December 13, 2010

SUMMARY
ENERGY EFFICIENT
TECHNICAL ASSISTANCE REPORT
GRAND PRAIRIE ISD
GRAND PRAIRIE, TEXAS

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1.0 EXECUTIVE SUMMARY

This technical assistance report 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 2.0 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 Technical Assistance Report addresses the following specific requirements for six campuses:

- Lighting Systems and Projects (Section 5.0)
- Power Factor Correction (Section 6.0)
- Renewable Energy (Section 7.0)
- Rainwater Harvesting (Section 8.0)

The Technical Assistance report addresses the following six campuses that were selected by the District and approved by SECO.

- Marshall Elementary School
- Arnold Middle School
- Grand Prairie High School
- Grand Prairie High School – 9th Grade
- South Grand Prairie High School
- South Grand Prairie High School – 9th Grade

David Fisher, P.E. visited the District and met with Mr. Jerry Palermo, Energy Manager. David Fisher, P.E. conducted on-site observations and evaluations for this technical assistance report. Your personal contact at SECO is Ms. Juline Ferris (Phone: (512) 936-9283); your contacts at Estes, McClure & Associates, Inc. are David Fisher, 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.

Grand Prairie is the 7th largest city in the Dallas-Fort Worth Metroplex and the 17th largest city in the state of Texas. Grand Prairie is located between Dallas and Fort Worth in the far western part of Dallas

County. Enrollment has increased about 35% during the last 10 years, and the district has responded by opening new campuses and renovating others. At other campuses, energy efficient equipment retrofits have been done. The district has had an energy conservation and management program for quite a few years.

The following are examples of strategies and projects GPISD has implemented to improve efficiency, environment (indoor and outdoor), learning environment, and maintenance.

- Full-time Energy Manager
- Energy monitoring and tracking system
- Include energy efficiency in new construction and renovation
- Energy manager conducts audits at various times
- New schools incorporate high efficiency lighting, HVAC, and other systems
- Several retrofit projects have been accomplished to convert gym lighting to higher efficiency high bay fluorescent lighting withT-5 HO lamps
- Installation of occupancy sensors to control lighting in some areas
- Outdoor lighting controls

Energy Star

According to information from the district, Grand Prairie ISD has been awarded the Energy Star at 38 of their campuses.

Review of the energy cost index (ECI) and energy use index (EUI) for the period from September 2009 through August 2010 (see Section 2.0 table) indicates the district is very energy efficient.

The data EMA has for 2008-2010 for schools in North and East Texas shows an average EUI of 49,962 Btu/ft^2/yr. for elementary schools and 63,729 Btu/ft^2/yr. for secondary schools. The lower the EUI value, the more energy efficient the school is considered to be. Virtually all GPISD schools are below the regional averages.

The following is a brief summary of specific technical assistance requested by the district and approved by SECO.

Lighting Systems (Section 5.0)

- Lighting retrofit projects for gymnasiums
- Occupancy sensors for lighting control in corridors
- Utilizing daylight harvesting in corridors
- Use of fluorescent (T-5 HO) or LED fixtures in parking lots

Power Factor Correction (Section 6.0)

- Analyzes power factor at four district high schools

Renewable Energy (Section 7.0)

- Provides information on the suitability of renewable energy for school applications in GPISD.
- GPISD is located in a region where widespread use of wind turbines will not have good potential. A small demonstration unit may be useful for demonstration purposes.
- Solar photovoltics (PV) is the most suitable application of renewable energy for GPISD. Prohibitive system costs and long paybacks make purchasing retail electricity more attractive in today's market.

- Demonstration projects at selected campuses are recommended for educational purposes. There are some grants and rebates available (see Section z). For any future LEED certified or other green building type initiatives, larger scale PV would be the best renewable option.
- GPISD has natural gas available for water heating. Solar water heating typically is more competitive and suitable in today's market for applications where electricity is used for heating large quantities of water.

Rainwater Harvesting (Section 8.0)

- Rainwater harvesting can provide water for irrigation and flushing of toilets. Systems for irrigation may be added to existing facilities or incorporated into new construction. Systems to flush toilets can only be feasibly accomplished in new construction. Local requirements for rainwater harvesting systems should be verified with local code officials.

The following is a summary of the energy savings projects in this report.

	Est. Cost	Est. Annual Energy Savings (kwh)	Est. Annual Savings	Simple Payback (Yrs)
Lighting Systems & Projects	$189,900	209,607	$23,063	8.2
Power Factor Correction	$162,500	n/a	$38,451	4.2

Appreciation

EMA appreciates the opportunity to provide the information in this report. Our intent is to be helpful and responsive to questions that were asked. SECO is commended for sponsoring this assistance program for GPISD and other school districts.

Please call to discuss or ask questions. Thank you.

2.0 DISTRICT ENERGY AND COST PERFORMANCE

Grand Prairie ISD has 39 campuses. The student enrollment according to the Texas Education Agency, was 26,395 for the 2009-2010 school year.

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.

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

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

Energy Cost & Performance: 9/2009 – 8/2010

Schools	ECI	EUI	KWH per Sq. Ft.	1000 Mcf per Sq. Ft.	Area (sq. Ft.)	Total Energy Cost
Austin Elementary School	$0.84	39,244	6.9	15.3	63,966	$53,577
Bonham Elementary School	$0.77	34,585	6.1	13.2	68,082	$52,369
Bowie Elementary School	$1.13	50,535	9.0	19.1	50,191	$56,885
Bush Elementary School	$1.15	44,755	10.4	9.0	66,574	$76,839
Daniels Elementary School	$0.90	27,920	7.2	3.2	85,420	$77,023
Dickinson Elementary School	$0.86	30,509	7.8	3.7	62,206	$53,708
Eisenhower Elementary School	$0.98	44,264	8.0	16.5	77,793	$76,227
Garcia Elementary School	$1.08	47,348	9.1	16.0	68,185	$73,669
Garner Elementary School	$0.76	27,942	6.9	4.3	60,963	$46,493
Hill Elementary School	$0.99	32,343	8.2	4.3	63,728	$63,198
Johnson Elementary School	$1.00	41,071	8.3	12.5	57,780	$57,690
Marshall Elementary School	$0.86	28,657	7.1	4.4	73,525	$63,027

Milam Elementary School	$0.85	38,118	7.7	11.5	62,245	$53,042
Moore Elementary School	$1.21	42,475	10.0	8.3	56,485	$68,363
Moseley Elementary School	$0.90	31,914	7.2	7.2	77,980	$70,181
Powell Elementary School	$1.10	47,404	9.2	15.6	65,710	$72,608
Rayburn Elementary School	$0.78	30,629	6.5	8.1	84,650	$65,916
Seguin Elementary School	$0.84	27,624	6.8	4.4	73,503	$61,611
Travis Elementary School	$0.51	28,967	3.4	16.8	112,121	$57,536
Whitt Elementary School	$0.94	31,810	7.7	5.3	72,872	$68,217
Williams Elementary School	$0.73	24,948	6.5	2.6	75,830	$55,449
Zavala Elementary School	$0.88	36,202	7.8	9.2	53,450	$47,092
Crockett 5th Grade center	$0.93	31,215	7.7	4.6	72,231	$67,519
Adams Middle School	$1.13	45,198	9.0	14.1	99,388	$111,853
Arnold Middle School	$0.81	29,217	6.6	6.6	143,962	$116,592
Fannin Middle School	$1.30	52,389	12.5	9.5	53,906	$69,941
Jackson Middle School	$0.88	30,485	7.3	5.3	137,690	$121,448
Kennedy Middle School	$0.93	39,815	8.9	9.3	121,770	$113,359
Reagan Middle School	$0.88	31,327	7.5	5.4	138,925	$121,805
Truman Middle School	$0.90	33,554	7.4	8.2	115,364	$103,884
Crosswinds High School	$1.06	49,530	10.0	14.9	46,795	$49,664
Dubiski High School	$0.95	33,184	9.0	2.3	247,880	$236,265
Grand Prairie High School – 9th	$0.75	23,874	6.3	2.4	157,046	$117,259
Grand Prairie High School	$1.02	40,353	8.8	9.9	484,397	$492,594
S. Grand Prairie High School – 9th	$1.01	39,272	8.3	10.6	124,834	$126,315
S. Grand Prairie High School	$0.82	32,157	6.7	8.9	516,667	$421,951

Review of the Energy Use Index (EUI) data in the table above indicates that GPISD is energy efficient. The data EMA has for 2008-2010 for schools in North and East Texas shows an average EUI of 49,962 Btu/ft^2/yr. for elementary schools and 63,729 Btu/ft^2/yr. for secondary schools. The lower the EUI value, the more energy efficient the school is considered to be. Virtually all GPISD schools are below the regional averages.

3.0 ENERGY ACCOUNTING

3.1 Monitoring and Tracking

GPISD uses the EnergyCAP program for energy monitoring and tracking.

3.2 Utility Providers and Rates

The District's retail electric provider is GDF Suez (deregulated). Oncor is the regulated transmission and distribution company. Natural gas is provided by Atmos Energy Company.

4.0 RECOMMENDED M&O PROCEDURES

Many of these recommendations have already been implemented by the district.

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 (e.g. 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.

   The following observations were made during walk-throughs:

   Arnold MS – Half of the light fixtures in unoccupied gyms were turned off
   S. Grand Prairie High School – Lighting was at a minimum in the unoccupied coliseum gym

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

   The following observations were made during walk-throughs:

   Arnold MS – Half of the fixtures in corridors with available daylighting were turned off.
   S. Grand Prairie High School-9th Grade – Some lights in gold gym were off, utilizing available daylighting

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 Districts. 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 (e.g. 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	$ 24
Personal space heater	$ 20+
Coffee maker, left on all day	$ 15
Microwave oven	$ 2
Computer	
On 24 hours/day	$ 50
Using sleep mode after hours	$ 20

*Based on 180 day school year, $0.12 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

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

5.0 LIGHTING SYSTEMS & PROJECTS

The following lighting retrofit opportunities are for some or all of the six schools that were audited. Some recommendations may also be applied to other facilities in the District.

Replace Gym Lighting

In all gyms where not already accomplished, the District should consider replacing the existing metal halide fixtures with energy-saving high bay fluorescent fixtures utilizing T-5 HO lamps. An existing 400-watt metal halide fixture consumes 458 watts as compared to the 6-lamp T-5 HO fixture which consumes approximately 351 watts (and produces comparable light output). The 4-lamp T-5 HO fixture uses approximately 234 watts. Additional savings may be realized because the fixtures are instant on/off requiring no warm up time and, therefore, are more likely to be turned off when not in use. The addition of occupancy sensors may also enhance energy savings.

At South Grand Prairie High School in the Coliseum gym, there is incandescent lighting which is reported to be house lighting for the stage and on a dimming system. Energy savings could be realized by replacing the existing 300-watt and 150-watt fixtures with compact fluorescent fixtures with dimming ballasts. Additionally, the dimming system would also need to be replaced to accommodate the fluorescent lighting. The costs to accomplish this and potential savings are beyond the scope of this report.

Gym Lighting Retrofits

	School	Est. Cost	Est. Annual Energy Savings (kwh)	Est. Annual Savings	Simple Payback (Yrs.)
b	Marshall Elementary School	$6,000	8,811	$1,031	5.8
c	Arnold Middle School (competition gym & auxiliary gym)	$41,600	52,120	$6,046	6.9
a,d	Grand Prairie High School (boys gym & Turner gym)	$35,200	36,330	$3,887	9.1
a	Grand Prairie High School – 9th grade (blue gym & white gym)	$32,400	32,470	$3,767	8.6
a,e	S. Prairie High School (JV gym & coliseum gym)	$18,200	17,210	$1,927	9.4
a	S. Grand Prairie High School – 9th grade (red gym & gold gym)	$26,000	26,100	$2,950	8.8

a) 6-lamp T-5 HO fixtures
b) 4-Lamp T-5 HO fixtures
c) 6-lamp T-5 HO fixtures over floor with 4-Lamp T-5 HO fixtures over stands
d) Includes removal of quartz fixtures in Turner gym
e) Additional savings may be realized by replacing incandescent flood lamps with compact fluorescent lamps (Not included in this table. See narrative above.)

Replace Metal Halide Lighting in Corridors

Lighting in the main corridor near the entrance at Arnold Middle School is metal halide. Existing fixtures use 250-watt lamps, which consume 295 watts each and produce about 12,000 initial lumens. These fixtures could be replaced with a decorative-type fixture utilizing two (2) T-5 HO lamps, producing about 10,000 lumens. Additional savings may be realized because the fixtures are instant on/off requiring no warm up time and, therefore, are more likely to be turned off when not in use. The addition of occupancy sensors may also enhance energy savings.

Metal Halide Lighting (Corridors) Retrofit

	Campus	Est. Cost	Est. Annual Energy Savings (kwh)	Est. Annual Savings	Simple Payback (Yrs)
	Arnold Middle School	$8,000	5,880	$682	11.8

Install Occupancy Sensors in Corridors and Cafeteria

Occupancy sensors turn lights off in spaces after a preset time when no people are detected. They can be utilized in all spaces – classrooms, halls, offices, meeting rooms, etc. a variety of studies indicate that lighting energy savings of 20 percent or more may be realized from utilizing occupancy sensors.

At Marshall Elementary School, every other corridor light is already on a separate circuit. Occupancy sensors can be added to one circuit, which will control one-half of the lights. At Grand Prairie High School, existing circuits will need to be re-wired to divide to corridor lights into two circuits. Additional switching may also need to be added. Occupancy sensors can then be added to control one circuit.

Occupancy Sensors Retrofit – Lighting Control

	Campus	Est. Cost	Est. Annual Energy Savings (Kwh)	Est. Annual Savings	Simple Payback (Yrs)
	Marshall Elementary School corridors	$3,600	2,079	$243	14.8
	Marshall Elementary School cafeteria	$800	2,625	$307	2.6
a	Grand Prairie High School corridors	$20,000	5,376	$575	34.7
a) Cost includes re-wiring of existing circuits					

Daylight Harvesting

There is potential savings from daylight controls at Arnold Middle School. In both the main corridor and the 200 wing corridor windows near the ceiling let daylighting into these corridors. Daylighting controls would turn lights off when light levels reach a preset level where supplemental lighting is not needed.

Daylight Harvesting Retrofit – Lighting Control

	Campus	Est. Cost	Est. Annual Energy Savings (kwh)	Est. Annual Savings	Simple Payback (Yrs)
	Arnold Middle School	$900	20,606	$1,648	0.5

Replace Metal Halide Lighting in Parking Lot

LEDs are semiconductors that convert electricity into light. At one time they were used only as indicator lights on electronic devices. LEDs are now being developed for use in downlights, troffers, and outdoor area lighting. One day they may replace most or all of the conventional light sources we currently use.

LEDs require a special power source commonly called a driver, which is similar to a fluorescent ballast. They can be produced in a variety of color temperatures, from warm to cool, just like other lamp types.

The Department of Energy's (DOE) long-term goals call for luminous efficacies of 160 lumens per watt (lpw) for LEDs. Efficacies of more than 100 lpw have been achieved under laboratory conditions. In the latest round of testing by the DOE, market available LED products exhibited a wide range of efficacies from 17 to 79 lpw, with an average of 46 lpw. For comparison, compact fluorescent and T-8 fluorescent fixture efficacies are about 65 and 90 lpw, respectively.

Costs of fixtures utilizing LED lamps are considerably higher than similar fixtures with fluorescent or HID lamps, and their light output is considerably lower. Therefore, more LED fixtures would be required to attain the same light levels.

LED light fixtures are available that are intended to replace parking lot lights. Typically, most parking lot light fixtures incorporate 400-watt metal halide lamps. These produce about 36,000 to 40,000 initial lumens. Currently, LED fixtures available in various sizes that use less than 100 to more than 400 watts and produce from 5,000 up to 28,000 initial lumens The LED fixtures cost substantially more than their counterpart metal halide fixtures.

The District requested analysis of replacing existing 400W metal halide fixtures in parking lots at various school facilities. Analysis of both fixtures utilizing T-5 HO lamps and LEDs was requested. As in the gyms, a 400W metal halide fixture consumes about 458 watts and a 6-lamp T-5 HO fixture consumes 351 watts and produces approximately the same light levels due to fixture optics. For comparison purposes an LED fixture using 440 watts and producing 28,000 lumens was used.

Information received from a lighting representative indicates that parking lot lighting utilizing fluorescent tube lamps is rarely used. To their knowledge none of the major lighting manufacturers produce this type of fixture. Also, the size of the fixtures and its surface area makes it susceptible to high winds and its use may necessitate changing out existing poles to accommodate these fixtures.

LED lighting is making progress toward producing light output equivalent to existing metal halide fixtures. However, first costs are still high relative to metal halide lighting. Therefore, we recommend monitoring the progress of LED lighting until it becomes more competitive with metal halide sources.

At Arnold Middle School there is a total of 17 400-watt metal halide fixtures. The following table summarizes parking lot lighting options at Arnold Middle School.

Parking Lot Lighting Retrofit

	Fixture	Est. Replacement Cost	Initial Lumens (each fixture)	Wattage (each fixture)	Est. Annual Energy Use (kwh)	Est. Annual Energy Cost
	400-watt metal halide	Existing	40,000	458	28,424	$2,985
a	Fluorescent with 6 T-5 HO lamps	-	30,000	351	21,777	$2,278
	LED fixture	$40,800	28,000	440	27,302	$2,873

a) No cost data was obtained for this type fixture
Estimated energy use based on an average 10 hours/day and 365 days/year. Est. cost based on $0.105/kwh

Note: The figures in this table are not included in the cost summary for lighting projects.

Summary Lighting Projects

	Campus	Est. Cost	Est. Annual Energy Savings (kwh)	Est. Annual Savings
	Marshall Elementary School	$10,400	13,515	$1,581
	Arnold Middle School	$50,500	78,606	$8,376
	Grand Prairie High School	$52,400	41,706	$4,462
	Grand Prairie High School – 9th Grade	$32,400	32,470	$3,767
	S. Grand Prairie High School	$18,200	17,210	$1,927
	S. Grand Prairie High School – 9th Gr.	$26,000	26,100	$2,950
	Total	$189,900	209,607	$23,063

The overall payback for the above is 8.2 years.

6.0 POWER FACTOR CORRECTION

Power factor is a measure of how efficiently electrical equipment uses the electricity supplied to it. Many devices consume electrical power that cannot be converted to useful work (lighting a bulb or turning a motor for example). However, electric circuits must still have the capacity to carry this "additional" power. The more facilities require, the larger utility transformers and wires must be. Higher power factors allow utility systems to carry more power, therefore, many utility companies (such as Oncor) bill larger customers for low power factor. Capacitors reduce the amount of "additional" power that equipment consumes and increases the power factor. Contributors to low power factor are generally motors and magnetic ballasts. Retrofitting these components with high power factor models can raise a facility's overall power factor. Where retrofits are impractical or have already been completed, installing capacitors will be necessary to improve the power factor.

For each meter with power factor penalty charges, peak demand (kw) and power factor was taken from bills obtained from Reliant Energy for a 12-month period. Billing demand (the higher of the actual kW for the current billing month or 80% of the highest monthly kW established in the 11 months preceding the current billing month), adjusted billing demand (billing demand (kw) x 0.95 / power factor), and the amount of the power factor penalty charges were estimated from this billing data. Oncor imposes a penalty for any billing month where the power factor is below 0.95 at the time of the monthly peak.

Demand (kw), TDSP changes, and power factor were taken from data provided by Jerry Palermo, Energy Manager. The amount of the power factor surcharges were estimated from this billing data. Oncor imposes a penalty/surcharge for any billing month where the power factor is below 0.95 at the time of the monthly peak.

Power factor analysis was done for the following locations for a 12 month period:

Grand Prairie High School	ESID 4015975, 4016006
Grand Prairie High School – 9th Grade	ESID 6342927
South Grand Prairie High School	ESID 4017215
South Grand Prairie High School – 9th Grade	ESID 4017246

The amount of correction, in kilovars (kvar), needed to bring the power factor to a minimum of 0.95 was then calculated in order to size power factor correction capacitors. An estimated cost was also determined.

A capacitor installation consists of the capacitors plus controls to measure the actual power factor and adjust the amount of correction as required. Since the capacitors will be used to improve the entire facility's power factor, the units should be installed near the main electrical service entrance. This location would ideally be in the main electrical room if space is available. If any equipment in the school has variable speed drives, special engineering studies may be necessary to determine the proper method of installation.

The billing data obtained reflects current conditions. Additions or changes in major equipment or significant changes in building electrical use could change power factor correction requirements.

Recommend evaluating all campuses for need/benefits. Typically larger facilities are more likely to benefit.

POWER FACTOR CORRECTION SUMMARY (Units sized for month requiring maximum correction)							
Facility	ESID	Month	P.F.	Annual Penalty (Est.)	Capacitor Unit Size (Est.)*	Cost (Est.)**	Payback, years (Est.)
Grand Prairie High School	4015975	July 2010	0.839	$7,783	300	$30,000	3.9
Grand Prairie High School	4016006	July 2010	0.900	$436	100	$7,500	17.2
Grand Prairie High School – 9th Grade	6342927	Aug 2010	0.798	$8,300	300	$30,000	3.6
South Grand Prairie High School	4017215	Aug 2010	0.821	$12,014	600	$60,000	5.0
South Grand Prairie High School – 9th	4017246	July 2010	0.762	$9,918	350	$35,000	3.5

* Next standard size larger than calculated required capacitance. Sizes selected to minimize, not necessarily eliminate, power factor surcharges.

** Cost includes capacitor unit and standard installation only. Special circumstances at a location may increase cost.

7.0 RENEWABLE ENERGY

Solar Hot Water

Solar hot water (solar water heating) involves heating water through the use of solar energy. Systems typically consist of solar collectors, a storage tank, pump, controller, and interconnecting piping. Solar water heating can be used to supply some or all of a facility's hot water needs. The application tends to be most economical where large quantities of hot water are needed, but can be used wherever hot water is required.

Flat plate solar collector installation

The most common types of solar collectors are flat plate and evacuated tube. A flat plate collector consists of a network of pipes passing through a glass-covered box. The surface behind the pipes is painted black to absorb more heat energy from the sun. This heat is transferred to the pipes within the collector. With evacuated tube types, a glass tube surrounds each individual pipe in a vacuum. The vacuum nearly eliminates the influence of the ambient air temperature. Evacuated tubes perform better than flat plate collectors in cloudy weather and can achieve higher temperatures. They are also more expensive. Solar collectors are usually mounted on the roof. An unshaded, south facing roof is optimal.

Most commercial systems are closed loop systems. This means that the domestic water does not actually pass through the solar collectors. Instead, a heat transfer fluid, generally a glycol solution, is circulated through the collectors where it picks up heat. The heated solution the goes through a heat exchanger where it transfers heat to the water. The cooled solution then circulates back to the collectors where it picks up more heat, and the process is repeated.

A system controller starts and stops the pump that circulates the heat transfer fluid. Sensors measure temperature readings in the storage tank and collectors and cause the pump to be switched on and off as needed.

System first costs are approximately $100 to $125 per square foot of collector area, which is based on the system hot water demand. Costs can vary depending on the system type selected. Where existing water heating by natural gas fired heaters, paybacks can be long. However, if replacing or supplementing electric water heating, payback periods can be shortened.

For an elementary school, the average daily hot water consumption is 0.6 gal/student/day (ASHRAE). Therefore, a typical GPISD elementary school with 500 students would use 300 gallons/day of hot water. This would require a solar hot water installation of approximately 224 ft^2 (using flat plate collectors). The following table shows the estimated costs of a solar hot water system for this case.

Est. system cost	Amt. of natural gas replaced annually (mcf)	Cost of natural gas (@ $7/mcf)
$22,400	35	$245

These figures are not included in the projects cost summary.

Solar Power/Photovoltaics

Photovoltaics (PV), is the direct conversion of sunlight into electricity. Sunlight striking the solar cells activates them to produce electric current.

A PV system consists of hundreds or even thousands of solar cells. An outer glass cover protects each cell. Individual cells vary in size from about ½" to 4" across. Cells are arranged in rows into modules. An assembly of modules is called an array. The quantity of arrays needed is dependent on the power requirements of the application. In general, on the order of 100 square feet of area is needed per kilowatt (kw) of capacity. For reference, an installation large enough to provide all the power needed for a typical elementary school at peak would be about the size of a football field.

In addition to arrays of cell modules, an installation includes other components such as inverters (to convert the dc power generated by the cells to ac power), controls, wiring, etc.

