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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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Bartlett Independent School District

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SECO
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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**.

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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 January 2010, **SECO** received a request for technical assistance from *Mike Mayfield*, Superintendent for Bartlett 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 **Bartlett ISD,** (hereafter known as BISD) 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 *Mr. Mayfield*, 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 6.0 of this report.

We estimate that as much as **$7,370** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$37,400**, yielding an average simple payback of **5-1/4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$6,150	$1,025	6 Years
Lighting ECRM #1	$ 3,650	$ 1,125	3-1/4 Years
Lighting ECRM #2	$ 9,600	$ 1,920	5 Years
Controls ECRM #1	$ 18,000	$ 3,300	5-1/2 Years
TOTAL PROJECTS	$ 37,400	$ 7,370	5-1/4 Years

The total utility cost for BISD in 2009 was $94,281. The projected savings of $7,370 would represent a decrease in utility expenditures for the district of 7.8%. 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 7.0 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 **BISD**. 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. 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 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 provided to the engineer for the preliminary assessment of the Energy Performance Indicators. After reviewing the utility bill data analysis and consultation with SECO to determine the program elements to be provided to BISD, ESA returned to the facilities to perform the following tasks:

1. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
2. 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.
3. Develop a prioritized schedule for replacement projects.
4. Assist in the development of guidelines for efficiency levels of future equipment purchases.
5. Recommend the quality orientated process required in retro-commissioning for achieving, verifying and documenting the performance of facilities, systems, and assemblies meet defined objectives and design criteria.

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.

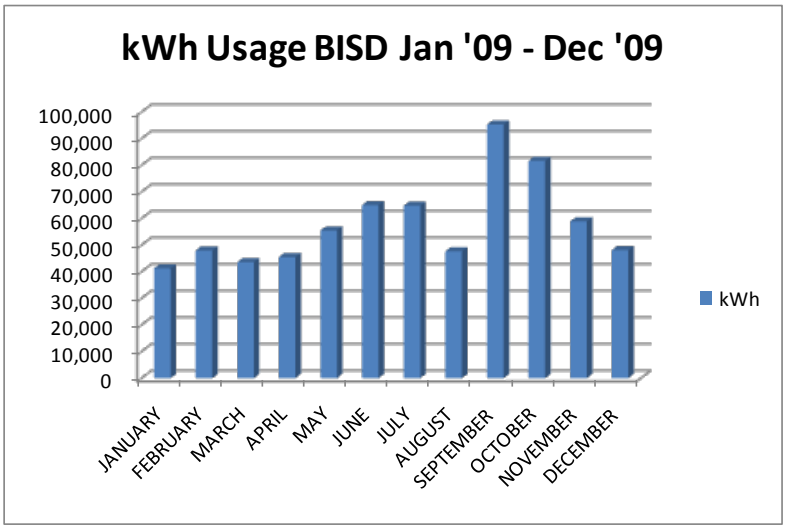
THE CURRENT ENERGY PERFORMANCE INDICATORS FOR :

BUCKHOLTS ISD

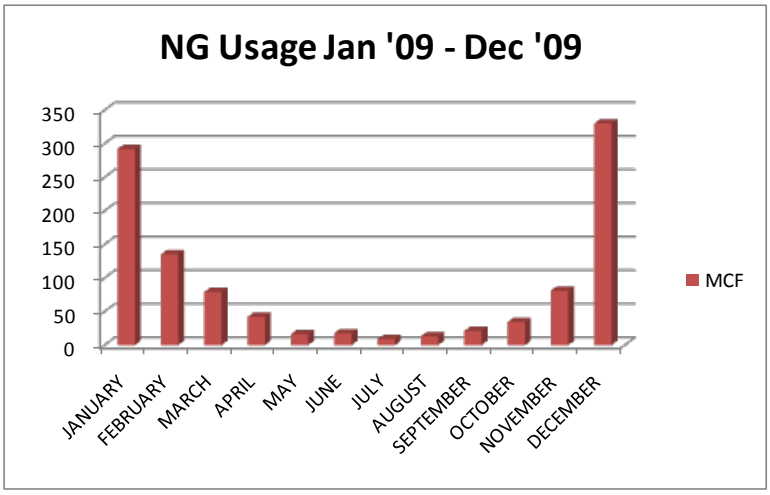
CAMPUS	ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year)	ENERGY COST INDEX (ECI) ($/sf-year)
2009 Bartlett K-12	**35,895**	**$0.97**

