	325	(338)	(2,675)
NOM	0	239	13,980	0	14,219	1,278	1,082	4,021	0	6,381	(7,838)	
NPV	0	97	4,569	0	4,666	398	357	1,237	0	1,991	(2,675)	

Discount Rate: 8.98 %
Benefit/Cost Ratio (Col(11) / Col(6)) : 0.43

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	133	0	2,215	0	2,348	769	170	0	939	1,409	1,186
2001	266	0	0	0	266	0	350	0	350	(83)	1,122
2002	266	0	0	0	266	0	359	0	359	(93)	1,056
2003	271	0	0	0	271	0	368	0	368	(98)	993
2004	272	0	0	0	272	0	378	0	378	(106)	929
2005	275	0	0	0	275	0	388	0	388	(113)	867
2006	275	0	0	0	275	0	399	0	399	(124)	805
2007	276	0	0	0	276	0	409	0	409	(133)	743
2008	278	0	0	0	278	0	421	0	421	(143)	683
2009	277	0	0	0	277	0	433	0	433	(155)	623
2010	286	0	0	0	286	0	445	0	445	(159)	566
2011	286	0	0	0	286	0	457	0	457	(171)	510
2012	289	0	0	0	289	0	470	0	470	(182)	455
2013	291	0	0	0	291	0	484	0	484	(193)	402
2014	295	0	0	0	295	0	498	0	498	(203)	351
2015	297	0	0	0	297	0	513	0	513	(216)	301
2016	300	0	0	0	300	0	527	0	527	(228)	252
2017	300	0	0	0	300	0	543	0	543	(243)	205
2018	302	0	0	0	302	0	558	0	558	(256)	159
2019	305	0	0	0	305	0	575	0	575	(270)	115
2020	307	0	2,215	0	2,522	1,334	591	0	1,926	597	205
2021	310	0	0	0	310	0	608	0	608	(299)	163
2022	312	0	0	0	312	0	626	0	626	(314)	123
2023	315	0	0	0	315	0	644	0	644	(329)	85
2024	318	0	0	0	318	0	663	0	663	(345)	48
NOM	7,100	0	4,430	0	11,530	2,103	11,877	0	13,980	(2,450)	
NPV	2,418	0	2,199	0	4,617	849	3,720	0	4,569	48	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) **1.01**

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMf Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	2,215	110	0	2,413	50	0	0	0	50	(2,363)	(1,990)
2001	0	0	0	219	0	219	115	42	0	0	157	(62)	(2,038)
2002	0	0	0	219	0	219	109	42	0	0	151	(68)	(2,086)
2003	0	0	0	222	0	222	113	42	0	0	155	(67)	(2,130)
2004	0	0	0	223	0	223	122	42	0	0	164	(59)	(2,165)
2005	0	0	0	225	0	225	235	42	0	0	277	51	(2,137)
2006	0	0	0	225	0	225	230	42	0	0	272	47	(2,113)
2007	0	0	0	226	0	226	225	42	0	0	267	41	(2,094)
2008	0	0	0	227	0	227	226	42	0	0	268	41	(2,077)
2009	0	0	0	227	0	227	219	43	0	0	261	34	(2,064)
2010	0	0	0	232	0	232	228	43	0	0	271	39	(2,050)
2011	0	0	0	232	0	232	222	43	0	0	265	33	(2,039)
2012	0	0	0	234	0	234	227	44	0	0	271	37	(2,028)
2013	0	0	0	235	0	235	235	44	0	0	279	43	(2,016)
2014	0	0	0	238	0	238	240	44	0	0	285	47	(2,004)
2015	0	0	0	240	0	240	244	45	0	0	289	50	(1,993)
2016	0	0	0	242	0	242	249	46	0	0	295	53	(1,981)
2017	0	0	0	242	0	242	250	46	0	0	296	54	(1,971)
2018	0	0	0	244	0	244	246	47	0	0	293	50	(1,962)
2019	0	0	0	245	0	245	244	48	0	0	291	46	(1,954)
2020	0	152	2,215	247	0	2,614	237	48	0	0	285	(2,329)	(2,306)
2021	0	0	0	249	0	249	240	49	0	0	290	41	(2,300)
2022	0	0	0	251	0	251	244	50	0	0	295	44	(2,294)
2023	0	0	0	252	0	252	276	52	0	0	328	76	(2,286)
2024	0	0	0	254	0	254	272	53	0	0	325	71	(2,278)
NOM.	0	239	4,430	5,762	0	10,431	5,300	1,082	0	0	6,381	(4,050)	
NPV	0	97	2,199	1,973	0	4,269	1,635	357	0	0	1,991	(2,278)	

Discount Rate 8.98 %

Benefit/Cost Ratio (Col(12) / Col(7)) : **0.47**

ATTACHEMENT D-2
AIR-SOURCE GAS CHILLER
GSD RATE - CASE 2

INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.86	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.11	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,364.2	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50.	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	0	0	88	66	44	769	170	0	939
2001	0	0	0	0	134	85	0	350	0	350
2002	0	0	0	0	134	85	0	359	0	359
2003	0	0	0	0	137	85	0	368	0	368
2004	0	0	0	0	138	85	0	378	0	378
2005	0	0	0	0	140	85	0	388	0	388
2006	0	0	0	0	141	84	0	399	0	399
2007	0	0	0	0	143	83	0	409	0	409
2008	0	0	0	0	144	84	0	421	0	421
2009	0	0	0	0	144	83	0	433	0	433
2010	0	0	0	0	152	81	0	445	0	445
2011	0	0	0	0	154	78	0	457	0	457
2012	0	0	0	0	156	78	0	470	0	470
2013	0	0	0	0	158	78	0	484	0	484
2014	0	0	0	0	161	78	0	498	0	498
2015	0	0	0	0	162	77	0	513	0	513
2016	0	0	0	0	165	76	0	527	0	527
2017	0	0	0	0	165	77	0	543	0	543
2018	0	0	0	0	167	76	0	558	0	558
2019	0	0	0	0	169	76	0	575	0	575
2020	152	0	0	152	172	75	1,334	591	0	1,926
2021	0	0	0	0	174	75	0	608	0	608
2022	0	0	0	0	176	75	0	626	0	626
2023	0	0	0	0	178	74	0	644	0	644
2024	0	0	0	0	180	74	0	663	0	663
NOM	239	0	0	239	3,809	1,953	2,103	11,877	0	13,980
NPV	97	0	0	97	1,266	707	849	3,720	0	4,569

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	726	25	0	50	31	10	24	2	142	142	142
2006	696	24	0	48	20	10	24	11	137	126	268
2007	661	23	0	45	20	10	24	9	132	111	379
2008	628	21	0	43	20	10	24	8	127	98	477
2009	596	20	0	41	20	10	24	7	123	87	564
2010	566	19	0	39	20	10	24	6	118	77	641
2011	537	18	0	37	20	10	24	5	114	68	709
2012	508	17	0	35	19	10	24	4	110	60	769
2013	480	16	0	33	18	10	24	3	106	53	822
2014	453	15	0	31	17	10	24	3	102	47	869
2015	425	15	0	29	16	10	24	3	98	41	911
2016	397	14	0	27	15	10	24	3	94	36	947
2017	370	13	0	25	14	10	24	3	90	32	979
2018	342	12	0	24	12	10	24	3	85	28	1,007
2019	314	11	0	22	11	10	24	3	81	24	1,031
2020	286	10	0	20	10	10	24	3	77	21	1,053
2021	259	9	0	18	9	10	24	3	73	19	1,071
2022	231	8	0	16	8	10	24	3	69	16	1,087
2023	203	7	0	14	6	10	24	3	65	14	1,101
2024	176	6	0	12	5	10	24	3	61	12	1,113
2025	151	5	0	10	10	10	24	(3)	58	10	1,123
2026	132	5	0	9	15	10	24	(9)	55	9	1,133
2027	117	4	0	8	15	10	24	(9)	53	8	1,140
2028	101	3	0	7	14	10	24	(9)	50	7	1,147
2029	86	3	0	6	13	10	24	(9)	48	6	1,154
2030	70	2	0	5	13	10	24	(9)	46	5	1,159
2031	55	2	0	4	12	10	24	(9)	43	5	1,164
2032	39	1	0	3	11	10	24	(9)	41	4	1,168
2033	23	1	0	2	11	10	24	(9)	39	4	1,171
2034	8	0	0	1	10	10	24	(9)	37	3	1,174

IN SERVICE COS ($000)	727
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	26	26	24	24	22	22	2	54	0	0	0	2	(11)
2006	7.22%	51	77	24	48	22	45	11	54	0	0	0	11	0
2007	6.68%	47	124	24	73	22	67	9	54	0	0	0	9	10
2008	6.18%	44	168	24	97	22	90	8	54	0	0	0	8	18
2009	5.71%	40	208	24	121	22	112	7	54	0	0	0	7	25
2010	5.29%	37	245	24	145	22	135	6	54	0	0	0	6	31
2011	4.89%	34	280	24	170	22	157	5	54	0	0	0	5	35
2012	4.52%	32	312	24	194	22	179	4	54	0	0	0	4	39
2013	4.46%	31	343	24	218	22	202	3	54	0	0	0	3	42
2014	4.46%	31	375	24	242	22	224	3	54	0	0	0	3	46
2015	4.46%	31	406	24	267	22	247	3	54	0	0	0	3	49
2016	4.46%	31	437	24	291	22	269	3	54	0	0	0	3	53
2017	4.46%	31	469	24	315	22	292	3	54	0	0	0	3	56
2018	4.46%	31	500	24	339	22	314	3	54	0	0	0	3	60
2019	4.46%	31	532	24	363	22	337	3	54	0	0	0	3	63
2020	4.46%	31	563	24	388	22	359	3	54	0	0	0	3	67
2021	4.46%	31	595	24	412	22	381	3	54	0	0	0	3	70
2022	4.46%	31	626	24	436	22	404	3	54	0	0	0	3	74
2023	4.46%	31	658	24	460	22	426	3	54	0	0	0	3	77
2024	4.46%	31	689	24	485	22	449	3	54	0	0	0	3	80
2025	2.23%	16	705	24	509	22	471	(3)	54	0	0	0	(3)	78
2026	0.00%	0	705	24	533	22	494	(9)	54	0	0	0	(9)	69
2027	0.00%	0	705	24	557	22	516	(9)	54	0	0	0	(9)	61
2028	0.00%	0	705	24	582	22	538	(9)	54	0	0	0	(9)	52
2029	0.00%	0	705	24	606	22	561	(9)	54	0	0	0	(9)	43
2030	0.00%	0	705	24	630	22	583	(9)	54	0	0	0	(9)	35
2031	0.00%	0	705	24	654	22	606	(9)	54	0	0	0	(9)	26
2032	0.00%	0	705	24	678	22	628	(9)	54	0	0	0	(9)	17
2033	0.00%	0	705	24	703	22	651	(9)	54	0	0	0	(9)	9
2034	0.00%	0	705	24	727	22	673	(9)	54	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(12)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	54
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	26	2	703	24	(11)	739	713	726
2006	7.22%	51	11	678	48	0	713	678	696
2007	6.68%	47	9	654	73	10	678	644	661
2008	6.18%	44	8	630	97	18	644	612	628
2009	5.71%	40	7	606	121	25	612	581	596
2010	5.29%	37	6	582	145	31	581	551	566
2011	4.89%	34	5	557	170	35	551	522	537
2012	4.52%	32	4	533	194	39	522	494	508
2013	4.46%	31	3	509	218	42	494	467	480
2014	4.46%	31	3	485	242	46	467	439	453
2015	4.46%	31	3	460	267	49	439	411	425
2016	4.46%	31	3	436	291	53	411	383	397
2017	4.46%	31	3	412	315	56	383	356	370
2018	4.46%	31	3	388	339	60	356	328	342
2019	4.46%	31	3	363	363	63	328	300	314
2020	4.46%	31	3	339	388	67	300	273	286
2021	4.46%	31	3	315	412	70	273	245	259
2022	4.46%	31	3	291	436	74	245	217	231
2023	4.46%	31	3	267	460	77	217	190	203
2024	4.46%	31	3	242	485	80	190	162	176
2025	2.23%	16	(3)	218	509	78	162	140	151
2026	0.00%	0	(9)	194	533	69	140	125	132
2027	0.00%	0	(9)	170	557	61	125	109	117
2028	0.00%	0	(9)	145	582	52	109	93	101
2029	0.00%	0	(9)	121	606	43	93	78	86
2030	0.00%	0	(9)	97	630	35	78	62	70
2031	0.00%	0	(9)	73	654	26	62	47	55
2032	0.00%	0	(9)	48	678	17	47	31	39
2033	0.00%	0	(9)	24	703	9	31	16	23
2034	0.00%	0	(9)	0	727	0	16	0	8

* Column not specified in workbook

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	NO.YEARS BEFORE IN-SERVICE	PLANT ESCALATION RATE	CUMULATIVE ESCALATION FACTOR	YEARLY EXPENDITURE (%)	ANNUAL SPENDING ($/kW)	CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	646	646	646
EQUITY AFUDC	54		
DEBT AFUDC	27	27	
CPI			58
TOTAL	727	673	705

* Column not specified in workbook

INPUT DATA -- PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMENT FUEL COST (C/kWh)	PROGRAM kW EFFECTIVENESS FACTOR	PROGRAM kWh EFFECTIVENESS FACTOR
1998	0	0	2.00	2.23	2.10	0.00	1.00	1.00
1999	0	0	2.23	2.53	2.39	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.81	2.64	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.24	3.00	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.07	2.89	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.16	2.88	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.41	3.10	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.65	3.30	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.76	3.39	3.34	1.00	1.00
2007	1,000	1,000	3.13	4.01	3.56	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.92	3.48	3.45	1.00	1.00
2009	1,000	1,000	3.15	4.04	3.58	3.60	1.00	1.00
2010	1,000	1,000	3.14	4.10	3.57	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.25	3.79	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.40	3.86	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.53	3.97	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.64	4.04	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.71	4.08	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.78	4.11	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.96	4.27	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.22	4.50	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.49	4.71	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.67	4.88	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.81	4.98	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.96	5.10	4.97	1.00	1.00
2023	1,000	1,000	4.53	6.13	5.24	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.31	5.38	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COST $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	142	51	7	192	287	104
2006	137	53	8	201	304	94
2007	132	55	8	207	322	80
2008	127	57	8	209	318	84
2009	123	59	8	210	328	72
2010	118	62	8	204	313	79
2011	114	64	8	207	326	68
2012	110	67	9	213	331	67
2013	106	70	9	219	334	70
2014	102	72	9	226	337	72
2015	98	75	9	230	339	73
2016	94	78	9	234	340	75
2017	90	81	10	241	353	68
2018	85	85	10	248	373	55
2019	81	88	10	257	394	43
2020	77	92	11	265	415	29
2021	73	95	11	270	423	27
2022	69	99	11	277	431	26
2023	65	103	12	312	441	51
2024	61	107	12	312	453	40
NOM	2,005	1,513	186	4,734	7,160	1,278
NPV	610	370	47	1,213	1,842	398

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	50	0
2001	15	3	18	9	15	24	115	0
2002	14	4	18	9	15	25	109	0
2003	14	4	17	9	16	25	113	0
2004	13	4	17	8	17	25	122	0
2005	12	4	16	8	17	25	131	0
2006	12	4	16	8	18	26	135	0
2007	12	4	16	8	19	26	145	0
2008	11	4	16	7	20	27	142	0
2009	11	5	15	7	20	27	146	0
2010	10	5	15	7	21	28	149	0
2011	10	5	15	6	22	28	154	0
2012	9	5	15	6	23	29	160	0
2013	9	5	14	6	24	30	165	0
2014	9	6	14	6	25	30	169	0
2015	8	6	14	5	26	31	172	0
2016	8	6	14	5	27	32	174	0
2017	7	6	14	5	28	32	181	0
2018	7	7	14	4	29	33	191	0
2019	6	7	13	4	30	34	201	0
2020	6	7	13	4	31	35	208	0
2021	6	7	13	4	32	36	213	0
2022	5	8	13	3	34	37	219	0
2023	5	8	13	3	35	38	225	0
2024	5	8	13	3	37	40	232	0
NOM.	223	134	357	145	579	725	4,021	0
NPV	90	39	129	58	169	228	1,237	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMf Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	939	0	1,027	0	0	50	0	50	(977)	(823)
2001	0	0	350	0	350	0	42	115	0	157	(192)	(971)
2002	0	0	359	0	359	0	42	109	0	151	(208)	(1,119)
2003	0	0	368	0	368	0	42	113	0	155	(213)	(1,257)
2004	0	0	378	0	378	0	42	122	0	164	(214)	(1,385)
2005	0	0	388	0	388	104	42	131	0	277	(111)	(1,446)
2006	0	0	399	0	399	94	42	135	0	272	(127)	(1,510)
2007	0	0	409	0	409	80	42	145	0	267	(142)	(1,575)
2008	0	0	421	0	421	84	42	142	0	268	(153)	(1,640)
2009	0	0	433	0	433	72	43	146	0	261	(171)	(1,707)
2010	0	0	445	0	445	79	43	149	0	271	(174)	(1,768)
2011	0	0	457	0	457	68	43	154	0	265	(192)	(1,831)
2012	0	0	470	0	470	67	44	160	0	271	(199)	(1,891)
2013	0	0	484	0	484	70	44	165	0	279	(205)	(1,948)
2014	0	0	498	0	498	72	44	169	0	285	(213)	(2,001)
2015	0	0	513	0	513	73	45	172	0	289	(223)	(2,053)
2016	0	0	527	0	527	75	46	174	0	295	(233)	(2,103)
2017	0	0	543	0	543	68	46	181	0	296	(247)	(2,151)
2018	0	0	558	0	558	55	47	191	0	293	(265)	(2,198)
2019	0	0	575	0	575	43	48	201	0	291	(283)	(2,245)
2020	0	152	1,926	0	2,078	29	48	208	0	285	(1,792)	(2,515)
2021	0	0	608	0	608	27	49	213	0	290	(319)	(2,560)
2022	0	0	626	0	626	26	50	219	0	295	(331)	(2,602)
2023	0	0	644	0	644	51	52	225	0	328	(316)	(2,639)
2024	0	0	663	0	663	40	53	232	0	325	(338)	(2,675)
NOM	0	239	13,980	0	14,219	1,278	1,082	4,021	0	6,381	(7,838)	
NPV	0	97	4,569	0	4,666	398	357	1,237	0	1,991	(2,675)	

