April 2010

SUMMARY
ENERGY EFFICIENT
PRELIMINARY ENERGY ASSESSMENT REPORT
WINNSBORO ISD
WINNSBORO, TEXAS

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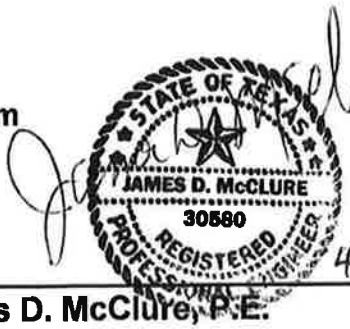

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1.0 EXECUTIVE SUMMARY

The Preliminary Energy Assessment is provided by the State Energy Conservation Office (SECO), a division of the Comptroller of Public Accounts of the State of Texas. This service assists school Districts in taking basic steps toward energy-efficient facility operation. Active involvement by the District in the partnership is critical in developing a customized blueprint for energy efficiency.

One of the first steps toward energy-efficient school operation is identifying the current energy performance of District facilities. An energy performance summary is included in Section 2 and more detailed data by month for each school is in the Appendix of this report.

Successful school energy management programs include the following:

- Identify the Need – District Energy Evaluation
- Appoint an Energy Manager & Provide Training
- Adopt a District Energy Policy
- Write an Energy Management Plan & Present to the School Board
- Implement Energy Accounting System
- Conduct Energy Audits
- Establish Energy Committees
- Adopt Building Operating Procedures & Guidelines
- Involve School Personnel & Students
- Obtain Publicity
- Create Competition & Incentives
- Communicate Success
- Give Personal Contact and Feedback from Energy Accounting
- Energy Procurement

This Preliminary Assessment Report also includes the following:

- Definition of system and replacement projects along with installation cost estimates, estimated energy and cost savings for HVAC, lighting, and controls.
- Prioritized replacement schedule
- Guidelines for developing long-range energy plans per Senate Bill 300

James D. McClure, P.E. visited the District and met with Dr. Bosold, Superintendent, and Mr. Charles Calhoune, Maintenance Director. Calhoune and McClure conducted a walk-through of each campus. James McClure and Malek Bekka of EMA conducted on-site observations for the Preliminary Energy Assessment. Mr. Jim Winters of Winnsboro ISD maintenance provided information and assistance in the on-site visit. Tricia Teague provided utility information. Your personal contact at SECO is Ms. Juline Ferris (Phone: (512) 936-9283); your contact at Estes, McClure & Associates, Inc. is James McClure, P.E., and Gary Bristow, P.E. (Phone: (903) 581-2677). Please call us if you have any questions or comments about this report or other energy management issues.

Project Summary

Facility	$ Saved	Estimated Cost	Priority
Elementary School			
Lighting	$3,292	$39,458	1A
A/C	$9,057	$875,000	1A
EMCS	$9,097	$77300	1A
Middle School			
Lighting	$2,724	$29,483	1B
A/C	$7,847	$950,000	1B
EMCS	$8,423	$72000	1B
High School			
Lighting	$6,464	$75,611	2
A/C	$7,008	$700,000	2
EMCS	$11,076	$83600	2
Administration Bldg.			
Lighting	$204	$2,030	3
A/C	$1,023	$58,000	3
EMCS	$527	$4,800	3
	$66,742	**$2,967,282**	

The lighting energy efficiency projects (see Section 7) will reduce energy consumption, overcome the issue of replacement ballasts for the old T12 fluorescent fixtures not being available after June 30, 2010, and should also reduce maintenance work from continually replacing old ballasts/lamps. These projects include energy efficient T8 fluorescent lamps/electronic ballasts, LED exit lights, and T5 fluorescent lighting for the gymnasium at the High School and Middle School. These projects may be accomplished independent of the air-conditioning and controls and are recommended as soon as the district can implement.

The air-conditioning projects (see Section 5) will save energy and dollars but the payback is longer because of the infrastructure nature of the projects. These projects are recommended because the age of the equipment is much beyond the expected life. The Elementary School and Middle School equipment is 28 years old and the High School equipment is 18 years old. Delaying these projects will add to energy costs and maintenance costs as well as resulting in more frequent down time in the schools. The projects are recommended as soon as possible with priority given to Elementary School, Middle School, High School, and Administration Building in that order.

Energy Management Controls (see Section 6) are recommended at the time of new air-conditioning.

2.0 DISTRICT ENERGY AND COST PERFORMANCE

Winnsboro ISD has three campuses (High School, Middle School, Elementary School, and an Administration Building).

The energy use performance or energy use index (EUI) and the energy cost performance or energy cost index (ECI) is provided below. Other detailed data is shown on the Base Year Energy Consumption History table provided in Appendix of this report

The energy cost index is a valuable tool for comparing the energy cost ($) of different schools and campuses in a given area. The energy use index allows for comparison of schools on a quantity (BTU) basis. Since the cost of electricity varies by school and natural gas is so much less than the cost of electricity, this index is a true value of the actual energy use on a square foot basis. The energy cost index (ECI) and the energy use index (EUI) are determined by the following formulas.

$$ECI = \frac{\text{Annual Electrical Cost + Annual Natural Gas Cost}}{\text{Total Area of School}}$$

$$EUI = \frac{\text{Annual Electrical BTUs + Annual Natural Gas BTUs}}{\text{Total Area of School}}$$

SCHOOLS	ECI	EUI	Kwh per Sq.Ft.	1000 Mcf per Sq Ft.	Total Utility Cost	Area (Sq. Ft.)
High School	$1.06	56,866	9.8	22.7	$158,268	86,239
Middle School	$0.88	46,946	10.1	12.1	$107,241	66,581
Elementary School	$0.96	51,098	9.7	17.4	$115,183	67,550
Administration Building	$0.34	19,056	3.9	5.5	$12,593	20,497

3.0 ENERGY ACCOUNTING

3.1 Monitoring and Tracking

Recommend that the District track utility usage and costs on a monthly basis for each meter and campus. This could be accomplished using a spread sheet. Monitoring and tracking is useful in providing feedback to administration and campuses as well as energy management activities (eg. Checking for errors, unusual energy usage patterns, etc.).

3.2 Utility Providers and Rates

The District is provided electricity by Southwestern Electric Power Company (SWEPCO), a regulated utility. Natural gas is provided by Centerpointe Energy Company.

4.0 RECOMMENDED M&O PROCEDURES

1. Turn off computers weekends, holidays, and summer when not in use.

2. Turn off lights when areas/rooms are unoccupied.
   - Coordinate with custodial staff to ensure after hours only the lights are on in areas being cleaned.
   - After school clean large areas with more lighting first (eg. gymnasium, cafeterias, etc.) and quickly turn the lights off when completed.
   - Coordinate with each school staff to turn off lights if their room or office is unoccupied.
   - Turn off or only use partial lighting in unoccupied cafeterias during the school day.
   - Also have custodial staff ensure outdoor lighting is off during daytime.

