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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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June 3, 2010

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F-4882

SECO
State Energy Conservation Office

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1.0 EXECUTIVE SUMMARY:

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

SECO
State Energy Conservation Office

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

In January 2010, **SECO** received a request for technical assistance from *Tony Williams*, Superintendent for Industrial 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 **Industrial ISD,** (hereafter known as IISD) 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. Williams,* a walk-through energy analysis was conducted throughout the campus with Jeffrey Woodring, Director of Maintenance for IISD. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 6.0 of this report.

<u>We estimate that as much as **$5,600** may be saved annually if all recommended projects are implemented</u>. The estimated installed cost of these projects should total approximately **$31,600**, yielding an average simple payback of **5-3/4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$400	$400	1 Year
Lighting ECRM #1	$ 31,200	$5,200	6 Years
TOTAL PROJECTS	$31,600	$5,600	5-3/4 Years

Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Return of Investment (ROI), for this retrofit program has been calculated and shown in Section 7.0 of this report.

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

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

2.0 ENERGY ASSESSMENT PROCEDURE:

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

1. Design and monitor customized procedures to control run times of energy consuming systems.
2. Analyzing 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. Assist in 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 ENERGY PERFORMANCE INDICATORS FOR :

Industrial ISD

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
Inez Elementary West	31,529	$1.31
Industrial Elementary East	38,802	$1.43
Junior High School	54,600	$1.35
HS Gym	13,219	$0.52
High School / Administration	33,728	$0.93

A company hired by Centerpoint to oversee the SCORE Program has recently indicated the average EUI and ECI for South Texas Schools is 52,800 BTU/sf-yr and $1.51, respectively. Industrial ISD is below the regional average for all facility ECIs and near or below average for all facility EUIs. This data demonstrates the success and dedication that Industrial ISD has placed on its energy efficiency.

The electricity and gas consumption charts for all of Industrial facilities area as follows:

OWNER: INDUSTRIAL ISD **BUILDING:** Elementary West

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	44259	n/a	n/a	n/a	6,042	11	$107
FEBRUARY	2009	14204	n/a	n/a	n/a	2,352	23	$214
MARCH	2009	13831	n/a	n/a	n/a	2,340	9	$93
APRIL	2009	15850	n/a	n/a	n/a	2,600	8	$84
MAY	2009	20890	n/a	n/a	n/a	4,912	8	$85
JUNE	2009	23699	n/a	n/a	n/a	3,866	8	$85
JULY	2009	22691	n/a	n/a	n/a	1,606	1	$18
AUGUST	2009	25130	n/a	n/a	n/a	3,860	8	$70
SEPTEMBER	2009	20233	n/a	n/a	n/a	4,281	8	$68
OCTOBER	2009	32551	n/a	n/a	n/a	4,011	8	$70
NOVEMBER	2009	27886	n/a	n/a	n/a	4,308	7	$68
DECEMBER	2009	40326	n/a	n/a	n/a	6,145	7	$65
TOTAL		301,550	0	0		$46,323	106	$1,027

Annual Total Energy Cost =	$47,350	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	31,529 BTU/s.f.yr
Total KWH x 0.003413 =	1,029.19	x 106		
Total MCF x 1.03 =	109.18	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.31 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	1,138.37	x 106		
Floor area:	36,106	s.f.		

OWNER: INDUSTRIAL ISD **BUILDING:** Elementary East

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	27,320	n/a	n/a	n/a	4,033	All Electric Facility	All Electric Facility
FEBRUARY	2009	54920	n/a	n/a	n/a	7,312		
MARCH	2009	40,120	n/a	n/a	n/a	5,273		
APRIL	2009	34,920	n/a	n/a	n/a	5,212		
MAY	2009	52,120	n/a	n/a	n/a	6,649		
JUNE	2009	65,320	n/a	n/a	n/a	7,922		
JULY	2009	42,400	n/a	n/a	n/a	4,473		
AUGUST	2009	37,720	n/a	n/a	n/a	5,280		
SEPTEMBER	2009	42,520	n/a	n/a	n/a	4,942		
OCTOBER	2009	46,920	n/a	n/a	n/a	4,878		
NOVEMBER	2009	30,120	n/a	n/a	n/a	3,285		
DECEMBER	2009	28,520	n/a	n/a	n/a	4,105		
TOTAL		502,920	0	0		$63,364	0	$0

Annual Total Energy Cost =	$63,364	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	38,802 BTU/s.f.yr
Total KWH x 0.003413 =	1,716.47	x 106		
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.43 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	1,716.47	x 106		
Floor area:	44,237	s.f.		

OWNER: **INDUSTRIAL ISD** **BUILDING:** **JH School**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	**YEAR**	**CONSUMPTION KWH**	**METERED KW/KVA**	**CHARGED KW/KVA**	**COST OF DEMAND**	**TOTAL ALL ELECTRICAL COSTS $**	**CONSUMPTION MCF**	**COSTS $**
JANUARY	2010	44,500	n/a	n/a	n/a	4,962	187	$1,775
FEBRUARY	2009	54,500	n/a	n/a	n/a	6,441	143	$1,671
MARCH	2009	51,500	n/a	n/a	n/a	5,846	142	$1,665
APRIL	2009	54,000	n/a	n/a	n/a	6,614	104	$1,219
MAY	2009	83,000	n/a	n/a	n/a	8,622	57	$671
JUNE	2009	97,500	n/a	n/a	n/a	10,632	39	$473
JULY	2009	89,000	n/a	n/a	n/a	7,811	1	$22
AUGUST	2009	78,000	n/a	n/a	n/a	7,174	1	$21
SEPTEMBER	2009	111,000	n/a	n/a	n/a	9,545	40	$394
OCTOBER	2009	53,500	n/a	n/a	n/a	8,004	50	$489
NOVEMBER	2009	63,000	n/a	n/a	n/a	4,448	76	$730
DECEMBER	2009	63,000	n/a	n/a	n/a	5,997	185	$1,757
TOTAL		**842,500**	**0**	**0**		**$86,096**	**1,025**	**$10,887**

Annual Total Energy Cost =	$96,983	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	54,600	BTU/s.f.yr
Total KWH x 0.003413 =	2,875.45	x 106			
Total MCF x 1.03 =	1,055.75	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.35	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	3,931.20	x 106			
Floor area:	72,000	s.f.			

OWNER: **INDUSTRIAL ISD** **BUILDING:** **HS Gym**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	**YEAR**	**CONSUMPTION KWH**	**METERED KW/KVA**	**CHARGED KW/KVA**	**COST OF DEMAND**	**TOTAL ALL ELECTRICAL COSTS $**	**CONSUMPTION MCF**	**COSTS $**
JANUARY	2010	12,000	n/a	n/a	n/a	1,436.00	All Electric Facility	All Electric Facility
FEBRUARY	2009	9,000	n/a	n/a	n/a	1,230.00		
MARCH	2009	3,700	n/a	n/a	n/a	813.00		
APRIL	2009	2,300	n/a	n/a	n/a	734.00		
MAY	2009	2,700	n/a	n/a	n/a	742.00		
JUNE	2009	5,700	n/a	n/a	n/a	1,000.00		
JULY	2009	11,900	n/a	n/a	n/a	1,104.00		
AUGUST	2009	11,300	n/a	n/a	n/a	1,008.00		
SEPTEMBER	2009	12,300	n/a	n/a	n/a	1,286.00		
OCTOBER	2009	9,400	n/a	n/a	n/a	1,048.00		
NOVEMBER	2009	3,000	n/a	n/a	n/a	479.00		
DECEMBER	2009	4,700	n/a	n/a	n/a	994.00		
TOTAL		**88,000**	**0**	**0**		**$11,874**	**0**	**$0**

Annual Total Energy Cost =	$11,874	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	13,219	BTU/s.f.yr
Total KWH x 0.003413 =	300.34	x 106			
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$0.52	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	300.34	x 106			
Floor area:	22,721	s.f.			

OWNER: INDUSTRIAL ISD **BUILDING:** Admin/High School

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	83,075	n/a	n/a	n/a	9,038	97	$929
FEBRUARY	2009	68,275	n/a	n/a	n/a	8,001	37	$446
MARCH	2009	43,875	n/a	n/a	n/a	5,490	30	$360
APRIL	2009	39,875	n/a	n/a	n/a	5,532	16	$200
MAY	2009	56,675	n/a	n/a	n/a	6,660	16	$202
JUNE	2009	83,875	n/a	n/a	n/a	9,504	9	$119
JULY	2009	85,475	n/a	n/a	n/a	7,738	6	$83
AUGUST	2009	95,075	n/a	n/a	n/a	7,756	9	$115
SEPTEMBER	2009	99,075	n/a	n/a	n/a	9,047	14	$145
OCTOBER	2009	92,510	n/a	n/a	n/a	7,724	15	$157
NOVEMBER	2009	55,075	n/a	n/a	n/a	4,206	19	$149
DECEMBER	2009	58,275	n/a	n/a	n/a	6,501	65	$628
TOTAL		861,135	0	0		$87,197	333	$3,533

Annual Total Energy Cost =	$90,730	Per Year	**Energy Use Index:**		
			Total Site BTU's/yr / Total Area (sq.ft.)	33,728	BTU/s.f.yr
Total KWH x 0.003413 =	2,939.05	x 106			
Total MCF x 1.03 =	342.99	x 106	**Energy Cost Index:**		
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$0.93	$/s.f. yr
Total Site BTU's/yr	3,282.04	x 106			
Floor area:	97,310	s.f.			

Charting the annual electricity consumption reveals that the campuses do not experience a significant decrease in consumption for June and July as would be expected for periods of vacationing students (see Figure 1 to the right). While it is acknowledged that summer months do represent custodial and administrative occupancy periods, the lack of a decrease in consumption for these months may indicate an opportunity for improved coordination and zoning of June and July Administrative and Custodial activities in order to reduce consumption during these time periods. Lack of a decrease in consumption during summer months implies that more units than necessary are being operated for floor maintenance activities or possibly that control programs are not being adjusted to the summer occupancy schedules.

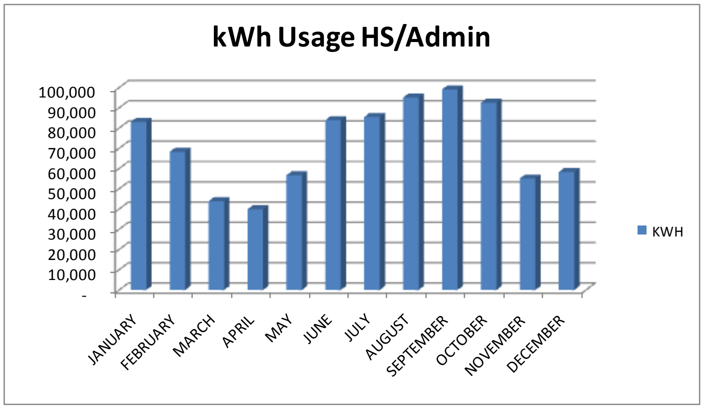
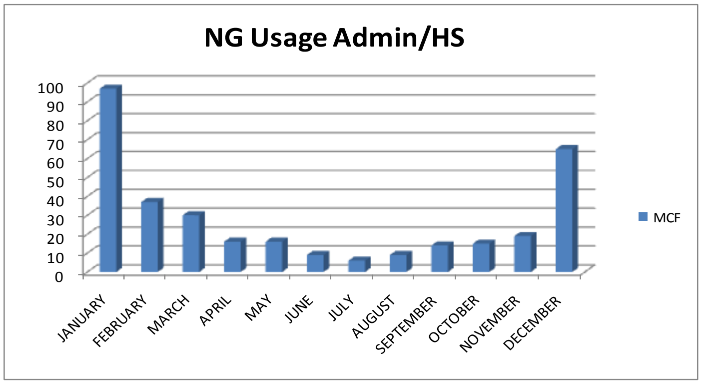


Figure 1: HS/Admin Consumption Chart

The district's natural gas consumption (Figure 2), on the other hand, shows an ideal inverted bell curve that demonstrates excellent control of natural gas use for space heating in a public school facility in Texas. The baseline readings in summer months likely represent the consumption for natural gas water heaters that are not disconnected during the summer.



The district has two electricity providers; Inez Elementary is served by Direct Energy and the Industrial campuses are served by Victoria Electric Cooperative. Copies of the electric rate schedules are included in Appendix II.

5.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

INEZ Elementary

RETAIL ELECTRIC PROVIDER (REP): Direct Energy [$0.08807 per kWh]

TRANSMISSION AND DISTRIBUTION (T&D): AEP

Electric Rate: Secondary Service > 10 kW

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$26.52 per meter
	Metering Charge	=	$15.81 per meter
	Transmission System Charge (Non-IDR Meter)	=	$1.793 per NCP kW
	Distribution System Charge	=	$3.314 per Billing kW
II.	SYSTEM BENEFIT FUND	=	$0.000662 per kWh
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$1.035407/kW
	Transition Charge 2	=	$2.464918/kW
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.037224 per Billing kVA
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.335686/4CP kVA
VI.	COMPETITIVE METERING CREDIT	=	$2.17 per month
VII.	RATE CASE SURCHARGE RIDER #1	=	$0.000047 per kWh
VIII.	RATE CASE SURCHARGE RIDER #2	=	$0.000065 per kWh
IX.	TRUE-UP CASE SURCHARGE RIDER	=	$0.041116 per kW
X.	ENERGY EFFICIENCY RIDER	=	$0.000288 per kWh
XI.	ADVANCED METERING SYSTEM RIDER	=	$2.05 per month

Average Savings for consumption (from billings) = $0.08807 + $0.000662 + $0.000047 + $0.000065 + $0.000288 = **$0.089132 / kWh**

Average Savings for demand = $1.793 + $3.314 + $1.035407 + $2.464918 + + 0.037224 + $0.335686 + $0.041116 **= $9.02 / kW****

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

1. NCP kW: Peak demand during 15 minute interval of current billing cycle
2. 4CP kW: Average demands of June, July, August and September of previous calendar year; usually only applied to IDR metered accounts
3. DS (Distribution System) Billing kW: Ratchet demand representing higher of two calculations: 80% of peak demand in last 11 months or current NCP kW

Facilities within Industrial City Limits:

ELECTRICITY PROVIDER:	**Victoria Electric Cooperative**
RATE:	**Large Power Secondary**
Customer Charge	$61.00
Energy Charge:	$ 0.059778 per kWh Plus monthly variable Power Cost Recovery Factor (example: April, 2010 = $0.0050650)
Demand Charge:	$10.21 per kW

Average Savings for consumption = **$0.064843 / kWh**

Average Savings for demand = **= $10.21 / kW**

NATURAL GAS PROVIDER:

Centerpoint

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

Total Cost of Natural Gas purchased for Industrial ISD: $15,447

Total Quantity of Natural Gas purchased for Industrial ISD: 1,464 mcf

Cost / Quantity **= Average Unit Cost** = $15,447 / 1,464 mcf = **$10.55/mcf**

5.0 CAMPUS DESCRIPTIONS:

Figure 1: Inez Elementary School

Industrial ISD consists of a single K-12 campus located in Vanderbilt, Texas, and an additional Elementary campus 17 miles from Vanderbilt in Inez, Texas. Both cities are east of Victoria. The facilities are operated from mid- August through late May on a weekday schedule of 7:00 A.M. to 5:00 P.M. The Administrative area is open all year, and portions of the facility are occupied by the maintenance/custodial staff throughout the summer. District records indicate the district contains 72,786 square feet of facilities while serving 299 students.

All of the buildings are brick faced and have flat built-up gravel or low sloping metal roofs. The oldest buildings were constructed in 1953 with various renovations and additions through 2007. The district has been aggressively pursuing energy efficiency improvements over the last few years; an effort that has been supported by the EUIs and ECIs demonstrated in Section 3.0.

<u>HVAC System Description:</u>

The district is predominantly a combination of rooftop units and split systems for the various buildings in the district. None of the units were installed before 1995. The district has an excellent maintenance staff and the district should be able to get the full life-expectancy of 20 years from the units currently in service, with the exception of four each 2004 Trane RAUCC404BX030 units. These 40-ton condensing units have coil fins that are rapidly corroding and falling off of the coils. Vanderbilt is approximately 15 miles from the Gulf of Mexico and we believe salt carried in from the ocean breeze is the catalyst for the coil fin corrosion. The units do not appear to have been ordered with supplemental corrosion protection; they are the only units in the district experiencing this problem. At 6 years old, these units are post-warranty period and will require replacement soon as the corrosion will not be limited to the coil fins and small refrigerant leaks are likely to develop in the near future.

Figure 2: Coil fins damaged at CU

It was noted during the survey that some of the units do not have coil guards installed on the units. These units have sustained mild to moderate coil fin damage as a result of this lack of protection (see picture to the right). Units with this type of damage to just 10% of the coil fins can lose as much as 30% of their operating efficiency due to the unit's inability to evacuate heat to the atmosphere. We recommend the district comb the damaged fins straight (fin combs are available for about $10) and install coil guards to protect the units from damage in the future.

The Junior High School was constructed in 2007; it has a DX-double duct variable volume system. The hot deck is currently operating with a morning startup temperature of 100°F and an afternoon operational temperature of 75°F. *We recommend the hot deck be limited to return air between the months of April and October to eliminate the use of the Sellers 800,000 BTUH input boiler for the system during the warmer cooling season months.* The existing system has Trane Climate Changer air handlers with hot gas bypass that has been problematic for the district and is under consideration for being removed from the system.

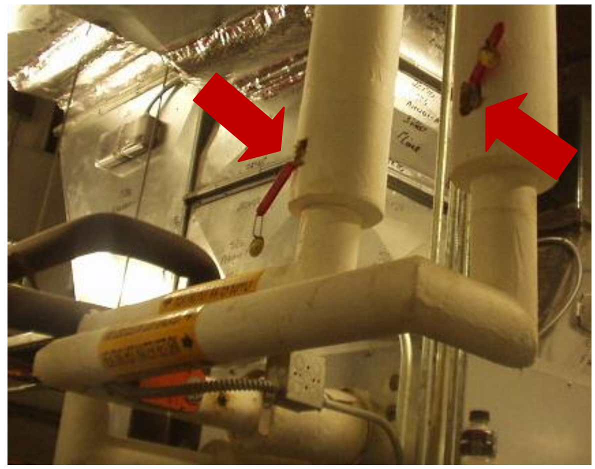


Figure 3: HW Valves throttled on VAV system

It was noted during the survey that the manual supply and return hot water valves at the air handlers are throttled down to approximately 30% closed. This condition is typically discovered after a temporary test and balance test has not been undone or if the hot water piping is oversized for the flow tolerances of the Belimo control valves which are installed in the system. Typically, the Variable Frequency Drive will offer the most energy savings when it is allowed to throttle pumps and fans to accommodate actual loads required to condition the space. Valves which are partially closed will increase the pressure in the system at the air handler piping, but reduce the pressure in the main branch piping where the differential pressure sensor is located. The sensor determines the overall satisfaction of space conditioning by the pressure in these main branch lines. As spaces become satisfied, their hot or chilled water valves will close and the pressure in the main branch line will increase, signaling the VFD that the spaces are mostly satisfied and the fans and pumps can slow down while the zones remain comfortable. As the spaces migrate away from setpoint, the hot and chilled water valves open, reducing the pressure in the main branch line and signaling the system to ramp up. Consequently, with the manual valves partially throttled back, the system is sensing an artificially unsatisfied condition and will run the system harder than necessary. This reduces the energy savings available in the same system if the manual valves had been left 100% open and the VFD allowed to adjust to actual load conditions.

The High School Auditorium is served by a 10-ton unit at the stage and a 70-ton unit at the house seating. Currently, the district is operating the 70-ton unit around the clock in an effort to protect the stage curtains from mold and mildew growth. *We recommend the district ensure all sources of incoming outside air are controlled and the space is dehumidified to protect the curtains*. Preferably, the dehumidification can be accomplished with the 10-ton stage unit to offer the district the significant savings on demand and consumption from the existing operation of the 70-ton unit.

The Black Box Theater utilizes a window unit to condition the space, but it is currently not controlled by the energy management system. We recommend the unit have an IP addressable programmable thermostat installed to allow the unit to be monitored and controlled via computer without having to incur the expense of extending the existing EMS to serve this area.

The Elementary Schools still utilize some PTAC units (Packaged Terminal Air Conditioners) to condition the classroom spaces. The district personnel state the units are a high source of frustration for the maintenance department and are gradually replacing the units with split systems as the PTAC units begin to fail. Outside air in these areas is supplied with dedicated outside air units and distributed to each classroom with a common ducted supply system.

Control System Description:

The district has an energy management system that limits operation of the HVAC equipment to the following schedule:

AREA	DAYS	PROGRAMMED ON	PROGRAMMED OFF
Cafeteria	M-F	0600	1430
Gymnasium	M-F	0800	1530
Classroom Areas	M-F	0730*	1600

*The units for the classroom areas operate with a staggered start program to try to limit peak demand readings.

Occupied cooling setpoint:	80°F after 1430 hours
Morning startup hot deck temperature	100°F
Afternoon operational hot deck temperature	75°F

Lighting System Description:

The district is virtually 100% T8 fluorescent fixtures with electronic ballasts in the facilities. The Gymnasium has 42 each 400-watt metal halide fixtures. The Band Hall has an additional six (6) 400-watt fixtures. These fixtures are relatively efficient by themselves, but their long re-strike issue discourages personnel from turning them off during periods of inactivity because they do not want to wait the 5-10 minutes required to re-start the fixtures when gym activities resume. Therefore, the fixtures typically operate 11-12 hours per day. *We recommend the district consider renovating the fixtures with new T5HO or T8 fluorescent high bay fixtures.* These fixtures do offer energy reductions from comparable metal halide fixtures, but more importantly, they do not have the re-strike issue inherent to metal halides and therefore may be turned off during inactive times of the day. *We recommend utilizing 4-lamp fixtures over the bleachers and general walkway areas and 6-lamp fixtures directly at the Band Hall and over the gymnasium court.*

The Junior High gymnasium has thirty (30) each 8-lamp compact fluorescent fixtures that currently produce 13 footcandles on the court. We recommend replacing these fixtures with fourteen 4-lamp fixtures over the perimeter and sixteen 6-lamp fixtures over the court.

Corridor fixtures in the Junior High are 3-lamp T8 fixtures. The corridor is slightly overlit with these fixtures. We recommend the district remove one lamp from each existing fixture and operate the fixtures with only two lamps. This measure will save the district approximately $1,250 each year at the Junior High.

There are some exterior fixtures which were operating during the daytime hours (see Figure 4 to the right). *We recommend these fixtures be controlled by photocell or timeclock to limit their operation to required nighttime hours.*

Figure 4: Exterior fixtures on at daytime – Inez ES

Exit signs are a mixture of LED and incandescent type fixtures. *We recommend the incandescent fixtures be renovated with new LED lamps if they are in sufficient condition to be in service*. Exit fixtures that are not illuminated, or in too poor of condition to be re-used, should be replaced with new LED or LEC units.

<u>Water Heating</u>

The Junior High domestic hot water loop is currently operated at 160°F. The district has opted for a chemical dishwasher that does not require hot water loop temperatures higher than about 130°F. Therefore, *we recommend the district lower the hot water loop temperature to 135°F to reduce hot water demand on the RBI Futura boiler.*

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

Lighting

- Remove one lamp from all Junior High 3-lamp corridor fixtures.
- Control exterior lights with timeclock or photocell

HVAC

- Comb condensing unit fins; install hail guards as necessary to prevent future coil fin damage.
- Turn off hot deck boiler at Junior High School during cooling season months.
- Ensure outside air sources are controlled at Auditorium and dehumidify with 10-ton unit
- Reduce JH hot water loop temp to 130 degrees

Building Envelope

- Check weatherstrip at all exterior doors, replace as needed

Maintenance and Operation procedures are strategies that can offer significant energy savings potential, yet require little or no capital investment by the district to implement. Exact paybacks are at times difficult to calculate, but are typically less than one year. The difficulties with payback calculations 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 weather-stripping so that exact air losses may be determined), is prohibitive when the benefits of renovating door and weather-stripping are well documented and universally accepted.

Lighting System M&O
Currently, the Junior High corridors have 3-lamp T8 fluorescent fixtures in the corridors. We recommend removing the center lamp from each of these fixtures for substantial energy savings in the corridor.

HVAC M&O #1
Condensing or rooftop units with damage to just 10% of the coil fins can lose as much as 30% of their operational efficiency as the units lose their ability to dissipate heat to the atmosphere. Combs to straighten damaged fins cost less than $10 and can usually restore most or all of the lost efficiency.

HVAC M&O #2

Currently the boiler is being used for 10 months each year to maintain a 100°F hot deck air temperature in the morning and a 75°F hot deck temperature in the afternoon. During warm cooling season months, the boilers can be shut off and the hot deck temperature maintained with 78°F return air only.

HVAC M&O #3

The Auditorium is currently dehumidified by operating the 70-ton HVAC unit 24/7. If the outside air sources are controlled (outside air dampers shut; exhaust fans limited to scheduled occupancy hours; etc.), we believe the space can be dehumidified with the 10-ton stage unit and the district realize significant energy savings by turning off the 70-ton unit.

HVAC M&O #4

The existing 160°F hot water loop temperature at the Junior High is significantly higher than the 130°F final rinse temperature required by the chemical dishwasher. Reduce loop temperature to 135°F.

Envelope M&O

It was noted there were several exterior doors around the district that suffered from missing or absent weather-stripping. We recommend that the weatherstripping be replaced as necessary.

B. CAPITAL EXPENSE PROJECTS

HVAC

- Install IP Adressable Thermostat at Black Box Theater window unit and eliminate after-hour operation.

Lighting

- Renovate Gym and Band Hall metal halide fixtures with T5 fluorescent fixtures.

HVAC ECRM

ECRM #1: Install IP Addressable Programmable Thermostat at Black Box Theater.

Estimated Installed Cost	=	$ 400
Estimated Energy Cost Savings	=	$ 400
Simple Payback Period	=	1 year

LIGHTING ECRM

ECRM #1: Replace metal halide and compact fluorescent high-bay fixtures with T5HO High Bay Fluorescent Fixtures

IISD has approximately forty-eight (48) each 400-watt metal halide fixtures at the Gymnasium and Band Hall and thirty (30) 8-lamp compact fluorescent fixtures at the Junior High gymnasium. We recommend replacing these lights with new 4 or 6-lamp T5HO high bay linear fluorescent fixtures over the bleachers and egress areas and new 6-lamp fixtures over the court area. These fixtures will allow the lights to be turned off during inactive periods of the day, saving as much as 4-6 hours of operation per day.

Estimated Installed Cost	=	$ 31,200
Estimated Energy Cost Savings	=	$ 5,200
Simple Payback Period	=	6 years

SUMMARY TABLE:

If IISD was to implement all recommended projects, the summary payback would be:

Estimated Installed Cost	=	$ 31,600
Estimated Energy Cost Savings	=	$ 5,600
Simple Payback Period	=	5-3/4 years

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

1. Lighting ECRM #1	Taking advantage of the ability to turn off the gymnasium fixtures during inactive periods of the day will generate energy savings and eliminate unnecessary heat generated in the gym which has to be overcome by the HVAC system.
2. HVAC ECRM #1	The new thermostat provides the district with the ability to monitor and control the Black Box Theater HVAC units without extending the existing EMS to the space.

7.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $500 maintenance expense next 5 years				
4. $1000 maintenance expense last 5 years				
5. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($31,600)		0	($31,600)
Year 1		$ 5,600	0	$5,600
Year 2		$ 5,600	0	$5,600
Year 3		$ 5,600	0	$5,600
Year 4		$ 5,600	0	$5,600
Year 5		$ 5,600	0	$5,600
Year 6		$ 5,488	($500)	$4,988
Year 7		$ 5,376	($500)	$4,876
Year 8		$ 5,264	($500)	$4,764
Year 9		$ 5,152	($500)	$4,652
Year 10		$ 5,040	($500)	$4,540
Year 11		$ 4,928	($1,000)	$3,928
Year 12		$ 4,816	($1,000)	$3,816
Year 13		$ 4,704	($1,000)	$3,704
Year 14		$ 4,592	($1,000)	$3,592
Year 15		$ 4,480	($1,000)	$3,480
			Internal Rate of Return	**13.74%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans On Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

The 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 Felix Lopez of State Energy Conservation Office, (SECO), at 512-463-1080 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 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 SCHEDULES

PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED
DEC 23 '09 DOCKET 36928
CONTROL #

AEP TEXAS CENTRAL COMPANY
TARIFF FOR ELECTRIC DELIVERY SERVICE
Applicable: Entire System
Chapter: 6 Section: 6.1.1
Section Title: Delivery System Charges
Revision: Sixth Effective Date: December 30, 2009

6.1.1.1.3 SECONDARY VOLTAGE SERVICE GREATER THAN 10 KW

AVAILABILITY

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

TYPE OF SERVICE

Delivery Service will be single-phase 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard meter provided for this type of Delivery Service. Any meter other than the standard meter will be provided at an additional charge. Where Delivery Service of the type desired is not available at the Point of Delivery, additional charges and special arrangements may be required prior to Delivery Service being furnished, pursuant to Section 5.7 and 6.1.2 of this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:

Customer Charge		
Non-IDR Metered	$3.26	per Retail Customer per Month
IDR Metered	$26.52	per Retail Customer per Month
Metering Charge	$15.81	per Retail Customer per Month
Transmission System Charge		
Non-IDR Metered	$1.286	per NCP kW Billing Demand
IDR Metered	$1.793	per 4CP kW Billing Demand
Distribution System Charge	$3.314	per NCP kW Billing Demand

II. System Benefit Fund: $0.000662 per kWh See SBF 6.1.1.4

III. Transition Charge: See Riders TC 6.1.1.2.1.1 and TC-2 6.1.1.2.2.1

IV. Nuclear Decommissioning Charge: See Rider NDC 6.1.1.5.1

V. Transmission Cost Recovery Factor: See Rider TCRF 6.1.1.6.2.1

119 16

PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED

DEC 2 3 '09 DOCKET 36923

CONTROL # ________

AEP TEXAS CENTRAL COMPANY
TARIFF FOR ELECTRIC DELIVERY SERVICE
Applicable: Entire System
Chapter: 6 Section: 6.1.1
Section Title: Delivery System Charges
Revision: Sixth Effective Date: December 30, 2009

VI. Excess Mitigation Credit: Not Applicable

VII. State Colleges and Universities Discount: See Rider SCUD 6.1.1.6.1

VIII. Competitive Metering Credit: See Rider CMC 6.1.1.6.6

IX. Other Charges or Credits:

- **A. Rate Case Surcharge Rider** See Rider RCS-2 6.1.1.6.8
- **B. True-up Case Surcharge Rider** See Rider TCE 6.1.1.6.7
- **C. Energy Efficiency Rider** See Rider EECRF 6.1.1.6.4.1
- **D. Advanced Metering System Rider** See Rider AMSCRF 6.1.1.6.9

COMPANY-SPECIFIC APPLICATIONS
Refer to Section 6.2.2 of the Tariff for additional voltage information.

Three-phase service may be provided if Retail Customer has permanently installed, and in regular use, motor(s) which qualify according to Section 6.2.3.4, or, at the Company's sole discretion, the load is sufficient to warrant three-phase service.

Service will normally be metered at the service voltage. For more information, refer to the Meter Installation and Meter Testing Policy, Section 6.2.3.3 of the Tariff.

Refer to Section 5.5.2 of the Tariff for additional information regarding highly fluctuating loads.

Refer to Section 5.5.4 of the Tariff for additional information regarding operational changes significantly affecting Demand.

Refer to Section 5.5.5 of the Tariff for additional information regarding Power Factor.

Transmission service will be furnished by the Transmission Service Providers (TSPs), and not the Company. The Company performs only the billing function for TSPs.

Determination of Billing Demand for Transmission System Charges
Determination of NCP kW
The NCP kW applicable under the Monthly Rate section for transmission system charges for non-IDR metered customers and IDR metered customers without sufficient 4CP kW

AEP TEXAS CENTRAL COMPANY
TARIFF FOR ELECTRIC DELIVERY SERVICE
Applicable: Entire System
Chapter: 6 Section: 6.1.1
Section Title: Delivery System Charges
Revision: Sixth Effective Date: December 30, 2009

PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED
DEC 23 '09 DOCKET 36928
CONTROL #

demand data shall be the kW supplied during the 15-minute period of maximum use during the billing month.

Determination of 4 CP kW For IDR Metered Customers

If the Billing Meter is an IDR Meter that was installed at the Retail Customer's request, or by Commission rule, the transmission system charges will be calculated using the 4CP billing kW demand as determined in this section. The 4 CP kW demand applicable under the Monthly Rate section shall be the average of the sum of the Retail Customer's integrated 15-minute demands at the time of the monthly ERCOT system 15-minute peak demand for the months of June, July, August and September of the previous calendar year. The Retail Customer's average 4 CP kW demand will be updated effective on January 1 of each calendar year and remain fixed throughout the calendar year. Retail Customers without previous history on which to determine their 4 CP kW demand will be billed at the applicable NCP kW demand rate under the "Transmission System Charge" using the Retail Customer's NCP kW demand.

All Retail Customers with IDR metering, except IDR meters installed by Company for load survey purposes, will be billed Transmission charges on their 4 CP kW demand pursuant to this schedule.

Determination of Billing Demand for Distribution System Charges

Determination of NCP kW Billing Demand

The NCP kW Billing Demand shall be the kW supplied during the 15-minute period of maximum use. The NCP kW Billing Demand applicable to the Distribution System Charge shall be the higher of the NCP kW demand for the current billing month or 80% of the highest monthly NCP kW demand established in the 11 months preceding the current billing month (80% ratchet). The 80% ratchet shall not apply to Retail Seasonal Agricultural Customers.

Determination Of Billing Demand When Meter Readings Cannot be Obtained

When meter readings cannot be obtained due to denial of access, weather, meter failure, tampering, or other event, the Retail Customer's demand will be estimated pursuant to Section 6.2.3.2.

NOTICE

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

VICTORIA ELECTRIC COOPERATIVE, INC.

102 S. BEN JORDAN
P. O. BOX 2178
VICTORIA, TEXAS 77902-2178

TEL (361) 573-2428
FAX (361) 573-5753

0000015660-00005-0007- 0000000

INDUSTRIAL ISD
PO BOX 369
VANDERBILT TX 77991-0369

VEC office will be closed Monday, May 31st in observance of Memorial Day. Have a safe holiday from VEC.

www.victoriaelectric.coop

Name	INDUSTRIAL ISD	Account Number	181453284-030	Billing Date	04/30/10

Sub Acct #	Meter Number	Service Period From	Service Period To	Meter Readings Prev	Meter Readings Pres	kWh Usage	Charge Description / Amount	
030	24082	03/09	04/09	4245	4292	9400	ARENOSA & 5TH	
							ENERGY CHARGE	561.91
							CUSTOMER CHARGE	61.00
							DEMAND CHARGE	530.92
							POWER COST ADJ	47.61
							5% Penalty After Due Date	

Power Cost Recovery Factor	.0050650	Due Date	05/17/10	Amount Due	1201.44

RETAIN THIS COPY FOR YOUR RECORDS

Meter read by VEC

Rate Schedule Classification

Rate Code	Member Class	Customer Charge	Charge/KWH	Demand Charge
110	Farm & Residential	$18.50	.093776	none
420	Single Phase/Sm Comm.	$18.50	.093776	none
430	Three Phase/Sm Power	$36.00	.093776	none
540	Lg Power Secondary	$61.00	.059778	10.21 per KW

APPENDIX III - 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 INDUSTRIAL 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: 4-14-10

Name (Mr./Ms./Dr.): Tony Williams Title: Superintendent

Organization: Industrial ISD Phone: 361-284-3226 Ext. 1175

Street Address: Fifth St. Fax: 361-284-3349

Mailing Address: PO Box 369 E-Mail: twilliams@iisd1.org

Vanderbilt, TX. 77991 County: Jackson

Contact Information:

Name (Mr./Ms./Dr.): Jeff Woodring Title: Operations Director

Phone: 361-284-3226 Ext. 1600 Fax: 361-284-3349

E-Mail: JSWoodring@iisd1.org County: Jackson

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 IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

TEMA

ANNOUNCING!

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 V - UTILITY CHARTS ON CD