Discount Rate: 8.98 %

Benefit/Cost Ratio (Col(11) / Col(6)) : 0.43

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	133	0	0	0	133	769	170	0	939	(806)	(679)
2001	266	0	0	0	266	0	350	0	350	(83)	(743)
2002	266	0	0	0	266	0	359	0	359	(93)	(809)
2003	271	0	0	0	271	0	368	0	368	(98)	(872)
2004	272	0	0	0	272	0	378	0	378	(106)	(936)
2005	275	0	0	0	275	0	388	0	388	(113)	(998)
2006	275	0	0	0	275	0	399	0	399	(124)	(1,060)
2007	276	0	0	0	276	0	409	0	409	(133)	(1,122)
2008	278	0	0	0	278	0	421	0	421	(143)	(1,182)
2009	277	0	0	0	277	0	433	0	433	(155)	(1,243)
2010	286	0	0	0	286	0	445	0	445	(159)	(1,299)
2011	286	0	0	0	286	0	457	0	457	(171)	(1,355)
2012	289	0	0	0	289	0	470	0	470	(182)	(1,410)
2013	291	0	0	0	291	0	484	0	484	(193)	(1,463)
2014	295	0	0	0	295	0	498	0	498	(203)	(1,514)
2015	297	0	0	0	297	0	513	0	513	(216)	(1,564)
2016	300	0	0	0	300	0	527	0	527	(228)	(1,613)
2017	300	0	0	0	300	0	543	0	543	(243)	(1,660)
2018	302	0	0	0	302	0	558	0	558	(256)	(1,706)
2019	305	0	0	0	305	0	575	0	575	(270)	(1,751)
2020	307	0	0	0	307	1,334	591	0	1,926	(1,618)	(1,995)
2021	310	0	0	0	310	0	608	0	608	(299)	(2,036)
2022	312	0	0	0	312	0	626	0	626	(314)	(2,076)
2023	315	0	0	0	315	0	644	0	644	(329)	(2,114)
2024	318	0	0	0	318	0	663	0	663	(345)	(2,151)
NOM	7,100	0	0	0	7,100	2,103	11,877	0	13,980	(6,880)	
NPV	2,418	0	0	0	2,418	849	3,720	0	4,569	(2,151)	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) **0.53**

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	0	110	0	198	50	0	0	0	50	(148)	(125)
2001	0	0	0	219	0	219	115	42	0	0	157	(62)	(172)
2002	0	0	0	219	0	219	109	42	0	0	151	(68)	(221)
2003	0	0	0	222	0	222	113	42	0	0	155	(67)	(264)
2004	0	0	0	223	0	223	122	42	0	0	164	(59)	(300)
2005	0	0	0	225	0	225	235	42	0	0	277	51	(272)
2006	0	0	0	225	0	225	230	42	0	0	272	47	(248)
2007	0	0	0	226	0	226	225	42	0	0	267	41	(229)
2008	0	0	0	227	0	227	226	42	0	0	268	41	(212)
2009	0	0	0	227	0	227	219	43	0	0	261	34	(199)
2010	0	0	0	232	0	232	228	43	0	0	271	39	(185)
2011	0	0	0	232	0	232	222	43	0	0	265	33	(174)
2012	0	0	0	234	0	234	227	44	0	0	271	37	(163)
2013	0	0	0	235	0	235	235	44	0	0	279	43	(151)
2014	0	0	0	238	0	238	240	44	0	0	285	47	(139)
2015	0	0	0	240	0	240	244	45	0	0	289	50	(127)
2016	0	0	0	242	0	242	249	46	0	0	295	53	(116)
2017	0	0	0	242	0	242	250	46	0	0	296	54	(106)
2018	0	0	0	244	0	244	246	47	0	0	293	50	(97)
2019	0	0	0	245	0	245	244	48	0	0	291	46	(89)
2020	0	152	0	247	0	399	237	48	0	0	285	(114)	(106)
2021	0	0	0	249	0	249	240	49	0	0	290	41	(101)
2022	0	0	0	251	0	251	244	50	0	0	295	44	(95)
2023	0	0	0	252	0	252	276	52	0	0	328	76	(86)
2024	0	0	0	254	0	254	272	53	0	0	325	71	(79)
NOM.	0	239	0	5,762	0	6,001	5,300	1,082	0	0	6,381	380	
NPV	0	97	0	1,973	0	2,070	1,635	357	0	0	1,991	(79)	

Discount Rate 8.98 %

Benefit/Cost Ratio (Col(12) / Col(7)) : **0.96**

ATTACHEMENT D-3
AIR-SOURCE GAS CHILLER
GSLD RATE - CASE 1

INPUT DATA -- PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.86	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.11	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,364.2	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA -- PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	2,305	0	2,393	61	46	769	170	0	939
2001	0	0	0	0	124	88	0	350	0	350
2002	0	0	0	0	124	88	0	359	0	359
2003	0	0	0	0	127	88	0	368	0	368
2004	0	0	0	0	128	88	0	378	0	378
2005	0	0	0	0	131	88	0	388	0	388
2006	0	0	0	0	132	86	0	399	0	399
2007	0	0	0	0	133	86	0	409	0	409
2008	0	0	0	0	134	86	0	421	0	421
2009	0	0	0	0	134	86	0	433	0	433
2010	0	0	0	0	142	83	0	445	0	445
2011	0	0	0	0	144	81	0	457	0	457
2012	0	0	0	0	146	81	0	470	0	470
2013	0	0	0	0	148	80	0	484	0	484
2014	0	0	0	0	151	80	0	498	0	498
2015	0	0	0	0	153	80	0	513	0	513
2016	0	0	0	0	155	79	0	527	0	527
2017	0	0	0	0	156	79	0	543	0	543
2018	0	0	0	0	158	78	0	558	0	558
2019	0	0	0	0	160	78	0	575	0	575
2020	152	2,305	0	2,457	162	77	1,334	591	0	1,926
2021	0	0	0	0	164	77	0	608	0	608
2022	0	0	0	0	166	77	0	626	0	626
2023	0	0	0	0	168	76	0	644	0	644
2024	0	0	0	0	171	76	0	663	0	663
NOM	239	4,610	0	4,849	3,571	2,010	2,103	11,877	0	13,980
NPV	97	2,289	0	2,385	1,183	728	849	3,720	0	4,569

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	726	25	0	50	31	10	24	2	142	142	142
2006	696	24	0	48	20	10	24	11	137	126	268
2007	661	23	0	45	20	10	24	9	132	111	379
2008	628	21	0	43	20	10	24	8	127	98	477
2009	596	20	0	41	20	10	24	7	123	87	564
2010	566	19	0	39	20	10	24	6	118	77	641
2011	537	18	0	37	20	10	24	5	114	68	709
2012	508	17	0	35	19	10	24	4	110	60	769
2013	480	16	0	33	18	10	24	3	106	53	822
2014	453	15	0	31	17	10	24	3	102	47	869
2015	425	15	0	29	16	10	24	3	98	41	911
2016	397	14	0	27	15	10	24	3	94	36	947
2017	370	13	0	25	14	10	24	3	90	32	979
2018	342	12	0	24	12	10	24	3	85	28	1,007
2019	314	11	0	22	11	10	24	3	81	24	1,031
2020	286	10	0	20	10	10	24	3	77	21	1,053
2021	259	9	0	18	9	10	24	3	73	19	1,071
2022	231	8	0	16	8	10	24	3	69	16	1,087
2023	203	7	0	14	6	10	24	3	65	14	1,101
2024	176	6	0	12	5	10	24	3	61	12	1,113
2025	151	5	0	10	10	10	24	(3)	58	10	1,123
2026	132	5	0	9	15	10	24	(9)	55	9	1,133
2027	117	4	0	8	15	10	24	(9)	53	8	1,140
2028	101	3	0	7	14	10	24	(9)	50	7	1,147
2029	86	3	0	6	13	10	24	(9)	48	6	1,154
2030	70	2	0	5	13	10	24	(9)	46	5	1,159
2031	55	2	0	4	12	10	24	(9)	43	5	1,164
2032	39	1	0	3	11	10	24	(9)	41	4	1,168
2033	23	1	0	2	11	10	24	(9)	39	4	1,171
2034	8	0	0	1	10	10	24	(9)	37	3	1,174

IN SERVICE COS ($000)	727
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST ▫ 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	26	26	24	24	22	22	2	54	0	0	0	2	(11)
2006	7.22%	51	77	24	48	22	45	11	54	0	0	0	11	0
2007	6.68%	47	124	24	73	22	67	9	54	0	0	0	9	10
2008	6.18%	44	168	24	97	22	90	8	54	0	0	0	8	18
2009	5.71%	40	208	24	121	22	112	7	54	0	0	0	7	25
2010	5.29%	37	245	24	145	22	135	6	54	0	0	0	6	31
2011	4.89%	34	280	24	170	22	157	5	54	0	0	0	5	35
2012	4.52%	32	312	24	194	22	179	4	54	0	0	0	4	39
2013	4.46%	31	343	24	218	22	202	3	54	0	0	0	3	42
2014	4.46%	31	375	24	242	22	224	3	54	0	0	0	3	46
2015	4.46%	31	406	24	267	22	247	3	54	0	0	0	3	49
2016	4.46%	31	437	24	291	22	269	3	54	0	0	0	3	53
2017	4.46%	31	469	24	315	22	292	3	54	0	0	0	3	56
2018	4.46%	31	500	24	339	22	314	3	54	0	0	0	3	60
2019	4.46%	31	532	24	363	22	337	3	54	0	0	0	3	63
2020	4.46%	31	563	24	388	22	359	3	54	0	0	0	3	67
2021	4.46%	31	595	24	412	22	381	3	54	0	0	0	3	70
2022	4.46%	31	626	24	436	22	404	3	54	0	0	0	3	74
2023	4.46%	31	658	24	460	22	426	3	54	0	0	0	3	77
2024	4.46%	31	689	24	485	22	449	3	54	0	0	0	3	80
2025	2.23%	16	705	24	509	22	471	(3)	54	0	0	0	(3)	78
2026	0.00%	0	705	24	533	22	494	(9)	54	0	0	0	(9)	69
2027	0.00%	0	705	24	557	22	516	(9)	54	0	0	0	(9)	61
2028	0.00%	0	705	24	582	22	538	(9)	54	0	0	0	(9)	52
2029	0.00%	0	705	24	606	22	561	(9)	54	0	0	0	(9)	43
2030	0.00%	0	705	24	630	22	583	(9)	54	0	0	0	(9)	35
2031	0.00%	0	705	24	654	22	606	(9)	54	0	0	0	(9)	26
2032	0.00%	0	705	24	678	22	628	(9)	54	0	0	0	(9)	17
2033	0.00%	0	705	24	703	22	651	(9)	54	0	0	0	(9)	9
2034	0.00%	0	705	24	727	22	673	(9)	54	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(12)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	54
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	26	2	703	24	(11)	739	713	726
2006	7.22%	51	11	678	48	0	713	678	696
2007	6.68%	47	9	654	73	10	678	644	661
2008	6.18%	44	8	630	97	18	644	612	628
2009	5.71%	40	7	606	121	25	612	581	596
2010	5.29%	37	6	582	145	31	581	551	566
2011	4.89%	34	5	557	170	35	551	522	537
2012	4.52%	32	4	533	194	39	522	494	508
2013	4.46%	31	3	509	218	42	494	467	480
2014	4.46%	31	3	485	242	46	467	439	453
2015	4.46%	31	3	460	267	49	439	411	425
2016	4.46%	31	3	436	291	53	411	383	397
2017	4.46%	31	3	412	315	56	383	356	370
2018	4.46%	31	3	388	339	60	356	328	342
2019	4.46%	31	3	363	363	63	328	300	314
2020	4.46%	31	3	339	388	67	300	273	286
2021	4.46%	31	3	315	412	70	273	245	259
2022	4.46%	31	3	291	436	74	245	217	231
2023	4.46%	31	3	267	460	77	217	190	203
2024	4.46%	31	3	242	485	80	190	162	176
2025	2.23%	16	(3)	218	509	78	162	140	151
2026	0.00%	0	(9)	194	533	69	140	125	132
2027	0.00%	0	(9)	170	557	61	125	109	117
2028	0.00%	0	(9)	145	582	52	109	93	101
2029	0.00%	0	(9)	121	606	43	93	78	86
2030	0.00%	0	(9)	97	630	35	78	62	70
2031	0.00%	0	(9)	73	654	26	62	47	55
2032	0.00%	0	(9)	48	678	17	47	31	39
2033	0.00%	0	(9)	24	703	9	31	16	23
2034	0.00%	0	(9)	0	727	0	16	0	8

* Column not specified in workbook

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	NO.YEARS BEFORE IN-SERVICE	PLANT ESCALATION RATE	CUMULATIVE ESCALATION FACTOR	YEARLY EXPENDITURE (%)	ANNUAL SPENDING ($/kW)	CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	646	646	646
EQUITY AFUDC	54		
DEBT AFUDC	27	27	
CPI			58
TOTAL	727	673	705

* Column not specified in workbook

INPUT DATA – PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMENT FUEL COST (C/kWh)	PROGRAM kW EFFECTIVENESS FACTOR	PROGRAM kWh EFFECTIVENESS FACTOR
1998	0	0	2.00	2.23	2.10	0.00	1.00	1.00
1999	0	0	2.23	2.53	2.39	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.81	2.64	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.24	3.00	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.07	2.89	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.16	2.88	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.41	3.10	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.65	3.30	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.76	3.39	3.34	1.00	1.00
2007	1,000	1,000	3.13	4.01	3.56	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.92	3.48	3.45	1.00	1.00
2009	1,000	1,000	3.15	4.04	3.58	3.60	1.00	1.00
2010	1,000	1,000	3.14	4.10	3.57	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.25	3.79	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.40	3.86	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.53	3.97	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.64	4.04	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.71	4.08	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.78	4.11	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.96	4.27	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.22	4.50	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.49	4.71	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.67	4.88	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.81	4.98	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.96	5.10	4.97	1.00	1.00
2023	1,000	1,000	4.53	6.13	5.24	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.31	5.38	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMt Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMEN FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	142	51	7	192	287	104
2006	137	53	8	201	304	94
2007	132	55	8	207	322	80
2008	127	57	8	209	318	84
2009	123	59	8	210	328	72
2010	118	62	8	204	313	79
2011	114	64	8	207	326	68
2012	110	67	9	213	331	67
2013	106	70	9	219	334	70
2014	102	72	9	226	337	72
2015	98	75	9	230	339	73
2016	94	78	9	234	340	75
2017	90	81	10	241	353	68
2018	85	85	10	248	373	55
2019	81	88	10	257	394	43
2020	77	92	11	265	415	29
2021	73	95	11	270	423	27
2022	69	99	11	277	431	26
2023	65	103	12	312	441	51
2024	61	107	12	312	453	40
NOM	2,005	1,513	186	4,734	7,160	1,278
NPV	610	370	47	1,213	1,842	398

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	50	0
2001	15	3	18	9	15	24	115	0
2002	14	4	18	9	15	25	109	0
2003	14	4	17	9	16	25	113	0
2004	13	4	17	8	17	25	122	0
2005	12	4	16	8	17	25	131	0
2006	12	4	16	8	18	26	135	0
2007	12	4	16	8	19	26	145	0
2008	11	4	16	7	20	27	142	0
2009	11	5	15	7	20	27	146	0
2010	10	5	15	7	21	28	149	0
2011	10	5	15	6	22	28	154	0
2012	9	5	15	6	23	29	160	0
2013	9	5	14	6	24	30	165	0
2014	9	6	14	6	25	30	169	0
2015	8	6	14	5	26	31	172	0
2016	8	6	14	5	27	32	174	0
2017	7	6	14	5	28	32	181	0
2018	7	7	14	4	29	33	191	0
2019	6	7	13	4	30	34	201	0
2020	6	7	13	4	31	35	208	0
2021	6	7	13	4	32	36	213	0
2022	5	8	13	3	34	37	219	0
2023	5	8	13	3	35	38	225	0
2024	5	8	13	3	37	40	232	0
NOM.	223	134	357	145	579	725	4,021	0
NPV	90	39	129	58	169	228	1,237	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	939	0	1,027	0	0	50	0	50	(977)	(823)
2001	0	0	350	0	350	0	42	115	0	157	(192)	(971)
2002	0	0	359	0	359	0	42	109	0	151	(208)	(1,119)
2003	0	0	368	0	368	0	42	113	0	155	(213)	(1,257)
2004	0	0	378	0	378	0	42	122	0	164	(214)	(1,385)
2005	0	0	388	0	388	104	42	131	0	277	(111)	(1,446)
2006	0	0	399	0	399	94	42	135	0	272	(127)	(1,510)
2007	0	0	409	0	409	80	42	145	0	267	(142)	(1,575)
2008	0	0	421	0	421	84	42	142	0	268	(153)	(1,640)
2009	0	0	433	0	433	72	43	146	0	261	(171)	(1,707)
2010	0	0	445	0	445	79	43	149	0	271	(174)	(1,768)
2011	0	0	457	0	457	68	43	154	0	265	(192)	(1,831)
2012	0	0	470	0	470	67	44	160	0	271	(199)	(1,891)
2013	0	0	484	0	484	70	44	165	0	279	(205)	(1,948)
2014	0	0	498	0	498	72	44	169	0	285	(213)	(2,001)
2015	0	0	513	0	513	73	45	172	0	289	(223)	(2,053)
2016	0	0	527	0	527	75	46	174	0	295	(233)	(2,103)
2017	0	0	543	0	543	68	46	181	0	296	(247)	(2,151)
2018	0	0	558	0	558	55	47	191	0	293	(265)	(2,198)
2019	0	0	575	0	575	43	48	201	0	291	(283)	(2,245)
2020	0	152	1,926	0	2,078	29	48	208	0	285	(1,792)	(2,515)
2021	0	0	608	0	608	27	49	213	0	290	(319)	(2,560)
2022	0	0	626	0	626	26	50	219	0	295	(331)	(2,602)
2023	0	0	644	0	644	51	52	225	0	328	(316)	(2,639)
2024	0	0	663	0	663	40	53	232	0	325	(338)	(2,675)
NOM	0	239	13,980	0	14,219	1,278	1,082	4,021	0	6,381	(7,838)	
NPV	0	97	4,569	0	4,666	398	357	1,237	0	1,991	(2,675)	

