Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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Blanket Independent School District

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SECO
State Energy Conservation Office

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1.0 EXECUTIVE SUMMARY:

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

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

In February 2010, **SECO** received a request for technical assistance from Kevy Allred, Superintendent for **Blanket I.S.D.** **SECO** responded by sending ESA **Energy Systems Associates, Inc.**, a registered professional engineering firm, to prepare this preliminary report for the school district. This report is intended to provide support for the district as it determines the most appropriate path for facility renovation, especially as it pertains to the energy consuming systems around the facility. It is our opinion that significant decreases in annual energy costs, as well as major maintenance cost reductions, can be achieved through the efficiency recommendations provided herein.

This study has focused on energy efficiency and systems operations. To that end, an analysis of the utility usage and costs for **Blanket ISD,** (hereafter known as BISD) was completed by ESA **Energy Systems Associates, Inc**., (hereafter known as *Engineer*) to determine the annual energy cost index (ECI) and energy use index (EUI) for each campus or facility. A complete listing of the Base Year Utility Costs and Consumption is provided in Section 3.0 of this report.

Following the utility analysis and a preliminary consultation with *Mr. Mo Amos*, a walk-through energy analysis was conducted throughout the campus. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 7.0 of this report.

We estimate that as much as **$21,229** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$161,300**, yielding an average simple payback of **7-2/3** years.

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

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$92,250	$7,688	12 Years
Lighting ECRM #1	$12,600	$1,683	7-1/2 Years
Lighting ECRM #2	$45,950	$7,658	6 Years
Controls ECRM #1	$10,500	$4,200	2-1/2 Years
TOTAL PROJECTS	**$ 161,300**	**$21,229**	**7-2/3 Years**

Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Internal Rate of Return (IRR), for this retrofit program has been calculated and shown in Section 8.0 of this report.

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

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

2.0 ENERGY ASSESSMENT PROCEDURE:

Involvement in this on-site analysis program was initiated through completion of a Preliminary Energy Assessment Service Agreement. This PEASA serves as the agreement to form a "partnership" between the client and the State Energy Conservation Office (SECO) for the purposes of energy costs and consumption reduction within owned and operated facilities. After receipt of the PEASA, an initial visit was conducted by the professional engineering firm contracted by SECO to provide service within that area of the state. The purpose of this visit is 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 requested for the engineer's preliminary assessment of the Energy Performance Indicators. After consultation with SECO to determine the program elements to be provided to BISD, ESA returned to the facilities to perform the following tasks:

1. Designing and monitoring customized procedures to control the run times of energy consuming systems.
2. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
3. Develop an accurate definition of system and equipment replacement projects along with installation cost estimates, estimated energy and cost savings and analyses for each recommended project.
4. Develop a prioritized schedule for replacement projects.
5. Assist in the development of guidelines for efficiency levels of future equipment purchases.

3.0 ENERGY PERFORMANCE INDICATORS:

In order to easily assess the *Partner's* energy utilization and current level of efficiency, there are two key "Energy Performance Indicators" calculated within this report.

1. Energy Utilization Index

The Energy Utilization Index (EUI) depicts the total annual energy consumption per square foot of building space, and is expressed in "British Thermal Units" (BTUs).

To calculate the EUI, the consumption of electricity and gas are first converted to equivalent BTU consumption via the following formulas:

ELECTRICITY Usage

[Total KWH /yr] x [3413 BTUs/KWH] = __________ BTUs / yr

NATURAL GAS Usage

[Total MCF/yr] x [1,030,000 BTUs/MCF] = ________ BTUs / yr

After adding the BTU consumption of each fuel, the total BTUs are then divided

by the building area.

EUI = [Electricity BTUs + Gas BTUs] divided by [Total square feet]

2. Energy Cost Index

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

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

ECI = [Electricity Cost + Gas Cost] divided by [Total square feet]

These indicators may be used to compare the facility's current cost and usage to past years, or to other similar facilities in the area. Although the comparisons will not provide specific reasons for unusual operation, they serve as indicators that problems may exist within the energy consuming systems.

THE CURRENT BISD ENERGY PERFORMANCE INDICATORS:

CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	ENERGY COST INDEX (ECI) $/sf-year
Blanket K-12	33,988	$0.92

Blanket ISD purchases electricity for all schools from Direct Energy. The transmission and distribution utility is Oncor. The energy history spreadsheets are shown on the next few pages.

