Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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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 local government facilities 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 May, 2008, **SECO** received a request for technical assistance from *Mrs. Carolyn Bilski,* Austin County Judge. **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 Austin County**,** 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 *Judge Bilski,* a walk-through energy analysis was conducted throughout the City. 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 **$21,475** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$102,850**, yielding an average simple payback of **5** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$15,375	$1,700	9 Years
HVAC ECRM #2	$23,575	$2,400	10 Years
Lighting ECRM #1	$29,500	$5,900	5 Years
Controls ECRM #1	$34,400	$11,475	3 Years
TOTAL PROJECTS	**$102,850**	**$21,475**	**5 Years**

The total projected savings is $21,475. 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 Austin County. 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 Austin County, 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:

Austin County

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
Court House	120,043	$3.06
Agrilife	96,243	$2.97
Tax Office	67,098	$1.40
Adult Probation	39,832	$1.14
Department of Human Services	69,668	$1.12

The electricity and gas consumption charts for Austin County Tax Office, Court House, Department of State Health Services, Agrilife, and the Adult Probation Building.

OWNER: **Austin County** **BUILDING:** **Court House**

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	38,520	n/a	126	678	4157	132	$1,185
FEBRUARY	2010	38,280	n/a	125	677	4135	181	$1,968
MARCH	2010	39,960	n/a	118	635	5459	115	$1,126
APRIL	2010	43,920	n/a	130	700	5922	57	$510
MAY	2010	53,160	n/a	146	790	6714	20	$168
JUNE	2009	56,520	n/a	149	802	5786	21	$145
JULY	2009	55,200	n/a	155	835	5477	10	$77
AUGUST	2009	59,880	n/a	145	785	5819	1	$10
SEPTEMBER	2009	60,240	n/a	146	787	6026	25	$183
OCTOBER	2009	52,440	n/a	142	767	5424	31	$181
NOVEMBER	2009	42,240	n/a	126	678	4454	55	$416
DECEMBER	2009	35,040	n/a	126	678	3813	118	$1,017
TOTAL		**575,400**	**n/a**	**1,634**	**8,812**	**$63,186**	**766**	**$6,986**

Annual Total Energy Cost = $70,172 Per Year

Total KWH x 0.003413 = 1,963.84 x 106
Total MCF x 1.03 = 788.98 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,752.82 x 106

Floor area: 22,932 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 120,043 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $3.06 $/s.f. yr

Electric Utility **Account #**
San Bernard Electric Co-Op 01-0210-00

OWNER: **Austin County** **BUILDING:** **Agrilife**

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	1,979	n/a	11	63	257	16	$155
FEBRUARY	2010	1,921	n/a	15	80	269	8	$96
MARCH	2010	1,628	n/a	14	77	286	6	$66
APRIL	2010	1,712	n/a	17	93	309	1	$12
MAY	2010	53,160	n/a	146	790	6,714	20	$168
JUNE	2009	6,049	n/a	16	87	635	0	$9
JULY	2009	3,239	n/a	288	17	109	0	$10
AUGUST	2009	4,041	n/a	355	18	115	0	$10
SEPTEMBER	2009	4,205	n/a	18	99	480	0	$9
OCTOBER	2009	2,806	n/a	17	92	356	0	$8
NOVEMBER	2009	1,918	n/a	15	79	266	0	$10
DECEMBER	2009	1,958	n/a	16	88	279	5	$49
TOTAL		**84,616**	**n/a**	**928**	**1,583**	**$10,075**	**56**	**$602**

Annual Total Energy Cost = $10,677 Per Year

Total KWH x 0.003413 = 288.79 x 106
Total MCF x 1.03 = 57.68 x 106
Total Other x ____ x 106
Total Site BTU's/yr 346.47 x 106

Floor area: 3,600 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 96,243 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.97 $/s.f. yr

Electric Utility **Account #**
San Bernard Electric Co-Op 01-0080-00

OWNER: **Austin County** **BUILDING:** **Tax Office**

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	2,272	n/a	12	63	265	118	$1,239
FEBRUARY	2010	3,098	n/a	13	68	295	9	$108
MARCH	2010	8,560	n/a	39	209	1,044	27	$275
APRIL	2010	3,416	n/a	19	93	418	1	$12
MAY	2010	4,388	n/a	28	96	501	0	$11
JUNE	2009	5,964	n/a	20	108	540	0	$9
JULY	2009	6,761	n/a	21	111	583	0	$9
AUGUST	2009	7,323	n/a	20	106	630	0	$10
SEPTEMBER	2009	6,067	n/a	21	114	542	0	$9
OCTOBER	2009	4,388	n/a	20	109	405	0	$8
NOVEMBER	2009	4,253	n/a	20	109	395	0	$10
DECEMBER	2009	3,279	n/a	13	71	309	4	$40
TOTAL		59,769	n/a	246	1,257	$5,927	159	$1,740

Annual Total Energy Cost = $7,667 Per Year

Total KWH x 0.003413 = 203.99 x 106
Total MCF x 1.03 = 163.77 x 106
Total Other x ____ x 106
Total Site BTU's/yr 367.76 x 106

Floor area: 5,481 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 67,098 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.40 $/s.f. yr

Electric Utility **Account #**
San Bernard Electric Co-Op 14-1240-01

OWNER: **Austin County** **BUILDING:** **Adult Probation**

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	1,645	n/a	10	55	220	32	$297
FEBRUARY	2010	1,463	n/a	12	65	252	15	$177
MARCH	2010	1,317	n/a	12	65	237	6	$66
APRIL	2010	1,199	n/a	12	66	221	3	$31
MAY	2010	2,187	n/a	14	75	331	0	$11
JUNE	2009	2,993	n/a	13	68	348	0	$9
JULY	2009	3,389	n/a	13	69	369	0	$9
AUGUST	2009	2,879	n/a	13	70	378	1	$10
SEPTEMBER	2009	2,369	n/a	11	59	359	0	$9
OCTOBER	2009	2,323	n/a	14	75	296	1	$8
NOVEMBER	2009	1,306	n/a	12	63	195	0	$9
DECEMBER	2009	1,441	n/a	13	70	253	0	$11
TOTAL		24,511	n/a	149	800	$3,459	58	$647

Annual Total Energy Cost = $4,106 Per Year

Total KWH x 0.003413 = 83.66 x 106
Total MCF x 1.03 = 59.74 x 106
Total Other x ____ x 106
Total Site BTU's/yr 143.40 x 106

Floor area: 3,600 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 39,832 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.14 $/s.f. yr

Electric Utility **Account #**
San Bernard Electric Co-Op 01-0700-00

OWNER: **Austin County** **BUILDING:** **DSHS**

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	9,200	n/a	26	139	843	79	$714
FEBRUARY	2010	10,160	n/a	34	186	930	50	$555
MARCH	2010	3,113	n/a	14	77	388	5	$56
APRIL	2010	11,040	n/a	42	226	1,322	6	$59
MAY	2010	116,560	n/a	66	356	1,855	3	$28
JUNE	2009	20,880	n/a	70	376	1,852	2	$16
JULY	2009	26,240	n/a	70	380	2,215	1	$9
AUGUST	2009	27,520	n/a	71	380	2,322	3	$28
SEPTEMBER	2009	21,440	n/a	69	372	1,875	2	$17
OCTOBER	2009	15,360	n/a	64	345	1,375	2	$14
NOVEMBER	2009	14,880	n/a	64	347	1,341	5	$42
DECEMBER	2009	9,760	n/a	45	244	885	48	$421
TOTAL		**286,153**	**n/a**	**635**	**3,428**	**$17,203**	**206**	**$1,959**

Annual Total Energy Cost = $19,162 Per Year

Total KWH x 0.003413 = 976.64 x 106
Total MCF x 1.03 = 212.18 x 106
Total Other x ____ x 106
Total Site BTU's/yr 1,188.82 x 106

Floor area: 17,064 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 69,668 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.12 $/s.f. yr

Electric Utility **Account #**
San Bernard Electric Co-Op 14-1230-01

4.0 RATE SCHEDULE ANALYSIS

ELECTRIC RATE SCHEDULE

Electric Provider: San Bernard Electric Co-Op

Customer Charge:	$35
Wires Charge:	kWh x .041497
Power Supply Charge:	kWh x G&T Factor
Minimum Charge:	$50.00

*Minimum charge applies only if usage is less than 361 kWh

Average Savings for consumption (from billings) = $0.0871055 / kWh

Average Commodity Cost Savings per mcf (from billings) = $**9.21 / mcf**

5.0 CAMPUS DESCRIPTIONS

Five buildings that are owned by Austin County were surveyed for this report. The buildings include the Courthouse, Agrilife Building, Adult Probation Building, Tax Office, and the Department of State Health Services. These buildings are generally operated during normal business hours from 8 A.M. to 5 P.M. The population of the county is approximately 24,000 people.

Austin County Courthouse

The courthouse was originally constructed in 1962. Different systems and areas of the building have been renovated at various times in the building's history. At $3.06 per square foot, this building has the highest energy costs of all of the County Buildings that were surveyed.

The courtroom was renovated with 24 new 3-lamp T8 light fixtures; the remainder of the building still utilizes T12 lamp and magnetic ballast fixtures. *We recommend the County retrofit the remaining T12 fixtures with new T8 lamps and electronic ballasts.* The new components will produce approximately 18% more light and consume about 20% less energy than the T12 components currently installed in the fixtures. Many of the T12 linear lamps are 40-watt lamps; there are also significant numbers of T12 U-shaped lamps. The measure will also help the County comply with Senate Bill 300 which requires all public facilities to install the most efficient lamps and ballasts possible in their existing fixtures.

Outdoor lighting is controlled with a 1962 Paragon timeclock; there were no outside lights noted to be operating at the time of the survey.

The water-cooled central HVAC system was replaced in 2005 with new air-cooled chillers. The 2nd and 3rd floors of the building are conditioned with a 60-ton air cooled chiller. At the time of the survey, most of the unit's panels were removed and anchored to the ground with pieces of wood. The staff reported that the coil had developed some leaks and the Contractor had replaced the entire coil. *We recommend the panels be re-installed to protect the internal components of the chiller from weather and wildlife.* The 1st floor and basement has its own dedicated 2005 45-ton (Carrier 30GN045) air cooled chiller.

The chilled water is distributed to single- and multi-zone air handlers located throughout the facility. Multi-zone units, also replaced in 2005, remain under pneumatic damper control. The air compressor for the pneumatic system recently had a leak in the air dryer; the dryer was replaced.

The backup generator (36 kW – Natural Gas fired) was installed just 3 months ago. The system is large enough to serve all of the critical areas within the building. The staff expects to add emergency lighting circuits to the system when the conversion to T8 components occurs, as they feel the lighting load reduction will allow more circuits to be included in the emergency system.

Space heating is accomplished with a Weil-McClain Boiler (1,050,000 BTUH input, 840,000 BTUH output). The unit remains in good condition despite its older age. The domestic hot water is provided by 75,000 BTUH input natural gas fired water heater. A small circulation pump distributes hot water throughout the system.

The HVAC system is controlled by a timeclock to only operate between the hours of 5am and 9pm. The courthouse is currently operating at $3.06 per square foot; this is approximately $1.00 higher than comparable courthouses in adjacent communities. We believe the largest contributor to this higher operating cost is the prolonged hours of HVAC system operation. The staff reports there are times that the facility has night activities, but they are rare events. Therefore, it is likely the timeclock is programmed to allow the system to operate for extended periods of time to allow the HVAC system to operate for these sporadic events rather than holding the system operation closer to actual occupancy hours. *We recommend the County upgrade the existing pneumatic/timeclock control system to a Direct Digital Control (DDC) system that will limit system operation to the scheduled occupancy hours and provide easy overrides for scheduled night activities.*

AgriLife Building

The AgriLife Building is a single story brick faced building located at 20 South Holland Street.

The building has the same T12 lighting system as does the Courthouse. *We recommend retrofitting the fixtures to T8 components.* There is a mercury vapor night light at the back of the building which was found to be operating during the daytime hours that the survey was performed. *We recommend replacing the photocell or timeclock that is controlling the fixture to eliminate daytime operation.*

The HVAC system is a 1990 7-1/2 ton split system controlled with a Honeywell Chromotherm III thermostat. *At 20 years old, the unit has served all of its useful life expectancy and we recommend the unit be replaced. The refrigerant line insulation is missing or damaged and needs to be replaced at the same time the unit is replaced. The County may also consider enlarging the condensing unit maintenance pad to prevent the weeds from growing on the condensing unit coil as evidenced by the vines left on the coil guard (see picture to the right).*

Adult Probation Building

The Adult Probation Office, approximately 3500 square feet located in downtown Bellville, is owned by the County, but operated by the State as the building houses the District Judge's office as well as Austin County Adult probation.

The building has a new 2008 split system to condition the building; the unit is controlled with a Honeywell programmable thermostat set to 74°F and scheduled to allow HVAC operation between the hours of 6am and 5:15pm.

The lighting system is comprised of T12 fixtures that *we recommend be retrofit with T8 lamps and electronic ballasts*. It was noted during the survey that some incandescent lamps are still in use in the building. *We recommend replacing incandescent lamps with compact fluorescent lamps (CFLs)*. CFLs last up to ten times longer than incandescent lamps and consume 75% less energy to operate.

Department of Human Services / Tax Office Building

The Tax Office and Department of Human Services Office, approximately 5,500 and 17,064 square feet, respectively, were among the better performing energy consumers among the facilities analyzed in the County. At $1.40 and $1.12 per square foot, these offices are among the lowest cost facilities.

Tax Office Section

The Tax Office Section has had more energy upgrades than any other building in the County, and a relatively low ECI reflects the success of those measures. The lighting system is T8; the windows have solar screens. The HVAC system consists of two 2009 condensing units that serve older air handlers also located above ceiling as in DHS. The 1" pleated HVAC filters were clean.

There is no hot water supplied to the Tax Office Section.

DHS Section

The HVAC system consists of split systems summarized in the following chart:

Split System	Nominal Size	Manufacture Date	Recommendation
1	5 ton	1993	Replace
2	5-ton	2006	
3	5-ton	2006	
4	5-ton	1993	Replace
5	5-ton	2005	
6	5-ton	2005	
7	5-ton	2009	
8	1-1/2 ton	1993	Replace

Three of the units have missing or damaged refrigerant line insulation. This condition will allow the refrigerant to absorb heat from the exterior of the building instead of from the conditioned space as intended. The units are controlled with a combination of programmable and conventional thermostats with cooling setpoints of 74°F and heating setpoints of 78°F. It is suspected that the non-programmed units are allowed to operate around the clock; *we recommend the County replace the non-programmable thermostat with programmable units to prevent after-hour HVAC system operation.*

It was also noted that many of the coils were dirty and in need of cleaning.
The air handlers are located in the attic. The attic has limited access and, as a result, the air handlers have not been replaced with the same frequency as the condensing units. The soffit vents are located on only one side of the building as the front of the building has approximately 6" of exposed soffit. The ridge cap was in the process of being replaced due to its tendency to leak during rain. The new ridge cap did not appear to have significant venting capabilities and this combination of factors suggests the ventilation in the attic space is minimal. Temperatures in a relatively un-ventilated attic in South Texas can easily reach 140°F, and force the HVAC system to operate longer than expected to overcome the additional heat absorbed by the system from the attic space. *We recommend the County begin to replace the entire split system in order to maintain efficient operation in the air handler as well as the condensing unit. At the current time, we are recommending the County replace the 1993 units* (11-1/2 tons of total cooling capacity). At 17 years old, they have served their anticipated 15-20 year useful life expectancy and should be replaced.

The water heater is a new 40 gallon, 40,000 BTUh input natural gas-fired unit. The circulation pump had a new energy motor installed within the last year.

The lighting system was consistently T12 throughout the building. *We recommend retrofitting the existing fixtures with T8 components.*

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC

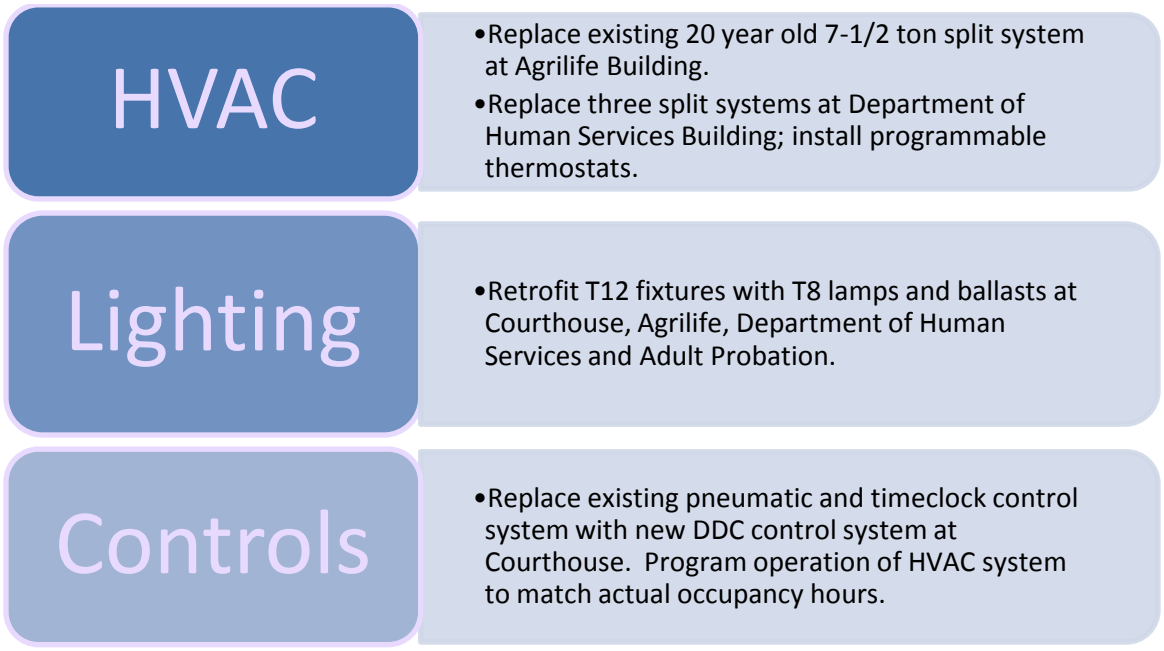
- Re-install the cabinet panels on the 2nd and 3rd floor chiller to protect the internal components.

Maintenance and Operation procedures (M&O) 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.

HVAC M&O #1

It was noted that the exterior cabinet panels have been removed to allow service to be performed with the 2nd and 3rd floor chiller. Re-installing the panels will minimize damage to the chiller interior components and prevent wildlife from relocating to the chiller.

B. CAPITAL EXPENSE PROJECTS



HVAC ECRM #1 – Replace 7-1/2 ton split system at Agrilife Building.

This unit has served all of its anticipated useful life expectancy. County should ensure refrigerant lines are re-insulated at time of replacement, and maintenance pad is enlarged to prevent weeds from suffocating unit.

Estimated Installed Cost	=	$ 15,375
Estimated Energy Cost Savings	=	$ 1,700
Simple Payback Period	=	9 years

HVAC ECRM #2 – Replace three split systems at DHS Building.

These units are 17 years old and have nearly served all of their anticipated useful life expectancy. County should ensure refrigerant lines are re-insulated at time of replacement.

Estimated Installed Cost	=	$ 23,575
Estimated Energy Cost Savings	=	$ 2,400
Simple Payback Period	=	10 years

LIGHTING ECRM #1 – retrofit T12 fixtures

There are T12 fixtures that we recommend be retrofitted with T8 lamps and electronic ballasts. The new components produce approximately 18% more light while consuming about 20% less energy.

Estimated Installed Cost	=	$ 29,500
Estimated Energy Cost Savings	=	$ 5,900
Simple Payback Period	=	5 years

Controls ECRM #1 – Replace pneumatic and timeclock control system with new DDC control system at Courthouse.

The existing multi-zone air handlers have pneumatic controls for damper and valve operation. The system is controlled with a timeclock that allows system operation for longer periods of time than normal occupancy hours.

Estimated Installed Cost	=	$ 34,400
Estimated Energy Cost Savings	=	$ 11,475
Simple Payback Period	=	3 Years

C. SUMMARY TABLE

If Austin County was to implement all recommended M&O and ECRM projects (where M&O costs do not have an installation cost), the summary payback would be:

Estimated Installed Cost	=	$ 102,850
Estimated Energy Cost Savings	=	$ 21,475
Simple Payback Period	=	5 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. $500 maintenance expense next 5 years				
4. $1000 maintenance expense last 5 years				
5. Savings decreases 3% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($102,850)		0	($102,850)
Year 1		$ 21,475	0	$21,475
Year 2		$ 21,475	0	$21,475
Year 3		$ 21,475	0	$21,475
Year 4		$ 21,475	0	$21,475
Year 5		$ 21,475	0	$21,475
Year 6		$ 20,831	($500)	$20,331
Year 7		$ 20,187	($500)	$19,687
Year 8		$ 19,542	($500)	$19,042
Year 9		$ 18,898	($500)	$18,398
Year 10		$ 18,254	($500)	$17,754
Year 11		$ 17,610	($1,000)	$16,610
Year 12		$ 16,965	($1,000)	$15,965
Year 13		$ 16,321	($1,000)	$15,321
Year 14		$ 15,677	($1,000)	$14,677
Year 15		$ 15,033	($1,000)	$14,033
			Internal Rate of Return	**17.98%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

8.0 GENERAL COMMENTS

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

APPENDICES

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

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:

They 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

How to Finance Your Energy Program *continued*

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

Wires Charge : kWh used X .039298
Power Supply Charge : kWh used X G&T factor
Minimum Charge : $ 27.50
* Minimum applies only if usage is less than 254 kWh

Rate: RES 3 – Three phase residential service
Customer Charge : $ 32.50
Wires Charge : kWh used X .039298
Power Supply Charge : kWh used X G&T factor
Minimum Charge : $ 40.50
* Minimum applies only if usage is less than 203 kWh

Rate: GS1 – Single phase general service
Customer Charge : $ 18.50
Wires Charge : kWh used X .041497
Power Supply Charge : kWh used X G&T factor
Minimum Charge : $ 32.50
* Minimum applies only if usage is less than 337 kWh

Rate: GS3 – Three phase general service
Customer Charge : $ 35.00
Wires Charge : kWh used X .041497
Power Supply Charge : kWh used X G&T factor
Minimum Charge : $ 50.00
* Minimum applies only if usage is less than 361 kWh

Rate: COMM – Large Commercial Service over 50 kW
Customer Charge : $ 175.00
Wires Charge : Billed Demand X 5.37
Power Supply Charge : kWh used X G&T factor

Rate: SUB – Industrial Service over 50 kW
Customer Charge : $ 400.00
Wires Charge : Billed Demand X 5.21
Power Supply Charge : kWh used X G&T factor

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

REQUEST FOR ENERGY ASSISTANCE

Energy efficiency is increasingly important for our local communities and the state of Texas. It reduces costs, increases available capital, spurs economic growth, improves working, learning and living environments and preserves precious resources. The State Energy Conservation Office (SECO) offers a number of free programs and services to help public agencies establish and achieve their energy efficiency goals.

SECO through its engineering consultants offers public agencies the following free or cost shared energy management services:

• On-Site Energy Assessments Of Facilities	Free
• On-Site Training For Maintenance And Operations Personnel	Free
• Workshops For Energy Managers, Maintenance Personnel And Administrators	Free
• Energy Management Policy Development And Implementation	Free
• Assistance In Identifying Energy Retrofit Funding Sources	Free

Specific responsibilities of the partner and SECO in this agreement:

- Partner will select a contact person to work with SECO and its engineering consultant to establish an energy policy and set realistic energy efficiency goals.
- SECO's contractor will contact partners to assess their energy management needs.
- SECO will provide a report, which identifies no cost/low cost recommendations, capital retrofit projects, potential sources of funding and other needs and opportunities.
- Partner will schedule a time for SECO's contractor to present its findings and recommendations to key decision makers.
- Partner pledges that it is ready and willing to consider implementing the energy saving recommendations.

Acceptance Of Agreement And Request For Energy Management Assistance

Signature: Carolyn Bilski Date: 5/28/08

Name (Mr./Ms./Dr.): Mrs. Carolyn Bilski Title: Austin County Judge

Organization: Austin County Phone: 979-865-5911

Address: 1 E. Main Fax: 979-865-8786

Bellville, Texas 77418 E-mail: cbilski@austincounty.com

Assigned Program Person:

Name: SAME - Carolyn Bilski Title:

Phone: County:

Fax: E-Mail:

Please complete and mail or fax to the following SECO Consultant : Texas Energy Engineering Services, Inc. (TEESI), ATTENTION: Saleem Khan, P.E., 1301 Capital Of Texas Highway #B-325, Austin, TX. 78746, Phone 512-328-2533, Fax 512-328-2544. If you need to contact the State Energy Conservation Office, please call Theresa Sifuentes at 512-463-1896 or you may write to her at: Comptroller Of Public Accounts, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774.

ESA 5/13/10
SRV

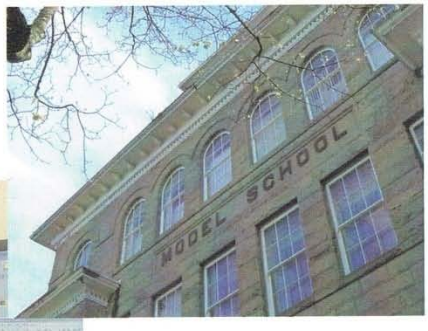
APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

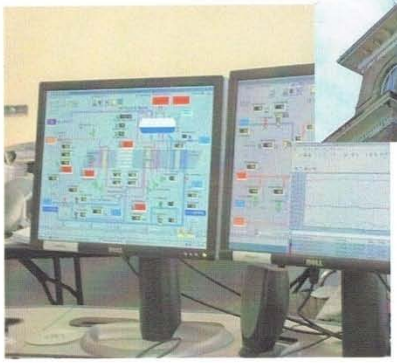
ANNOUNCING!

TEXAS ENERGY MANAGERS ASSOCIATION

TEMA

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