3. Utilize available daylighting.
   - Observe each school for areas where daylighting is adequate without having the lights on.

4. Eliminate small personal refrigerators, microwaves, and floor heaters in the classroom unless needed for instructional purposes or special needs.

5. Evaluate the summer operations for each campus. The summer operation of the air conditioning of the schools should be evaluated by the District. Practices such as group cleaning, centralized summer school, and four day work weeks have been successful in other District's. The air conditioning systems should be operated a sufficient amount to control humidity in the buildings.

6. Provide motion sensors to control lighting in rooms used intermittently (eg. File rooms, resource rooms, offices, teachers lounge, etc.). For this approach to be cost effective the lights would need to have the lighting time reduced about 3 hours/day and 1 ½ hours/day if the labor is done by the district. Note that current codes require automatic control (eg. Occupancy sensors, etc.) of lighting for new construction.

7. Provide schools with energy check list or guidelines for regular school days, holidays, partial occupancy, summer operations, etc. Provide for teachers, custodians, kitchen staff, library, athletics, etc.

8. Sample costs for small appliances

User	Est. Annual Cost*
Mini refrigerator	$ 14
Personal space heater	$ 21

Coffee maker, left on all day	$ 9
Microwave oven	$ 1
Computer	
On 24 hours/day	$ 47
Using sleep mode after hours	$ 15

*Based on 180 day school year, $0.07 per kwh

9. Potential Savings From Changing Thermostat Settings

   Cooling energy costs decrease about 1.5% for each degree above 72°.

   Heating (gas) energy costs increase about 1% for each degree above 68°F.

10. Energy Tracking and Monitoring
    Set up a spread sheet to track energy costs and usage by month for each electric and natural gas meter.

11. Conduct periodic energy audits at various times (eg. Weekends, regular operation, nights, etc.) to verify lights off, computers off, etc.

12. A few incandescent light fixtures were observed. As maintenance replacement item change to energy efficient fluorescent.

5.0 MECHANICAL SYSTEMS

5.1 Elementary School

The Elementary School is a single story building with a pitched metal roof. It was constructed in 1982.

The air-conditioning systems are original to the building except for a few replaced equipment components. The equipment has exceeded its normal rated life. The system type is single zone unitary direct expansion (Dx) systems electric cooling and natural gas furnaces for space heating. The equipment has R22 refrigerant.

The classrooms around the exterior of the building have closets on an outside wall for the individual classroom air-handling unit with a Dx coil and natural gas furnace. Return air is into the closet plenum and supply air is ducted to the room. An individual thermostat controls the unit. The outdoor air-cooled condensing units are located ground level outside adjacent to the air-handling closet.

The remaining interior zones of the school have single zone air handlers with Dx coils electric cooling (Dx) and natural gas fired furnaces. These air-handling systems are located above the ceiling in a mezzanine area. Air-cooled condensing units for these above ceiling units are located outside on the roof. There are several mezzanine areas. These units serve office area, cafeteria, library, and other interior classrooms. A thermostat located within the zone serves each air-handler.

The original equipment manufacturer is York. Maintenance replacement components are from a variety of manufacturers including Whirlpool, Comfortmaker, Goodman, and Heil. The original installed York air-cooled condensing units are the old green "tombstone" shaped units.

Exterior Classrooms

- 30 classrooms
- Approximately 3 ½ ton units (1 per classroom)
- Split-system Dx, natural gas heating
- A/H, Dx coil, furnace in closet
- Condensing unit outside on ground
- One thermostat per classroom

Interior Areas

- Mezzanine-Cafeteria
    - 4 air-handlers
    - Condensing units on roof
    - Air handlers serve Cafetorium, Fine Skills, Gross Motor Skills, Early Childhood

- Mezzanine B
  - 4 air-handlers
  - Stage, Art, Music, Kitchen, Rest Rooms
- Serving Line A/H (above ceiling)
- Mezzanine "A"
  - 3 air-handlers includes CR's, Rest Rooms, Library, Computer Room
- Administration A/H (above ceiling)

Outbuildings

- Metal gym
  - 2 – 5 ton Dx split system units (about 5yrs old)
  - 2 – unit heaters (original)

Headstart (Portable)

- Through wall Dx units

General

- Of the 30 exterior classrooms, 18 still have the original outdoor condensing units. Some of the replacements do not appear to be very new. The air-handlers for the exterior classroom are original and a few have refurbished burners.
- Of the approximate 15 air-cooled condensing units on the roof, there are reported to only be two original units and the others about 5 years old.
- Office air-handler original; heating replaced as well as the evaporator coil.
- Access to the above ceiling equipment is difficult and will add to complexity of replacing the units.
- Mezzanine area air-handlers are original.

Recommendations

- The air-conditioning system with the exception of several component replacements is original equipment. This means the original equipment is 28 years old and is much beyond the normal rated life. The entire original main building is recommended for new air-conditioning.
- The new base line system recommended is high-efficiency unitary direct expansion with a current technology acceptable refrigerant such as R410A. The high occupancy areas for sustained time periods (eg. Classrooms) is recommended that the Dx units include condenser heat (energy) reclaim for humidity control in order to accommodate current outdoor air ventilation standards.
  - Energy Management control system is recommended at the same time as the air-conditioning retrofit.
  - Comply with International Energy Code which includes ASHRAE ventilation standards.

Estimated Cost: $ 875,000

Estimated Energy Savings:
KWHRS Saved = 89,906
MCF Saved = 181

Estimated Cost Savings: $ 9,057/year

5.2 Middle School

The Middle School is a single story building with a flat roof. There are three areas to the school.

Area A – 1982 Construction
Area B – 1946 Construction
Area C – 1974 Construction

Areas A and B are connected to each other and include the Gymnasium. Area C is connected to Area B by a covered walkway. Areas A and B include classrooms, offices, library, music, art and gym. Area C includes the kitchen, cafeteria, labs, and office.

The campus air-conditioning system type is single zone unitary direct expansion (Dx) systems electric cooling. Most of the heating is natural gas. The refrigerant is R22. There are no automatic controls for energy management. The air-conditioning equipment is primarily split system Dx with the air-cooled condensing units on the roof except Area C condensing units are ground level.

Some of the air-handlers for the Dx split system are located above the ceiling and some are in closets. A few areas more than one room is served by a single unit thermostat. Area A includes six classrooms (A1-A6) that have split system Dx units with electric heat. These classrooms share a common return air plenum above the corridor. Area A also has several packaged Dx rooftop units serving larger areas (eg. Band, Library, Art, Office).

The age of the system and most equipment is estimated to be as follows:

Area A – 28 Years
Area B – 28 Years
Area C – 28 Years

There has been some maintenance replacement of equipment components primarily the outside air-cooled condensing units located on the roof of Area A and B and on the ground for Area C. A variety of manufacturers different from the indoor air-handlers were used in the maintenance replacements. This selected maintenance replacement equipment appears to be of a variety of age. Area C outside condensing units (7) appears to be newer to several years old.

Area A

- 6 packaged Dx rooftop units electric/gas
- 17 split system Dx electric and natural gas
- 7 split system Dx electric

Area B

- 16 split system Dx units, gas heating

Area C

- 7 split system Dx units, gas heating
- Air handlers appear original and access is difficult. Rework of the closets will be needed during replacement.
- The condensing units for Area C all appear to be newer to several years old and all are different manufacturers than the original indoor air-handlers.

Recommendations

- The air-conditioning system with the exception of several component replacements is original equipment. This means the original equipment is 28 years old and is much beyond the normal rated life. Areas A, B, and C are recommended for new air-conditioning.
- The new base line system recommended is high-efficiency unitary direct expansion with a current technology acceptable refrigerant such as R410A. The high occupancy areas for sustained time periods (eg. CR's) is recommended that the Dx units include condenser heat (energy) reclaim for humidity control in order to accommodate current outdoor air ventilation standards.
- Energy Management control system is recommended at the same time as the air-conditioning retrofit.
- Comply with International Energy Code which includes ASRAE ventilation standards.

Estimated Cost: $ 950,000

Estimated Energy Savings:
KWHRS Saved = 88,869
MCF Saved = 99.6

Estimated Cost Savings: $ 7,847/year

5.3 High School

The High School is a single story pitched roof building constructed in 1961. The rooms, except

for a few, do not have lay-in ceiling. The steel structure is exposed.

At one time the High School had a central chilled water system and it has been abandoned. In the classrooms some of the floor mounted units are still in place.

It was reported that the present air-conditioning is about 18 years old. The present air-conditioning system type is single zone unitary split-system direct expansion (Dx) systems electric cooling and natural gas space heating. The equipment has R22 refrigerant.

The air-cooled condensing units are located ground level except for those serving 10 air-handlers in a mezzanine in the auditorium These condensing units are on the roof.

Some components have been replaced as maintenance with a variety of manufacturer parts. The air-handlers and condensing units in the Auditorium area were reported to be about 8 years old.

The High School classroom indoor air-handling systems are located in the corner of a room. They are exposed and not in a closet. They are gas fired heating with flue ducted outside. These in-room units tend to be a distraction not only visually but acoustically. No outside air provisions were observed.

There is no automatic energy management control system.

Main Classroom Building

- 25 split systems with condensing units outside on ground.
- Auditorium mezzanine 10 air-handlers with condensing units on roof

Homemaking Building

- 5 split system Dx

Gym Metal Building

- 17 split system Dx units, reported to be 10 years old
- 4 gas unit heaters

Field House Area

- 2 split systems

Recommendations

- The main high school building air-conditioning is at its normal life except for the units in the auditorium mezzanine and some scattered replacement components.
- The main building systems are recommended for replacement. Recommend considering high efficiency split-system Dx units with natural gas heating. For high occupancy areas for sustained time periods recommend condenser heat reclaim (energy recovery) into systems for humidity control. This is needed due to increased

outside air ventilation codes.

- Provide energy management control system at the time of the new air-conditioning systems.
- Evaluate methods to provide new air-conditioning in the classrooms where they are not sitting open in the room.
- Before spending district resources on new air-conditioning evaluate the long term usage and plan for the high school.
- Incorporate International Energy Conservation Code and ASHRAE Ventilation Standard in new work.

Estimated Cost: $ 700,000

Estimated Energy Savings:
KWHRS Saved = 69,158
MCF Saved = 122

Estimated Cost Savings: $ 7,008/year

5.4 Administration Building

The administration building is an old school and only part of it is used for administration. The senior citizen's have an activity area in the east end. Maintenance uses the north wing for storage and a few other maintenance related activities. This report addresses the south front area of the building used for administrative purposes. This includes the board room, superintendent's office, business and other offices.

The administration building is of the 1940-50's construction time frame. The air-conditioning was reported to be about 15 years old.

The air-conditioning systems are unitary split system single zone direct expansion type with natural gas heating. The air-cooled condensing units are located ground level on the north side of the administration area. Three air-handlers are located in a small room of the administration area corridor. The refrigerant is R22.

There is no energy management control system.

An older rooftop unit is located on the north wing where there is storage. It was reported not to be activated.

Recommendations

- Replace the administration area air-conditioning systems with high energy efficiency split system Dx units having natural gas heating. Use current technology refrigerant (eg.

R410A).

- Rework or relocate air-handlers location (for new system) for better maintenance access.
- Provide energy management controls at time of new air-conditioning.
- Incorporate Energy Conservation Code and ASHRAE Ventilation Standards in new work.

Estimated Cost: $ 58,000

Estimated Energy Savings:

KWHRS Saved = 12,448

MCF Saved = 12

Estimated Cost Savings: $ 7,643/year

6.0 ENERGY MANAGEMENT CONTROLS

Winnsboro ISD facilities does not have any energy management controls systems for the air-conditioning.

Recommendations

Energy Management controls with central computer based control is recommended for the elementary school, middle school, high school and administration building when new upgraded air-conditioning systems are installed. Space sensors are recommended such that temperatures may be read or reset from central location and laptops or remote computers (eg. Maintenance after hour use, etc.). This is a valuable tool for maintenance and off-hours monitoring (eg. Bad weather, extended holiday, etc.).

Incorporate Energy Conservation Code and ASHRAE Ventilation Standards in new work.

Estimated Cost

Elementary School	$ 77,300
Middle School	$ 72,000
High School	$ 83,600
Administration Building	$ 4,800

Estimated Energy Savings

Elementary School	Kwh 118,150
Middle School	Kwh 116,987
High School	Kwh 138,450
Administration Building	Kwh 7,643
Total	

Estimated Cost Savings

Elementary School	$ 9,097/yr

Middle School	$ 8,423/yr
High School	$ 11,076/yr
Administration Building	$ 527/yr

7.0 LIGHTING SYSTEMS

The lighting inside the Winnsboro ISE facilities is fluorescent with non-electronic ballasts. The Middle School and High School Gymnasiums have metal halide type fixtures. One corridor in the High School has T8 fluorescent lamps and electronic ballasts.

Note for comparison that non electronic ballasts with two T12 lamps consume about 72 watts while new electronic ballasts and two T8 lamps consumes about 53 watts.

The High School main classrooms typically have two lamp fixtures. There is daylight available in the high school classrooms.

As of April 6, 2006, manufacturers can no longer have T12 ballasts shipped in fluorescent fixtures and as of June 30, 2010, replacement T12 fluorescent ballasts will not be available. When disposing of any old ballast the District should make sure and dispose of the PBC ballasts correctly.

Recommendation

- Retrofit the existing fluorescent lamps and non-electronic ballasts with energy efficient T8 fluorescent lamps and electronic ballasts, at all campuses and administration.
- Replace fluorescent and incandescent exit light fixtures with LED at all campuses and administration.
- Replace the metal halide gym lighting with T5 fluorescent fixtures and electronic ballasts (Middle School and High School).

	Kw Saved	KWH Saved	$ Saved	Cost	P.O.
Elementary School	19.2	40,320	$3,104	$37,148	12
Middle School	11.8	24,839	$1,788	$16,949	9.5
High School	6.3	13,266	$1,061	$12,023	11.3
M.S. Gym	3.1	9,765	$703	$9,300	13.2
H.S. Dressing	1.8	3,748	$300	$3,360	11.2
H.S. Gym	2.4	7,560	$605	$7,200	11.9
Field House	6.8	14,280	$1,142	$12,800	11.2
Administration	1.4	2,957	$204	$2,030	9.9
H.S. Exit Lights	0.4	3,153	$252	$3,080	12.2
M.S. Exit Lights	0.4	3,232	$233	$3,234	13.8
E.S. Exit Lights	0.3	2,444	$188	$2,310	12
Total Estimated		**125,564**	**$9,580**	**$109,434**	

8.0 PRIOTIZED SCHEDULE FOR REPLACEMENT PROJECTS

The replacement projects recommended are air-conditioning, controls, and lighting for the Elementary School, Middle School, High School and Administration.

Lighting Priority

The lighting retrofits may be done at anytime separate from the air-conditioning and controls. Considering the industry change to more efficient T8 fluorescent lamps and electronic ballasts, unavailability of T12 fluorescent ballasts after June 2010, energy savings of new efficient lamps/ballasts, and the maintenance savings of continually replacing old ballasts as they fail, it is recommended that the District go ahead and initiate the lighting projects especially for the fluorescent fixtures and exit lights. The gyms would be second priority.

Energy Management Controls Priority

The energy management controls priority is recommended to coincide with each air-conditioning retrofit project. Due to the age of the existing air-conditioning equipment in the District, controls are not recommended until the old equipment is replaced.

Air-Conditioning Systems Priority

The air-conditioning for all facilities has reached its normal expected rated life with the exception of a few maintenance replacement projects and the High School gym. The recommended priority based on limited on-site observations is as follows:

1A. Elementary School
1B. Middle School
2. High School
3. Administration

All campuses are in need of upgrading. Considering the 28 year old equipment at the Elementary School and Middle School these are first priority.

9.0 GUIDELINES TO ASSIST IN DEVELOPING LONG-RANGE ENERGY PLANS (PER SB 300) FOR PUBLIC ENTITIES

Background

The 2009 Texas Legislature passed SB300 that accomplished the following;

- Requires a school board approved long range plan to reduce annual electric consumption.
- Repeals requirements to reduce electric consumption by 5% each year for 6 years.
- Left reporting and posting of energy requirements intact.

SB300 requires five percent annual electric consumption reduction beginning with 2008 state fiscal year and consume electricity in subsequent fiscal years in accordance with the district's energy plan. The act applies beginning with the 2009 – 2010 school year.

The district plan must include strategies for achieving energy efficiency that result in net savings for the district or can be achieved without financial cost to the district. For each strategy in the plan include short term capital cost and lifetime costs and savings that may result from implementation of the strategy. In determining if a strategy may result in financial cost to the district, consider the total net savings that may occur over the seven year period following implementation of the strategy.

Helpful Hints

- Read and understand SB300
- Document 2008 state fiscal year electricity and natural gas consumption
- Determine if district is complying with prior requirement left intact by SB300 for reporting and posting energy consumption.
- Establish an energy tracking system and keep updated monthly
- Document maintenance operations, and custodial strategies to reduce energy usage.
- Document energy efficiency projects already accomplished
- Document energy efficiency projects in progress
- Assign someone for responsibility of energy manager in the district.
- Perform energy audits of existing facilities
- Develop strategies for reducing energy consumption that had no first cost
- Develop list of potential capital projects with costs and benefits
- Prioritize strategies
- Document plan in accordance with SB300

10.0 FUNDING OPTIONS

School Districts have traditionally tapped bond money, maintenance dollars, or federal grants to fund energy efficient equipment change-outs or additions such as energy efficient lighting systems, high efficiency air conditioning units, and computerized energy management control systems. Today, a broader range of funding options is available. A number of these are listed below.

Texas LoanSTAR Program

The LoanSTAR (Saving Taxes and Resources) Program, which is administered by the State Energy Conservation Office, finances energy-efficient building retrofits at a current interest rate of 3.0 percent. The program's revolving loan mechanism allows borrowers to repay loans through the stream of cost savings realized from the projects. Projects financed by LoanSTAR must have an average simple payback of 10 years or less and must be analyzed in an Energy Assessment Report by a Professional Engineer who meets criteria. Upon final loan execution, the District proceeds to implement funded projects through the traditional bid/spec process. For more information contact Theresa Sifuentes at 512/463-1896 for more information.

Capital Acquisition Program or Municipal Financing Program

This program also offers loans to purchase and install energy-saving equipment. The minimal loan amount is $100,000 and interest rates range from 3.0% to 5.0%, depending upon current financial market conditions, the length of the loan, and the District's bond rating. Loan terms are set at three year, four year, seven year, or ten year periods and are not related to project payback. The application procedure is simple: completion of a one-page form and submission of the most recent budget and audit. For more information call 512/467-0222 or visit www.firstpublic.com.

Private Lending Institutions or Leasing Corporations

Banks, leasing corporations, and other private lenders have become increasingly interested in the energy efficiency market. The financing vehicle frequently used by these entities is a municipal lease. Structured like a simple loan, a municipal leasing agreement is usually a lease-purchase arrangement. 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.

Grants

Possible Stimulus

Bond Issue

11.0 PROCUREMENT METHODS

School Districts have several options available for procurement methods. The following are some of the options available.

State Purchasing
The Texas Building and Procurement Commission has competitively bid contracts for numerous items that are available for direct purchase by District. For example, electronic ballasts and T-8 lamps are available. For more information call 512/475-2351 or visit the web site at http://www.gsc.state.tx.us/stpurch/index.html.

Competitive Bidding
Plans and specifications are prepared for specific projects and competitive sealed bids are received from contractors. This traditional approach provides the District with more control and projects are specifically defined. Competitive pricing is achieved because the contractors are competing for the same equipment and work. This method results in lower cost and better quality.

Design/Build
Design/Build contracts are usually structured where the Engineer and Contractor are under the same contract to the District. This team approach was developed for fast-track projects, and to have a contractor involved in decisions during the process of preparing plans/specifications. The disadvantage is that the District does not have the independence of the Engineer to totally represent the District. There is less control and protection for the District in substitution of equipment and in quality control.

Purchasing Standardization Management
Purchasing Standardization Management will result in significant dollar savings if integrated into facility improvements that are being planned. For example, District have standardized purchasing of District-wide energy management controls, air conditioning equipment, etc. This approach includes the traditional competitive bidding with pricing structured for present and future, or phased purchasing.

Performance Contracting

APPENDICES

APPENDIX A

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 WINNSBORO 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: Mark Bosold Date: 1/19/10

Name (Mr./Ms.): MARK Bosold Title: Supt.

Organization: WINNSBORO ISD Phone: 903 342-3737

Street Address: 207 E. PINE Fax: 903 342-3380

Mailing Address: WINNSBORO, TX 75494 E-Mail: mbosold@proplesnet.net

County: WOOD

Contact Information:

Name (Mr./Ms./Dr.): SAME Title:

Phone: Fax:

E-Mail: County:

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 B

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 48207 (Elec) 9813 (Gas)
(area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: ADMINISTRATION

FLOOR AREA: 20,497 square feet

STUDENTS:

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
JAN	2009	7,181	$416	30			27	$401
FEB	2009	7,191	$488	28			30	$374
MAR	2009	5,620	$441	27			17	$217
APR	2009	4,617	$367	21			9	$129
MAY	2009	4,912	$385	24			2	$36
JUN	2009	7,111	$531	30			0	$19
JUL	2009	10,031	$696	32				$17
AUG	2009	9,020	$564	31				$17
SEP	2009	7,360	$494	29				$17
OCT	2009	5,210	$378	29			0	$18
NOV	2009	3,863	$293	21			2	$38
DEC	2009	8,524	$490	27			24	$224
TOTAL		80,640	$5,544	328			112	$1,506

Annual Total Electricity Cos	=	$5,544	Per Year
Annual Total Energy Cost	=	$7,049	Per Year
Total KWH x 0.003413	=	275.2	x 10^6
Total MCF x 1.03	=	115.4	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	390.6	x 10^6
Cost per KWH	=	$0.069	Per Year
Cost per student	=	#DIV/0!	Per Year

Energy Use Index:
Total Site BTU's/yr = 19,056 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.34 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 3.9

1,000 mcf / square foot = 5.5

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 28209, 41709, 28202, 02904 (Elec) 5687 (Gas) (area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: ELEMENTARY SCHOOL & HEAD START

FLOOR AREA: 67,550 square feet

STUDENTS: 648

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
JAN	2009	42,003	$3,507	348			282	$3,987
FEB	2009	46,976	$3,856	210			275	$3,279
MAR	2009	42,982	$3,855	244			170	$2,030
APR	2009	47,218	$4,014	228			88	$1,063
MAY	2009	63,957	$5,060	299			36	$447
JUN	2009	48,256	$3,989	242			19	$242
JUL	2009	52,764	$4,160	137			11	$147
AUG	2009	59,076	$4,409	304			13	$169
SEP	2009	86,494	$5,734	317			23	$217
OCT	2009	63,817	$4,501	305			30	$275
NOV	2009	50,447	$3,854	312			36	$327
DEC	2009	51,706	$3,706	208			196	$1,707
TOTAL		655,696	$50,645	3,155			1,178	$13,892

Annual Total Electricity Cos	=	$50,645	Per Year
Annual Total Energy Cost	=	$64,538	Per Year
Total KWH x 0.003413	=	2,237.9	x 10^6
Total MCF x 1.03	=	1,213.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,451.6	x 10^6
Cost per KWH	=	$0.077	Per Year
Cost per student	=	$99.60	Per Year

Energy Use Index:

Total Site BTU's/yr = 51,098 BTU/sq.ft./yr

Total Area (sq.ft.)

Energy Cost Index:

Total Energy Cost/yr = $0.96 $/sq.ft./yr

Total Area (sq.ft)

kwh per square foot = 9.7

1,000 mcf / square foot = 17.4

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 48207, 48208, 08702, 43905, 14102, 48201, 48205 (Elec)
2863, 2759 (Gas)
(area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: MIDDLE SCHOOL

FLOOR AREA: 66,581 square feet **STUDENTS:** 428

		ELECTRICITY DATA			*WATER*		*NATURAL GAS/OTHER FUEL*	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
JAN	2009	44,355	$3,142	165			237	$3,370
FEB	2009	47,894	$3,847	233			194	$2,335
MAR	2009	39,753	$3,617	221			115	$1,397
APR	2009	44,936	$3,821	192			53	$660
MAY	2009	59,766	$4,558	246			13	$191
JUN	2009	62,188	$4,626	235			7	$119
JUL	2009	74,540	$5,170	215			3	$72
AUG	2009	71,221	$4,426	215			4	$79
SEP	2009	75,760	$5,015	282			8	$104
OCT	2009	54,914	$3,795	255			12	$133
NOV	2009	45,895	$3,173	219			13	$149
DEC	2009	51,429	$3,476	181			147	$1,302
TOTAL		672,651	$48,666	2,659			806	$9,909

Annual Total Electricity Cos	=	$48,666	Per Year
Annual Total Energy Cost	=	$58,575	Per Year
Total KWH x 0.003413	=	2,295.8	x 10^6
Total MCF x 1.03	=	830.0	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,125.7	x 10^6
Cost per KWH	=	$0.072	Per Year
Cost per student	=	$136.86	Per Year

Energy Use Index:
Total Site BTU's/yr = 46,946 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.88 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 10.1

1,000 mcf / square foot = 12.1

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 358208, 558203, 558208, 786702, 783704, 558205, 355309
(Elec) 6405, 6431, 6438, 5872, 5836 (Gas)
(area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: HIGH SCHOOL

FLOOR AREA: 86,239 square feet **STUDENTS:** 403

		ELECTRICITY DATA			*WATER*		*NATURAL GAS/OTHER FUEL*	
MONTH	**YEAR**	**CONSUMPTION KWH**	**REP COSTS $**	**BILLED KW**	**WATER CONSUMPTION**	**WATER COSTS $**	**CONSUMPTION UNITS (MCF)**	**COSTS**
JAN	2009	22,421	$1,647	101			485	$6,908
FEB	2009	46,669	$3,577	185			397	$4,797
MAR	2009	39,387	$3,377	185			288	$3,497
APR	2009	39,995	$3,373	176			174	$2,151
MAY	2009	46,529	$3,882	213			65	$852
JUN	2009	41,796	$3,449	175			38	$540
JUL	2009	36,461	$3,270	152			12	$231
AUG	2009	47,293	$3,419	206			20	$319
SEP	2009	63,586	$4,394	229			32	$362
OCT	2009	50,184	$3,657	220			55	$562
NOV	2009	39,430	$2,871	164			56	$566
DEC	2009	48,681	$3,352	183			339	$3,018
TOTAL		522,432	$40,268	2,189			1,962	$23,805

Annual Total Electricity Cos	=	$40,268	Per Year
Annual Total Energy Cost	=	$64,073	Per Year
Total KWH x 0.003413	=	1,783.1	x 10^6
Total MCF x 1.03	=	2,020.7	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,803.7	x 10^6
Cost per KWH	=	$0.077	Per Year
Cost per student	=	$158.99	Per Year

Energy Use Index:
Total Site BTU's/yr = 44,107 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.74 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.1

1,000 mcf / square foot = 22.7

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 697600, 358201, 458205, 758202, 848202, 648208, 948205
(Elec)
(area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: HIGH SCHOOL

FLOOR AREA: 86,239 square feet **STUDENTS:** 403

		ELECTRICITY DATA			*WATER*		*NATURAL GAS/OTHER FUEL*	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
JAN	2009	24,700	$1,837	124				
FEB	2009	24,302	$2,121	144				
MAR	2009	20,486	$1,946	132				
APR	2009	20,306	$1,878	132				
MAY	2009	26,713	$2,316	127				
JUN	2009	32,838	$2,830	130				
JUL	2009	41,680	$3,515	126				
AUG	2009	24,136	$1,950	150				
SEP	2009	37,329	$2,883	165				
OCT	2009	24,807	$2,094	158				
NOV	2009	19,806	$1,603	138				
DEC	2009	25,286	$1,990	109				
TOTAL		322,389	$26,964	1,634				

Annual Total Electricity Cos	=	$26,964	Per Year	
Annual Total Energy Cost	=	$26,964	Per Year	
Total KWH x 0.003413	=	1,100.3	x 10^6	
Total MCF x 1.03	=		x 10^6	
Total Other x _____	=		x 10^6	
Total Site BTU's/yr	=	1,100.3	x 10^6	
Cost per KWH	=	$0.084	Per Year	
Cost per student	=	$66.91	Per Year	

Energy Use Index:
Total Site BTU's/yr = 12,759 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.31 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 3.7

1,000 mcf / square foot = _____

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 358208, 558203, 558208, 786702, 783704, 558205, 355309, 697600, 358201, 458205, 758202, 848202, 648208, 948205 (Elec) 6431, 6438, 5872, 5836 (Gas)
(area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: HIGH SCHOOL

FLOOR AREA: 86,239 square feet **STUDENTS:** 403

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
JAN	2009	47,121	$3,484	224			485	$6,908
FEB	2009	70,971	$5,698	329			397	$4,797
MAR	2009	59,873	$5,323	317			288	$3,497
APR	2009	60,301	$5,251	308			174	$2,151
MAY	2009	73,242	$6,198	340			65	$852
JUN	2009	74,634	$6,279	305			38	$540
JUL	2009	78,141	$6,785	278			12	$231
AUG	2009	71,429	$5,369	356			20	$319
SEP	2009	100,915	$7,277	394			32	$362
OCT	2009	74,991	$5,751	379			55	$562
NOV	2009	59,236	$4,474	302			56	$566
DEC	2009	73,967	$5,342	292			339	$3,018
TOTAL		844,821	$67,232	3,822			1,962	$23,805

Annual Total Electricity Cos	=	$67,232	Per Year
Annual Total Energy Cost	=	$91,036	Per Year
Total KWH x 0.003413	=	2,883.4	x 10^6
Total MCF x 1.03	=	2,020.7	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,904.0	x 10^6
Cost per KWH	=	$0.080	Per Year
Cost per student	=	$225.90	Per Year

Energy Use Index:
Total Site BTU's/yr = 56,866 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.06 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 9.8

1,000 mcf / square foot = 22.7

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: 548208 (Elec) 5827 (Gas)
(area served by meter)

DISTRICT: WINNSBORO ISD

BUILDING: ROCK GYM

FLOOR AREA: 8,466 square feet

STUDENTS:

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
JAN	2009	2,911	$226	16			79	$1,130
FEB	2009	1,567	$158	16			60	$727
MAR	2009	724	$80	2			30	$372
APR	2009	452	$68				2	$39
MAY	2009	1,280	$113				2	$38
JUN	2009	855	$94	8			2	$41
JUL	2009	5,700	$505	20			2	$39
AUG	2009	8,953	$685	17			2	$39
SEP	2009	6,629	$519	18			2	$32
OCT	2009	3,448	$299	16			2	$31
NOV	2009	2,126	$182	14			3	$38
DEC	2009	1,519	$114	0			55	$493
TOTAL		36,164	$3,044	126			239	$3,020

Annual Total Electricity Cos	=	$3,044	Per Year
Annual Total Energy Cost	=	$6,064	Per Year
Total KWH x 0.003413	=	123.4	x 10^6
Total MCF x 1.03	=	246.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	370.0	x 10^6
Cost per KWH	=	$0.084	Per Year
Cost per student	=	#DIV/0!	Per Year

Energy Use Index:
Total Site BTU's/yr = 43,705 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.72 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 4.3

1,000 mcf / square foot = 28.3

APPENDIX C

Energy Conservation Policy
for
Winnsboro Independent School District

Recognizing our responsibility as Trustees of the Winnsboro Independent School District, we believe that every effort should be made to conserve energy and our natural resources. We also believe that this commitment will be beneficial to our students and taxpayers in prudent financial management and the saving of energy.

The fulfillment of this policy is the joint responsibility of the trustees, administrators, teachers, students and the support personnel. Cooperation shall be experienced on all levels for the success of this policy.

The District will maintain accurate records of energy consumption and cost of energy on a monthly basis. Information will be furnished to the media on the goals and progress of the Energy Conservation Program.

In compliance with Senate Bill 300, as passed by the 81st Texas Legislature, the District sets a goal to reduce its annual electric consumption by five percent. Reporting will be in accordance with House Bill 3693.

An energy audit will be conducted annually at each campus and recommendations will be made for updating the energy program. Energy conservation guidelines and procedures will be reviewed and accepted or rejected by the Board of Trustees.

Adopted this _____day of _____, 2010

President of the Board: _____

ATTEST: _____

APPENDIX D

SENATE BILL 300
Long-Range Energy Plan Section

S.B. No. 300

AN ACT

relating to eliminating or modifying certain mandates on school districts.

SECTION 4. Section 44.902, Education Code, is amended to read as follows:

Sec. 44.902. LONG-RANGE ENERGY PLAN [~~GOAL~~] TO REDUCE CONSUMPTION OF ELECTRIC ENERGY. (a) The board of trustees of a school district shall establish a long-range energy plan [~~goal~~] to reduce the [~~school~~] district's annual electric consumption by five percent beginning with the 2008 [~~each~~] state fiscal year and consume electricity in subsequent fiscal years in accordance with the district's energy plan [~~for six years beginning September 1, 2007~~].

(b) The plan required under Subsection (a) must include:

(1) strategies for achieving energy efficiency that:

(A) result in net savings for the district; or

(B) can be achieved without financial cost to the district; and

(2) for each strategy identified under Subdivision (1),

the initial, short-term capital costs and lifetime costs and savings that may result from implementation of the strategy.

(c) In determining under Subsection (b) whether a strategy may result in financial cost to the district, the board of trustees shall consider the total net costs and savings that may occur over the seven-year period following implementation of the strategy.

(d) The board of trustees may submit the plan required under Subsection (a) to the State Energy Conservation Office for the purposes of determining whether funds available through loan programs administered by the office are available to the district.

SECTION 5. Subsection (b), Section 44.901, Education Code, is repealed.

SECTION 6. This Act applies beginning with the 2009-2010 school year.

SECTION 7. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2009.

Potential Energy Savings

No-cost strategies	Annual savings*
Turn off classroom lights one hour daily	$15-25
De-lamp a vending machine	$120
Use sleep mode for computer and monitor	$35
Turn off classroom air conditioning one hour daily	$30
Turn off outdoor lighting one hour nightly	$100+
Use moderate temperature setpoints	
Cooling – each degree above 72°	1.5% of cooling cost
Heating – each degree below 68°	1% of heating cost

Personal appliances	Annual cost*
Small refrigerator (1.7 cu. ft.)	$25
Heater (1500 watt)	$40

*Based on 180-day school year
$0.12 per kwh

APPENDIX E

STATE ENERGY CONSERVATION OFFICE
SUGGESTED WATER EFFICIENCY GUIDELINES
FOR BUILDINGS AND EQUIPMENT
AT TEXAS STATE FACILITIES

The 77th Legislature directed the State Energy Conservation Office to develop a set of water efficiency standards for state agencies. This document represents SECO's response to that request.

We wish to thank the Texas Water Development Board and the City of Austin Water Conservation Office for their assistance in preparing these guidelines.

The following is a guideline that should be followed for new buildings and facilities and purchase of any new or used equipment by the State. These guidelines would also apply when purchasing new or used equipment to replace existing equipment, or for making major modifications to existing systems or equipment that equals more that half the original purchase price of the equipment. These should also be used as guides for upgrading existing equipment. A system approach should be used when examining water use in this sector. The goal shall be to balance water, wastewater, energy, and related costs to achieve the lowest lifecycle cost when purchasing new equipment or making modifications to existing equipment.

Irrigation Requirements

Automatic irrigation systems should comply with the following guidelines. These guidelines should be noted on a plan drawn by the agency, licensed irrigator or licensed landscape architect.

1. Adjustable flow controls valves on circuit remote control valves. Pressure regulation component(s) shall be required where static pressure exceeds manufacturer's recommended operating range (30-60 psi). This component(s) may be installed at the valve or at the head.

2. Valves and circuits shall be separated based on water use, (hydro-zoned) so that turf and shrub areas, sun and shade areas, as well as high and low runoff areas may be watered separately.

3. The minimum precipitation rate that can be applied by any zone of conventional irrigation should be in accordance with State regulations established by the Texas Natural Resource Conservation Commission. Sprinkler heads shall have matched precipitation rates within each control valve circuit.

4. Serviceable check valves shall be required where elevation differential may cause low head drainage adjacent to paving areas.

5. Sprinkler head spacing shall be designed for head-to-head coverage or heads shall be spaced as per manufacturer's recommendations and adjusted for prevailing winds. The system shall be designed for minimum run-off. There shall be no direct over spray onto impervious areas (i.e. paving and structures).

6. All automatic irrigation systems shall be equipped with a controller capable of dual or multiple programming. Controllers should have multiple cycle start capacity and flexible calendar program, including the capability of day of week or day interval watering. All automatic irrigation systems shall be equipped with a rain sensor shut-off device.

7. Irrigation construction plans shall include a water budget. A water budget should include:

a) Estimated monthly water use (in gallons per application) and the area (in square feet) irrigated.
b) Precipitation rates for each valve circuit.
c) Monthly irrigation schedule for the plant establishment period (first three months) and recommended yearly watering schedule, including seasonal adjustments.
d) Location of emergency irrigation system shut-off valve.

8. All in-ground irrigation systems shall have backflow prevention device installed that meet local code.

9. In addition to local requirements, all irrigation systems must comply with the Texas Natural Resource Conservation Commission rules and regulations.

10. Where available, reclaimed water will be used for all purposes allowed by rules established by the Texas Natural Resource Conservation Commission, if the reclaimed water is less costly than potable water or other water currently being used by the purposes that reclaimed water can be use.

11. Sources of water such as water from foundation and basement sump pump discharges, air conditioner condensate, captured stormwater or rainwater, and other sources should be explored and used as long as local plumbing codes are followed.

Landscape Design Standards (Based on the Landscaping Guidelines adopted by the General Services Commission pursuant to SB 814, 73rd Legislature)

1. Irrigated turf areas and planting beds should be limited to as small an area as possible.

2. Areas that are irrigated shall have at least six inches of a good quality soil in the areas to be watered.

3. Plants having similar water needs shall be grouped together and shall be selected based on use, soil and sun/shade conditions, adaptability to geographic and climatic conditions, and upon ability to survive, once established, on normal rainfall or minimal irrigation.

4. Irrigated turf shall be used sparingly and only in circumstances where other landscaping media will not satisfy the site's needs.

5. Turf and overhead sprinklers should not be placed along curbs and in parkways and planning islands less than 6 feet wide.

6. All new construction projects shall include specifications for soil analysis and amendments, such as compost, in type and quantity necessary to enhance plant growth and maximize water retention. All landscape planting selections must, be appropriate for the soil as analyzed and amended.

7. In planted areas, mulches of two inches or more shall cover most soil surfaces to minimize soil moisture evaporation.

8. Turf shall be limited to 90% of landscaped areas.

9. Turf grass selection shall be determined by facility need and geographic location. Use of different types of turf for distinctive purposes is encouraged. Turf types that can be maintained on natural rainfall is encouraged.

Plumbing Fixtures and Practices

1. All water closets shall comply with state plumbing standards as administered by the Texas Natural Resource Conservation Commission.

2. Faucet aerators in public lavatories and hand washing facilities shall have a flow rate of no more than 1.0 gallons per minute. All other faucet aerators shall comply with state plumbing standards as administered by the Texas Natural Resource Conservation Commission.

3. Faucets in high use restrooms shall be self-closing or shall be equipped with on-off sensors.

4. Showerheads for lockers, dorms, and other non-medical purposes shall use no more than 2.0 gallons per minute. All other showerheads shall comply with state plumbing standards as administered by the Texas Natural Resource Conservation Commission.

5. All water fountains shall be self-closing.

6. All hot water lines shall be insulated.
7. All water pipes subject to freezing shall be insulated.

8. Special plumbing fixtures other that the ones mentioned above should be chosen based on their water and energy efficiency and functionality.

9. All major new buildings, cooling towers, and irrigation systems shall be separately metered and records kept to determine use.

10. Signage requesting that leaks and other plumbing problems be promptly reported shall be placed in each restroom, shower facilities, kitchen, laundry, pool, and other high water use areas. The signage shall also have the phone number where to report such problems.

Heating, Ventilation, & Air Conditioning Equipment

1. Cooling towers and boiler chemical contracts shall specify the cycles of concentration to be achieved. The cycles of concentration should be set to match local water chemistry but shall exceed at least four cycles unless the blowdown from the tower is being beneficially reused for landscape irrigation or other uses.

2. Steam condensate shall be returned to the boiler unless volumes are too low to justify condensate return loops. In the latter case, the condensate shall be reused beneficially wherever possible.

3. Condensate from the air conditioner cooling coils should be captured and used for cooling tower makeup or other purposes where feasible. Building design should be considered that would help facilitate the easy capture of condensate by convent location of air handling units.

4. Cooling tower side stream filtration shall be investigated when new systems are purchased.

Water Treatment Equipment

1. If water softening is used, regeneration shall be controlled by actual hardness or by a flow volume control that is based on the hardness of the water to be softened. Softeners that use timers for recharging are prohibited.

moving down the trough to the disposal or scrap basket is not efficient. A recirculating trough system, with water flow controls can cut water use in half. However, recirculating pre-rinse and scrapping basins are more water efficient than trough systems in general. If possible do not even use a trough.

Steamers

1. Steamers shall be of the self-contained, boilerless type that does not have a direct connection to a water supply.
2. Steamers that are connected directly to a water line, at the best, have a continuous blowdown of a quarter of a gallon per minute, but most continuously dump much more. They are significantly less energy efficient and require soft water with no more that 60 parts per million of total dissolved solids or require that very large volumes of water be continuously passed through to the sewer for water quality control.

Clothes Washing Equipment

1. Commercial clothes washing equipment such as those found in central laundry facilities shall use no more that 1.6 gallons per pound washed.

2. Clothes washers shall have double dump valves and equipment of 150 pounds capacity or greater shall be equipped so that the final rinse water can be returned for use in the first flush wash.

3. Smaller residential type clothes washers intended for personal use by clients or inmates shall have a water use factor of 9.5 gallons per cubic foot of washer volume or less. This is a different standard from the one cited for commercial laundries above. Information for this can be obtained Oregon Residential Tax Rebate Program at the following web site http://www.energy.state.or.us.

Pumps

Water pumps shall have mechanical seals unless prohibited by code.

Metering

1. All buildings intended for daily occupation or for water using equipment operation shall be metered separately and records of its water use maintained by that agency.

2. If any one, single activity or piece of equipment at a facility accounts for more that 20% of the total water use at that facility, it shall be metered separately and records of its water use maintained by that agency.

3. Any water use that does not create waste water should be metered separately to better align waste water costs with actual usage.

Vehicle Washing

1. New softeners installed at carwash facilities shall not use timers to determine when to recharge. Recharge cycles shall be controlled by instruments that measure volume of water treated or the actual quality of the water being softened

2. Reverse osmosis or nano-filtration reject water shall be reused beneficially for vehicle washing.

3. Chamois wringer shall have self-closing valves on their faucets

In-bay: Hand held spray wash equipment including spray wands and foaming brushes shall use no more that 3.0 gallons of water per minute and shall be equipped with trigger shutoffs. The shutoffs shall have weep holes or other devices to allow for drainage and pressure surges. All pressure wash equipment shall be equipped with unloader valves.

Conveyor, drive-through, and rollover type car washes: Equipment for automobiles and small truck and vans shall use no more than 15 gallons per vehicle. Washes designed specifically for buses and tractor-trailer rigs shall use no more than 40 gallons per vehicle washed. All such equipment shall be equipped with re-circulation or reuse equipment.

Bench Mark Indices[1]

For Texas, the amount of outdoor water will vary with location ranging from 20 inches per year in Far East Texas to 48 inches a year in Far West Texas. For the San Antonio to Dallas line, the demand is about 36 inches per year or about 22 gallons per square foot of use. Many state facilities do not water the whole campus and when they do, they use under that amount. Most schools do not irrigate in Texas. For your use, the conversion from inches to gallons per square foot is 0.623 gallons of water per inch per square foot. In other words, if a campus irrigates 10,000 square feet at a rate of 40 inches a year, they will use {10,000 X 40 X 0.623 = } 249,200 gallons a year.

As for the numbers above, they represent the low end from an American Water Works Association study completed in 2000. The range of use we see in public facilities can be significantly higher. For example, in a study of over 300 schools in Texas, the water use ranged from two gallons per student per day to over 130 gallons per student per day. The high number was from a school that has now made **MAJOR** repairs to a basket case of a plumbing system. High schools should be at the high end of the table above, while most elementary schools can use under 10 gallons per student per day.

Office Buildings

End Use/Benchmark Measure	N***	Efficiency Benchmark Range*
INDOOR USE		
Gal./sf/year	62	9 - 15
Gal./employee/day	72	9 - 16
COOLING USE**		
Gal./sf/year	49	8.5 - 22
IRRIGATION USE**		
Inches per year	47	26 - 50
TOTAL WATER USE**		
Gal./sf/year	62	26 - 35

* Developed from combined methods (field studies, audit data, and modeling results).
** Appropriate benchmarks will depend upon local climate.
***Sample size.

[1] Information provided by Bill Hoffman, City of Austin, Water Conservation Department (2001).

Schools

End Use/Benchmark Measure	N***	Efficiency Benchmark Range*
INDOOR USE		
Gal./ sf /year	142	8 - 16
Gal./school day/student	141	3 - 15
COOLING USE**		
Gal./ sf /year	35	8 - 20
IRRIGATION USE**		
Inches per year	132	22 - 50
TOTAL WATER USE**		
Gal./ sf /year	142	40 - 93

* Developed from combined methods (field studies, audit data, and modeling results).
** Appropriate benchmarks will depend upon local climate.
*** Sample size.

Bench mark indices continued

Food Service

End Use/Benchmark Measure	N***	Efficiency Benchmark Range*
INDOOR USE		
Gal./sf/year	142	8 - 16
Gal./school day/student	141	3 - 15
COOLING USE**		
Gal./sf/year	35	8 - 20
IRRIGATION USE**		
Inches per year	132	22 - 50
TOTAL WATER USE**		
Gal./sf/year	142	40 - 93

* Developed from combined methods (field studies, audit data, and modeling results).
** Appropriate benchmarks will depend upon local climate.
***Sample size.