OWNER: Bartlett ISD					**BUILDING: K-12**			
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	2009	41,240	118	n/a	1,628	5,910	292	$1,869
FEBRUARY	2009	47,960	118	n/a	1,719	6,472	135	$741
MARCH	2009	43,560	118	n/a	1,628	6,142	79	$417
APRIL	2009	45,480	118	n/a	1,585	6,130	42	$255
MAY	2009	55,480	118	n/a	1,953	7,456	16	$129
JUNE	2009	65,000	137	n/a	2,033	8,129	18	$124
JULY	2009	64,800	118	n/a	1,985	8,125	9	$112
AUGUST	2009	47,600	118	n/a	1,680	5,957	13	$141
SEPTEMBER	2009	95,240	165	n/a	2,574	10,760	21	$193
OCTOBER	2009	81,680	165	n/a	1,229	8,031	34	$325
NOVEMBER	2009	58,880	158	n/a	2,295	7,666	81	$656
DECEMBER	2009	48,080	124	n/a	1,679	6,166	330	$2,375
TOTAL		**695,000**	**1,575**	**0**	**21,988**	**$86,944**	**1,070**	**$7,337**
					Energy Use Index:			
Annual Total Energy Cos		$94,281	Per Year		Total Site BTU's/yr		35,895	BTU/s.f.yr
					Total Area (sq.ft.)			
Total KWH x 0.003413 =		2,372.04	x 106					
Total MCF x 1.03 =		1,101.59	x 106		**Energy Cost Index:**			
Total Other x _____			x 106		Total Energy Cost/yr _		$0.97	$/s.f. yr
Total Site BTU's/yr		3,473.62	x 106		Total Area (sq.ft.)			
Floor area:		96,773	s.f.					
Electric Utility		**Account #**	**Meter#**		**Gas Utility**	**Account #**		
City of Bartlett		Multiple			Atmos	Multiple		

Charting the annual electricity consumption reveals that the district does not experience a significant decrease in consumption for June and July as would be expected for periods of vacationing students. While it is acknowledged that summer months do represent custodial and administrative occupancy periods, the lack of a decrease in consumption for these months may indicate an opportunity for improved coordination and zoning of June and July Administrative and Custodial activities in order to reduce consumption during these time periods. The district conditions their spaces with individual split systems and rooftop units; control is provided with a combination of programmable and conventional thermostats. The lack of a decrease in consumption during summer months implies that more units than necessary are being operated for floor maintenance activities or possibly that thermostat programs are not being adjusted to the summer occupancy schedules.



The chart for natural gas consumption, on the other hand, shows an ideal inverted bell curve that demonstrates excellent control of natural gas use for space heating in a public school facility in Texas. The baseline readings in summer months likely represent the consumption for natural gas water heaters that are not disconnected during the summer.



Bartlett ISD is served by two different utility providers. Bartlett Municipal Light serves the older areas of the campus (everything except for the 1997 additions (High School, Gym and Weight Room), while Bartlett Electric Cooperative serves the new addition areas. As such the district does not have choice from whom they purchase electric power. The rate schedule analysis for the High School building is shown below. A copy of the schedule is included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

ELECTRIC COOPERATIVE: BARTLETT ELECTRIC COOPERATIVE

Electric Rate: Large General Service

Customer Charge	=	$75.00 per meter
Demand Charge	=	$6.50 per kW
Energy Charge	=	$.08436 per kWh
Power Cost Recovery Factor	=	Varies per wholesale power costs

Average Savings for consumption = $0.08436/kWh

Average Savings for demand = = $6.50/kW

NATURAL GAS PROVIDER:

Atmos

Rate Schedule Unavailable: Average cost per MCF determined from utility billings.