Photovoltaic systems may be stand-alone or hybrid. In the stand-alone mode, the PV system provides all the electrical needs of the facility it serves. A hybrid system is combined with another power source, usually the electric utility. The utility provides power beyond what the PV system is able to supply. The electric utility will require that the PV system meet certain standards before allowing it to connect to their system. In some cases, the electric utility may purchase excess power produced by the PV system when the school does not need it (e.g. nights and weekends).

High initial costs and large physical size of installations generally make photovoltaics unsuitable for supplying all power needs to schools. However, the technology could be useful for providing some fraction of energy needs or to small remote users such as entrance signs, etc. A smaller demonstration project for students to see this technology in action might also be practical.

The following table shows the potential power that may be generated from a PV array in the north Texas area, as well as estimated costs.

kw	Area (ft^2)	Est. annual energy production (kwh)	Est. system cost
1	125	1,300	$8,000
10	1,250	13,000	$70,000
25	3,125	33,000	$150,000
50	6,250	66,000	$300,000
100	12,500	132,000	$600,000

PV systems that generate large amounts of energy represent big initial investments and can take up large amounts of space. However, demonstration or smaller projects may be feasible. For additions or future schools, the district might consider incorporating PV into structures such as canopies or covered walkways. For smaller projects funding assistance or rebates may be available from Oncor. Additionally, the district should monitor the availability of funds from the State Energy Conservation Office.

Wind Power

Wind power turns the wind's energy into electrical energy that can be put to practical use. This is done thorough wind turbines, which closely resemble the windmills of yesteryear. Wind turbines can be used to supply power in a wide range of applications, from small users in rural areas to large-scale utility company wind farms.

A wind turbine typically consists of a rotor with blades that turn a generator at the top of a tower. The tower is typically some 80 to 120 feet tall, depending on the size of the generator and prevailing wind conditions. Towers are tall to take advantage of the fact that wind speed generally increases with height. Also, a tall tower decreases interference that might be created by obstacles such as hills, buildings, and trees nearby.

When the wind exceeds the minimum required speed for rotation, the rotor begins to turn. The rotor is connected to an electric generator through a shaft and gearbox. As long as the generator is kept turning, it creates electricity.

To be effective, wind turbines must be used in locations with adequate average wind speeds. Areas of west Texas, the Panhandle, and High Plains are considered good, while central and east Texas are generally marginal to poor. Although wind power can be utilized anywhere, lower wind speeds reduces the potential energy production.

Installations may be stand-alone or connected to the utility grid. The electric utility will require that the system meet certain standards before allowing it to connect to their system. In some cases, the electric utility may purchase excess power produced by the system when the school does not need it (e.g. nights and weekends).

Wind power systems cost approximately $3,000 to $5,000 per kw. They do require some annual maintenance.

The map below illustrates wind power potential for the state of Texas. Areas that are classified as class 3 or better (green yellow, red, or orange) are considered to have good potential for widespread use of wind turbines. Grand Prairie ISD falls in the class 2 (dark blue) area; therefore, the extensive use of wind power is not recommended. However, smaller installations for demonstration purposes may be appropriate.

Summary

The following is a summary of renewable energy potential, costs, and benefits:

- Renewable energy installations could be used to promote community awareness and student learning.
- Renewable energy can offset some purchased energy (electricity and natural gas) requirement.
- Economic paybacks can be long, and in some cases exceed the expected life of the equipment.
- The District should contact local utility companies for any rebates and incentives that may be available and be on the lookout for any stimulus program grants that may be offered.
- Benefits will be maximized if grants and rebates are obtained.
- Solar photovoltaics (PV) is the most suitable renewable energy application for GPISD. Systems costs are high and paybacks are long in today's market compared to purchasing retail electricity. For any future LEED certified or other green building type approaches, PV would be the best renewable type option.
- Review codes and ordinances for any restrictions on renewable energy installations, such as screening, etc.

8.0 RAINWATER HARVESTING

Rainwater can be harvested from the roof of a building. This water can then be channeled into storage tanks to use for flushing toilets and urinals and irrigating lawn areas. The rainwater collection and utilization system includes gutters to direct the water to storage tanks, storage tanks to collect the rainwater, and pumps to distribute the water.

There are several components needed to harvest the rainwater. They are as follows.
1. Collection
2. Roof Wash
3. Grey Water
4. Irrigation

All of the above components must be integrated together to achieve a complete rainwater harvesting system.

A grey water system is designed to supply rainwater to the toilets and urinals for flushing. A skid-mounted package pump system with a pneumatic tank would have been used to pressurize the system to meet the minimum flushing pressure requirements. The air chamber created by the bladder allows the air inside to compress, thereby pressurizing the system.

A rainwater collection system for irrigation could be included in the construction of a new school or added to an existing school. The addition of a greywater system for flushing toilets and urinals would not be feasible at an existing school.

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.

The amount of water that can be caught annually can be approximated by the formula:

$$\text{Gallons} = \frac{\text{roof area } (ft^2) \times \text{annual rainfall (inches)} \times 600}{1000}$$

Average annual precipitation in the Dallas/Fort Worth area is approximately 35 inches. Therefore, about 21 gallons of water per square foot of roof area could be captured annually.

Some cities have specific requirements regarding rainwater harvesting systems. Therefore, the District should check with the City of Grand Prairie before beginning a rainwater collection project.

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

Background

The 2009 Texas Legislature passed SB 300 that accomplished the following;

- Requires a school board approved long range plan to reduce annual electric consumption by 5%.
- Repeals requirements to reduce electric consumption by 5% each year for 6 years.
- Left reporting and posting of energy requirements intact (HB 3693 from 2007 session).

SB 300 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 with financial cost to the district. For each strategy in the plan include short term capital cost and lifetime cost 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 SB 300
- Document 2008 state fiscal year electricity and natural gas consumption
- Determine if district is complying with prior requirement left intact by SB 300 (i.e. HB 3693) 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 district
- Perform energy audits of existing facilities
- Develop strategies for reducing energy consumption that had no first cost
- Prioritize strategies
- Document plan in accordance with SB 300

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. Consult with district financial consultant and attorney. 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. 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 requirements 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 Juline Ferris at 512/936-9283 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 are competitive. Rates depend on 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 512/467-3695 or contact Texas Association School Boards.

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.

Rebates

Many electrical transmission and distribution companies offer rebates for energy projects that reduce the peak electrical demand (kw). Contact the provider in your area for detail. For example Oncor offers energy efficiency rebates for various projects such as upgraded new energy efficient air-conditioning, lighting, and others. The availability of rebates, the amounts, and eligibility requirements vary. Contact the provider before beginning a project as most times they require prior approval and documentation of existing conditions or items to be upgraded.

Grants

There are numerous sources of grants and their requirements, availability, and eligibility vary at times. Examples of some opportunities to monitor included the following:

- State Energy Conservation Office (SECO) monitor SECO's website and the Electronic State Business Daily
- Oncor school matching grant (www.takealoadofftexas.com)

- Oncor Solar PV Program (www.txreincentives.com/opv/)
- Discretionary and other grants offered by the federal government may be searched at www.grants.gov
- Foundations
- Public Independent School District Energy Efficiency Grants. Monitor SECO (www.seco.cpa.state.tx.us) and the Electronic State Business Daily
- Renewable energy technology grants (SECO).
- Alternative fuel and hybrid vehicle grant program (SECO).

Stimulus

The American Recovery and Reinvestment Act (ARRH), provides stimulus funding in various methods and for different energy projects. The Texas Comptroller of Public Accounts provides convenient Stimulus Tracking Reports (www.tx.comptroller@service.govdelivery.com) For energy project announcements refer to SECO website.

Qualified School Construction Bonds (QSCB's) and Build America Bonds (BAB)

QSCB and BAB bonds are debt financing tools that came out of the federal AARA stimulus. Recent legislation revised the process of QSCB's and BAB. The Hiring Incentives to Restore Employment (HIRE) Act is supposed to simplify the process and result in reduced interest cost to the district. The bonds are taxable to the purchaser and they receive the interest (currently about 5.76 percent).

The federal government pays the district the "lesser of" the taxable issuance rate or the current tax credit rate as of sale date. The district under current conditions pays near zero interest. Depending on use of the QSCB, districts can potentially use with maintenance tax note.

For BAB this is a 30 year taxable bond and the district receives a federal subsidy.

The conditions and suitability of the above bonds are subject to change. Consult with the district's financial consultant with these and all other financial methods, instruments, and options.

Bonds

Traditional school bonds are approved by the voters. These bonds are tax-exempt. Typically these bonds are used for new construction, major renovations, and infrastructure upgrades. Consult district financial planner.

Department of Energy Resource

Refer to DOE's Guide to Financing Energy Smart Schools. See www.eere.energy.gov

11.0 PROCUREMENT METHODS

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

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 may result in significant dollar savings if integrated into facility improvements that are being planned. The benefits of this approach are in part dependent on market conditions such as stability of pricing, forecasting, and availability of commodities, equipment and labor. 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

Performance contracting is a procurement method of that guarantees performance of selected energy conservation measures. An agreement between the company and the school district is executed. The intent is to structure the agreement where the energy savings will meet the district's debt obligations of the contract.

APPENDICES

APPENDIX A

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 Estes McClure Associates 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 no previous PEA

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

Signature: [signature] Date: 10/21/10

Name (Mr./Ms./Dr.): Jerry Palermo Title: Energy Manager

Organization: Grand Prairie ISD Phone: 972.533.3481

Street Address: 514 Skyline Dr. Fax: 972.343.4424

Mailing Address: Grand Prairie, TX 75051 E-Mail: jerry.palermo@gpisd.org

County: Dallas - EMA

Contact Information:

Name (Mr./Ms./Dr.): ~~Mr.~~ Jerry Palermo Title: Energy Manager

Phone: 972.533.3481 Fax: 972.343.4424

E-Mail: jerry.palermo@gpisd.org County: Dallas

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#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: AUSTIN ELEMENTARY SCHOOL

FLOOR AREA: 63,966 square feet

STUDENTS: 544

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	54,050	$5,295	299			8	$75
OCT	2009	37,762	$3,776	243			25	$200
NOV	2009	33,074	$3,570	239			57	$493
DEC	2009	31,757	$3,476	239			87	$677
JAN	2010	31,805	$3,625	239			151	$1,108
FEB	2010	34,536	$3,819	239			235	$1,629
MAR	2010	29,170	$3,385	239			222	$1,393
APR	2010	33,490	$3,700	239			112	$720
MAY	2010	38,533	$4,108	239			60	$381
JUN	2010	47,470	$4,607	264			22	$144
JUL	2010	22,370	$2,825	239			2	$33
AUG	2010	45,317	$4,523	290				$15
TOTAL		439,334	$46,709	3,008			981	$6,868

Annual Total Electricity Cos	=	$46,709	Per Year
Annual Total Energy Cost	=	$53,577	Per Year
Total KWH x 0.003413	=	1,499.4	x 10^6
Total MCF x 1.03	=	1,010.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,510.3	x 10^6
Cost per KWH	=	$0.106	Per Year
Cost per student	=	$98.49	Per Year

Energy Use Index:
Total Site BTU's/yr = 39,244 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.84 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.9

1,000 mcf / square foot = 15.3

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: BONHAM ELEMENTARY SCHOOL

FLOOR AREA: 68,082 square feet

STUDENTS: n/a

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	54,050	$5,295	299			23	$185
OCT	2009	31,316	$3,367	243			20	$164
NOV	2009	27,929	$3,270	243			37	$335
DEC	2009	21,863	$2,936	243			123	$939
JAN	2010	26,657	$3,276	243			211	$1,533
FEB	2010	25,915	$3,186	243			178	$1,241
MAR	2010	23,796	$3,078	243			195	$1,240
APR	2010	30,748	$3,533	243			68	$445
MAY	2010	51,380	$5,000	294			27	$181
JUN	2010	20,536	$2,719	243			16	$112
JUL	2010	30,793	$3,786	339				$15
AUG	2010	73,462	$6,518	302			0	$15
TOTAL		418,445	$45,964	3,178			900	$6,405

Annual Total Electricity Cos	=	$45,964	Per Year
Annual Total Energy Cost	=	$52,369	Per Year
Total KWH x 0.003413	=	1,428.2	x 10^6
Total MCF x 1.03	=	926.5	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,354.6	x 10^6
Cost per KWH	=	$0.110	Per Year
Cost per student	=	#VALUE!	Per Year

Energy Use Index:
Total Site BTU's/yr = 34,585 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.77 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.1

1,000 mcf / square foot = 13.2

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: BOWIE ELEMENTARY SCHOOL

FLOOR AREA: 50,191 square feet

STUDENTS: 517

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	46,473	$4,966	332			13	$114
OCT	2009	30,098	$3,340	266			16	$134
NOV	2009	30,980	$3,570	266			31	$278
DEC	2009	34,367	$3,974	266			168	$1,273
JAN	2010	36,475	$4,124	266			243	$1,766
FEB	2010	38,513	$4,212	266			233	$1,600
MAR	2010	27,713	$3,448	266			158	$1,013
APR	2010	33,892	$3,946	226			62	$407
MAY	2010	51,477	$5,073	299			24	$163
JUN	2010	27,444	$3,676	314			11	$80
JUL	2010	33,024	$3,635	266			0	$15
AUG	2010	63,168	$6,057	341			1	$21
TOTAL		453,624	$50,021	3,374			959	$6,864

Annual Total Electricity Cos	=	$50,021	Per Year
Annual Total Energy Cost	=	$56,885	Per Year
Total KWH x 0.003413	=	1,548.2	x 10^6
Total MCF x 1.03	=	988.2	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,536.4	x 10^6
Cost per KWH	=	$0.110	Per Year
Cost per student	=	$110.03	Per Year

Energy Use Index:
Total Site BTU's/yr = 50,535 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.13 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 9.0

1,000 mcf / square foot = 19.1

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: BUSH ELEMENTARY SCHOOL

FLOOR AREA: 66,574 square feet

STUDENTS: 549

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	73,080	$7,473	330			27	$216
OCT	2009	54,720	$5,883	325			34	$260
NOV	2009	58,770	$5,969	250			48	$431
DEC	2009	42,840	$4,906	268			12	$104
JAN	2010	55,260	$5,933	282			98	$724
FEB	2010	52,230	$5,768	296			158	$1,083
MAR	2010	45,300	$5,190	299			94	$611
APR	2010	49,350	$5,229	228			65	$426
MAY	2010	65,220	$6,684	297			43	$273
JUN	2010	62,580	$6,329	321			21	$139
JUL	2010	60,210	$6,029	257				$15
AUG	2010	72,720	$7,148	338			0	$16
TOTAL		692,280	$72,541	3,491			599	$4,298

Annual Total Electricity Cos	=	$72,541	Per Year
Annual Total Energy Cost	=	$76,839	Per Year
Total KWH x 0.003413	=	2,362.8	x 10^6
Total MCF x 1.03	=	616.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,979.5	x 10^6
Cost per KWH	=	$0.105	Per Year
Cost per student	=	$139.96	Per Year

Energy Use Index:
Total Site BTU's/yr = 44,755 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.15 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 10.4

1,000 mcf / square foot = 9.0

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: DANIELS ELEMENTARY SCHOOL

FLOOR AREA: 85,420 square feet

STUDENTS: 528

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	55,590	$6,758	398			12	$101
OCT	2009	47,352	$5,428	248			29	$225
NOV	2009	44,202	$5,513	345			31	$278
DEC	2009	47,220	$6,252	375			28	$228
JAN	2010	50,250	$6,469	368			23	$183
FEB	2010	47,952	$6,214	372			29	$217
MAR	2010	40,290	$5,745	370			34	$223
APR	2010	49,446	$5,841	251			28	$190
MAY	2010	66,594	$7,329	386			33	$214
JUN	2010	45,690	$5,722	363			26	$170
JUL	2010	44,988	$5,584	362			2	$33
AUG	2010	76,320	$8,091	419				$15
TOTAL		615,894	$74,946	4,257			275	$2,077

Annual Total Electricity Cos	=	$74,946	Per Year
Annual Total Energy Cost	=	$77,023	Per Year
Total KWH x 0.003413	=	2,102.0	x 10^6
Total MCF x 1.03	=	282.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,384.9	x 10^6
Cost per KWH	=	$0.122	Per Year
Cost per student	=	$145.88	Per Year

Energy Use Index:
Total Site BTU's/yr = 27,920 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.90 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.2

1,000 mcf / square foot = 3.2

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: DICKINSON ELEMENTARY SCHOOL

FLOOR AREA: 62,206 square feet

STUDENTS: 464

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	50,608	$5,105	286			8	$72
OCT	2009	39,824	$4,033	255			16	$131
NOV	2009	35,275	$3,879	255			16	$148
DEC	2009	33,984	$3,916	255			14	$126
JAN	2010	35,734	$4,048	255			19	$154
FEB	2010	36,602	$4,054	255			45	$342
MAR	2010	34,791	$3,934	255			45	$311
APR	2010	43,848	$4,630	255			22	$157
MAY	2010	48,380	$4,756	268			21	$152
JUN	2010	26,995	$3,488	302			18	$122
JUL	2010	36,047	$3,995	292			5	$43
AUG	2010	65,323	$6,097	318				$15
TOTAL		487,411	$51,935	3,251			228	$1,773

Annual Total Electricity Cos	=	$51,935	Per Year
Annual Total Energy Cost	=	$53,708	Per Year
Total KWH x 0.003413	=	1,663.5	x 10^6
Total MCF x 1.03	=	234.3	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	1,897.9	x 10^6
Cost per KWH	=	$0.107	Per Year
Cost per student	=	$115.75	Per Year

Energy Use Index:
Total Site BTU's/yr = 30,509 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.86 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.8

1,000 mcf / square foot = 3.7

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: EISENHOWER ELEMENTARY SCHOOL

FLOOR AREA: 77,793 square feet

STUDENTS: 539

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	78,549	$7,054	322			28	$225
OCT	2009	51,901	$5,374	326			43	$328
NOV	2009	40,645	$4,167	294			82	$702
DEC	2009	36,997	$4,174	294			128	$983
JAN	2010	35,565	$4,373	294			342	$2,478
FEB	2010	35,396	$4,361	294			188	$1,329
MAR	2010	69,605	$8,545	588			301	$1,887
APR	2010	40,611	$4,742	294			102	$653
MAY	2010	60,716	$6,269	386			43	$276
JUN	2010	37,309	$4,364	309			26	$169
JUL	2010	53,008	$5,701	391			0	$17
AUG	2010	81,424	$8,036	467			1	$20
TOTAL		621,726	$67,160	4,259			1,283	$9,067

Annual Total Electricity Cos	=	$67,160	Per Year	Energy Use Index:	
Annual Total Energy Cost	=	$76,227	Per Year	Total Site BTU's/yr =	44,264 BTU/sq.ft./yr
Total KWH x 0.003413	=	2,122.0	x 10^6	Total Area (sq.ft.)	
Total MCF x 1.03	=	1,321.5	x 10^6	Energy Cost Index:	
Total Other x _____	=		x 10^6	Total Energy Cost/yr =	$0.98 $/sq.ft./yr
Total Site BTU's/yr	=	3,443.4	x 10^6	Total Area (sq.ft)	
Cost per KWH	=	$0.108	Per Year	kwh per square foot =	8.0
Cost per student	=	$141.42	Per Year	1,000 mcf / square foot =	16.5

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: GARCIA ELEMENTARY SCHOOL

FLOOR AREA: 68,185 square feet

STUDENTS: 560

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	62,126	$6,457	391			11	$93
OCT	2009	48,966	$4,977	313			17	$139
NOV	2009	46,163	$4,973	313			71	$612
DEC	2009	39,504	$4,816	342			118	$916
JAN	2010	47,808	$5,452	352			248	$1,811
FEB	2010	58,390	$6,137	336			219	$1,519
MAR	2010	49,713	$5,461	340			270	$1,691
APR	2010	55,709	$5,757	313			82	$534
MAY	2010	67,658	$6,515	352			32	$210
JUN	2010	31,603	$3,941	313			20	$135
JUL	2010	42,906	$4,792	335			2	$28
AUG	2010	66,572	$6,688	417				$15
TOTAL		617,118	$65,966	4,117			1,090	$7,703

Annual Total Electricity Cos	=	$65,966	Per Year
Annual Total Energy Cost	=	$73,669	Per Year
Total KWH x 0.003413	=	2,106.2	x 10^6
Total MCF x 1.03	=	1,122.2	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,228.4	x 10^6
Cost per KWH	=	$0.107	Per Year
Cost per student	=	$131.55	Per Year

Energy Use Index:
Total Site BTU's/yr = 47,348 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.08 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 9.1

1,000 mcf / square foot = 16.0

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: GARNER ELEMENTARY SCHOOL

FLOOR AREA: 60,963 square feet

STUDENTS: 387

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	42,268	$4,293	244			10	$92
OCT	2009	32,717	$3,423	228			18	$145
NOV	2009	30,813	$3,399	228			22	$195
DEC	2009	32,760	$3,640	233			19	$165
JAN	2010	33,091	$3,648	229			17	$135
FEB	2010	36,611	$3,851	230			45	$324
MAR	2010	32,287	$3,540	229			61	$391
APR	2010	36,706	$3,904	229			27	$185
MAY	2010	40,639	$4,027	239			22	$149
JUN	2010	18,222	$2,481	229			20	$131
JUL	2010	29,908	$3,229	231			2	$33
AUG	2010	53,896	$5,098	80				$15
TOTAL		419,918	$44,533	2,629			262	$1,960

Annual Total Electricity Cos	=	$44,533	Per Year
Annual Total Energy Cost	=	$46,493	Per Year
Total KWH x 0.003413	=	1,433.2	x 10^6
Total MCF x 1.03	=	270.3	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	1,703.5	x 10^6
Cost per KWH	=	$0.106	Per Year
Cost per student	=	$120.14	Per Year

Energy Use Index:
Total Site BTU's/yr = 27,942 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.76 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.9

1,000 mcf / square foot = 4.3

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: HILL ELEMENTARY SCHOOL

FLOOR AREA: 63,728 square feet

STUDENTS: 530

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	77,760	$7,770	333			7	$63
OCT	2009	61,920	$6,644	304			17	$141
NOV	2009	38,025	$4,520	272			20	$178
DEC	2009	38,025	$4,700	286			22	$183
JAN	2010	45,540	$5,394	314			36	$275
FEB	2010	41,670	$5,082	307			59	$421
MAR	2010	38,520	$4,826	306			58	$373
APR	2010	33,480	$4,388	287			20	$142
MAY	2010	39,510	$4,720	233			20	$137
JUN	2010	42,480	$4,980	287			16	$110
JUL	2010	19,260	$2,900	90			3	$34
AUG	2010	44,280	$5,202	295				$15
TOTAL		520,470	$61,126	3,314			277	$2,072

Annual Total Electricity Cos	=	$61,126	Per Year
Annual Total Energy Cost	=	$63,198	Per Year
Total KWH x 0.003413	=	1,776.4	x 10^6
Total MCF x 1.03	=	284.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,061.2	x 10^6
Cost per KWH	=	$0.117	Per Year
Cost per student	=	$119.24	Per Year

Energy Use Index:
Total Site BTU's/yr = 32,343 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.99 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 8.2

1,000 mcf / square foot = 4.3

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: JOHNSON ELEMENTARY SCHOOL

FLOOR AREA: 57,780 square feet | STUDENTS: 502

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	52,965	$5,579	256			10	$86
OCT	2009	41,175	$4,596	256			9	$82
NOV	2009	33,795	$3,851	163			20	$188
DEC	2009	32,265	$3,701	150			104	$797
JAN	2010	32,085	$3,712	147			197	$1,442
FEB	2010	33,570	$3,821	152			170	$1,168
MAR	2010	29,340	$3,461	143			111	$718
APR	2010	39,060	$4,209	158			70	$459
MAY	2010	46,215	$4,931	231			28	$182
JUN	2010	41,580	$4,618	264			5	$44
JUL	2010	38,025	$4,314	241				$15
AUG	2010	56,745	$5,701	291				$15
TOTAL		476,820	$52,494	2,452			724	$5,196

Annual Total Electricity Cos	=	$52,494	Per Year
Annual Total Energy Cost	=	$57,690	Per Year
Total KWH x 0.003413	=	1,627.4	x 10^6
Total MCF x 1.03	=	745.7	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,373.1	x 10^6
Cost per KWH	=	$0.110	Per Year
Cost per student	=	$114.92	Per Year

Energy Use Index:
Total Site BTU's/yr = 41,071 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.00 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 8.3

1,000 mcf / square foot = 12.5

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: LEE ELEMENTARY SCHOOL

FLOOR AREA: 146,091 square feet

STUDENTS: n/a

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	94,707	$9,752	723			20	$163
OCT	2009	75,802	$9,809	674			22	$172
NOV	2009	74,310	$9,894	674			28	$260
DEC	2009	75,289	$10,084	684			76	$587
JAN	2010	83,322	$10,649	683			113	$831
FEB	2010	85,284	$9,824	577			121	$842
MAR	2010	80,748	$9,600	569			77	$504
APR	2010	82,811	$9,623	569			46	$305
MAY	2010	97,447	$10,479	593			28	$187
JUN	2010	48,344	$6,651	327			28	$179
JUL	2010	85,880	$9,417	498				$15
AUG	2010	137,539	$13,301	615				$15
TOTAL		1,021,483	$119,083	7,186			560	$4,060

Annual Total Electricity Cos	=	$119,083	Per Year
Annual Total Energy Cost	=	$123,143	Per Year
Total KWH x 0.003413	=	3,486.3	x 10^6
Total MCF x 1.03	=	576.5	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,062.8	x 10^6
Cost per KWH	=	$0.117	Per Year
Cost per student	=	#VALUE!	Per Year

Energy Use Index:
Total Site BTU's/yr = 27,810 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.84 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.0

1,000 mcf / square foot = 3.8

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: MARSHALL ELEMENTARY SCHOOL

FLOOR AREA: 73,525 square feet

STUDENTS: 588

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	58,680	$6,543	335			28	$224
OCT	2009	47,640	$5,423	295			31	$239
NOV	2009	42,060	$4,788	210			37	$335
DEC	2009	33,990	$4,234	214			34	$270
JAN	2010	36,990	$4,662	277			29	$225
FEB	2010	43,980	$5,120	279			40	$283
MAR	2010	38,340	$4,384	149			35	$235
APR	2010	47,250	$5,087	182			34	$232
MAY	2010	55,740	$5,789	202			35	$229
JUN	2010	42,810	$5,045	351			20	$136
JUL	2010	29,010	$4,263	305				$15
AUG	2010	42,960	$5,241	332			1	$25
TOTAL		519,450	$60,579	3,131			324	$2,448

Annual Total Electricity Cos	=	$60,579	Per Year
Annual Total Energy Cost	=	$63,027	Per Year
Total KWH x 0.003413	=	1,772.9	x 10^6
Total MCF x 1.03	=	334.1	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,107.0	x 10^6
Cost per KWH	=	$0.117	Per Year
Cost per student	=	$107.19	Per Year

Energy Use Index:
Total Site BTU's/yr = 28,657 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.86 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.1

1,000 mcf / square foot = 4.4

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: MILAM ELEMENTARY SCHOOL

FLOOR AREA: 62,245 square feet

STUDENTS: 584

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	45,998	$4,610	249			22	$179
OCT	2009	33,005	$3,311	199			27	$212
NOV	2009	36,334	$3,700	199			33	$302
DEC	2009	40,667	$4,103	208			113	$861
JAN	2010	45,160	$4,515	228			148	$1,086
FEB	2010	45,807	$4,439	217			153	$1,049
MAR	2010	32,365	$3,500	204			93	$608
APR	2010	35,149	$3,605	199			66	$430
MAY	2010	51,740	$4,816	249			38	$243
JUN	2010	25,318	$2,892	212			20	$134
JUL	2010	25,309	$2,776	199			3	$37
AUG	2010	61,463	$5,593	275			3	$41
TOTAL		478,315	$47,860	2,638			719	$5,182

Annual Total Electricity Cos	=	$47,860	Per Year
Annual Total Energy Cost	=	$53,042	Per Year
Total KWH x 0.003413	=	1,632.5	x 10^6
Total MCF x 1.03	=	740.2	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,372.6	x 10^6
Cost per KWH	=	$0.100	Per Year
Cost per student	=	$90.83	Per Year

Energy Use Index:
Total Site BTU's/yr = 38,118 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.85 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.7

1,000 mcf / square foot = 11.5

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: MOORE ELEMENTARY SCHOOL

FLOOR AREA: 56,485 square feet

STUDENTS: 632

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	60,600	$6,833	353			27	$215
OCT	2009	46,500	$5,464	309			33	$252
NOV	2009	37,260	$4,493	185			38	$344
DEC	2009	35,700	$4,499	242			49	$379
JAN	2010	39,720	$4,848	253			70	$523
FEB	2010	41,130	$4,975	272			84	$586
MAR	2010	36,150	$4,588	275			52	$347
APR	2010	43,380	$4,905	176			44	$292
MAY	2010	55,680	$6,177	289			42	$267
JUN	2010	56,490	$6,060	288			23	$149
JUL	2010	47,760	$5,411	357			4	$48
AUG	2010	61,890	$6,683	360			1	$25
TOTAL		562,260	$64,936	3,359			466	$3,427

Annual Total Electricity Cos	=	$64,936	Per Year
Annual Total Energy Cost	=	$68,363	Per Year
Total KWH x 0.003413	=	1,919.0	x 10^6
Total MCF x 1.03	=	480.2	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,399.2	x 10^6
Cost per KWH	=	$0.115	Per Year
Cost per student	=	$108.17	Per Year

Energy Use Index:
Total Site BTU's/yr = 42,475 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.21 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 10.0

1,000 mcf / square foot = 8.3

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: MOSELEY ELEMENTARY SCHOOL

FLOOR AREA: 77,980 square feet **STUDENTS:** 573

		ELECTRICITY DATA			*WATER*		*NATURAL GAS/OTHER FUEL*	
MONTH	**YEAR**	**CONSUMPTION KWH**	**COSTS $**	**BILLED KW**	**WATER CONSUMPTION**	**WATER COSTS $**	**CONSUMPTION UNITS (MCF)**	**COSTS**
SEP	2009	54,090	$6,205	325			55	$422
OCT	2009	47,775	$5,595	325			56	$425
NOV	2009	45,285	$5,442	317			59	$524
DEC	2009	43,665	$5,374	317			54	$407
JAN	2010	43,830	$5,473	344			65	$458
FEB	2010	42,390	$4,898	305			58	$401
MAR	2010	43,845	$5,167	305			62	$409
APR	2010	53,025	$6,323	370			79	$525
MAY	2010	53,025	$5,500	300			51	$323
JUN	2010	29,595	$4,468	370			13	$91
JUL	2010	32,565	$4,388	289				$15
AUG	2010	71,250	$7,268	360			8	$80
TOTAL		560,340	$66,101	3,927			559	$4,080

Annual Total Electricity Cos	=	$66,101	Per Year
Annual Total Energy Cost	=	$70,181	Per Year
Total KWH x 0.003413	=	1,912.4	x 10^6
Total MCF x 1.03	=	576.2	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,488.6	x 10^6
Cost per KWH	=	$0.118	Per Year
Cost per student	=	$122.48	Per Year

Energy Use Index:
Total Site BTU's/yr = 31,914 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.90 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.2

1,000 mcf / square foot = 7.2

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: POWELL ELEMENTARY SCHOOL

FLOOR AREA: 65,710 square feet

STUDENTS: 507

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	52,920	$5,822	308			7	$70
OCT	2009	45,270	$4,956	265			31	$241
NOV	2009	37,980	$4,532	236			23	$180
DEC	2009	48,150	$5,259	241			36	$325
JAN	2010	42,630	$4,917	241			175	$1,316
FEB	2010	38,910	$4,606	250			324	$2,394
MAR	2010	36,540	$4,444	250			276	$1,841
APR	2010	47,550	$5,317	260			98	$637
MAY	2010	53,820	$5,500	278			33	$228
JUN	2010	45,210	$5,014	282			21	$139
JUL	2010	67,140	$6,509	268			5	$43
AUG	2010	86,700	$8,303	348				$15
TOTAL		602,820	$65,179	3,227			1,027	$7,429

Annual Total Electricity Cos	=	$65,179	Per Year
Annual Total Energy Cost	=	$72,608	Per Year
Total KWH x 0.003413	=	2,057.4	x 10^6
Total MCF x 1.03	=	1,057.5	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,114.9	x 10^6
Cost per KWH	=	$0.108	Per Year
Cost per student	=	$143.21	Per Year

Energy Use Index:
Total Site BTU's/yr = 47,404 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.10 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 9.2

1,000 mcf / square foot = 15.6

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: RAYBURN ELEMENTARY SCHOOL

FLOOR AREA: 84,650 square feet **STUDENTS:** 499

		ELECTRICITY DATA			*WATER*		*NATURAL GAS/OTHER FUEL*	
MONTH	**YEAR**	**CONSUMPTION KWH**	**COSTS $**	**BILLED KW**	**WATER CONSUMPTION**	**WATER COSTS $**	**CONSUMPTION UNITS (MCF)**	**COSTS**
SEP	2009	65,086	$6,480	368			21	$172
OCT	2009	49,608	$4,981	329			24	$188
NOV	2009	46,516	$4,988	329			39	$351
DEC	2009	38,201	$4,398	329			108	$822
JAN	2010	37,079	$4,564	329			132	$968
FEB	2010	38,571	$4,670	329			139	$958
MAR	2010	36,380	$4,457	329			111	$716
APR	2010	45,909	$5,142	329			60	$395
MAY	2010	51,231	$5,577	329			34	$221
JUN	2010	49,311	$5,171	329			18	$119
JUL	2010	41,267	$4,821	370				$15
AUG	2010	53,903	$5,727	401			0	$15
TOTAL		553,062	$60,976	4,100			685	$4,940

Annual Total Electricity Cos	=	$60,976	Per Year
Annual Total Energy Cost	=	$65,916	Per Year
Total KWH x 0.003413	=	1,887.6	x 10^6
Total MCF x 1.03	=	705.1	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,592.7	x 10^6
Cost per KWH	=	$0.110	Per Year
Cost per student	=	$132.10	Per Year

Energy Use Index:
Total Site BTU's/yr = 30,629 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.78 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.5

1,000 mcf / square foot = 8.1

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

BUILDING: SEGUIN ELEMENTARY SCHOOL

DISTRICT: GRAND PRAIRIE ISD

FLOOR AREA: 73,503 square feet

STUDENTS: 653

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	55,860	$6,484	350			30	$239
OCT	2009	42,990	$4,946	282			38	$290
NOV	2009	38,460	$4,588	196			38	$346
DEC	2009	33,780	$4,433	269			32	$257
JAN	2010	39,870	$4,877	272			31	$237
FEB	2010	36,120	$4,608	277			39	$279
MAR	2010	34,230	$4,373	244			32	$219
APR	2010	42,630	$4,992	245			36	$241
MAY	2010	58,140	$6,052	296			34	$218
JUN	2010	33,150	$4,329	280			15	$104
JUL	2010	23,280	$3,142	76				$15
AUG	2010	58,290	$6,323	332			1	$19
TOTAL		496,800	$59,147	3,119			325	$2,464

Annual Total Electricity Cos	=	$59,147	Per Year
Annual Total Energy Cost	=	$61,611	Per Year
Total KWH x 0.003413	=	1,695.6	x 10^6
Total MCF x 1.03	=	334.9	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,030.4	x 10^6
Cost per KWH	=	$0.119	Per Year
Cost per student	=	$94.35	Per Year

Energy Use Index:
Total Site BTU's/yr = 27,624 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.84 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.8

1,000 mcf / square foot = 4.4

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: TRAVIS ELEMENTARY SCHOOL

FLOOR AREA: 112,121 square feet STUDENTS; 484

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	40,588	$4,351	279			14	$133
OCT	2009	27,859	$3,092	233			26	$216
NOV	2009	25,128	$3,034	233			122	$1,057
DEC	2009	21,813	$2,975	233			211	$1,649
JAN	2010	23,065	$3,064	233			334	$2,450
FEB	2010	22,971	$3,024	233			454	$3,149
MAR	2010	21,654	$2,942	234			484	$3,033
APR	2010	29,771	$3,552	234			163	$1,052
MAY	2010	46,070	$4,680	280			50	$334
JUN	2010	17,403	$2,811	235			26	$182
JUL	2010	36,039	$4,035	294			2	$153
AUG	2010	70,440	$6,538	336			0	$30
TOTAL		382,801	$44,098	3,057			1,885	$13,438

Annual Total Electricity Cos	=	$44,098	Per Year
Annual Total Energy Cost	=	$57,536	Per Year
Total KWH x 0.003413	=	1,306.5	x 10^6
Total MCF x 1.03	=	1,941.3	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,247.8	x 10^6
Cost per KWH	=	$0.115	Per Year
Cost per student	=	$118.88	Per Year

Energy Use Index:
Total Site BTU's/yr = 28,967 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.51 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 3.4

1,000 mcf / square foot = 16.8

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: WHITT ELEMENTARY SCHOOL

FLOOR AREA: 72,872 square feet

STUDENTS: 571

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	63,540	$7,140	356			24	$190
OCT	2009	44,760	$5,184	287			27	$212
NOV	2009	39,030	$4,673	181			35	$314
DEC	2009	39,960	$5,009	303			60	$461
JAN	2010	43,050	$5,387	321			48	$360
FEB	2010	45,570	$5,528	313			72	$500
MAR	2010	35,940	$4,640	282			54	$357
APR	2010	41,790	$4,860	183			31	$214
MAY	2010	54,990	$6,055	285			15	$108
JUN	2010	55,530	$6,051	325			19	$125
JUL	2010	38,490	$4,382	134				
AUG	2010	60,870	$6,436	344			0	$31
TOTAL		563,520	$65,345	3,314			383	$2,872

Annual Total Electricity Cos	=	$65,345	Per Year
Annual Total Energy Cost	=	$68,217	Per Year
Total KWH x 0.003413	=	1,923.3	x 10^6
Total MCF x 1.03	=	394.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,318.1	x 10^6
Cost per KWH	=	$0.116	Per Year
Cost per student	=	$119.47	Per Year

Energy Use Index:
Total Site BTU's/yr = 31,810 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.94 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.7

1,000 mcf / square foot = 5.3

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: WILLIAMS ELEMENTARY SCHOOL

FLOOR AREA: 75,830 square feet

STUDENTS: 468

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	53,760	$5,598	289			11	$96
OCT	2009	38,640	$3,971	219			12	$101
NOV	2009	35,940	$4,119	257			17	$165
DEC	2009	37,470	$4,395	296			28	$222
JAN	2010	36,300	$4,312	296			32	$242
FEB	2010	44,700	$4,950	301			33	$241
MAR	2010	30,630	$3,820	289			23	$161
APR	2010	38,580	$4,028	194			17	$120
MAY	2010	56,460	$5,429	260			15	$103
JUN	2010	24,510	$2,975	156			9	$69
JUL	2010	31,250	$3,634	260				$15
AUG	2010	67,000	$6,668	358				$15
TOTAL		495,240	$53,899	3,175			196	$1,550

Annual Total Electricity Cos	=	$53,899	Per Year
Annual Total Energy Cost	=	$55,449	Per Year
Total KWH x 0.003413	=	1,690.3	x 10^6
Total MCF x 1.03	=	201.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	1,891.8	x 10^6
Cost per KWH	=	$0.109	Per Year
Cost per student	=	$118.48	Per Year

Energy Use Index:
Total Site BTU's/yr = 24,948 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.73 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.5

1,000 mcf / square foot = 2.6

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: ZAVALLA ELEMENTARY SCHOOL

FLOOR AREA: 53,450 square feet

STUDENTS: 578

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	49,448	$4,783	245			17	$142
OCT	2009	37,622	$3,656	213			20	$161
NOV	2009	32,090	$3,385	208			26	$239
DEC	2009	26,336	$2,977	208			66	$508
JAN	2010	25,760	$3,030	208			105	$772
FEB	2010	26,818	$3,105	208			108	$745
MAR	2010	26,123	$3,015	208			75	$491
APR	2010	33,084	$3,514	208			37	$247
MAY	2010	40,345	$4,069	208			22	$145
JUN	2010	39,834	$3,968	240			14	$100
JUL	2010	28,951	$3,164	222				$15
AUG	2010	52,936	$4,846	254			0	$15
TOTAL		419,347	$43,512	2,630			489	$3,580

Annual Total Electricity Cos	=	$43,512	Per Year
Annual Total Energy Cost	=	$47,092	Per Year
Total KWH x 0.003413	=	1,431.2	x 10^6
Total MCF x 1.03	=	503.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	1,935.0	x 10^6
Cost per KWH	=	$0.104	Per Year
Cost per student	=	$81.47	Per Year

Energy Use Index:
Total Site BTU's/yr = 36,202 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 = 7.8

1,000 mcf / square foot = 9.2

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: CROCKETT 5TH GRADE CENTER

FLOOR AREA: 72,231 square feet

STUDENTS: n/a

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	55,950	$6,515	350			23	$182
OCT	2009	40,410	$5,257	350			29	$227
NOV	2009	38,910	$4,737	247			30	$270
DEC	2009	35,610	$4,645	284			31	$247
JAN	2010	41,730	$5,080	284			41	$311
FEB	2010	40,140	$5,068	295			52	$367
MAR	2010	33,480	$4,567	300			35	$239
APR	2010	40,350	$5,065	300			38	$257
MAY	2010	68,160	$6,811	305			36	$234
JUN	2010	36,630	$4,136	88			20	$135
JUL	2010	49,920	$5,263	250				$15
AUG	2010	78,270	$7,876	359				$15
TOTAL		559,560	$65,020	3,412			335	$2,499

Annual Total Electricity Cos	=	$65,020	Per Year
Annual Total Energy Cost	=	$67,519	Per Year
Total KWH x 0.003413	=	1,909.8	x 10^6
Total MCF x 1.03	=	344.9	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,254.7	x 10^6
Cost per KWH	=	$0.116	Per Year
Cost per student	=	#VALUE!	Per Year

Energy Use Index:
Total Site BTU's/yr = 31,215 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.93 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.7

1,000 mcf / square foot = 4.6

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: ADAMS MIDDLE SCHOOL

FLOOR AREA: 99,388 square feet

STUDENTS: 768

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	111,350	$11,784	697			24	$206
OCT	2009	79,052	$8,928	630			43	$346
NOV	2009	69,658	$8,387	584			86	$749
DEC	2009	65,438	$7,778	458			145	$1,134
JAN	2010	58,604	$7,351	463			271	$1,995
FEB	2010	69,870	$8,156	466			322	$2,242
MAR	2010	57,018	$7,143	465			309	$1,949
APR	2010	68,524	$7,966	462			112	$736
MAY	2010	80,494	$8,908	457			49	$326
JUN	2010	97,749	$10,019	542			39	$263
JUL	2010	56,027	$6,857	458			1	$40
AUG	2010	79,320	$8,556	523			1	$34
TOTAL		893,104	$101,833	6,205			1,402	$10,020

Annual Total Electricity Cos	=	$101,833	Per Year
Annual Total Energy Cost	=	$111,853	Per Year
Total KWH x 0.003413	=	3,048.2	x 10^6
Total MCF x 1.03	=	1,444.0	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,492.1	x 10^6
Cost per KWH	=	$0.114	Per Year
Cost per student	=	$145.64	Per Year

Energy Use Index:
Total Site BTU's/yr = 45,198 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.13 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 9.0

1,000 mcf / square foot = 14.1

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: ARNOLD MIDDLE SCHOOL

FLOOR AREA: 143,962 square feet

STUDENTS: 793

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	REP COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	106,833	$11,667	777			41	$320
OCT	2009	75,561	$8,457	622			41	$316
NOV	2009	68,540	$8,252	622			69	$610
DEC	2009	58,978	$7,850	622			108	$827
JAN	2010	68,630	$8,535	622			187	$1,357
FEB	2010	64,810	$8,169	622			150	$1,050
MAR	2010	57,931	$7,793	622			169	$1,079
APR	2010	79,164	$9,201	622			79	$514
MAY	2010	113,587	$11,463	693			65	$409
JUN	2010	54,862	$7,237	622			39	$249
JUL	2010	73,688	$8,794	716				$15
AUG	2010	123,331	$12,413	751				$15
TOTAL		945,915	$109,831	7,913			949	$6,761

Annual Total Electricity Cos	=	$109,831	Per Year
Annual Total Energy Cost	=	$116,592	Per Year
Total KWH x 0.003413	=	3,228.4	x 10^6
Total MCF x 1.03	=	977.7	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,206.1	x 10^6
Cost per KWH	=	$0.116	Per Year
Cost per student	=	$147.03	Per Year

Energy Use Index:
Total Site BTU's/yr = 29,217 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.81 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.6

1,000 mcf / square foot = 6.6

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____ (area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: FANNIN MIDDLE SCHOOL

FLOOR AREA: 53,906 square feet STUDENTS: n/a

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	53,729	$5,466	333			27	$217
OCT	2009	40,490	$4,115	276			33	$253
NOV	2009	38,019	$4,231	266			36	$318
DEC	2009	35,575	$4,055	266			52	$410
JAN	2010	40,383	$4,396	266			61	$457
FEB	2010	42,541	$4,556	266			62	$440
MAR	2010	37,372	$4,120	266			79	$506
APR	2010	48,421	$4,912	266			62	$407
MAY	2010	76,961	$7,468	340			41	$265
JUN	2010	46,204	$4,596	272			51	$316
JUL	2010	70,627	$6,480	272			7	$66
AUG	2010	142,818	$11,867	474			1	$24
TOTAL		673,140	$66,262	3,563			511	$3,679

Annual Total Electricity Cos	=	$66,262	Per Year
Annual Total Energy Cost	=	$69,941	Per Year
Total KWH x 0.003413	=	2,297.4	x 10^6
Total MCF x 1.03	=	526.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,824.1	x 10^6
Cost per KWH	=	$0.098	Per Year
Cost per student	=	#VALUE!	Per Year

Energy Use Index:

Total Site BTU's/yr = 52,389 BTU/sq.ft./yr

Total Area (sq.ft.)

Energy Cost Index:

Total Energy Cost/yr = $1.30 $/sq.ft./yr

Total Area (sq.ft)

kwh per square foot = 12.5

1,000 mcf / square foot = 9.5

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: JACKSON MIDDLE SCHOOL

FLOOR AREA: 137,690 square feet

STUDENTS: 1074

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	121,253	$12,788	777			34	$268
OCT	2009	93,146	$10,037	674			39	$297
NOV	2009	77,671	$8,998	622			47	$418
DEC	2009	65,802	$8,156	622			110	$837
JAN	2010	72,630	$8,973	622			140	$1,029
FEB	2010	75,225	$9,157	622			137	$940
MAR	2010	60,891	$8,031	622			99	$646
APR	2010	82,056	$9,552	622			51	$336
MAY	2010	101,550	$11,167	648			47	$299
JUN	2010	88,202	$9,900	686			14	$100
JUL	2010	57,100	$7,796	409			10	$92
AUG	2010	114,695	$11,613	704			0	$18
TOTAL		1,010,221	$116,168	7,630			728	$5,280

Annual Total Electricity Cos	=	$116,168	Per Year
Annual Total Energy Cost	=	$121,448	Per Year
Total KWH x 0.003413	=	3,447.9	x 10^6
Total MCF x 1.03	=	749.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,197.5	x 10^6
Cost per KWH	=	$0.115	Per Year
Cost per student	=	$113.08	Per Year

Energy Use Index:
Total Site BTU's/yr = 30,485 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 = 7.3

1,000 mcf / square foot = 5.3

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: KENNEDY MIDDLE SCHOOL

FLOOR AREA: 121,770 square feet

STUDENTS: 912

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	106,695	$10,491	512			40	$312
OCT	2009	74,550	$7,539	425			55	$417
NOV	2009	77,667	$8,041	425			58	$520
DEC	2009	87,591	$8,672	425			140	$1,065
JAN	2010	92,187	$8,998	425			231	$1,681
FEB	2010	92,689	$8,894	425			242	$1,661
MAR	2010	73,929	$7,713	425			154	$992
APR	2010	88,505	$8,626	425			108	$700
MAY	2010	116,703	$10,551	511			62	$394
JUN	2010	69,638	$7,237	470			36	$231
JUL	2010	68,913	$6,847	425				$15
AUG	2010	130,111	$11,723	567			3	$39
TOTAL		1,079,178	$105,332	5,460			1,131	$8,027

Annual Total Electricity Cos	=	$105,332	Per Year
Annual Total Energy Cost	=	$113,359	Per Year
Total KWH x 0.003413	=	3,683.2	x 10^6
Total MCF x 1.03	=	1,165.0	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,848.3	x 10^6
Cost per KWH	=	$0.098	Per Year
Cost per student	=	$124.30	Per Year

Energy Use Index:
Total Site BTU's/yr = 39,815 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.93 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 8.9

1,000 mcf / square foot = 9.3

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: REAGAN MIDDLE SCHOOL

FLOOR AREA: 138,925 square feet

STUDENTS: 368

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	105,780	$12,125	634			11	$114
OCT	2009	90,870	$9,740	458			78	$582
NOV	2009	85,800	$9,687	461			50	$448
DEC	2009	80,730	$9,018	257			97	$741
JAN	2010	82,800	$9,687	530			166	$1,237
FEB	2010	73,950	$8,951	530			169	$1,134
MAR	2010	56,640	$7,729	530			68	$446
APR	2010	105,420	$11,315	530			51	$342
MAY	2010	102,330	$11,423	639			48	$303
JUN	2010	64,230	$4,329	280			10	$74
JUL	2010	67,560	$8,745	597				$15
AUG	2010	130,920	$13,535	677			9	$85
TOTAL		1,047,030	$116,284	6,123			756	$5,521

Annual Total Electricity Cos	=	$116,284	Per Year
Annual Total Energy Cost	=	$121,805	Per Year
Total KWH x 0.003413	=	3,573.5	x 10^6
Total MCF x 1.03	=	778.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,352.1	x 10^6
Cost per KWH	=	$0.111	Per Year
Cost per student	=	$330.99	Per Year

Energy Use Index:
Total Site BTU's/yr = 31,327 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 = 7.5

1,000 mcf / square foot = 5.4

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: TRUMAN MIDDLE SCHOOL

FLOOR AREA: 115,364 square feet

STUDENTS; 697

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	87,572	$9,934	660			14	$122
OCT	2009	68,110	$8,140	624			30	$236
NOV	2009	62,821	$8,016	624			37	$327
DEC	2009	65,905	$7,893	519			72	$568
JAN	2010	63,355	$7,802	519			130	$984
FEB	2010	62,401	$7,667	519			257	$1,898
MAR	2010	57,372	$7,280	511			223	$1,496
APR	2010	73,241	$8,654	599			96	$626
MAY	2010	97,458	$9,525	629			49	$330
JUN	2010	40,748	$3,855	378			28	$182
JUL	2010	59,189	$7,252	601			6	$51
AUG	2010	111,696	$11,030	649			0	$16
TOTAL		849,868	$97,048	6,832			942	$6,836

Annual Total Electricity Cos	=	$97,048	Per Year
Annual Total Energy Cost	=	$103,884	Per Year
Total KWH x 0.003413	=	2,900.6	x 10^6
Total MCF x 1.03	=	970.4	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,871.0	x 10^6
Cost per KWH	=	$0.114	Per Year
Cost per student	=	$149.04	Per Year

Energy Use Index:
Total Site BTU's/yr = 33,554 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.90 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 7.4

1,000 mcf / square foot = 8.2

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: CROSSWINDS HIGH SCHOOL

FLOOR AREA: 46,795 square feet

STUDENTS: 368

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	49,200	$4,668	192			3	$34
OCT	2009	37,200	$3,602	174			9	$81
NOV	2009	33,600	$3,489	174			24	$217
DEC	2009	30,000	$3,037	108			58	$456
JAN	2010	30,600	$3,090	102			153	$1,121
FEB	2010	39,000	$3,686	102			199	$1,378
MAR	2010	34,800	$3,350	108			182	$1,145
APR	2010	39,000	$3,673	126			50	$332
MAY	2010	43,200	$4,086	156			14	$102
JUN	2010	47,400	$4,186	162			4	$38
JUL	2010	37,800	$3,452	154			1	$19
AUG	2010	47,400	$4,407	210				$15
TOTAL		469,200	$44,726	1,768			696	$4,938

Annual Total Electricity Cos	=	$44,726	Per Year
Annual Total Energy Cost	=	$49,664	Per Year
Total KWH x 0.003413	=	1,601.4	x 10^6
Total MCF x 1.03	=	716.4	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	2,317.7	x 10^6
Cost per KWH	=	$0.095	Per Year
Cost per student	=	$134.96	Per Year

Energy Use Index:
Total Site BTU's/yr = 49,530 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 = 10.0

1,000 mcf / square foot = 14.9

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: DUBISKI CAREER HIGH SCHOOL

FLOOR AREA: 247,880 square feet

STUDENTS: 781

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	271,500	$24,560	765			35	$270
OCT	2009	169,500	$17,533	915			42	$323
NOV	2009	163,500	$16,537	459			64	$567
DEC	2009	162,994	$18,546	1131			80	$616
JAN	2010	171,940	$19,527	1163			51	$386
FEB	2010	182,362	$20,687	1230			77	$537
MAR	2010	145,988	$16,823	1066			61	$404
APR	2010	165,934	$17,267	984			54	$361
MAY	2010	209,828	$21,825	1094			52	$330
JUN	2010	226,138	$21,949	1117			27	$177
JUL	2010	141,271	$14,690	499				
AUG	2010	229,578	$22,178	1173			18	$172
TOTAL		2,240,533	$232,122	11,596			562	$4,143

Annual Total Electricity Cos	=	$232,122	Per Year
Annual Total Energy Cost	=	$236,265	Per Year
Total KWH x 0.003413	=	7,646.9	x 10^6
Total MCF x 1.03	=	578.8	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	8,225.7	x 10^6
Cost per KWH	=	$0.104	Per Year
Cost per student	=	$302.52	Per Year

Energy Use Index:
Total Site BTU's/yr = 33,184 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.95 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 9.0

1,000 mcf / square foot = 2.3

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: GRAND PRAIRIE HIGH SCHOOL 9TH GRADE

FLOOR AREA: 157,046 square feet

STUDENTS: 808

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	119,860	$12,885	883			25	$213
OCT	2009	92,069	$10,188	736			37	$284
NOV	2009	81,981	$9,393	654			44	$388
DEC	2009	68,175	$8,413	654			38	$305
JAN	2010	62,965	$8,257	654			31	$239
FEB	2010	72,020	$9,114	700			46	$332
MAR	2010	56,805	$7,707	654			41	$266
APR	2010	73,955	$8,940	654			37	$247
MAY	2010	93,266	$10,417	654			41	$262
JUN	2010	98,808	$10,588	726			36	$229
JUL	2010	64,928	$8,011	654			1	$25
AUG	2010	99,828	$10,533	780			1	$23
TOTAL		984,660	$114,446	8,403			377	$2,813

Annual Total Electricity Cos	=	$114,446	Per Year
Annual Total Energy Cost	=	$117,259	Per Year
Total KWH x 0.003413	=	3,360.6	x 10^6
Total MCF x 1.03	=	388.7	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	3,749.4	x 10^6
Cost per KWH	=	$0.116	Per Year
Cost per student	=	$145.12	Per Year

Energy Use Index:
Total Site BTU's/yr = 23,874 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.75 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.3

1,000 mcf / square foot = 2.4

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: GRAND PRAIRIE HIGH SCHOOL

FLOOR AREA: 484,397 square feet

STUDENTS: 2049

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	504,878	$50,411	2536			67	$554
OCT	2009	349,240	$37,058	2337			111	$867
NOV	2009	299,208	$34,754	2284			192	$1,675
DEC	2009	293,908	$34,233	2192			492	$3,803
JAN	2010	308,242	$35,145	2185			987	$7,221
FEB	2010	355,015	$38,989	2372			1,036	$7,171
MAR	2010	270,686	$32,562	2391			1,106	$6,926
APR	2010	309,947	$34,702	2128			479	$3,081
MAY	2010	362,910	$38,542	1996			159	$1,025
JUN	2010	411,253	$41,333	2325			132	$843
JUL	2010	373,083	$38,512	2210			12	$154
AUG	2010	447,574	$42,947	2380			3	$86
TOTAL		4,285,944	$459,188	27,336			4,776	$33,406

Annual Total Electricity Cos	=	$459,188	Per Year
Annual Total Energy Cost	=	$492,594	Per Year
Total KWH x 0.003413	=	14,627.9	x 10^6
Total MCF x 1.03	=	4,918.9	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	19,546.8	x 10^6
Cost per KWH	=	$0.107	Per Year
Cost per student	=	$240.41	Per Year

Energy Use Index:
Total Site BTU's/yr = 40,353 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.02 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 8.8

1,000 mcf / square foot = 9.9

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: S. GRAND PRAIRIE HIGH SCHOOL 9TH GRADE

FLOOR AREA: 124,834 square feet

STUDENTS: 849

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	119,213	$12,520	792			21	$169
OCT	2009	86,789	$9,249	660			23	$185
NOV	2009	81,883	$9,160	634			32	$292
DEC	2009	68,358	$8,200	634			190	$1,435
JAN	2010	73,170	$8,879	634			328	$2,391
FEB	2010	75,211	$9,024	634			359	$2,444
MAR	2010	61,762	$7,957	634			212	$1,358
APR	2010	77,935	$9,122	634			109	$704
MAY	2010	99,016	$11,098	713			32	$208
JUN	2010	82,516	$9,673	762			17	$118
JUL	2010	87,303	$9,657					$15
AUG	2010	124,030	$12,442	790				$15
TOTAL		1,037,186	$116,981	7,521			1,323	$9,334

Annual Total Electricity Cos	=	$116,981	Per Year
Annual Total Energy Cost	=	$126,315	Per Year
Total KWH x 0.003413	=	3,539.9	x 10^6
Total MCF x 1.03	=	1,362.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	4,902.5	x 10^6
Cost per KWH	=	$0.113	Per Year
Cost per student	=	$148.78	Per Year

Energy Use Index:
Total Site BTU's/yr = 39,272 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $1.01 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 8.3

1,000 mcf / square foot = 10.6

12/13/2010

TABLE 1 - BASE YEAR ENERGY CONSUMPTION HISTORY

METER/ACCT#: _____
(area served by meter)

DISTRICT: GRAND PRAIRIE ISD

BUILDING: SOUTH GRAND PRAIRIE HIGH SCHOOL

FLOOR AREA: 516,667 square feet

STUDENTS: 2416

		ELECTRICITY DATA			WATER		NATURAL GAS/OTHER FUEL	
MONTH	YEAR	CONSUMPTION KWH	COSTS $	BILLED KW	WATER CONSUMPTION	WATER COSTS $	CONSUMPTION UNITS (MCF)	COSTS
SEP	2009	342,159	$37,315	2223			68	$517
OCT	2009	297,132	$31,887	2083			154	$1,137
NOV	2009	280,865	$31,575	1970			333	$2,885
DEC	2009	251,970	$28,127	1555			700	$5,255
JAN	2010	272,024	$31,335	1891			1,144	$8,293
FEB	2010	285,623	$32,568	2035			985	$6,684
MAR	2010	241,332	$28,953	2019			646	$4,118
APR	2010	244,712	$28,844	1758			365	$2,321
MAY	2010	317,717	$37,199	1900			140	$862
JUN	2010	245,844	$28,154	1880			71	$438
JUL	2010	264,251	$29,895	2023			1	$20
AUG	2010	433,039	$43,530	2201			3	$39
TOTAL		3,476,668	$389,382	23,538			4,610	$32,569

Annual Total Electricity Cos	=	$389,382	Per Year
Annual Total Energy Cost	=	$421,951	Per Year
Total KWH x 0.003413	=	11,865.9	x 10^6
Total MCF x 1.03	=	4,748.6	x 10^6
Total Other x _____	=		x 10^6
Total Site BTU's/yr	=	16,614.5	x 10^6
Cost per KWH	=	$0.112	Per Year
Cost per student	=	$174.65	Per Year

Energy Use Index:
Total Site BTU's/yr = 32,157 BTU/sq.ft./yr
Total Area (sq.ft.)

Energy Cost Index:
Total Energy Cost/yr = $0.82 $/sq.ft./yr
Total Area (sq.ft)

kwh per square foot = 6.7

1,000 mcf / square foot = 8.9

12/13/2010

APPENDIX C

Energy Conservation Policy
for
_____ Independent School District

Recognizing our responsibility as Trustees of the _____ 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 _____, 20__

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

GRAND PRAIRIE ISD
LONG-RANGE ENERGY CONSERVATION PLAN

Senate Bill 300, passed by the Texas Legislature in 2009, requires each school district to develop a long-range energy conservation plan for reducing energy consumption. The 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.

SUMMARY

Grand Prairie ISD consists of 43 facilities totaling approximately 4,432,000 square feet. GPISD has emphasized energy efficient operations and energy conservation for many years.

An analysis of utility bills was performed in November 2010 under the State Energy Conservation Office Preliminary Energy Assessment Service. The analysis confirmed that the energy saving procedures in place are effective. For the district's facilities, the average energy cost index (ECI) was $\$0.93/ft^2$/year and the average energy use index (EUI) was 35,909 Btu/ft^2/year. Both indices are well below the averages for other school districts in the area.

CURRENT STRATEGIES

Below are examples of energy saving projects that have been accomplished and practices that are routinely utilized by the district.

HVAC

- Utilize energy-efficient systems, such as ground source heat pumps, as a part of new construction and renovations
- Use moderate temperature setpoints
- Utilize setback/unoccupied temperatures

Lighting

- Replace electromagnetic ballasts and T-12 lamps with electronic ballasts and T-8 lamps
- Replace metal halide lighting in some gymnasiums with more energy efficient high bay fluorescent lighting with T-5 HO lamps
- Occupancy sensors in some areas for lighting control
- Turn off lights in unoccupied spaces
- Turn off lights in areas with daylighting
- Reduce outdoor lighting hours of operation

Miscellaneous

- Utilize a fulltime energy manager
- Conducting energy audits of district schools
- Energy Management Program Guidelines and Philosophies document
- Review bills for errors
- Enlist help of custodial & maintenance staffs
- Keep exterior doors closed
- Keep doors to unconditioned spaces closed

- Keep windows closed when air conditioning
- Energy awareness (The District produced an energy awareness video that has been shown to employees)
- Reduce HVAC hours of operation
- Have custodians turn off lights after cleaning areas
- Turn off office equipment not in use

ADDITIONAL STRATEGIES

The following additional strategies can be achieved without financial cost to the district:

- Implement Watt Watchers program
- Share usage & cost data with principals
- Use only task lighting when possible
- De-lamp vending machines
- Clean return air grilles
- Change air filters regularly
- Enable sleep mode for computers
- Use kitchen hoods when cooking, turn off when done
- Consolidate after school activities
- Reduce number of summer school campuses
- Discourage use of personal appliances
- Close blinds, etc. on hot summer days
- Use recommended chilled water temperatures

The following additional strategies would result in a net savings to the district:

Retrofit lighting (400-watt metal halide) in additional gyms with high bay fluorescent (T-5 HO) fixtures:

Facilities	Total Costs* (Years 1-7)	Annual Savings**	Total Savings** (Years 1-7)
Marshall ES	$6,000	$1,031	$7,217
Arnold MS	$41,600	$6,046	$42,322
GPHS	$35,200	$3,887	$27,209
GPHS – 9th	$32,400	$3,767	$26,369
SGPHS	$18,200	$1,927	$13,489
SGPHS – 9th	$26,000	$2,950	$20,650

*First cost of fixtures and installation
** Energy savings

Install occupancy sensors in corridors

Facilities	Total Costs* (Years 1-7)	Annual Savings**	Total Savings** (Years 1-7)
Marshall ES	$3,600	$243	$1,701
GPHS	$20,000	$575	$4,025

*First cost of sensors and installation

**Energy savings

Install occupancy sensors in cafeteria

Facilities	Total Costs* (Years 1-7)	Annual Savings**	Total Savings** (Years 1-7)
Marshall ES	$800	$307	$2,149

*First cost of sensors and installation
**Energy savings

Power factor correction at high schools

Facilities	Total Costs* (Years 1-7)	Annual Savings	Total Savings** (Years 1-7)
GPHS	$	$8,219	$57,533
GPHS – 9th	$	$8,300	$58,100
SGPHS	$	$12,014	$84,098
SGPHS – 9th	$	$9,918	$69,426

*First cost of equipment and installation
**Reduction in surcharges from TDSP

Daylight harvesting in corridors

Facilities	Total Costs* (Years 1-7)	Annual Savings	Total Savings (Years 1-7)
Arnold MS	$900	$1,648	$0.5

Similar costs and savings could be achieved by applying these strategies to other schools in the district.

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.

2. If reverse osmosis or nano-filtration is used, reject waste volumes shall be reused for landscape irrigation or other beneficial purposes.

Refrigeration Equipment

1. Once through cooling of any refrigeration equipment is prohibited. Refrigeration equipment (i.e. refrigerators, walking coolers, ice cream and yogurt machines, and similar equipment) of 10 tons per hour or less shall be air-cooled or be fed with water from a closed cooling water loop.

2. Ice flake machines should be used instead of ice cubes makers whenever possible. Ice flakes require less water to produce. If ice cube makers are used, they shall be air-cooled and use no more than 20 gallons per 100 pounds of ice produced based on the Air-conditioning & Refrigeration Institute's annual Directory of Certified Automatic Commercial Ice-Cube Machines and Ice Storage Bins.

Warewashing

1. New warewashing equipment shall use less than 1.2 gallons of fresh water per rack based on National Sanitation Foundation information.

2. Conveyor-type dishwashers shall have electronic eye sensor system so that the machine only operates when there are dishes present on the conveyor belt, not continuously. If the conveyor is continuously running, expecting another load of dishes, water and chemicals are also spraying, to clean the ware that is not even there. This is a waste of energy, water, and chemicals.

Garbage Disposals

1. Manually scrap dishes into a garbage can or scrap basket to reduce the need for pre-rinse and/or pre-rinse time.

2. Manual pre-wash units shall have shut-off's that turn the water off when the operator lets go of the nozzle.

3. Garbage grinders and disposals should not be use where manually scrapping and the use of a scrapping basket with the pre-wash spray can be efficiently done.

4. All garbage disposals shall be equipped with solenoids that shut water flow to the disposal off when not in use.

5. All garbage disposals shall be air-cooled.

6. A scrapping system, a complete pre-rinsing and disposing system, that can increase efficiency in some kitchens. A recirculated water plume in the salvage basin allows the ware to be simultaneously soaked and rinsed, increasing scrapping efficiency and because the water is recirculated, new water does not need to be added. Waste falls from the salvage basin into a collection basket.

7. Where volume of use makes it feasible, install a recirculating "pot scrubbing" or Jacuzzi-style sink to loosen up foodstuff rather than under a stream of running water.

8. A fresh-water trough system, used for scrapping and pre-rinse, can use up to 14 gallons a minute and is not recommended. The amount of pressure and water needed to keep the waste

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.

APPENDIX F

Grand Prairie High School
ESID 4015975

Meter & Billing Data				Calculated				
Month	kw	Power Factor	BD*	ABD**	Penalty	kvar	kvar2 ***	Reqd Cap ****
Sep-09	1025	0.844	1025	1154	$836.76	651	337	314
Oct-09	951	0.897	951	1007	$365.24	469	313	156
Nov-09	505	0.882	858	924	$429.97	270	166	104
Dec-09	747	0.834	858	977	$775.70	494	246	249
Jan-10	785	0.842	858	968	$715.34	503	258	245
Feb-10	704	0.830	858	982	$806.31	473	231	242
Mar-10	725	0.863	858	944	$562.22	424	238	186
Apr-10	544	0.863	858	944	$562.22	318	179	140
May-10	738	0.841	858	969	$722.82	475	243	232
Jun-10	952	0.866	952	1044	$600.22	550	313	237
Jul-10	994	0.839	994	1126	$854.79	645	327	318
Aug-10	923	0.870	923	1008	$551.68	523	303	220
				Total	$7,783.28			

* Billed demand
** Adjusted billed demand (adjusted for power factor)
*** kvar at 0.95 power factor
**** Size of power factor correction capacitor

Grand Prairie High School
ESID 4016006

Meter & Billing Data				Calculated				
Month	kw	Power Factor	BD*	ABD**	Penalty	kvar	kvar2 ***	Reqd Cap ****
Sep-09	603	0.918	603	624	$136.63	260	198	62
Oct-09	502	0.955	502	502	$0.00	156	165	-9
Nov-09	394	0.974	482	482	$0.00	92	130	-38
Dec-09	366	0.978	482	482	$0.00	78	120	-42
Jan-10	379	0.971	482	482	$0.00	93	125	-31
Feb-10	399	0.956	482	482	$0.00	122	131	-9
Mar-10	405	0.972	482	482	$0.00	98	133	-35
Apr-10	374	0.969	482	482	$0.00	95	123	-28
May-10	471	0.957	482	482	$0.00	143	155	-12
Jun-10	552	0.950	552	552	$0.00	181	181	0
Jul-10	586	0.900	586	619	$211.61	284	193	91
Aug-10	547	0.927	547	561	$88.22	221	180	41
				Total	$436.45			

* Billed demand
** Adjusted billed demand (adjusted for power factor)
*** kvar at 0.95 power factor
**** Size of power factor correction capacitor

Grand Prairie High School - 9th Grade Center
ESID 6342927

Meter & Billing Data				Calculated				
Month	**kw**	**Power Factor**	**BD***	**ABD****	**Penalty**	**kvar**	**kvar2 *****	**Reqd Cap ********
Sep-09	817	0.824	817	942	$812.04	562	269	293
Oct-09	736	0.823	736	850	$738.24	508	242	266
Nov-09	486	0.833	654	746	$597.08	323	160	163
Dec-09	504	0.842	654	738	$545.26	323	166	157
Jan-10	568	0.837	654	742	$573.91	371	187	185
Feb-10	700	0.844	700	788	$571.45	445	230	215
Mar-10	620	0.849	654	732	$505.71	386	204	182
Apr-10	486	0.836	654	743	$579.68	319	160	159
May-10	647	0.828	654	750	$626.36	438	213	225
Jun-10	726	0.788	726	875	$970.15	567	239	329
Jul-10	526	0.787	654	789	$880.45	412	173	239
Aug-10	727	0.798	727	865	$900.10	549	239	310
				Total	$8,300.42			

* Billed demand
** Adjusted billed demand (adjusted for power factor)
*** kvar at 0.95 power factor
**** Size of power factor correction capacitor

South Grand Prairie High School
ESID 4017215

Meter & Billing Data				Calculated				
Month	kw	Power Factor	BD*	ABD**	Penalty	kvar	kvar2 ***	Reqd Cap ****
Sep-09	1652	0.845	1652	1857	$1,334.31	1,045	543	502
Oct-09	1442	0.842	1442	1627	$1,202.24	924	474	450
Nov-09	918	0.870	1322	1444	$790.16	520	302	218
Dec-09	888	0.888	1322	1414	$599.96	460	292	168
Jan-10	854	0.875	1322	1435	$736.54	473	281	192
Feb-10	964	0.901	1322	1394	$467.32	464	317	147
Mar-10	933	0.894	1322	1405	$538.26	468	307	161
Apr-10	875	0.862	1322	1457	$877.24	515	288	227
May-10	1303	0.845	1322	1486	$1,067.77	825	428	396
Jun-10	1448	0.850	1448	1618	$1,107.29	897	476	421
Jul-10	1436	0.810	1436	1684	$1,613.28	1,040	472	567
Aug-10	1645	0.821	1645	1903	$1,680.06	1,144	541	603
				Total	$12,014.45			

* Billed demand
** Adjusted billed demand (adjusted for power factor)
*** kvar at 0.95 power factor
**** Size of power factor correction capacitor

South Grand Prairie High School - 9th Grade Center
ESID 4017246

Meter & Billing Data				Calculated				
Month	kw	Power Factor	BD*	ABD**	Penalty	kvar	kvar2 ***	Reqd Cap ****
Sep-09	792	0.800	792	941	$965.25	594	260	334
Oct-09	660	0.795	660	789	$836.42	504	217	287
Nov-09	395	0.816	634	738	$676.73	280	130	150
Dec-09	419	0.835	634	721	$567.56	276	138	138
Jan-10	462	0.831	634	725	$590.13	309	152	157
Feb-10	443	0.810	634	744	$712.27	321	146	175
Mar-10	423	0.801	634	752	$766.58	316	139	177
Apr-10	383	0.804	634	749	$748.34	283	126	157
May-10	713	0.774	713	875	$1,053.84	583	234	349
Jun-10	762	0.793	762	913	$980.61	585	251	335
Jul-10	688	0.762	688	858	$1,103.33	585	226	358
Aug-10	790	0.806	790	931	$917.42	580	260	320
				Total	$9,918.48			

* Billed demand
** Adjusted billed demand (adjusted for power factor)
*** kvar at 0.95 power factor
**** Size of power factor correction capacitor