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

Copies of the rate schedules are included in Appendix I.

OWNER: **Blanket ISD** **BUILDING:** **Blanket K-12**

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	29,159				$4,431	328	$2,206
FEBRUARY	2010	36,001				$5,088	300	$1,895
MARCH	2010	27,124				$4,250	205	$1,221
APRIL	2010	33,369				$5,209	73	$452
MAY	2010	37,616				$5,468	18	$125
JUNE	2010	43,711	*Not delineated in the billing*			$6,051	12	$94
JULY	2010	34,657				$5,093	11	$104
AUGUST	2010	38,210				$5,466	8	$88
SEPTEMBER	2010	64,274				$8,386	14	$138
OCTOBER	2010	48,206				$6,887	15	$144
NOVEMBER	2010	40,179				$5,888	26	$220
DECEMBER	2010	36,393				$5,230	133	$1,011
TOTAL		468,899	0	0	0	$67,447	1,142	$7,698

Annual Total Energy Cost =	$75,145	Per Year
Total KWH x 0.003413 =	1,600.35	x 106
Total MCF x 1.03 =	1,176.16	x 106
Total Other x ____		x 106
Total Site BTU's/yr	2,776.51	x 106
Floor area:	81,690	s.f.
Electric Utility	**Meter#**	

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 33,988 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.92 $/s.f. yr

As can be seen in the chart above, the peak consumption for electricity occurs in September, which is typical for a Texas school district. Peak gas consumption also represents a typical Texas school district. It occurs in January with a significant bell curve throughout the year that bottoms out in July and August.

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC PROVIDER: Direct Energy Contract price: $0.0897 per kWh

TRANSMISSION AND DISTRIBUTION UTILITY: Oncor

Electric Rate: Secondary Service > 10 kVA

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$3.50 per meter
	Metering Charge	=	$18.41 per IDR meter
	Transmission System Charge		
	IDR Metered	=	$1.99 per 4CP kW
	Distribution System Charge	=	$3.97 per Distribution System Billing kW
II.	SYSTEM BENEFIT FUND	=	$0.000655 per kWh see Rider SBF
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$0.188/kW
	Transition Charge 2	=	$0.269/kW
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.044 per Distribution System Billing kW
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.175714/4CP Kw
VI.	ENERGY EFFICIENCY COST RECOVERY FACTOR	=	$9.66/Retail Customer
VII.	COMPETITIVE METER CREDIT	=	$5.47/Month
VIII.	ADVANCED METERING COST RECOVERY FACTOR	=	$3.98/Month
IX.	RATE CASE EXPENSE SURCHARGE	=	$0.007944/kW
X.	TAXES		
	General Local Taxes		

Average Savings for consumption = $0.0897/kWh + $0.000655/kWh = $0.090355/kWh
Average Savings for demand = $1.99 + $3.97 + $0.188 + $0.269 + $0.044 + $0.175714 + $0.007944 = $ 6.644658/kW**

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

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

NATURAL GAS PROVIDER:

The rate schedule for Natural gas is unavailable, but the average cost per MCF of purchased natural gas in the district has been calculated by analyzing the utility histories for the facility surveyed in this report.

Total cost for natural gas at the five facilities in the analyzed billing cycle: $7,698

Total quantity purchased during the analyzed billing cycle: 1,142 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $7,698 / 1,142 MCF

Average cost per MCF = $6.74

5.0 CAMPUS DESCRIPTION:

Blanket ISD occupies one campus that consists of seven different buildings. The oldest building on campus, the Gymnasium, was constructed in 1907. This building does not have air conditioning or plumbing and its use is limited to about two times per year. Other buildings have been added throughout the years, the most significant expansions occurring with the new Gymnasium Building in 1996 and a new Kindergarten through sixth grade building in 2003. The current square footage for the regularly occupied and conditioned student spaces is 81,690 square feet.

