Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

ESA ENERGY SYSTEMS ASSOCIATES, Inc

A TERRACON COMPANY

100 East Main Street, Suite 201

Round Rock, Texas 78664

(512) 258-0547

Buna Independent School District

May 20, 2011

ESA
Energy Systems Associates, Inc.
A Terracon COMPANY

SECO
State Energy Conservation Office

Table of Contents

1.0 EXECUTIVE SUMMARY: 3

Table 1: Summary of Recommended Energy Cost Reduction Measures (ECRMs) 4

2.0 ENERGY ASSESSMENT PROCEDURE: 6

3.0 ENERGY PERFORMANCE INDICATORS: 7

4.0 RATE SCHEDULE ANALYSIS: 11

ELECTRICITY PROVIDER: 11

NATURAL GAS PROVIDER: 11

5.0 CAMPUS DESCRIPTIONS: 12

Table 2: School Facilities Analyzed For This Report 12

6.0 ENERGY RECOMMENDATIONS: 13

HVAC ECRM 1: INSTALL PROGRAMMABLE NETWORK THERMOSTATS 13

HVAC ECRM 2: RETRO-COMMISSION FACILITIES WITH DDC INSTALLED 2005 13

HVAC ECRM 3: CONVERT SECONDARY CHILLED WATER LOOPS TO VARIABLE VOLUME 14

HVAC ECRM 4: HVAC SYSTEM REPLACEMENT AT HIGH SCHOOL 14

HVAC ECRM 5: CHILLED WATER PUMP INSULATION 15

Lighting ECRM 1: METAL HALIDE FIXTURE RETROFIT TO T8 16

Lighting ECRM 2: RETROFIT T12 MAGNETIC BALLAST TO T8 WITH ELECTRONIC BALLAST 16

Envelope ECRM 1: Replace Poor Weather Stripping and Exhaust Fan Gravity Dampers 18

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS 19

8.0 FINANCIAL EVALUATION 22

9.0 GENERAL COMMENTS 23

APPENDICES 24

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 25

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 26

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 27

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE 32

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT 35

APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA) 37

APPENDIX VI - UTILITY CHARTS ON CD 39

APPENDIX VII – SUGGESTED PRODUCTS MENTIONED IN THE REPORT 40

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

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

In February 2010, **SECO** received a request for technical assistance from Joe Menard for **Buna 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 **Buna ISD,** (hereafter known as *School District*) 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 Jesse, the school district's HVAC technician and our escort during the survey, 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.

<u>We estimate that as much as **$100,700** may be saved annually if all recommended projects are implemented</u>. The estimated installed cost of these projects should total approximately **$336,000**, yielding an average simple payback of **3 1/2** years.

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

ECRM	HS	JH	ES	AC	AB	Observation	Proposed Solution	Cost	Savings	Payback
HVAC-1	X	X				Thermostat control of single zone DX units with not programming capability	Programmable networked thermostats or other means for centralized schedule and setpoint control of each unit.	$ 120,000	$ 60,000	2.0
HVAC-2			X	X		Systems installed in 2005 have DDC controls. The Activity Center has some specialized operating requirements and the Elementary School has a very high ECI.	Retro-commission both of these facilities including humidity control sequence for the new gymnasium in the Activity Center as well as pump and chiller staging controls and AHU controls in both buildings.	$ 70,000	$ 14,000	5.0
HVAC-3			X	X		The ES and Activity Center have chilled water primary/secondary pumping systems	Convert secondary loop to variable volume by converting to two-way valve operation and installing VFD's to operate the existing pumps.	$ 19,000	$ 2,300	8.3
HVAC-4	X					High School and Junior High air condition system is aging, has installation issues causing inefficiency, and does not provide adequate ventilation air for students and staff.	Retrofit the High School with VRV type system that supports simultaneous cooling and heat pump modes (in adjacent spaces) to maximize system efficiency during reheat modes. Add dedicated outdoor air via seperately ducted and operated system employing DCV.	$ 500,000	$ 22,000	22.7
HVAC-5			X	X		Chilled water pumps are not insulated	Insulate chilled water pumps	$ 2,000	$ 400	5.0
Lighting-1	X	X	X	X		All gymnasiums have metal halide lighting	Replace with linear flourescent	$ 50,000	$ 8,000	6.3
Lighting-2	X	X				T12 Lighting with magnetic ballasts	Retrofit with T8 and electronic ballasts	$ 55,000	$ 14,000	3.9
Lighting-2			X	X		Overlit spaces observed	Delamp corridors and some classrooms and other common areas	Incl.	Incl.	Incl.
Envelope	X	X				Poor weatherstripping, failed gravity dampers	Repair door weatherstripping, repair gravity dampers on exhaust fans	$ 20,000	$ 2,000	10.0
								$ 836,000	**$ 122,700**	**6.8**

HS = Buna High School
JH = Buna Junior High
ES = Buna Elementary School
AC = Activity Center
AB = Administration Building

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 Buna ISD. 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
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 Buna ISD, 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

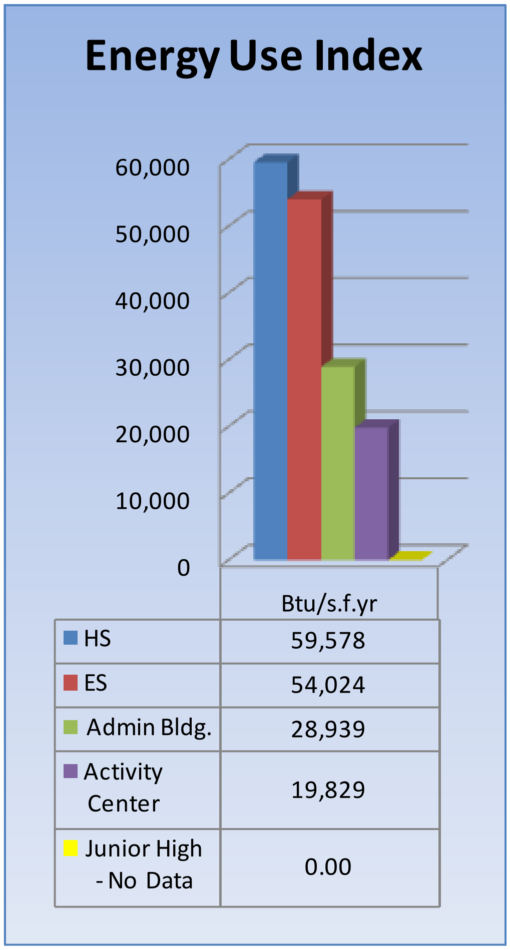
The Energy Cost Index (ECI) depicts the total annual energy cost per square foot of building space.

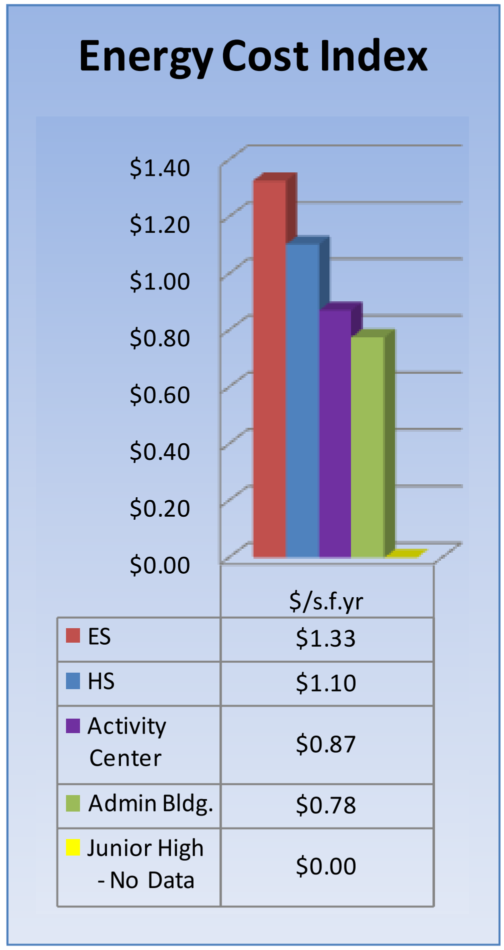
To calculate the ECI, the annual costs of electricity and gas are totaled and divided by the total square footage of the facility:

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 BUNA ISD ENERGY PERFORMANCE INDICATORS:





Buna ISD purchases electricity from **Jasper & Newton Electric Coop**. The transmission and distribution utility is **Jasper & Newton Electric Coop**. The energy history spreadsheets are shown on the next few pages.

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

A copy of the rate schedule is included in Appendix I

OWNER: Buna ISD BUILDING: HS

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2011	145,880		609	8,474	12,850	694	6,020
FEBRUARY	2011	116,780		537	7,532	11,035	480	4,182
MARCH	2010	87,680		465	6,589	9,219	418	4,670
APRIL	2010	110,180		498	7,787	11,092	286	3,217
MAY	2010	183,380		579	11,900	17,401	117	1,401
JUNE	2010	91,880		366	6,370	9,126	1	72
JULY	2010	151,880		450	7,539	12,095	11	162
AUGUST	2010	182,780		606	6,664	12,147	261	2,381
SEPTEMBER	2010	181,580		606	9,276	14,723	311	2,833
OCTOBER	2010	140,780		546	8,863	13,086	353	3,184
NOVEMBER	2010	103,280		432	6,465	9,563	648	5,615
DECEMBER	2010	101,180		510	7,317	10,352	694	6,020
TOTAL		**1,597,260**	**6,204**	**6,204**	**94,776**	**$142,689**	**4,274**	**$39,757**

			Energy Use Index:		
Annual Total Energy Cost =	$182,446	Per Year	Total Site BTU's/yr	59,578	BTU/s.f.yr
			Total Area (sq.ft.)		
Total KWH x 0.003413 =	5,451.45	x 106			
Total MCF x 1.03 =	4,402.22	x 106	**Energy Cost Index:**		
Total Other x ____		x 106	Total Energy Cost/yr	$1.10	$/s.f. yr
Total Site BTU's/yr	9,853.67	x 106	Total Area (sq.ft.)		
Floor area:	165,392	s.f.			
Electric Utility	**Account #**	**Meter#**	**Gas Utility**	**Meter #**	
Jasper & Newton Electric Coop.	40018	40018	Centerpoint Energy	32047953	

OWNER: Buna ISD BUILDING: Elementary

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2011	111,160		500	6,548	9,896	65	564
FEBRUARY	2011	103,460		508	6,752	6,363	42	396
MARCH	2010	95,760		515	6,956	2,829	107	1,214
APRIL	2010	134,280		605	9,141	13,169	14	188
MAY	2010	147,600		709	11,040	15,468	11	161
JUNE	2010	74,880		504	6,399	8,645	1	44
JULY	2010	100,080		608	6,967	9,969	2	54
AUGUST	2010	158,760		792	9,429	14,191	7	100
SEPTEMBER	2010	171,720		763	8,749	15,001	12	140
OCTOBER	2010	153,000		706	10,119	14,709	11	127
NOVEMBER	2010	126,360		569	7,864	11,655	121	1,067
DECEMBER	2010	86,400		558	6,878	9,470	165	1,441
TOTAL		**1,463,460**	**0**	**7,337**	**96,842**	**$131,365**	**558**	**$5,496**

			Energy Use Index:		
Annual Total Energy Cost =	$136,860	Per Year	Total Site BTU's/yr	54,024	BTU/s.f.yr
			Total Area (sq.ft.)		
Total KWH x 0.003413 =	4,994.79	x 106			
Total MCF x 1.03 =	574.74	x 106	**Energy Cost Index:**		
Total Other x ____		x 106	Total Energy Cost/yr	$1.33	$/s.f. yr
Total Site BTU's/yr	5,569.53	x 106	Total Area (sq.ft.)		
Floor area:	103,093	s.f.			

OWNER: Buna ISD **BUILDING:** Administration

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	17,640		67	1,001	1,530	0	0
FEBRUARY	2011	15,720		65	985	1,456	0	0
MARCH	2010	13,800		62	968	1,382	0	0
APRIL	2010	16,560		72	1,161	1,657	0	0
MAY	2010	21,840		90	1,580	2,235	0	0
JUNE	2010	20,280		47	1,160	1,768	0	0
JULY	2010	21,480		64	1,084	1,728	0	0
AUGUST	2010	26,880		98	1,397	2,203	0	0
SEPTEMBER	2010	26,040		96	1,408	2,189	0	0
OCTOBER	2010	19,800		85	1,316	1,910	0	0
NOVEMBER	2010	15,240		77	1,057	1,514	0	0
DECEMBER	2010	14,160		65	995	1,419	0	0
TOTAL		229,440	0	888	14,112	$20,991	0	$0

Annual Total Energy Cost =	$20,991	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	28,939 BTU/s.f.yr
Total KWH x 0.003413 =	783.08	x 106		
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$0.78 $/s.f. yr
Total Site BTU's/yr	783.08	x 106		
Floor area:	27,060	s.f.		

OWNER: Buna ISD **BUILDING:** Activity Center

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	11,880		191	1,719	2,075	0	0
FEBRUARY	2011	12,420		198	1,832	2,205	0	0
MARCH	2010	12,960		205	1,945	2,334	0	0
APRIL	2010	10,440		198	1,827	2,140	0	0
MAY	2010	24,480		284	3,047	3,781	0	0
JUNE	2010	25,920		277	2,978	3,756	0	0
JULY	2010	28,440		281	2,785	3,638	0	0
AUGUST	2010	33,120		284	2,849	3,843	0	0
SEPTEMBER	2010	25,560		250	2,427	3,194	0	0
OCTOBER	2010	18,000		216	2,004	2,544	0	0
NOVEMBER	2010	12,600		263	852	2,654	0	0
DECEMBER	2010	15,120		205	2,013	2,467	0	0
TOTAL		230,940	0	2,852	26,278	$34,630	0	$0

Annual Total Energy Cost =	$34,630	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	19,829 BTU/s.f.yr
Total KWH x 0.003413 =	788.20	x 106		
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$0.87 $/s.f. yr
Total Site BTU's/yr	788.20	x 106		
Floor area:	39,750	s.f.		

Electric Utility	Account #	Meter#	Gas Utility	Meter #
Jasper & Newton Electric Coop.	40452	40452	Centerpoint Energy	0

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

Jasper-Newton Electric Cooperative, Inc.

Large Power Service (Schedule "LP")

(Available to consumers 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 $7.25 per kW
Energy Charge, all kW 3.65¢ 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.

Average Savings for consumption = $0.0365/kWh

Average Savings for demand = $7.25/kW

It doesn't get much simpler than this. This rate structure results in Buna ISD's demand cost being 70% of the overall electricity cost! *This provides an opportunity for significant cost reduction through demand savings by managing the peak demand of each facility and meter consolidation if possible*.

NATURAL GAS PROVIDER:

CenterPoint Energy

The rate schedule for Natural gas is variable and highly dependent on market conditions (80% or more of the price paid is variable and market driven), but we have calculated the average cost per MCF of purchased natural gas in the district by analyzing the utility histories for the schools surveyed in this report. The two support facilities, Administration and Activity Center, do not consume a significant amount of natural gas.

Total cost for natural gas at the two schools during the analyzed billing cycle: $45,253

Total quantity purchased during the analyzed billing cycle: 4,832 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $45,253 / 22,927 MCF

Average cost per MCF = $9.37

5.0 CAMPUS DESCRIPTIONS:

Buna ISD consists of three (3) educational campuses, one (1) administration building, and one (1) community activity center. The high school, junior high, and elementary school as well as the two additional support facilities mentioned are located in Buna, Texas in Jasper County situated in deep southeast Texas near the Texas-Louisiana border. The location falls in the ASHRAE Climate Zone 2-moist. The energy survey focused on two of the educational campuses and two support buildings:

Table 2: School Facilities Analyzed For This Report

Facility	Year originally Constructed	Approximate Square Footage	Basic HVAC Cool/Heat	Basic HVAC Air Distribution	Basic Lighting System Description	Basic Control System Description
Buna High School	1950 Science Wing- 2000	165,392	Split DX with gas furnace or separate gas unit heater. Air cooled chillers for new gym	SZAHU	95% T12 Gym MH	Individual Thermostats
Buna Junior High	1968	54,764	Split DX with gas furnace	SZAHU	Almost all T12 Gym MH	Individual Thermostats
Buna Elementary School	2005	103,093	Air cooled chillers / natural gas boilers	SZAHU	T8 Gym MH	Automated Logic
Administration	1979	27,060	DX	SZ AHU	T12	Individual Thermostats
Activity Center	2005	39,750	Air cooled chiller	SZ AHU	25% T12	Automated Logic

Note: SZAHU = Single-Zone Air Handling Unit; MZAHU = Multi-Zone Air Handling Unit

6.0 ENERGY RECOMMENDATIONS:

HVAC ECRM 1: INSTALL PROGRAMMABLE NETWORK THERMOSTATS

All of the classrooms at the High School and Junior High are served by a split DX cooling system with a non-programmable thermostat. *We recommend installing IP Addressable Programmable Thermostats in these buildings*. These devices will allow the district personnel with appropriate password credentials to monitor and program these units at any district network computer and will limit operation of the HVAC equipment to scheduled occupancy hours. See also the M&O section of this report regarding ventilation of these spaces.

Estimated Cost: $120,000 Estimated Savings: $60,000 Estimated Payback: 2 Years

HVAC ECRM 2: RETRO-COMMISSION FACILITIES WITH DDC INSTALLED 2005

Retro-commissioning/Re-commissioning is the process of commissioning a building that has never been commissioned before or that has been commissioned but is in need of a tune-up. Based on our observations we believe the Activity Center and Elementary School are great candidates for this process of going through all of the control systems in detail and identifying programming changes and other low-cost/no-cost measures that will reduce operating costs and improve conditions/comfort in the facilities. Both have full DDC systems and central chilled water plants that serve air distribution systems that include re-heat, humidity controls, and other processes that can cause wasteful practices if not controlled properly. Detailed analysis at this level is beyond the scope of this report, but we can apply experience with similar facilities to estimate the potential impact of a retro-commissioning effort at these facilities.

Estimated Cost: $70,000 Estimated Savings: $14,000 Estimated Payback: 5 Years

HVAC ECRM 3: CONVERT SECONDARY CHILLED WATER LOOPS TO VARIABLE VOLUME

The Elementary School and Activity Center both have chilled water pumping systems with primary loop for the chillers and secondary loop for the AHU's. *We recommend converting the secondary chilled water loop at each facility to variable flow pumping using Variable Frequency Drives (VFD) to control the pumps*.

Estimated Cost: $19,000   Estimated Savings: $2,300   Estimated Payback: 8.3 Years

HVAC ECRM 4: HVAC SYSTEM REPLACEMENT AT HIGH SCHOOL

In general, the population of DX air conditioners and space heaters to cool and heat the High School and Junior High is aging and is experiencing other issues that rob system efficiency. For instance, the Science Wing at the High School has four (4) condensing units located in a space that does not provide the recommend clearance for proper air flow to the units. This is causing low air flow and possibly re-circulation of warm air to the units. Another major concern is the lack of ventilation air to the spaces. It is possible that the spaces get plenty of ventilation through windows and doors, but relying on this means that the ventilation is not controlled and is not pre-conditioned. *We recommend a complete retrofit of the existing split DX system with an efficient alternative such as variable refrigerant volume (VRV) cooling using terminal type equipment supplied with air from a dedicated outdoor air (DOA) unit centrally located and ducted to each space to provide conditioning of ventilation air, all latent loads, and all heating*. The final system design should incorporate high efficiency natural gas sourced heating as much as possible and perhaps heat recovery from cooling condenser (such as using heat pump mode for reheat of cold air dehumidified by central DOAU during periods of low cooling load when cooling of ventilation air for dehumidification is greater than space cooling loads) but should avoid switching the fuel source from the current source of natural gas and avoid any system that will increase the peak electrical demand due to the high cost of demand under the current rate structure. The cost and savings listed below assumes performing this retrofit at the High School only, due to the fact the Junior High is scheduled to be taken out of service during the next bond cycle. This analysis also does not consider the added cost of ventilating the spaces due to the unknown amount of infiltration through existing windows and doors.

Estimated Cost: $500,000   Estimated Savings: $22,000   Estimated Payback: 23 Years

HVAC ECRM 5: CHILLED WATER PUMP INSULATION

There is no insulation on chilled water pumps at the new Gym or the Elementary School. In the hot and humid environment of Buna this results in a lot of condensation and unnecessary heat gain on the system. *We recommend insulating the pumps when the surfaces are dry to prevent further deterioration of the pump housing and adjacent piping.*

Estimated Cost: $2,000 *Estimated Savings: $400* *Estimated Payback: 5 Years*

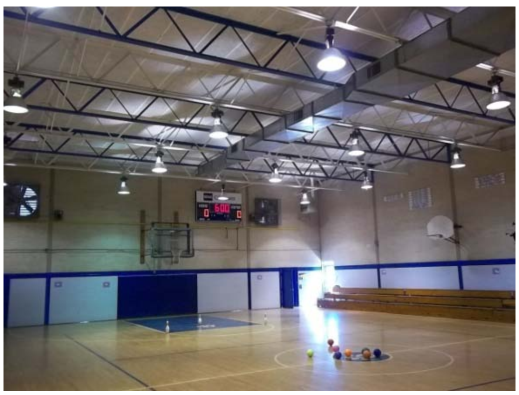



Lighting ECRM 1: METAL HALIDE FIXTURE RETROFIT TO T8

All of the gymnasiums in the district currently utilize high intensity discharge (HID) metal-halide (MH) lighting. These fixtures have inherently long re-strike times, the time it takes for the fixture to “warm up” to rated light output. Therefore, these fixtures are left on many more hours than necessary because the users are simply afraid to turn them off for fear of not having light the minute they need it. *Therefore we recommend the district replace all HID lighting located in indoor spaces with high bay T8 fixtures that provide instant-on lighting and are typically more efficient as well.*

Occupancy sensors should be considered for the gymnasiums to avoid leaving the lights on when no one is present. This was observed in all cases and it was also observed that the scoreboard was left on in the JH gym even though no one was in the gym.

Estimated Cost: $50,000 *Estimated Savings: $8,000* *Estimated Payback: 6.3 Years*




Lighting ECRM 2: RETROFIT T12 MAGNETIC BALLAST TO T8 WITH ELECTRONIC BALLAST

The High School and Junior High were noted to utilize T12 components in their linear fluorescent lighting fixtures. T12 components produce approximately 18% less light and consume about 20% more energy than the T8 lamps and electronic ballasts that may be retrofit into the existing linear fluorescent fixtures. 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 these facilities with T8 lamps and electronic ballasts. NOTE: The Junior High is slated for discontinued use when the next bond is passed, so this needs to be considered compared to potential payback.*

At least one trophy case was observed with T12 lighting that had no switch to turn the lights off. After retrofitting the case with T8 lamps and electronic ballasts, *we recommend installing a manual wall switch to control the lights so they can be turned off at the end of the occupied day.*

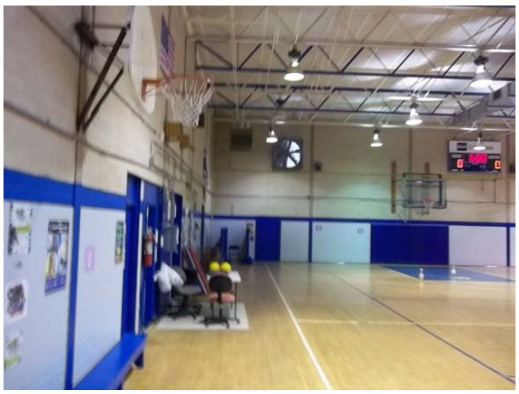
Some spaces including the High School library have a high number of burn-outs. In these areas, a comprehensive retrofit will not reduce consumption but will improve the learning environment significantly. In contrast, many areas such as corridors and some learning areas were noted to have very high lighting levels well beyond IES standards. These areas should be de-lamped as part of the retrofit project. Other spaces such as the Activity Center snack bar area should be considered for occupancy sensor control because it appears the lights are frequently left.

Estimated Cost: $55,000 *Estimated Savings: $14,000* *Estimated Payback: 3.9 years*

Envelope ECRM 1: Replace Poor Weather Stripping and Exhaust Fan Gravity Dampers

Weather stripping is in poor condition at the High School. We recommend implementing a program in replace all of the weather stripping around doors and operable windows. In addition, the exhaust fan at the Junior High gymnasium has gravity dampers that fail to close when the fan is off. *We recommend repairing all weather stripping and making sure other sources for infiltration are remedied.*

Estimated Cost: $20,000 *Estimated Savings: $2,000* *Estimated Payback: 10 years*



7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC

- Comb fins on damaged condensing units
- Install hail guards to protect fins in future
- Keep electric boiler off during peak electrical load conditions
- Verify elec heat stages at low load conditions
- Increase frequency of filter replacement
- Clean Lake Olympia Cooling Tower
- Repair Dulles Cooling Tower

Lighting

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

Controls

- Relocate EMS sensors to improve temperature sampling
- Install timer for booster heater at Briargate

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

Many of the refrigerant lines for the DX units were falling off of the copper tubing. We recommend re-installing the vapor line insulation to keep condensation from forming and dripping from the vapor lines.

For much of the district, the HVAC M&O opportunities revolve around combing the condenser fins [combs available for less than $10]. 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. We recommend installing hail guards on the units to prevent future coil fin damage.

We observed open exterior doors in many instances including the hallway doors and classroom doors in the Health Wing to the outside at the High School while the space air conditioner was running. This is a major source of infiltration and should be eliminated through education of the occupants. However, we also noted that there is no source for mechanical ventilation of classroom spaces in the High School or the Junior High building (See HVAC ECRM 4). Current building codes require ventilation air for occupied spaces, as many of these codes refer to ASHRAE 62.1. *We recommend that any HVAC upgrade in these buildings include a design that is compliant with the ventilation standards outlined in ASHRAE 62.1 2010 or the code requirements of the authority having jurisdiction.* This will likely increase energy consumption but will improve the learning environment for the students and teachers. There is also some concern that current electrical distribution systems within these buildings will be able to handle the added load of equipment sized to handle ventilation air. However, one could argue that the current practice of opening doors puts added load on the systems already. A thorough load analysis should be performed to determine the proper sizing of equipment in each case.

<u>Plug Loads</u>

It was noted that almost every classroom has a mini-fridge, microwave oven, space heater, desk fan, toaster oven, or some combination of these devices. Having these devices in the classroom can result in added load on the distribution electrical and HVAC that was not accounted for in the original design and can cost much more to operate than if one or two of these devices were provided centrally for sharing. This is particularly true in Buna ISD's case because the demand charge is such a high portion of the current bill. You can imagine that if everyone has a microwave oven in their room or a space heater then all of these devices are probably going to be used at about the same time during the day and therefore the demand for each is going to add up quickly and stress the already sensitive electrical distribution system. Having centrally accessible appliances limits the instantaneous demand because only one person can use the device at one time and a single large refrigerator holding everyone's goods is typically going to be much more efficient than many small distributed refrigerators. *We recommend the district institute a policy that prohibits the use of these appliances within the classroom.*

8.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $5,000 maintenance expense next 5 years				
4. $10,000 maintenance expense next 5 years				
5. Savings decreases 5% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($836,000)		0	($836,000)
Year 1		$ 122,700.00	0	$122,700
Year 2		$ 122,700.00	0	$122,700
Year 3		$ 122,700.00	0	$122,700
Year 4		$ 122,700.00	0	$122,700
Year 5		$ 122,700.00	0	$122,700
Year 6		$ 116,565.00	($5,000)	$111,565
Year 7		$ 110,430.00	($5,000)	$105,430
Year 8		$ 104,295.00	($5,000)	$99,295
Year 9		$ 98,160.00	($5,000)	$93,160
Year 10		$ 92,025.00	($5,000)	$87,025
Year 11		$ 85,890.00	($10,000)	$75,890
Year 12		$ 79,755.00	($10,000)	$69,755
Year 13		$ 73,620.00	($10,000)	$63,620
Year 14		$ 67,485.00	($10,000)	$57,485
Year 15		$ 61,350.00	($10,000)	$51,350
			Internal Rate of Return	**9.03%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 GENERAL COMMENTS

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

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

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

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

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

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

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

continued

How to Finance Your Energy Program *continued*

Financing Mechanisms

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

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

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

Internal Funds

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

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

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

Debt Financing

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

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

How to Finance Your Energy Program *continued*

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

Jasper-Newton Electric Cooperative, Inc.

Serving our members since 1943

Home About Us Services Community Power Outages Energy Management Press Release Careers Safety Contact Us
Online Bill Payment

RATES

Effective February 24, 2009

The five base rates listed below are adjusted upward or downward monthly depending on changes in the cooperative's cost of wholesale power. The adjustment is shown on members' bills as the PCRF (Power Cost Recovery Factor).

RATE SCHEDULE

Farm and Home Service (Schedule "R")

(Available for permanent residential consumer installations with a metered demand of 50 kW or less.)

Customer Charge, per month $12.00
All kWh 7.00¢ per kWh

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 bill.

General Service (Schedule "G")

(Available for general installations, commercial service, schools, churches, or other public buildings, and three-phase residential and farm service with metered demand of 50 kW or less.)

Customer Charge, per month $14.00
All kWh 7.10¢ per kWh
Minimum Monthly Charge will be the greater of the following:

A. Single phase $10.00
B. Multi-phase $20.00
C. The minimum monthly charge specified in the contract for service.

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.

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.

Large Power Service (Schedule "LP")

(Available to consumers 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 $7.25 per kW
Energy Charge, all kW 3.65¢ 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.

Security Lighting (Schedule "SL")

(Applicable to all residential farm and home service, commercial establishments, industrial and for street or parkway lighting.)

Security Lighting Options Offered

100 W high pressure sodium $7.35/mo. plus PCRF for 45 kWh
150 W high pressure sodium $7.35/mo. plus PCRF for 70 kWh
400 W high pressure sodium $11.00/mo. plus PCRF for 160 kWh
400 W metal halide $11.00/mo. plus PCRF for 180 kWh

Line Extension Policy - For information about JNEC's line extension policy, please contact the Engineering Department.

Easements - All member/applicants who request service from the cooperative are required to secure the necessary right (s)-of-way easement(s) for the electric lines over and across all lands necessary for providing service to the member/applicant, including land which they do not own. Typical right(s)-of-way are 20 feet in width.

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

SECO
State Energy Conservation Office

Public Schools, Colleges and Non-Profit Hospitals

Preliminary Energy Assessment Service Agreement

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

Description of the Service

The State Energy Conservation Office (SECO) will analyze electric, gas and other utility data and work with _Fort Bend 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: BW Copeland — Date: 8/5/2010

Name (Mr./~~Ms.~~/~~Dr.~~)__Ben W. Copeland — Title: __Chief Auxiliary Services Officer

Organization: __Fort Bend ISD — Phone: __281-634-1042__

Street Address: ___16431 Lexington Blvd — Fax: __281-634-1705_______

Mailing Address: __16431 Lexington Blvd, Sugar Land, TX 77479__ — E-Mail:_benjamin.copeland@fortbendisd.com_

County: ____Fort Bend________

Contact Information:

Name (Mr./~~Ms.~~/~~Dr.~~):__Tim Castilaw_____ — Title: _Executive Director of Facilities and School Support__

Phone: __281-634-1871____________ — Fax: 281-634-5554

E-Mail:__timothy.castilaw@fortbendisd.com______ — County: __Fort Bend_____

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.**

AND fax to the SECO Contractor for this service, **Yvonne Huneycutt**, 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

APPENDIX VII – SUGGESTED PRODUCTS MENTIONED IN THE REPORT

Note: Products listed in the report or shown in this section are provided as a guide to aid in understanding the proposed solution only and is not to be considered a product specification. Product specification will be made by the engineer of record when and if a detailed design is performed for each recommended solution.

PROLIPHIX

PRODUCT BRIEF

INTERNET-MANAGED THERMOSTATS

UNIPHY COMMERCIAL SERIES

IMT550

- Multi-Stage HVAC System Control
- Humidity Sensing & Control
- Auxiliary Equipment Control
- Advanced Sensor Monitoring

PRODUCT HIGHLIGHTS

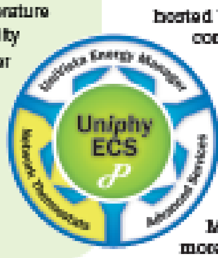
- Internet HVAC Monitoring and Control
- Advanced HVAC System Diagnostics
- Time-of-Day Equipment Control
- Wired Ethernet or 802.11b/g Wireless Communications
- Web Browser Configuration
- E-mail Status and Fault Reporting
- Secure Socket Layer (SSL) Data Security
- Flexible Power Options

UNIPHY ENERGY CONTROL SOLUTION

The Proliphix Internet-Managed Energy Control Solution (ECS) is a sophisticated yet inexpensive energy management system alternative for the small facility owner or operator. The Proliphix ECS provides remote HVAC system monitoring and control, lighting or process equipment control and advanced sensor monitoring, for one or all facilities in an enterprise. The Proliphix ECS is ideally suited for light commercial facilities which require comprehensive energy control at a fraction of the cost of conventional energy management systems. Small business owners/operators will be able to experience aggressive returns on investment, most often in less than a year.

UNIPHY COMMERCIAL SERIES NETWORK THERMOSTATS

The Proliphix Commercial Series Network Thermostats (IMT550c/w) are all that is necessary to provide Proliphix ECS capability at the customer facility for remote HVAC monitoring and control, appliance or equipment control and advanced thermal monitoring. The IMT550c/w network controllers, along with the Proliphix-hosted UniVista Energy Manager software (UEM), provide comprehensive energy control at the lowest cost of ownership.



The Commercial Series Network Thermostats take full advantage of wired and wireless Ethernet technologies and the Internet to leverage the business network infrastructure for comprehensive energy and HVAC system management. The Proliphix Commercial Series product line is compatible with typical HVAC systems and offers all the features expected by commercial installers and system integrators. The Proliphix Commercial Series improves on the strengths of our popular Thermal Management Series Network Thermostats by adding advanced alarming, more sophisticated HVAC control and versatile sensor capability.

SYSTEM SUPPORT

HVAC SYSTEMS

- Hydronic or Hot Air Heat by Oil or Gas
- Heat Pumps, Air Conditioning
- PTACs, RTUs

HVAC TYPE

- Fossil Fuel – Gas/Oil, 3H/2C
- Heat Pump/AC - Electric, 3H (Aux heat)/2C

PRODUCT FEATURES

ADVANCED HVAC FEATURES

- Auto Changeover
- Intelligent Recovery
- Adjustable Setpoint Dead Band
- Adjustable Stage Offsets
- Adjustable Stage Turn-on Delay
- Fan Control on Heat
- Hold Mode Adjustable Timeout
- Time-of-Day Fan Scheduling
- Humidity Sensing & Control

SIMPLE SCHEDULING

- Calendar-Based Graphical Interface
- Drop-Down Menu Control
  - 366 Day Programming
  - 5 Year Scheduling
  - 12 Daily Profiles

ALARM TYPES

- Zone Low/High Temperature
- Zone Low/High Humidity
- Filter Change Reminder
- Remote Sensor
  - Low/High Temperature Threshold
  - Open/Closed Contact Closure

3 LAN Drive, Suite 100, Westford, MA 01886 | ph: 978.692.3375 | fx: 978.692.3378 | www.proliphix.com

PROLIPHIX

PRODUCT BRIEF

ADDITIONAL PRODUCT CAPABILITY

EXTERNAL INPUT SENSORS (3)
- Thermistor Temperature
- Dry Contact Closure

AUXILIARY RELAY OUTPUTS (2 MAX)
- Time-of-Day Activation
- Humidification/Dehumidification Control
- Zone Alarm Threshold Activation

PRODUCT NETWORK CAPABILITY

NETWORK FEATURES
- Wired Ethernet or Wireless 802.11b/g Connectivity
- SSL Password Authentication & Connection Encryption
- SMTP Client
  - E-mail, Text Messaging
  - Alarm Notifications
- Static/DHCP Addressing
- Settable Gateway Address/Address Mask
- Selectable HTTP Ports
- Supports Class A, B, C IP Addressing

ADDITIONAL PRODUCT FEATURES

ENERGY SAVINGS
- HVAC Stage Usage Counters
- Temporary Timed Override
- Limited H/C Cycles per Hour

SECURITY
- Keypad Lockout w/Override Limits
- SSL Data Encryption

CONVENIENCE
- Color Graphic TFT Display
- Ergonomic Touchscreen Control
- Ambient Light Display Backlight Control
- Auto Daylight Savings
- Unique Thermostat Naming
- Service Provider Contact Info

POWER OPTIONS
- IMT550c
  - Proliphix EPA
  - PoE (802.3af)
  - HVAC Power
- IMT550w
  - HVAC Power

PRODUCT SPECIFICATIONS
- Operating Temperature: -10°C to +40°C
- Weight: .75 lb
- Warranty: 3 Year Limited Warranty

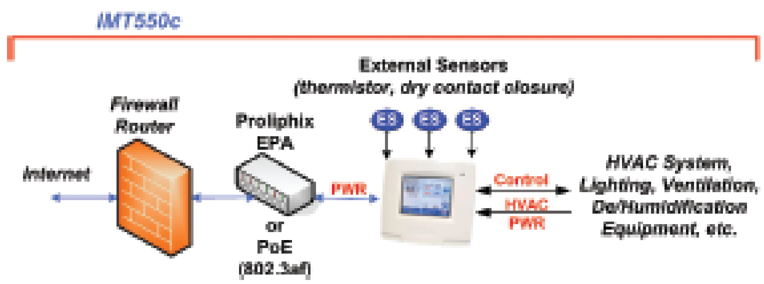
UNIPHY REMOTE MONITORING AND CONTROL

Internet connectivity and the thermostat's browser interface offer unprecedented ease of configuration, monitoring and management capabilities at a fraction of the cost of current programmable communicating thermostats. The Commercial Series Network Thermostats offer distinctive features and functions which position them as sophisticated HVAC system controllers remotely accessible and controllable via the Internet. Authorized resellers and service providers can:

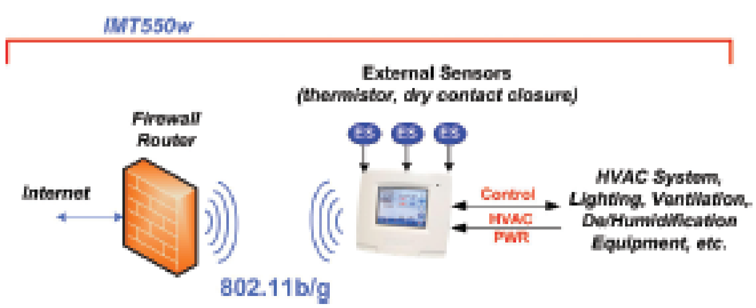
- Remotely adjust the zone temperature
- Respond to HVAC alarm notifications
- Verify system maintenance completion
- Diagnose air handlers and compressors
- Control energy – real-time monitoring

Alternatively, these features can be used independently to:
- Monitor and control HVAC
- Control lighting, exhaust fans, food service equipment, etc.
- Monitor refrigeration/freezer temperatures, door contact closures, etc.
- Monitor RTU electrical energy consumption

TYPICAL IMT550c NETWORK INSTALLATION



TYPICAL IMT550w NETWORK INSTALLATION



Product features and availability are subject to change without notice. Please contact Proliphix or visit our website for more information. Rev 2.0

3 LAN Drive, Suite 100, Westford, MA 01886 | ph: 978.692.3375 | fx: 978.692.3378 | www.proliphix.com