Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

ESA ENERGY SYSTEMS ASSOCIATES, Inc

100 East Main Street, Suite 201

Round Rock, Texas 78664

(512) 258-0547

Runge Independent School District

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

SECO
State Energy Conservation Office

Program Administrator:	Juline Ferris
Phone:	512-936-9283
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 January 2010, **SECO** received a request for technical assistance from *Randy Ewing*, Superintendent for Runge 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 **Runge ISD,** (hereafter known as RISD) 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. Ewing,* a walk-through energy analysis was conducted throughout the campus with Manuel Garza, Director of Maintenance for RISD. 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 **$5,350** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$49,825**, yielding an average simple payback of **9-1/3** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$6,500	$1,100	6 Years
Lighting ECRM #1	$ 7,500	$1,250	6 Years
Building Envelope ECRM #1	$35,825	$3,000	12 Years
TOTAL PROJECTS	$49,825	$5,350	9-1/3 Years

The total utility cost for RISD in 2009 was $130,901. The projected savings of $5,350 would represent a decrease in utility expenditures for the district of 4%. 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 **RISD**. 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 RISD, 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.
6. Recommend the quality oriented process required in retro-commissioning for achieving, verifying, and documenting the performance of facilities, systems, and assemblies meet defined objectives and design criteria.

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 BTU's 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 :

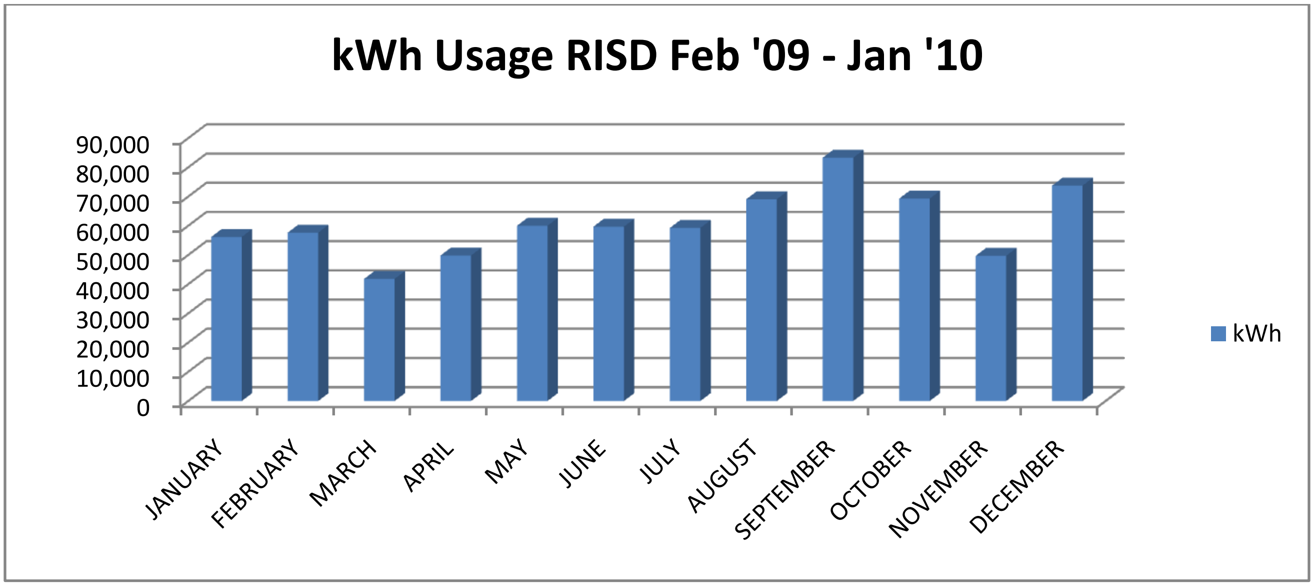
Runge ISD

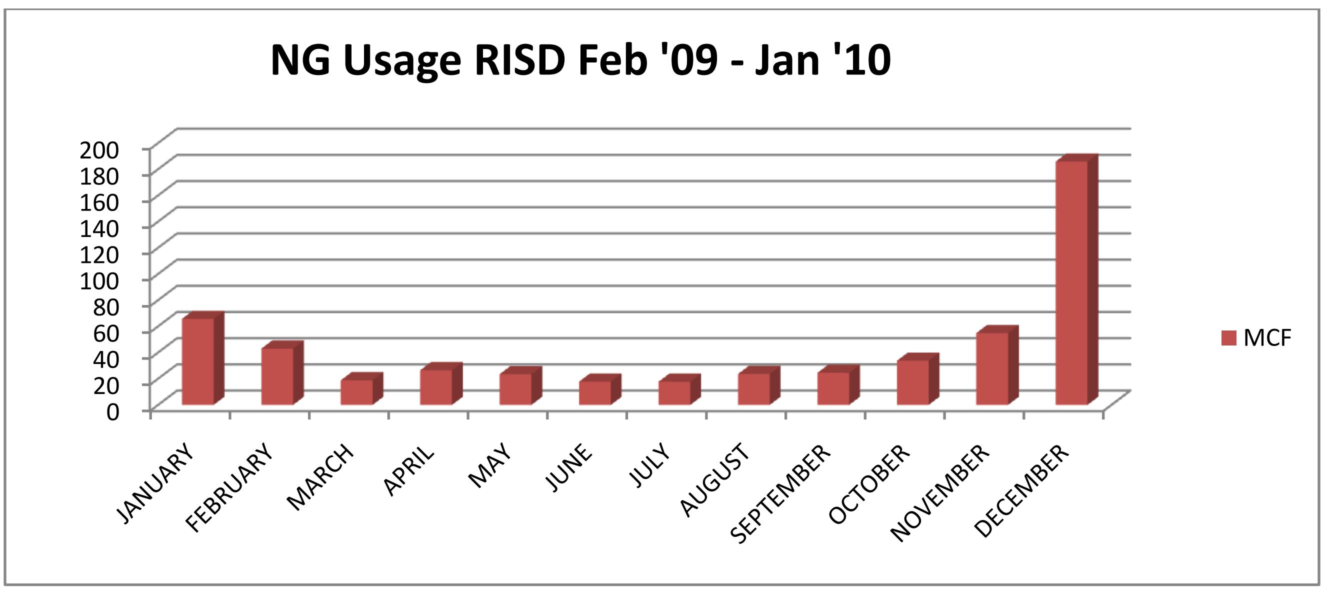
CAMPUS	ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year)	ENERGY COST INDEX (ECI) ($/sf-year)
2010 Runge K-12:	**47,519**	**$2.05**

In the summer of 2008, RISD completed an HVAC renovation from window units to variable volume terminal boxes with rooftop unit supplied outside air. The utility bills increased from an estimated $6-7,000/month to $12,000 per month. Since that time, the Contractor has been performing evaluations and re-commissioning of the system in attempts to identify and correct some or all of the increase in utility costs. The staff believes that the last attempt, completed March, 2010 has been the most successful, but these improvements are not reflected in the billing analysis period under review for this report. Therefore, we believe the utility analysis results in an artificially high EUI and ECI compared to the data that will be collected from March, 2010 forward.

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

RUNGE ISD K-12





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

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

As Runge is located in a deregulated energy market area of the State, the district is free to negotiate electricity contracts within State mandated procurement processes. The district's current Retail Electric Provider (REP) is Reliant (Energy for Schools) and their Transmission and Distribution (T&D) Provider is AEP. The rate schedule applicable to most of the district's meters is Secondary Service Greater than 10 kW. A copy of the schedule and applicable riders is included in Appendix II.

6.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC PROVIDER (REP): Reliant [$0.08807 per kWh)

TRANSMISSION AND DISTRIBUTION (T&D): AEP

Electric Rate: Secondary Service > 10 kW

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$3.26 per meter
	Metering Charge	=	$15.81 per meter
	Transmission System Charge (Non-IDR Meter)	=	$1.793 per NCP kW
	Distribution System Charge	=	$3.314 per Billing kW
II.	SYSTEM BENEFIT FUND	=	$0.000662 per kWh
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$1.035407/kW
	Transition Charge 2	=	$2.464918/kW
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.037224 per Billing kVA
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.335686/NCP kVA
VI.	COMPETITIVE METERING CREDIT	=	$2.17 per month
VII.	RATE CASE SURCHARGE RIDER #1	=	$0.000047 per kWh
VIII.	RATE CASE SURCHARGE RIDER #2	=	$0.000065 per kWh
IX.	TRUE-UP CASE SURCHARGE RIDER	=	$0.041116 per kW
X.	ENERGY EFFICIENCY RIDER	=	$0.000288 per kWh
XI.	ADVANCED METERING SYSTEM RIDER	=	$2.05 per month

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

Average Savings for demand = $1.793 + $3.314 + $1.035407 + $2.464918 + $0.0335686 + $0.041116 **= $8.68/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 kW: Peak demand during 15 minute interval of current billing cycle
2. 4CP kW: Average demands of June, July, August and September of previous calendar year; usually only applied to IDR metered accounts
3. DS (Distribution System) Billing kW: Ratchet demand representing higher of two calculations: 80% of peak demand in last 11 months or current NCP kW

NATURAL GAS PROVIDER:

Centerpoint

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

Total Cost of Natural Gas purchased for Runge ISD: $4,712

Total Quantity of Natural Gas purchased for Runge ISD: 536 mcf

Cost / Quantity = Average Unit Cost $4,712/536 mcf = $8.79/mcf

5.0 CAMPUS DESCRIPTIONS:

Runge I**SD** consists of a single K-12 campus located in Runge, Texas. The facilities are operated from mid- August through late May on a weekday schedule of 6:00 A.M. to 5:00 P.M. The Administrative area is open all year, and portions of the facility are occupied by the maintenance/custodial staff throughout the summer. District records indicate the district contains 72,786 square feet of facilities while serving 299 students.

The facilities have been constructed in phases; the oldest building was built in 1930 and the Band Hall represents the newest addition from 2000. The facilities are predominantly brick-faced construction with flat roofs that are currently built-up gravel covered, or have been renovated to rolled asphalt shingle roofing.

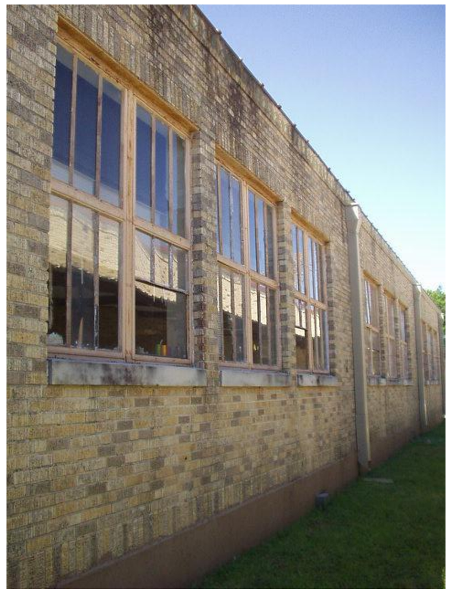


Figure 1: 6th Grade Wing Windows

Windows have been recently replaced along the southern and western side of the Main building with new double pane windows. There remain many old and inefficient single pane operable windows on the North side of the Sixth Grade area and the Auditorium. *We recommend the district replace these windows which the same types of windows utilized in the previous renovation.* This project will renovate approximately 642 square feet of windows at the Sixth Grade Wing.

The Auditorium has two sets of windows that also need to be replaced. One set includes four standard height 4'x5' awning windows under four additional 4'x5' transom windows. They should be replaced with operable windows as the Auditorium is not currently conditioned. Ventilation will be maximized as cooler air can be brought in at low levels and allowed to exit as warmer air through the higher windows.

The space also has eight perimeter 4'x15' window that do not close securely and have been a source for unauthorized access to the school in the past (see Figure 2 to the right). The energy efficiency can be significantly improved by enclosing the middle 1/3 of the current glass area with insulated window enclosure and new energy efficient windows at the bottom and top 1/3. This will also allow for the ventilation pattern utilized in the back of the auditorium.

Figure 2: Typical Auditorium window

The Band Hall also has two 3'x4' windows which should be replaced.

It was noted during the survey that many of the exterior doors have missing or damaged weatherstripping. *We recommend the district inspect the weatherstripping at the exterior doors and replace as needed.*

Similarly, the multiple small water heaters around the campus had missing hot water line insulation. *Given that the majority of hot water system losses occur in the hot water piping, we recommend the district install insulation on the hot water lines where it is currently absent.*

HVAC System Description:

As stated above, the district recently completed a renovation from rooftop, window and through-the-wall (TTW) units to a variable volume terminal box system which is supplied conditioned outside air from packaged rooftop units. Most of the new packaged systems utilize electric resistance heating coils instead of natural gas, even though it is available at the campus. Likewise, the VAV boxes themselves have 3 or 6kW electric re-heat coils to ensure supply air is not over-chilled in attempts to dehumidify the outside air stream. The old units were abandoned in place as long as the locations were not required for the new rooftop unit installation. These abandoned units are referred to as backup systems throughout the district, but it was unclear if the units still possess the electrical capacity to operate should portions of the new system fail.

During occupied status, the new system provides continuous air circulation and adjusts temperature by modulating dampers in the terminal boxes between return air and the conditioned outside air.

The staff reports that the temperature in the controlled spaces was not consistent after the new system was brought on line. It was determined that the plenum return pathway to many of the rooftop units was not originally adequate to return enough air to the units during operation and the units were “starved” for return air flow. RISD staff removed the intermediate filters between sections of the building and return air openings were enlarged to facilitate the transfer of return air in the space. They state that this procedure improved the consistency of the temperature in all controlled spaces and the temperature discomforts have reduced dramatically.

As stated earlier, the Contractor for the project has made several attempts to re-commission the system and resolve the issue of the increased utility bills with the new system. The most recent utility bills, March and April 2010, suggest that the latest attempt has successfully restored historically compatible consumptions to the school. More data collected during more extreme temperature periods will ultimately confirm or deny this trend.

Control System Description:

The district controls have been renovated with a Trane Summitt energy management system. The wireless sensors have one-hour override buttons to allow operation of individual units after normal occupancy hours. The buildings operate on the following schedule with the following parameters:

AREA	DAYS	PROGRAMMED ON	PROGRAMMED OFF
Administration	M-F	0600	1700
Lab	M-F	0715	1700
Band Hall	M-F	0800	1700
High School 1/2	M-F	0645	1700
Junior HS	M-F	0645	1700
Library	M-F	0730	1700

Unoccupied cooling setpoint: 85°F
Unoccupied Heating setpoint: 60°F
Occupied cooling setpoint: 72-74°F
Occupied heating setpoint: 68-71°F

There is one area of the campus, the Band Hall, which may offer an opportunity to reduce the programmed run times to more closely match scheduled student occupancy. The Band Hall utilizes two each 2008 packaged heat pump units (Trane 4TCC3036A1000) that serve VAV terminal boxes above the ceiling. The space does not have isolated instrument storage which may be driving the extended operating hours in this area. *We recommend the district construct an isolated instrument and music storage room in one corner of the Band Hall and condition this space with a small HVAC system to the required temperature and humidity parameters.* This will allow the larger room conditioning systems to have reduced operational hours which will save energy and extend the life of the units.

Lighting System Description:

The district is virtually 100% T8 fluorescent fixtures with electronic ballasts in the facilities. The Gymnasium has 20 each 400-watt metal halide fixtures. These fixtures are relatively efficient by themselves, but their long re-strike issue discourages personnel from turning them off during periods of inactivity because they do not want to wait the 5-10 minutes required to re-start the fixtures when gym activities resume. Therefore, the fixtures typically operate 11-12 hours per day. *We recommend the district consider renovating the gymnasium fixtures with new T5HO or T8 fluorescent high bay fixtures.* These fixtures do offer energy reductions from comparable metal halide fixtures, but more importantly, they do not have the re-strike issue inherent to metal halides and therefore may be turned off during inactive times of the day. We recommend utilizing five 4-lamp fixtures over the bleachers and general walkway areas and fifteen 6-lamp fixtures directly over the court.

There are some exterior fixtures which were operating during the daytime hours (see Figure 3 to the right). We recommend these fixtures be controlled by photocell or timeclock to limit their operation to required nighttime hours.

Figure 3: Exterior lights on at daytime.

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

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

Lighting

- Renovate existing incandescent exit lamps with LED lamps or replace fixture with new LED or LEC
- Control exterior lights with timeclock or photocell

Controls

- Construct instrument storage room and re-program Band Hall to more closely match occupancy schedules.

Building Envelope

- Check weatherstrip at all exterior doors, replace as needed
- Replace damaged or missing insulation at hot water piping.

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

Lighting System M&O

Incandescent lamps are the least efficient lamp available for a light fixture, including exit fixtures, which are designed to operate 8,760 hours per year. If the fixtures are in reasonable condition, the lamps in these fixtures can be replaced with LED lamps designed to fir the existing incandescent sockets. If the fixtures are old, they should be replaced with a new LED or LEC unit.

Controls M&O

The control system is programmed to closely match student occupancy hours except for the Band Hall which may have extended operating hours in order to protect temperature and humidity sensitive instruments and music. By constructing an instrument and music storage room and conditioning the new space to the required temperature and humidity parameters, the large room HVAC equipment can be scheduled off when students do not occupy the space.

Envelope M&O

It was noted there were several exterior doors and water heaters around the district that suffered from missing or absent weather-stripping and insulation. We recommend that these situations be addressed as the opportunity arises.

B. CAPITAL EXPENSE PROJECTS

HVAC	• Isolate instrument storage from large space conditioning systems
Lighting	• Renovate Gym metal halide fixtures with T5 fluorescent fixtures.
Building Envelope	• Replace windows on North side of 6th Grade wing, Band Hall and Auditorium

HVAC ECRM

ECRM #1: Construct instrument storage in Band Hall and condition with a small system which will allow the larger Band Hall system to be turned off when the space is unoccupied.

Estimated Installed Cost	=	$ 6,500
Estimated Energy Cost Savings	=	$ 1,100
Simple Payback Period	=	6 years

LIGHTING ECRM

ECRM #1: Retrofit Existing Gymnasiums Fixtures to T5HO High Bay Fluorescent

RISD has approximately 20 each 400-watt metal halide fixtures. We recommend replacing these lights with five (5) new 4-lamp T5HO high bay linear fluorescent fixtures over the bleachers and egress areas and fifteen (15) new 6-lamp fixtures over the court area. These fixtures will allow the lights to be turned off during inactive periods of the day, saving as much as 4-6 hours of operation per day.

Estimated Installed Cost	=	$ 7,500
Estimated Energy Cost Savings	=	$ 1,250
Simple Payback Period	=	6 years

BUILDING AND ENVELOPE ECRM

ECRM #1: Replace existing windows on North side of 6th Grade building with new double pane window; enclose 2/3 of the existing window space at the Auditorium and replace upper third with new double pane windows.

The 6th Grade space contains 37 windows which represent 642 square feet of fenestration. The Auditorium space has 16 windows which will require 160 square feet of enclosure and 480 square feet of window. The Band Hall has 24 square feet of windows to be replaced.

Estimated Installed Cost	=	$ 35,825
Estimated Energy Cost Savings	=	$ 3,000
Simple Payback Period	=	12 years

SUMMARY TABLE:

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

Estimated Installed Cost	=	$ 49,825
Estimated Energy Cost Savings	=	$ 5,350
Simple Payback Period	=	9-1/3 years

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

1. Lighting ECRM #1	Taking advantage of the ability to turn off the gymnasium fixtures during inactive periods of the day will generate energy savings and eliminate unnecessary heat generated in the gym which has to be overcome by the HVAC system.
2. HVAC ECRM #1	The addition of a small instrument storage room allows the main system to be closely controlled with student occupancy schedules, yet still provides the required storage conditions for the instruments and music.
3. Building Envelope ECRM #1	Window replacements typically have paybacks of 12 to 20 years, depending on their current condition and their overall area. The windows in the Sixth Grade wing, Auditorium and Band Hall are in poor condition and should lend themselves to the shorter overall payback estimates.

7.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $500 maintenance expense next 5 years				
4. $1000 maintenance expense last 5 years				
5. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($49,825)		0	($49,825)
Year 1		$ 5,350	0	$5,350
Year 2		$ 5,350	0	$5,350
Year 3		$ 5,350	0	$5,350
Year 4		$ 5,350	0	$5,350
Year 5		$ 5,350	0	$5,350
Year 6		$ 5,243	($500)	$4,743
Year 7		$ 5,136	($500)	$4,636
Year 8		$ 5,029	($500)	$4,529
Year 9		$ 4,922	($500)	$4,422
Year 10		$ 4,815	($500)	$4,315
Year 11		$ 4,708	($1,000)	$3,708
Year 12		$ 4,601	($1,000)	$3,601
Year 13		$ 4,494	($1,000)	$3,494
Year 14		$ 4,387	($1,000)	$3,387
Year 15		$ 4,280	($1,000)	$3,280
			Internal Rate of Return	**4.36%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans On Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

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

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

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

Performance Contracting:
Through this arrangement, an energy service company (ESCO) using in-house or third party financing to implement comprehensive packages of energy saving retrofit projects. Usually a turnkey service, this method includes an initial assessment of energy savings potential, design of the identified projects, purchase and installation of the equipment, and overall project management. The ESCO guarantees that the cost savings generated will, at a minimum, cover the annual payment due over the term of the contract. The laws governing Performance Contracting for school districts are detailed in the Texas Education Code, Subchapter Z, Section 44.901. Senate Bill SB 3035, passed by the seventy-fifth Texas Legislature, amends some of these conditions. Performance Contracting is a highly competitive field, and interested districts may wish to contact Felix Lopez of State Energy Conservation Office, (SECO), at 512-463-1080 for assistance in preparing requests for proposals or requests for qualifications.

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

continued

How to Finance Your Energy Program *continued*

Financing Mechanisms

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

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

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

Internal Funds

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

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

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

Debt Financing

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

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

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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

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

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

6.1.1.1.3 SECONDARY VOLTAGE SERVICE GREATER THAN 10 KW

AVAILABILITY

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

TYPE OF SERVICE

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

MONTHLY RATE

I. Transmission and Distribution Charges:

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

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

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

IV. Nuclear Decommissioning Charge: See Rider NDC 6.1.1.5.1

V. Transmission Cost Recovery Factor: See Rider TCRF 6.1.1.6.2.1

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PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED

DEC 2 3 '09 DOCKET 36923

CONTROL # ______

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

VI. Excess Mitigation Credit:	Not Applicable
VII. State Colleges and Universities Discount:	See Rider SCUD 6.1.1.6.1
VIII. Competitive Metering Credit:	See Rider CMC 6.1.1.6.6
IX. Other Charges or Credits:	
A. Rate Case Surcharge Rider	See Rider RCS-2 6.1.1.6.8
B. True-up Case Surcharge Rider	See Rider TCE 6.1.1.6.7
C. Energy Efficiency Rider	See Rider EECRF 6.1.1.6.4.1
D. Advanced Metering System Rider	See Rider AMSCRF 6.1.1.6.9

COMPANY-SPECIFIC APPLICATIONS

Refer to Section 6.2.2 of the Tariff for additional voltage information.

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

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

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

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

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

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

Determination of Billing Demand for Transmission System Charges

Determination of NCP kW

The NCP kW applicable under the Monthly Rate section for transmission system charges for non-IDR metered customers and IDR metered customers without sufficient 4CP kW

PUBLIC UTILITY COMMISSION OF TEXAS APPROVED
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demand data shall be the kW supplied during the 15-minute period of maximum use during the billing month.

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

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

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

Determination Of Billing Demand When Meter Readings Cannot be Obtained
When meter readings cannot be obtained due to denial of access, weather, meter failure, tampering, or other event, the Retail Customer's demand will be estimated pursuant to Section 6.2.3.2.

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

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

OFFICE OF THE COMPTROLLER ★ TEXAS ★

SECO
State Energy Conservation Office

Public Schools, Colleges and Non-Profit Hospitals

Preliminary Energy Assessment Service Agreement

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

Description of the Service

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

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

Principles of the Agreement

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

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

Acceptance of Agreement

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

Signature: [signature]
Name (Mr./Ms./Dr.): Randy Ewing
Organization: Runge ISD
Street Address: 600 Reiffert St.
Mailing Address: Runge, TX 78151

Date: 4/7/2010
Title: Superintendent
Phone: 830-239-4315 x 100
Fax: 830-239-4816
E-Mail: ewingr@rungeisd.org
County: Karnes

Contact Information:

Name (Mr./Ms./Dr.): Manuel Garza
Phone: 830-239-4315 X 289
E-Mail: garzam@rungeisd.org

Title: Director of Maintenance
Fax: 830-239-4816
County: Karnes

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

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

APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

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

APPENDIX V - UTILITY CHARTS ON CD