HVAC System:

The majority of the campus is conditioned with rooftop units (RTUs) with natural gas heating and controlled with a combination of conventional or programmable thermostats:

Area served	Manufacturer	Quantity	Nominal Size	Age	Notes
New Gymnasium	Trane	2	17-1/2 tons	2008	Cooling Only; Excellent condition.
New Gym Building	Carrier	3	3-tons	1996	15 years old
	Carrier	4	4-tons	1996	15 years old
	Carrier	4	5-tons	1996	15 years old
High School	York	5	4-tons	2000	Good condition
	York	1	7-1/2 ton	2000	Good condition
	-	2	4-tons	2009	Excellent Condition
Elementary	-	-	Varies	2003	Good Condition

Lighting System:

The majority of the lighting system for the district is comprised of energy efficient T8 linear fluorescent fixtures. There are, however, still some older T12 fixtures in use throughout the campus. We recommend the district retrofit the existing T12 component fixtures with new T8 lamps and electronic ballasts. These new components will produce approximately 18% more light while consuming about 20% less energy than the existing T12 lighting system.

6.0 ENERGY RECOMMENDATIONS:

HVAC ECRM 1: RENOVATION OF AGED HVAC EQUIPMENT

It was noted during the survey that several pieces of equipment are nearing the end of their useful life expectancy. *We recommend this equipment be included in subsequent maintenance budgets to be replaced as planned equipment upgrades in order to avoid the higher cost of emergency replacement when they inevitably fail.*

The gymnasium was originally constructed in 1996 and is still utilizing some of the original DX rooftop units from the same year. At 15 years of age, these units are approaching the end of their anticipated useful life expectancy of 15-20 years. *We recommend the district begin to budget for the replacement of the 1996 units using a process called "planned obsolescence".* In this process, a few of the oldest or most maintenance intensive units are replaced each year so that the district can plan for the equipment replacement and not have to schedule a massive HVAC project that would occur when all of the units began to fail at the same time. In the survey, we identified 11 each 1996 units with a total nominal cooling capacity of 45 tons. As these units remain operational, their operating efficiency will continue to decrease and the payback associated with their replacement will improve; but if all of this equipment was going to be replaced in one project next year, the project budget would approximate:

Estimated Cost: $92,250 Estimated Savings: $7,688 Estimated Payback: 12 Years

LIGHTING ECRM 1: METAL HALIDE FIXTURE RETROFIT TO T5

It was noted during the survey that the gymnasium utilizes 36 each 400-watt metal halide fixtures. These fixtures have a long re-strike time, which causes a 5-10 minute delay after the lights are turned on for the lamps to warm up to their full operating light output level. This often promotes coaches and facility operators to leave gym lights operating throughout the day in order to avoid lengthy delays in getting the area illuminated for immediate use. The new T5 fixtures do not have the inherently long re-strike characteristic of metal halide fixtures and therefore can be easily turned off when the gym is unoccupied. *We recommend replacing each metal halide fixture with new six-lamp T5 high-output fluorescent fixtures.*

Estimated Cost: $12,600 Estimated Savings: $1,683 Estimated Payback: 7-1/2

LIGHTING ECRM 2: MAGNETIC BALLAST RETROFIT TO ELECTRONIC BALLAST

During the survey it was noted that the campus is still utilizing some T12 light fixtures. The T12 fixtures consume approximately twenty percent more energy than T8 fixtures because of the magnetic ballasts that are utilized in the fixture. *We recommend replacing all magnetic ballasts with electronic ballasts* and *replacing all 34-watt T12 lamps to more efficient 32-watt T8 lamps to minimize energy consumption.*

Estimated Cost: $45,950 Estimated Savings: $7,658 Estimated Payback: 6

CONTROLS ECRM 1: INSTALL IP ADDRESSABLE THERMOSTATS

It was noted during the survey that the district utilizes a combination of conventional and programmable thermostats for the HVAC system. These units rely on the behavioral practices of the staff to operate and maintain up to date programming requirements for the system. Making changes to the programming requires district staff to visit and re-program each thermostat location. *We recommend replacing all manual thermostats with IP addressable thermostats.* These units can be connected into the existing facility intranet which allows each unit to be monitored and programmed from one network location. This system offers many of the advantages of a Direct Digital Control (DDC) energy management system at a substantially reduced installation cost for the district.

Estimated Cost: $10,500 *Estimated Savings: $4,200* *Estimated Payback: 2-1/2*

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC	•Inspect and repair piping insulation at kitchen, cafeteria, and gymnasium •Review domestic water heater set points
Lighting	•Turn off all light fixtures not required during daytime •Turn off lights in unoccupied spaces •Repair photocell sensors •Replace incandescent lambs with compact fluorescent lamps
Controls	•Create a conditioning time schedule

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

HVAC M&O

It was noted during the survey that the hot water piping on the domestic water heater at the cafeteria, kitchen and gymnasium was not fully insulated. The majority of the energy losses in a hot water system occur in the hot water piping. *We recommend the district insulate the hot water piping to minimize energy losses in the hot water system.*

Lighting M&O

It was noted in our survey that the typical classroom has 3-lamp light fixtures which are dual switched, meaning that the two outside lamps operate on one switch and the one inside lamp operates on the other switch. This switching strategy where two switches operate lamps within the same light fixture is also called inboard-outboard switching. At the time of our survey, we noted that only the outer lamps were being utilized and the foot candle measurement was 52. The Illuminating Engineering Society of North America (IESNA) recommendation for classrooms is 50 foot candles. IESNA has determined that the efficiency of most students performing reading and writing activities in the classroom is maximized with 50 footcandles at the desktop level. Given that this level of illumination is currently being provided with only the outboard lamps in the fixtures operating, w*e recommend the district continue the practice of only utilizing the lighting needed by keeping the inner lamp turned off.*

Although the proper level of light is being used in the spaces, we did note during the survey that there were several unoccupied spaces in which the lights were still operating. Studies have shown that turning off fluorescent light fixtures, like those found in the majority of classrooms in Texas schools, saves energy if the occupants are gone from the space for any amount of time greater than 23 seconds. *We recommend the district remind the staff of the importance of turning off the fixtures as they leave the room in the next staff training or in-service.*

The majority of the exterior light fixtures were noted to be off during the energy survey. There were, however, a few fixtures that were operating during the day. It is likely that the photocell or timeclock designed to control these fixtures is in need of adjustment or repair. *We recommend making the appropriate repairs to the sensor or timeclock to ensure that the exterior fixtures do not operate during daytime hours.*

We noticed areas on campus that is still operating less efficient incandescent lamps. W*e recommend the district replace all incandescent lamps with compact fluorescent lamps (CFLs).* CFLs will use seventy five percent less energy than the incandescent lamps and will last between 8 and 10 times longer.

8.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $500 maintenance expense next 5 years				
4. $1000 maintenance expense next 5 years				
5. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($161,300)		0	($161,300)
Year 1		$ 21,229.00	0	$21,229
Year 2		$ 21,229.00	0	$21,229
Year 3		$ 21,229.00	0	$21,229
Year 4		$ 21,229.00	0	$21,229
Year 5		$ 21,229.00	0	$21,229
Year 6		$ 20,804.42	($500)	$20,304
Year 7		$ 20,379.84	($500)	$19,880
Year 8		$ 19,955.26	($500)	$19,455
Year 9		$ 19,530.68	($500)	$19,031
Year 10		$ 19,106.10	($500)	$18,606
Year 11		$ 18,681.52	($1,000)	$17,682
Year 12		$ 18,256.94	($1,000)	$17,257
Year 13		$ 17,832.36	($1,000)	$16,832
Year 14		$ 17,407.78	($1,000)	$16,408
Year 15		$ 16,983.20	($1,000)	$15,983
			Internal Rate of Return	**8.82%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 GENERAL COMMENTS

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

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

State Purchasing:

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

Design/Bid/Build (Competitive Bidding):

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

Design/Build:

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

Purchasing Standardization Method:

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

Performance Contracting:

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

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

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Financing Mechanisms

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

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

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

Internal Funds

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

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

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

Debt Financing

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

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

Tariff for Retail Delivery Service
Oncor Electric Delivery Company LLC

6.1.1 Delivery System Charges	Sheet: 1.3
Applicable: Entire Certified Service Area	Page 1 of 2
Effective Date: December 30, 2009	Revision: Three

6.1.1.1.3 Secondary Service Greater Than 10 kW

AVAILABILITY

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

TYPE OF SERVICE

Delivery Service will be single or three-phase, 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard meter provided for this type of Delivery Service, unless Retail Customer is eligible for and chooses a competitive meter provider. Any meter other than the standard meter provided by Company will be provided at an additional charge. Where Delivery Service of the type desired is not available at the Point of Delivery, additional charges and special contract arrangements may be required prior to Delivery Service being furnished, pursuant to Section 6.1.2.2 of this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:		
Customer Charge	$3.50	per Retail Customer
Metering Charge	$18.41	per Retail Customer
Transmission System Charge		
Non-IDR Metered	$1.48	per NCP kW
IDR Metered	$1.99	per 4CP kW
Distribution System Charge	$3.97	per Distribution System billing kW
II. System Benefit Fund:	$0.000655	per kWh, See Rider SBF
III. Transition Charge:	See Riders TC1 and TC2	per Distribution System billing kW
IV. Nuclear Decommissioning Charge:	$0.044	per Distribution System billing kW, See Rider NDC
V. Transmission Cost Recovery Factor:	See Rider TCRF	
VI. Energy Efficiency Cost Recovery Factor:	See Rider EECRF	
VII. Competitive Meter Credit:	See Rider CMC	
VIII. Advanced Metering Cost Recovery Factor:	See Rider AMCRF	
Other Charges or Credits		
IX. Rate Case Expense Surcharge:	See Rider RCE	per Distribution System billing kW

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Tariff for Retail Delivery Service
Oncor Electric Delivery Company LLC

COMPANY SPECIFIC APPLICATIONS

At Company's option, locations where the electrical installation has multiple connections to Company's conductors, due to Company facilities limitations or design criteria, may be considered one Point of Delivery for billing purposes.

DETERMINATION OF BILLING DEMAND FOR TRANSMISSION SYSTEM CHARGES

DETERMINATION OF NCP kW

The NCP kW applicable under the Monthly Rate section shall be the kW supplied during the 15 minute period of maximum use during the billing month.

DETERMINATION OF 4 CP kW

The 4 CP kW applicable under the Monthly Rate section shall be the average of the Retail Customer's integrated 15 minute demands at the time of the monthly ERCOT system 15 minute peak demand for the months of June, July, August and September of the previous calendar year. The Retail Customer's average 4CP demand will be updated effective on January 1 of each calendar year and remain fixed throughout the calendar year. Retail Customers without previous history on which to determine their 4 CP kW will be billed at the applicable NCP rate under the "Transmission System Charge" using the Retail Customer's NCP kW.

DETERMINATION OF BILLING DEMAND FOR DISTRIBUTION SYSTEM CHARGES

DETERMINATION OF BILLING kW

For loads whose maximum NCP kW established in the 11 months preceding the current billing month is less than or equal to 20 kW, the Billing kW applicable to the Distribution System Charge shall be the NCP kW for the current billing month.

For all other loads, the Billing kW applicable to the Distribution System Charge shall be the higher of the NCP kW for the current billing month or 80% of the highest monthly NCP kW established in the 11 months preceding the current billing month (80% ratchet).

The 80% ratchet shall not apply to Retail Seasonal Agricultural Customers.

NOTICE

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

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

Public Schools, Colleges and Non-Profit Hospitals

Preliminary Energy Assessment
Service Agreement

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

Description of the Service

The State Energy Conservation Office (SECO) will analyze electric, gas and other utility data and work with Blanket ISD, hereinafter referred to as Partner, to identify energy cost-savings potential. To achieve this potential, SECO and Partner have agreed to work together to complete an energy assessment of mutually selected facilities.

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

Principles of the Agreement

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

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

Acceptance of Agreement

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

Signature: Kevy Allred | Date: Feb. 17, 2010

Name (Mr./Ms./Dr.) Kevy Allred | Title: Superintendent

Organization: Blanket ISD | Phone: 325-748-5311

Street Address: 901 Avenue H | Fax: 325-748-3391

Mailing Address: 901 Avenue H | E-Mail: kevy.allred@blanketisd.net

Blanket, Texas 76432 | County: Brown

Contact Information:

Name (Mr./Ms./Dr.): ____ | Title: ____

Phone: ____ | Fax: ____

E-Mail: ____ | County: ____

Please sign and mail or fax to: **Stephen Ross**, Schools and Education Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1770. **Fax 512-475-2569.**

AND fax to the SECO Contractor for this service, **Colby May**, ESA Energy Systems Associates, Inc. Phone: 512-258-0547, x124. **Fax: 512-388-3312.**

APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

TEMA

ANNOUNCING!

TEXAS ENERGY MANAGERS ASSOCIATION

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

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

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD