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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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Mesquite Independent School District

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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**.

State Energy Conservation Office

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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 February 2010, **SECO** received a request for technical assistance from Chuck Maxwell, Director of Energy Management for **Mesquite I.S.D.** **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 **Mesquite ISD,** (hereafter known as MISD) 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 *Chuck Maxwell and Timothy Kinsworthy*, 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 **$116,615** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$1,008,045**, yielding an average simple payback of **8-2/3** years.

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

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$ 308,525	$ 38,565	8 Years
HVAC ECRM #2	$ 310,000	$ 24,700	12-/2 Years
HVAC ECRM #3	$ 287,000	$ 20,000	14-1/2 Years
HVAC ECRM #4	$ 25,000	$ 5,000	5 Years
HVAC ECRM #5	$ 60,000	$ 15,000	4 Years
HVAC ECRM #6	$ 4,000	$ 9,600	1/2 Year
HVAC ECRM #7	$ 10,000	$ 1,250	8 Years
LIGHTING ECRM #1	$ 1,000	$ 750	1-1/4 Years
Controls ECRM-1	$ 2,520	$ 1,750	1-1/2 Years
TOTAL PROJECTS	**$ 1,008,045**	**$ 116,615**	**8-2/3 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 MISD. 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.

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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 MISD, 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 MISD ENERGY PERFORMANCE INDICATORS:

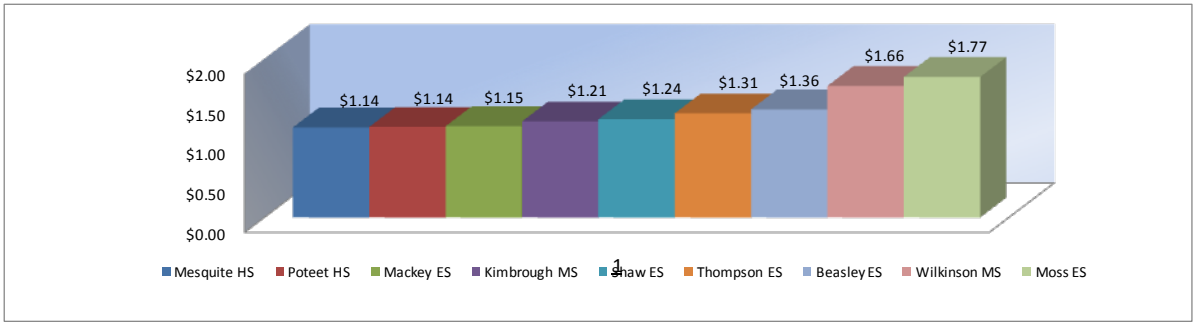
CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	COMPARISON TO DISTRICT AVERAGE	ENERGY COST INDEX (ECI) $/sf-year	COMPARISON TO DISTRICT AVERAGE
Mesquite HS	68,051	-6%	$1.14	-14%
RH Poteet HS	64,469	-11%	$1.14	-14%
Sue Anne Mackey ES	59,844	-17%	$1.15	-14%
RS Kimbrough MS	61,279	-15%	$1.21	-9%
Ruby Shaw ES	59,926	-17%	$1.24	-7%
Jay Thompson ES	72,703	0%	$1.31	-2%
CW Beasley ES	69,896	-3%	$1.36	2%
Walter Wilkinson MS	109,143	51%	$1.66	25%
Mary Moss ES	86,347	19%	$1.77	33%
Average Value:	72,406		$1.33	

Mesquite ISD purchases electricity for all schools from TXU Energy. The Transmission and Distribution Utility in the Mesquite area 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.

Chart Summarizing ECIs for Analyzed Facilities



OWNER: Mesquite ISD **BUILDING:** Mesquite HS

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	320,961		954	5,857	25,440	1,611	10,969
FEBRUARY	2010	301,028		1,138	6,720	25,087	1,929	11,945
MARCH	2010	308,511		1,121	6,648	25,470	1,004	6,362
APRIL	2010	329,515		1,140	6,749	26,854	584	3,477
MAY	2010	374,275		1,128	6,567	29,402	82	536
JUNE	2010	246,001		945	5,897	20,607	47	415
JULY	2010	305,420		945	5,656	24,290	34	326
AUGUST	2010	445,085		1,174	6,893	34,050	61	534
SEPTEMBER	2009	343,680		1,166	6,642	27,611	82	666
OCTOBER	2009	324,347		1,054	6,129	25,918	503	4,748
NOVEMBER	2009	323,605		1,089	6,291	26,035	1,014	7,763
DECEMBER	2009	290,359		1,149	6,751	24,467	2,126	16,082
TOTAL		**3,912,787**	**0**	**13,003**	**76,800**	**$315,231**	**9,077**	**$63,823**

Annual Total Energy Cost = $379,054 Per Year

Total KWH x 0.003413 = 13,354.34 x 106
Total MCF x 1.03 = 9,349.31 x 106
Total Other x ____ x 106
Total Site BTU's/yr 22,703.65 x 106

Floor area: 333,628 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 68,051 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.14 $/s.f. yr

OWNER: Mesquite ISD **BUILDING:** Poteet HS

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	298,028		925	6,097	24,281	1,010	7,483
FEBRUARY	2010	296,679		899	6,012	24,113	1,291	8,558
MARCH	2010	328,945		890	5,991	26,061	1,077	6,891
APRIL	2010	366,271		1,019	6,618	28,965	500	3,242
MAY	2010	336,670		978	6,261	26,803	184	1,131
JUNE	2010	324,078		850	5,674	25,448	47	292
JULY	2010	329,596		855	5,701	25,811	68	548
AUGUST	2010	404,305		995	6,451	31,120	75	626
SEPTEMBER	2009	348,942		966	6,045	27,335	102	771
OCTOBER	2009	351,615		1,063	6,495	27,948	419	3,058
NOVEMBER	2009	345,718		959	6,019	27,112	568	4,925
DECEMBER	2009	299,156		890	5,935	24,187	1,443	10,739
TOTAL		**4,030,003**	**0**	**11,289**	**73,299**	**$319,184**	**6,784**	**$48,264**

Annual Total Energy Cost = $367,448 Per Year

Total KWH x 0.003413 = 13,754.40 x 106
Total MCF x 1.03 = 6,987.52 x 106
Total Other x ____ x 106
Total Site BTU's/yr 20,741.92 x 106

Floor area: 321,734 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 64,469 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.14 $/s.f. yr

OWNER: Mesquite ISD **BUILDING:** Mackey ES

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	74,712		317	2,074	6,632	337	2,318
FEBRUARY	2010	80,424		323	2,127	7,034	322	2,011
MARCH	2010	75,528		321	2,112	6,720	197	1,249
APRIL	2010	88,584		331	2,183	7,588	151	931
MAY	2010	93,672		329	2,125	7,840	95	582
JUNE	2010	58,752		299	1,847	5,431	15	132
JULY	2010	65,736		343	2,193	6,204	4	50
AUGUST	2010	107,064		433	2,805	9,337	9	84
SEPTEMBER	2009	84,936		365	2,331	7,513	23	186
OCTOBER	2009	79,800		343	2,196	7,064	85	727
NOVEMBER	2009	82,104		343	2,197	7,207	160	1,250
DECEMBER	2009	71,688		336	2,192	6,565	287	2,093
TOTAL		**963,000**	**0**	**4,083**	**26,382**	**$85,135**	**1,685**	**$11,613**

Annual Total Energy Cost = $96,748 Per Year

Total KWH x 0.003413 = 3,286.72 x 106
Total MCF x 1.03 = 1,735.55 x 106
Total Other x ____ x 106
Total Site BTU's/yr 5,022.27 x 106

Floor area: 83,922 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 59,844 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.15 $/s.f. yr

OWNER: Mesquite ISD **BUILDING:** Kimbrough MS

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	129,798		479	3,198	11,118	392	2,913
FEBRUARY	2010	136,610		479	3,223	11,558	539	3,580
MARCH	2010	155,150		536	3,499	12,967	305	1,959
APRIL	2010	162,736		551	3,576	13,505	100	665
MAY	2010	173,335		580	4,264	14,840	50	317
JUNE	2010	74,641		474	3,088	7,642	19	128
JULY	2010	144,229		485	3,184	11,984	23	199
AUGUST	2010	231,988		586	3,736	17,891	33	281
SEPTEMBER	2009	165,751		593	3,487	13,601	37	289
OCTOBER	2009	150,736		547	3,274	12,471	74	555
NOVEMBER	2009	151,815		501	3,066	12,328	180	1,571
DECEMBER	2009	132,299		479	3,200	11,272	459	3,426
TOTAL		**1,809,088**	**0**	**6,290**	**40,795**	**$151,177**	**2,211**	**$15,883**

Annual Total Energy Cost = $167,060 Per Year

Total KWH x 0.003413 = 6,174.42 x 106
Total MCF x 1.03 = 2,277.33 x 106
Total Other x ____ x 106
Total Site BTU's/yr 8,451.75 x 106

Floor area: 137,922 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 61,279 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.21 $/s.f. yr

OWNER: Mesquite ISD **BUILDING:** Shaw ES

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	53,208		262	1,613	4,860	273	1,311
FEBRUARY	2010	54,432		262	1,571	4,892	196	1,234
MARCH	2010	59,112		262	1,630	5,237	37	247
APRIL	2010	62,982		271	1,788	5,631	19	128
MAY	2010	90,882		289	1,877	7,422	14	99
JUNE	2010	94,374		293	1,904	7,662	9	81
JULY	2010	85,248		283	1,836	7,037	7	75
AUGUST	2010	97,668		341	2,225	8,185	8	81
SEPTEMBER	2009	94,536		283	1,834	7,602	16	133
OCTOBER	2009	69,138		262	1,684	5,903	16	147
NOVEMBER	2009	61,056		262	1,610	5,335	75	582
DECEMBER	2009	56,970		262	1,573	5,049	226	2,234
TOTAL		**879,606**	**0**	**3,332**	**21,145**	**$74,815**	**896**	**$6,352**

Annual Total Energy Cost =	$81,167	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	59,926 BTU/s.f.yr
Total KWH x 0.003413 =	3,002.10	x 106		
Total MCF x 1.03 =	922.88	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.24 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	3,924.98	x 106		
Floor area:	65,497	s.f.		

OWNER: Mesquite ISD **BUILDING:** Thompson ES

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	80,010		319	2,056	6,938	414	2,858
FEBRUARY	2010	85,320		319	2,076	7,282	437	2,727
MARCH	2010	70,380		319	2,050	6,344	230	1,461
APRIL	2010	81,270		319	2,088	7,047	78	490
MAY	2010	93,690		354	2,279	7,995	30	190
JUNE	2010	62,460		319	1,976	5,786	8	75
JULY	2010	75,780		319	2,007	6,631	12	115
AUGUST	2010	100,890		370	2,408	8,564	12	109
SEPTEMBER	2009	88,560		399	2,542	7,946	18	149
OCTOBER	2009	79,650		319	2,027	6,887	141	1,197
NOVEMBER	2009	83,340		319	2,009	7,094	239	1,848
DECEMBER	2009	82,980		321	2,104	7,167	538	3,909
TOTAL		**984,330**	**0**	**3,996**	**25,622**	**$85,681**	**2,157**	**$15,128**

Annual Total Energy Cost =	$100,809	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	72,703 BTU/s.f.yr
Total KWH x 0.003413 =	3,359.52	x 106		
Total MCF x 1.03 =	2,221.71	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.31 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	5,581.23	x 106		
Floor area:	76,768	s.f.		