Total Cost of Natural Gas purchased for Bartlett ISD:	$7,337
Total Quantity of Natural Gas purchased for Bartlett ISD:	1,070 MCF

Cost / Quantity = Average Unit Cost

$ 7,337 / 1,070 mcf = **$6.86 per mcf of natural gas**

5.0 CAMPUS DESCRIPTIONS:

Buckholts **ISD** consists of three main educational buildings which are located on one K-12 campus at 404 North Robinson Street in Bartlett, Texas. The Elementary School, High School/Junior High, and Cafetorium constitute the primary buildings; the Administration, Ag Shop, Maintenance Buildings make up the rest of the campus. The facilities are occupied from mid- August through late May on a weekday schedule of 7:15 A.M. to 4:30 P.M. Summer school runs throughout the month of June. The Administrative area, a separate building on the west side of the property, is open all year, and portions of the facility are occupied by the maintenance/custodial staff throughout the summer. Insurance records indicate the district contains 96,773 square feet of classroom and student occupied space, although one wing of the facility is only utilized for ISS/AEP and storage at the current time.

All of the primary facilities are brick veneered cavity wall construction buildings with low to mid- pitched white colored single-ply membrane roofs. Only minimal amounts of HVAC equipment is located on the roof, limited to the High School gymnasium area. Most windows are single pane, but appear to be in good condition. Weatherstripping at most doors is in adequate shape, but some doors could have their seals replaced. The door adjacent to the Elementary office does not close completely on its own; it must be pulled to fully close and the weatherstripping come into contact with door and jamb surfaces. *We recommend repairing the pneumatic closure to shut the door completely on its own.*

HVAC System Description:

The majority of the campus is conditioned with individual split systems. The units are a combination of heat pumps and conventional air conditioners with natural gas heat air handlers. The units range in age from 27 years to 2 years old. The only rooftop units at the district are limited to the High School Gym and Band Hall areas.

Elementary School HVAC						
Unit *	Make	Model	Serial	Age	Electrical**	Notes
1	Lennox	TSA04852N41G	5806H10358	2008	460/3/5.7	
2	Goodman	GSC13048AC	809610562	2008	460/3/5.8	
3	Lennox	HS19-311-6P	5193L18529	1993	230/1/14.2	
4	Carrier	4-ton	n/a	1983	230/3/13.3	REFRIGERATION LINE INSULATION POOR
5	Goodman	GSH130363AD		2008	230/3/12.7	
6	Goodman	GSH130363AD		2008	230/3/12.7	
7	York	HIDB060	EMOM501107	1996	230/3/16.3	REFRIGERATION LINE INSULATION POOR
8	Standard	2A7B0030		2004	230/1/17	
9	York	HIDB048		1996	230/3/14.7	
10	Lennox	HS23-261-1P	5193HO4692	1996	230/1/9.8	REFRIGERATION LINE INSULATION POOR
11	Lennox	2-TON				MOUNTED ON ROOF PLATFORM
12	Goodman	GSC130604AC	805008245	2008	460/3/6.7	
13	Goodman	GSC130484AC	806145406	2008	460/3/5.8	
14	Goodman	2-ton		2008		
15	Lennox	HS23-513-1G	5894B007820	1994	460/3/7	
16	Goodman	GSC13048AC		2008	460/3/5.8	
17	Goodman	GSH13030		2008		
18	Goodman	GSH130363AD		2008	230/3/12.7	
19	Goodman	GSH130363AD		2008	230/3/12.7	
20	Goodman	CPLE36-1C	503067829	2005	230/1/16.2	
* Units have been numbered by surveyor and do not reflect area assignment by district						
**Electrical characteristics are for compressor only - volts / phase / running load amps						

JUNIOR HIGH / HIGH SCHOOL HVAC						
Unit *	Make	Model	Serial	Age	Electrical**	Notes
1	York	H2DB060S25A	EFHM634050	1999	230/3/16	INSULATION POOR; COMB & CLEAN FINS
2	York	H2DB060S25A		1999	230/3/16	INSULATION POOR; COMB & CLEAN FINS
3	York	H2DB060S25A		1999	230/3/16	INSULATION POOR; COMB & CLEAN FINS
4	York	H2DB060S25A		1999	230/3/16	INSULATION POOR; COMB & CLEAN FINS
5	York	HSDB024	ENGM487605	1998	230/1/11.5	
6	York	HIRD060S25B	WON7531428	2004	230/3/17.3	
7	York	H2DB060S25A		1999	230/3/16	INSULATION POOR; COMB & CLEAN FINS
8	York	H2DB060S25A		1999	230/3/16	INSULATION POOR; COMB & CLEAN FINS
9	Goodman	GSC130604AC		2008	460/3/6.7	
10	York	3-TON		1995		INSULATION POOR; UNIT NOT PLUMB
11	York	4-TON		1995		INSULATION POOR; UNIT NOT PLUMB
12	York	3-TON		1995		INSULATION POOR
13		3-TON		1995		INSULATION POOR
14		3-TON		1995		INSULATION POOR
15		3-TON		1995		INSULATION POOR
16		3-TON		1995		INSULATION POOR
17		3-TON		1995		INSULATION POOR
18		3-TON		1995		INSULATION POOR
19	York	4-TON		1995		INSULATION POOR
20-25	RTUs	Varies		< 5 Yrs		COIL FIN DAMAGE - SOME EXTENSIVE
* Units have numbered by surveyor and do not reflect area assignment by district						
**Electrical characteristics are for compressor only - volts / phase / running load amps						

The refrigerant line insulation was notably damaged or missing from several units around the district. As shown in Figure 1, this damage to the insulation allows the refrigerant to absorb heat from the ambient air and limits its ability to absorb heat from the interior space as intended. *We recommend the district examine the condition of the refrigerant piping insulation at all units and repair or replace missing and damaged sections.*

Figure 1: Refrigerant insulation missing

It was also noted during the survey that there is some coil fin damage at rooftop units and condensing units. This damage appears to be a combination of weather related (hail) and non-weather related (weed trimmer and students) occurrences. Units with just 10% of the fins sustaining damage can result in up to 30% loss of operating efficiency for the unit. *We recommend that the unit fins be combed straight and coil guards be installed (where missing) to prevent this damage from occurring in the future.*

Figure 2: Gym RTU coil fin damage

Control System Description:

The district utilizes a combination of conventional and programmable thermostats to control the district's HVAC equipment. During the survey, the majority of the programmable thermostats inspected appeared to be programmed for start times between 0600 and 0700 hours and off times between 1600 and 1700 hours. Some of the HVAC units in the Elementary School have override timers located adjacent to the thermostat that controls the unit (see Figure 3). As stated in Section 3.0, the lack of a decrease in energy consumption during the summer months may be attributable to personnel not modifying the occupancy schedule in the programmable thermostats during the summer. We recommend the district examine its summer thermostat re-programming plan and investigate opportunities to reduce consumption during the summer vacation. We also recommend the district consider replacing the existing thermostats with IP-addressable programmable thermostats. These units are connected to a Local Area Network (LAN) connection which allows them to be monitored and programmed over the district's local network. Software is available to allow global changes to all thermostats on the network which would greatly simplify making changes to the occupied schedules.

Figure 3: Override and Thermostat ES Corridor

There were two cases of inappropriate thermostat locations that were observed during the survey. The first, in the Elementary Art classroom, has the programmable thermostat located between bookshelves where airflow around the sensor will be limited. Additionally, the thermostat is located on an exterior wall (see Figure 4) where heat gain through the wall can lead to the unit sampling too high of room temperature and causing the unit to run excessively. The second occurrence was in the Elementary School Teacher workroom, where the conventional thermostat was located immediately above the laminating machine, a device that produces large quantities of heat when turned on. The thermostat was currently off, the room was warm, and the cooling setpoint for the unit was set at 68 degrees. There was also a copier located in the room. *We recommend these two thermostats be relocated to areas that room temperature may be properly sampled.*

Figure 4: ES Art Room Thermostat Location

Lighting System Description:

The Elementary School has T8 fluorescent fixtures throughout the 1983 and 1996 sections of the buildings. The Junior High / High School, Welding Shop and the older gymnasium building have a combination of T8 and T12 fixtures. The High School has T8 fixtures in the classrooms and teaching spaces, and older, less efficient T12 fluorescent fixtures in the majority of the corridors of the campus. *The T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the energy saving opportunities available and the fact that Senate Bill 300 mandates that all public schools install the most efficient lamps and ballasts possible in their existing lighting system, we recommend the district retrofit the remaining T12 system fixtures with T8 lamps and electronic ballasts.* The current lighting system, when renovated with T8 components, will produce 20% more light while consuming 18% less energy and will eliminate the flicker and hum associated with the current older technology. Oncor, the district's T&D electric utility, offers energy efficiency rebates for this type of renovation.

During the walkthrough at the High School, it was noted that every other gymnasium and band hall corridor fixture is currently switched as a night light and operates 24/7. Depending upon the security needs of the district, we conservatively estimate that this could be revised to one fixture in every 6, which would eliminate 2/3 of the nightlight fixtures used for night lights.

It was also noted that the High School corridors are utilizing 4-lamp fixtures. We recommend the district renovate these fixtures to 2-lamp units as they are retrofit from T12 to T8 components. Currently the corridors demonstrate 25-45 footcandles in the corridors on average, and 80 footcandles in the areas where the entrance doors offer abundant natural daylight. The Illumination Engineering Society of North America (IESNA), the organization that determines the level of light required to perform activities safely, recommends school corridors only have 10-15 footcandles in corridors. We recommend for Junior-Senior High Schools that districts maintain 15-25 footcandles in corridors. Regardless, with the additional light output that the T8 fixtures will offer, BISD will have sufficient light output from 2-lamp fixtures in the corridors after the renovation is complete and will enjoy significant energy savings from operating one-half of the lamps compared to the current system.

The gymnasiums currently utilize metal halide fixtures for the majority of the illumination in the space. These fixtures are relatively efficient fixtures by themselves, but their long re-strike issue discourages personnel from turning them off during periods of inactivity because they do not want to wait the 5-10 minutes required to re-start the fixtures when gym activities resume. Therefore, the fixtures typically operate 11-12 hours per day. We recommend the district consider renovating the gymnasium fixtures with new T5HO or T8 fluorescent high bay fixtures. These fixtures do offer energy reductions from comparable metal halide fixtures, but more importantly, they do not have the re-strike issue inherent to metal halides and therefore may be turned off during inactive times of the day.

District staff reported the Elementary School lighting system has a 30 minute timer that guarantees lighting in unoccupied areas stays off.

It was noted during the survey (Figure 5) that several areas of exterior fixtures remain operating throughout daytime hours: the dock area light at the Kitchen, the mercury vapor fixture located under the football field press box, and most of the exterior lights at the High School. We recommend these fixtures be placed under photocell control so that they will not operate during daytime hours.

Figure 5: Kitchen dock light on at day

One other area had exterior fixtures operating during the day, but in this case, the lights are currently necessary. At a side entrance to the Cafeteria, a sheet metal canopy has been constructed to protect travelers from weather as they enter the building. The construction of the canopy did not include any panels in the roof that would allow light to enter the space. *We recommend three of the metal roof panels be replaced with light emissive corrugated panels so that the exterior fixtures may be left off during daytime hours.*

General District Observations:

In general, the district's HVAC equipment is relatively modern and in good shape. The oldest unit in the district is one single 27 year old split system at the Elementary School; the remainder of the units are 16 years old or newer. The district has no immediate need for a capital investment for this system, aside from the single 27 year old unit, but should plan for replacement of the 14-16 year old units (53 ½ total tons of nominal cooling capacity) prior to the 2015-2016 school year. The system has several Maintenance and Operation procedural opportunities that will offer significant energy savings and improve the likelihood that these units will survive their 20 year life expectancy.

The control systems are likely controlling unit operation outside of the current 0715 to 1630 hour program. It is likely that this program is not updated for holiday or vacation time periods and therefore may be allowing units to operate more hours than necessary, especially in the summer months. A strategic plan to update the programmable thermostat and timeclock settings, or a renovation to IP addressable programmable thermostats, would define and simplify this procedure.

The lighting system consists of moderate numbers of older T12 fluorescent technology in the High School corridor spaces and metal halide fixtures in the gymnasiums that are operated more hours than necessary due to the long re-strike issue inherent to HID fixtures. Renovation of the lighting system to T8 and T5 fluorescent fixtures offers significant energy and scheduling savings opportunities.

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC	•Comb fins on damaged condensing units •Install hail guards to protect fins in future •Replace damaged refrigerant line insulation • Relocate two thermostats at Elementary School •Trim weeds away from Condensing Units
Lighting	•Install photocell for Kitchen dock light •Install photocell for Pressbox Mercury Vapor light •Install photocell for HS exterior lights •Install light emissive pansls at cafeteria canopy
Controls	• Adjust holiday/vacation programs at timeclocks and programmable thermostats
Building Envelope	•Check weatherstrip at all exterior doors, replace as needed

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 prohibitive when the benefits of renovating door and weather weatherstripping are well documented and universally accepted.

HVAC M&O

At BISD, the HVAC M&O opportunities revolve around combing the condenser fins [combs available for less than $10] and replacement of refrigerant line insulation. The installation of coil guards prevents future fin combing, which is ultimately a combination of deferred labor savings for eliminating the need for maintenance personnel to perform the task and energy savings resulting from the units maintaining optimum operating efficiency. Additionally, there were several condensing unit banks where spring weeds had already grown up around the units and evidence of past weeds were stuck between the coil guards and coil fins. This debris must be kept clear of the condensing units in order for the units to effectively evacuate heat to the atmosphere. We therefore recommend cutting back the weeds and washing the coils on the units.

As discussed in the campus description, there are two locations in the Elementary where relocating the thermostat will reduce runtimes for the units without sacrificing occupant comfort in the space.

Lighting System M&O

The low cost lighting system opportunities involve eliminating daylight operation of existing exterior fixtures. The Cafeteria canopy has two fixtures and the High School has six exterior fixtures which were operating during daytime hours. Additionally, the football field press box and Kitchen dock wallpack were also operating during the day. Assuming this is a common occurrence and not coincidental to the days of the surveys, this represents approximately 1.0 kW worth of light fixtures. The installation of a photocell would likely disable operation of these fixtures for up to 12 hours per day. Savings can be calculated by the following formulae:
1.0kW * 12 hours * 365 days = 4,380 kWh per year

1.0 kW/month * 12 months/year * $6.50 (average demand savings, Section 4.0) +
4,380 kWh * $0.08436 (average consumption savings, Section 4.0) = $ 447 per year

Photocontrols are available for less than $15 dollars per unit. One unit will likely be required for each exterior lighting circuit involved, but should not number more than six. Corrugated light emissive panels are available for less than $15 per piece. Assume six units are required: materials (labor could be calculated with in-house staff rates) would total $120; payback is project cost / savings [$120/$447] = 3-1/4 months

Controls M&O

The apparent M&O opportunities in the controls arena center focus on adjusting holiday and vacation schedules in the timeclocks and programmable thermostats will eliminate HVAC systems from operating during special unoccupied occasions. The only cost associated with this practice is the staff time spent making changes to the systems. There are commercially available products that will eliminate much of the labor associated with the schedule adjustment, but that requires a capital investment and is discussed in Section 6.0.B. Otherwise, the payback for this measure will result in the first holiday or vacation when the task is performed.

Envelope M&O

As discussed previously, calculating paybacks for missing or damaged weatherstripping is tedious and serves little purpose. It was noted there were several exterior doors around the district that suffered from missing or absent weatherstripping and we recommend that these situations be addressed as the opportunity arises.

B. CAPITAL EXPENSE PROJECTS

HVAC	•Replace 27 year old split system •Budget for other HVAC replacement in 5-6 years
Lighting	•Retrofit T12s with T8 lamps and ballsts •De-lamp corridor fixtures to 2-lamp •Renovate Gym metal halide fixtures with T5
Controls	•Install IP Addressable Programmable thermostats at all HVAC units

HVAC and Infrastructure ECRMs

ECRM #1: Plan to replace 27 year old split system at Elementary School.

At the Elementary School, there is one single 27 year old split system still in use for the district. The life expectancy for these units is generally 15-20 years. At this point the unit is not operating with any degree of efficiency.

Estimated Installed Cost	=	$6,150
Estimated Energy Cost Savings	=	$ 1,025
Simple Payback Period	=	6 years

ECRM #2: Begin to budget for Elementary Split System Renovation

Some of the HVAC equipment for these facilities is currently 14-16 years old. The life expectancy for this equipment is 15-20 years depending on the quality of maintenance performed during its life. There are 16 units with a total cooling capacity of 53-1/2 tons that should be replaced by the 2015-2016 school year. If replaced this year, the project budget would likely be the following:

Estimated Installed Cost	=	$ 109,675
Estimated Energy Cost Savings	=	$ 7,311
Simple Payback Period	=	15 years

The 15 year payback is due to the fact that the units still have functional life and are not operating as inefficiently as they will be when the appropriate time to replace the units arrives. Allowing for 4% inflation per year for the next 5 years, the budget may become the following:

Estimated Installed Cost	=	$ 131,610
Estimated Energy Cost Savings	=	$ 15,500
Simple Payback Period	=	8-1/2 years

<u>LIGHTING ECRMs</u>

ECRM #1: Retrofit Existing T12 Lighting with T8 Lamps and Electronic Ballasts

At BISD, there are approximately 73 T12 fixtures that we recommend be retrofit with T8 lamps and electronic ballasts. The new components produce approximately 18% more light while consuming about 20% less energy. Senate Bill 300 mandates school districts in Texas install the most energy efficient lamps and ballasts possible in their existing fixtures. T12 components will no longer be manufactured after 2010. This cost includes de-lamping the High School corridor fixtures to 2-lamp units.

Estimated Installed Cost	=	$ 3,650
Estimated Energy Cost Savings	=	$ 1,125
Simple Payback Period	=	3-1/4 years

ECRM #2: Retrofit Existing Gymnasium Fixtures to T5HO or T8 High Bay Fluorescent

At BISD, there are approximately 20 400-watt and 10 each 250-watt metal halide fixtures we recommend be replaced with new 6-lamp and 4-lamp T5HO or T8 high bay linear fluorescent fixtures, respectively. These fixtures will allow the lights to be turned off during inactive periods of the day, saving as much as 4-6 hours of operation per day.

Estimated Installed Cost	=	$ 9,600
Estimated Energy Cost Savings	=	$ 1,920
Simple Payback Period	=	5 years

<u>CONTROL ECRMs</u>

ECRM #1: Retrofit Existing Conventional and Programmable Thermostats with New IP Addressable Programmable Thermostats

The existing programmable thermostats are providing some level of control over the operation of the HVAC system outside normal occupancy hours; the control that the conventional thermostats provide are solely dependent on the diligence of the staff to turn the units off. As stated several times in the report, it appears that the programs are not currently adjusted for holiday and vacation periods, which is allowing the systems to operate outside exception unoccupied periods. The task to manually update holiday and vacation programs can be tedious, new IP Addressable Programmable Thermostats may be monitored and programmed via the district's intranet and software available for the units makes updating all of the thermostat programming a five minute task. The programming may be monitored from any internet connection provided the user has the appropriate password and credentials, so the system may be monitored by the Director of Maintenance or Superintendent from home, if desired. The units may be relocated to a different location or unit as necessary in the future.

Estimated Installed Cost	=	$ 18,000
Estimated Energy Cost Savings	=	$ 3,300
Simple Payback Period	=	5-1/2 years

SUMMARY TABLE:

Excluding HVAC ECRM #2, because it is a future consideration, not a current recommended measure, the projects we recommend BISD consider at the present time include HVAC ECRM #1 plus both lighting ECRMs as well as Controls ECRM #1:

Estimated Installed Cost	=	$ 37,400
Estimated Energy Cost Savings	=	$ 7,370
Simple Payback Period	=	5-1/4 years

Should the district desire to implement these projects in stages and not all at once, we recommend the following implementation schedule:

1. Lighting ECRM #1 — Lighting is often considered one of the most economical projects a district may undertake. It is also a project mandated by Senate Bill 300. The cost savings generated by this project can be collected to fund the additional projects.

2. Lighting ECRM #2 — Taking advantage of the ability to turn off the gymnasium fixtures during inactive periods of the day will generate energy savings and eliminate unnecessary heat generated in the gym which has to be overcome by the HVAC system.

3. HVAC ECRM #1 — A 27 year old split system does not operate with any degree of efficiency and is likely to fail at any time, forcing the district to undergo an emergency replacement project. Budgeted replacement costs are always less than emergency replacement costs.

4. Controls ECRM #1 — Prioritized last for the reasons stated above, but potentially the most effective of all of the recommended measures in generating energy savings for the district.

7.0 FINANCIAL EVALUATION

Financing of these projects may be provided using a variety of methods 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 last 5 years				
5. Savings decreases 5% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($37,400.00)		0	($37,400)
Year 1		$ 7,370.00	0	$7,370
Year 2		$ 7,370.00	0	$7,370
Year 3		$ 7,370.00	0	$7,370
Year 4		$ 7,370.00	0	$7,370
Year 5		$ 7,370.00	0	$7,370
Year 6		$ 7,001.50	($500)	$6,502
Year 7		$ 6,633.00	($500)	$6,133
Year 8		$ 6,264.50	($500)	$5,765
Year 9		$ 5,896.00	($500)	$5,396
Year 10		$ 5,527.50	($500)	$5,028
Year 11		$ 5,159.00	($1,000)	$4,159
Year 12		$ 4,790.50	($1,000)	$3,791
Year 13		$ 4,422.00	($1,000)	$3,422
Year 14		$ 4,053.50	($1,000)	$3,054
Year 15		$ 3,685.00	($1,000)	$2,685
			Internal Rate of Return	**15.00%**

More information regarding financial programs available to BISD can be found in:

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

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 Theresa Sifuentes 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

REBATES

Weekly Spring Energy Saving Tip

Install window coverings to prevent heat gain through your windows.

Find out more ways to prepare for spring's energy costs from ENERGYSAVERS.GOV

Put this widget on your own site to get weekly updated tips.

AccuWeather.com

Hourly Info | 15 Days

°F

RealFeel®: °F
Winds: at mph

Rate Schedules

Rate Schedule 1 – Permanent Residential Service

Available only for qualifying permanent residential installations.

Customer Charge	$ 20.00
Energy Charge	$ .10874 per kWh
PCRF	Depends upon monthly wholesale power costs

Rate Schedule 2 – Small General Service

Available for general service installations where demand is less than 25kw, and single phase church facilities regardless of demand. If demand exceeds 25kw second time within most recent 12 months, will go to Rate Schedule 3. (A demand meter will be installed if a 25 kVa transformer is required.)

Customer Charge	$ 22.00 Single Phase
	$ 27.00 Three Phase
Energy Charge	$ .12115 per KWh
PCRF	Depends upon monthly wholesale power costs

Rate Schedule 3 – Large General Service

Available for general service for metered demand exceeding 25 kw. (Where 37.5 kVa or larger is installed.)

Customer Charge	$ 75.00
Demand Charge	$ 6.50
Energy Charge	$ .08436 per kWh
PCRF	Depends upon monthly wholesale power costs

Minimum is the greater of:

1) Special Contract amount, or
2) $ 2.60 per installed transformer capacity, or
3) Customer charge

Rate Schedule 5 – Outdoor Lighting

175 watt mercury vapor lamp	$ 13.50 @ 70 kWh per month
100 watt high pressure sodium	$ 13.50 @ 40 kWh per month
400 watt metal halide	$ 22.80 @ 182 kWh per month
400 watt high pressure sodium	$ 22.80 @ 182 kWh per month
PCRF	Depends upon monthly wholesale power costs

Service Fees

Membership Fee:	$25
Application/Connect, Reconnect, Changeover Fees:	$25

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

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 Bartlett ISD, 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.

No previous TA/PEA

Signature: Mike Mayfield
Date: 2-23-10
Name (Mr./Ms./Dr.): Mike Mayfield
Title: Supt.
Organization: Bartlett ISD
Phone: 254-527-4247
Street Address: 404 N. Robinson
Fax: 254-527-3340
Mailing Address: PO Box 170
E-Mail: mmayfield@bartlett.txed.net
Bartlett, TX 76511
County: Bell / ESA
txed.net

Contact Information:

Name (Mr./Ms./Dr.): Same
Title:
Phone:
Fax:
E-Mail:
County:

Please sign and mail or fax to: Juline Ferris, Schools and Education Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-936-9283. Fax 512-475-2569.

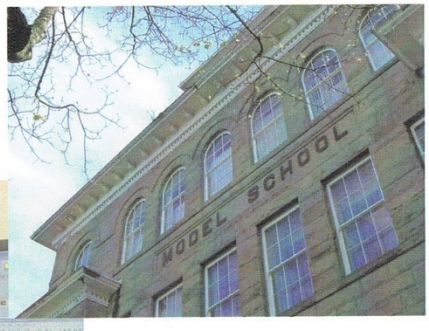
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

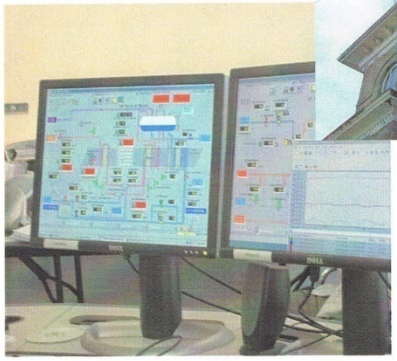
ANNOUNCING!

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.

Texas Energy Managers Association

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD