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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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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**.

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

In February 2010, **SECO** received a request for technical assistance from *Scott Singletary*, Business Manager for Navasota 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 **Navasota ISD,** (hereafter known as NISD) 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. Singletary*, a walk-through energy analysis was conducted throughout the campus. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 6.0 of this report.

We estimate that as much as **$112,882** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$719,811**, yielding an average simple payback of **6-1/2** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
LightingECRM #1	$30,800	$6,160	5 Years
Intermediate Lighting Retrofit T12 to T8	$27,674	$4,600	6 Years
Junior High Lighting Retrofit T12 to T8	$70,028	$11,675	6 Years
High School Lighting Retrofit T12 to T8	$104,950	$17,500	6 Years
Intermediate Controls	$ 66,417	$ 11,069	6 Years
JH Controls	$ 168,066	$ 25,896	6-1/2 Years
HS Controls	$ 251,876	$ 35,982	7 Years
TOTAL PROJECTS (Lighting and Controls)	**$ 719,811**	**$ 112,882**	**6-1/2 Years**

The total utility cost for NISD in 2009 was $659,644. The projected savings of $112,882 would represent a decrease in utility expenditures for the district of 17%. Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Internal Rate of Return (IRR), for this retrofit program has been calculated and shown in Section 7.0 of this report.

Our final "summary" comment is that **SECO** views the completion and presentation of this report as a beginning, rather than an end, of our relationship with NISD. 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 NISD, ESA returned to the facilities to perform the following tasks:

1. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
2. Develop an accurate definition of system and equipment replacement projects along with installation cost estimates, estimated energy and cost savings and analyses for each recommended project.
3. Develop a prioritized schedule for replacement projects.
4. Developing and drafting an overall Energy Management Policy.
5. 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 ENERGY PERFORMANCE INDICATORS FOR :

NAVASOTA ISD

CAMPUS	ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year)	ENERGY COST INDEX (ECI) ($/sf-year)
2009 Navasota Administration	**61,385**	**$1.21**
2009 High Point Elementary	**62,052**	**$1.37**
2009 JCW Elementary	**75,995**	**$ 1.36**
2009 Navasota Intermediate	**65,691**	**$ 1.30**
2009 Navasota Junior High	**50,533**	**$ 1.08**
2009 Navasota High School	**76,256**	**$ 1.38**

OWNER:	**Navasota 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	2010	30,800	92		397	1,867	63	$557
FEBRUARY	2010	32,000	84		362	1,925	14	$109
MARCH	2010	25,000	129		556	1,958	15	$109
APRIL	2010	28,000	129		556	2,920	6	$50
MAY	2009	50,100	141		608	4,165	1	$9
JUNE	2009	37,400	132		569	3,184	1	$10
JULY	2009	55,600	132		569	3,597	1	$14
AUGUST	2009	57,000	137		590	2,825	1	$9
SEPTEMBER	2009	47,700	118		508	2,495	1	$9
OCTOBER	2009	37,550	111		476	2,478	1	$10
NOVEMBER	2009	27,400	103		444	2,460	1	$9
DECEMBER	2009	22,700	74		319	2,059	42	$408
TOTAL		**451,250**	**1,382**		**5,954**	**$31,933**	**147**	**$1,303**

				Energy Use Index:			
Annual Total Energy Cost =	$33,236	Per Year		Total Site BTU's/yr		61,385	BTU/s.f.yr
				Total Area (sq.ft.)			
Total KWH x 0.003413 =	1,540.12	x 106					
Total MCF x 1.03 =	151.41	x 106		**Energy Cost Index:**			
Total Other x ____		x 106		Total Energy Cost/yr		$1.21	$/s.f. yr
Total Site BTU's/yr	1,691.53	x 106		Total Area (sq.ft.)			
Floor area:	27,556	s.f.					

OWNER: Navasota ISD **BUILDING:** High Point 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	2010	103,227	248		2,427	5,947	All electric facility	
FEBRUARY	2010	93,826	259		1,116	6,211		
MARCH	2010	112,081	252		1,086	10,347		
APRIL	2010	106,192	272		1,173	8,709		
MAY	2009	114,683	290		1,250	9,230		
JUNE	2009	123,107	229		987	7,683		
JULY	2009	103,953	261		1,125	5,207		
AUGUST	2009	125,121	300		1,293	6,480		
SEPTEMBER	2009	26,097	306		1,319	7,982		
OCTOBER	2009	98,684	311		1,341	8,542		
NOVEMBER	2009	94,308	227		979	8,126		
DECEMBER	2009	95,477	234		1,008	5,526		
TOTAL		**1,196,756**	**3,189**	**0**	**15,104**	**$89,990**	**0**	**$0**

Annual Total Energy Cost =	$89,990	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	62,052	BTU/s.f.yr
Total KWH x 0.003413 =	4,084.53	x 106			
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.37	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	4,084.53	x 106			
Floor area:	65,824	s.f.			

OWNER: Navasota ISD **BUILDING:** JCW 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	2010	121,400	410	410	1,767	7,454	365	$3,185
FEBRUARY	2010	114,600	372	372	1,603	7,103	262	$1,869
MARCH	2010	111,200	422	422	1,819	7,929	239	$1,620
APRIL	2010	133,800	460	460	1,983	13,137	137	$960
MAY	2009	114,600	484	484	2,086	10,176	21	$132
JUNE	2009	114,000	494	494	2,129	10,024	5	$41
JULY	2009	133,800	500	500	2,155	9,389	6	$48
AUGUST	2009	132,600	530	530	2,284	7,434	11	$79
SEPTEMBER	2009	154,000	540	540	2,327	8,658	22	$149
OCTOBER	2009	130,200	534	534	2,302	9,094	22	$171
NOVEMBER	2009	113,800	458	458	1,974	10,230	494	$4,568
DECEMBER	2009	108,200	330	330	1,422	9,575	367	$3,496
TOTAL		**1,482,200**	**5,534**	**5,534**	**23,851**	**$110,203**	**1,951**	**$16,318**

Annual Total Energy Cost =	$126,521	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	75,995	BTU/s.f.yr
Total KWH x 0.003413 =	5,058.75	x 106			
Total MCF x 1.03 =	2,009.53	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.36	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	7,068.28	x 106			
Floor area:	93,010	s.f.			

OWNER:	Navasota ISD				BUILDING:	Intermediate		
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	54,600	192		828	3,406	64	$566
FEBRUARY	2010	57,000	184		793	3,547	24	$179
MARCH	2010	57,000	200		862	4,012	23	$164
APRIL	2010	72,800	182		784	6,871	15	$113
MAY	2009	75,000	192		828	6,135	11	$73
JUNE	2009	58,800	162		698	4,788	10	$72
JULY	2009	75,000	194		836	4,908	8	$61
AUGUST	2009	84,200	226		974	4,258	9	$66
SEPTEMBER	2009	77,800	208		896	4,113	14	$98
OCTOBER	2009	67,600	214		922	4,467	13	$105
NOVEMBER	2009	58,400	210		905	5,160	17	$167
DECEMBER	2009	41,000	168		724	3,836	34	$332
TOTAL		779,200	2,332	2,332	10,050	$55,501	242	$1,996
					Energy Use Index:			
Annual Total Energy Cost =		$57,497	Per Year		Total Site BTU's/yr		65,691	BTU/s.f.yr
					Total Area (sq.ft.)			
Total KWH x 0.003413 =		2,659.41	x 106					
Total MCF x 1.03 =		249.26	x 106		Energy Cost Index:			
Total Other x ____			x 106		Total Energy Cost/yr		$1.30	$/s.f. yr
Total Site BTU's/yr		2,908.67	x 106		Total Area (sq.ft.)			
Floor area:		44,278	s.f.					

OWNER:	Navasota ISD				BUILDING:	Junior High		
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	91213	295	295	1,272	5,591	0	0
FEBRUARY	2010	106439	274	274	1,181	6,606	0	0
MARCH	2010	104153	553	553	2,384	8,301	0	0
APRIL	2010	27413	531	531	2,288	13,390	57	252
MAY	2009	174258	493	493	2,125	10,867	57	249
JUNE	2009	129105	462	462	1,991	10,964	77	330
JULY	2009	199551	355	355	1,530	12,338	7	51
AUGUST	2009	193711	579	579	2,495	10,039	0	0
SEPTEMBER	2009	182884	609	609	2,625	10,172	0	0
OCTOBER	2009	157116	630	630	2,513	10,942	0	0
NOVEMBER	2009	138546	727	727	2,668	12,749	0	0
DECEMBER	2009	94782	343	343	1,478	8,662	0	0
TOTAL		1,599,171	5,851	5,851	24,550	$120,621	198	$882
					Energy Use Index:			
Annual Total Energy Cost =		$121,503	Per Year		Total Site BTU's/yr		50,533	BTU/s.f.yr
					Total Area (sq.ft.)			
Total KWH x 0.003413 =		5,457.97	x 106					
Total MCF x 1.03 =		203.94	x 106		Energy Cost Index:			
Total Other x ____			x 106		Total Energy Cost/yr		$1.08	$/s.f. yr
Total Site BTU's/yr		5,661.91	x 106		Total Area (sq.ft.)			
Floor area:		112,044	s.f.					

OWNER:	Navasota ISD			BUILDING:	High School		
MONTH / YEAR		ELECTRIC				NAT'L GAS / FUEL	
			DEMAND				
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	209,500	620	620	2,672	12,460	604	$5,264
FEBRUARY	2010	230,000	580	580	2,500	13,500	221	$1,578
MARCH	2010	231,000	600	600	2,586	15,238	218	$1,478
APRIL	2010	256,500	705	705	3,039	24,388	127	$890
MAY	2009	205,000	665	665	2,866	17,309	76	$455
JUNE	2009	220,000	615	615	2,651	17,852	44	$282
JULY	2009	310,000	600	600	2,586	19,298	30	$206
AUGUST	2009	279,000	800	800	3,448	14,243	61	$396
SEPTEMBER	2009	337,500	830	830	3,577	17,406	115	$743
OCTOBER	2009	289,500	855	855	3,685	18,742	117	$872
NOVEMBER	2009	295,000	650	650	2,802	24,145	222	$2,058
DECEMBER	2009	222,400	600	600	2,586	19,424	373	$3,552
TOTAL		3,085,400	8,120	8,120	34,998	$214,005	2,208	$17,774
					Energy Use Index:			
Annual Total Energy Cost =		$231,779	Per Year		Total Site BTU's/yr		76,256	BTU/s.f.yr
					Total Area (sq.ft.)			
Total KWH x 0.003413 =		10,530.47	x 106					
Total MCF x 1.03 =		2,274.24	x 106		Energy Cost Index:			
Total Other x ____			x 106		Total Energy Cost/yr		$1.38	$/s.f. yr
Total Site BTU's/yr		12,804.71	x 106		Total Area (sq.ft.)			
Floor area:		167,917	s.f.					

Navasota ISD is supplied electricity by Entergy. The rate schedule analysis for the district is shown below. A copy of the rate schedule is included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC SUPPLIER: Entergy

Electric Rate: General Service

I.	Customer Charge	=	$37.1500 per meter
II.	Demand Charge	=	$4.31000 per Billing kW
III.	Energy Charge	=	$0.0234 per kWh
TTC RIDER		=	$0.0011000 per kWh
FUEL ADJUSTMENT	[Varies per month]	=	$0.0547115 per kWh
	[Average for 12 months of analyzed billing cycle.]		

Average Savings for consumption (from billings) = $0.0234 + $0.001100 + $0.0547115 = $0.0792115 / kWh

Average Savings for demand = $4.31 = $4.31 / kW**

** This number is a generalization of average cost per kW because the rate schedule from ENTERGY utilizes two (2) different types of demand for the calculation of the utility bill:

1. Highest Contract Power: the greater of (i) the highest Billing Load established during the billing months of June through September or (ii) the contracted kW specified in the currently effective contract.
2. Contract Power: the greater of (i) 60% of the Highest Contract Power, or (ii) the customer's maximum measured 30-minute demand during any 30-minute interval during the billing months of June – September during the 12 months ending with the current month.

NATURAL GAS PROVIDER:

Rate schedule unavailable: average cost for the commodity determined through utility billings.

Cost for Natural Gas purchased during billing cycle by NISD: $38,273

Quantity of Natural gas purchased during billing cycle by NISD: 4,746 mcf

Average cost per mcf = Quantity Purchased / Cost of Purchase = $38,273 / 4,746 mcf = $8.06/mcf

5.0 CAMPUS DESCRIPTIONS:

Navasota ISD consists of five educational campuses which are located within Navasota, Texas, a moderately sized community 25 miles from Bryan-College Station. There is John C. Webb Elementary School, High Point Elementary School and Navasota Intermediate, Junior High and High Schools. Additionally, the district operates an Administration complex, Maintenance Offices and the non-traditional at-risk student Navasota Educational Learning Center. The district serves approximately 3,000 students overall.

Administration

The Administration Building was originally constructed in 1930 as Navasota HS. Encompassing 27,556 square feet, the two-story building has carpeted floors and acoustical tile ceilings. *There are six each 300-watt pendant and several wall sconce incandescent fixtures in the building that we recommend be retrofit with new compact fluorescent lamps (CFLs) pendant and sconce fixtures.*

Junior High School

The Junior High School was built in 1997, but its lighting system consists almost exclusively of T12 fluorescent fixtures. We recommend the district renovate the existing lighting system with T8 lamps and electronic ballasts. The new components will produce about 18% more light while consuming approximately 20% less energy. The T8 lamps and electronic ballasts will also allow the district to comply with the provisions of Senate Bill 300, in which school districts are required to install the most efficient lamps and ballasts possible in their existing lighting system.

The automatic control system that once served this facility has been removed, leaving them with a manually controlled pneumatic system. As comfort calls are delivered to Maintenance, someone goes to the Junior High and manually adjusts the system.

It was noted during the survey that many of the HVAC filters were extremely dirty and needing replacement (see picture to the right). It was also apparent that at some point in time, the building has experienced humidity control issues as some of the outside air ducts in the mechanical rooms had been covered with plastic bags. The district confirmed that there are ongoing humidity issues at the cafeteria. The district states that the exhaust fans may not be well-controlled and are potentially operating at night, which will place the building into a negative pressure condition and draw in warm humid air throughout the evening hours. We recommend the district install a new DDC energy

management system at the Junior High School to control all pieces of energy consuming equipment and outside air dampers. This measure will significantly improve occupant comfort and reduce maintenance labor costs.

The HVAC system itself consists of air cooled chillers and a gas-fired boiler plant. The chiller is a 2009 Trane RTAC chiller and is backed up by an older redundant McQuay ALR1956. The new chiller is missing insulation on the chilled water lines where the new system was tied into the old piping. *We recommend the district re-install this insulation.* The chilled water pumps (2 each 20hp with 482 gpm and 100' head) distribute chilled water throughout the building to air handlers.

The boiler plant consists of two each Sellers space heating boilers (space heating system is supplied with 10hp hot water pumps delivering 200 gpm and 90' head) and a 250 gallon PVI domestic water boiler.

The gymnasium utilizes 35 each 400-watt metal halide fixtures at the practice gym and 42 each 400-watt metal halide fixtures at the competition gym. Metal halide fixtures have a long re-strike issue that encourages facility operators to allow the fixtures to be left operating throughout the day, even when the space is unoccupied. *We recommend the district replace the metal halide fixtures with new 6-lamp T5HO high-bay fluorescent fixtures which do not have an inherent re-strike issue and can be turned off during unoccupied periods.*

High School

Originally built in the 1970s, the building had major additions in 1994 and 1997. Similar to the Junior High, the facility has almost exclusively T12 lighting and a lack of system controls. *Consequently, we recommend the district renovate the lighting system with T8 lamps and electronic ballasts and install a DDC energy management system at this facility as well.*

Similar to the Junior High, there are also reported humidity issues within areas of this building. One such area, the Mezzanine Mechanical Room above the gym, was found to have the outside air handling unit operating and bringing outside air into the mechanical room plenum, but the four air handlers responsible for distributing air throughout the gymnasium and dressing rooms were off as would normally be the case for the time of day the inspection occurred. This condition means that humid outdoor air was being brought into the space untreated for humidity and allowed to disperse throughout the building on its own.

The staff reported over-cooling conditions occurring at one wing of the High School. Inspection in this area revealed another issue resulting from the removal of the Honeywell controls from the building. Individual room sensors were removed and to limit repair expenses, one single sensor for the entire wing was located in the corridor between the classrooms. The problem is that the corridor is not in and of itself conditioned, therefore it tends to remain warmer than the classrooms and frequently warmer than cooling setpoint. There is little return air leaving the classrooms (no return air grill exists in many of the rooms and classroom doors remain closed during class) so the sensor commands the units to operate much longer than would be

required if the room's temperature was properly sampled. This has resulted in these rooms being over-cooled.

The HVAC system is similar to the system at the Junior High. Air cooled chillers supply chilled water to air handlers distributed throughout the building. The system is set to supply 44°F chilled water. The domestic hot water loop temperature is appropriately set at 128°F.

The district utilizes 30 each 1000-watt metal halide fixtures at the High School Gym. The staff reports that the operation of these fixtures, however, is much more controlled than other gyms in the district and therefore it is not likely necessary to renovate this system with the new high-bay fixtures. The gym is kept locked at all times except for scheduled events and activities and the lights are kept off when the room is locked.

It was noted during the survey that six canopy lights between the new weight room and classroom wing were operating during the day. *We recommend getting the photocell repaired that is supposed to control this exterior light circuit.*

It was also noted during the survey that some of the High School corridors have 3-lamp fixtures. Light readings in these areas indicated light levels between 18 and 60 footcandles in the corridors. The Illumination Engineering Society of North America (IESNA) recommends that corridor light levels of 10-15 footcandles are sufficient. *Therefore, we recommend the district remove the center lamp from the 3-lamp corridor fixtures which will save 29 watts, or $4.95, per fixture per year.*

Navasota Intermediate School

The HVAC system at the Intermediate School consists of two Trane Series R air cooled chillers. The boiler is a 1983 Rite boiler, but the unit appears to remain in good condition. The 7-1/2hp hot water pump and 7-1/2hp chilled water pump were replaced in 1997.

Similar to the Junior High and High School, the Intermediate School is operating under predominantly manual control. Humidity control issues are also occurring at this campus as evidenced by the plastic wrap installed over the outside air ductwork. The indoor air temperature in many of the spaces was approximately 69-70°F with nobody occupying the building at the time of the survey. Condensation was discovered on all interior glass in the spaces. *We recommend the district expand the energy management system to cover this campus.*

The lighting system at the Intermediate School was almost exclusively T12. *We recommend the district renovate the system with T8 lamps and electronic ballasts.*

6.0 RECOMMENDATIONS

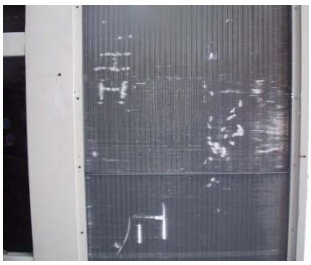
A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC	•Comb fins on damaged condensing units •Install hail guards to protect fins in future • Replace water heater insulation where required •Clean coils and increase filter change frequency
Lighting	•Repair photocells to ensure exterior lighting off during daytime hours
Building Envelope	•Check weatherstrip at all exterior doors, replace as needed

Maintenance and Operation procedures are strategies that can offer significant energy savings potential, yet require little or no capital investment by the district to implement. Exact paybacks are at times difficult to calculate, but are typically always less than one year. The difficulties with payback calculation are often related to the fact that the investigation required to make the payback calculation, for example measuring the air gap between exterior doors and missing or damaged weatherstripping so that exact air losses may be determined, is time and cost prohibitive when the benefits of renovating door and weather weatherstripping are well documented and universally accepted.

HVAC M&O #1 and #2:

At NISD, the HVAC M&O opportunities revolve around combing the condenser fins [combs available for less than $10]. The installation of coil guards and concrete maintenance pads 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.



HVAC M&O #3:

It was noted during the survey that some of the water heaters had damaged or missing insulation on the hot water piping. The majority of energy losses in a hot water system occur in the hot water piping of the system.

HVAC M&O #4:

It was noted during the survey that many of the HVAC filters were dirty and in need of replacement. We recommend increasing the frequency of filter replacement. In addition, if this issue has been occurring over an extended period of time, it is likely the HVAC coils have become dirty and are in need of cleaning as well.

Lighting M&O #1

It was noted during the survey that some exterior lights were operating during the day. In addition to increased energy consumption, this condition requires maintenance to replace lamps more frequently.

Envelope M&O

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

B. CAPITAL EXPENSE PROJECTS

Lighting

- Renovate Gym 400-watt Metal Halide fixtures with high-bayT5HO fixtures
- Retrofit Intermediate, Junior High and High School T12 fixtures with T8 lamps and electronic ballasts

Controls

- Install energy management systems at the Intermediate, Junior High and High Schools.

LIGHTING ECRM

ECRM #1: Replace existing metal halide gymnasium fixtures with new high-bay T5HO fluorescent fixtures

Existing Junior High practice gymnasium has 35 each 400-watt metal halide fixtures. The Junior High competition gym has 42 each 400-watt metal halide fixtures. Metal halides have long re-strike issue which promotes districts to allow the lights to be left operating in unoccupied gyms. The new high-bay fixtures do not have the inherent re-strike issue and may be easily turned on and off when the activity in the space changes.

Estimated Installed Cost	=	$ 30,800
Estimated Energy Cost Savings	=	$ 6,160
Simple Payback Period	=	5 years

ECRM #2: Retrofit existing T12 fixtures with T8 lamps and electronic ballasts at Intermediate, Junior High and High Schools.

Intermediate	Estimated Installed Cost	=	$ 27,674
	Estimated Energy Cost Savings	=	$ 4,600
	Simple Payback Period	=	6 years
Junior High	Estimated Installed Cost	=	$ 70,028
	Estimated Energy Cost Savings	=	$ 11,675
	Simple Payback Period	=	6 years
High School	Estimated Installed Cost	=	$ 104,950
	Estimated Energy Cost Savings	=	$ 17,500
	Simple Payback Period	=	6 years

<u>CONTROLS ECRM</u>

ECRM #1: Install new energy management control systems at Intermediate, Junior High and High School Buildings.

Intermediate	Estimated Installed Cost	=	$ 66,417
	Estimated Energy Cost Savings	=	$ 11,069
	Simple Payback Period	=	6 years
Junior High	Estimated Installed Cost	=	$ 168,066
	Estimated Energy Cost Savings	=	$ 25,856
	Simple Payback Period	=	6-1/2 years
High School	Estimated Installed Cost	=	$ 251,876
	Estimated Energy Cost Savings	=	$ 35,982
	Simple Payback Period	=	7 years

SUMMARY CHART:

If all of the above projects were implemented at the same time, the cost analysis would become:

Estimated Installed Cost	=	$ 517,159
Estimated Energy Cost Savings	=	$ 70,067
Simple Payback Period	=	7-1/2 years

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. $1000 maintenance expense next 10 years				
4. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($719,811.00)		0	($719,811)
Year 1		$ 112,882.00	0	$112,882
Year 2		$ 112,882.00	0	$112,882
Year 3		$ 112,882.00	0	$112,882
Year 4		$ 112,882.00	0	$112,882
Year 5		$ 112,882.00	0	$112,882
Year 6		$ 110,624.36	($1,000)	$109,624
Year 7		$ 108,366.72	($1,000)	$107,367
Year 8		$ 106,109.08	($1,000)	$105,109
Year 9		$ 103,851.44	($1,000)	$102,851
Year 10		$ 101,593.80	($1,000)	$100,594
Year 11		$ 99,336.16	($1,000)	$98,336
Year 12		$ 97,078.52	($1,000)	$96,079
Year 13		$ 94,820.88	($1,000)	$93,821
Year 14		$ 92,563.24	($1,000)	$91,563
Year 15		$ 90,305.60	($1,000)	$89,306
			Internal Rate of Return	**12.34%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

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

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

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

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

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

continued

Financing Mechanisms

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

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

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

Internal Funds

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

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

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

Debt Financing

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

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

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

ENTERGY TEXAS, INC. Electric Service SCHEDULE GS	Sheet No.: 9 Effective Date: 1-28-09 Revision: 14 Supersedes: GS Effective 3-1-99 Schedule Consists of: Two Sheets

GENERAL SERVICE

I. APPLICABILITY

This rate is applicable under the regular terms and conditions of the Company to Customers who contract for not less than 5 kW or not more than 2,500 kW of electric service to be used for general lighting and power.

II. NET MONTHLY BILL

A. Customer Charge $37.15 per month

B. Billing Load Charge
All kW per month $ 4.31 per kW

C. Energy Charge

All kWh used $ 0.02003 per kWh*

*Plus the Fixed Fuel Factor per Schedule FF and all applicable riders.

D. Delivery Voltage Adjustment

The Delivery Voltage below represents the voltage of the line from which service is delivered and metered or the voltage used in determining the facilities charge under Schedule AFC, whichever is less. When service is metered at a voltage other than the Delivery Voltage, metered quantities will be adjusted by 1.5% for each transformation step to the Delivery Voltage.

Delivery Voltage	Adjustment
Secondary	No adjustment
Primary (2.4KV-34.5KV)	($0.53) per kW of Billing Load
69KV/138KV	($1.05) per kW of Billing Load

E. Minimum Charge

The monthly minimum charge will be the sum of the Customer Charge, the Billing Load Charge and the Delivery Voltage Adjustment. Where the installation of excessive new facilities is required or where there are special conditions affecting the service, Company may require, in the Contract, a higher minimum charge and/or Facilities Agreement pursuant to Schedule AFC, to compensate for the additional costs.

(Continued on reverse side)

III. METERING, PHASE AND VOLTAGE OF SERVICE

Service under this rate schedule will be rendered at the Company's standard phase and voltage available at the point of service. Customer will pay a facilities charge as set forth in Schedule AFC for any applicable nonstandard or duplicative facilities.

Where the Customer elects to take service at the available line voltage (greater than Secondary), metering will be installed at that voltage and Customer will receive the applicable Voltage Adjustment pursuant to § II (D) above. In such cases, Customer may elect to have Company install the necessary transformation facilities to provide service at a lower voltage and Customer will then pay facilities charges pursuant to Schedule AFC. At Company's option, metering may then be at Secondary and Customer's metered quantities will be adjusted pursuant to § II (D) above.

Where service is of extremely fluctuating or intermittent type, Company may specify shorter intervals of load measurement than 30-minute intervals.

IV. POWER FACTOR ADJUSTMENT

Where Customer's power factor of total service supplied by Company is such that 80% of measured monthly maximum kVA used during any 30-minute interval exceeds the corresponding measured kW, Company will use 80% of such measured maximum kVA as the number of kW for all purposes that measured maximum kW load is specified herein. However, where Customer's power factor is regularly 80% or higher, Company may at its option omit kVA metering equipment or remove same if previously installed.

V. DETERMINATION OF BILLING LOAD

The kW of Billing Load will be the greatest of the following:

(A) The Customer's maximum measured 30-minute demand during any 30-minute interval of the current billing month, subject to § III, and IV above; or

(B) 50% of the first 500 kW of Contract Power plus 75% of all additional kW of Contract Power as defined in § VI, or

(C) 5 kW.

VI. DETERMINATION OF CONTRACT POWER

Unless Company gives Customer written notice to the contrary, Highest Contract Power and Contract Power will be as defined below:

Highest Contract Power - the greater of (i) the highest Billing Load established during the billing months of June through September since service to Customer began under the currently effective contract or (ii) the contracted kW specified in the currently effective contract.

Contract Power - the greater of (i) 60% of the Highest Contract Power, or (ii) the highest load established under V (A) above during the billing months of June - September during the 12 months ending with the current month. For the initial 12 months of Customer's service, the Contract Power shall be estimated in advance from best data available and subject to adjustment for difference in actual and estimated.

 (Continued on next page)

ENTERGY TEXAS, INC. Electric Service SCHEDULE GS (Cont.)	Sheet No.: 10 Effective Date: 1-28-09 Revision: 14 Supersedes: GS Effective 3-1-99 Schedule Consists of: Two Sheets

GENERAL SERVICE

VII. **USE OF SERVICE**

Electric service furnished under this rate shall not be used by Customer as an auxiliary or supplementary service to engines or other prime movers, or to any other source of power except in conjunction with rider for Standby and Maintenance Service. Customer shall not sub-meter and resell any energy purchased under this rate, except as may be specifically authorized by the appropriate regulatory authority.

VIII. **AMOUNT DUE AND PAYMENT**

The past due amount for service furnished for which payment is not made within sixteen (16) days of the billing date shall be the monthly bill, including all adjustments under the rate schedule and applicable riders, plus 5% of the first $50.00 and 2% of any additional amount of such net monthly bill above $50.00. If the amount due when rendered is paid prior to such date, the monthly bill, including all adjustments under the rate schedule and applicable riders, shall apply. If providing service to the state of Texas, Company shall not assess a fee, penalty, interest or other charge to the state for delinquent payment of a bill.

ENTERGY TEXAS, INC. Electric Service SCHEDULE SMC	Sheet No.: 13 Effective Date: 1-28-09 Revision: 9 Supersedes: SMC Effective 12-18-98 Schedule Consists of: One Sheet

SPECIAL MINIMUM CHARGE RIDER TO SCHEDULES SGS, GS AND LGS

I. APPLICABILITY

This rider is applicable under the regular terms and conditions of the Company to Customers served under Schedule SGS, GS or LGS for service to seasonal operations recurring annually such as the following:

- seasonally operated municipal facilities including sewage treatment plants, municipally-owned seasonal athletic fields;
- Municipal Utility Districts serving an incorporated city;
- churches; and,
- elementary and secondary schools (public and parochial) and state colleges and universities including the athletic fields of such educational institutions.

For purposes of this rider, seasonal operations are those operations associated with agricultural products (rice, soybeans, cotton, etc.), ball parks operated by non-profit organizations, and public playgrounds.

II. MODIFICATION TO REGULAR RATE SCHEDULE

Section V, Determination of Billing Load, under Schedules GS and LGS is modified to the extent that Billing Load will be the actual maximum kW load of the current month but not less than 5 kW under Schedule GS and 300 kW under Schedule LGS.

III. SEASONALLY OPERATED FACILITY RECONNECTIONS

Seasonally operated facilities such as those described above may, upon request, reconnect after the facility's regular seasonal operations have been completed. Such reconnections will be allowed in accordance with § A and B below. Where a portion of the service, such as lighting is on a year-round basis and not seasonally disconnected, Customer will arrange wiring so that such portion can be separately served, metered, and billed under the applicable rate schedule.

A. Following a seasonal disconnect, the first reconnection of service requested in the same calendar year that the seasonal disconnect was requested will be free of charge;

B. For each additional reconnection of service requested thereafter, in the same calendar year, the customer will be charged a Connection Charge in accordance with § II.B of Rate Schedule MES.

ENTERGY TEXAS, INC.
Electric Service

SCHEDULE FF

Sheet No.: 51
Effective Date: 3-2-10
Revision: 29
Supersedes: FF Effective 8-28-09
Schedule Consists of: One Sheet

FIXED FUEL FACTOR AND LOSS MULTIPLIERS

The Texas retail fixed fuel factor is $0.0528816 per kWh.

The loss multipliers by voltage level are:

Delivery Voltage	Loss Multiplier
Secondary	1.034603
Primary	1.004911
69KV/138KV	0.962921
230KV	0.945741

The corresponding fixed fuel factors by voltage level are:

Delivery Voltage	Fixed Fuel Factor
Secondary	$0.0547115 per kWh
Primary	$0.0531413 per kWh
69KV/138KV	$0.0509208 per kWh
230KV	$0.0500123 per kWh

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 Navasota 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

no previous PGA on record

This agreement should be signed by your organization's chief executive officer or other upper management staff.

Signature: Scott Singletary
Date: 4-22-10
Name (Mr./Ms./Dr.) Mr Scott Singletary
Title: Bus Mgr
Organization: Navasota ISD
Phone: 936 825-4224
Street Address: ~~P.O. Box 511~~ 705 E Washington
Fax: 936 825-4297
Mailing Address: P.O Box 511
E-Mail: scott@Navasotaisd.org
County: Grimes / ESA

Contact Information:

Name (Mr./Ms./Dr.): Scott Singletary
Title: Business Mgr
Phone: 936-825-4224
Fax: 936-825-4297
E-Mail: scott@Navasotaisd.org
County: Grimes

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

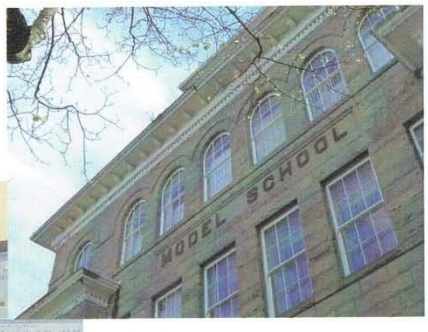
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

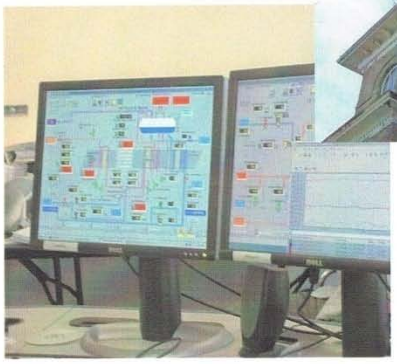
ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

A PROFESSIONAL ASSOCIATION FOR THOSE RESPONSIBLE FOR ENERGY MANAGEMENT IN TEXAS PUBLIC FACILITIES





- Networking
- Sharing Knowledge and Resources
- Training Workshops
- Regional Meetings
- Annual Conference
- Certification
- Legislative Updates
- Money-Saving Opportunities

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

SECO
State Energy Conservation Office

APPENDIX VI – SAMPLE ENERGY POLICY

ENERGY POLICY

Recognizing our responsibility as Trustees of Navasota ISD, we believe that every effort should be made to conserve energy and natural resources. As a result, we are establishing this Energy Management Policy which shall be implemented within each of our facilities. We believe that this policy will be beneficial for taxpayers and community residents in the prudent management of our financial and energy resources.

The Board will designate an Energy Manager to coordinate and implement the overall Energy Policy. The Energy Manager will also maintain accurate records of energy consumption and cost on a monthly and annual basis. Energy audits will be conducted annually at each facility and recommendations will be made for updating and improving the energy program. Energy efficiency guidelines and procedures will be reviewed and accepted or rejected by the Board. In addition, the procedures required for implementation of the program, and the results achieved from its administration, will be published for administrative and staff information.

The Board shall sanction the Energy Manager with the authority to establish air conditioning heating and cooling setpoints, equipment operating schedules, and demand limiting strategies for the district's energy consuming equipment. The Energy Manager shall have authority to approve or reject requests for personal refrigerators, heaters, fans, light fixtures, and other energy consuming equipment in district facilities.

Energy management is not sacrificing comfort or productivity in exchange for reduced energy bills. Energy management is eliminating the wasteful energy consumption of having equipment operating inappropriately or outside normal occupancy hours. Lights should be turned off when no one occupies a room. Air conditioning equipment should not be left operating overnight. Custodial and Maintenance activities shall be zoned so lights and air conditioning systems will not be operated in unoccupied areas of the building.

The fulfillment of this policy shall be the joint responsibility of the trustees, administrators, staff and support personnel. The success of the policy is dependent upon total cooperation from all levels within the system.

Adopted this day of , 2010 .

By: _____ , President, Board of Trustees

Attest: _____ , Secretary, Board of Trustees

APPENDIX VII - UTILITY CHARTS ON CD