OWNER: **Mesquite ISD** **BUILDING:** **Beasley ES**

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	40,776		234	1,402	3,890	254	1,890
FEBRUARY	2010	40,560		234	1,400	3,875	284	1,892
MARCH	2010	42,240		234	1,468	4,046	149	969
APRIL	2010	52,080		251	1,654	4,832	45	304
MAY	2010	70,800		311	1,999	6,319	23	154
JUNE	2010	61,200		249	1,606	5,340	4	40
JULY	2010	73,440		277	1,791	6,272	5	52
AUGUST	2010	87,360		338	2,200	7,530	5	51
SEPTEMBER	2009	48,060		261	1,669	4,601	23	182
OCTOBER	2009	40,068		234	1,434	3,879	45	340
NOVEMBER	2009	38,700		234	1,385	3,746	90	791
DECEMBER	2009	36,828		234	1,405	3,652	311	2,328
TOTAL		**632,112**	**3,091**	**3,091**	**19,413**	**$57,982**	**1,238**	**$8,993**

Annual Total Energy Cost = $66,975 Per Year

Total KWH x 0.003413 = 2,157.40 x 106
Total MCF x 1.03 = 1,275.14 x 106
Total Other x ____ x 106
Total Site BTU's/yr 3,432.54 x 106

Floor area: 49,109 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 69,896 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $1.36 $/s.f. yr

OWNER: **Mesquite ISD** **BUILDING:** **Wilkinson MS**

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	190,960		691	3,956	15,607	2,994	19,041
FEBRUARY	2010	167,560		622	3,632	13,855	1,399	8,580
MARCH	2010	151,339		622	3,621	12,855	513	3,255
APRIL	2010	164,968		648	3,751	13,817	181	1,112
MAY	2010	206,146		726	4,034	16,612	61	376
JUNE	2010	138,258		685	3,804	12,240	10	95
JULY	2010	158,803		692	3,850	13,539	15	138
AUGUST	2010	228,140		745	4,170	18,090	23	200
SEPTEMBER	2009	188,260		777	4,538	16,024	71	563
OCTOBER	2009	186,792		683	4,117	15,514	256	2,162
NOVEMBER	2009	207,783		622	3,853	16,531	903	6,849
DECEMBER	2009	214,918		622	3,649	16,762	1,034	7,447
TOTAL		**2,203,927**	**8,135**	**8,135**	**46,975**	**$181,446**	**7,460**	**$49,818**

Annual Total Energy Cost = $231,264 Per Year

Total KWH x 0.003413 = 7,522.00 x 106
Total MCF x 1.03 = 7,683.80 x 106
Total Other x ____ x 106
Total Site BTU's/yr 15,205.80 x 106

Floor area: 139,320 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 109,143 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $1.66 $/s.f. yr

OWNER: **Mesquite ISD** **BUILDING:** **Moss ES**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	87,842		363	2,223	7,583	168	1,182
FEBRUARY	2010	83,885		335	2,100	7,218	152	962
MARCH	2010	93,914		398	2,401	8,131	187	1,193
APRIL	2010	105,504		376	2,306	8,743	117	725
MAY	2010	125,973		394	2,344	10,030	87	529
JUNE	2010	92,576		318	1,979	7,627	27	228
JULY	2010	92,841		332	2,042	7,707	27	238
AUGUST	2010	137,495		417	2,479	10,868	19	171
SEPTEMBER	2009	70,378		127	2,094	8,651	61	456
OCTOBER	2009	101,847		137	2,143	8,357	94	809
NOVEMBER	2009	95,280		326	1,871	7,685	134	1,034
DECEMBER	2009	78,098		308	1,960	6,725	179	1,303
TOTAL		**1,165,633**	**0**	**3,831**	**25,942**	**$99,325**	**1,252**	**$8,830**

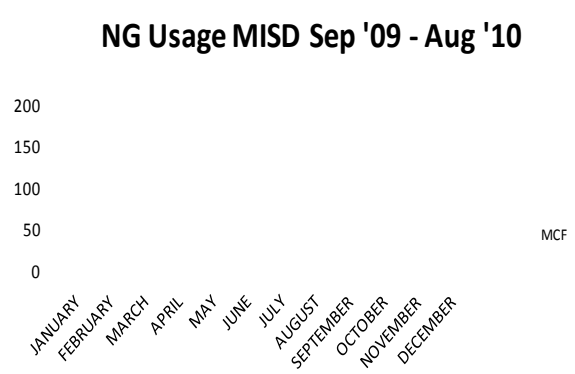
Annual Total Energy Cost =	$108,155	Per Year
Total KWH x 0.003413 =	3,978.31	x 106
Total MCF x 1.03 =	1,289.56	x 106
Total Other x ____		x 106
Total Site BTU's/yr	5,267.87	x 106
Floor area:	61,008	s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) — 86,347 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) — $1.77 $/s.f. yr

Examining the utility data, there are some general conclusions that can be made:

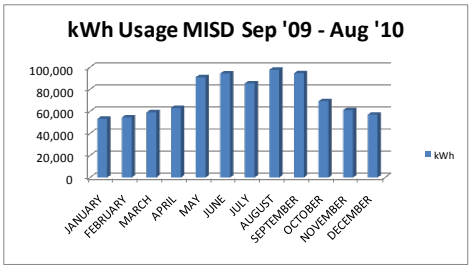
1. Gas usage at Moss ES is higher than other facilities at MISD. The minimum monthly consumption for natural gas at Moss is 19 MCF in August. All other Elementary facilities experience a minimum monthly consumption during the summer of 8 MCF or less. While overall usage is high for an Elementary School, a chart of the consumption (see right) does follow the typical pattern for natural gas usage in Texas schools.



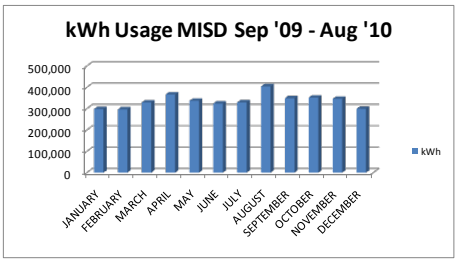
2. Wilkinson Middle School consumes a large amount of energy. At over 2.2 million kWh and 7,460 MCF of gas consumed per year, one would expect the facility to be much larger than 132,456 square feet. It is extremely unusual to have a Texas school facility demonstrate an EUI that exceeds 100,000 BTUs/sf-yr.

3. The other facilities analyzed for this report are performing well as compared to the State average ECI of $1.51 and EUI of 52,800 BTUs/sf-yr.

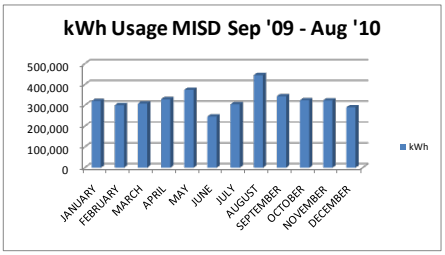
4. Shaw Elementary and Poteet HS do not demonstrate a typical consumption pattern when electricity usage is charted over a year's period. As can be seen in the charts to the right, Shaw's and Poteet's consumption does not follow the more typical pattern demonstrated by Kimbrough MS; the difference lies in the significant decrease in consumption during the summer that occurs at Kimbrough, but not at Shaw or Poteet. This condition suggests that the control system is not being adjusted for decreased occupancy in the summer months at Shaw or Poteet. An argument for Poteet could be made that as a High School, it has activities occurring at the facility throughout the summer and therefore it may not show the predicted drop in consumption like a Middle or Elementary School. However, the chart for Mesquite HS does show the predicted drop. This chart might serve as evidence that redundant DX service for areas in which the Poteet summer activities occur would allow the central system to be turned off as expected in the summer and the predicted drop could be realized.



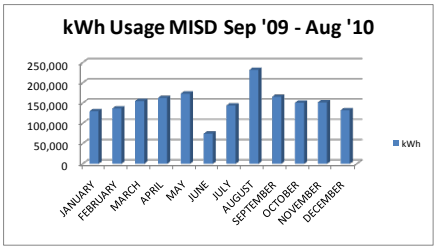
Shaw ES Electricity Consumption



Poteet HS Electricity Consumption



Mesquite HS Electricity Consumption



Kimbrough MS Electricity Consumption

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRICITY PROVIDER: **TXU Energy,** Contract price: $0.057 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 = $0.057/kWh + $0.000655/kWh = $0.057655/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
3. Billing kVA: Ratchet demand representing higher of two calculations: 80% of peak demand in last 11 months or current NCP kVA

NATURAL GAS PROVIDER:

NATURAL GAS PROVIDER: Atmos Energy Corporation

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 nine facilities in the analyzed billing cycle: $228,704

Total quantity purchased during the analyzed billing cycle: 32,760 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $228,704 / 32,760 MCF

Average cost per MCF = $6.98

5.0 CAMPUS DESCRIPTIONS:

Mesquite ISD consists of 46 educational campuses and 12 support service facilities which are all located in Dallas County; in and throughout the cities of Mesquite, Garland, and Balch Springs. The energy survey focused on nine of the educational campuses:

Table 2: School Facilities Analyzed For This Report

Facility	Year originally Constructed/ Significant Renovations	Approximate Square Footage (Including SCUs)	Basic HVAC Cool/Heat	Basic Lighting System Description	Basic Control System Description
CW Beasley ES	1980 1986	49,109	RTUs NG Heat	T8 General T5 Gyms	Enviromatic Systems
Sue Anne Mackey ES	2003	83,992	Central System Chillers/NG Boilers	T8 General T5 Gyms	Enviromatic Systems DDC/Pneumatic
Mary Moss ES	1990 1997	61,008	Ice and Air Cooled Chillers/NG Boilers	T8 General T5 Gyms	Johnson Metasys Controls DDC/Pneumatic
Ruby Shaw ES	1982 1997	65,497	Central System Chillers/NG Boilers	T8 General T5 Gyms	Enviromatic Systems DDC/Pneumatic
Jay Thompson ES	1993	76,768	Central System Chillers/NG Boilers	T8 General T5 Gyms	Schneider (Invensys) <Barber Colman> DDC/Pneumatic
RS Kimbrough MS	1993	137,922	Central System Chillers/NG Boilers Calmac TS 4-pipe FCUs	T8 General T5 Gyms	Schneider (Invensys) <Barber Colman> DDC/Pneumatic
Walter Wilkinson MS	-	139,320	Hydronic Heat Pumps	T8 General T5 Gyms	Schneider (Invensys) <Barber Colman> DDC/Pneumatic
Mesquite HS	1965 1995 1998	333,628	Central System Chillers/NG Boilers	T8 General T5 Gyms	Johnson Metasys Controls DDC/Pneumatic
RH Poteet HS	1986	321,734	Central System Chillers/NG Boilers	T8 General T5 Gyms	Johnson Metasys Controls DDC/Pneumatic

Mesquite ISD has been actively involved in improving the energy efficiency of their district for the last several years after participating in the SECO Energy Partnership Program with Estes-McClure Associates (EMA). The district utilized the SCORE program to implement the district-wide lighting recommendations originally delineated in the SECO Preliminary Energy Assessment report prepared by EMA. The focus of the program was to retrofit the T12 fixtures with T8 lamps and electronic ballasts. Additionally, they replaced all Gymnasium metal halide fixtures with T5 or T8 high-bay linear fluorescent fixtures. The estimated demand savings for the project was 2.5 mega-watts and the estimated district energy cost savings was $618,000.

In addition to the lighting renovation project, Mesquite ISD has installed or implemented the following:

- Occupancy sensors for significant renovations or newly constructed buildings to control lighting and Fan Coil Units (FCUs) or Variable Air Volume (VAV) terminal units in the spaces.
- Variable Frequency Drives (VFDs) on most of the central system secondary distribution pumps and air handlers.
- Ceiling fans in offices and classrooms to improve the perceived comfort level for students and staff.
- Monitoring and evaluation of the Energy Management Program with School Dude energy software.
- Re-programmed some of the existing thermal storage systems to function as demand shifting equipment instead of demand eliminating equipment after Time-Of-Use (TOU) rate schedules were eliminated by deregulation.
- Streamlined some central plant schedules to more closely match student occupancy schedules for the buildings.

Note regarding the Maintenance Resources available to the district. Many of the district's campuses have a hybrid Direct Digital Control (DDC) and pneumatic system to control the energy consuming equipment. For most districts the expense required to maintain the hybrid system is prohibitive and we typically recommend for districts to replace the system with a 100% DDC control system. At Mesquite, however, the district has an employee with extensive experience maintaining industrial pneumatic systems and the condition of their systems is excellent, therefore the quality and degree of control they have with their pneumatic system is sufficient and does not warrant replacement at the current time.

6.0 ENERGY RECOMMENDATIONS:

HVAC ECRM 1: RENOVATION OF AGED HVAC EQUIPMENT – Beasley Elementary

Beasley Elementary School is conditioned with packaged rooftop units. Many of these units have reached or surpassed their useful life expectancy of 15-20 years. The inventory of RTUs at Beasley is:

Manufacturer	Quantity	Nominal Tonnage	Estmated Date of Manufacture	Comments
Carrier	2	5 tons	2004	Coil fins need combed; need coil guard
Lennox	2	Estimate 10 ton	Estimate 1990	Nameplate illegible; poor condition
Lennox GCS9-513-150	5	4 tons	Estimate 1988	poor condition
Lennox GCS-953	2	7-1/2 tons	Estimate 1988	poor condition
Lennox GCS-261	1	2 tons	Estimate 1988	poor condition
Lennox CB C153	1	1-1/2 ton	Estimate 1988	poor condition
Trane SFHC-B406	23	4 ton	1983	Have box economizers; poor condition
TOTAL		160-1/2 tons		150-1/2 tons of RTUs need to be replaced

The 2004 5-ton Carrier units are the only units which do not require replacement at the current time. These units were installed without coil guards, however, and the coil fins have sustained some damage. Having just 10% of the coil fins folded against the coil tubes can result in as much as a 30% loss of energy efficiency. We recommend the district comb the coil fins straight (fin combs are available for about $10) and install coil guards on the 2004 units.

The older units (pictured to the right) have sustained significant coil fin damage and some of these units are currently 28 years old. The anticipated useful lifespan of a rooftop unit is 15-20 years; there are currently 34 RTUs at Beasley which have surpassed that life expectancy. It is estimated that these units are operating with an Energy Efficiency Rating (EER) of about 6. New units will operate with an EER of about 12, and will provide significant efficiency improvements over the existing system. *We recommend the district replace these units at its earliest convenience and ensure coil guards are included with the installation of all compressor-based equipment within the district.*

Estimated Cost: $308,525 Estimated Savings: $38,565 Estimated Payback: 8 Years

HVAC ECRM 2: RENOVATION OF AGED HVAC EQUIPMENT – Moss Elementary

Moss Elementary utilizes a Vogt Turbo ice harvester/thermal storage system (Model HP400CSC) to produce chilled water for the facility. This system is a two-story chiller unit with storage tanks located at the first level (with four each 5 hp circulation pumps) and an upper level ice generator that contains two Carrier compressor motor sets of 75hp and 7.5 hp each. The system was installed during a period when time-of-use rate schedules were available and the ice was generated at night during low-cost demand cycles in order to conserve energy during high-cost demand cycles during the day. As deregulation has eliminated the time-of-use rate schedules in this area, the opportunities for this type of thermal storage system have been diminished. This system does not have the ability to generate ice and simultaneously bleed chilled water from the tanks, one of the few ways thermal storage systems can save money in the deregulated energy market. More traditional thermal storage systems, chilled water storage tanks that can supply chilled water to the building loop at the same time that the central plant chillers are operating at a reduced load, save money by allowing the traditional chiller plant to operate with fewer chillers than the cooling load would normally require. The district has some of these systems in operation at other campuses.

As for Moss Elementary, the system only allows for a percentage of the demand to be shifted out of peak periods. Given the age of the equipment, 1990, it is nearing the end of its useful life expectancy. The district has a similar system at Austin, Kimball and Pirrung Elementaries. All were about the same age and the district has begun to analyze what maintenance work the systems require. The district concluded that replacing the ice harvesters with two 100-ton air-cooled rotary chillers at Austin would be the most economical long-term renovation project. Given the fact that the time-of-use rate schedules are no longer available, *we recommend the district proceed with a similar project at Moss as is currently underway at Austin, however, given the energy saving opportunities water cooled systems have over air cooled systems, we recommend the district consider water cooled reciprocating chillers and a cooling tower at Moss.* Air cooled systems operate at about 1.3 kW per ton while water cooled systems operate at less than 1 kW/ton including the additional condenser water pumps and cooling tower. *We also recommend installing a redundant DX cooling coil in the Administration and Gymnasium air handlers so that these areas can be operated after the scheduled student occupancy hours without the need for the central system equipment.*

Estimated Cost: $310,000 Estimated Savings: $24,700 Estimated Payback: 12-1/2 Years

HVAC ECRM 3: RENOVATION OF AGED HVAC EQUIPMENT – Shaw Elementary

The older section of Shaw Elementary utilizes a two-pipe central system in which most of the equipment utilized is original to the 1982 construction of the building. The newer section has a separate central plant constructed in 1997. At approximately 30 years old, the older system does not provide consistent comfort for the occupants and does not operate efficiently. Two-pipe systems operate well as seasonal temperatures allow for cooling- or heating-only operation. Issues arise as spring and autumn temperatures require heating processes in the morning and cooling processes in the afternoon to provide comfort. The period of time necessary to switch between heating and cooling processes is called the changeover. It is not possible to immediately fill 130-140°F hot water supply and return piping with 42-46°F chilled water to switch to cooling processes. The cold shock would force a sudden contraction in the piping and the system will develop severe leaks. Similarly, flooding a cold pipe system with hot water causes a sudden expansion, resulting in the same leaking condition of the distribution system. Therefore, the changeover period is essentially the time required for the temperature of the water in the piping system to equilibrate to allow a change in the operational process equipment.

The first option available to the district is to renovate the existing equipment so that it operates efficiently and do nothing about eliminating the changeover issues involved with the 2-pipe system.

Renovation of existing 2-pipe central system 1988 equipment:

Retrofit 4 each 50-ton reciprocating chillers to 2 each 100-ton water-cooled reciprocating chillers

Replace cooling tower (200-ton)

Replace one 7-1/2hp chilled water, two 2hp condenser water, and one 10hp chilled water pumps

New VFD and differential pressure control point for the secondary chilled water pump

Estimated Cost: $287,000 Estimated Savings: $20,000 Estimated Payback: 14-1/2 Years

If the district wishes to eliminate the changeover discomfort issues, there are multiple solutions to this situation, depending on budget, accessibility, and the desires of the district:

- Replace the chiller plant with chillers and boilers, convert the existing 2-pipe distribution system to a 4-pipe system by dedicating the existing two-pipes for hot water supply and installing an additional set of supply and return pipes for the chilled water supply to new fan coil units in the spaces.

- Abandon the chilled water plant, install rooftop units above the spaces:
    - Extend the existing 2-pipe system as hot water distribution to the new rooftops (with hot water coils and electric DX compressors).
    - Run new gas piping on the roof to the new packaged rooftops (with gas heat coils).

- Abandon the chilled water plant. Replace the terminal units with fan coil units that utilize a hot water coil distributed from the existing 2-pipe boiler system and a DX cooling coil matched with a new condensing unit installed on the roof above each space.

The choice between the options involves balancing first costs for construction and the life-cycle costs for the system. The most advantageous choice for the overall lifetime efficiency of the system is to convert the system to a 4-pipe distribution system. This will improve comfort levels by eliminating the changeover period the system experiences for about 3 months of the year. Additionally, the system offers efficiency improvements over the DX systems described in the other options through the use of water-cooled chillers and natural gas fired boilers. The downside to this option is the first cost of construction. The installation of a parallel two pipe water distribution system in an existing 30 year old building is expensive. Other systems (controls, fire alarm, security, etc.) have already been installed in the spaces that the distribution piping has to be installed; some of which would have to be relocated because a water distribution system cannot be routed in and around obstacles in the plenum space. The corridor acoustical ceilings will need to be replaced.

Rooftop units with natural gas heating would prove to be the next most efficient option, but the first costs to install gas distribution piping on the roof is significant and does not in and of itself offer any energy savings. Additionally, rooftop units require penetrations through the roof and would likely require a detailed structural analysis to ensure the roof had the capacity to support the loading of the RTUs. While the overall electrical load of the RTUs would not significantly exceed the existing central plant electrical loads, it is possible that the electrical distribution system might require renovation as the loads are distributed throughout the campus instead of remaining centralized at the existing central plant.

The most optimum balance between first costs and system efficiency may be the installation of condensing units on the roof and replacement of the terminal units with fan coils utilizing DX cooling coils and the hot water heating from the existing 2-pipe system. This system does not require a structural analysis on the roof as does the RTU installation, and the roof penetration is limited to the refrigerant line sets instead of a large roof curb. There is no additional chilled water or gas piping required, but the electrical distribution system could require the same renovation that was described in the RTU option.

HVAC ECRM 4: INSTALL REDUNDANT DX SYSTEMS AT OFFICES AND/OR GYMS

Most campuses in MISD have central systems that provide efficient conditioning for the buildings when the facilities are fully occupied. These systems are less efficient after regular school hours and during summer schedule periods when just a few staff are present at the building. Having redundant DX systems at the office areas and gymnasiums (in schools with frequent after-school activities in the gyms) would allow the district to turn off the central system when the majority of the building does not require conditioning. Most office areas in the district can be satisfied with approximately 10-tons of DX cooling capacity. The condensing unit would need to be matched with new DX coil in the existing air handler for the area or the air handler may need to be retrofit to a new unit with a redundant DX coil for after-hour operation and the chilled water/hot water coils for regular occupancy hours. Project costs are estimated on a typical campus, office area only basis:

Estimated Cost: $25,000 *Estimated Savings: $5,000* *Estimated Payback: 5 Years*

HVAC ECRM 5: ELIMINATE STEAM HEAT AT MESQUITE HS

Steam is most effective as a transfer medium for heat energy over long distances. It is most commonly converted into hot water to be used for space heating facilities when the steam has reached the point where the energy is needed. This type of system is quite common for large multi-building complexes like hospitals and university campuses. At Mesquite HS, the space heating system consists of a low pressure (15 psi) steam system and hot water converters that are all located in the same mechanical room and the hot water is distributed around the building. By converting the steam to hot water in the same mechanical room in which the steam is produced, the efficiency advantages of a steam system are not being realized. The district is consuming considerably more energy to convert the water to steam and immediately back hot water than to produce hot water with a boiler and distribute it through the building. Typical low pressure steam systems that convert to hot water operate with an efficiency between 74 and 80%. New condensing hot water boilers are up to 98% efficient and would offer significant energy savings over the existing steam system.

Estimated Cost: $60,000 Estimated Savings: $15,000 Estimated Payback: 4 Years

HVAC ECRM 6: RE-VALVE THERMAL STORAGE TANKS AT MESQUITE AND POTEET HSs

During the survey, the staff noted that it was not possible to utilize the chilled water stored in the thermal storage tanks at Mesquite and Poteet High Schools while simultaneously operating the chilled water plant. In historical thermal storage operation, the tanks were charged at night when the demand rates were low as per the available Time of Use Rate Schedules and the chilled water extracted from the ice tanks was used during the peak demand periods of the day in order to avoid demand charges from the chiller plant. After electric deregulation began in 2002, the Time of Use rate schedules disappeared. It is now more advantageous to flatten demand load profiles than to shift demand to non-peak times. Districts that have the opportunity to bleed chilled water as a supplement from the tanks as the chiller plant operates so that the demand load will experience fewer chillers operating at the same time, will create a flatter load profile and minimize peak demand. Rate schedules currently charge demand in three or four different classifications. Two of these classifications are long term peak demand charges under which districts will be paying for high demand readings for up to 16 months after the peak demand was set. *We recommend the district re-valve the thermal storage tank piping to allow for simultaneous operation of the thermal energy storage (TES) and chiller plant.*

Estimated Cost: $4,000 Estimated Savings: $9,600 Estimated Payback: 5 Months

HVAC ECRM 7: INSTALL VFDs ON COOLING TOWER FANS AT MESQUITE HS

It was noted during the survey that the cooling tower fans are controlled with 2-speed motors and not VFDs. *We recommend the district replace the two-speed controllers with VFDs which will offer improved load matching opportunity for the fans and realize fan energy savings.*

Estimated Cost: $10,000 Estimated Savings: $1,250 Estimated Payback: 8 Years

LIGHTING ECRM 1: ADD MOTION CONTROL TO GYMNASIUMS

The district has just completed a project to replace all of the gymnasium metal halide fixtures with high-bay T5 fluorescent fixtures. There was no control equipment incorporated into the project and it is reported that despite the ability to turn off the gym fixtures without having to worry about the re-strike problems with the old metal halide fixtures, the hopes for behavioral change to turn off the fixtures when the gym is empty just has not materialized. Therefore, w*e recommend the district install two each long-range occupancy sensors in each gymnasium to turn off the new T5 gymnasium lighting when the space is unoccupied.*

Estimated Cost: $1,000 *Estimated Savings: $750* *Estimated Payback: 1-1/4 Years*

CONTROLS ECRM 1: VENDING MACHINE CONTROLS

At Poteet High School it was noted that there are at least nine vending machines that are operating all day. There were 14 additional machines notes at Mesquite High School. *We recommend the district install vending machine controls. These controls have an occupancy sensor that operates the advertising lighting and compressor while the space is occupied, but turns the lighting off and cycles the compressor when the space is unoccupied.* The compressor will operate and maintain a programmed maximum temperature for the vending product during the unoccupied periods in order to keep the product from getting too hot.

Estimated Cost: $2,520 *Estimated Savings: $1,750* *Estimated Payback: 1-1/2 Years*

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC

- Replace damaged or missing hot water insulation.
- Lower hot water loop temperatures.
- Recommission sequence of operations.
- Re-evaluate start-up times.
- Eliminate simultaneous heat and cool processes

Lighting

- Turn off all light fixtures not required during daytime
- Ensure photocells and timeclocks are functioning
- Remove unecessary light fixtures.
- Re-evaluate exterior lighting schedule.
- De-lamp over-lamped fixtures.
- Instigate "Turn Off Lights" Program

Envelope

- Replace damaged weatherstripping
- Ensure exterior doors close properly

Controls

- Raise cooling setpoints by 2 degrees
- Raise summer setback from 78 to 82 degrees

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

It was noted during the survey that the hot water piping insulation at several facilities was damaged or missing. The majority of heating losses in a hot water system occur through piping losses. The following buildings demonstrated this condition:

- Moss Elementary: approximately 50 feet of 3" uninsulated copper pipe.
- Kimbrough: estimated 25 feet of 2" pipe; 50 feet of 3" pipe.
- Shaw Elementary: about 14 feet of 1-1/2" pipe; 10 feet of ¾" pipe.

Insulating these specific sections of hot water piping can save the district 23 MCF and $160 annually, which grants a payback time less than three years. *We recommend the district insulate the hot water piping to minimize energy losses in the hot water system.*

HVAC M&O #2

It was noted that the hot water loop temperature at Moss ES was set at 155°F. After the uninsulated pipe is repaired, it may be possible to lower this temperature as the loop will not be losing energy through the piping. *We recommend lowering the loop temperature until the outlet temperature still satisfies minimum requirement.*

HVAC M&O #3

At Thompson, it was noted that both chillers were operating under part load conditions while either chiller could have handled the load on its own. Both VFDs on the chilled water pumps were operating at 20 Hz (full load would be 60 Hz). During these conditions, peak demand can be reduced if just one chiller is operating instead of two.

HVAC M&O #4

Currently the control system allows HVAC systems to start up at 5:00 am. Staff reports that this early start time is necessary for rooms to feel comfortable when students and teachers arrive on campus, especially on Monday mornings after the units have been off for most of the weekend. While the start time may be required during hotter and colder months to provide comfort on Mondays, if the outside air dampers are controlled to be shut during startup and exhaust fans are controlled to be off overnight, then the systems should be able to provide comfort to the classrooms when started at 6:30am or later for Tuesday through Friday mornings. Minimizing run times will offer consumption savings throughout the year.

HVAC M&O #5

It was noted during the survey that the hot water and chilled water valves on at least one air handler were open 100% at the same time. The boiler and chiller systems were both operational, indicating that the unit was in full heat and full cool mode at the same time. This unit should be re-commissioned (and the other units should be inspected for the same condition) to ensure that the units are not simultaneously and unnecessarily heating and cooling.

Lighting M&O #1

There were areas in the district where natural daylight was brought into the building with windows or light wells and the light fixtures were still operating during daytime hours. *We recommend turning off light fixtures close to the natural light source when sufficient natural light supplies the recommended light levels for the tasks to be performed in the space.* Appropriate light levels are described by the Illumination Engineering Society of North America (IESNA) for each type of space in a school facility. The least expensive means to turn these fixtures off is to train district staff to not turn them on during the daytime hours. If staff training is unsuccessful, then automatic means, for instance photocells and occupancy sensor controls, can be installed to control the light fixtures automatically.

Some areas where this condition was noted include:

- Thompson
- Beasley Cafeteria
- Mackey Corridor sconces
- Poteet HS metal halide fixtures

Lighting M&O #2

At Kimbrough, there is a photocell that is supposed to control 42 each 4-lamp T8 fixtures in the cafeteria that were operating outside of the anticipated parameters during the time of the survey. *We recommend checking the status of the photocell or timeclock for proper operation.*

Lighting M&O #3

At Kimbrough, there are old linear fluorescent fixtures left operating in the gym that were intended to be emergency light fixtures for the old metal halide fixtures that used to be at the gym. These emergency fixtures are no longer required with the new T5 gym fixtures and should be removed or locked out of operation.

Lighting M&O #4

The current exterior lighting program at Mesquite HS turns lights on at 7:40pm and off at 7:00am. This is appropriate for some times of the year, but allows exterior lights to be operating during daytime hours at other times of the year. *We recommend using photocells, in addition to the existing timeclocks, to prevent exterior lights from operating during daytime hours.*

Lighting M&O #5

There are 26 each 2-lamp light fixtures in a hallway at Mesquite HS producing 50-57 footcandles on the floor. The Illumination Engineering Society of North America (IESNA) recommends as little as 15fc in school corridors. These 2-lamp fixtures can be de-lamped to just one lamp and still produce 25fc in the space, while saving 29 watts per fixture.

Lighting M&O #6

There were several classroom, cafeteria or gym spaces throughout the district where light fixtures were left on in spaces not occupied by students. We recommend the district initiate a behavioral adjustment plan, such as Wattwatchers or POWER, to encourage building occupants to turn off lights. Linear fluorescent fixtures, the type most often found in schools, realize energy savings if turned off for more than 23 seconds when occupants have left the room. If behavioral techniques do not realize the desired results, then automatic mean of turning off the lights, such as occupancy sensors, can be used.

Envelope M&O #1

During the survey, it was discovered that the weatherstripping was in poor condition at some of the exterior doors. Poor weatherstripping allows conditioned air to escape and non-conditioned air to enter the building uncontrolled. Undesired moisture in the building can lead to mold growth, which decreases indoor air quality. When outside air is getting into the conditioned space it causes the HVAC system to work harder because it is trying to condition based on the outside conditions. *We recommend that the district implement a schedule to inspect and replace all weather-stripping and seals to ensure optimal energy efficiency and conditioning.*

Envelope M&O #2

During the survey, it was noted at Mesquite HS that some of the exterior doors did not shut completely. This problem allows outside air to enter the building causing the indoor air quality to decrease as well as the HVAC efficiency. *We recommend that the district staff makes ensures that all doors shut completely once they have been opened.*

Controls M&O #1

The staff reported during the survey that the district Energy policy limits cooling setpoints to remain between 72°and 76°F, however, when setpoints are programmed for the spaces, they are automatically setup for 72°F. We recommend the temperatures be adjusted to be programmed at 74°F as the baseline programming. Studies have indicated raising the setpoint of the system by one degree will save approximately 3% of the facility utility costs. Consequently, this two degree adjustment would suggest that up to a 6% decrease in utility costs could result. Caution is advised if implementing this recommendation in buildings with

reheat air distribution systems. If the room temperature control does nothing but increase or decrease the amount of "reheat", then increasing room setpoint temperatures will actually increase energy consumed by the reheat coil.

Controls M&O #2

The district has a summer setback temperature program to reduce consumption during lower occupied summer periods. The current program utilizes 78°F; *we recommend raising this setback to 82°F.* After all efforts to reduce night time infiltration are completed and latent loads are reduced, it is quite possible that setback temperatures as high as 88°F may be implemented.

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. $500 maintenance expense next 5 years				
4. $1000 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	($1,008,045)		0	($1,008,045)
Year 1		$ 116,615.00	0	$116,615
Year 2		$ 116,615.00	0	$116,615
Year 3		$ 116,615.00	0	$116,615
Year 4		$ 116,615.00	0	$116,615
Year 5		$ 116,615.00	0	$116,615
Year 6		$ 114,282.70	($500)	$113,783
Year 7		$ 111,950.40	($500)	$111,450
Year 8		$ 109,618.10	($500)	$109,118
Year 9		$ 107,285.80	($500)	$106,786
Year 10		$ 104,953.50	($500)	$104,454
Year 11		$ 102,621.20	($1,000)	$101,621
Year 12		$ 100,288.90	($1,000)	$99,289
Year 13		$ 97,956.60	($1,000)	$96,957
Year 14		$ 95,624.30	($1,000)	$94,624
Year 15		$ 93,292.00	($1,000)	$92,292
			Internal Rate of Return	**6.88%**

More information regarding financial programs available to MISD 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

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

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

Public Schools, Colleges and Non-Profit Hospitals

Preliminary Energy Assessment Service Agreement

Investing in our public schools, colleges and non-profit hospitals 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 _____, 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: [signature]
Date: 3-31-11
Name (Mr./Ms./Dr.) MICHAEL COFFEY
Title: ASST. SUPT.
Organization: MESQUITE ISD
Phone: 972-882-7313
Street Address: 405 E. DAVIS
Fax: 972-882-5591
Mailing Address: MESQUITE, TX 75149
E-Mail: MCOFFEY@MESQUITEISD.ORG
County: DALLAS

Contact Information:

Name (Mr./Ms./Dr.): Tim Kinsworthy
Title: ENERGY CONSERVATION MANAGER
Phone: 972-882-5571
Fax: 972-882-5529
E-Mail: tkinsworthy1@mesquiteisd.org
County: DALLAS

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

AND fax to the SECO Contractor for this service, **Colby May**, ESA Energy Systems Associates, Inc. Phone: 512-258-0547, x124. **Fax: 512-388-3312.**

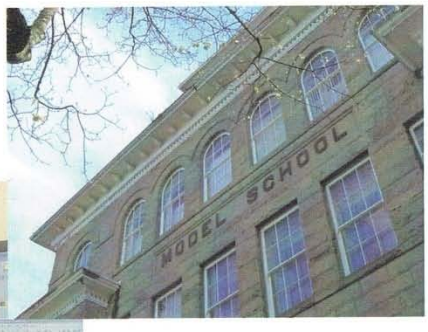
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

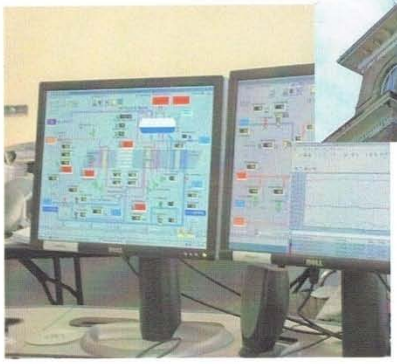
ANNOUNCING!

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