Discount Rate: 8.98 %
Benefit/Cost Ratio (Col(11) / Col(6)) : 0.43

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	128	0	2,305	0	2,433	769	170	0	939	1,494	1,258
2001	256	0	0	0	256	0	350	0	350	(94)	1,185
2002	256	0	0	0	256	0	359	0	359	(103)	1,112
2003	260	0	0	0	260	0	368	0	368	(108)	1,042
2004	261	0	0	0	261	0	378	0	378	(117)	972
2005	264	0	0	0	264	0	388	0	388	(124)	904
2006	264	0	0	0	264	0	399	0	399	(134)	837
2007	266	0	0	0	266	0	409	0	409	(144)	770
2008	267	0	0	0	267	0	421	0	421	(154)	705
2009	267	0	0	0	267	0	433	0	433	(166)	641
2010	275	0	0	0	275	0	445	0	445	(170)	581
2011	275	0	0	0	275	0	457	0	457	(182)	521
2012	278	0	0	0	278	0	470	0	470	(193)	463
2013	280	0	0	0	280	0	484	0	484	(204)	407
2014	284	0	0	0	284	0	498	0	498	(214)	353
2015	286	0	0	0	286	0	513	0	513	(227)	300
2016	289	0	0	0	289	0	527	0	527	(239)	250
2017	289	0	0	0	289	0	543	0	543	(254)	200
2018	291	0	0	0	291	0	558	0	558	(267)	152
2019	294	0	0	0	294	0	575	0	575	(281)	106
2020	296	0	2,305	0	2,601	1,334	591	0	1,926	675	208
2021	299	0	0	0	299	0	608	0	608	(310)	165
2022	301	0	0	0	301	0	626	0	626	(325)	124
2023	304	0	0	0	304	0	644	0	644	(341)	84
2024	306	0	0	0	306	0	663	0	663	(357)	46
NOM	6,835	0	4,610	0	11,445	2,103	11,877	0	13,980	(2,535)	
NPV	2,326	0	2,289	0	4,615	849	3,720	0	4,569	46	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) 1.01

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	2,305	107	0	2,499	50	0	0	0	50	(2,450)	(2,063)
2001	0	0	0	212	0	212	115	42	0	0	157	(55)	(2,105)
2002	0	0	0	212	0	212	109	42	0	0	151	(61)	(2,148)
2003	0	0	0	215	0	215	113	42	0	0	155	(60)	(2,187)
2004	0	0	0	216	0	216	122	42	0	0	164	(52)	(2,218)
2005	0	0	0	218	0	218	235	42	0	0	277	59	(2,186)
2006	0	0	0	218	0	218	230	42	0	0	272	54	(2,159)
2007	0	0	0	219	0	219	225	42	0	0	267	48	(2,137)
2008	0	0	0	220	0	220	226	42	0	0	268	48	(2,117)
2009	0	0	0	220	0	220	219	43	0	0	261	41	(2,101)
2010	0	0	0	225	0	225	228	43	0	0	271	46	(2,084)
2011	0	0	0	225	0	225	222	43	0	0	265	41	(2,071)
2012	0	0	0	227	0	227	227	44	0	0	271	45	(2,058)
2013	0	0	0	228	0	228	235	44	0	0	279	51	(2,044)
2014	0	0	0	231	0	231	240	44	0	0	285	54	(2,030)
2015	0	0	0	232	0	232	244	45	0	0	289	57	(2,017)
2016	0	0	0	234	0	234	249	46	0	0	295	61	(2,004)
2017	0	0	0	234	0	234	250	46	0	0	296	62	(1,992)
2018	0	0	0	236	0	236	246	47	0	0	293	57	(1,982)
2019	0	0	0	238	0	238	244	48	0	0	291	54	(1,973)
2020	0	152	2,305	239	0	2,696	237	48	0	0	285	(2,411)	(2,337)
2021	0	0	0	241	0	241	240	49	0	0	290	49	(2,330)
2022	0	0	0	243	0	243	244	50	0	0	295	52	(2,323)
2023	0	0	0	245	0	245	276	52	0	0	328	84	(2,313)
2024	0	0	0	246	0	246	272	53	0	0	325	79	(2,305)
NOM.	0	239	4,610	5,580	0	10,430	5,300	1,082	0	0	6,381	(4,049)	
NPV	0	97	2,289	1,911	0	4,296	1,635	357	0	0	1,991	(2,305)	

Discount Rate 8.98 %
Benefit/Cost Ratio (Col(12) / Col(7)) : 0.46

ATTACHEMENT D-4
AIR-SOURCE GAS CHILLER
GSLD RATE - CASE 2

INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.86	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.11	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,364.2	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	0	0	88	61	46	769	170	0	939
2001	0	0	0	0	124	88	0	350	0	350
2002	0	0	0	0	124	88	0	359	0	359
2003	0	0	0	0	127	88	0	368	0	368
2004	0	0	0	0	128	88	0	378	0	378
2005	0	0	0	0	131	88	0	388	0	388
2006	0	0	0	0	132	86	0	399	0	399
2007	0	0	0	0	133	86	0	409	0	409
2008	0	0	0	0	134	86	0	421	0	421
2009	0	0	0	0	134	86	0	433	0	433
2010	0	0	0	0	142	83	0	445	0	445
2011	0	0	0	0	144	81	0	457	0	457
2012	0	0	0	0	146	81	0	470	0	470
2013	0	0	0	0	148	80	0	484	0	484
2014	0	0	0	0	151	80	0	498	0	498
2015	0	0	0	0	153	80	0	513	0	513
2016	0	0	0	0	155	79	0	527	0	527
2017	0	0	0	0	156	79	0	543	0	543
2018	0	0	0	0	158	78	0	558	0	558
2019	0	0	0	0	160	78	0	575	0	575
2020	152	0	0	152	162	77	1,334	591	0	1,926
2021	0	0	0	0	164	77	0	608	0	608
2022	0	0	0	0	166	77	0	626	0	626
2023	0	0	0	0	168	76	0	644	0	644
2024	0	0	0	0	171	76	0	663	0	663
NOM	239	0	0	239	3,571	2,010	2,103	11,877	0	13,980
NPV	97	0	0	97	1,183	728	849	3,720	0	4,569

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	726	25	0	50	31	10	24	2	142	142	142
2006	696	24	0	48	20	10	24	11	137	126	268
2007	661	23	0	45	20	10	24	9	132	111	379
2008	628	21	0	43	20	10	24	8	127	98	477
2009	596	20	0	41	20	10	24	7	123	87	564
2010	566	19	0	39	20	10	24	6	118	77	641
2011	537	18	0	37	20	10	24	5	114	68	709
2012	508	17	0	35	19	10	24	4	110	60	769
2013	480	16	0	33	18	10	24	3	106	53	822
2014	453	15	0	31	17	10	24	3	102	47	869
2015	425	15	0	29	16	10	24	3	98	41	911
2016	397	14	0	27	15	10	24	3	94	36	947
2017	370	13	0	25	14	10	24	3	90	32	979
2018	342	12	0	24	12	10	24	3	85	28	1,007
2019	314	11	0	22	11	10	24	3	81	24	1,031
2020	286	10	0	20	10	10	24	3	77	21	1,053
2021	259	9	0	18	9	10	24	3	73	19	1,071
2022	231	8	0	16	8	10	24	3	69	16	1,087
2023	203	7	0	14	6	10	24	3	65	14	1,101
2024	176	6	0	12	5	10	24	3	61	12	1,113
2025	151	5	0	10	10	10	24	(3)	58	10	1,123
2026	132	5	0	9	15	10	24	(9)	55	9	1,133
2027	117	4	0	8	15	10	24	(9)	53	8	1,140
2028	101	3	0	7	14	10	24	(9)	50	7	1,147
2029	86	3	0	6	13	10	24	(9)	48	6	1,154
2030	70	2	0	5	13	10	24	(9)	46	5	1,159
2031	55	2	0	4	12	10	24	(9)	43	5	1,164
2032	39	1	0	3	11	10	24	(9)	41	4	1,168
2033	23	1	0	2	11	10	24	(9)	39	4	1,171
2034	8	0	0	1	10	10	24	(9)	37	3	1,174

IN SERVICE COS ($000)	727
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	26	26	24	24	22	22	2	54	0	0	0	2	(11)
2006	7.22%	51	77	24	48	22	45	11	54	0	0	0	11	0
2007	6.68%	47	124	24	73	22	67	9	54	0	0	0	9	10
2008	6.18%	44	168	24	97	22	90	8	54	0	0	0	8	18
2009	5.71%	40	208	24	121	22	112	7	54	0	0	0	7	25
2010	5.29%	37	245	24	145	22	135	6	54	0	0	0	6	31
2011	4.89%	34	280	24	170	22	157	5	54	0	0	0	5	35
2012	4.52%	32	312	24	194	22	179	4	54	0	0	0	4	39
2013	4.46%	31	343	24	218	22	202	3	54	0	0	0	3	42
2014	4.46%	31	375	24	242	22	224	3	54	0	0	0	3	46
2015	4.46%	31	406	24	267	22	247	3	54	0	0	0	3	49
2016	4.46%	31	437	24	291	22	269	3	54	0	0	0	3	53
2017	4.46%	31	469	24	315	22	292	3	54	0	0	0	3	56
2018	4.46%	31	500	24	339	22	314	3	54	0	0	0	3	60
2019	4.46%	31	532	24	363	22	337	3	54	0	0	0	3	63
2020	4.46%	31	563	24	388	22	359	3	54	0	0	0	3	67
2021	4.46%	31	595	24	412	22	381	3	54	0	0	0	3	70
2022	4.46%	31	626	24	436	22	404	3	54	0	0	0	3	74
2023	4.46%	31	658	24	460	22	426	3	54	0	0	0	3	77
2024	4.46%	31	689	24	485	22	449	3	54	0	0	0	3	80
2025	2.23%	16	705	24	509	22	471	(3)	54	0	0	0	(3)	78
2026	0.00%	0	705	24	533	22	494	(9)	54	0	0	0	(9)	69
2027	0.00%	0	705	24	557	22	516	(9)	54	0	0	0	(9)	61
2028	0.00%	0	705	24	582	22	538	(9)	54	0	0	0	(9)	52
2029	0.00%	0	705	24	606	22	561	(9)	54	0	0	0	(9)	43
2030	0.00%	0	705	24	630	22	583	(9)	54	0	0	0	(9)	35
2031	0.00%	0	705	24	654	22	606	(9)	54	0	0	0	(9)	26
2032	0.00%	0	705	24	678	22	628	(9)	54	0	0	0	(9)	17
2033	0.00%	0	705	24	703	22	651	(9)	54	0	0	0	(9)	9
2034	0.00%	0	705	24	727	22	673	(9)	54	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(12)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	54
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	26	2	703	24	(11)	739	713	726
2006	7.22%	51	11	678	48	0	713	678	696
2007	6.68%	47	9	654	73	10	678	644	661
2008	6.18%	44	8	630	97	18	644	612	628
2009	5.71%	40	7	606	121	25	612	581	596
2010	5.29%	37	6	582	145	31	581	551	566
2011	4.89%	34	5	557	170	35	551	522	537
2012	4.52%	32	4	533	194	39	522	494	508
2013	4.46%	31	3	509	218	42	494	467	480
2014	4.46%	31	3	485	242	46	467	439	453
2015	4.46%	31	3	460	267	49	439	411	425
2016	4.46%	31	3	436	291	53	411	383	397
2017	4.46%	31	3	412	315	56	383	356	370
2018	4.46%	31	3	388	339	60	356	328	342
2019	4.46%	31	3	363	363	63	328	300	314
2020	4.46%	31	3	339	388	67	300	273	286
2021	4.46%	31	3	315	412	70	273	245	259
2022	4.46%	31	3	291	436	74	245	217	231
2023	4.46%	31	3	267	460	77	217	190	203
2024	4.46%	31	3	242	485	80	190	162	176
2025	2.23%	16	(3)	218	509	78	162	140	151
2026	0.00%	0	(9)	194	533	69	140	125	132
2027	0.00%	0	(9)	170	557	61	125	109	117
2028	0.00%	0	(9)	145	582	52	109	93	101
2029	0.00%	0	(9)	121	606	43	93	78	86
2030	0.00%	0	(9)	97	630	35	78	62	70
2031	0.00%	0	(9)	73	654	26	62	47	55
2032	0.00%	0	(9)	48	678	17	47	31	39
2033	0.00%	0	(9)	24	703	9	31	16	23
2034	0.00%	0	(9)	0	727	0	16	0	8

* Column not specified in workbook

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	NO.YEARS BEFORE IN-SERVICE	PLANT ESCALATION RATE	CUMULATIVE ESCALATION FACTOR	YEARLY EXPENDITURE (%)	ANNUAL SPENDING ($/kW)	CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	646	646	646
EQUITY AFUDC	54		
DEBT AFUDC	27	27	
CPI			58
TOTAL	727	673	705

* Column not specified in workbook

INPUT DATA -- PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATINC CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATINC CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMEN FUEL COST (C/kWh)	PROGRAM kW FFECTIVENES FACTOR	PROGRAM kWh FFECTIVENESS FACTOR
1998	0	0	2.00	2.23	2.10	0.00	1.00	1.00
1999	0	0	2.23	2.53	2.39	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.81	2.64	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.24	3.00	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.07	2.89	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.16	2.88	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.41	3.10	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.65	3.30	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.76	3.39	3.34	1.00	1.00
2007	1,000	1,000	3.13	4.01	3.56	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.92	3.48	3.45	1.00	1.00
2009	1,000	1,000	3.15	4.04	3.58	3.60	1.00	1.00
2010	1,000	1,000	3.14	4.10	3.57	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.25	3.79	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.40	3.86	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.53	3.97	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.64	4.04	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.71	4.08	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.78	4.11	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.96	4.27	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.22	4.50	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.49	4.71	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.67	4.88	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.81	4.98	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.96	5.10	4.97	1.00	1.00
2023	1,000	1,000	4.53	6.13	5.24	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.31	5.38	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	142	51	7	192	287	104
2006	137	53	8	201	304	94
2007	132	55	8	207	322	80
2008	127	57	8	209	318	84
2009	123	59	8	210	328	72
2010	118	62	8	204	313	79
2011	114	64	8	207	326	68
2012	110	67	9	213	331	67
2013	106	70	9	219	334	70
2014	102	72	9	226	337	72
2015	98	75	9	230	339	73
2016	94	78	9	234	340	75
2017	90	81	10	241	353	68
2018	85	85	10	248	373	55
2019	81	88	10	257	394	43
2020	77	92	11	265	415	29
2021	73	95	11	270	423	27
2022	69	99	11	277	431	26
2023	65	103	12	312	441	51
2024	61	107	12	312	453	40
NOM	2,005	1,513	186	4,734	7,160	1,278
NPV	610	370	47	1,213	1,842	398

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	50	0
2001	15	3	18	9	15	24	115	0
2002	14	4	18	9	15	25	109	0
2003	14	4	17	9	16	25	113	0
2004	13	4	17	8	17	25	122	0
2005	12	4	16	8	17	25	131	0
2006	12	4	16	8	18	26	135	0
2007	12	4	16	8	19	26	145	0
2008	11	4	16	7	20	27	142	0
2009	11	5	15	7	20	27	146	0
2010	10	5	15	7	21	28	149	0
2011	10	5	15	6	22	28	154	0
2012	9	5	15	6	23	29	160	0
2013	9	5	14	6	24	30	165	0
2014	9	6	14	6	25	30	169	0
2015	8	6	14	5	26	31	172	0
2016	8	6	14	5	27	32	174	0
2017	7	6	14	5	28	32	181	0
2018	7	7	14	4	29	33	191	0
2019	6	7	13	4	30	34	201	0
2020	6	7	13	4	31	35	208	0
2021	6	7	13	4	32	36	213	0
2022	5	8	13	3	34	37	219	0
2023	5	8	13	3	35	38	225	0
2024	5	8	13	3	37	40	232	0
NOM.	223	134	357	145	579	725	4,021	0
NPV	90	39	129	58	169	228	1,237	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	939	0	1,027	0	0	50	0	50	(977)	(823)
2001	0	0	350	0	350	0	42	115	0	157	(192)	(971)
2002	0	0	359	0	359	0	42	109	0	151	(208)	(1,119)
2003	0	0	368	0	368	0	42	113	0	155	(213)	(1,257)
2004	0	0	378	0	378	0	42	122	0	164	(214)	(1,385)
2005	0	0	388	0	388	104	42	131	0	277	(111)	(1,446)
2006	0	0	399	0	399	94	42	135	0	272	(127)	(1,510)
2007	0	0	409	0	409	80	42	145	0	267	(142)	(1,575)
2008	0	0	421	0	421	84	42	142	0	268	(153)	(1,640)
2009	0	0	433	0	433	72	43	146	0	261	(171)	(1,707)
2010	0	0	445	0	445	79	43	149	0	271	(174)	(1,768)
2011	0	0	457	0	457	68	43	154	0	265	(192)	(1,831)
2012	0	0	470	0	470	67	44	160	0	271	(199)	(1,891)
2013	0	0	484	0	484	70	44	165	0	279	(205)	(1,948)
2014	0	0	498	0	498	72	44	169	0	285	(213)	(2,001)
2015	0	0	513	0	513	73	45	172	0	289	(223)	(2,053)
2016	0	0	527	0	527	75	46	174	0	295	(233)	(2,103)
2017	0	0	543	0	543	68	46	181	0	296	(247)	(2,151)
2018	0	0	558	0	558	55	47	191	0	293	(265)	(2,198)
2019	0	0	575	0	575	43	48	201	0	291	(283)	(2,245)
2020	0	152	1,926	0	2,078	29	48	208	0	285	(1,792)	(2,515)
2021	0	0	608	0	608	27	49	213	0	290	(319)	(2,560)
2022	0	0	626	0	626	26	50	219	0	295	(331)	(2,602)
2023	0	0	644	0	644	51	52	225	0	328	(316)	(2,639)
2024	0	0	663	0	663	40	53	232	0	325	(338)	(2,675)
NOM	0	239	13,980	0	14,219	1,278	1,082	4,021	0	6,381	(7,838)	
NPV	0	97	4,569	0	4,666	398	357	1,237	0	1,991	(2,675)	

Discount Rate: 8.98 %
Benefit/Cost Ratio (Col(11) / Col(6)) : **0.43**

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	128	0	0	0	128	769	170	0	939	(811)	(683)
2001	256	0	0	0	256	0	350	0	350	(94)	(756)
2002	256	0	0	0	256	0	359	0	359	(103)	(829)
2003	260	0	0	0	260	0	368	0	368	(108)	(899)
2004	261	0	0	0	261	0	378	0	378	(117)	(969)
2005	264	0	0	0	264	0	388	0	388	(124)	(1,037)
2006	264	0	0	0	264	0	399	0	399	(134)	(1,104)
2007	266	0	0	0	266	0	409	0	409	(144)	(1,170)
2008	267	0	0	0	267	0	421	0	421	(154)	(1,235)
2009	267	0	0	0	267	0	433	0	433	(166)	(1,300)
2010	275	0	0	0	275	0	445	0	445	(170)	(1,360)
2011	275	0	0	0	275	0	457	0	457	(182)	(1,420)
2012	278	0	0	0	278	0	470	0	470	(193)	(1,478)
2013	280	0	0	0	280	0	484	0	484	(204)	(1,534)
2014	284	0	0	0	284	0	498	0	498	(214)	(1,588)
2015	286	0	0	0	286	0	513	0	513	(227)	(1,641)
2016	289	0	0	0	289	0	527	0	527	(239)	(1,691)
2017	289	0	0	0	289	0	543	0	543	(254)	(1,741)
2018	291	0	0	0	291	0	558	0	558	(267)	(1,789)
2019	294	0	0	0	294	0	575	0	575	(281)	(1,835)
2020	296	0	0	0	296	1,334	591	0	1,926	(1,630)	(2,081)
2021	299	0	0	0	299	0	608	0	608	(310)	(2,124)
2022	301	0	0	0	301	0	626	0	626	(325)	(2,165)
2023	304	0	0	0	304	0	644	0	644	(341)	(2,205)
2024	306	0	0	0	306	0	663	0	663	(357)	(2,243)
NOM	6,835	0	0	0	6,835	2,103	11,877	0	13,980	(7,145)	
NPV	2,326	0	0	0	2,326	849	3,720	0	4,569	(2,243)	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) **0.51**

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMt Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	0	107	0	194	50	0	0	0	50	(145)	(122)
2001	0	0	0	212	0	212	115	42	0	0	157	(55)	(164)
2002	0	0	0	212	0	212	109	42	0	0	151	(61)	(207)
2003	0	0	0	215	0	215	113	42	0	0	155	(60)	(246)
2004	0	0	0	216	0	216	122	42	0	0	164	(52)	(278)
2005	0	0	0	218	0	218	235	42	0	0	277	59	(245)
2006	0	0	0	218	0	218	230	42	0	0	272	54	(218)
2007	0	0	0	219	0	219	225	42	0	0	267	48	(196)
2008	0	0	0	220	0	220	226	42	0	0	268	48	(176)
2009	0	0	0	220	0	220	219	43	0	0	261	41	(160)
2010	0	0	0	225	0	225	228	43	0	0	271	46	(143)
2011	0	0	0	225	0	225	222	43	0	0	265	41	(130)
2012	0	0	0	227	0	227	227	44	0	0	271	45	(117)
2013	0	0	0	228	0	228	235	44	0	0	279	51	(103)
2014	0	0	0	231	0	231	240	44	0	0	285	54	(89)
2015	0	0	0	232	0	232	244	45	0	0	289	57	(76)
2016	0	0	0	234	0	234	249	46	0	0	295	61	(63)
2017	0	0	0	234	0	234	250	46	0	0	296	62	(51)
2018	0	0	0	236	0	236	246	47	0	0	293	57	(41)
2019	0	0	0	238	0	238	244	48	0	0	291	54	(32)
2020	0	152	0	239	0	391	237	48	0	0	285	(106)	(48)
2021	0	0	0	241	0	241	240	49	0	0	290	49	(41)
2022	0	0	0	243	0	243	244	50	0	0	295	52	(34)
2023	0	0	0	245	0	245	276	52	0	0	328	84	(25)
2024	0	0	0	246	0	246	272	53	0	0	325	79	(16)
NOM.	0	239	0	5,580	0	5,820	5,300	1,082	0	0	6,381	561	
NPV	0	97	0	1,911	0	2,007	1,635	357	0	0	1,991	(16)	

Discount Rate 8.98 %
Benefit/Cost Ratio (Col(12) / Col(7)) : 0.99

ATTACHEMENT D-5
WATER-SOURCE GAS CHILLER
GSD RATE - CASE 1

INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.89	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.14	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,926.7	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	2,530	0	2,618	77	44	879	192	0	1,071
2001	0	0	0	0	156	85	0	394	0	394
2002	0	0	0	0	156	85	0	404	0	404
2003	0	0	0	0	160	85	0	415	0	415
2004	0	0	0	0	161	85	0	426	0	426
2005	0	0	0	0	164	85	0	437	0	437
2006	0	0	0	0	165	84	0	449	0	449
2007	0	0	0	0	167	83	0	461	0	461
2008	0	0	0	0	168	84	0	474	0	474
2009	0	0	0	0	168	83	0	487	0	487
2010	0	0	0	0	177	81	0	501	0	501
2011	0	0	0	0	179	78	0	515	0	515
2012	0	0	0	0	182	78	0	530	0	530
2013	0	0	0	0	184	78	0	545	0	545
2014	0	0	0	0	188	78	0	561	0	561
2015	0	0	0	0	190	77	0	578	0	578
2016	0	0	0	0	193	76	0	594	0	594
2017	0	0	0	0	193	77	0	612	0	612
2018	0	0	0	0	195	76	0	629	0	629
2019	0	0	0	0	198	76	0	648	0	648
2020	152	2,530	0	2,682	200	75	1,525	666	0	2,191
2021	0	0	0	0	203	75	0	686	0	686
2022	0	0	0	0	205	75	0	706	0	706
2023	0	0	0	0	208	74	0	726	0	726
2024	0	0	0	0	210	74	0	747	0	747
NOM	239	5,060	0	5,299	4,445	1,953	2,403	13,384	0	15,788
NPV	97	2,512	0	2,609	1,478	707	970	4,193	0	5,163

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	746	26	0	51	32	10	25	2	145	145	145
2006	714	24	0	49	21	10	25	11	141	129	275
2007	679	23	0	47	21	10	25	10	136	114	389
2008	645	22	0	44	21	10	25	8	131	101	490
2009	612	21	0	42	21	10	25	7	126	89	579
2010	581	20	0	40	20	10	25	6	121	79	658
2011	551	19	0	38	20	10	25	5	117	70	728
2012	522	18	0	36	20	10	25	4	113	62	790
2013	493	17	0	34	19	10	25	4	109	55	844
2014	465	16	0	32	18	10	25	4	104	48	893
2015	436	15	0	30	16	10	25	4	100	42	935
2016	408	14	0	28	15	10	25	4	96	37	972
2017	379	13	0	26	14	10	25	4	92	33	1,005
2018	351	12	0	24	13	10	25	4	88	29	1,034
2019	323	11	0	22	12	10	25	4	84	25	1,059
2020	294	10	0	20	10	10	25	4	79	22	1,081
2021	266	9	0	18	9	10	25	4	75	19	1,100
2022	237	8	0	16	8	10	25	4	71	17	1,116
2023	209	7	0	14	7	10	25	4	67	14	1,131
2024	180	6	0	12	5	10	25	4	63	12	1,143
2025	155	5	0	11	11	10	25	(3)	59	11	1,154
2026	136	5	0	9	16	10	25	(9)	56	9	1,163
2027	120	4	0	8	15	10	25	(9)	54	8	1,171
2028	104	4	0	7	15	10	25	(9)	52	7	1,178
2029	88	3	0	6	14	10	25	(9)	49	6	1,184
2030	72	2	0	5	13	10	25	(9)	47	5	1,190
2031	56	2	0	4	12	10	25	(9)	45	5	1,195
2032	40	1	0	3	12	10	25	(9)	42	4	1,199
2033	24	1	0	2	11	10	25	(9)	40	4	1,202
2034	8	0	0	1	10	10	25	(9)	38	3	1,206

IN SERVICE COS ($000)	746
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	27	27	25	25	23	23	2	55	0	0	0	2	(11)
2006	7.22%	52	79	25	50	23	46	11	55	0	0	0	11	0
2007	6.68%	48	128	25	75	23	69	10	55	0	0	0	10	10
2008	6.18%	45	172	25	100	23	92	8	55	0	0	0	8	18
2009	5.71%	41	214	25	124	23	115	7	55	0	0	0	7	25
2010	5.29%	38	252	25	149	23	138	6	55	0	0	0	6	31
2011	4.89%	35	287	25	174	23	161	5	55	0	0	0	5	36
2012	4.52%	33	320	25	199	23	184	4	55	0	0	0	4	40
2013	4.46%	32	352	25	224	23	207	4	55	0	0	0	4	43
2014	4.46%	32	385	25	249	23	230	4	55	0	0	0	4	47
2015	4.46%	32	417	25	274	23	253	4	55	0	0	0	4	51
2016	4.46%	32	449	25	299	23	276	4	55	0	0	0	4	54
2017	4.46%	32	481	25	323	23	299	4	55	0	0	0	4	58
2018	4.46%	32	514	25	348	23	323	4	55	0	0	0	4	61
2019	4.46%	32	546	25	373	23	346	4	55	0	0	0	4	65
2020	4.46%	32	578	25	398	23	369	4	55	0	0	0	4	68
2021	4.46%	32	611	25	423	23	392	4	55	0	0	0	4	72
2022	4.46%	32	643	25	448	23	415	4	55	0	0	0	4	76
2023	4.46%	32	675	25	473	23	438	4	55	0	0	0	4	79
2024	4.46%	32	707	25	498	23	461	4	55	0	0	0	4	83
2025	2.23%	16	724	25	522	23	484	(3)	55	0	0	0	(3)	80
2026	0.00%	0	724	25	547	23	507	(9)	55	0	0	0	(9)	71
2027	0.00%	0	724	25	572	23	530	(9)	55	0	0	0	(9)	62
2028	0.00%	0	724	25	597	23	553	(9)	55	0	0	0	(9)	53
2029	0.00%	0	724	25	622	23	576	(9)	55	0	0	0	(9)	44
2030	0.00%	0	724	25	647	23	599	(9)	55	0	0	0	(9)	36
2031	0.00%	0	724	25	672	23	622	(9)	55	0	0	0	(9)	27
2032	0.00%	0	724	25	697	23	645	(9)	55	0	0	0	(9)	18
2033	0.00%	0	724	25	721	23	668	(9)	55	0	0	0	(9)	9
2034	0.00%	0	724	25	746	23	691	(9)	55	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(13)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	55
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	27	2	721	25	(11)	759	732	746
2006	7.22%	52	11	697	50	0	732	696	714
2007	6.68%	48	10	672	75	10	696	662	679
2008	6.18%	45	8	647	100	18	662	628	645
2009	5.71%	41	7	622	124	25	628	596	612
2010	5.29%	38	6	597	149	31	596	566	581
2011	4.89%	35	5	572	174	36	566	536	551
2012	4.52%	33	4	547	199	40	536	507	522
2013	4.46%	32	4	522	224	43	507	479	493
2014	4.46%	32	4	498	249	47	479	451	465
2015	4.46%	32	4	473	274	51	451	422	436
2016	4.46%	32	4	448	299	54	422	394	408
2017	4.46%	32	4	423	323	58	394	365	379
2018	4.46%	32	4	398	348	61	365	337	351
2019	4.46%	32	4	373	373	65	337	308	323
2020	4.46%	32	4	348	398	68	308	280	294
2021	4.46%	32	4	323	423	72	280	251	266
2022	4.46%	32	4	299	448	76	251	223	237
2023	4.46%	32	4	274	473	79	223	195	209
2024	4.46%	32	4	249	498	83	195	166	180
2025	2.23%	16	(3)	224	522	80	166	144	155
2026	0.00%	0	(9)	199	547	71	144	128	136
2027	0.00%	0	(9)	174	572	62	128	112	120
2028	0.00%	0	(9)	149	597	53	112	96	104
2029	0.00%	0	(9)	124	622	44	96	80	88
2030	0.00%	0	(9)	100	647	36	80	64	72
2031	0.00%	0	(9)	75	672	27	64	48	56
2032	0.00%	0	(9)	50	697	18	48	32	40
2033	0.00%	0	(9)	25	721	9	32	16	24
2034	0.00%	0	(9)	0	746	0	16	0	8

* Column not specified in workbook

(1) YEAR	(2) NO.YEARS BEFORE IN-SERVICE	(3) PLANT ESCALATION RATE	(4) CUMULATIVE ESCALATION FACTOR	(5) YEARLY EXPENDITURE (%)	(6) ANNUAL SPENDING ($/kW)	(7) CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	664	664	664
EQUITY AFUDC	55		
DEBT AFUDC	27	27	
CPI			60
TOTAL	746	691	724

* Column not specified in workbook

INPUT DATA -- PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMENT FUEL COST (C/kWh)	PROGRAM kW EFFECTIVENESS FACTOR	PROGRAM kWh EFFECTIVENESS FACTOR
1998	0	0	2.00	2.20	2.13	0.00	1.00	1.00
1999	0	0	2.23	2.50	2.41	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.77	2.67	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.18	3.04	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.04	2.93	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.11	2.94	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.35	3.17	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.58	3.38	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.69	3.47	3.34	1.00	1.00
2007	1,000	1,000	3.13	3.92	3.66	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.84	3.57	3.45	1.00	1.00
2009	1,000	1,000	3.15	3.95	3.68	3.60	1.00	1.00
2010	1,000	1,000	3.14	3.99	3.67	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.18	3.90	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.30	3.97	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.42	4.08	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.52	4.15	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.58	4.20	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.64	4.23	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.81	4.39	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.07	4.63	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.34	4.86	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.52	5.04	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.65	5.14	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.79	5.26	4.97	1.00	1.00
2023	1,000	1,000	4.53	5.96	5.41	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.13	5.55	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMEN FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	145	52	7	197	295	107
2006	141	54	8	206	312	97
2007	136	56	8	212	331	82
2008	131	59	8	215	326	86
2009	126	61	8	215	336	74
2010	121	63	8	209	321	81
2011	117	66	9	212	334	70
2012	113	69	9	219	340	69
2013	109	71	9	225	342	72
2014	104	74	9	232	346	74
2015	100	77	9	236	348	75
2016	96	80	10	240	349	77
2017	92	84	10	247	362	70
2018	88	87	10	255	383	57
2019	84	90	11	264	405	44
2020	79	94	11	272	426	30
2021	75	98	11	278	434	28
2022	71	102	12	284	442	26
2023	67	106	12	321	453	53
2024	63	110	12	321	465	41
NOM	2,058	1,554	191	4,860	7,351	1,313
NPV	626	380	49	1,245	1,892	408

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	57	0
2001	15	4	18	10	15	25	131	0
2002	14	4	18	9	16	25	125	0
2003	14	4	18	9	16	25	129	0
2004	13	4	17	9	17	26	140	0
2005	13	4	17	8	18	26	150	0
2006	12	4	17	8	19	27	154	0
2007	12	4	16	8	19	27	165	0
2008	11	5	16	7	20	27	161	0
2009	11	5	16	7	21	28	166	0
2010	11	5	16	7	22	29	168	0
2011	10	5	15	7	23	29	176	0
2012	10	5	15	6	23	30	182	0
2013	9	6	15	6	24	30	187	0
2014	9	6	15	6	25	31	191	0
2015	8	6	14	5	26	32	194	0
2016	8	6	14	5	27	33	196	0
2017	7	7	14	5	29	33	204	0
2018	7	7	14	5	30	34	215	0
2019	7	7	14	4	31	35	227	0
2020	6	7	14	4	32	36	235	0
2021	6	8	13	4	33	37	240	0
2022	5	8	13	4	35	38	246	0
2023	5	8	14	3	36	39	254	0
2024	5	9	14	3	38	41	261	0
NOM.	229	137	367	149	595	744	4,553	0
NPV	92	40	132	60	174	234	1,405	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMt Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	1,071	0	1,158	0	0	57	0	57	(1,101)	(927)
2001	0	0	394	0	394	0	43	131	0	174	(219)	(1,097)
2002	0	0	404	0	404	0	43	125	0	169	(236)	(1,264)
2003	0	0	415	0	415	0	43	129	0	172	(243)	(1,422)
2004	0	0	426	0	426	0	43	140	0	183	(243)	(1,567)
2005	0	0	437	0	437	107	43	150	0	299	(138)	(1,643)
2006	0	0	449	0	449	97	43	154	0	294	(155)	(1,720)
2007	0	0	461	0	461	82	43	165	0	290	(171)	(1,799)
2008	0	0	474	0	474	86	43	161	0	291	(183)	(1,877)
2009	0	0	487	0	487	74	44	166	0	284	(203)	(1,956)
2010	0	0	501	0	501	81	44	168	0	294	(207)	(2,030)
2011	0	0	515	0	515	70	44	176	0	290	(225)	(2,104)
2012	0	0	530	0	530	69	45	182	0	296	(234)	(2,174)
2013	0	0	545	0	545	72	45	187	0	304	(242)	(2,241)
2014	0	0	561	0	561	74	46	191	0	310	(251)	(2,304)
2015	0	0	578	0	578	75	46	194	0	315	(263)	(2,365)
2016	0	0	594	0	594	77	47	196	0	320	(275)	(2,423)
2017	0	0	612	0	612	70	47	204	0	321	(290)	(2,480)
2018	0	0	629	0	629	57	48	215	0	320	(309)	(2,535)
2019	0	0	648	0	648	44	49	227	0	319	(328)	(2,589)
2020	0	152	2,191	0	2,343	30	50	235	0	314	(2,029)	(2,896)
2021	0	0	686	0	686	28	51	240	0	319	(367)	(2,946)
2022	0	0	706	0	706	26	52	246	0	325	(381)	(2,995)
2023	0	0	726	0	726	53	53	254	0	359	(367)	(3,038)
2024	0	0	747	0	747	41	54	261	0	357	(390)	(3,079)
NOM	0	239	15,788	0	16,027	1,313	1,111	4,553	0	6,977	(9,051)	
NPV	0	97	5,163	0	5,259	408	366	1,405	0	2,180	(3,079)	

