Susan Combs
Texas Comptroller of Public Accounts

# Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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## Huffman Independent School District

May 30, 2012

*ESA-Energy Systems Associates, Inc.*
*F-4882*

SECO
State Energy Conservation Office

# Table of Contents

## 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<br>LBJ State Office Building<br>111 E. 17th Street<br>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 *Charlie Miller*, Director of Maintenance for Huffman 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 **Huffman ISD,** (hereafter known as HISD) 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. Miller,* a walk-through energy analysis was conducted throughout the campus. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 6.0 of this report.

We estimate that as much as **$106,625** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$1,167,000**, yielding an average simple payback of **11** years.

| SUMMARY: | IMPLEMENTATION COST | ESTIMATED SAVINGS | SIMPLE PAYBACK |
|---|---|---|---|
| HVAC ECRM #1b | $360,300 | $26,000 | 14 Years |
| HVAC ECRM #1d | $400,000 | $32,500 | 12 Years |
| HVAC ECRM #2 | $226,200 | $26,000 | 8-3/4 Years |
| Lighting ECRM #3 | $ 59,500 | $11,500 | 5 3/4 Years |
| Lighting ECRM #4 | $121,000 | $17,125 | 7 Years |
| **TOTAL PROJECTS** | $1,167,000 | $106,625 | 11 Years |

The total utility cost for HISD in 2009 was $660,493. The projected savings of $106,625 would represent a decrease in utility expenditures for the district of 16.1%. 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 **HISD**. 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 HISD, 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. Develop an accurate definition of system and equipment replacement projects along with installation cost estimates, estimated energy and cost savings and analyses for each recommended project.
3. Develop a prioritized schedule for replacement projects.
4. Develop and draft an overall energy management policy.

## 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" (BTU's).

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 BTU's + Gas BTU's] 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.

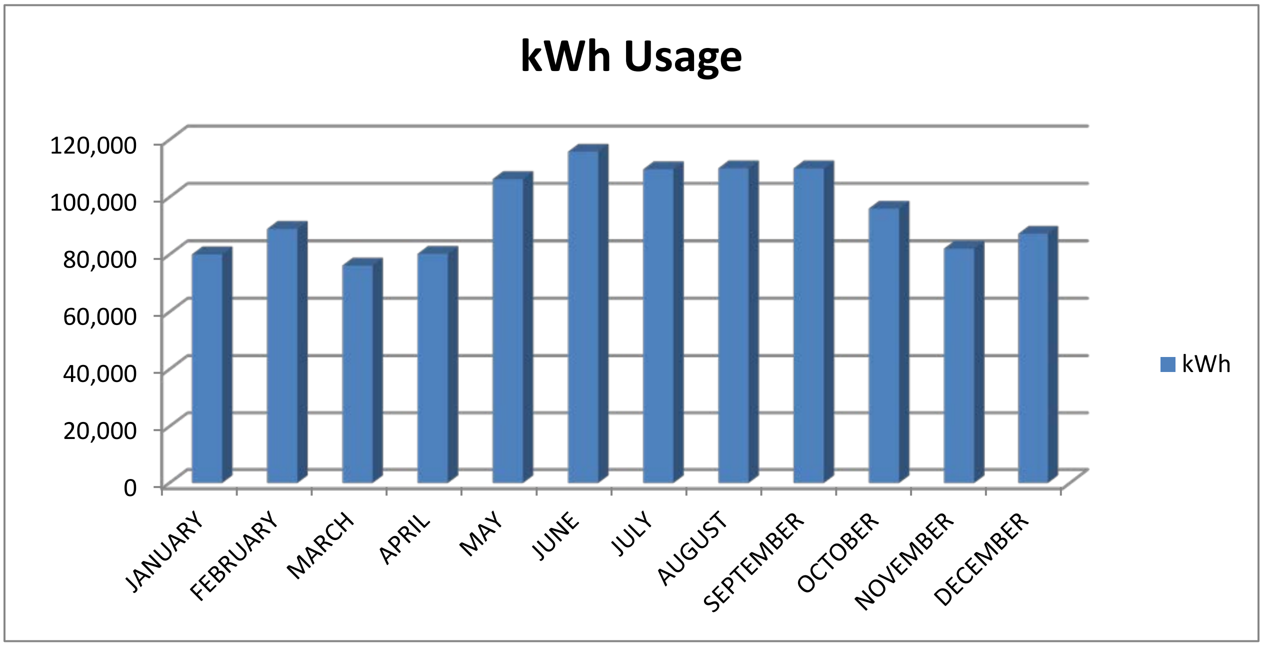
# THE CURRENT ENERGY PERFORMANCE INDICATORS FOR :

**Huffman ISD**

| CAMPUS | ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year) | ENERGY COST INDEX (ECI) ($/sf-year) |
|---|---|---|
| **2010 Huffman ISD:** | | |
| Hargrave HS | **62,072** | **$1.82** |
| Huffman MS | **68,913** | **$1.95** |
| Copeland ES/Huffman Intermediate | **50,961** | **$1.54** |
| Ben Bowen | **48,778** | **$1.60** |

