Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

ESA ENERGY SYSTEMS ASSOCIATES, Inc

A TERRACON COMPANY

100 East Main Street

Round Rock, Texas 78664

(512) 258-0547

City of Temple

June 13, 2011

ESA
Energy Systems Associates, Inc.
A Terracon COMPANY

SECO
State Energy Conservation Office

Table of Contents

1.0 EXECUTIVE SUMMARY: 4
Table 1: Summary of Recommended Energy Cost Reduction Measures (ECRMs) 5
2.0 ENERGY ASSESSMENT PROCEDURE: 6
3.0 ENERGY PERFORMANCE INDICATORS: 7
4.0 RATE SCHEDULE ANALYSIS: 13
ELECTRICITY PROVIDER: 13
NATURAL GAS PROVIDER: 14
5.0 CAMPUS DESCRIPTIONS: 15
Table 2: City Facilities Analyzed For This Report 15
6.0 ENERGY RECOMMENDATIONS: 17
ELECTRICAL ECRM 1: REPLACE ELECTRICAL DISTRIBUTION PANEL 17
HVAC ECRM 1: REPLACE OCCUPANCY SENSORS 17
HVAC ECRM 2: INSTALL VARIABLE FREQUENCY DRIVES 17
HVAC ECRM 3: REPLACE CONVENTIONAL THERMOSTAT 17
HVAC ECRM 4: REPLACE HVAC UNITS 18
LIGHTING ECRM 1: REPLACE INCANDESCENT LIGHTING 18
LIGHTING ECRM 2: REPLACE METAL HALIDE FIXTURES WITH T5 LINEAR FLUORESCENT 19
LIGHTING ECRM 3: RETROFIT T12 FIXTURES TO T8 19
LIGHTING ECRM 4: INSTALL PHOTOCELL SENSOR FOR EXTERIOR LIGHTING 19
LIGHTING ECRM 5: INSTALL OCCUPANCY SENSORS 20
CONTROLS ECRM 1: INSTALL VENDING MACHINE CONTROLS 20
ENERGY CONSERVATION ECRM: INSTALL SOLAR PANELS 20
7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS 21
8.0 FINANCIAL EVALUATION 25
9.0 GENERAL COMMENTS 26
APPENDICES 27
APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 28
SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 29
SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 30

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE 35
APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT 38
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA) 40
APPENDIX VI - UTILITY CHARTS ON CD 42

1.0 EXECUTIVE SUMMARY:

This **Energy Efficient Partnership Service** is provided to public school districts and hospitals as a portion of the state's ***Schools/ Local Government Energy Management Program***; a program sponsored by the **State Energy Conservation Office (SECO)**, a division of the **State of Texas Comptroller of Public Accounts**.

Program Administrator:	Stephen Ross
Phone:	512-463-1770
Address:	State Energy Conservation Office LBJ State Office Building 111 E. 17th Street Austin. Texas 78774

The service assists these public, non-profit institutions to take basic steps towards energy efficient facility operation. Active involvement in the partnership from the entire administration and staff within the agencies and institutions is critical in developing a customized blueprint for energy efficiency for their facilities.

In March 2011, **SECO** received a request for technical assistance from Ashley Williams, Grant Manager for the **City of Temple. SECO** responded by sending ESA **Energy Systems Associates, Inc.**, a registered professional engineering firm, to prepare this preliminary report for the school district. This report is intended to provide support for the district as it determines the most appropriate path for facility renovation, especially as it pertains to the energy consuming systems around the facility. It is our opinion that significant decreases in annual energy costs, as well as major maintenance cost reductions, can be achieved through the efficiency recommendations provided herein.

This study has focused on energy efficiency and systems operations. To that end, an analysis of the utility usage and costs for **City of Temple,** was completed by ESA **Energy Systems Associates, Inc**., (hereafter known as *Engineer*) to determine the annual energy cost index (ECI) and energy use index (EUI) for each campus or facility. A complete listing of the Base Year Utility Costs and Consumption is provided in Section 3.0 of this report.

Following the utility analysis and a preliminary consultation with Ashley Williams and *Mr. William Hickman, Maintenance Supervisor*, a walk-through energy analysis was conducted throughout the campus. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 7.0 of this report.

We estimate that as much as **$53,283** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$280,335**, yielding an average simple payback of **5-1/4** years.

Table 1: Summary of Recommended Energy Cost Reduction Measures (ECRMs)

SUMMARY:	MEASURE SUMMARY	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	Occupancy Sensors	$765	255	3 Years
HVAC ECRM #2	VFDs for Pumps	$161,300	35,235	4-1/2 Years
HVAC ECRM #3	Programmable Thermostat	$100	33	3 Years
HVAC ECRM #4	Replace HVAC	$18,500	1,550	12 Years
Lighting ECRM #1	Replace Incandescent Lighting	$34,400	6,920	5 Years
Lighting ECRM #2	Replace Metal Halide Lighting	$60,000	7,500	8 Years
Lighting ECRM #3	Retrofit T12 Fixtures	$2,275	455	5 Years
Lighting ECRM #4	Exterior Photocell	$100	250	4 Months
Lighting ECRM #5	Occupancy Sensors	$2,175	725	3 Years
Controls ECRM #1	Vending Machine Controls	$720	360	2 Years
TOTAL PROJECTS		**$280,335**	**$53,283**	**5-1/4 Years**

Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Internal Rate of Return (IRR), for this retrofit program has been calculated and shown in Section 8.0 of this report.

Our final "summary" comment is that **SECO** views the completion and presentation of this report as a beginning, rather than an end, of our relationship with CITY OF TEMPLE. We hope to be ongoing partners in assisting you to implement the recommendations listed in this report. Please call us if you have further questions or comments regarding your Energy Management Issues.

*ESA Energy Systems Associates, Inc., A Terracon Company James W. Brown (512) 258-0547

2.0 ENERGY ASSESSMENT PROCEDURE:

Involvement in this on-site analysis program was initiated through completion of a Preliminary Energy Assessment Service Agreement. This PEASA serves as the agreement to form a "partnership" between the client and the State Energy Conservation Office (SECO) for the purposes of energy costs and consumption reduction within owned and operated facilities. After receipt of the PEASA, an initial visit was conducted by the professional engineering firm contracted by SECO to provide service within that area of the state. The purpose of this visit is to review the program elements that SECO provides to school districts and determine which elements could best benefit the district. A summary of the *Partner's* most recent twelve months of utility bills was requested for the engineer's preliminary assessment of the Energy Performance Indicators. After consultation with SECO to determine the program elements to be provided to CITY OF TEMPLE, ESA returned to the facilities to perform the following tasks:

1. Designing and monitoring customized procedures to control the run times of energy consuming systems.
2. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
3. Develop an accurate definition of system and equipment replacement projects along with installation cost estimates, estimated energy and cost savings and analyses for each recommended project.
4. Develop a prioritized schedule for replacement projects.
5. Developing and drafting an overall Energy Management Policy.
6. Assist in the development of guidelines for efficiency levels of future equipment purchases.

3.0 ENERGY PERFORMANCE INDICATORS:

In order to easily assess the *Partner's* energy utilization and current level of efficiency, there are two key "Energy Performance Indicators" calculated within this report.

1. Energy Utilization Index

The Energy Utilization Index (EUI) depicts the total annual energy consumption per square foot of building space, and is expressed in "British Thermal Units" (BTUs).

To calculate the EUI, the consumption of electricity and gas are first converted to equivalent BTU consumption via the following formulas:

ELECTRICITY Usage

[Total KWH /yr] x [3413 BTUs/KWH] = _____ BTUs / yr

NATURAL GAS Usage

[Total MCF/yr] x [1,030,000 BTUs/MCF] = _____ BTUs / yr

After adding the BTU consumption of each fuel, the total BTUs are then divided

by the building area.

EUI = [Electricity BTUs + Gas BTUs] divided by [Total square feet]

2. Energy Cost Index

The Energy Cost Index (ECI) depicts the total annual energy cost per square foot of building space.

To calculate the ECI, the annual costs of electricity and gas are totaled and divided by the total square footage of the facility:

ECI = [Electricity Cost + Gas Cost] divided by [Total square feet]

These indicators may be used to compare the facility's current cost and usage to past years, or to other similar facilities in the area. Although the comparisons will not provide specific reasons for unusual operation, they serve as indicators that problems may exist within the energy consuming systems.

THE CURRENT CITY OF TEMPLE ENERGY PERFORMANCE INDICATORS:

CAMPUS	FBISD ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	COMPARISON TO DISTRICT AVERAGE	ENERGY COST INDEX (ECI) $/sf-year	COMPARISON TO CITY AVERAGE
Parks and Leisure	106,973	27%	$2.65	41%
Courthouse	96,343	14%	$2.36	26%
Summit Family Fitness	104,332	24%	$2.31	23%
Mayborn Convention	73,383	-13%	$2.24	20%
Animal Control	98,737	17%	$1.82	-3%
Fire Station	99,465	18%	$1.42	-24%
Facilities Maintenance	49,029	-42%	$1.12	-40%
City Hall	45,736	-46%	$1.07	-43%
Average Value:	84,250		$1.87	

City of Temple purchases electricity for all facilities from Mid-American Energy. The Transmission and Distribution utility is Oncor.

The rate schedule analysis for the district is shown in Section 4.0.

Copies of the rate schedules are included in Appendix I.

OWNER: City of Temple **BUILDING:** Animal Control

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	8,520		0	0	813	76	556
FEBRUARY	2010	38,520		0	0	2,813	72	494
MARCH	2010	10,280		0	0	949	41	267
APRIL	2010	11,600		0	0	1,031	6	49
MAY	2010	19,160		0	0	1,516	5	43
JUNE	2010	19,480		0	0	1,536	4	38
JULY	2010	19,320		0	0	1,521	3	40
AUGUST	2010	21,280		0	0	1,649	3	39
SEPTEMBER	2010	17,840		0	0	1,429	4	44
OCTOBER	2009	13,800		0	0	1,171	4	43
NOVEMBER	2009	13,800		0	0	1,207	5	53
DECEMBER	2009	2,320		0	0	(344)	38	291
TOTAL		**195,920**	**0**	**0**	**0**	**$15,291**	**261**	**$1,957**

Annual Total Energy Cost = $17,248 Per Year

Total KWH x 0.003413 = 668.67 x 106
Total MCF x 1.03 = 268.83 x 106
Total Other x ____ x 106
Total Site BTU's/yr 937.50 x 106

Floor area: 9,495 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 98,737 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $1.82 $/s.f. yr

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000744376	0	Atmos	000967532

OWNER: City of Temple **BUILDING:** Courthouse

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	43,700		0	0	3,683	19	148
FEBRUARY	2010	53,300		0	0	4,288	16	122
MARCH	2010	29,100		0	0	2,767	6	53
APRIL	2010	29,100		0	0	2,141	0	15
MAY	2010	24,800		0	0	2,304	0	15
JUNE	2010	34,600		0	0	2,773	0	15
JULY	2010	33,000		0	0	2,836	0	14
AUGUST	2010	35,500		0	0	2,999	1	95
SEPTEMBER	2010	29,800		0	0	2,628	0	15
OCTOBER	2009	25,065		0	0	2,523	0	17
NOVEMBER	2009	22,300		0	0	2,193	0	15
DECEMBER	2009	51,000		0	0	4,087	14	121
TOTAL		**411,265**	**0**	**0**	**0**	**$35,224**	**56**	**$645**

Annual Total Energy Cost = $35,869 Per Year

Total KWH x 0.003413 = 1,403.65 x 106
Total MCF x 1.03 = 57.68 x 106
Total Other x ____ x 106
Total Site BTU's/yr 1,461.33 x 106

Floor area: 15,168 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 96,343 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $2.36 $/s.f. yr

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000281954	0	Atmos	000880093

OWNER: City of Temple **BUILDING:** Facilities Maint.

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	45,960		0	0	4,142	76	570
FEBRUARY	2010	49,360		0	0	4,255	82	574
MARCH	2010	40,040		0	0	3,628	52	351
APRIL	2010	42,120		0	0	3,801	3	48
MAY	2010	48,840		0	0	4,249	2	44
JUNE	2010	63,480		0	0	5,105	3	45
JULY	2010	63,720		0	0	5,251	2	47
AUGUST	2010	68,880		0	0	5,722	2	48
SEPTEMBER	2010	63,480		0	0	5,297	2	62
OCTOBER	2009	45,360		0	0	4,042	10	100
NOVEMBER	2009	41,760		0	0	3,783	18	183
DECEMBER	2009	51,440		0	0	4,411	84	645
TOTAL		**624,440**	**0**	**0**	**0**	**$53,685**	**336**	**$2,717**

Annual Total Energy Cost = $56,402 Per Year

Total KWH x 0.003413 = 2,131.21 x 106
Total MCF x 1.03 = 346.08 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,477.29 x 106

Floor area: 50,527 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 49,029 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.12 $/s.f. yr

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000651429	0	Atmos	000284623

OWNER: City of Temple **BUILDING:** Fire Station

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	3,771		0	0	356	73	535
FEBRUARY	2010	3,742		0	0	354	82	552
MARCH	2010	4,346		0	0	405	54	346
APRIL	2010	4,318		0	0	410	8	68
MAY	2010	5,681		0	0	493	2	24
JUNE	2010	6,212		0	0	533	1	23
JULY	2010	6,948		0	0	579	2	26
AUGUST	2010	6,813		0	0	572	2	27
SEPTEMBER	2010	5,833		0	0	504	1	26
OCTOBER	2009	4,416		0	0	413	11	93
NOVEMBER	2009	4,327		0	0	388	21	189
DECEMBER	2009	4,254		0	0	386	82	617
TOTAL		**60,661**	**0**	**0**	**0**	**$5,393**	**339**	**$2,526**

Annual Total Energy Cost = $7,919 Per Year

Total KWH x 0.003413 = 207.04 x 106
Total MCF x 1.03 = 349.17 x 106
Total Other x ____ x 106
Total Site BTU's/yr 556.21 x 106

Floor area: 5,592 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 99,465 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.42 $/s.f. yr

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000331845	0	Atmos	000824495

OWNER: City of Temple **BUILDING:** Convention Center

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	80,102		0	0	8,560	0	0
FEBRUARY	2010	89,158		0	0	9,321	0	0
MARCH	2010	53,798		0	0	6,679	0	0
APRIL	2010	63,859		0	0	6,803	0	0
MAY	2010	69,736		0	0	7,104	0	0
JUNE	2010	76,278		0	0	7,472	0	0
JULY	2010	67,222		0	0	6,965	0	0
AUGUST	2010	86,042		0	0	8,154	0	0
SEPTEMBER	2010	70,650		0	0	7,219	0	0
OCTOBER	2009	60,914		0	0	6,531	0	0
NOVEMBER	2009	64,885		0	0	7,041	0	0
DECEMBER	2009	86,860		0	0	8,856	0	0
TOTAL		**869,504**	**0**	**0**	**0**	**$90,706**	**0**	**$0**

Annual Total Energy Cost = $90,706 Per Year

Total KWH x 0.003413 = 2,967.62 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,967.62 x 106

Floor area: 40,440 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 73,383 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.24 $/s.f. yr

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000330794	0	Atmos	0

OWNER: City of Temple **BUILDING:** Parks and Leisure

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	8,600		0	0	767	19	152
FEBRUARY	2010	11,520		0	0	1,022	10	85
MARCH	2010	6,080		0	0	628	7	60
APRIL	2010	4,040		0	0	468	3	35
MAY	2010	4,120		0	0	467	2	25
JUNE	2010	6,360		0	0	619	2	24
JULY	2010	5,600		0	0	567	2	30
AUGUST	2010	5,960		0	0	588	2	27
SEPTEMBER	2010	6,520		0	0	625	2	29
OCTOBER	2009	3,200		0	0	391	2	29
NOVEMBER	2009	3,400		0	0	428	3	40
DECEMBER	2009	9,400		0	0	805	12	105
TOTAL		**74,800**	**0**	**0**	**0**	**$7,373**	**66**	**$641**

Annual Total Energy Cost = $8,014 Per Year

Total KWH x 0.003413 = 255.29 x 106
Total MCF x 1.03 = 67.98 x 106
Total Other x ____ x 106
Total Site BTU's/yr 323.27 x 106

Floor area: 3,022 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 106,973 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.65 $/s.f. yr

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000301382	0	Atmos	001130285

OWNER: City of Temple **BUILDING:** Summit Fitness

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	37,200		0	0	3,486	60	442
FEBRUARY	2010	33,000		0	0	3,152	50	347
MARCH	2010	35,600		0	0	3,310	46	294
APRIL	2010	39,800		0	0	3,562	31	208
MAY	2010	48,600		0	0	4,146	23	154
JUNE	2010	61,100		0	0	5,067	22	142
JULY	2010	66,800		0	0	5,445	27	224
AUGUST	2010	68,700		0	0	5,577	23	195
SEPTEMBER	2010	65,900		0	0	5,414	26	221
OCTOBER	2009	51,595		0	0	4,369	30	233
NOVEMBER	2009	45,700		0	0	3,968	31	276
DECEMBER	2009	43,700		0	0	3,873	41	312
TOTAL		597,695	0	0	0	$51,369	410	$3,048

Annual Total Energy Cost = $54,417 Per Year

Total KWH x 0.003413 = 2,039.93 x 106
Total MCF x 1.03 = 422.30 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,462.23 x 106

Floor area: 23,600 s.f.

Energy Use Index:
Total Site BTU's/yr = 104,332 BTU/s.f.yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $2.31 $/s.f. yr
Total Area (sq.ft.)

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy	1044372000371733	0	Atmos	000417160

OWNER: City of Temple **BUILDING:** City Hall

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	46,240				3,786		
FEBRUARY	2010	51,600				4,121		
MARCH	2010	44,080				3,636		
APRIL	2010	52,320				4,189		
MAY	2010	52,160				4,250		
JUNE	2010	61,520				4,865		
JULY	2010	59,600				4,720		
AUGUST	2010	62,640				5,008		
SEPTEMBER	2010	62,000				4,832		
OCTOBER	2009	49,960				4,041		
NOVEMBER	2009	45,120				3,691		
DECEMBER	2009	57,920				4,532		
TOTAL		645,160	0	0	0	$51,671	0	$0

Annual Total Energy Cost = $51,671 Per Year

Total KWH x 0.003413 = 2,201.93 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,201.93 x 106

Floor area: 48,144 s.f.

Energy Use Index:
Total Site BTU's/yr = 45,736 BTU/s.f.yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.07 $/s.f. yr
Total Area (sq.ft.)

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Mid-American Energy			Atmos	

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC PROVIDER: Mid-American Energy Contract price: $0.0611 per kWh

TRANSMISSION AND DISTRIBUTION UTILITY: Oncor

Electric Rate: Secondary Service > 10 kVA

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$3.50 per meter
	Metering Charge	=	$18.41 per IDR meter
	Transmission System Charge IDR Metered	=	$1.99 per 4CP kW
	Distribution System Charge	=	$3.97 per Distribution System Billing kW
II.	SYSTEM BENEFIT FUND	=	$0.000655 per kWh see Rider SBF
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$0.188/kW
	Transition Charge 2	=	$0.269/kW
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.044 per Distribution System Billing kW
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.175714/4CP Kw
VI.	ENERGY EFFICIENCY COST RECOVERY FACTOR	=	$9.66/Retail Customer
VII.	COMPETITIVE METER CREDIT	=	$5.47/Month
VIII.	ADVANCED METERING COST RECOVERY FACTOR	=	$3.98/Month
IX.	RATE CASE EXPENSE SURCHARGE	=	$0.007944/kW
X.	TAXES		
	General Local Taxes		

Average Savings for consumption = $0.0611/kWh + $0.000655/kWh = $0.061755/kWh
Average Savings for demand = $1.99 + $3.97 + $0.188 + $0.269 + $0.044 + $0.175714 + $0.007944 = $ 6.644658/kW**

** This number is a generalization of average cost per kW because the rate schedule from Centerpoint utilizes three (3) different types of demand for the calculation of the utility bill:

1. NCP kVA: Peak demand during 15 minute interval of current billing cycle
2. 4CP kVA: Average demands of June, July, August and September of previous calendar year; usually only applied to IDR metered accounts

Billing kVA: Ratchet demand representing higher of two calculations: 80% of peak demand in last 11 months or current NCP kVA

NATURAL GAS PROVIDER:

The rate schedule for Natural gas is unavailable, but we have calculated the average cost per MCF of purchased natural gas in the district by analyzing the utility histories for the schools surveyed in this report.

Total cost for natural gas at the five facilities in the analyzed billing cycle: $17,630

Total quantity purchased during the analyzed billing cycle: 2,306 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $17,630 / 2,306 MCF

Average cost per MCF = $7.65

5.0 CAMPUS DESCRIPTIONS:

City of Temple consists of approximately 50 facility campuses which are all located in Temple, Texas. The energy survey focused on ten of the campuses:

Table 2: City Facilities Analyzed For This Report

Facility	Year originally Constructed	Approximate Square Footage	Basic HVAC Cool/Heat	Basic Lighting System Description	Basic Control System Description
Parks and Leisure	1986	3,022	Split System DX Cooled/ Natural Gas Heat	Incandescent and T12 fluorescent	Programmable thermostat
Courthouse	1971	15,168	Rooftop Units / Split Systems	T8 fluorescent with some occupancy sensors	Programmable thermostat
Office of Public Works	2002	n/a	Split System DX Cooled/ Natural Gas Heat	T8 fluorescent / Metal Halide	Programmable thermostat
Summit Family Fitness	1982	23,600	Rooftop Units DX Cooled/ Natural Gas Heat	T12 linear fluorescent; T8 at racquetball addition	Programmable thermostat
Mayborn Convention Center	1982	40,440	Split System DX Cooled/ Natural Gas Heat	Incandescent and Metal Halide	Programmable thermostat
Animal Control	2004	9,495	Split System DX Cooled/ Natural Gas Heat	T8 linear fluorescent	Conventional thermostat
Fire Station #6	1986	5,592	Split System DX Cooled/ Natural Gas Heat	F96T12 in garage bay; T8 in conditioned space	Conventional thermostat
Facilities Maintenance	2002	50,527	Split System DX Cooled/ Natural Gas Heat	Metal Halide at Shops; T8 fluorescent in Offices	Programmable thermostat
City Hall	1928	48,144	Air cooled chilled water/ NG Boiler	T8 linear fluorescent	Programmable thermostat and conventional thermostat
Water Treatment	1978	42,840	Split Systems / Through The Wall (TTW) DX Cooled/ Natural Gas Heat	T8 and T12 linear fluorescent	Programmable thermostat

Note: The selection of campuses to be surveyed in the report represented a mix of older and newer campuses which allows for comparison of energy strategies between older and newer designs as well as the ability to extrapolate recommendations for these facilities to other facilities in the district.

6.0 ENERGY RECOMMENDATIONS:

ELECTRICAL ECRM 1: REPLACE ELECTRICAL DISTRIBUTION PANEL

City staff at the water treatment facility reported that the 9600 amp, 9-section main electrical distribution panel will need to be replaced in the near future. The purpose of this report is to identify measures that will save energy for the City; given that this type of infrastructure equipment does not save energy, we include it as a matter of convenience for City officials that will need to take the replacement cost (approximately $168,750 for a nine section panel with copper busses and main circuit breakers for each section) for this piece of equipment into future budget considerations. *This measure is not included in the summary of recommended projects noted elsewhere in this report.*

HVAC ECRM 1: REPLACE OCCUPANCY SENSORS

At the new Courthouse Building, only two of the upstairs offices are currently occupied. The HVAC system operates with a setback in these unoccupied areas. We recommend installing occupancy sensors in each office space so that the HVAC system can be operated only when the space is occupied. *We recommend the City install an occupancy sensor in each office that will determine when the HVAC equipment can allow the system to reach an unoccupied setpoint of 80°F. When the office occupants return, the motion sensors will trigger the system back on and call for it to satisfy an occupied setpoint of 73°F.*

The estimate below is for 8 wall switch occupancy sensors, 1 per office.
Estimated Cost: $765 Estimated Savings: $255 Estimated Payback: 3 years

HVAC ECRM 2: INSTALL VARIABLE FREQUENCY DRIVES

At the wastewater treatment plant we found multiple pumps that need VFDs installed with them. We found four 100hp pumps at the loop 363 pump station; there are two 100hp, one 60hp, and two 250hp at the raw water intake building. Not only do these drives save energy by matching the speed of the pump with the load conditions at the time, but single speed drives start motors more abruptly, they subject the motor to higher torque and current surges. Variable frequency drives offer a "soft start" capability, gradually ramping up a motor to operating speed. This will lessen mechanical and electrical stress on the motor, reduce maintenance and repair costs and extend the life of the motor. *We recommend the City install variable frequency drives on all nine pumps listed above.*

Estimated Cost: $161,300 Estimated Savings: $35,235 Estimated Payback: 4-1/2

HVAC ECRM 3: REPLACE CONVENTIONAL THERMOSTAT

The HVAC system that serves the Parks and Leisure building is controlled by a conventional thermostat. Since the control of the unit is accomplished by the building occupants, it is likely this unit is left operating beyond normal occupancy hours. *We recommend replacing the existing thermostat with a programmable unit that can be matched to the occupancy hours for the Parks and Leisure building.*

Estimated Cost: $100 Estimated Savings: $33 Estimated Payback: 3 years

HVAC ECRM 4: REPLACE HVAC UNITS

There are two units that are over 15 years old and nearing the end of their useful life expectancy of 15-20 years. A 5-ton Lennox unit located at Fire Station #6, and a 4-ton unit at the Parks and Leisure Services building. *We recommend the City replace these units as soon as funds become available to do so, to avoid the higher costs associated with emergency replacement if the unit is allowed to fail on its own.*

Estimated Cost: $18,500 Estimated Savings: $1,550 Estimated Payback: 12 years

LIGHTING ECRM 1: REPLACE INCANDESCENT LIGHTING

It was noted during the survey that many areas in the City still utilize incandescent lighting at the facilities. Incandescent fixtures are the least efficient fixtures that can be used in a facility. The Convention Center, in particular, has many areas where incandescent lighting is used. The canopy covering the entrance to the building has approximately 115 incandescent can light fixtures that we recommend be retrofit with compact fluorescent lamps. The main floor of the Center has 96-500w incandescent fixtures mounted between 92-400 watt metal halide fixtures. When turned on, the incandescent fixtures alone require 48kW of demand. At the average cost for demand discussed in Section 4 of this report, this represents $638 of demand cost each month on the utility bill.

The two different types of fixtures at the facility, incandescent and metal halides, are likely never used simultaneously; they are likely selected based on the type of presentation conducted at the facility and the presentation's requirement for accurate color rendering. Different light sources have different abilities to accurately portray colors. Sunlight and incandescent light is scores 100% for people's ability to accurately perceive color. Metal halides, especially older metal halides, only score about 65% on ability to correctly perceive color. T5 fluorescent lamps have a CRI (Color Rendering Index) of about 85%. While we are recommending that the incandescent fixtures be replaced with T5 linear fluorescent fixtures based on the energy benefits, the project should be discussed with the persons in charge of the Convention Center marketing to ensure the lower CRI will not have negative effects for their ability to schedule certain events. While a less attractive option for the energy model, it may be found that replacing the existing metal halide fixtures with T5 fluorescent fixtures and retaining the incandescent fixtures for only those events requiring the high CRI is the best overall option for the City.

<u>Canopy Lighting</u>
Estimated Cost: $750 Estimated Savings: $187 per month Estimated Payback: 4 months

<u>Main Room Lighting</u>
Estimated Cost: $33,600 Estimated Savings: $6,720 Estimated Payback: 5 years

<u>Loop 363 Pump Station</u> – 7 incandescent lamps
Estimated Cost: $50 Estimated Savings: $13 per month Estimated Payback: 4 months

LIGHTING ECRM 2: REPLACE METAL HALIDE FIXTURES WITH T5 LINEAR FLUORESCENT

It was noted during the survey that multiple facilities are utilizing metal halide light fixtures. One characteristic of metal halide fixtures is their inherently long re-strike. This means that if the fixtures are ever turned off, it can take up to 15 minutes for them to come back on. This long re-strike encourages staff to leave the lights on throughout the day, even if the space is not occupied. Studies have shown that linear fluorescent fixtures offer energy savings 23 seconds after they have been turned off when considering the startup current required to turn the fixtures back on. To maximize the energy efficiency of installing systems that do not have a long re-strike issue, we recommend the City install occupancy sensors to ensure all lighting is turned off when the space is unoccupied. *We recommend replacing the metal halides with 6-lamp T5 high bay fluorescent fixtures with occupancy sensors serving each space.*

- Summit Family Fitness Center – 14 each 400w MH
- Service Center – 39 each 400w MH
- Mechanic Shops – 84 each 400w MH
- Membrane Plant – 35 each 400w MH

Estimated Cost: $60,000 Estimated Savings: $7,500 Estimated Payback: 8 years

LIGHTING ECRM 3: RETROFIT T12 FIXTURES TO T8

The Wastewater Treatment Facility, pump station 2305, the Parks and Leisure building, and Fire Station #6 were all noted to utilize T12 components in their linear fluorescent lighting fixtures. T12 components produce approximately 18% less light and consume about 20% more energy than the T8 lamps and electronic ballasts that may be retrofit into the existing linear fluorescent fixtures. Additionally, the T12 components are no longer produced by lighting manufacturers. While still available, the ability to acquire replacement parts for T12 fixtures will become more difficult over time. *Therefore we recommend the district retrofit the fixtures at these facilities with T8 lamps and electronic ballasts.*

- 7 at Waste Water Treatment Facility
- 12 at pump station 2305
- 34 at Parks and Leisure building
- 16 at Fire Station #6

Estimated Cost: $2,275 Estimated Savings: $455 Estimated Payback: 5 years

LIGHTING ECRM 4: INSTALL PHOTOCELL SENSOR FOR EXTERIOR LIGHTING

At the Wastewater Treatment facility it was noted that some exterior metal halide fixtures were remaining on throughout the day. *Our recommendation is for the City to install a photocell sensor that will control the exterior metal halide lighting and keep the fixtures turned off during the day.*

Estimated Cost: $100 Estimated Savings: $250 Estimated Payback: 4 months

LIGHTING ECRM 5: INSTALL OCCUPANCY SENSORS

It was noted during our survey, that many areas of the buildings had lights operating in unoccupied spaces. Studies have shown that turning off fluorescent fixtures, the type most often found in City buildings, saves energy after just 23 seconds of the space becoming unoccupied. If staff training is not able to help with lights being left on in unoccupied spaces, then the City may wish to consider installing occupancy sensors to perform this function. *We recommend the district install lighting occupancy sensors at the following locations.*

- The Service Center File Room– 1 sensor
- The Public Works Copy Room – 1 sensor
- The offices at the Public Works building – approximately 8 sensors
- The Membrane Plant Office and Electrical Room – 2 sensors

The cost estimate shown below would involve the installation of 12 occupancy sensors and 12 switchpacks.

Estimated Cost: $2,175 Estimated Savings: $725 Estimated Payback: 3 years

CONTROLS ECRM 1: INSTALL VENDING MACHINE CONTROLS

Vending machine controls can be installed to control existing advertising lighting and compressors that refrigerate food or drink. Using a motion sensor mounted on top of the machine, the vending machines will allow lights to operate whenever it senses occupants are in the area and cycles the compressor on and off to maintain food or beverages at a programmable temperature when it senses inactivity in the area. There were four vending machines (two at Public Works and two at the Animal Shelter) specifically noted during our survey. *We recommend the City install vending machine controls on all existing vending machines.*

Estimated Cost: $720 Estimated Savings: $360 Estimated Payback: 2 years

ENERGY CONSERVATION ECRM: INSTALL SOLAR PANELS

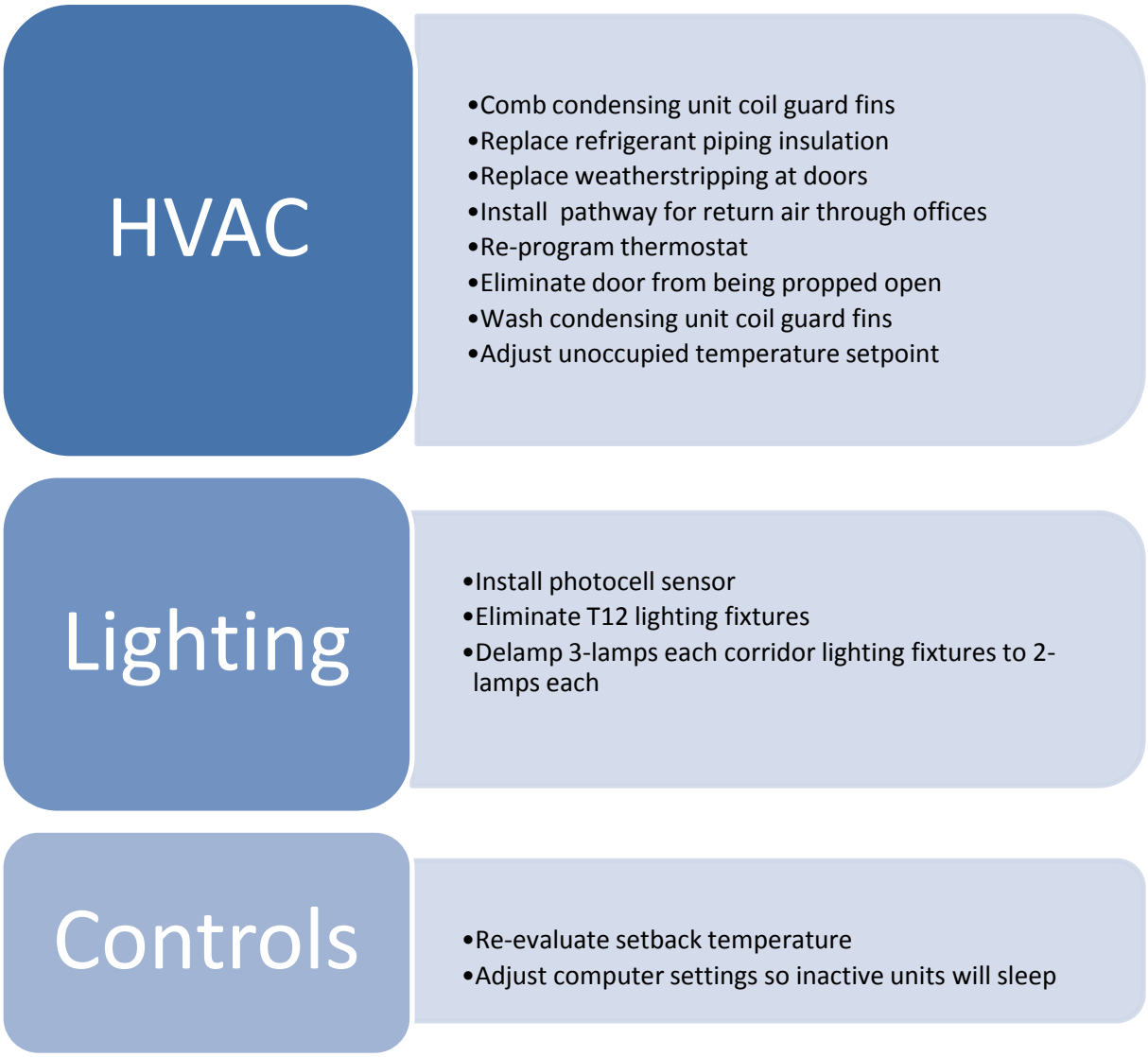
At the time of the survey, some of the staff expressed interest in exploring opportunities for renewable energy projects that could help lower the City's dependence on traditional utility commodities. We recommend the City consider solar photovoltaic systems as an option for supporting some equipment within the City:

1. Solar powered traffic control signage.
2. Lift stations (wastewater distribution).
3. Water treatment and wastewater treatment plants.
4. Covered parking awnings to generate power for City Hall or the Police Station.

Estimated project costs include available government grants and utility rebates for renewable projects.

Estimated Cost: $2,000 per kW Est. Savings: $152 per kW Estimated Payback: 13 years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS



Maintenance and Operation procedures are strategies that can offer significant energy savings potential, yet require little or no capital investment by the district to implement. Exact paybacks are at times difficult to calculate, but are typically always less than one year. The difficulties with payback calculation are often related to the fact that the investigation required to make the payback calculation, for example measuring the air gap between exterior doors and missing or damaged weatherstripping so that exact air losses may be determined, is time and cost prohibitive when the benefits of renovating door and weather weatherstripping are well documented and universally accepted.

HVAC M&O - #1

The HVAC M&O opportunities begin with combing the condenser fins [combs available for less than $10] to maximize the unit's ability to reject heat to the atmosphere which in turn maximizes the system's ability to absorb heat from the space. We noticed damaged and bent coil fins at the City Hall air cooled chiller and condensing units at the Wastewater Treatment facility. If only 10% of the coil guard fins are damaged, the unit's efficiency can decrease by up to 30%. *We recommend the City comb all bent coil guard fins and install coil guards on any unit that does not have them to prevent such damage in the future.*

HVAC M&O - #2

Upon inspection of the City Hall HVAC equipment, we found that multiple condenser units' refrigerant piping insulation is damaged or missing, particularly the units serving the information technology room. This condition minimizes the ability of the refrigerant to absorb heat from the conditioned space as it instead absorbs heat from the outdoors. *We recommend the district replace damaged refrigerant piping insulation on all condensing units.*

HVAC M&O - #3

It was noted during our survey of the City Hall that some exterior doors had damaged or missing weatherstripping. This condition allows conditioned air to leak from the building and allows insects, humidity and non-conditioned air to infiltrate the building. *We recommend the district replace the damaged or missing weatherstripping at all exterior doors where necessary.*

HVAC M&O - #4

Some staff stated that some areas of City Hall are not as comfortable as others during both the heating and cooling seasons. We suspect this condition is caused by the starving of return air to the HVAC system by the addition of walls in the building and the failure to provide return air access back to the units. This condition is common in large City office areas as the space needs of the employees change rapidly in this type of environment. Offices are constructed in areas that were not originally designed as offices and the conditioned air can become trapped in a given space. Trapping supply air introduces back pressure on the supply air ductwork and these spaces may not receive significant supply air when the doors to these offices are closed. Installing return air bypasses (U-shaped ductwork assemblies with return air grills installed at both ends above the door frames or through the walls will allow return air from the offices to reach the return air intake and enable the system to provide comfort to all spaces, even when office doors are closed.

HVAC M&O - #5

The thermostat in the court room was observed to be set in the "hold" mode, which overrides all programmed schedules and forces the unit to run all at all times. *We recommend reprogramming the thermostat to allow setpoint and setback times to be governed by the City's Energy Policy schedule.*

HVAC M&O - #6

At the Fitness Center and Convention Center, it was noted that occupants prop open exterior doors while the HVAC system is operating. Due to the excessive heat gain to a conditioned space while doors are propped open, *we recommend the City implement a strict policy to prevent doors from being propped open when the HVAC system is operating.*

HVAC M&O - #7

At the Wastewater Treatment Facility there were two (2003 Lennox LGA unit and an American Standard unit) noted to have dirty condenser fins. Allowing dirt and debris to collect in-between coil fins decreases the ability of a condensing unit to properly reject heat from the refrigerant into the atmosphere. *We recommend the City wash the coil fins at these two units.*

HVAC M&O - #8

The Convention Center was described to be operating with a temperature setback program during unoccupied hours. The setbacks are currently 75°F cooling and 65°F heating. We recommend the City consider increase the amount of setback within the program to 80°F cooling and 60°F heating. This will save the City a significant amount of energy yet still allow the building to quickly reach the desired temperature when occupants return to the building.

LIGHTING M&O - #1

There were many areas noted in the City where natural daylight was sufficient for the space at the time of the survey, but artificial light fixtures were still being used. We recommend the City use daylighting strategies in these areas that will allow the City to turn off all light fixtures in the space. At the Fitness Center there are 8 each 2-lamp T8 fixtures and 10 incandescent lamps at the Public Works building that if connected to a photocell will allow the spaces to operate primarily off the natural ambient light entering the space. The fixtures pictured to the right are small incandescent fixtures installed behind the bench seating in the lobby of the convention center. *We recommend installing a photocell that will prevent these fixtures from operating during the day.*

LIGHTING M&O - #2

In the Convention Center there are T12 fluorescent lighting fixtures currently serving as the emergency lighting for the metal halide fixtures. In conjunction with our recommendation to replace all metal halides with T5 fluorescent lighting, *we recommend these emergency T12 fixtures be removed.*

LIGHTING M&O - #3

At the Public Works building we found 14 each 3-lamp lighting fixtures located in the corridor. The footcandle reading for this corridor ranged from 40fc-62fc. The recommended light levels for a corridor in an office building is 15-20 footcandles by IESNA (Illumination Engineering Society of North America). *We recommend the City de-lamp each of the corridor light fixtures to 2-lamps per fixture and still should surpass the IESNA recommendation with corridor light levels between 29 and 40fc*.

8.0 FINANCIAL EVALUATION

Financing of these projects may be provided using a variety of methods such as Bond Programs, municipal leases, or state financing programs like the SECO LoanSTAR Program.

If the project was financed with in-house funds, the internal rate of return for the investment would be as follows:

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $5,000 maintenance expense next 5 years				
4. $10,000 maintenance expense next 5 years				
5. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($280,335)		0	($280,335)
Year 1		$ 53,283.00	0	$53,283
Year 2		$ 53,283.00	0	$53,283
Year 3		$ 53,283.00	0	$53,283
Year 4		$ 53,283.00	0	$53,283
Year 5		$ 53,283.00	0	$53,283
Year 6		$ 52,217.34	($5,000)	$47,217
Year 7		$ 51,151.68	($5,000)	$46,152
Year 8		$ 50,086.02	($5,000)	$45,086
Year 9		$ 49,020.36	($5,000)	$44,020
Year 10		$ 47,954.70	($5,000)	$42,955
Year 11		$ 46,889.04	($10,000)	$36,889
Year 12		$ 45,823.38	($10,000)	$35,823
Year 13		$ 44,757.72	($10,000)	$34,758
Year 14		$ 43,692.06	($10,000)	$33,692
Year 15		$ 42,626.40	($10,000)	$32,626
			Internal Rate of Return	**15.24%**

More information regarding financial programs available to CITY OF TEMPLE can be found in:

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 GENERAL COMMENTS

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted engineering practices. All estimations provided in this report were based upon information provided to ESA by the District and their respective utility providers. While cost saving estimates have been provided, they are not intended to be considered a guarantee of cost savings. No guarantees or warranties, expressed or implied, are intended or made. Changes in energy usage or utility pricing from those provided will impact the overall calculations of estimated savings and could result in different or longer payback periods.

APPENDICES

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

Several options are available for funding retrofit measures which require capital expenditures.

LoanSTAR Program:

The Texas LoanSTAR program is administered by the State Energy Conservation Office (SECO). It is a revolving loan program available to all public school districts in the state as well as other institutional facilities. SECO loans money at 3% interest for the implementation of energy conservation measures which have a combined payback of eight years or less. The amount of money available varies, depending upon repayment schedules of other facilities with outstanding loans, and legislative actions. Check with Eddy Trevino of SECO (512-463-1876) for an up-to-date evaluation of prospects for obtaining a loan in the amounts desired.

TASB (Texas Association of School Boards) Capital Acquisition Program:

TASB makes loans to school districts for acquiring personal property for "maintenance purposes". Energy conservation measures are eligible for these loans. The smallest loan TASB will make is $100,000. Financing is at 4.4% to 5.3%, depending upon length of the loan and the school district's bond rating. Loans are made over a three year, four year, seven year, or ten year period. The application process involves filling out a one page application form, and submitting the school district's most recent budget and audit. Contact Cheryl Kepp at TASB (512-467-0222) for further information.

Loans on Commercial Market:

Local lending institutions are another source for the funding of desired energy conservation measures. Interest rates obtainable may not be as attractive as that offered by the LoanSTAR or TASB programs, but advantages include "unlimited" funds available for loan, and local administration of the loan.

Leasing Corporations:

Leasing corporations have become increasingly interested in the energy efficiency market. The financing vehicle frequently used is the municipal lease. Structured like a simple loan, a municipal leasing agreement is usually a lease-purchase agreement. Ownership of the financed equipment passes to the district at the beginning of the lease, and the lessor retains a security interest in the purchase until the loan is paid off. A typical lease covers the total cost of the equipment and may include installation costs. At the end of the contract period a nominal amount, usually a dollar, is paid by the lessee for title to the equipment.

Bond Issue:

The Board may choose to have a bond election to provide funds for capital improvements. Because of its political nature, this funding method is entirely dependent upon the mood of the voters, and may require more time and effort to acquire the funds than the other alternatives.

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

State Purchasing:
The General Services Commission has competitively bid contracts for numerous items which are available for direct purchase by school districts. Contracts for this GSC service may be obtained from Sue Jager at (512) 475-2351.

Design/Bid/Build (Competitive Bidding):
Plans and specifications are prepared for specific projects and competitive bids are received from installation contractors. This traditional approach provides the district with more control over each aspect of the project, and task items required by the contractors are presented in detail.

Design/Build:
These contracts are usually structured with the engineer and contractor combined under the same contract to the owner. This type team approach was developed for fast-track projects, and to allow the contractor a position in the decision making process. The disadvantage to the district is that the engineer is not totally independent and cannot be completely focused upon the interest of the district. The district has less control over selection of equipment and quality control.

Purchasing Standardization Method:
This method will result in significant dollar savings if integrated into planned facility improvements. For larger purchases which extend over a period of time, standardized purchasing can produce lower cost per item expense, and can reduce immediate up-front expenditures. This approach includes traditional competitive bidding with pricing structured for present and future phased purchases.

Performance Contracting:
Through this arrangement, an energy service company (ESCO) using in-house or third party financing to implement comprehensive packages of energy saving retrofit projects. Usually a turnkey service, this method includes an initial assessment of energy savings potential, design of the identified projects, purchase and installation of the equipment, and overall project management. The ESCO guarantees that the cost savings generated will, at a minimum, cover the annual payment due over the term of the contract. The laws governing Performance Contracting for school districts are detailed in the Texas Education Code, Subchapter Z, Section 44.901. Senate Bill SB 3035, passed by the seventy-fifth Texas Legislature, amends some of these conditions. Performance Contracting is a highly competitive field, and interested districts may wish to contact Eddy Trevino of State Energy Conservation Office, (SECO), at 512-463-1896 for assistance in preparing requests for proposals or requests for qualifications.

Solution Center

How to Finance Your Energy Program

Cost and financing issues are pivotal factors in determining which energy-efficiency measures will be included in your final energy management plan. Before examining financing options, you need to have a reasonably good idea of the measures that may be implemented. For this purpose, you will want to perform cost/benefit analyses on each candidate measure to identify those with the best investment potential. This document presents a brief introduction to cost/benefit methods and then suggests a variety of options for financing your program.

Selecting a Cost/Benefit Analysis Method

Cost/benefit analysis can determine if and when an improvement will pay for itself through energy savings and to help you set priorities among alternative improvement projects. Cost/benefit analysis may be either a simple payback analysis or the more sophisticated life cycle cost analysis. Since most electric utility rate schedules are based on both consumption and peak demand, your analyst should be skilled at assessing the effects of changes in both electricity use and demand on total cost savings, regardless of which type of analysis is used. Before beginning any cost/benefit analyses, you must first determine acceptable design alternatives that meet the heating, cooling, lighting, and control requirements of the building being evaluated. The criteria for determining whether a design alternative is "acceptable" includes reliability, safety, conformance with building codes, occupant comfort, noise levels, and space limitations. Since there will usually be a number of acceptable alternatives for any project, cost/benefit analysis allows you to select those that have the best savings potential.

Simple Payback Analysis

A highly simplified form of cost/benefit analysis is called simple payback. In this method, the total first cost of the improvement is divided by the first-year energy cost savings produced by the improvement. This method yields the number of years required for the improvement to pay for itself.

This kind of analysis assumes that the service life of the energy-efficiency measure will equal or exceed the simple payback time. Simple payback analysis provides a relatively easy way to examine the overall costs and savings potentials for a variety of project alternatives. However, it does not consider a number of factors that are difficult to predict, yet can have a significant impact on cost savings. These factors may be considered by performing a life-cycle cost (LCC) analysis.

Simple Payback

As an example of simple payback, consider the lighting retrofit of a 10,000-square-foot commercial office building. Relamping with T-8 lamps and electronic, high-efficiency ballasts may cost around $13,300 ($50 each for 266 fixtures) and produce annual savings of around $4,800 per year (80,000 kWh at $0.06/kWh). This simple payback for this improvement would be

$$\frac{\$13{,}300}{\$4{,}800/\text{year}} = 2.8 \text{ years}$$

That is, the improvement would pay for itself in 2.8 years, a 36% simple return on the investment (1/2.8 = 0.36).

Life-Cycle Cost Analysis

Life-cycle cost analysis (LCC) considers the total cost of a system, device, building, or other capital equipment or facility over its anticipated useful life. LCC analysis allows a comprehensive assessment of all anticipated costs associated with a design alternative. Factors commonly considered in LCC analyses include initial capital cost, operating costs, maintenance costs, financing costs, the expected useful life of equipment, and its future salvage values. The result of the LCC analysis is generally expressed as the value of initial and future costs in today's dollars, as reflected by an appropriate discount rate.

The first step in this type of analysis is to establish the general study parameters for the

continued

How to Finance Your Energy Program *continued*

Financing Mechanisms

Capital for energy-efficiency improvements is available from a variety of public and private sources, and can be accessed through a wide and flexible range of financing instruments. While variations may occur, there are five general financing mechanisms available today for investing in energy-efficiency:

- **Internal Funds.** Energy-efficiency improvements are financed by direct allocations from an organization's own internal capital or operating budget.
- **Debt Financing.** Energy-efficiency improvements are financed with capital borrowed directly by an organization from private lenders.
- **Lease or Lease-Purchase Agreements.** Energy-efficient equipment is acquired through an operating or financing lease with no up-front costs, and payments are made over five to ten years.
- **Energy Performance Contracts.** Energy-efficiency measures are financed, installed, and maintained by a third party, which guarantees savings and payments based on those savings.
- **Utility Incentives.** Rebates, grants, or other financial assistance are offered by an energy utility for the design and purchase of certain energy-efficient systems and equipment.

These financing mechanisms are not mutually exclusive (i.e., an organization may use several of them in various combinations). The most appropriate set of options will depend on the size and complexity of a project, internal capital constraints, in-house expertise, and other factors. Each of these mechanisms is discussed briefly below, followed by some additional funding sources and considerations.

Internal Funds

The most direct way for the owner of a building or facility to pay for energy-efficiency improvements is to allocate funds from the internal capital or operating budget. Financing internally has two clear advantages over the other options discussed below – it retains internally all savings from increased energy-efficiency, and it is usually the simplest option administratively. The resulting savings may be used to decrease overall operating expenses in future years or retained within a revolving fund used to support additional efficiency investments. Many public and private organizations regularly finance some or all of their energy-efficiency improvements from internal funds.

In some instances, competition from alternative capital investment projects and the requirement for relatively high rates of return may limit the use of internal funds for major, standalone investments in energy-efficiency. In most organizations, for example, the highest priorities for internal funds are business or service expansion, critical health and safety needs, or productivity enhancements. In both the public and private sectors, capital that remains available after these priorities have been met will usually be invested in those areas that offer the highest rates of return. The criteria for such investments commonly include an annual return of 20 percent to 30 percent or a simple payback of three years or less.

Since comprehensive energy-efficiency improvements commonly have simple paybacks of five to six years, or about a 12 percent annual rate of return, internal funds often cannot serve as the sole source of financing for such improvements. Alternatively, however, internal funding can be used well and profitably to achieve more competitive rates of return when combined with one or more of the other options discussed below.

Debt Financing

Direct borrowing of capital from private lenders can be an attractive alternative to using internal funds for energy-efficiency investments. Financing costs can be repaid by the savings that accrue from increased energy-efficiency. Additionally, municipal governments can often issue bonds or other long-term debt instruments at substantially lower interest rates than can private corporate entities. As in the case of internal funding, all savings from efficiency improvements (less only the cost of financing) are retained internally.

Debt financing is administratively more complex than internal funding, and financing costs will vary according to the credit rating of the borrower. This approach may also be restricted by formal debt ceilings imposed by municipal

How to Finance Your Energy Program *continued*

policy, accounting standards, and/or Federal or state legislation.

In general, debt financing should be considered for larger retrofit projects that involve multiple buildings or facilities. When considering debt financing, organizations should weigh the cost and complexity of this type of financing against the size and risk of the proposed projects.

Lease and Lease-Purchase Agreements

Leasing and lease-purchase agreements provide a means to reduce or avoid the high, up-front capital costs of new, energy-efficient equipment. These agreements may be offered by commercial leasing corporations, management and financing companies, banks, investment brokers, or equipment manufacturers. As with direct borrowing, the lease should be designed so that the energy savings are sufficient to pay for the financing charges. While the time period of a lease can vary significantly, leases in which the lessee assumes ownership of the equipment generally range from five to ten years. There are several different types of leasing agreements, as shown in the sidebar. Specific lease agreements will vary according to lessor policies, the complexity of the project, whether or not engineering and design services are included, and other factors.

Energy Performance Contracts

Energy performance contracts are generally financing or operating leases provided by an Energy Service Company (ESCo) or equipment manufacturer. The distinguishing features of these contracts are that they provide a guarantee on energy savings from the installed retrofit measures, and they provide payments to the ESCo from the savings, freeing the customer from any need of up-front payments to the ESCo. The contract period can range from five to 15 years, and the customer is required to have a certain minimum level of capital investment (generally $200,000 or more) before a contract will be considered.

Under an energy performance contract, the ESCo provides a service package that typically includes the design and engineering, financing, installation, and maintenance of retrofit measures to improve energy-efficiency. The scope of these improvements can range from measures that affect a single part of a building's energy-using

Types of Leasing Agreements

Operating Leases are usually for a short term, occasionally for periods of less than one year. At the end of the lease period, the lessee may either renegotiate the lease, buy the equipment for its fair market value, or acquire other equipment. The lessor is considered the owner of the leased equipment and can claim tax benefits for its depreciation.

Financing Leases are agreements in which the lessee essentially pays for the equipment in monthly installments. Although payments are generally higher than for an operating lease, the lessee may purchase the equipment at the end of the lease for a nominal amount (commonly $1). The lessee is considered the owner of the equipment and may claim certain tax benefits for its depreciation.

Municipal Leases are available only to tax-exempt entities such as school districts or municipalities. Under this type of lease, the lessor does not have to pay taxes on the interest portion of the lessee's payments, and can therefore offer an interest rate that is lower than the rate for usual financing leases. Because of restrictions against multi-year liabilities, the municipality specifies in the contract that the lease will be renewed year by year. This places a higher risk on the lessor, who must be prepared for the possibility that funding for the lease may not be appropriated. The lessor may therefore charge an interest rate that is as much as 2 percent above the tax-exempt bond rate, but still lower than rates for regular financing leases. Municipal leases nonetheless are generally faster and more flexible financing tools than tax-exempt bonds.

Guaranteed Savings Leases are the same as financing or operating leases but with the addition of a guaranteed savings clause. Under this type of lease, the lessee is guaranteed that the annual payments for leasing the energy-efficiency improvements will not exceed the energy savings generated by them. The owner pays the contractor a fixed payment per month. If actual energy savings are less than the fixed payment, however, the owner pays only the small amount saved and receives a credit for the difference.

How to Finance Your Energy Program *continued*

Bulk Purchasing. Large organizations generally have purchasing or materials procurement departments that often buy standard materials in bulk or receive purchasing discounts because of the volume of their purchases. Such organizations can help reduce the costs of energy-efficiency renovations if their bulk purchasing capabilities can be used to obtain discounts on the price of materials (e.g., lamps and ballasts). While some locales may have restrictions that limit the use of this option, some type of bulk purchasing can usually be negotiated to satisfy all parties involved.

Project Transaction Costs. Certain fixed costs are associated with analyzing and installing energy measures in each building included in a retrofit program. Each additional building, for example, could represent additional negotiations and transactions with building owners, building analysts, energy auditors, equipment installers, commissioning agents, and other contractors. Similarly, each additional building will add to the effort involved in initial data analysis as well as in tracking energy performance after the retrofit. For these reasons, it is often possible to achieve target energy savings at lower cost by focusing only on those buildings that are the largest energy users. One disadvantage with larger buildings is that the energy systems in the building can be more difficult to understand, but overall, focusing on the largest energy users is often the most efficient use of your financial resources.

Direct Value-Added Benefits. The primary value of retrofits to buildings and facilities lies in the reduction of operating costs through improved energy-efficiency and maintenance savings. Nevertheless, the retrofit may also directly help address a variety of related concerns, and these benefits (and avoided costs) should be considered in assessing the true value of an investment. A few examples of these benefits include the improvement of indoor air quality in office buildings and schools; easier disposal of toxic or hazardous materials found in energy-using equipment; and assistance in meeting increasingly stringent state or Federal mandates for water conservation. Effective energy management controls for buildings can also provide a strong electronic infrastructure for improving security systems and telecommunications.

Economic Development Benefits. In addition to direct savings on operating costs and the added-value benefits mentioned above, investments in energy-efficiency can also support a community's economic development and employment opportunities. Labor will typically constitute about 60 percent of a total energy investment, and about 50 percent of equipment can be expected to be purchased from local equipment suppliers; as a result, about 85 percent of the investment is retained within the local economy. Additionally, funds retained in urban areas will generally be re-spent in the local economy. The Department of Commerce estimates that each dollar retained in an urban area will be re-spent three times. This multiplier effect results in a three-fold increase in the economic benefits of funds invested in energy-efficiency, without even considering the savings from lower overall fuel costs.

For more information contact the Rebuild America Clearinghouse at 252-459-4664 or visit www.rebuild.gov

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

6.1.1.1.3 Secondary Service Greater Than 10 kW

AVAILABILITY

This schedule is applicable to Delivery Service at secondary voltage with demand greater than 10 kW when such Delivery Service is to one Point of Delivery and measured through one Meter.

TYPE OF SERVICE

Delivery Service will be single or three-phase, 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard meter provided for this type of Delivery Service, unless Retail Customer is eligible for and chooses a competitive meter provider. Any meter other than the standard meter provided by Company will be provided at an additional charge. Where Delivery Service of the type desired is not available at the Point of Delivery, additional charges and special contract arrangements may be required prior to Delivery Service being furnished, pursuant to Section 6.1.2.2 of this Tariff.

MONTHLY RATE

I.	**Transmission and Distribution Charges:**		
	Customer Charge	$3.50	per Retail Customer
	Metering Charge	$18.41	per Retail Customer
	Transmission System Charge		
	Non-IDR Metered	$1.48	per NCP kW
	IDR Metered	$1.99	per 4CP kW
	Distribution System Charge	$3.97	per Distribution System billing kW
II.	**System Benefit Fund:**	$0.000655	per kWh, See Rider SBF
III.	**Transition Charge:**	See Riders TC1 and TC2	per Distribution System billing kW
IV.	**Nuclear Decommissioning Charge:**	$0.044	per Distribution System billing kW, See Rider NDC
V.	**Transmission Cost Recovery Factor:**	See Rider TCRF	
VI.	**Energy Efficiency Cost Recovery Factor:**	See Rider EECRF	
VII.	**Competitive Meter Credit:**	See Rider CMC	
VIII.	**Advanced Metering Cost Recovery Factor:**	See Rider AMCRF	
	Other Charges or Credits		
IX.	**Rate Case Expense Surcharge:**	See Rider RCE	per Distribution System billing kW

COMPANY SPECIFIC APPLICATIONS

At Company's option, locations where the electrical installation has multiple connections to Company's conductors, due to Company facilities limitations or design criteria, may be considered one Point of Delivery for billing purposes.

DETERMINATION OF BILLING DEMAND FOR TRANSMISSION SYSTEM CHARGES

DETERMINATION OF NCP kW

The NCP kW applicable under the Monthly Rate section shall be the kW supplied during the 15 minute period of maximum use during the billing month.

DETERMINATION OF 4 CP kW

The 4 CP kW applicable under the Monthly Rate section shall be the average of the Retail Customer's integrated 15 minute demands at the time of the monthly ERCOT system 15 minute peak demand for the months of June, July, August and September of the previous calendar year. The Retail Customer's average 4CP demand will be updated effective on January 1 of each calendar year and remain fixed throughout the calendar year. Retail Customers without previous history on which to determine their 4 CP kW will be billed at the applicable NCP rate under the "Transmission System Charge" using the Retail Customer's NCP kW.

DETERMINATION OF BILLING DEMAND FOR DISTRIBUTION SYSTEM CHARGES

DETERMINATION OF BILLING kW

For loads whose maximum NCP kW established in the 11 months preceding the current billing month is less than or equal to 20 kW, the Billing kW applicable to the Distribution System Charge shall be the NCP kW for the current billing month.

For all other loads, the Billing kW applicable to the Distribution System Charge shall be the higher of the NCP kW for the current billing month or 80% of the highest monthly NCP kW established in the 11 months preceding the current billing month (80% ratchet).

The 80% ratchet shall not apply to Retail Seasonal Agricultural Customers.

NOTICE

This rate schedule is subject to the Company's Tariff and Applicable Legal Authorities.

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

SECO
State Energy Conservation Office

Local Governments and Municipalities

Preliminary Energy Assessment Service Agreement

Investing in our communities through improved energy efficiency in public buildings is a win-win opportunity for our communities and the state. Energy-efficient buildings reduce energy costs, increase available capital, spur economic growth, and improve working and living environments. The Preliminary Energy Assessment Service provides a viable strategy to achieve these goals.

Description of the Service

The State Energy Conservation Office (SECO) will analyze electric, gas and other utility data and work with the City of Temple, hereinafter referred to as Partner, to identify energy cost-savings potential. To achieve this potential, SECO and Partner have agreed to work together to complete an energy assessment of mutually selected facilities.

SECO agrees to provide this service at no cost to the Partner with the understanding that the Partner is ready and willing to consider implementing the energy savings recommendations.

Principles of the Agreement

Specific responsibilities of the Partner and SECO in this agreement are listed below.

- ✓ Partner will select a contact person to work with SECO and its designated contractor to establish an Energy Policy and set realistic energy efficiency goals.
- ✓ SECO's contractor will go on site to provide walk through assessments of selected facilities. SECO will provide a report which identifies no cost/low cost recommendations, Capital Retrofit Projects, and potential sources of funding. Portions of this report may be posted on the SECO website.
- ✓ Partner will schedule a time for SECO's contractor to make a presentation of the assessment findings key decision makers.

Acceptance of Agreement

This agreement should be signed by your organization's chief executive officer or other upper management staff.

Signature: K. Foutz — Date: 03/24/11

Name (Mr./Ms./Dr.) Kim Foutz — Title: Acting City Mgr

Organization: City of Temple — Phone: 254·298·5600

Street Address: 2 N Main St. — Fax: 254·298·5459

Mailing Address: 2 N Main St., Temple, TX 76501 — E-Mail: kfoutz@ci.temple.tx.us

County: Bell

Contact Information:

Name (Mr./Ms./Dr.): Ashley Williams — Title: Sustainability & Grant Mngr.

Phone: 254·298·5607 — Fax: 254·298·5459

E-Mail: awilliams@ci.temple.tx.us — County: Bell

Please sign and mail or fax to: Stephen Ross, **Local Governments and Municipalities** Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1770. **Fax 512-475-2569.**

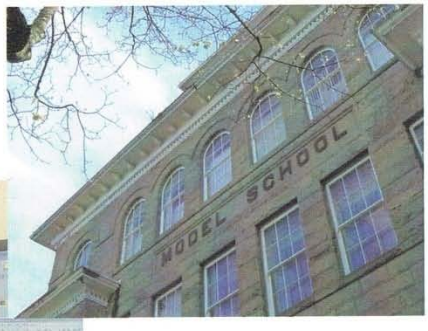
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

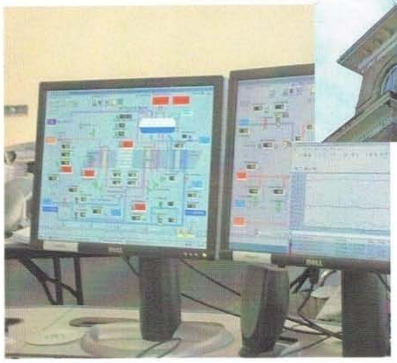
ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

A PROFESSIONAL ASSOCIATION FOR THOSE RESPONSIBLE FOR ENERGY MANAGEMENT IN TEXAS PUBLIC FACILITIES





- Networking
- Sharing Knowledge and Resources
- Training Workshops
- Regional Meetings
- Annual Conference
- Certification
- Legislative Updates
- Money-Saving Opportunities

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD