Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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Deweyville Independent School District

June 7, 2011

ESA Energy Systems Associates, Inc.
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SECO
State Energy Conservation Office

Table of Contents

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**.

SECO State Energy Conservation Office	Program Administrator:	Stephen Ross
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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 March 2011, **SECO** received a request for technical assistance from Rick Summers, Superintendent of **Deweyville 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 **Deweyville ISD,** (hereafter known as DISD) 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. Rick Summers*, 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 **$21,140** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$169,410**, yielding an average simple payback of **8** years.

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

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$104,600	$9,500	11 years
Lighting ECRM #1	$41,650	$6,950	6 Years
Lighting ECRM #2	$14,000	$2,400	6 years
Lighting ECRM #3	$120 per fixture	$20 per fixture	6 Years
Controls ECRM #1	$540	$270	2 years
Controls ECRM #2	$8,500	$2,000	4-1/4 Years
TOTAL PROJECTS	**$169,410**	**$21,140**	**8 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 DISD. 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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A Terracon Company

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 DISD, 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]

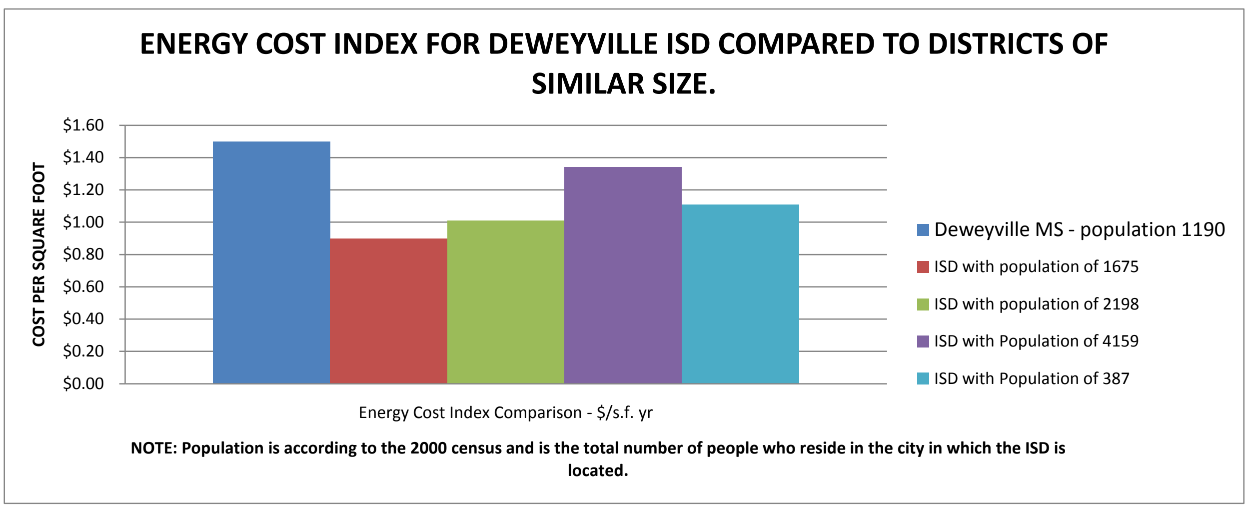
These indicators may be used to compare the facility's current cost and usage to past years, or to other similar facilities in the area. Although the comparisons will not provide specific reasons for unusual operation, they serve as indicators that problems may exist within the energy consuming systems.

THE CURRENT DISD ENERGY PERFORMANCE INDICATORS:

CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	ENERGY COST INDEX (ECI) $/sf-year
Deweyville HS	37,196	$0.86
Deweyville MS	56,444	$1.50

Note: The gas utility data was not available at the time of the survey; therefore, the EUI and ECI reflected in this report are for electricity consumption only. Including natural gas data in future Utility Bill Analyses will significantly increase the EUI for the facilities, but should only have a negligible impact on the ECI. This is due to the high energy output of natural gas for less cost as compared to electricity consumption.

Despite the lack of natural gas information, the ECI for Deweyville Middle School is substantially higher than other facilities in the area that did include their natural gas data:



Deweyville ISD purchases electricity for all schools from Jasper Newton Electric Cooperative.

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

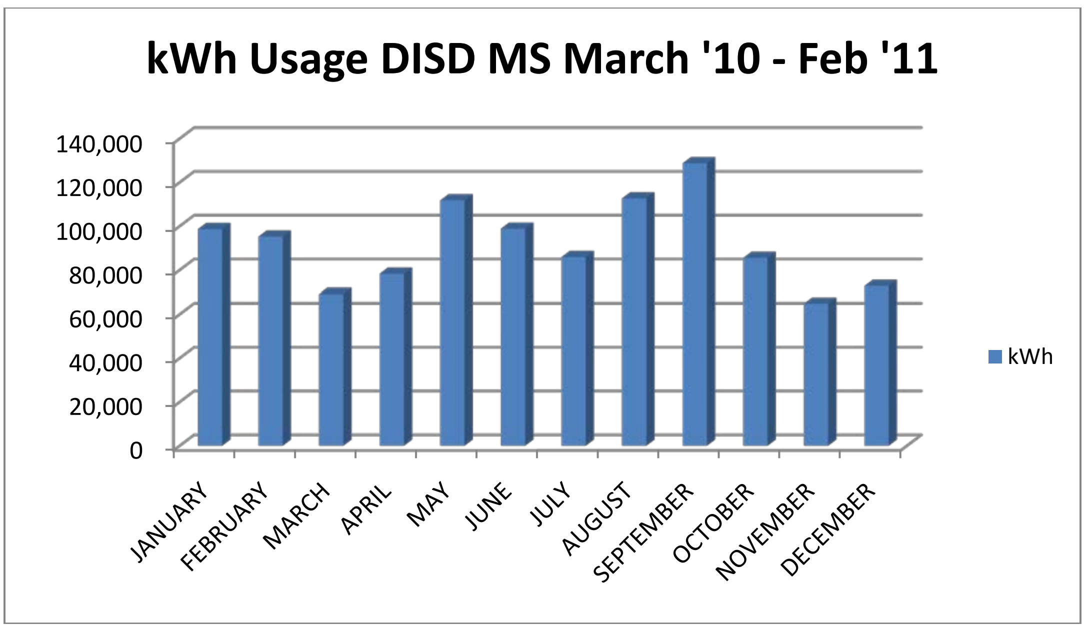
Copies of the rate schedules are included in Appendix I.

OWNER: **Deweyville ISD** **BUILDING:** **Middle School**

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	2011	98,630	369	369	5,262	8,443	Unavailable Information	
FEBRUARY	2011	95,210	396	396	5,419	8,497		
MARCH	2010	69,110	340	340	4,800	7,096		
APRIL	2010	78,290	315	315	5,080	7,652		
MAY	2010	111,770	369	369	7,214	10,788		
JUNE	2010	98,810	294	294	5,544	8,730		
JULY	2010	85,850	218	218	3,873	6,671		
AUGUST	2010	112,670	428	428	5,757	9,359		
SEPTEMBER	2010	128,690	398	398	6,174	10,257		
OCTOBER	2010	85,490	382	382	5,577	8,364		
NOVEMBER	2010	64,790	322	322	4,247	6,413		
DECEMBER	2010	72,710	367	367	5,073	7,476		
TOTAL		**1,102,020**	**4,198**	**4,198**	**64,020**	**$99,746**		

Annual Total Energy Cost =	$99,746	Per Year	**Energy Use Index:**	
			Total Site BTU's/yr	56,444 BTU/s.f.yr
			Total Area (sq.ft.)	
Total KWH x 0.003413 =	3,761.19	x 106		
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr	$1.50 $/s.f. yr
Total Site BTU's/yr	3,761.19	x 106	Total Area (sq.ft.)	
Floor area:	66,636	s.f.		

Electric Utility	**Account #**	**Meter#**
Jasper Newton Electric Co-op	584-23	97820



OWNER: Deweyville ISD **BUILDING:** High School

MONTH / YEAR		ELECTRIC	DEMAND				NAT'L GAS / FUEL	
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2011	75,600	192	192	3,379	6,118	Unavailable Information	
FEBRUARY	2011	74,400	204	204	3,478	6,135		
MARCH	2010	86,400	204	204	4,420	7,077		
APRIL	2010	111,600	240	240	5,732	9,139		
MAY	2010	121,200	252	252	6,739	10,435		
JUNE	2010	120,000	234	234	5,728	9,388		
JULY	2010	118,800	216	216	4,716	8,340		
AUGUST	2010	121,200	288	288	4,972	8,668		
SEPTEMBER	2010	118,800	324	324	5,365	8,989		
OCTOBER	2010	98,400	228	228	4,910	7,922		
NOVEMBER	2010	102,000	228	228	4,702	7,822		
DECEMBER	2010	74,400	192	192	3,880	6,619		
TOTAL		1,222,800	2,802	2,802	58,021	$96,652		

Annual Total Energy Cost = $96,652 Per Year

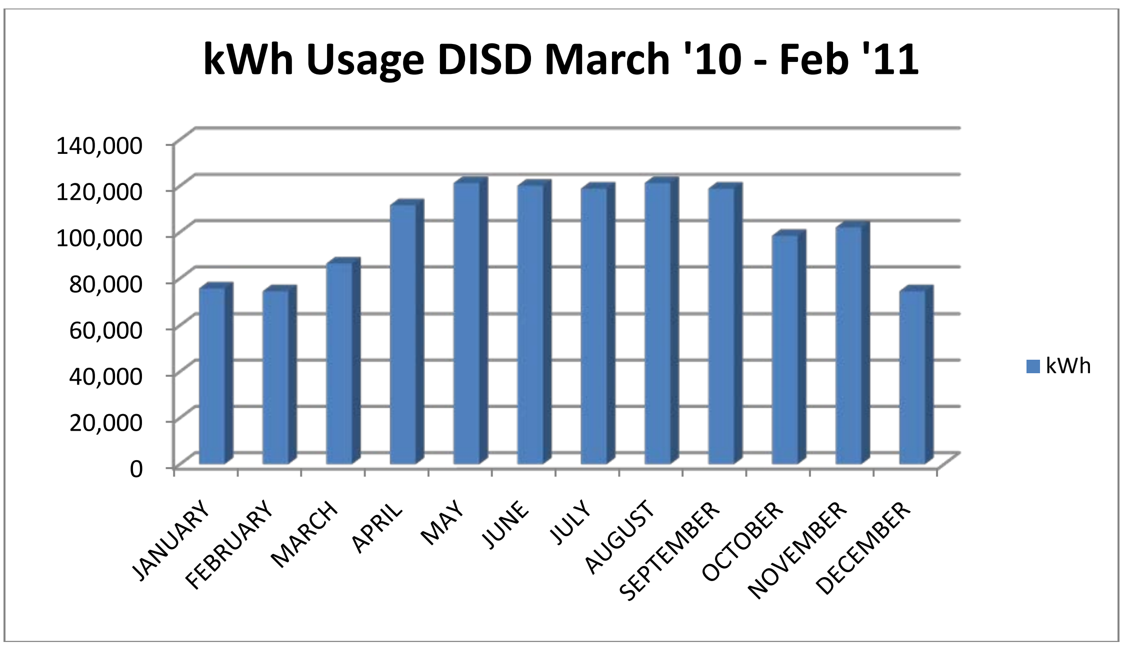
Total KWH x 0.003413 = 4,173.42 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 4,173.42 x 106

Floor area: 112,202 s.f.

Electric Utility Jasper Newton Electric Co-op
Account # 584-24
Meter# 40302

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 37,196 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.86 $/s.f. yr



As can be seen in the chart above, the High School does not show the characteristic energy reduction in July that is typical for schools in Texas during unoccupied months. This suggests that there are opportunities for better system control during the summer months.

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC PROVIDER: None Contract price: $0.03 per kWh

TRANSMISSION AND DISTRIBUTION UTILITY: Jasper Newton Electric Co-op

Electric Rate: Large Power >50 kW peak demand

I.	Demand Charge	=	$6.85 per kW
II.	Customer Charge	=	$60.00 per meter
III.	Energy Charge	=	$0.03 per kWh
IV.	PCRF Charge	=	$0.036629 per kWh

Average Savings for consumption= $0.03/kWh + $0.036629/kWh = $0.066629/kWh

Average Savings for demand = $6.85/kW

5.0 CAMPUS DESCRIPTIONS:

Deweyville ISD consists of 3 educational campuses (1 Elementary, 1 Middle School and 1 High School) which are located in Newton County. The survey did not include the Elementary campus as the district has plans to close that campus (originally constructed in 1950 and the 1970s). Elementary students will attend the Middle School campus for the 2011-2012 school year.

Table 2: School Facilities Analyzed For This Report

Facility	Approximate Square Footage	Basic HVAC Cool/Heat	Basic HVAC Air Distribution	Basic Lighting System Description	Basic Control System Description
DISD High School	66,636	Air cooled chillers/ Natural gas boilers.	VAV AHU with powered terminal boxes.	T8 with electronic ballasts	DDC controls (system not currently operational)
DISD Middle School	112,202	Split system HVAC units	SZAHU with gas heat.	T12 with magnetic ballasts	Programmable Thermostats
DISD Elementary	44,812	To be closed	To be closed	To be closed	To be closed

Note: SZAHU = Single-Zone Air Handling Unit.

VAV AHU = Variable Air Volume Air Handling unit

6.0 ENERGY RECOMMENDATIONS:

HVAC ECRM 1: RENOVATION OF AGED HVAC EQUIPMENT

It was noted during the survey that many pieces of equipment at the Middle School campus have reached the end of their useful life expectancy of 15-20 years. We recommend this equipment be included in subsequent maintenance budgets to be replaced as planned equipment upgrades in order to avoid the higher cost of emergency replacement.

The HVAC units determined to need replacement are listed in the following table.

Year of Manufacture	Quantity	Model	Electrical (compressor)
1997	6	Goodman PAC060	230/1
1988	1	Rheem RAFD036	230/1
1995	1	Luxaire HABA-T060SG	230/3
1988	1	Rheem (3-ton)	-
1996	2	Ruud UAKA-060T82	230/1

The table represents 51 total tons of nominal cooling capacity for units we recommend be replaced at the Middle School. In addition to the equipment reaching the end of its anticipated useful life expectancy, the condensing units serving the gymnasium and dressing room spaces are located on the inside of the building (see picture to the right), in a non-conditioned space that was enclosed to provide storage and a space to locate other mechanical and electrical equipment. We recommend that the condensing units be relocated outside of this interior space at the time the equipment is replaced.

Estimated Cost: $104,600 *Estimated Savings: $9,500* *Estimated Payback: 11 Years*

Lighting ECRM 1: RETROFIT OF T12 LIGHTING TO T8

At the Middle School campus, the lighting system is utilizing T12 components in the linear fluorescent fixtures. T12 components produce approximately 18% less light and consume about 20% more energy than the T8 lamps and electronic ballasts that may be retrofit into the existing linear fluorescent fixtures. Senate Bill 300 requires Texas school districts to install the most efficient lamps and ballasts possible in their existing fixtures. *Therefore we recommend the district retrofit the fixtures at the Middle School with T8 lamps and electronic ballasts.*

Estimated Cost: $41,650 Estimated Savings: $6,950 Estimated Payback: 6 Years

Lighting ECRM 2: METAL HALIDE FIXTURE RETROFIT TO T5

The two High School gymnasiums contain 20 each 400-watt metal halide fixtures. One characteristic of metal halide fixtures is their inherently long re-strike. This means that if the fixtures are ever turned off, it can take up to 15 minutes for them to come back on. This long re-strike encourages staff to leave the lights on throughout the day, even if the space is not occupied. *We recommend replacing the metal halides with 6-lamp T5 high bay fluorescent fixtures that will improve overall light levels in the space and to allow the fixtures to be turned off during unoccupied periods of the day.*

Estimated Cost: $14,000 Estimated Savings: $2400 Estimated Payback: 6 Years

Lighting ECRM 3: REPLACE INCANDESCENT EXIT FIXTURES WITH LED FIXTURES

The Middle School was noted to have numerous incandescent exit fixtures in the buildings. Most incandescent exit fixtures have two each 15-watt lamps and consume 30 watts per fixture, 8,760 hours per year. Therefore, each fixture consumes 263 kWh per year. LED exit fixtures consume less than 1 watt per fixture and reduce electrical consumption to 9 kWh per year. *We recommend the district replace all incandescent exit fixtures with LED exit fixtures.*

Estimated Cost: $120 per fixture Est. Savings: $20 per fixture Estimated Payback: 6 Years

Controls ECRM 1: INSTALL VENDING MACHINE CONTROLS

Vending machine controls can be installed to control existing advertising lighting and compressors that refrigerate food or drink. Using a motion sensor mounted on top of the machine, the vending machines will allow lights to operate whenever it determines occupants are in the area and cycles the compressor on and off to maintain food or beverages at a maximum programmed temperature when it determines there is no activity in the area. *We recommend DISD install vending machine controls on all existing vending machines.* For the 3 vending machines we identified during the survey, our calculated cost and energy savings for this project is displayed below.

Estimated Cost: $540 Estimated Savings: $270 Estimated Payback: 2 Years

Controls ECRM 2: RETROCOMMISSION EXISTING BUILDING ENERGY MANAGEMENT SYSTEM

The High School has a state of the art direct digital control (DDC) system that is currently not controlling the energy consuming systems. The system is run manually after having difficulties getting the system appropriately commissioned. The system is an Envision product that was installed by OpenTech.

At the time of the survey, the control system computer was discovered to be off. After energizing the system, we toured the operating system to perform a cursory review of the functionality of the system. Some of our observations are summarized below:

- The outside relative humidity sensor was not sampling correctly. At the time of the survey it was reading 17%RH. The correct relative humidity for this morning was estimated to be between 75 and 85%. An incorrect humidity reading can affect the status of chilled and hot water central systems.
- The deadband between heating and cooling setpoints was 2°F (69°F and 71°F, respectively). It is not normally recommended to have a deadband tighter than 4°F of separation as a tight deadband forces units to fluctuate between heating and cooling cycles while trying to maintain setpoint.
- Outside air dampers on the air handlers is currently controlled by the system so startup and dehumidification cycles can be performed with the outside air dampers closed.

It appeared from the cursory review that a minimal amount of re-commissioning effort and system repair would be required to reinstate the energy management system. *We recommend the district re-commission the energy management system.*

Estimated Cost: $8,500 Estimated Savings: $2,000 Estimated Payback: 4-1/4 Years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC

- Comb fins on damaged condensing units and Install hail guards
- Lock all fences surrounding exterior HVAC equipment
- Replace damaged/missing refrigerant piping insulation
- Address flashing "check filter" signal on thermostats
- Disconnect gym space heaters if no longer in use
- Re-install freezer/cooler condensing unit cover
- Remove mops from condensing units

Lighting

- Turn off all light fixtures not required during daytime
- Turn off lights in unoccupied spaces

Controls

- Implement a district wide energy management policy regarding temperature setpoints
- Set all computer monitors to sleep while inactive

Plumbing

- Fix leaking pipe connections in boiler room
- Unclog floor drain in boiler room

Safety

- Ensure all breaker boxes remain closed
- Cover electrical outlet in MS cafeteria.

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

At DISD, the HVAC M&O opportunities begin with combing the condenser fins [combs available for less than $10]. The installation of higher quality 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. *We recommend installing improved quality hail guards on the units to prevent future coil fin damage.*

HVAC M&O -2

Some of the damage found on the condenser fins at some of the units can be attributed to vandalism. During our survey we noticed that none of the fences surrounding the condensing equipment were locked. To eliminate future vandalism to these units we recommend the district lock the entrance gates surrounding all exterior HVAC equipment and install coil guards on units which do not currently have protection.

HVAC M&O -3

Upon inspection of the Middle School HVAC equipment, we found that many of the condenser units' refrigerant piping insulation is severely damaged or missing. This condition minimizes the ability of the refrigerant to absorb heat from the conditioned space as it absorbs heat from the outdoors. *We recommend the district replace the refrigerant piping insulation on all condensing units.*

HVAC M&O -4

At the Middle School cafeteria we found the two wall mounted thermostats had flashing "check filter" lights appearing on the screen. We recommend the district ensure that all filters are being changed every 3 months to optimize efficiency and the unit's useful life expectancy.

HVAC M&O -5

The Middle School gymnasium has large space heaters mounted in the upper corners of the room. We recognize that these units may still be in use, however, if these units are no longer being used, we recommend the district disconnect them to ensure there are not two separate systems simultaneously trying to condition the same space.

HVAC M&O -6

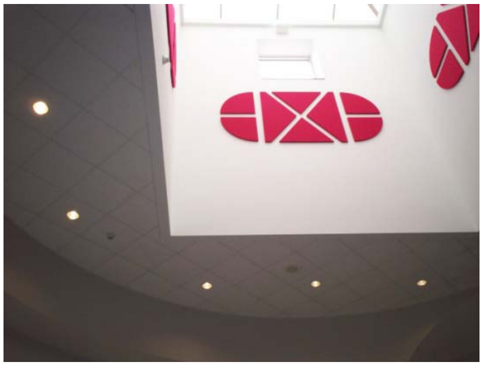
During our survey, we discovered that the exterior unit serving either the refrigerator or freezer at the Middle School Kitchen has no cover, leaving it entirely vulnerable to the elements. *We recommend re-installing the condensing unit's protective cover.*

HVAC M&O -7

At the Middle School gym we found multiple condensing units that had mops laid on top of them to allow them to dry. In order for a unit to operate at its highest efficiency, it needs to have unrestricted airflow to the unit through the fins. *We recommend the district remove all objects from on top of these units and meet with maintenance personnel to explain why this hurts efficiency and discuss an alternate location where the mops can be placed to dry*.

Lighting M&O

Some areas of the buildings had light fixtures that were not required to be operating during the day or were fixtures left operating in unoccupied spaces. Both of these are easy to correct and will result in immediate energy savings. The least expensive remedy for these issues is to train staff to not turn on fixtures not needed during daytime hours and to turn off fixtures in unoccupied spaces. If the behavioral modification training is not effective, then the district can elect to go with automated controls (photocells and occupancy sensors) to control lighting for daylighting and occupancy.



Controls M&O -1
During our survey it was noted that thermostats throughout the district had temperature setpoints that varied greatly from one another. We found the thermostats in the Middle School cafeteria were set at 61°F and 68°F. In the Middle School gym we found three thermostats set at 62°F, 65°F, and 65°F. While replacing the conventional thermostats with IP addressable programmable thermostats is our first recommendation for this issue, implementing a strict energy management policy requiring all thermostats be set between 72°F and 78°F is an alternative solution to this problem. The energy saved from raising all temperature setpoints to at least 72°F district wide will result in significant energy savings and save on maintenance cost due to the decrease in equipment run-time each day.

Controls M&O -2
At the Middle School we found the computer monitors in the computer classroom were on in screen saver mode despite the room being vacant for that period of the day. We recommend the district change the settings on each computer monitor to go to sleep whenever the computer has been idle for 10 to 15 minutes.

Plumbing M&O -1
In the high school boiler room we found pipe connections that were leaking a significant amount of domestic hot water onto the floor. Judging from the flow rate of the water leaking from the pipe connections, we estimate approximately 12 gallons per hour of hot water may be lost from these leaks. We recommend the district inspect and correct all leaking connections in the high school boiler room.

Plumbing M&O -2
Upon our inspection we found one of the floor drains located between the boilers was clogged. As a result, water was pooling up against the back wall of the room. We recommend the district clean out this floor drain to allow the water in this space to properly drain.

Safety M&O -1

At the Middle School gym we noticed an electrical breaker panel located a few feet from a laundry dryer. The breaker panel was completely open leaving all electrical components exposed. We recommend the district ensure all electrical panel boxes throughout the district are closed and secured to prevent any foreign objects from coming in contact with the electrical current

Safety M&O -2

In the Middle School cafeteria we discovered an electrical outlet that was missing the plastic fixture cover that surrounds the outlet plugs. This plastic cover hides the live electrical wiring and protects against anything coming in contact with the electrical wiring. Because this outlet is located in a high traffic area and low to the ground, we recommend the district immediately install a protective covering around the outlet that will protect the electrical wiring and keep students from inadvertently coming in contact with the energized conductors.

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 5% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($169,410)		0	($169,410)
Year 1		$ 21,140.00	0	$21,140
Year 2		$ 21,140.00	0	$21,140
Year 3		$ 21,140.00	0	$21,140
Year 4		$ 21,140.00	0	$21,140
Year 5		$ 21,140.00	0	$21,140
Year 6		$ 20,083.00	($500)	$19,583
Year 7		$ 19,026.00	($500)	$18,526
Year 8		$ 17,969.00	($500)	$17,469
Year 9		$ 16,912.00	($500)	$16,412
Year 10		$ 15,855.00	($500)	$15,355
Year 11		$ 14,798.00	($1,000)	$13,798
Year 12		$ 13,741.00	($1,000)	$12,741
Year 13		$ 12,684.00	($1,000)	$11,684
Year 14		$ 11,627.00	($1,000)	$10,627
Year 15		$ 10,570.00	($1,000)	$9,570
			Internal Rate of Return	**6.29%**

More information regarding financial programs available to DISD 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

How to Finance Your Energy Program *continued*

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

JASPER NEWTON ELECTRIC COOPERATIVE

Churches and Schools Service (Schedule "CS")

(Available to public schools, and church facilities with metered demands exceeding 50 kW in two or more of the preceding twelve months. A consumer must remain on this rate schedule for a minimum of twelve months before receiving service under another rate schedule.)

Customer Charge, per month $60.00
Demand Charge, all kW $6.85 per kW
Energy Charge, all kWh 3.00¢ per kWh
Minimum monthly charge will be the greater of the following:

A. The minimum monthly charge specified in the contract for service.
B. A charge of $1.15 per kVA of installed transformer capacity.

Late Payment Charge: In the event the current monthly bill is not paid by the due date, a five percent (5%) penalty will be added to the non-residential bill.

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

OFFICE OF THE COMPTROLLER ★ TEXAS ★

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 Deweyville 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.

Signature: [signature] Date: 3/4/11

Name (Mr./Ms./Dr.) Rick Summers Title: Superintendent of Schools

Organization: Deweyville Independent School District Phone: (409) 746-7702

Street Address: 250 Private Road, 8145 Deweyville 77614 Fax: (409) 746-3360

Mailing Address: P.O. Box 408 Deweyville, TX 77614 E-Mail: risummers@esc5.net

County: Newton

Contact Information:

Name (Mr./Ms./Dr.): Rick Summers Title: Superintendent of Schools

Phone: (409) 746-7702 Fax: (409) 746-3360

E-Mail: risummers@esc5.net County: Newton

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.

Texas Energy Managers Association

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD