Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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City of Nolanville

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ESA-Energy Systems Associates, Inc.
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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**.

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

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

In July, 2010, **SECO** received a request for technical assistance from *Ms. Crystal Briggs*, City Secretary for the City of Nolanville. **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 the **City of Nolanville,** 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 *Ms. Briggs,* 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 **$1,605** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$10,800**, yielding an average simple payback of **6-3/4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$8,200	$1,170	7 Years
Lighting ECRM #1	$2,600	$435	6 Years
TOTAL PROJECTS	**$10,800**	**$1,605**	**6-3/4 Years**

The total utility cost for CITY OF NOLANVILLE from July 2009 to June 2010 was $11,252 for the City Hall, Police Station and Public Library. The projected savings of $1,605 would represent a decrease in utility expenditures for the district of 14.3%. 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 the **City of Nolanville**. 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 City of Nolanville, 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:

City of Nolanville

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
City Hall/Police	57,381	2.34
Community Center	20,169	1.28

The electricity and gas consumption charts for the City of Nolanville City Hall-Police Department and Community Center are as follows:

OWNER: **City Of Nolanville** **BUILDING:** **City Hall / Police**

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	2,544	6	6	84	338	Unavailable	
FEBRUARY	2010	2,063	7	7	85	291		
MARCH	2010	2,089	8	8	91	300		
APRIL	2010	3,429	10	10	102	446		
MAY	2010	3,762	13	13	120	497		
JUNE	2010	4,386	15	15	132	651		
JULY	2009	5,928	14	14	126	827		
AUGUST	2009	5,238	13	13	120	740		
SEPTEMBER	2009	5,109	13	13	120	724		
OCTOBER	2009	3,006	12	12	114	415		
NOVEMBER	2009	2,535	10	10	102	356		
DECEMBER	2009	2,581	10	10	85	344		
TOTAL		42,670	131	131	1,281	$5,929	7.60	$246

Annual Total Energy Cost =	$6,175	Per Year
Total KWH x 0.003413 =	145.63	x 106
Total MCF x 1.03 =	#REF!	x 106
Total Other x ____		x 106
Total Site BTU's/yr	#REF!	x 106
Floor area:	2,538	s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = #REF! BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.43 $/s.f. yr

Natural Gas estimates derived from the following assumptions:

The furnaces being used consume 100,000 btu per hour

The furnaces run for 38 hours annually based on the "Equivalent Full Load Heating Hours" cited by the Texas LoanSTAR program guidebook for Austin and surrounding areas.

The average price for natural gas in Central Texas is $7.50 per mcf and $15.74 in service charges each month.

OWNER: **City Of Nolanville** **BUILDING:** **Community Center**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	3,348	22	22	173	508	All Electric Facility	
FEBRUARY	2010	2,355	31	31	226	462		
MARCH	2010	1,833	25	25	191	374		
APRIL	2010	882	17	17	22	110		
MAY	2010	1,053	25	25	191	314		
JUNE	2010	2,289	25	25	191	478		
JULY	2009	928	15	15	197	543		
AUGUST	2009	2,748	15	15	197	521		
SEPTEMBER	2009	2,346	15	15	197	474		
OCTOBER	2009	1,326	12	12	197	330		
NOVEMBER	2009	1,002	18	18	197	297		
DECEMBER	2009	2,316	27	27	217	449		
TOTAL		**22,426**	**247**	**247**	**2,196**	**$4,860**	**3.80**	**$217**

Annual Total Energy Cost =	$5,077	Per Year
Total KWH x 0.003413 =	76.54	x 106
Total MCF x 1.03 =	3.91	x 106
Total Other x ____		x 106
Total Site BTU's/yr	80.45	x 106
Floor area:	3,795	s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 21,200 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.34 $/s.f. yr

Natural Gas estimates derived from the following assumptions:

- The furnaces being used consume 100,000 btu per hour
- The furnaces run for 38 hours annually based on the “Equivalent Full Load Heating Hours” cited by the Texas LoanSTAR program guidebook for Austin and surrounding areas.
- The average price for natural gas in Central Texas is $7.50 per mcf and $15.74 in service charges each month.

The district has one electricity provider; TXU Energy. Copies of the electric rate schedules are included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS

A. ELECTRICITY PROVIDER

TXU Energy

Rate Schedule Demonstrated on Billings:

I.	ENERGY CHARGE	= $0.1123 per kWh
II.	DELIVERY CHARGE	= $9.19 per kW
III.	Advanced Meter Charge	= $3.98 per meter

Average Savings for consumption determined from billings

= (Total Cost for annual electricity – Demand Cost for electricity) / total annual kWh

= ($10,789 – $3,477) / 65,096 = **$0.1123 per kWh**

Average Savings for demand

= Total cost for demand / Total kW of Demand

= ($2196 + $1281) / (247 + 131) = $9.19 / kW

5.0 CAMPUS DESCRIPTIONS

The **City of Nolanville**, located in Bell County Texas, owns two buildings that were assessed for this report. The buildings include a combined City Hall and Police Department building and a Community Center. The buildings are generally operated during normal business hours and the community center is available to be rented for special occasions. The population of the city is approximately 2,150 persons.

A. CITY HALL / POLICE DEPARTMENT

City Hall is a brick-faced building on a concrete slab with a low-slope roof. The building contains approximately 2,538 square feet of conditioned floor area and was completed in 1973. The City will soon receive grant money to replace the windows at the City Hall / Police Department building.

HVAC & Control System Description:

The building is heated and cooled by two split systems utilizing natural gas heating and electric DX cooling. The condensing units are pad-mounted at the exterior of the building and the air handling units (AHUs) are located in a mechanical room. Air distribution is accomplished by ductwork above the ceiling.

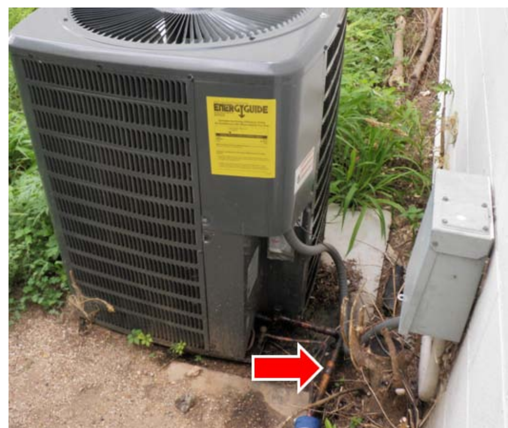

Figure 1 : Missing insulation at condensing unit

The Goodman condensing unit was manufactured in 2009 and is in good condition. The refrigerant line between the unit and the building is not insulated and the weeds growing around the unit may inhibit airflow as seen in figure 1. The lack of insulation integrity allows the refrigerant to absorb heat from the ambient air and reduces its ability to absorb heat from the interior space as intended. W*e recommend that the City replace the refrigerant line insulation to improve the operating efficiency of this unit and keep the weeds cut back to allow sufficient airflow to the unit.*

The Rheem condensing unit was manufactured in 1993 and is in need of replacement. At 17 years old, the unit has served the useful life expectancy for a split system of 15 years. *We recommend the City consider replacing this condensing unit with a new energy-efficient model in the next 1-2 years. Budgeted replacement of an old inefficient unit is less expensive than the emergency replacement costs for a unit that has failed.*

During the survey, some air leaks were detected between the seams of the AHU cabinet. These leaks reduce the AHU's ability to provide occupant comfort in the desired space. *We recommend the City seal the seams of the AHU cabinet.*

It was also noted that the City uses spun fiberglass filters in the AHU. *We recommend these filters be replaced with pleated filters.* Pleated filters provide improved indoor air quality and greater protection for the equipment than spun fiberglass filters.

Lighting System Description:
The building uses approximately 29 ceiling-mounted fluorescent strip fixtures, each with two or four T12 lamps. The T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the energy saving opportunities available, *we recommend retrofitting the T12 fixtures with T8 lamps and electronic ballasts.* The building also has one 100W incandescent lamp which *we recommend replacing with a compact fluorescent lamp.*

Building Envelope Description:
It was noted during the survey that the exterior door on the police side of the building does not close correctly. Doors that do not close properly leak conditioned air to the outside. *We recommend this door be repaired or replaced as needed to improve the seal between the building and outdoor environment.*

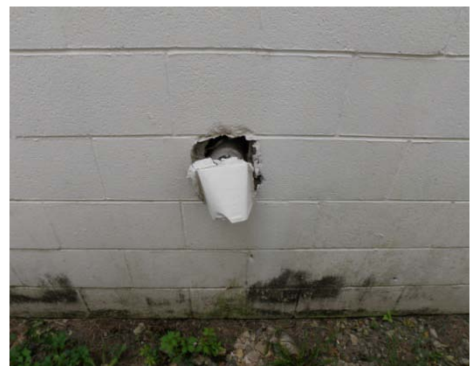
Figure 2 : Opening at exterior exhaust duct

An opening between the building and outdoor environment was noted at the exhaust duct shown in figure 2. This opening is large enough to permit outside air and wildlife to enter the building. *We recommend the City examine the building's exterior and seal all openings with weatherproof expandable insulating foam.*

B. J.W. SIMS COMMUNITY CENTER

The Community Center is a stone-faced building on a concrete slab with a moderately sloped roof. The building contains approximately 3,795 square feet of conditioned floor area and was constructed in 1980. The facility was constructed by the citizens of Nolanville; the brick and stone exterior is a combination of different lots that were donated by volunteers. The single pane windows are protected from solar radiation by a 4-5 foot overhang.

HVAC & Control System Description:
The building is conditioned by a 5-ton split system manufactured by Rheem. The condensing unit was manufactured in 2000. It was noted during the survey that the refrigerant line insulation for this unit was damaged or missing. W*e recommend that the City replace the refrigerant line insulation*.

The current 5-ton split system supplies 1-ton of cooling for every 760 square feet. This is insufficient for large crowds. In order to provide sufficient cooling, *we recommend installing an additional split system utilizing a 5-ton condensing unit.* This will supply 1-ton of cooling for every 380 square feet.

The split system is currently controlled by a conventional, non-programmable thermostat. The thermostat is set back to 80°F when the building is not in use. *We recommend the City turn the* *air conditioning off when the building is unoccupied.* Significant energy savings may be available by turning the air conditioning off during unoccupied hours instead of just setting the temperature back. The setback procedure should only be used when low temperatures are expected during the unoccupied period and freeze protection within the building is a concern.

Lighting System Description:

The building uses approximately 38 ceiling-mounted fluorescent strip fixtures, each with two T12 lamps. The T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the energy saving opportunities available, *we recommend retrofitting T12 system fixtures with T8 lamps and electronic ballasts.* The building also has two incandescent globe fixtures in the lobby which *we recommend retrofitting with compact fluorescent lamps.*

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC

- Replace damaged and missing refrigerant line insulation at the split systems .
- Cut back weeds around condensing unit at the City Hall / Police Station
- Seal leaks in City Hall / Police Station air handling unit cabinet
- Replace spun fiberglass filters with pleated filters
- Turn off Community Center thermostat when building is not in use

Building Envelope

- Repair exterior Police Station door
- Seal all openings in City Hall / Police Station exterior walls

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 condensing unit's refrigerant line insulation was damaged or missing. This condition allows the refrigerant to absorb heat from the ambient air and minimizes the ability for the refrigerant to absorb heat from the interior space as desired.

HVAC M&O #2
Overgrown weeds can reduce air circulation through condensing units. We recommend keeping weeds cut back to allow maximum airflow through the unit at the City Hall / Police Station.

HVAC M&O #3
A significant air leak was noted at an air handling unit in the City Hall / Police Station. This air leak limits the unit's ability to propel conditioned air through the building. The air handler cabinet should be sealed to prevent air from leaking through the cabinet seams.

HVAC M&O #4
Pleated filters offer improved indoor air quality and protection for the air handler.

HVAC M&O #5
Significant energy savings may be available by turning the air conditioning off during unoccupied hours instead of just setting the temperature back. The setback procedure should only be used when low temperatures are expected during the unoccupied period and freeze protection within the building is a concern.

Building Envelope M&O #1
The exterior door at the Police Station does not close properly and leaks conditioned air into the outdoors. This door needs to be repaired to achieve an airtight seal.

Building Envelope M&O #2
A large opening in the City Hall / Police Station was noted in the exterior wall surrounding an exhaust duct. Such an opening allows outside air and wildlife to move freely into the building. The exterior wall should be checked for openings, and all openings should be correctly sealed.

B. CAPITAL EXPENSE PROJECTS

HVAC

- Replace condensing unit at the City Hall / Police Station.
- Add additional 5-ton split system at Community Center

Lighting

- Retrofit older T12 fixtures with T8 lamps and ballasts.

HVAC ECRM #1 – replace condensing unit at City Hall / Police Station

There is a 17 year old Rheem condensing unit at the City Hall / Police Station which should be replaced. These systems typically have a life expectancy of 15-20 years.

Estimated Installed Cost	=	$ 8,200
Estimated Energy Cost Savings	=	$ 1,170
Simple Payback Period	=	7 years

HVAC ECRM #1 – add 5-ton split system at Community Center

The current 5-ton split system supplies 1-ton of cooling for every 760 square feet. This is insufficient for large crowds. In order to provide sufficient cooling, *we recommend installing an additional split system utilizing a 5-ton condensing unit.* This will supply 1-ton of cooling for every 380 square feet. This measure is meant to improve building comfort.

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	=	$ 2,600
Estimated Energy Cost Savings	=	$ 435
Simple Payback Period	=	6 years

C. SUMMARY TABLE

If the City of Nolanville 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	=	$ 10,800
Estimated Energy Cost Savings	=	$ 1,605
Simple Payback Period	=	6 - 3/4 years

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

1. Lighting ECRM #1	T12 lamps and ballasts are no longer being manufactured. The City should plan on retrofitting these fixtures with T8 lamps and electronic ballasts.
2. HVAC ECRM #1	The condensing unit is at the end of its useful life expectancy and will need to be replaced soon.

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. $150 maintenance expense next 5 years				
4. $300 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	($10,800)		0	($10,800)
Year 1		$ 1,605	0	$1,605
Year 2		$ 1,605	0	$1,605
Year 3		$ 1,605	0	$1,605
Year 4		$ 1,605	0	$1,605
Year 5		$ 1,605	0	$1,605
Year 6		$ 1,557	($150)	$1,407
Year 7		$ 1,509	($150)	$1,359
Year 8		$ 1,461	($150)	$1,311
Year 9		$ 1,412	($150)	$1,262
Year 10		$ 1,364	($150)	$1,214
Year 11		$ 1,316	($300)	$1,016
Year 12		$ 1,268	($300)	$968
Year 13		$ 1,220	($300)	$920
Year 14		$ 1,172	($300)	$872
Year 15		$ 1,124	($300)	$824
			Internal Rate of Return	**9.53%**

More information regarding financial programs available to CITY OF NOLANVILLE 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, either 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

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULES

Transmission and Distribution – TXU Energy

Rate schedules unavailable. Average savings calculated from billing.

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

Local Governments and Municipalities

Preliminary Energy Assessment Service Agreement

Investing in our communities 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 City of Nolanville Texas, hereinafter referred to as Partner, to identify energy cost-savings potential. To achieve this potential, SECO and Partner have agreed to work together to complete an energy assessment of mutually selected facilities.

SECO agrees to provide this service at no cost to the Partner with the understanding that the Partner is ready and willing to consider implementing the energy savings recommendations.

Principles of the Agreement

Specific responsibilities of the Partner and SECO in this agreement are listed below.

- ✓ Partner will select a contact person to work with SECO and its designated contractor to establish an Energy Policy and set realistic energy efficiency goals.
- ✓ SECO's contractor will go on site to provide walk through assessments of selected facilities. SECO will provide a report which identifies no cost/low cost recommendations, Capital Retrofit Projects, and potential sources of funding. Portions of this report may be posted on the SECO website.
- ✓ Partner will schedule a time for SECO's contractor to make a presentation of the assessment findings key decision makers.

Acceptance of Agreement

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

Signature: Jeffrey D. Looney
Date: 02/26/2009 (office is vacant)

Name (Mr./Ms./Dr.) ~~Jeff Looney~~ Crystal Briggs (City Secretary)
Title: ~~City Administrator~~

Organization: City of Nolanville
Phone: 254-698-6335

Street Address: 100 N. Main St.
Fax: 254-698-6337

Mailing Address: P.O. Box 128 Nolanville, TX ~~766~~ 76559
E-Mail: jeff.looney@ci.nolanville.tx.us

County: Bell

Contact Information: Bob Pena - Public Works Director (bobpenanolanville@live.com)

Name (Mr./Ms./Dr.): ~~Jeff Looney~~
Title: ~~City Administrator~~

Phone: 254-698-6335
Fax: 254-698-~~6337~~2540

E-Mail: 254-698-6337 / ~~jeff.looney@ci.nolanville.tx.us~~
County: Bell

Please sign and mail or fax to: Theresa Sifuentes, Local Governments and Municipalities Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1896. Fax 512-475-2569.

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APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

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

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

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

Texas Energy Managers Association

SECO State Energy Conservation Office