Discount Rate: 8.98 %
Benefit/Cost Ratio (Col(11) / Col(6)) : 0.41

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	148	0	2,530	0	2,678	879	192	0	1,071	1,607	1,354
2001	296	0	0	0	296	0	394	0	394	(97)	1,278
2002	296	0	0	0	296	0	404	0	404	(108)	1,202
2003	302	0	0	0	302	0	415	0	415	(113)	1,128
2004	303	0	0	0	303	0	426	0	426	(123)	1,054
2005	307	0	0	0	307	0	437	0	437	(131)	983
2006	307	0	0	0	307	0	449	0	449	(143)	911
2007	309	0	0	0	309	0	461	0	461	(153)	841
2008	310	0	0	0	310	0	474	0	474	(164)	771
2009	310	0	0	0	310	0	487	0	487	(178)	702
2010	320	0	0	0	320	0	501	0	501	(181)	637
2011	321	0	0	0	321	0	515	0	515	(195)	574
2012	324	0	0	0	324	0	530	0	530	(206)	512
2013	326	0	0	0	326	0	545	0	545	(219)	452
2014	331	0	0	0	331	0	561	0	561	(230)	393
2015	334	0	0	0	334	0	578	0	578	(244)	337
2016	337	0	0	0	337	0	594	0	594	(257)	282
2017	337	0	0	0	337	0	612	0	612	(274)	228
2018	340	0	0	0	340	0	629	0	629	(289)	177
2019	343	0	0	0	343	0	648	0	648	(304)	127
2020	346	0	2,530	0	2,876	1,525	666	0	2,191	685	230
2021	349	0	0	0	349	0	686	0	686	(337)	183
2022	352	0	0	0	352	0	706	0	706	(353)	138
2023	355	0	0	0	355	0	726	0	726	(371)	95
2024	358	0	0	0	358	0	747	0	747	(389)	54
NOM	7,960	0	5,060	0	13,020	2,403	13,384	0	15,788	(2,767)	
NPV	2,704	0	2,512	0	5,216	970	4,193	0	5,163	54	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) 1.01

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	2,530	121	0	2,739	57	0	0	0	57	(2,682)	(2,258)
2001	0	0	0	242	0	242	131	43	0	0	174	(67)	(2,310)
2002	0	0	0	241	0	241	125	43	0	0	169	(73)	(2,362)
2003	0	0	0	245	0	245	129	43	0	0	172	(73)	(2,409)
2004	0	0	0	246	0	246	140	43	0	0	183	(63)	(2,447)
2005	0	0	0	249	0	249	256	43	0	0	299	51	(2,419)
2006	0	0	0	249	0	249	251	43	0	0	294	46	(2,396)
2007	0	0	0	250	0	250	247	43	0	0	290	40	(2,378)
2008	0	0	0	251	0	251	247	43	0	0	291	40	(2,361)
2009	0	0	0	251	0	251	240	44	0	0	284	33	(2,348)
2010	0	0	0	258	0	258	250	44	0	0	294	36	(2,335)
2011	0	0	0	258	0	258	246	44	0	0	290	32	(2,325)
2012	0	0	0	260	0	260	251	45	0	0	296	36	(2,314)
2013	0	0	0	262	0	262	259	45	0	0	304	42	(2,302)
2014	0	0	0	265	0	265	265	46	0	0	310	45	(2,291)
2015	0	0	0	267	0	267	268	46	0	0	315	48	(2,280)
2016	0	0	0	269	0	269	273	47	0	0	320	50	(2,269)
2017	0	0	0	270	0	270	274	47	0	0	321	52	(2,259)
2018	0	0	0	272	0	272	272	48	0	0	320	48	(2,250)
2019	0	0	0	274	0	274	271	49	0	0	319	46	(2,243)
2020	0	152	2,530	276	0	2,958	265	50	0	0	314	(2,643)	(2,642)
2021	0	0	0	278	0	278	268	51	0	0	319	41	(2,636)
2022	0	0	0	280	0	280	273	52	0	0	325	45	(2,631)
2023	0	0	0	282	0	282	306	53	0	0	359	77	(2,622)
2024	0	0	0	284	0	284	302	54	0	0	357	72	(2,614)
NOM.	0	239	5,060	6,399	0	11,698	5,866	1,111	0	0	6,977	(4,722)	
NPV	0	97	2,512	2,185	0	4,794	1,814	366	0	0	2,180	(2,614)	

Discount Rate 8.98 %

Benefit/Cost Ratio (Col(12) / Col(7)) : 0.45

ATTACHEMENT D-6
WATER-SOURCE GAS CHILLER
GSD RATE - CASE 2

INPUT DATA -- PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.89	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.14	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,926.7	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA -- PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	0	0	88	77	44	879	192	0	1,071
2001	0	0	0	0	156	85	0	394	0	394
2002	0	0	0	0	156	85	0	404	0	404
2003	0	0	0	0	160	85	0	415	0	415
2004	0	0	0	0	161	85	0	426	0	426
2005	0	0	0	0	164	85	0	437	0	437
2006	0	0	0	0	165	84	0	449	0	449
2007	0	0	0	0	167	83	0	461	0	461
2008	0	0	0	0	168	84	0	474	0	474
2009	0	0	0	0	168	83	0	487	0	487
2010	0	0	0	0	177	81	0	501	0	501
2011	0	0	0	0	179	78	0	515	0	515
2012	0	0	0	0	182	78	0	530	0	530
2013	0	0	0	0	184	78	0	545	0	545
2014	0	0	0	0	188	78	0	561	0	561
2015	0	0	0	0	190	77	0	578	0	578
2016	0	0	0	0	193	76	0	594	0	594
2017	0	0	0	0	193	77	0	612	0	612
2018	0	0	0	0	195	76	0	629	0	629
2019	0	0	0	0	198	76	0	648	0	648
2020	152	0	0	152	200	75	1,525	666	0	2,191
2021	0	0	0	0	203	75	0	686	0	686
2022	0	0	0	0	205	75	0	706	0	706
2023	0	0	0	0	208	74	0	726	0	726
2024	0	0	0	0	210	74	0	747	0	747
NOM	239	0	0	239	4,445	1,953	2,403	13,384	0	15,788
NPV	97	0	0	97	1,478	707	970	4,193	0	5,163

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	746	26	0	51	32	10	25	2	145	145	145
2006	714	24	0	49	21	10	25	11	141	129	275
2007	679	23	0	47	21	10	25	10	136	114	389
2008	645	22	0	44	21	10	25	8	131	101	490
2009	612	21	0	42	21	10	25	7	126	89	579
2010	581	20	0	40	20	10	25	6	121	79	658
2011	551	19	0	38	20	10	25	5	117	70	728
2012	522	18	0	36	20	10	25	4	113	62	790
2013	493	17	0	34	19	10	25	4	109	55	844
2014	465	16	0	32	18	10	25	4	104	48	893
2015	436	15	0	30	16	10	25	4	100	42	935
2016	408	14	0	28	15	10	25	4	96	37	972
2017	379	13	0	26	14	10	25	4	92	33	1,005
2018	351	12	0	24	13	10	25	4	88	29	1,034
2019	323	11	0	22	12	10	25	4	84	25	1,059
2020	294	10	0	20	10	10	25	4	79	22	1,081
2021	266	9	0	18	9	10	25	4	75	19	1,100
2022	237	8	0	16	8	10	25	4	71	17	1,116
2023	209	7	0	14	7	10	25	4	67	14	1,131
2024	180	6	0	12	5	10	25	4	63	12	1,143
2025	155	5	0	11	11	10	25	(3)	59	11	1,154
2026	136	5	0	9	16	10	25	(9)	56	9	1,163
2027	120	4	0	8	15	10	25	(9)	54	8	1,171
2028	104	4	0	7	15	10	25	(9)	52	7	1,178
2029	88	3	0	6	14	10	25	(9)	49	6	1,184
2030	72	2	0	5	13	10	25	(9)	47	5	1,190
2031	56	2	0	4	12	10	25	(9)	45	5	1,195
2032	40	1	0	3	12	10	25	(9)	42	4	1,199
2033	24	1	0	2	11	10	25	(9)	40	4	1,202
2034	8	0	0	1	10	10	25	(9)	38	3	1,206

IN SERVICE COS ($000)	746
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	27	27	25	25	23	23	2	55	0	0	0	2	(11)
2006	7.22%	52	79	25	50	23	46	11	55	0	0	0	11	0
2007	6.68%	48	128	25	75	23	69	10	55	0	0	0	10	10
2008	6.18%	45	172	25	100	23	92	8	55	0	0	0	8	18
2009	5.71%	41	214	25	124	23	115	7	55	0	0	0	7	25
2010	5.29%	38	252	25	149	23	138	6	55	0	0	0	6	31
2011	4.89%	35	287	25	174	23	161	5	55	0	0	0	5	36
2012	4.52%	33	320	25	199	23	184	4	55	0	0	0	4	40
2013	4.46%	32	352	25	224	23	207	4	55	0	0	0	4	43
2014	4.46%	32	385	25	249	23	230	4	55	0	0	0	4	47
2015	4.46%	32	417	25	274	23	253	4	55	0	0	0	4	51
2016	4.46%	32	449	25	299	23	276	4	55	0	0	0	4	54
2017	4.46%	32	481	25	323	23	299	4	55	0	0	0	4	58
2018	4.46%	32	514	25	348	23	323	4	55	0	0	0	4	61
2019	4.46%	32	546	25	373	23	346	4	55	0	0	0	4	65
2020	4.46%	32	578	25	398	23	369	4	55	0	0	0	4	68
2021	4.46%	32	611	25	423	23	392	4	55	0	0	0	4	72
2022	4.46%	32	643	25	448	23	415	4	55	0	0	0	4	76
2023	4.46%	32	675	25	473	23	438	4	55	0	0	0	4	79
2024	4.46%	32	707	25	498	23	461	4	55	0	0	0	4	83
2025	2.23%	16	724	25	522	23	484	(3)	55	0	0	0	(3)	80
2026	0.00%	0	724	25	547	23	507	(9)	55	0	0	0	(9)	71
2027	0.00%	0	724	25	572	23	530	(9)	55	0	0	0	(9)	62
2028	0.00%	0	724	25	597	23	553	(9)	55	0	0	0	(9)	53
2029	0.00%	0	724	25	622	23	576	(9)	55	0	0	0	(9)	44
2030	0.00%	0	724	25	647	23	599	(9)	55	0	0	0	(9)	36
2031	0.00%	0	724	25	672	23	622	(9)	55	0	0	0	(9)	27
2032	0.00%	0	724	25	697	23	645	(9)	55	0	0	0	(9)	18
2033	0.00%	0	724	25	721	23	668	(9)	55	0	0	0	(9)	9
2034	0.00%	0	724	25	746	23	691	(9)	55	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(13)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	55
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	27	2	721	25	(11)	759	732	746
2006	7.22%	52	11	697	50	0	732	696	714
2007	6.68%	48	10	672	75	10	696	662	679
2008	6.18%	45	8	647	100	18	662	628	645
2009	5.71%	41	7	622	124	25	628	596	612
2010	5.29%	38	6	597	149	31	596	566	581
2011	4.89%	35	5	572	174	36	566	536	551
2012	4.52%	33	4	547	199	40	536	507	522
2013	4.46%	32	4	522	224	43	507	479	493
2014	4.46%	32	4	498	249	47	479	451	465
2015	4.46%	32	4	473	274	51	451	422	436
2016	4.46%	32	4	448	299	54	422	394	408
2017	4.46%	32	4	423	323	58	394	365	379
2018	4.46%	32	4	398	348	61	365	337	351
2019	4.46%	32	4	373	373	65	337	308	323
2020	4.46%	32	4	348	398	68	308	280	294
2021	4.46%	32	4	323	423	72	280	251	266
2022	4.46%	32	4	299	448	76	251	223	237
2023	4.46%	32	4	274	473	79	223	195	209
2024	4.46%	32	4	249	498	83	195	166	180
2025	2.23%	16	(3)	224	522	80	166	144	155
2026	0.00%	0	(9)	199	547	71	144	128	136
2027	0.00%	0	(9)	174	572	62	128	112	120
2028	0.00%	0	(9)	149	597	53	112	96	104
2029	0.00%	0	(9)	124	622	44	96	80	88
2030	0.00%	0	(9)	100	647	36	80	64	72
2031	0.00%	0	(9)	75	672	27	64	48	56
2032	0.00%	0	(9)	50	697	18	48	32	40
2033	0.00%	0	(9)	25	721	9	32	16	24
2034	0.00%	0	(9)	0	746	0	16	0	8

* Column not specified in workbook

(1) YEAR	(2) NO.YEARS BEFORE IN-SERVICE	(3) PLANT ESCALATION RATE	(4) CUMULATIVE ESCALATION FACTOR	(5) YEARLY EXPENDITURE (%)	(6) ANNUAL SPENDING ($/kW)	(7) CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	664	664	664
EQUITY AFUDC	55		
DEBT AFUDC	27	27	
CPI			60
TOTAL	746	691	724

* Column not specified in workbook

INPUT DATA – PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMENT FUEL COST (C/kWh)	PROGRAM kW EFFECTIVENESS FACTOR	PROGRAM kWh EFFECTIVENESS FACTOR
1998	0	0	2.00	2.20	2.13	0.00	1.00	1.00
1999	0	0	2.23	2.50	2.41	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.77	2.67	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.18	3.04	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.04	2.93	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.11	2.94	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.35	3.17	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.58	3.38	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.69	3.47	3.34	1.00	1.00
2007	1,000	1,000	3.13	3.92	3.66	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.84	3.57	3.45	1.00	1.00
2009	1,000	1,000	3.15	3.95	3.68	3.60	1.00	1.00
2010	1,000	1,000	3.14	3.99	3.67	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.18	3.90	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.30	3.97	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.42	4.08	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.52	4.15	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.58	4.20	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.64	4.23	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.81	4.39	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.07	4.63	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.34	4.86	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.52	5.04	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.65	5.14	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.79	5.26	4.97	1.00	1.00
2023	1,000	1,000	4.53	5.96	5.41	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.13	5.55	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMENT FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	145	52	7	197	295	107
2006	141	54	8	206	312	97
2007	136	56	8	212	331	82
2008	131	59	8	215	326	86
2009	126	61	8	215	336	74
2010	121	63	8	209	321	81
2011	117	66	9	212	334	70
2012	113	69	9	219	340	69
2013	109	71	9	225	342	72
2014	104	74	9	232	346	74
2015	100	77	9	236	348	75
2016	96	80	10	240	349	77
2017	92	84	10	247	362	70
2018	88	87	10	255	383	57
2019	84	90	11	264	405	44
2020	79	94	11	272	426	30
2021	75	98	11	278	434	28
2022	71	102	12	284	442	26
2023	67	106	12	321	453	53
2024	63	110	12	321	465	41
NOM	2,058	1,554	191	4,860	7,351	1,313
NPV	626	380	49	1,245	1,892	408

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	57	0
2001	15	4	18	10	15	25	131	0
2002	14	4	18	9	16	25	125	0
2003	14	4	18	9	16	25	129	0
2004	13	4	17	9	17	26	140	0
2005	13	4	17	8	18	26	150	0
2006	12	4	17	8	19	27	154	0
2007	12	4	16	8	19	27	165	0
2008	11	5	16	7	20	27	161	0
2009	11	5	16	7	21	28	166	0
2010	11	5	16	7	22	29	168	0
2011	10	5	15	7	23	29	176	0
2012	10	5	15	6	23	30	182	0
2013	9	6	15	6	24	30	187	0
2014	9	6	15	6	25	31	191	0
2015	8	6	14	5	26	32	194	0
2016	8	6	14	5	27	33	196	0
2017	7	7	14	5	29	33	204	0
2018	7	7	14	5	30	34	215	0
2019	7	7	14	4	31	35	227	0
2020	6	7	14	4	32	36	235	0
2021	6	8	13	4	33	37	240	0
2022	5	8	13	4	35	38	246	0
2023	5	8	14	3	36	39	254	0
2024	5	9	14	3	38	41	261	0
NOM.	229	137	367	149	595	744	4,553	0
NPV	92	40	132	60	174	234	1,405	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	1,071	0	1,158	0	0	57	0	57	(1,101)	(927)
2001	0	0	394	0	394	0	43	131	0	174	(219)	(1,097)
2002	0	0	404	0	404	0	43	125	0	169	(236)	(1,264)
2003	0	0	415	0	415	0	43	129	0	172	(243)	(1,422)
2004	0	0	426	0	426	0	43	140	0	183	(243)	(1,567)
2005	0	0	437	0	437	107	43	150	0	299	(138)	(1,643)
2006	0	0	449	0	449	97	43	154	0	294	(155)	(1,720)
2007	0	0	461	0	461	82	43	165	0	290	(171)	(1,799)
2008	0	0	474	0	474	86	43	161	0	291	(183)	(1,877)
2009	0	0	487	0	487	74	44	166	0	284	(203)	(1,956)
2010	0	0	501	0	501	81	44	168	0	294	(207)	(2,030)
2011	0	0	515	0	515	70	44	176	0	290	(225)	(2,104)
2012	0	0	530	0	530	69	45	182	0	296	(234)	(2,174)
2013	0	0	545	0	545	72	45	187	0	304	(242)	(2,241)
2014	0	0	561	0	561	74	46	191	0	310	(251)	(2,304)
2015	0	0	578	0	578	75	46	194	0	315	(263)	(2,365)
2016	0	0	594	0	594	77	47	196	0	320	(275)	(2,423)
2017	0	0	612	0	612	70	47	204	0	321	(290)	(2,480)
2018	0	0	629	0	629	57	48	215	0	320	(309)	(2,535)
2019	0	0	648	0	648	44	49	227	0	319	(328)	(2,589)
2020	0	152	2,191	0	2,343	30	50	235	0	314	(2,029)	(2,896)
2021	0	0	686	0	686	28	51	240	0	319	(367)	(2,946)
2022	0	0	706	0	706	26	52	246	0	325	(381)	(2,995)
2023	0	0	726	0	726	53	53	254	0	359	(367)	(3,038)
2024	0	0	747	0	747	41	54	261	0	357	(390)	(3,079)
NOM	0	239	15,788	0	16,027	1,313	1,111	4,553	0	6,977	(9,051)	
NPV	0	97	5,163	0	5,259	408	366	1,405	0	2,180	(3,079)	

Discount Rate: 8.98 %

Benefit/Cost Ratio (Col(11) / Col(6)) : 0.41

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	148	0	0	0	148	879	192	0	1,071	(923)	(777)
2001	296	0	0	0	296	0	394	0	394	(97)	(852)
2002	296	0	0	0	296	0	404	0	404	(108)	(929)
2003	302	0	0	0	302	0	415	0	415	(113)	(1,002)
2004	303	0	0	0	303	0	426	0	426	(123)	(1,076)
2005	307	0	0	0	307	0	437	0	437	(131)	(1,148)
2006	307	0	0	0	307	0	449	0	449	(143)	(1,219)
2007	309	0	0	0	309	0	461	0	461	(153)	(1,290)
2008	310	0	0	0	310	0	474	0	474	(164)	(1,359)
2009	310	0	0	0	310	0	487	0	487	(178)	(1,428)
2010	320	0	0	0	320	0	501	0	501	(181)	(1,493)
2011	321	0	0	0	321	0	515	0	515	(195)	(1,557)
2012	324	0	0	0	324	0	530	0	530	(206)	(1,619)
2013	326	0	0	0	326	0	545	0	545	(219)	(1,679)
2014	331	0	0	0	331	0	561	0	561	(230)	(1,737)
2015	334	0	0	0	334	0	578	0	578	(244)	(1,794)
2016	337	0	0	0	337	0	594	0	594	(257)	(1,848)
2017	337	0	0	0	337	0	612	0	612	(274)	(1,902)
2018	340	0	0	0	340	0	629	0	629	(289)	(1,954)
2019	343	0	0	0	343	0	648	0	648	(304)	(2,004)
2020	346	0	0	0	346	1,525	666	0	2,191	(1,845)	(2,282)
2021	349	0	0	0	349	0	686	0	686	(337)	(2,329)
2022	352	0	0	0	352	0	706	0	706	(353)	(2,374)
2023	355	0	0	0	355	0	726	0	726	(371)	(2,417)
2024	358	0	0	0	358	0	747	0	747	(389)	(2,459)
NOM	7,960	0	0	0	7,960	2,403	13,384	0	15,788	(7,827)	
NPV	2,704	0	0	0	2,704	970	4,193	0	5,163	(2,459)	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) **0.52**

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMf Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	0	121	0	209	57	0	0	0	57	(152)	(128)
2001	0	0	0	242	0	242	131	43	0	0	174	(67)	(180)
2002	0	0	0	241	0	241	125	43	0	0	169	(73)	(231)
2003	0	0	0	245	0	245	129	43	0	0	172	(73)	(279)
2004	0	0	0	246	0	246	140	43	0	0	183	(63)	(317)
2005	0	0	0	249	0	249	256	43	0	0	299	51	(289)
2006	0	0	0	249	0	249	251	43	0	0	294	46	(266)
2007	0	0	0	250	0	250	247	43	0	0	290	40	(248)
2008	0	0	0	251	0	251	247	43	0	0	291	40	(231)
2009	0	0	0	251	0	251	240	44	0	0	284	33	(218)
2010	0	0	0	258	0	258	250	44	0	0	294	36	(205)
2011	0	0	0	258	0	258	246	44	0	0	290	32	(194)
2012	0	0	0	260	0	260	251	45	0	0	296	36	(184)
2013	0	0	0	262	0	262	259	45	0	0	304	42	(172)
2014	0	0	0	265	0	265	265	46	0	0	310	45	(161)
2015	0	0	0	267	0	267	268	46	0	0	315	48	(150)
2016	0	0	0	269	0	269	273	47	0	0	320	50	(139)
2017	0	0	0	270	0	270	274	47	0	0	321	52	(129)
2018	0	0	0	272	0	272	272	48	0	0	320	48	(120)
2019	0	0	0	274	0	274	271	49	0	0	319	46	(113)
2020	0	152	0	276	0	428	265	50	0	0	314	(113)	(130)
2021	0	0	0	278	0	278	268	51	0	0	319	41	(124)
2022	0	0	0	280	0	280	273	52	0	0	325	45	(118)
2023	0	0	0	282	0	282	306	53	0	0	359	77	(109)
2024	0	0	0	284	0	284	302	54	0	0	357	72	(102)
NOM.	0	239	0	6,399	0	6,638	5,866	1,111	0	0	6,977	338	
NPV	0	97	0	2,185	0	2,281	1,814	366	0	0	2,180	(102)	

Discount Rate 8.98 %
Benefit/Cost Ratio (Col(12) / Col(7)) : 0.96

ATTACHEMENT D-7
WATER-SOURCE GAS CHILLER
GSLD RATE - CASE 1

INPUT DATA -- PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.89	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.14	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,926.7	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	2,640	0	2,728	71	46	879	192	0	1,071
2001	0	0	0	0	145	88	0	394	0	394
2002	0	0	0	0	145	88	0	404	0	404
2003	0	0	0	0	149	88	0	415	0	415
2004	0	0	0	0	150	88	0	426	0	426
2005	0	0	0	0	153	88	0	437	0	437
2006	0	0	0	0	154	86	0	449	0	449
2007	0	0	0	0	155	86	0	461	0	461
2008	0	0	0	0	156	86	0	474	0	474
2009	0	0	0	0	156	86	0	487	0	487
2010	0	0	0	0	166	83	0	501	0	501
2011	0	0	0	0	168	81	0	515	0	515
2012	0	0	0	0	170	81	0	530	0	530
2013	0	0	0	0	173	80	0	545	0	545
2014	0	0	0	0	176	80	0	561	0	561
2015	0	0	0	0	178	80	0	578	0	578
2016	0	0	0	0	181	79	0	594	0	594
2017	0	0	0	0	182	79	0	612	0	612
2018	0	0	0	0	184	78	0	629	0	629
2019	0	0	0	0	186	78	0	648	0	648
2020	152	2,640	0	2,792	189	77	1,525	666	0	2,191
2021	0	0	0	0	191	77	0	686	0	686
2022	0	0	0	0	194	77	0	706	0	706
2023	0	0	0	0	196	76	0	726	0	726
2024	0	0	0	0	199	76	0	747	0	747
NOM	239	5,280	0	5,519	4,168	2,010	2,403	13,384	0	15,788
NPV	97	2,621	0	2,718	1,380	728	970	4,193	0	5,163

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	746	26	0	51	32	10	25	2	145	145	145
2006	714	24	0	49	21	10	25	11	141	129	275
2007	679	23	0	47	21	10	25	10	136	114	389
2008	645	22	0	44	21	10	25	8	131	101	490
2009	612	21	0	42	21	10	25	7	126	89	579
2010	581	20	0	40	20	10	25	6	121	79	658
2011	551	19	0	38	20	10	25	5	117	70	728
2012	522	18	0	36	20	10	25	4	113	62	790
2013	493	17	0	34	19	10	25	4	109	55	844
2014	465	16	0	32	18	10	25	4	104	48	893
2015	436	15	0	30	16	10	25	4	100	42	935
2016	408	14	0	28	15	10	25	4	96	37	972
2017	379	13	0	26	14	10	25	4	92	33	1,005
2018	351	12	0	24	13	10	25	4	88	29	1,034
2019	323	11	0	22	12	10	25	4	84	25	1,059
2020	294	10	0	20	10	10	25	4	79	22	1,081
2021	266	9	0	18	9	10	25	4	75	19	1,100
2022	237	8	0	16	8	10	25	4	71	17	1,116
2023	209	7	0	14	7	10	25	4	67	14	1,131
2024	180	6	0	12	5	10	25	4	63	12	1,143
2025	155	5	0	11	11	10	25	(3)	59	11	1,154
2026	136	5	0	9	16	10	25	(9)	56	9	1,163
2027	120	4	0	8	15	10	25	(9)	54	8	1,171
2028	104	4	0	7	15	10	25	(9)	52	7	1,178
2029	88	3	0	6	14	10	25	(9)	49	6	1,184
2030	72	2	0	5	13	10	25	(9)	47	5	1,190
2031	56	2	0	4	12	10	25	(9)	45	5	1,195
2032	40	1	0	3	12	10	25	(9)	42	4	1,199
2033	24	1	0	2	11	10	25	(9)	40	4	1,202
2034	8	0	0	1	10	10	25	(9)	38	3	1,206

IN SERVICE COS ($000)	746
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	27	27	25	25	23	23	2	55	0	0	0	2	(11)
2006	7.22%	52	79	25	50	23	46	11	55	0	0	0	11	0
2007	6.68%	48	128	25	75	23	69	10	55	0	0	0	10	10
2008	6.18%	45	172	25	100	23	92	8	55	0	0	0	8	18
2009	5.71%	41	214	25	124	23	115	7	55	0	0	0	7	25
2010	5.29%	38	252	25	149	23	138	6	55	0	0	0	6	31
2011	4.89%	35	287	25	174	23	161	5	55	0	0	0	5	36
2012	4.52%	33	320	25	199	23	184	4	55	0	0	0	4	40
2013	4.46%	32	352	25	224	23	207	4	55	0	0	0	4	43
2014	4.46%	32	385	25	249	23	230	4	55	0	0	0	4	47
2015	4.46%	32	417	25	274	23	253	4	55	0	0	0	4	51
2016	4.46%	32	449	25	299	23	276	4	55	0	0	0	4	54
2017	4.46%	32	481	25	323	23	299	4	55	0	0	0	4	58
2018	4.46%	32	514	25	348	23	323	4	55	0	0	0	4	61
2019	4.46%	32	546	25	373	23	346	4	55	0	0	0	4	65
2020	4.46%	32	578	25	398	23	369	4	55	0	0	0	4	68
2021	4.46%	32	611	25	423	23	392	4	55	0	0	0	4	72
2022	4.46%	32	643	25	448	23	415	4	55	0	0	0	4	76
2023	4.46%	32	675	25	473	23	438	4	55	0	0	0	4	79
2024	4.46%	32	707	25	498	23	461	4	55	0	0	0	4	83
2025	2.23%	16	724	25	522	23	484	(3)	55	0	0	0	(3)	80
2026	0.00%	0	724	25	547	23	507	(9)	55	0	0	0	(9)	71
2027	0.00%	0	724	25	572	23	530	(9)	55	0	0	0	(9)	62
2028	0.00%	0	724	25	597	23	553	(9)	55	0	0	0	(9)	53
2029	0.00%	0	724	25	622	23	576	(9)	55	0	0	0	(9)	44
2030	0.00%	0	724	25	647	23	599	(9)	55	0	0	0	(9)	36
2031	0.00%	0	724	25	672	23	622	(9)	55	0	0	0	(9)	27
2032	0.00%	0	724	25	697	23	645	(9)	55	0	0	0	(9)	18
2033	0.00%	0	724	25	721	23	668	(9)	55	0	0	0	(9)	9
2034	0.00%	0	724	25	746	23	691	(9)	55	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(13)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	55
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	27	2	721	25	(11)	759	732	746
2006	7.22%	52	11	697	50	0	732	696	714
2007	6.68%	48	10	672	75	10	696	662	679
2008	6.18%	45	8	647	100	18	662	628	645
2009	5.71%	41	7	622	124	25	628	596	612
2010	5.29%	38	6	597	149	31	596	566	581
2011	4.89%	35	5	572	174	36	566	536	551
2012	4.52%	33	4	547	199	40	536	507	522
2013	4.46%	32	4	522	224	43	507	479	493
2014	4.46%	32	4	498	249	47	479	451	465
2015	4.46%	32	4	473	274	51	451	422	436
2016	4.46%	32	4	448	299	54	422	394	408
2017	4.46%	32	4	423	323	58	394	365	379
2018	4.46%	32	4	398	348	61	365	337	351
2019	4.46%	32	4	373	373	65	337	308	323
2020	4.46%	32	4	348	398	68	308	280	294
2021	4.46%	32	4	323	423	72	280	251	266
2022	4.46%	32	4	299	448	76	251	223	237
2023	4.46%	32	4	274	473	79	223	195	209
2024	4.46%	32	4	249	498	83	195	166	180
2025	2.23%	16	(3)	224	522	80	166	144	155
2026	0.00%	0	(9)	199	547	71	144	128	136
2027	0.00%	0	(9)	174	572	62	128	112	120
2028	0.00%	0	(9)	149	597	53	112	96	104
2029	0.00%	0	(9)	124	622	44	96	80	88
2030	0.00%	0	(9)	100	647	36	80	64	72
2031	0.00%	0	(9)	75	672	27	64	48	56
2032	0.00%	0	(9)	50	697	18	48	32	40
2033	0.00%	0	(9)	25	721	9	32	16	24
2034	0.00%	0	(9)	0	746	0	16	0	8

* Column not specified in workbook

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	NO.YEARS BEFORE IN-SERVICE	PLANT ESCALATION RATE	CUMULATIVE ESCALATION FACTOR	YEARLY EXPENDITURE (%)	ANNUAL SPENDING ($/kW)	CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
			24.09		72.53		52.57		(10.98)		654.77	

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	664	664	664
EQUITY AFUDC	55		
DEBT AFUDC	27	27	
CPI			60
TOTAL	746	691	724

* Column not specified in workbook

INPUT DATA -- PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAMt Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATINC CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATINC CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMEN FUEL COST (C/kWh)	PROGRAM kW FFECTIVENES FACTOR	PROGRAM kWh FFECTIVENESS FACTOR
1998	0	0	2.00	2.20	2.13	0.00	1.00	1.00
1999	0	0	2.23	2.50	2.41	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.77	2.67	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.18	3.04	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.04	2.93	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.11	2.94	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.35	3.17	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.58	3.38	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.69	3.47	3.34	1.00	1.00
2007	1,000	1,000	3.13	3.92	3.66	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.84	3.57	3.45	1.00	1.00
2009	1,000	1,000	3.15	3.95	3.68	3.60	1.00	1.00
2010	1,000	1,000	3.14	3.99	3.67	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.18	3.90	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.30	3.97	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.42	4.08	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.52	4.15	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.58	4.20	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.64	4.23	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.81	4.39	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.07	4.63	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.34	4.86	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.52	5.04	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.65	5.14	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.79	5.26	4.97	1.00	1.00
2023	1,000	1,000	4.53	5.96	5.41	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.13	5.55	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMEN1 FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	145	52	7	197	295	107
2006	141	54	8	206	312	97
2007	136	56	8	212	331	82
2008	131	59	8	215	326	86
2009	126	61	8	215	336	74
2010	121	63	8	209	321	81
2011	117	66	9	212	334	70
2012	113	69	9	219	340	69
2013	109	71	9	225	342	72
2014	104	74	9	232	346	74
2015	100	77	9	236	348	75
2016	96	80	10	240	349	77
2017	92	84	10	247	362	70
2018	88	87	10	255	383	57
2019	84	90	11	264	405	44
2020	79	94	11	272	426	30
2021	75	98	11	278	434	28
2022	71	102	12	284	442	26
2023	67	106	12	321	453	53
2024	63	110	12	321	465	41
NOM	2,058	1,554	191	4,860	7,351	1,313
NPV	626	380	49	1,245	1,892	408

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	57	0
2001	15	4	18	10	15	25	131	0
2002	14	4	18	9	16	25	125	0
2003	14	4	18	9	16	25	129	0
2004	13	4	17	9	17	26	140	0
2005	13	4	17	8	18	26	150	0
2006	12	4	17	8	19	27	154	0
2007	12	4	16	8	19	27	165	0
2008	11	5	16	7	20	27	161	0
2009	11	5	16	7	21	28	166	0
2010	11	5	16	7	22	29	168	0
2011	10	5	15	7	23	29	176	0
2012	10	5	15	6	23	30	182	0
2013	9	6	15	6	24	30	187	0
2014	9	6	15	6	25	31	191	0
2015	8	6	14	5	26	32	194	0
2016	8	6	14	5	27	33	196	0
2017	7	7	14	5	29	33	204	0
2018	7	7	14	5	30	34	215	0
2019	7	7	14	4	31	35	227	0
2020	6	7	14	4	32	36	235	0
2021	6	8	13	4	33	37	240	0
2022	5	8	13	4	35	38	246	0
2023	5	8	14	3	36	39	254	0
2024	5	9	14	3	38	41	261	0
NOM.	229	137	367	149	595	744	4,553	0
NPV	92	40	132	60	174	234	1,405	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	1,071	0	1,158	0	0	57	0	57	(1,101)	(927)
2001	0	0	394	0	394	0	43	131	0	174	(219)	(1,097)
2002	0	0	404	0	404	0	43	125	0	169	(236)	(1,264)
2003	0	0	415	0	415	0	43	129	0	172	(243)	(1,422)
2004	0	0	426	0	426	0	43	140	0	183	(243)	(1,567)
2005	0	0	437	0	437	107	43	150	0	299	(138)	(1,643)
2006	0	0	449	0	449	97	43	154	0	294	(155)	(1,720)
2007	0	0	461	0	461	82	43	165	0	290	(171)	(1,799)
2008	0	0	474	0	474	86	43	161	0	291	(183)	(1,877)
2009	0	0	487	0	487	74	44	166	0	284	(203)	(1,956)
2010	0	0	501	0	501	81	44	168	0	294	(207)	(2,030)
2011	0	0	515	0	515	70	44	176	0	290	(225)	(2,104)
2012	0	0	530	0	530	69	45	182	0	296	(234)	(2,174)
2013	0	0	545	0	545	72	45	187	0	304	(242)	(2,241)
2014	0	0	561	0	561	74	46	191	0	310	(251)	(2,304)
2015	0	0	578	0	578	75	46	194	0	315	(263)	(2,365)
2016	0	0	594	0	594	77	47	196	0	320	(275)	(2,423)
2017	0	0	612	0	612	70	47	204	0	321	(290)	(2,480)
2018	0	0	629	0	629	57	48	215	0	320	(309)	(2,535)
2019	0	0	648	0	648	44	49	227	0	319	(328)	(2,589)
2020	0	152	2,191	0	2,343	30	50	235	0	314	(2,029)	(2,896)
2021	0	0	686	0	686	28	51	240	0	319	(367)	(2,946)
2022	0	0	706	0	706	26	52	246	0	325	(381)	(2,995)
2023	0	0	726	0	726	53	53	254	0	359	(367)	(3,038)
2024	0	0	747	0	747	41	54	261	0	357	(390)	(3,079)
NOM	0	239	15,788	0	16,027	1,313	1,111	4,553	0	6,977	(9,051)	
NPV	0	97	5,163	0	5,259	408	366	1,405	0	2,180	(3,079)	

Discount Rate: 8.98 %
Benefit/Cost Ratio (Col(11) / Col(6)) : 0.41

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	142	0	2,640	0	2,782	879	192	0	1,071	1,711	1,441
2001	284	0	0	0	284	0	394	0	394	(110)	1,356
2002	284	0	0	0	284	0	404	0	404	(120)	1,270
2003	289	0	0	0	289	0	415	0	415	(126)	1,188
2004	290	0	0	0	290	0	426	0	426	(136)	1,107
2005	294	0	0	0	294	0	437	0	437	(143)	1,029
2006	294	0	0	0	294	0	449	0	449	(155)	950
2007	296	0	0	0	296	0	461	0	461	(165)	874
2008	297	0	0	0	297	0	474	0	474	(177)	799
2009	297	0	0	0	297	0	487	0	487	(190)	725
2010	307	0	0	0	307	0	501	0	501	(194)	656
2011	308	0	0	0	308	0	515	0	515	(208)	588
2012	311	0	0	0	311	0	530	0	530	(219)	522
2013	313	0	0	0	313	0	545	0	545	(232)	459
2014	318	0	0	0	318	0	561	0	561	(243)	397
2015	321	0	0	0	321	0	578	0	578	(257)	337
2016	324	0	0	0	324	0	594	0	594	(271)	280
2017	324	0	0	0	324	0	612	0	612	(287)	224
2018	327	0	0	0	327	0	629	0	629	(302)	169
2019	330	0	0	0	330	0	648	0	648	(318)	117
2020	333	0	2,640	0	2,973	1,525	666	0	2,191	782	235
2021	336	0	0	0	336	0	686	0	686	(350)	187
2022	339	0	0	0	339	0	706	0	706	(367)	140
2023	342	0	0	0	342	0	726	0	726	(384)	95
2024	345	0	0	0	345	0	747	0	747	(402)	52
NOM	7,642	0	5,280	0	12,922	2,403	13,384	0	15,788	(2,866)	
NPV	2,593	0	2,621	0	5,215	970	4,193	0	5,163	52	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) 1.01

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	2,640	117	0	2,844	57	0	0	0	57	(2,788)	(2,347)
2001	0	0	0	233	0	233	131	43	0	0	174	(58)	(2,392)
2002	0	0	0	233	0	233	125	43	0	0	169	(64)	(2,438)
2003	0	0	0	237	0	237	129	43	0	0	172	(64)	(2,480)
2004	0	0	0	237	0	237	140	43	0	0	183	(55)	(2,513)
2005	0	0	0	240	0	240	256	43	0	0	299	59	(2,480)
2006	0	0	0	240	0	240	251	43	0	0	294	55	(2,453)
2007	0	0	0	241	0	241	247	43	0	0	290	49	(2,430)
2008	0	0	0	242	0	242	247	43	0	0	291	48	(2,410)
2009	0	0	0	242	0	242	240	44	0	0	284	42	(2,393)
2010	0	0	0	249	0	249	250	44	0	0	294	45	(2,377)
2011	0	0	0	249	0	249	246	44	0	0	290	41	(2,364)
2012	0	0	0	251	0	251	251	45	0	0	296	45	(2,350)
2013	0	0	0	253	0	253	259	45	0	0	304	51	(2,336)
2014	0	0	0	256	0	256	265	46	0	0	310	54	(2,323)
2015	0	0	0	258	0	258	268	46	0	0	315	57	(2,309)
2016	0	0	0	260	0	260	273	47	0	0	320	60	(2,297)
2017	0	0	0	260	0	260	274	47	0	0	321	61	(2,285)
2018	0	0	0	262	0	262	272	48	0	0	320	58	(2,274)
2019	0	0	0	264	0	264	271	49	0	0	319	55	(2,265)
2020	0	152	2,640	266	0	3,058	265	50	0	0	314	(2,744)	(2,679)
2021	0	0	0	268	0	268	268	51	0	0	319	50	(2,672)
2022	0	0	0	271	0	271	273	52	0	0	325	54	(2,666)
2023	0	0	0	273	0	273	306	53	0	0	359	87	(2,655)
2024	0	0	0	275	0	275	302	54	0	0	357	82	(2,647)
NOM.	0	239	5,280	6,177	0	11,697	5,866	1,111	0	0	6,977	(4,720)	
NPV	0	97	2,621	2,108	0	4,827	1,814	366	0	0	2,180	(2,647)	

Discount Rate 8.98 %
Benefit/Cost Ratio (Col(12) / Col(7)) : **0.45**

ATTACHEMENT D-8
WATER-SOURCE GAS CHILLER
GSLD RATE - CASE 2

INPUT DATA -- PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

I. PROGRAM DEMAND SAVINGS & LINE LOSSES

(1) CUSTOMER kW REDUCTION AT METER	0.89	kW
(2) GENERATOR kW REDUCTION PER CUSTOMER	1.14	kW
(3) kW LINE LOSS PERCENTAGE	9.01	%
(4) GENERATOR kWh REDUCTION PER CUSTOMER	3,926.7	kWh
(5) kWh LINE LOSS PERCENTAGE	7.02	%
(6) GROUP LINE LOSS MULTIPLIER	1.0000	
(7) CUSTOMER kWh INCREASE AT METER	0.0	kWh

II. ECONOMIC LIFE & K FACTORS

(1) STUDY PERIOD FOR THE CONSERVATION PROGRAM	27	YEARS
(2) GENERATOR ECONOMIC LIFE	30	YEARS
(3) T&D ECONOMIC LIFE	35	YEARS
(4) K FACTOR FOR GENERATION	1.61524	
(5) K FACTOR FOR T & D	1.46985	

III. UTILITY & CUSTOMER COSTS

(1) UTILITY NON RECURRING COST PER CUSTOMER	***	$/CUST
(2) UTILITY RECURRING COST PER CUSTOMER	***	$/CUST
(3) UTILITY COST ESCALATION RATE	***	%**
(4) CUSTOMER EQUIPMENT COST	***	$/CUST
(5) CUSTOMER EQUIPMENT ESCALATION RATE	***	%**
(6) CUSTOMER O & M COST	***	$/CUST/YR
(7) CUSTOMER O & M COST ESCALATION RATE	***	%**
(8) INCREASED SUPPLY COSTS	***	$/CUST/YR
(9) SUPPLY COSTS ESCALATION RATES	***	%**
(10) UTILITY DISCOUNT RATE	8.98	%
(11) UTILITY AFUDC RATE	10.30	%
(12) UTILITY NON RECURRING REBATE/INCENTIVE	***	$/CUST
(13) UTILITY RECURRING REBATE/INCENTIVE	***	$/CUST
(14) UTILITY REBATE/INCENTIVE ESCALATION RATE	***	%

IV. AVOIDED GENERATOR AND T&D COSTS

(1) BASE YEAR	1998	
(2) IN-SERVICE YEAR FOR AVOIDED GENERATING UNIT	2005	
(3) IN-SERVICE YEAR FOR AVOIDED T&D	2001-2005	
(4) BASE YEAR AVOIDED GENERATING COST	519	$/kW
(5) BASE YEAR AVOIDED TRANSMISSION COST	70	$/kW
(6) BASE YEAR DISTRIBUTION COST	50	$/kW
(7) GEN, TRAN & DIST COST ESCALATION RATE	1.78	%**
(8) GENERATOR FIXED O & M COST	35	$/kW/YR
(9) GENERATOR FIXED O&M ESCALATION RATE	4.10	%**
(10) TRANSMISSION FIXED O & M COST	2.73	$/kW
(11) DISTRIBUTION FIXED O & M COST	13.01	$/kW
(12) T&D FIXED O&M ESCALATION RATE	4.10	%**
(13) AVOIDED GEN UNIT VARIABLE O & M COSTS	0.067	CENTS/kWh
(14) GENERATOR VARIABLE O&M COST ESCALATION RATE	2.70	%**
(15) GENERATOR CAPACITY FACTOR	91%	** (In-service year)
(16) AVOIDED GENERATING UNIT FUEL COST	2.17	CENTS PER kWh** (In-service y
(17) AVOIDED GEN UNIT FUEL COST ESCALATION RATE	1.75	%**

V. NON-FUEL ENERGY AND DEMAND CHARGES

(1) NON FUEL COST IN CUSTOMER BILL	***	CENTS/kWh
(2) NON-FUEL COST ESCALATION RATE	***	%
(3) DEMAND CHARGE IN CUSTOMER BILL	***	$/kW/MO
(4) DEMAND CHARGE ESCALATION RATE	***	%

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** VALUE SHOWN IS FOR FIRST YEAR ONLY (VALUE VARIES OVER TIME)
*** PROGRAM COST CALCULATION VALUES ARE SHOWN ON PAGE 2

* INPUT DATA – PART 1 CONTINUED
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(1) UTILITY PROGRAM COSTS WITHOUT INCENTIVES $(000)	(2) UTILITY INCENTIVES $(000)	(3) OTHER UTILITY COSTS $(000)	(4) TOTAL UTILITY PROGRAM COSTS $(000)	(5) ENERGY CHARGE REVENUE LOSSES $(000)	(6) DEMAND CHARGE REVENUE LOSSES $(000)	(7) PARTICIPANT EQUIPMENT COSTS $(000)	(8) PARTICIPANT O&M COSTS $(000)	(9) OTHER PARTICIPANT COSTS $(000)	(10) TOTAL PARTICIPANT COSTS $(000)
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	88	0	0	88	71	46	879	192	0	1,071
2001	0	0	0	0	145	88	0	394	0	394
2002	0	0	0	0	145	88	0	404	0	404
2003	0	0	0	0	149	88	0	415	0	415
2004	0	0	0	0	150	88	0	426	0	426
2005	0	0	0	0	153	88	0	437	0	437
2006	0	0	0	0	154	86	0	449	0	449
2007	0	0	0	0	155	86	0	461	0	461
2008	0	0	0	0	156	86	0	474	0	474
2009	0	0	0	0	156	86	0	487	0	487
2010	0	0	0	0	166	83	0	501	0	501
2011	0	0	0	0	168	81	0	515	0	515
2012	0	0	0	0	170	81	0	530	0	530
2013	0	0	0	0	173	80	0	545	0	545
2014	0	0	0	0	176	80	0	561	0	561
2015	0	0	0	0	178	80	0	578	0	578
2016	0	0	0	0	181	79	0	594	0	594
2017	0	0	0	0	182	79	0	612	0	612
2018	0	0	0	0	184	78	0	629	0	629
2019	0	0	0	0	186	78	0	648	0	648
2020	152	0	0	152	189	77	1,525	666	0	2,191
2021	0	0	0	0	191	77	0	686	0	686
2022	0	0	0	0	194	77	0	706	0	706
2023	0	0	0	0	196	76	0	726	0	726
2024	0	0	0	0	199	76	0	747	0	747
NOM	239	0	0	239	4,168	2,010	2,403	13,384	0	15,788
NPV	97	0	0	97	1,380	728	970	4,193	0	5,163

* SUPPLEMENTAL INFORMATION NOT SPECIFIED IN WORKBOOK
** NEGATIVE COSTS WILL BE CALCULATED AS POSITIVE BENEFITS FOR TRC AND RIM TESTS

CALCULATION OF GEN K-FACTOR
PROGRAM METHOD SELECTED REV_REQ
PROGRAM NAME: Air/Water Source Gas Chillers

YEAR	(2) MID-YEAR RATE BASE $(000)	(3) DEBT $(000)	(4) PREFERRED STOCK $(000)	(5) COMMON EQUITY $(000)	(6) INCOME TAXES $(000)	(7) OTHER TAXES & INSURANCE $(000)	(8) DEPREC. $(000)	(9) DEFERRED TAXES $(000)	(10) TOTAL FIXED CHARGES $(000)	(11) PRESENT WORTH FIXED CHARGES $(000)	(12) CUMULATIVE PW FIXED CHARGES $(000)
2005	746	26	0	51	32	10	25	2	145	145	145
2006	714	24	0	49	21	10	25	11	141	129	275
2007	679	23	0	47	21	10	25	10	136	114	389
2008	645	22	0	44	21	10	25	8	131	101	490
2009	612	21	0	42	21	10	25	7	126	89	579
2010	581	20	0	40	20	10	25	6	121	79	658
2011	551	19	0	38	20	10	25	5	117	70	728
2012	522	18	0	36	20	10	25	4	113	62	790
2013	493	17	0	34	19	10	25	4	109	55	844
2014	465	16	0	32	18	10	25	4	104	48	893
2015	436	15	0	30	16	10	25	4	100	42	935
2016	408	14	0	28	15	10	25	4	96	37	972
2017	379	13	0	26	14	10	25	4	92	33	1,005
2018	351	12	0	24	13	10	25	4	88	29	1,034
2019	323	11	0	22	12	10	25	4	84	25	1,059
2020	294	10	0	20	10	10	25	4	79	22	1,081
2021	266	9	0	18	9	10	25	4	75	19	1,100
2022	237	8	0	16	8	10	25	4	71	17	1,116
2023	209	7	0	14	7	10	25	4	67	14	1,131
2024	180	6	0	12	5	10	25	4	63	12	1,143
2025	155	5	0	11	11	10	25	(3)	59	11	1,154
2026	136	5	0	9	16	10	25	(9)	56	9	1,163
2027	120	4	0	8	15	10	25	(9)	54	8	1,171
2028	104	4	0	7	15	10	25	(9)	52	7	1,178
2029	88	3	0	6	14	10	25	(9)	49	6	1,184
2030	72	2	0	5	13	10	25	(9)	47	5	1,190
2031	56	2	0	4	12	10	25	(9)	45	5	1,195
2032	40	1	0	3	12	10	25	(9)	42	4	1,199
2033	24	1	0	2	11	10	25	(9)	40	4	1,202
2034	8	0	0	1	10	10	25	(9)	38	3	1,206

IN SERVICE COS ($000)	746
IN SERVICE YEAR	2005
BOOK LIFE (YRS)	30
EFFEC. TAX RATE	38.575
DISCOUNT RATE	8.98%
OTAX & INS RATE	1.40%

CAPITAL STRUCTURE

SOURCE	WEIGHT	COST	
DEBT	45%	7.60	%
P/S	0%	0.00	%
C/S	55%	12.50	%

K-FACTOR = CPWFC / IN-SVC COST = 1.61524

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	ACCUMULATED TAX DEPRECIATION $(000)	BOOK DEPRECIATION $(000)	ACCUMULATED BOOK DEPRECIATION $(000)	BOOK DEPRECIATION FOR DEFERRED TAX $(000)	ACCUMULATED BOOK DEPR FOR DEFERRED TAX $(000)	DEFERRED TAX DUE TO DEPRECIATION $(000)	TOTAL EQUITY AFUDC $(000)	BOOK DEPR RATE MINUS 1/LIFE	(10)*(11) TAX RATE $(000)	SALVAGE TAX RATE $(000)	ANNUAL DEFERRED TAX (9)-(12)+(13) $(000)	ACCUMULATED DEFERRED TAX $(000)
2005	3.75%	27	27	25	25	23	23	2	55	0	0	0	2	(11)
2006	7.22%	52	79	25	50	23	46	11	55	0	0	0	11	0
2007	6.68%	48	128	25	75	23	69	10	55	0	0	0	10	10
2008	6.18%	45	172	25	100	23	92	8	55	0	0	0	8	18
2009	5.71%	41	214	25	124	23	115	7	55	0	0	0	7	25
2010	5.29%	38	252	25	149	23	138	6	55	0	0	0	6	31
2011	4.89%	35	287	25	174	23	161	5	55	0	0	0	5	36
2012	4.52%	33	320	25	199	23	184	4	55	0	0	0	4	40
2013	4.46%	32	352	25	224	23	207	4	55	0	0	0	4	43
2014	4.46%	32	385	25	249	23	230	4	55	0	0	0	4	47
2015	4.46%	32	417	25	274	23	253	4	55	0	0	0	4	51
2016	4.46%	32	449	25	299	23	276	4	55	0	0	0	4	54
2017	4.46%	32	481	25	323	23	299	4	55	0	0	0	4	58
2018	4.46%	32	514	25	348	23	323	4	55	0	0	0	4	61
2019	4.46%	32	546	25	373	23	346	4	55	0	0	0	4	65
2020	4.46%	32	578	25	398	23	369	4	55	0	0	0	4	68
2021	4.46%	32	611	25	423	23	392	4	55	0	0	0	4	72
2022	4.46%	32	643	25	448	23	415	4	55	0	0	0	4	76
2023	4.46%	32	675	25	473	23	438	4	55	0	0	0	4	79
2024	4.46%	32	707	25	498	23	461	4	55	0	0	0	4	83
2025	2.23%	16	724	25	522	23	484	(3)	55	0	0	0	(3)	80
2026	0.00%	0	724	25	547	23	507	(9)	55	0	0	0	(9)	71
2027	0.00%	0	724	25	572	23	530	(9)	55	0	0	0	(9)	62
2028	0.00%	0	724	25	597	23	553	(9)	55	0	0	0	(9)	53
2029	0.00%	0	724	25	622	23	576	(9)	55	0	0	0	(9)	44
2030	0.00%	0	724	25	647	23	599	(9)	55	0	0	0	(9)	36
2031	0.00%	0	724	25	672	23	622	(9)	55	0	0	0	(9)	27
2032	0.00%	0	724	25	697	23	645	(9)	55	0	0	0	(9)	18
2033	0.00%	0	724	25	721	23	668	(9)	55	0	0	0	(9)	9
2034	0.00%	0	724	25	746	23	691	(9)	55	0	0	0	(9)	0

SALVAGE / REMOVAL COST	0.00
YEAR SALVAGE / COST OF REMOVAL	2029
DEFERRED TAXES DURING CONSTRUCTION (SEE PAGE 5)	(13)
TOTAL EQUITY AFUDC CAPITALIZED (SEE PAGE 5)	55
BOOK DEPR RATE - 1/USEFUL LIFE	3.33%

DEFERRED TAX AND MID-YEAR RATE BASE CALCULATION
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(5a)*	(5b)*	(6)	(7)	(8)
YEAR	TAX DEPRECIATION SCHEDULE	TAX DEPRECIATION $(000)	DEFERRED TAX $(000)	END OF YEAR NET PLANT IN SERVICE $(000)	ACCUMULATED DEPRECIATION $(000)	ACCUMULATED DEF TAXES $(000)	BEGINNING YEAR RATE BASE $(000)	ENDING OF YEAR RATE BASE $(000)	MID-YEAR RATE BASE $(000)
2005	3.75%	27	2	721	25	(11)	759	732	746
2006	7.22%	52	11	697	50	0	732	696	714
2007	6.68%	48	10	672	75	10	696	662	679
2008	6.18%	45	8	647	100	18	662	628	645
2009	5.71%	41	7	622	124	25	628	596	612
2010	5.29%	38	6	597	149	31	596	566	581
2011	4.89%	35	5	572	174	36	566	536	551
2012	4.52%	33	4	547	199	40	536	507	522
2013	4.46%	32	4	522	224	43	507	479	493
2014	4.46%	32	4	498	249	47	479	451	465
2015	4.46%	32	4	473	274	51	451	422	436
2016	4.46%	32	4	448	299	54	422	394	408
2017	4.46%	32	4	423	323	58	394	365	379
2018	4.46%	32	4	398	348	61	365	337	351
2019	4.46%	32	4	373	373	65	337	308	323
2020	4.46%	32	4	348	398	68	308	280	294
2021	4.46%	32	4	323	423	72	280	251	266
2022	4.46%	32	4	299	448	76	251	223	237
2023	4.46%	32	4	274	473	79	223	195	209
2024	4.46%	32	4	249	498	83	195	166	180
2025	2.23%	16	(3)	224	522	80	166	144	155
2026	0.00%	0	(9)	199	547	71	144	128	136
2027	0.00%	0	(9)	174	572	62	128	112	120
2028	0.00%	0	(9)	149	597	53	112	96	104
2029	0.00%	0	(9)	124	622	44	96	80	88
2030	0.00%	0	(9)	100	647	36	80	64	72
2031	0.00%	0	(9)	75	672	27	64	48	56
2032	0.00%	0	(9)	50	697	18	48	32	40
2033	0.00%	0	(9)	25	721	9	32	16	24
2034	0.00%	0	(9)	0	746	0	16	0	8

* Column not specified in workbook

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	NO.YEARS BEFORE IN-SERVICE	PLANT ESCALATION RATE	CUMULATIVE ESCALATION FACTOR	YEARLY EXPENDITURE (%)	ANNUAL SPENDING ($/kW)	CUMULATIVE AVERAGE SPENDING ($/kW)
1998	-7	0.00%	1.000	0.00%	0.00	0.00
1999	-6	1.78%	1.018	0.00%	0.00	0.00
2000	-5	1.53%	1.033	0.32%	1.72	0.86
2001	-4	2.64%	1.061	0.65%	3.58	3.51
2002	-3	2.62%	1.088	13.85%	78.24	44.42
2003	-2	2.28%	1.113	35.34%	204.20	185.63
2004	-1	2.27%	1.139	49.84%	294.50	434.98
				100.00%	582.24	

YEAR	NO.YEARS BEFORE IN-SERVICE	(8) CUMULATIVE SPENDING WITH AFUDC ($/kW)	(8a)* DEBT AFUDC ($/kW)	(8b)* CUMULATIVE DEBT AFUDC ($/kW)	(9) YEARLY TOTAL AFUDC ($/kW)	(9a)* CUMULATIVE TOTAL AFUDC ($/kW)	(9b)* CONSTRUCTION PERIOD INTEREST ($/kW)	(9c)* CUMULATIVE CPI ($/kW)	(9d)* DEFERRED TAXES ($/kW)	(9e)* CUMULATIVE DEFERRED TAXES ($/kW)	(10) INCREMENTAL YEAR-END BOOK VALUE ($/kW)	(11) CUMULATIVE YEAR-END BOOK VALUE ($/kW)
1998	-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000	-5	0.86	0.03	0.03	0.09	0.09	0.07	0.07	(0.01)	(0.01)	1.80	1.80
2001	-4	3.59	0.12	0.15	0.37	0.46	0.27	0.34	(0.06)	(0.07)	3.95	5.75
2002	-3	44.88	1.54	1.69	4.63	5.09	3.40	3.74	(0.72)	(0.79)	82.87	88.62
2003	-2	190.72	6.55	8.24	19.72	24.80	14.39	18.13	(3.03)	(3.82)	223.91	312.54
2004	-1	459.79	15.86	24.09	47.73	72.53	34.44	52.57	(7.17)	(10.98)	342.23	654.77
				24.09		72.53		52.57		(10.98)		654.77

IN SERVICE YEAR	2005
PLANT COSTS	519
AFUDC RATE	10.30%

	BOOK BASIS	BOOK BASIS FOR DEF TAX	TAX BASIS
CONSTRUCTION CASH	664	664	664
EQUITY AFUDC	55		
DEBT AFUDC	27	27	
CPI			60
TOTAL	746	691	724

* Column not specified in workbook

INPUT DATA -- PART 2
PROGRAM METHOD SELECTED : REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)
YEAR	CUMULATIVE TOTAL PARTICIPATING CUSTOMERS	ADJUSTED CUMULATIVE PARTICIPATING CUSTOMERS	UTILITY AVERAGE SYSTEM FUEL COST (C/kWh)	AVOIDED MARGINAL FUEL COST (C/kWh)	INCREASED MARGINAL FUEL COST (C/kWh)	REPLACEMENT FUEL COST (C/kWh)	PROGRAM kW EFFECTIVENESS FACTOR	PROGRAM kWh EFFECTIVENESS FACTOR
1998	0	0	2.00	2.20	2.13	0.00	1.00	1.00
1999	0	0	2.23	2.50	2.41	0.00	1.00	1.00
2000	1,000	1,000	2.45	2.77	2.67	0.00	1.00	1.00
2001	1,000	1,000	2.73	3.18	3.04	0.00	1.00	1.00
2002	1,000	1,000	2.61	3.04	2.93	0.00	1.00	1.00
2003	1,000	1,000	2.60	3.11	2.94	0.00	1.00	1.00
2004	1,000	1,000	2.78	3.35	3.17	0.00	1.00	1.00
2005	1,000	1,000	2.93	3.58	3.38	3.25	1.00	1.00
2006	1,000	1,000	3.01	3.69	3.47	3.34	1.00	1.00
2007	1,000	1,000	3.13	3.92	3.66	3.49	1.00	1.00
2008	1,000	1,000	3.07	3.84	3.57	3.45	1.00	1.00
2009	1,000	1,000	3.15	3.95	3.68	3.60	1.00	1.00
2010	1,000	1,000	3.14	3.99	3.67	3.57	1.00	1.00
2011	1,000	1,000	3.32	4.18	3.90	3.71	1.00	1.00
2012	1,000	1,000	3.38	4.30	3.97	3.77	1.00	1.00
2013	1,000	1,000	3.47	4.42	4.08	3.84	1.00	1.00
2014	1,000	1,000	3.55	4.52	4.15	3.92	1.00	1.00
2015	1,000	1,000	3.58	4.58	4.20	3.95	1.00	1.00
2016	1,000	1,000	3.62	4.64	4.23	4.00	1.00	1.00
2017	1,000	1,000	3.75	4.81	4.39	4.13	1.00	1.00
2018	1,000	1,000	3.93	5.07	4.63	4.35	1.00	1.00
2019	1,000	1,000	4.09	5.34	4.86	4.55	1.00	1.00
2020	1,000	1,000	4.23	5.52	5.04	4.79	1.00	1.00
2021	1,000	1,000	4.32	5.65	5.14	4.88	1.00	1.00
2022	1,000	1,000	4.41	5.79	5.26	4.97	1.00	1.00
2023	1,000	1,000	4.53	5.96	5.41	5.10	1.00	1.00
2024	1,000	1,000	4.64	6.13	5.55	5.23	1.00	1.00

* THIS COLUMN IS USED ONLY FOR LOAD SHIFTING PROGRAMS WHICH SHIFT CONSUMPTION TO OFF-PEAK PERIODS.
THE VALUES REPRESENT THE OFF PEAK SYSTEM FUEL COSTS.

AVOIDED GENERATING BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

YEAR	(2) AVOIDED GEN UNIT CAPACITY COS $(000)	(3) AVOIDED GEN UNIT FIXED O&M $(000)	(4) AVOIDED GEN UNIT VARIABLE O&M $(000)	(5) AVOIDED GEN UNIT FUEL COST $(000)	(6) REPLACEMEN FUEL COST $(000)	(7) AVOIDED GEN UNIT BENEFITS $(000)
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	145	52	7	197	295	107
2006	141	54	8	206	312	97
2007	136	56	8	212	331	82
2008	131	59	8	215	326	86
2009	126	61	8	215	336	74
2010	121	63	8	209	321	81
2011	117	66	9	212	334	70
2012	113	69	9	219	340	69
2013	109	71	9	225	342	72
2014	104	74	9	232	346	74
2015	100	77	9	236	348	75
2016	96	80	10	240	349	77
2017	92	84	10	247	362	70
2018	88	87	10	255	383	57
2019	84	90	11	264	405	44
2020	79	94	11	272	426	30
2021	75	98	11	278	434	28
2022	71	102	12	284	442	26
2023	67	106	12	321	453	53
2024	63	110	12	321	465	41
NOM	2,058	1,554	191	4,860	7,351	1,313
NPV	626	380	49	1,245	1,892	408

AVOIDED T&D AND PROGRAM FUEL SAVINGS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8a)*
YEAR	AVOIDED TRANSMISSION CAP COST $(000)	AVOIDED TRANSMISSION O&M COST $(000)	TOTAL AVOIDED TRANSMISSION COST $(000)	AVOIDED DISTRIBUTION CAP COST $(000)	AVOIDED DISTRIBUTION O&M COST $(000)	TOTAL AVOIDED DISTRIBUTION COST $(000)	PROGRAM FUEL SAVINGS $(000)	PROGRAM OFF-PEAK PAYBACK $(000)
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	57	0
2001	15	4	18	10	15	25	131	0
2002	14	4	18	9	16	25	125	0
2003	14	4	18	9	16	25	129	0
2004	13	4	17	9	17	26	140	0
2005	13	4	17	8	18	26	150	0
2006	12	4	17	8	19	27	154	0
2007	12	4	16	8	19	27	165	0
2008	11	5	16	7	20	27	161	0
2009	11	5	16	7	21	28	166	0
2010	11	5	16	7	22	29	168	0
2011	10	5	15	7	23	29	176	0
2012	10	5	15	6	23	30	182	0
2013	9	6	15	6	24	30	187	0
2014	9	6	15	6	25	31	191	0
2015	8	6	14	5	26	32	194	0
2016	8	6	14	5	27	33	196	0
2017	7	7	14	5	29	33	204	0
2018	7	7	14	5	30	34	215	0
2019	7	7	14	4	31	35	227	0
2020	6	7	14	4	32	36	235	0
2021	6	8	13	4	33	37	240	0
2022	5	8	13	4	35	38	246	0
2023	5	8	14	3	36	39	254	0
2024	5	9	14	3	38	41	261	0
NOM.	229	137	367	149	595	744	4,553	0
NPV	92	40	132	60	174	234	1,405	0

* THESE VALUES REPRESENT THE COST OF THE INCREASED FUEL CONSUMPTION DUE TO GREATER OFF-PEAK ENERGY USAGE. USED FOR LOAD SHIFTING PROGRAMS ONLY.

TOTAL RESOURCE COST TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMt Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	PARTICIPANT PROGRAM COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	PROGRAM FUEL SAVINGS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	1,071	0	1,158	0	0	57	0	57	(1,101)	(927)
2001	0	0	394	0	394	0	43	131	0	174	(219)	(1,097)
2002	0	0	404	0	404	0	43	125	0	169	(236)	(1,264)
2003	0	0	415	0	415	0	43	129	0	172	(243)	(1,422)
2004	0	0	426	0	426	0	43	140	0	183	(243)	(1,567)
2005	0	0	437	0	437	107	43	150	0	299	(138)	(1,643)
2006	0	0	449	0	449	97	43	154	0	294	(155)	(1,720)
2007	0	0	461	0	461	82	43	165	0	290	(171)	(1,799)
2008	0	0	474	0	474	86	43	161	0	291	(183)	(1,877)
2009	0	0	487	0	487	74	44	166	0	284	(203)	(1,956)
2010	0	0	501	0	501	81	44	168	0	294	(207)	(2,030)
2011	0	0	515	0	515	70	44	176	0	290	(225)	(2,104)
2012	0	0	530	0	530	69	45	182	0	296	(234)	(2,174)
2013	0	0	545	0	545	72	45	187	0	304	(242)	(2,241)
2014	0	0	561	0	561	74	46	191	0	310	(251)	(2,304)
2015	0	0	578	0	578	75	46	194	0	315	(263)	(2,365)
2016	0	0	594	0	594	77	47	196	0	320	(275)	(2,423)
2017	0	0	612	0	612	70	47	204	0	321	(290)	(2,480)
2018	0	0	629	0	629	57	48	215	0	320	(309)	(2,535)
2019	0	0	648	0	648	44	49	227	0	319	(328)	(2,589)
2020	0	152	2,191	0	2,343	30	50	235	0	314	(2,029)	(2,896)
2021	0	0	686	0	686	28	51	240	0	319	(367)	(2,946)
2022	0	0	706	0	706	26	52	246	0	325	(381)	(2,995)
2023	0	0	726	0	726	53	53	254	0	359	(367)	(3,038)
2024	0	0	747	0	747	41	54	261	0	357	(390)	(3,079)
NOM	0	239	15,788	0	16,027	1,313	1,111	4,553	0	6,977	(9,051)	
NPV	0	97	5,163	0	5,259	408	366	1,405	0	2,180	(3,079)	

Discount Rate: 8.98 %
Benefit/Cost Ratio (Col(11) / Col(6)) : 0.41

PARTICIPANT COSTS AND BENEFITS
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAME Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
YEAR	SAVINGS IN PARTICIPANTS BILLS $(000)	TAX CREDITS $(000)	UTILITY REBATES $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	CUSTOMER EQUIPMENT COSTS $(000)	CUSTOMER O&M COSTS $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	142	0	0	0	142	879	192	0	1,071	(929)	(782)
2001	284	0	0	0	284	0	394	0	394	(110)	(867)
2002	284	0	0	0	284	0	404	0	404	(120)	(953)
2003	289	0	0	0	289	0	415	0	415	(126)	(1,035)
2004	290	0	0	0	290	0	426	0	426	(136)	(1,116)
2005	294	0	0	0	294	0	437	0	437	(143)	(1,194)
2006	294	0	0	0	294	0	449	0	449	(155)	(1,273)
2007	296	0	0	0	296	0	461	0	461	(165)	(1,349)
2008	297	0	0	0	297	0	474	0	474	(177)	(1,424)
2009	297	0	0	0	297	0	487	0	487	(190)	(1,498)
2010	307	0	0	0	307	0	501	0	501	(194)	(1,567)
2011	308	0	0	0	308	0	515	0	515	(208)	(1,635)
2012	311	0	0	0	311	0	530	0	530	(219)	(1,701)
2013	313	0	0	0	313	0	545	0	545	(232)	(1,765)
2014	318	0	0	0	318	0	561	0	561	(243)	(1,826)
2015	321	0	0	0	321	0	578	0	578	(257)	(1,886)
2016	324	0	0	0	324	0	594	0	594	(271)	(1,943)
2017	324	0	0	0	324	0	612	0	612	(287)	(1,999)
2018	327	0	0	0	327	0	629	0	629	(302)	(2,054)
2019	330	0	0	0	330	0	648	0	648	(318)	(2,106)
2020	333	0	0	0	333	1,525	666	0	2,191	(1,858)	(2,386)
2021	336	0	0	0	336	0	686	0	686	(350)	(2,435)
2022	339	0	0	0	339	0	706	0	706	(367)	(2,481)
2023	342	0	0	0	342	0	726	0	726	(384)	(2,526)
2024	345	0	0	0	345	0	747	0	747	(402)	(2,569)
NOM	7,642	0	0	0	7,642	2,403	13,384	0	15,788	(8,146)	
NPV	2,593	0	0	0	2,593	970	4,193	0	5,163	(2,569)	

In Service of Gen Unit: 2005
Discount Rate : 8.98 %
Benefit/Cost Ratio (Col(6) / Col(10)) 0.50

RATE IMPACT TEST
PROGRAM METHOD SELECTED: REV_REQ
PROGRAM NAMI Air/Water Source Gas Chillers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YEAR	INCREASED SUPPLY COSTS $(000)	UTILITY PROGRAM COSTS $(000)	INCENTIVES $(000)	REVENUE LOSSES $(000)	OTHER COSTS $(000)	TOTAL COSTS $(000)	AVOIDED GEN UNIT & FUEL BENEFITS $(000)	AVOIDED T&D BENEFITS $(000)	REVENUE GAINS $(000)	OTHER BENEFITS $(000)	TOTAL BENEFITS $(000)	NET BENEFITS $(000)	CUMULATIVE DISCOUNTED NET BENEFITS $(000)
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	88	0	117	0	204	57	0	0	0	57	(148)	(124)
2001	0	0	0	233	0	233	131	43	0	0	174	(58)	(169)
2002	0	0	0	233	0	233	125	43	0	0	169	(64)	(215)
2003	0	0	0	237	0	237	129	43	0	0	172	(64)	(257)
2004	0	0	0	237	0	237	140	43	0	0	183	(55)	(290)
2005	0	0	0	240	0	240	256	43	0	0	299	59	(257)
2006	0	0	0	240	0	240	251	43	0	0	294	55	(230)
2007	0	0	0	241	0	241	247	43	0	0	290	49	(207)
2008	0	0	0	242	0	242	247	43	0	0	291	48	(187)
2009	0	0	0	242	0	242	240	44	0	0	284	42	(170)
2010	0	0	0	249	0	249	250	44	0	0	294	45	(154)
2011	0	0	0	249	0	249	246	44	0	0	290	41	(141)
2012	0	0	0	251	0	251	251	45	0	0	296	45	(127)
2013	0	0	0	253	0	253	259	45	0	0	304	51	(113)
2014	0	0	0	256	0	256	265	46	0	0	310	54	(99)
2015	0	0	0	258	0	258	268	46	0	0	315	57	(86)
2016	0	0	0	260	0	260	273	47	0	0	320	60	(74)
2017	0	0	0	260	0	260	274	47	0	0	321	61	(62)
2018	0	0	0	262	0	262	272	48	0	0	320	58	(51)
2019	0	0	0	264	0	264	271	49	0	0	319	55	(42)
2020	0	152	0	266	0	418	265	50	0	0	314	(104)	(58)
2021	0	0	0	268	0	268	268	51	0	0	319	50	(51)
2022	0	0	0	271	0	271	273	52	0	0	325	54	(44)
2023	0	0	0	273	0	273	306	53	0	0	359	87	(34)
2024	0	0	0	275	0	275	302	54	0	0	357	82	(25)
NOM.	0	239	0	6,177	0	6,417	5,866	1,111	0	0	6,977	560	
NPV	0	97	0	2,108	0	2,205	1,814	366	0	0	2,180	(25)	

Discount Rate 8.98 %
Benefit/Cost Ratio (Col(12) / Col(7)) : 0.99