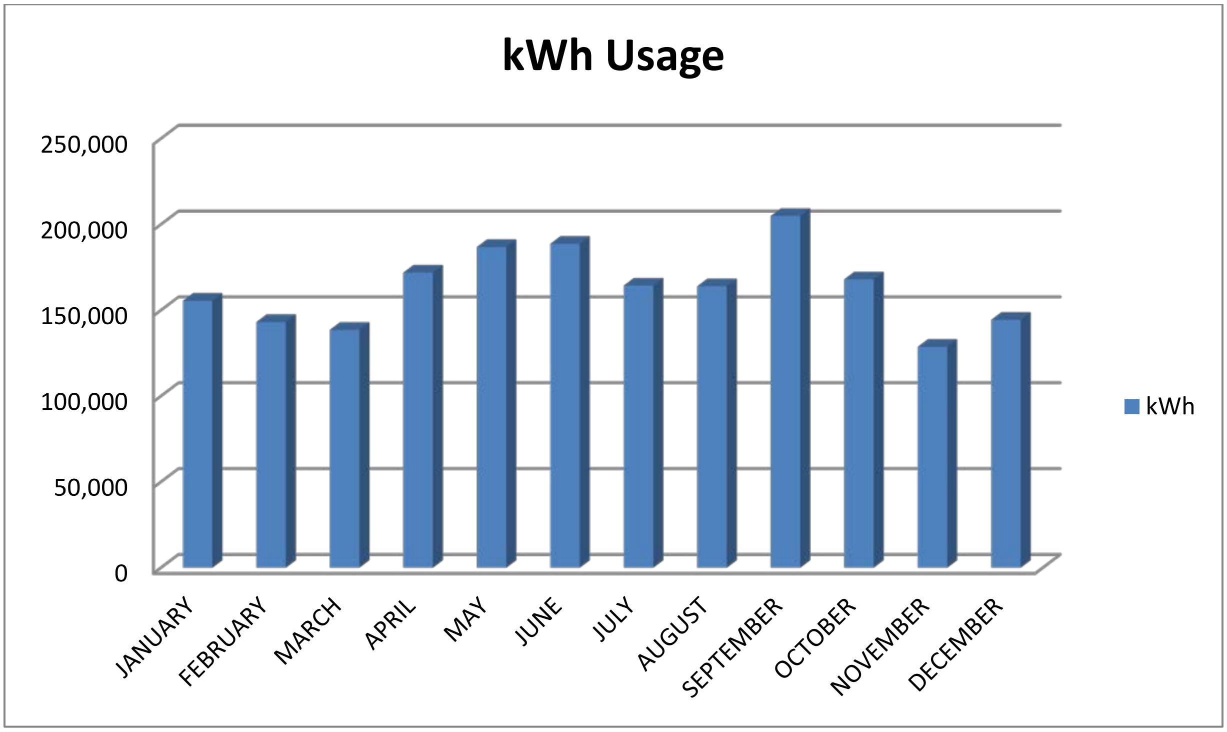
The electricity and gas consumption charts for all of Huffman's facilities area as follows:

**BEN BOWEN**

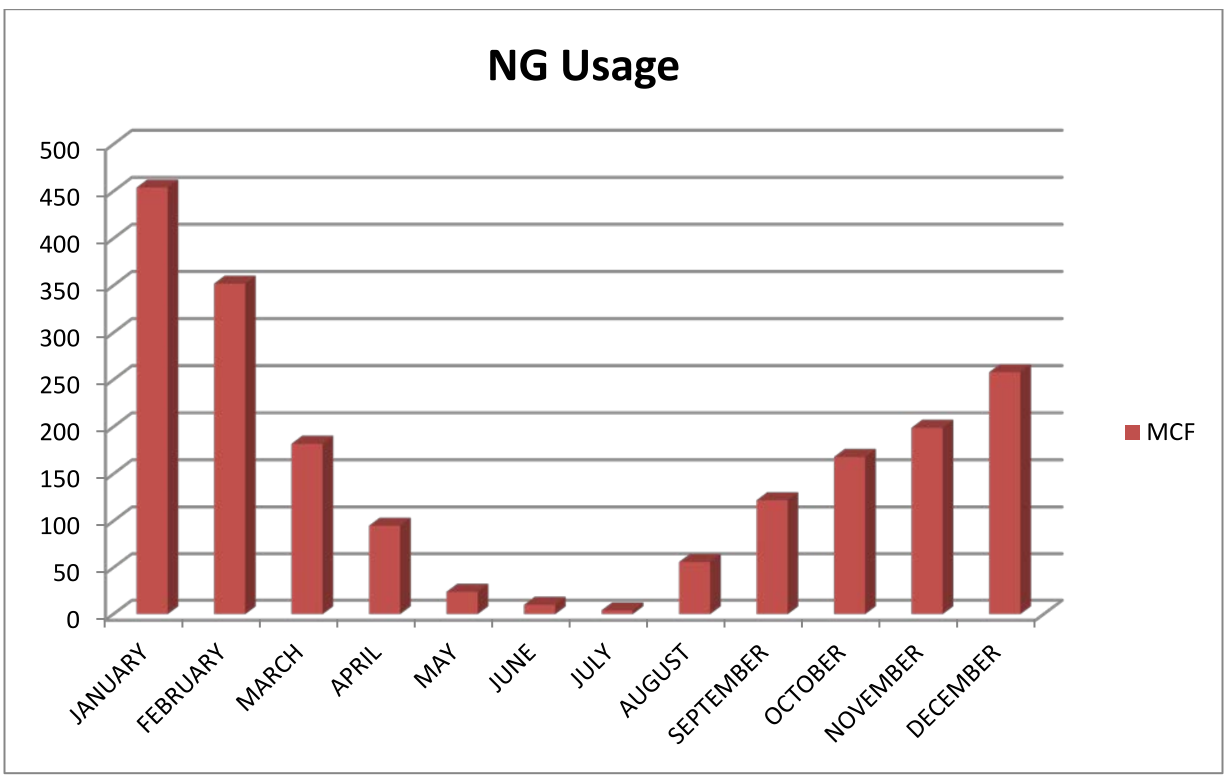



Charting the annual electricity consumption reveals that this campus does not experience a significant decrease in consumption for June and July as would be expected for periods of vacationing students. While it is acknowledged that summer months do represent custodial and administrative occupancy periods, 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.

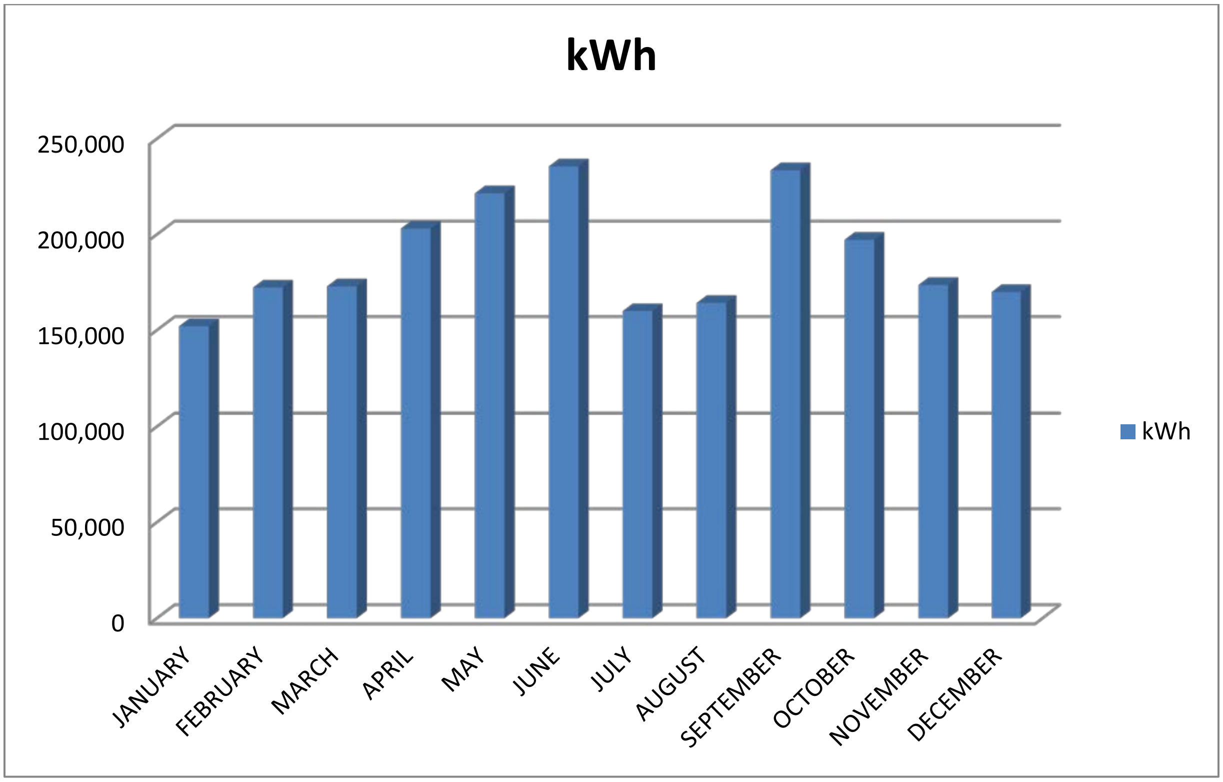
## HUFFMAN INTERMEDIATE/COPELAND ES

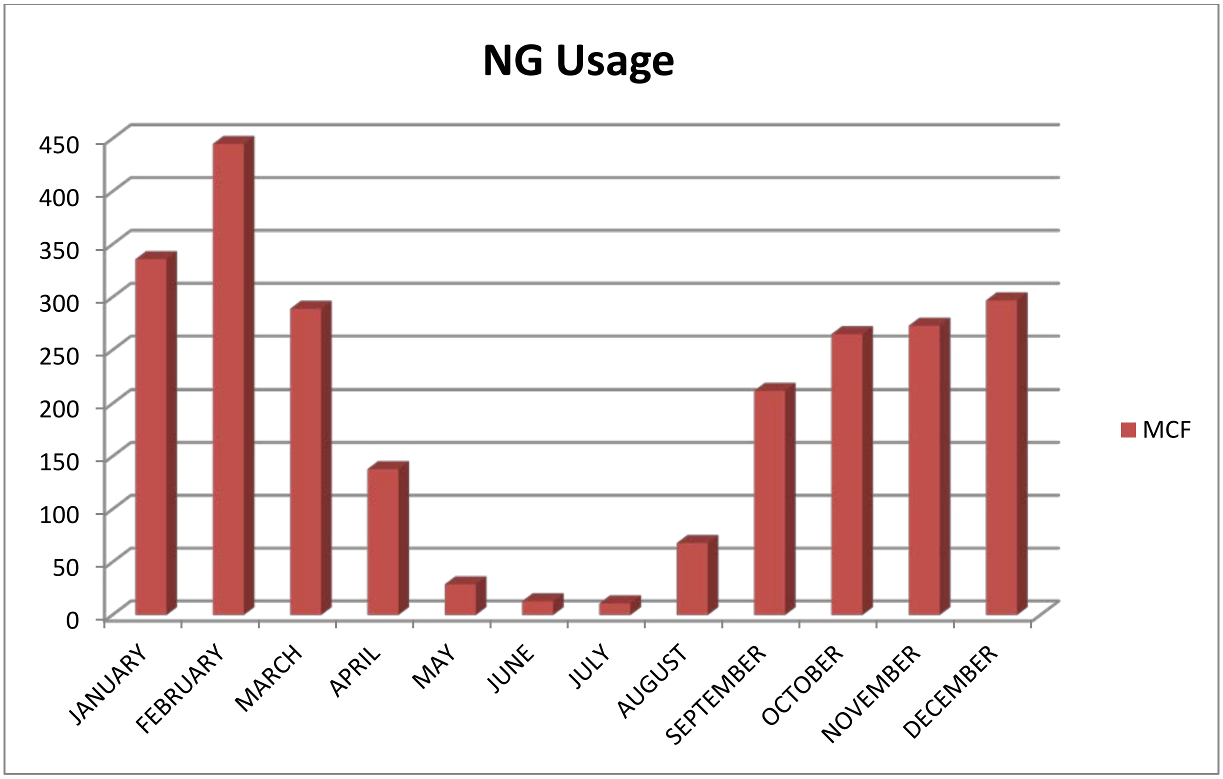



Again the annual electricity consumption reveals that this campus does not experience a significant decrease in consumption for June and July.

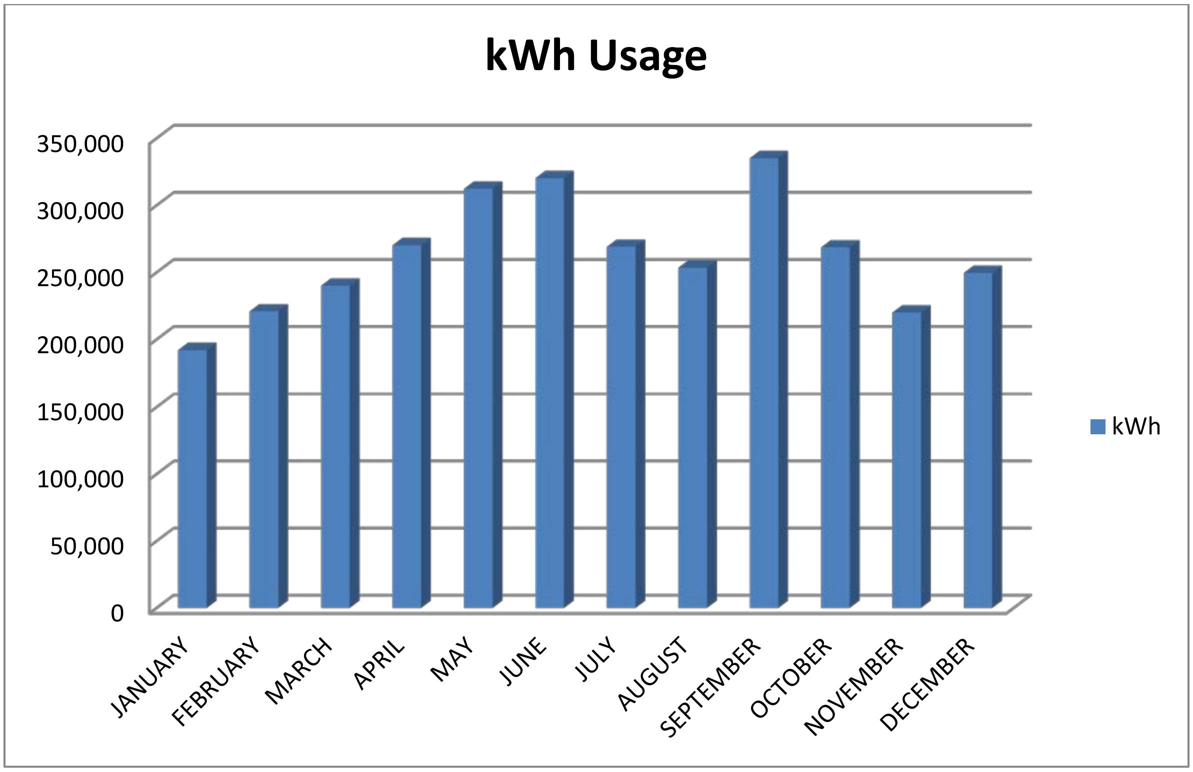


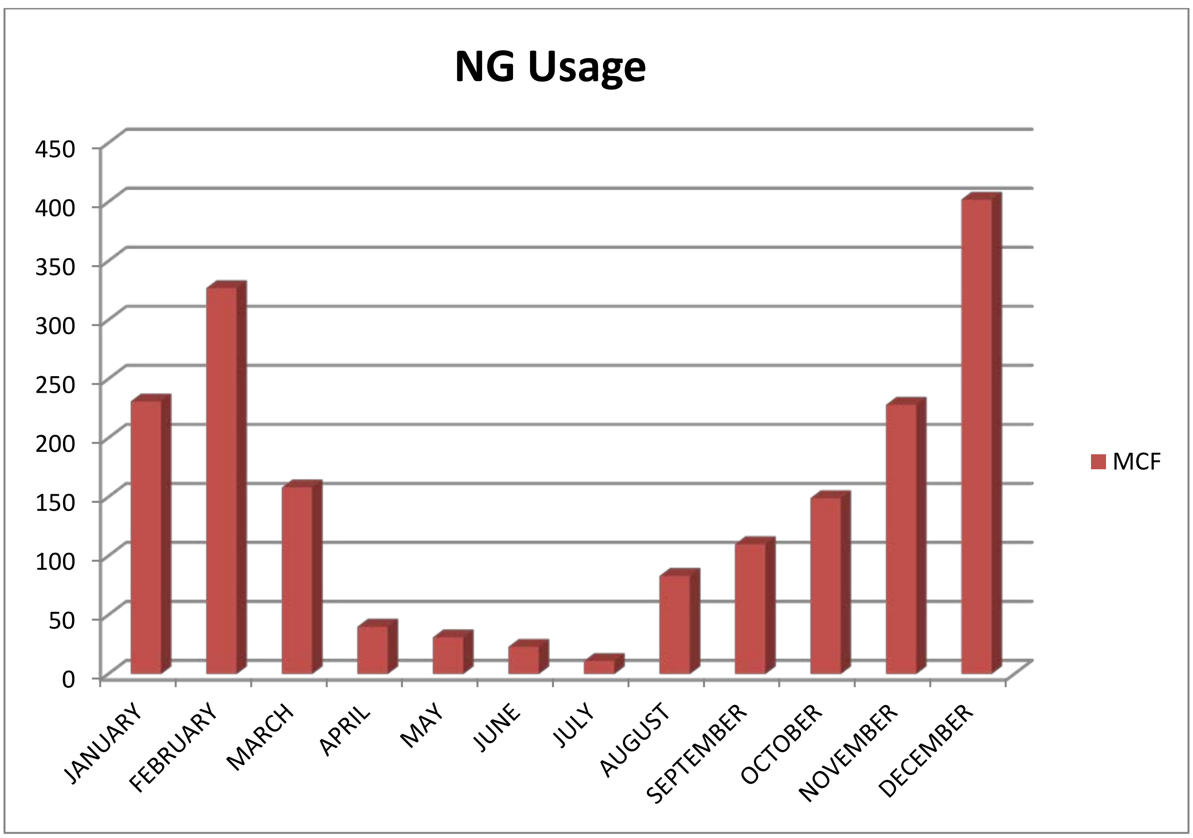
## HUFFMAN MIDDLE SCHOOL



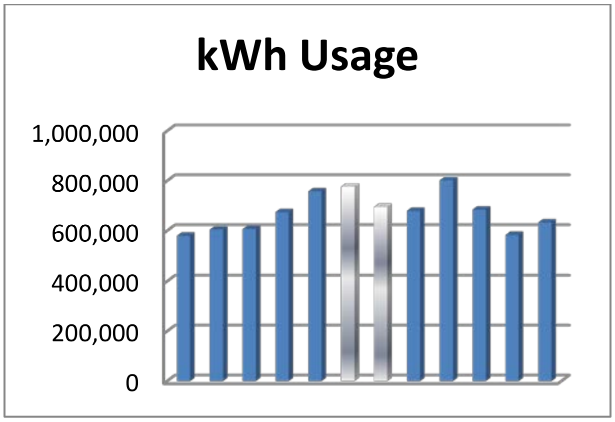



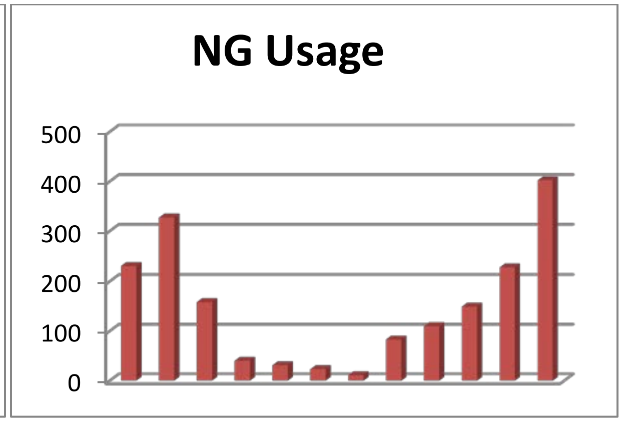
**HUFFMAN HIGH SCHOOL**



**HUFFMAN ISD TOTAL**




**The district's electricity consumption** does not experience a significant decrease for June and July as would be expected for periods of vacationing students. The High School and Middle School do show somewhat of a decrease in the summer months, but overall the district is in a good position to conserve energy through the commissioning of their HVAC units.

**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 Huffman 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 and their Transmission and Distribution (T&D) Provider is Centerpoint. 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.

## 4.0 RATE SCHEDULE ANALYSIS:

### ELECTRICITY PROVIDER:

**RETAIL ELECTRIC PROVIDER (REP): Reliant [$0.089 per kWh)**

**TRANSMISSION AND DISTRIBUTION (T&D): Centerpoint**

**Electric Rate: Secondary Service > 10 kW**

| | | | |
|---|---|---|---|
| I. | TRANSMISSION AND DISTRIBUTION CHARGES: | | |
| | Customer Charge | = | $5.27 per meter |
| | Metering Charge | = | $31.86 per meter |
| | Transmission System Charge (Non-IDR Meter) | = | $1.1027 per NCP kVA |
| | Distribution System Charge | = | $3.118137 per Billing kVA |
| II. | SYSTEM BENEFIT FUND | = | $0.000657 per kWh |
| III. | TRANSITION CHARGES | | |
| | Transition Charge 1 | = | $0.351/kVA |
| | Transition Charge 2 | = | $0.352226/kVA |
| IV. | NUCLEAR DECOMMISSIONING CHARGE | = | $0.008909per Billing kVA |
| V. | TRANSMISSION COST RECOVERY FACTOR | = | $0.346971/NCP kVA |
| VI. | COMPETITIVE METERING CREDIT | = | $4.28 per month |

Average Savings for consumption = $0.089/kWh + $0.000657/kWh = $0.089657/kWh

Average Savings for demand = $1.1027 + $3.11 + $0.351 + $0.352 + $0.009 + $0.346971 = $5.27/kVA**

** 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 Huffman ISD: | $83,849 |
| Total Quantity of Natural Gas purchased for Huffman ISD: | 7,749 MCF |

Cost / Quantity = Average Unit Cost

$83,849/ 7,749 mcf = **$10.82 per mcf of natural gas**

# 5.0 CAMPUS DESCRIPTIONS:


Huffman **ISD** consists of five campuses located throughout Huffman, Texas. Ben Bowen, Copeland Elementary School & Huffman Intermediate are located on the same campus off of East Lake Houston Parkway. Huffman MS & Hargrave HS are located at a separate site. The facilities are occupied from mid- August through late May on a weekday schedule of 7:15 A.M. to 4:30 P.M. The Administrative area is open all year, and portions of the facility are occupied by the maintenance/custodial staff throughout the summer. Tax records indicate the district contains 600,168 square feet of classroom and student occupied space.

*HVAC System Description:*

Most of the district has either a flat gravel or flat membrane roof. The Ben Bowen campus utilizes rooftop units with electric heat, while all other campuses are conditioned by a water cooled chiller and gas heat boilers via a 4-pipe water distribution system..

Figure 2 Ben Bowen Packaged Units

**Ben Bowen** – consists of 60 roof top units with electric strip heat. Fifty one (51) of the units are 10 years and older and are in need of being replaced. Many of these units have outside air intakes sealed off (figure 2). In order for district to comply with ASHRAE 62.1 the outside air intakes must be opened allowing outside air to enter the classrooms. The district needs to be aware that opening these intakes will result in more energy consumption by the units as they try to overcome the increased latent load of the outside airstream. Many of the units also have bent coil fins which can decrease the efficiency of the unit by as much as 30%.

**Copeland Elementary School** – Is conditioned by a 4 pipe system consisting of 2 fifteen year old Trane Scroll chillers, 3 fifteen year old Teledyne Laars hot water boilers (currently operating year around), single zone air handling units, and VAV boxes with hot water coils above classrooms. The campus lacks isolation valves on the chillers, and needs VFD's for variable flow controls of pumps (figure 3) and air handling units.

**Huffman Intermediate** – Is conditioned by a 4 pipe system consisting of 1 thirty year old York Chiller, 2 new Ray Pack boilers, single zone air handling units, and fan coil units above classrooms. The pumps, chiller & single cell cooling tower are in need of being replaced. This campus also lacks VFD's for variable flow control on pumps.

**Huffman Middle School** - – Is conditioned by a 4-pipe system consisting of 3 (2 Trane & 1 Carrier) chillers (in good shape), 1 Teledyne Laars boiler (in need of replacement), single zone air handling units, and VAV boxes with hot water coils above classrooms. The campus lacks isolation valves on the chillers and VFD's for variable flow controls of pumps and air handling units. The pumps and the boiler are in need of replacement. The district is planning to replace the boiler with 2 smaller boilers this summer.

Figure 3 Copeland pumps

*Control System Description:*

The district has an adequate control system for their facilities turning on equipment at around 5 am and turning them off at around 4 pm. While reviewing the control system set points, it was noticed that a "staggered start" approach has been programmed in order to minimize peak demand. Although staggered start-up does reduce utility costs when used to keep equipment off until it is needed, the practice of bringing equipment on long before it is needed simply to avoid the higher in-rush current seen when equipment starts up does not save energy or demand cost, in fact, it consumes electrical energy unnecessarily.

When motors start up, there is typically an in-rush of current 3 to 5 times higher than normal operating current. However, this in-rush lasts only around 3 seconds and has little impact on the Peak Demand charges seen on utility bills that are the result on demand loads averaged over 15 to 30 minute periods. We believe the district could potentially save energy by turning on their equipment at the latest possible moment that still allows the area to be comfortable when occupants arrive. We also believe the district could benefit from a commissioning of their current system.

Figure 3 Copeland Gym Lighting

*Lighting System Description:*

The district is 100% T8 fluorescent fixtures with electromagnetic ballasts in the classrooms, hallways, cafeterias, and offices. The district has done a fantastic job in conserving energy through lighting. All hallways and cafeterias have been de-lamped from a 4 light system to a 2-light system. When rooms, cafeterias, offices and gymnasiums are not in use the lights are off. The district is also in the planning stages of implementing a Watt Watchers program to turn lights off. The high school lights are on an automated control system (6am-4pm)

All seven (7) district gymnasiums currently utilize metal halide fixtures for the illumination in their spaces. 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.

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

| | |
|---|---|
| HVAC | •Comb fins on damaged condensing units<br>•Install hail guards to protect fins in future<br>•Add isolation valves to chillers |
| Lighting | •Implement Watt Watchers Program |
| Controls | •Reprogram from staggered start to immediate start.<br>•Recommission Controls |
| Building Envelope | •Check weatherstrip at all exterior doors, replace as needed |

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

*HVAC M&O*
At HISD, the HVAC M&O opportunities revolve around combing the condenser fins [combs available for less than $10] and adding isolation valves to chillers. The installation of coil guards prevents future fin combing, which is ultimately a combination of deferred labor savings for eliminating the need for maintenance personnel to perform the task and energy savings resulting from the units maintaining optimum operating efficiency.

*Lighting System M&O*
The district would benefit by adopting a Watt Watchers Program. This program teaches students the importance of turning off lights, by giving them the opportunity to patrol the building looking for energy waste. Turning off a classroom's light fixtures an average of 2 hours or more per day can save the average classroom $50 per year. This program not only saves energy for the district, but also builds an energy awareness environment throughout the district.

*Controls M&O*
There are two apparent M&O opportunities in the controls arena. As discussed previously, commissioning the control system and adjusting summer month operating schedules I will eliminate HVAC systems operation during special unoccupied periods. Commissioning the control system will allow the district to save energy and the only cost associated is the staff time spent making changes to the systems.

As previously mentioned the second control opportunity exists with staggering the start up on systems to avoid a peak in demand. Again, we believe some energy can be saved by avoiding staggered start up.

*Envelope M&O*
It was noted there were several exterior doors around the district that suffered from missing or absent weather-stripping and we recommend that these situations be addressed as the opportunity arises.

## B. CAPITAL EXPENSE PROJECTS

**HVAC**

- Replace Ben Bowen & Copeland HVAC systems
- Replace Huffman Intermediate Chiller and pumps.

**Lighting**

- Renovate Gym metal halide fixtures with T5 fluorescent
- Add controls & sensors to 3 campuses.

*HVAC and Infrastructure ECRMs*

***NOTE:*** *ECRM's 1a through 1d present options for system replacement at Copeland ES and Ben Bowen. We leave it to the district to determine the best combination of options for these two campuses. However, our final recommendation incorporates ECRM's 1a & 1d rather than 1a & 1c.*

*ECRM #1a: HVAC Renovation & Consolidation at Ben Bowen and Copeland Elementary*

The HVAC system at Copeland ES consists of two (15 year old) 250 ton scroll chillers. Bowen consists of 60 RTU's totaling 171 tons with electric strip heat. Our recommendation is for HISD to replace the chillers at Copeland and 60 RTU's at Ben Bowen with roof mounted AHU's connected to the central plant, and to upgrade the central plant to accommodate both campuses. When the district upgrades the HVAC system we recommend they add VFD's' to secondary pumps and to AHU's.

| | | |
|---|---|---|
| Estimated Installed Cost | = | $1,368,000 |
| Estimated Energy Cost Savings | = | $ 58,500 |
| Simple Payback Period | = | 23 years |

*ECRM #1b: HVAC Renovation at Ben Bowen*

Ben Bowen consists of 60 RTU's totaling 171 tons with electric strip heat. We recommend the district replace the entire system with newer more efficient roof top units having gas in lieu of electric heating sections.  The gas will need to be piped approximately 300 feet from Copeland ES central plant a distance of 300 feet.

| | | |
|---|---|---|
| Estimated Installed Cost | = | $360,300 |
| Estimated Energy Cost Savings | = | $ 26,000 |
| Simple Payback Period | = | 14 years |

*ECRM #1c: HVAC Renovation at Ben Bowen with heat pumps*

Ben Bowen consists of 60 RTU's totaling 171 tons with electric strip heat.  We recommend the district replace the entire system with newer more efficient heat pump roof top units.

| | | |
|---|---|---|
| Estimated Installed Cost | = | $351,000 |
| Estimated Energy Cost Savings | = | $ 25,600 |
| Simple Payback Period | = | 13 ¼ years |

*ECRM #1d: HVAC Renovation at Copeland*

The HVAC system at Copeland ES consists of two 15 year old 250 ton scroll chillers.  We recommend the district upgrade these chillers and related pumps with newer more efficient models.  When upgrading system we recommend the district add VFD's to secondary pumps and to AHU's.

| | | |
|---|---|---|
| Estimated Installed Cost | = | $400,000 |
| Estimated Energy Cost Savings | = | $ 32,500 |
| Simple Payback Period | = | 12 years |

*ECRM #2: HVAC Renovation at Huffman Intermediate*

The HVAC equipment for Huffman Intermediate consists of one 30 year old York centrifugal chiller that we recommend replacing.  We also recommend replacing the associated pumps and a single-cell cooling tower.  When replacing the system we recommend adding VFD's to secondary pumps and differential pressure sensors to fan coil units.

| | | |
|---|---|---|
| Estimated Installed Cost | = | $ 226,200 |
| Estimated Energy Cost Savings | = | $ 26,000 |
| Simple Payback Period | = | 8 ¾ years: |

*<u>LIGHTING ECRMs</u>*
*ECRM #3: Retrofit Existing Gymnasiums Fixtures to T5HO or T8 High Bay Fluorescent*

HISD has of 7 gymnasiums that contain approximately 195 400-watt metal halide fixtures and twenty (20) 2-lamp T12 fluorescents. We recommend replacing these lights with new T5HO or

T8 high bay linear fluorescent fixtures. 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 | = | $ 59,500 |
| Estimated Energy Cost Savings | = | $ 11,500 |
| Simple Payback Period | = | 5 ¾ years |

*ECRM #4: Add lighting controls and occupancy sensors to three campuses*

We recommend adding lighting controls and occupancy sensors to Huffman Intermediate, Copeland ES and Huffman MS and tying this into their current TAC energy management system.

| | | |
|---|---|---|
| Estimated Installed Cost | = | $ 121,000 |
| Estimated Energy Cost Savings | = | $ 17,125 |
| Simple Payback Period | = | 7 years |

**SUMMARY TABLE:**

The projects we recommend HISD consider at the present time include HVAC ECRM #1b, ECRM #1d, ECRM #2 plus both lighting ECRMs:

| | | |
|---|---|---|
| Estimated Installed Cost | = | $ 1,167,000 |
| Estimated Energy Cost Savings | = | $ 106,625 |
| Simple Payback Period | = | 11 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 #3 — 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 #1b &1d — These projects are the most cost effective when considering upfront costs, the price of gas and equipment efficiency. The cost of electricity can be up to 3 times the cost gas.
3. HVAC ECRM #2 — The chiller that serves Huffman intermediate is thirty years old and is nearing the end of its life. We recommend the district look into replacing this unit and associated pumps in the near future.
4. Lighting ECRM #4 — This project is prioritized last based on the importance of the above projects, but the district could see energy savings by placing campuses on a lighting control system and by adding sensors to classrooms.

## 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. $2500 maintenance expense next 5 years | | | | |
| 4. $5000 maintenance expense last 5 years | | | | |
| 5. Savings decreases 5% per year after year 5 | | | | |
| | | | | |
| **Cash Flow** | **Project Cost** | **Project Savings** | **Maintenance Expense** | **Net Cash Flow** |
| Time 0 | ($1,167,000) | | 0 | ($1,167,000) |
| Year 1 | | $ 106,625 | 0 | $106,625 |
| Year 2 | | $ 106,625 | 0 | $106,625 |
| Year 3 | | $ 106,625 | 0 | $106,625 |
| Year 4 | | $ 106,625 | 0 | $106,625 |
| Year 5 | | $ 106,625 | 0 | $106,625 |
| Year 6 | | $ 101,294 | ($2,500) | $98,794 |
| Year 7 | | $ 95,963 | ($2,500) | $93,463 |
| Year 8 | | $ 90,631 | ($2,500) | $88,131 |
| Year 9 | | $ 85,300 | ($2,500) | $82,800 |
| Year 10 | | $ 79,969 | ($2,500) | $77,469 |
| Year 11 | | $ 74,638 | ($5,000) | $69,638 |
| Year 12 | | $ 69,306 | ($5,000) | $64,306 |
| Year 13 | | $ 63,975 | ($5,000) | $58,975 |
| Year 14 | | $ 58,644 | ($5,000) | $53,644 |
| Year 15 | | $ 53,313 | ($5,000) | $48,313 |
| | | | | |
| | | | **Internal Rate of Return** | **1.22%** |

More information regarding financial programs available to HISD 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

### Financing Mechanisms

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

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

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

### Internal Funds

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

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

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

### Debt Financing

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

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

## How to Finance Your Energy Program *continued*

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

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

### Lease and Lease-Purchase Agreements

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

### Energy Performance Contracts

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

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

### Types of Leasing Agreements

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

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

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

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

## How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

# APPENDIX II - ELECTRIC UTILITY RATE SCHEDULES

CenterPoint Energy Houston Electric, LLC
Applicable: Entire Service Area

CNP 8017

### 6.1.1.1.3 SECONDARY SERVICE GREATER THAN 10 KVA

**AVAILABILITY**
This schedule is applicable to Delivery Service for non-residential purposes at secondary voltage with demand greater than 10 kVA 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. Any Meter other than the standard Meter will be provided at an additional charge and/or will be provided by a Meter Owner other than the Company pursuant to Applicable Legal Authorities. 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, Construction Services, in this Tariff.

**MONTHLY RATE**

**I. Transmission and Distribution Charges:**

| | Standard Class | Subclass Exception | |
|---|---|---|---|
| Customer Charge | $5.27 | $0.00 | per Retail Customer per Month |
| Metering Charge | | | |
| Non-IDR Metered | $31.86 | $17.07 | per Retail Customer per Month |
| IDR Metered | $116.89 | $116.89 | per Retail Customer per Month |
| Transmission System Charge | | | |
| Non-IDR Metered | $1.1027 | $1.1027 | per NCP kVA |
| IDR Metered | $1.4709 | $1.4709 | per 4CP kVA |
| Distribution System Charge | $3.118137 | $3.118137 | per Billing kVA |

The following charges are applicable to both the Standard Class and the Subclass Exception

| | | |
|---|---|---|
| **II.** | **System Benefit Fund:** | See Rider SBF |
| **III.** | **Transition Charge:** | See Schedules TC, TC2, TC3 and SRC |
| **IV.** | **Nuclear Decommissioning Charge:** | See Rider NDC |
| **V.** | **Transmission Cost Recovery Factor:** | See Rider TCRF |

CenterPoint Energy Houston Electric, LLC
Applicable: Entire Service Area

CNP 8017

| | | | |
|---|---|---|---|
| **VI.** | **Excess Mitigation Credit:** | | Not Applicable |
| **VII.** | **State Colleges and Universities Discount:** | | See Rider SCUD |
| **VIII.** | **Competition Transition Charge:** | | See Rider CTC |
| **IX.** | **Competitive Metering Credit:** | | See Rider CMC |
| **X.** | **Other Charges or Credits:** | | |
| | A. Municipal Account Franchise Credit (see application and explanation below) | $(.002207) | per kWh |
| | B. Rate Case Expenses Surcharge | | See Rider RCE |
| | C. Rider UCOS Retail Credit | | See Rider RURC |
| | D. Advanced Metering System Surcharge | | See Rider AMS |
| | E. Accumulated Deferred Federal Income Tax Credit | | See Rider ADFITC |

**COMPANY SPECIFIC APPLICATIONS**

DETERMINATION OF BILLING DEMAND FOR TRANSMISSION SYSTEM CHARGES

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

Determination of 4 CP kVA The 4 CP kVA 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

# APPENDIX III – SAMPLE ENERGY POLICY

# ENERGY POLICY

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

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

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

Adopted this day of , 200 .

________________________________

President, Board of Trustees

Attest: ________________________________

Secretary, Board of Trustees

# APPENDIX IV - 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 Huffman 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]

Date: 2/12/10

Name (~~Mr./Ms.~~/Dr.): Douglas Killian

Title: Superintendent

Organization: Huffman ISD

Phone: 281-324-1871

Street Address: 24302 FM 2100

Fax: 281-324-4531

Mailing Address: P.O. Box 2390

E-Mail: ____________

Huffman, Texas 77336

County: Harris / ESA

**Contact Information:**

Name (Mr./Ms./Dr.): Charlie Miller

Title: Maintenance Director

Phone: 281-324-2425

Fax: 281-324-2370

E-Mail: cmiller@huffmanisd.net

County: Harris

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

# APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

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.

Texas Energy Managers Association

SECO
State Energy Conservation Office

## APPENDIX VI - UTILITY CHARTS ON CD