



Susan Combs

Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

City of Enchanted Oaks

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TABLE OF CONTENTS

1.	EXECUTIVE SUMMARY.....	1
2.	FACILITY DESCRIPTIONS.....	3
3.	FACILITY ENERGY PERFORMANCE.....	5
4.	ENERGY ACCOUNTING.....	5
5.	EMISSIONS CALCULATIONS.....	5
6.	RECOMMENDATIONS.....	6

APPENDIX A: UTILITY ANALYSIS DATA

APPENDIX B: ECM INFORMATION

APPENDIX C: ENERGY STAR - PORTFOLIO MANAGER

APPENDIX D: FUNDING AND PROCUREMENT

APPENDIX E: GOVERNMENT LEGISLATION AND STANDARDS

APPENDIX F: SERVICE AGREEMENT

1. EXECUTIVE SUMMARY

A Preliminary Energy Assessment (PEA) site visit for the City of Enchanted Oaks was conducted during the month of June 2010 for the purpose of identifying viable Energy Conservation Measures (ECMs). This report documents that investigation.

This service is provided by Jacobs at no cost to the City of Enchanted Oaks by the Texas Comptroller of Public Accounts, State Energy Conservation Office (SECO). This program promotes and encourages an active partnership between SECO and local political subdivisions for the purpose of planning, funding, and implementing cost-effective energy conservation measures. The goal is to reduce energy consumption of existing facilities and ultimately reduce regional emissions and facility energy costs.

The following ECMs were investigated and recommended for implementation or further detailed analysis:

ECM 1: Replace existing incandescent exit signs with new LED exit signs in the City Hall

ECM 2: Replace existing incandescent lights with new CFLs in the City Hall

ECM 3: Replace existing incandescent exit signs with new LED exit signs in the Fire Station

ECM 4: Replace existing T12 fluorescent light fixtures with new T8 fixtures in the Fire Station

A preliminary energy and cost savings evaluation was conducted on each recommended measure listed above. Descriptions of these measures and a summary of each evaluation are presented in the following sections. An overall summary of the results is presented in the ECM Table. Each proposed utility evaluation was based on the prevalent utility costs at the time of the audit.

As seen in the ECM table, the recommended measures provide for a combined estimated annual savings of up to \$153.78 for City Hall, with an estimated capital requirement of \$595.31 thus yielding a composite simple payback period of 3.9 years. For the Fire Station the annual savings would be \$132.79 based on a capital of \$1,855.93, yielding a simple payback of 14.0 years. Overall, it is estimated that by implementing these measures, electric utility consumption, in the buildings surveyed, can be reduced by 12.1% for City Hall and 10.5% for the Fire Station.

Descriptions and calculations for the recommended measures can be found within this report. A follow-up visit can be scheduled to address questions regarding the report, project financing options, implementation schedules, or any other aspect of this program or its implementation.

SECO is committed to providing whatever assistance is required in planning, funding, and implementing the recommendations of this report. The City of Enchanted Oaks is encouraged to direct any questions or concerns to either of the following:

SECO
Stephen Ross
1-800-531-5441, ext 3-1896

Jacobs
Travis Alexander
817-735-7063

Included in the appendix of this report is also a list of websites that can be utilized in learning more about SECO, Senate Bill 12, various funding solutions, energy saving projects, and various state and federal agency services and programs.

2. FACILITY DESCRIPTIONS

The City of Enchanted Oaks owns and operates two buildings within the city limits.

2.1. City Hall

The City Hall is located at 111 Deerwood Dr, Enchanted Oaks, TX, 75156. The facility consists of an 8,500 square foot, one story building that was constructed in the mid-1970s. The building's exterior walls are stone and wood siding, windows are single paned, and the roof is shingled and pitched.

The lighting fixtures in the building utilize incandescent lamps with magnetic ballasts. Based on conversations with the mayor, the building is used for a few hours a couple of times a month for monthly and city council meetings. The City Secretary works daily in an office in the building but is cooled by a window unit.

The building's air conditioning consists of a direct expansion split system and three window units located in individual offices (mayor, police chief and city secretary). In the split system, the air handler is a 9 year old unit with a 1/2hp fan motor. The indoor unit is in good condition overall. Heating is provided by electric resistance coils within the indoor unit. The condensing unit is a 10 year old, 5 ton unit; also in good condition. The window units are around 20 years old and are still operational.

The building is controlled by a manual thermostat and the setting is carefully monitored as the building is in use. In general, building occupants participate in manually setting back the temperature set point during unoccupied periods to conserve energy.

2.2. Fire Station

The Fire Station is located at 1 Enchanted Dr, Enchanted Oaks, TX, 75156. It is a one story building of approximately 6,900 square feet which was built in 2006. It is a metal structure with a structural steel frame separated into two portions. The garage has sliding bay doors for the fire trucks and insulation lining the inside of the metal siding. Other than a manually controlled freeze protection electric heater the garage is not conditioned. There is no exhaust vent in the garage due to the rare usage of the fire trucks (they are turned on only to get them in and out of the garage). The office portion of the building, which is about 1,500 square feet, is climate controlled but the AC is turned on only when the EMS team (primary users of the building) occupies it. Most doors have weather strips to assist in insulating the building except for the bottom portion of the doors between the conditioned offices and the unconditioned garage where there is about a ½ inch gap.

The lighting fixtures in the building utilize T12 fluorescent lamps with electronic ballasts.

Air conditioning is provided by a 4 ton, direct expansion split system. The indoor and outdoor units are about 4 years old and are in good condition. Due to the infrequent occupancy of the building, the system is rarely used (EMS personnel are not constant occupants; they share time among a number of facilities).

Hot water is provided by a 5 year old, electric water heater. It stays off the majority of the year and is only switched on if EMS personnel want a shower.

The building is controlled by a manual thermostat which is carefully regulated so that the system is on only when the building is in use.

3. FACILITY ENERGY PERFORMANCE

Based on current utility data, the City of Enchanted Oaks buildings have the following annual electric costs, Energy Use Index (EUI), and Energy Cost Index (ECI):

	Building	Electric			EUI	ECI	SF
		kWh/Yr	MMBTU/Yr	\$Cost/Yr	kBTU/SF/Yr	\$/SF/Yr	
1	City Hall	13,009	44	\$1,272.02	5	\$0.15	8,500
2	Fire Station	12,896	44	\$1,260.97	6	\$0.18	6,900
		kWh/Yr	MMBTU/Yr	\$Cost/Yr	kBTU/SF/Yr	\$/SF/Yr	SF
Total		25,905	88	\$2,532.99	6 (average)	\$0.17 (average)	15,400

The utility data collected can be found in Appendix A.

The EUI, an estimate of the energy consumption performance, is measured in thousands of BTUs per square foot per year. Likewise, the ECI, an estimate of the energy cost performance, is measured in dollars per square foot per year.

4. ENERGY ACCOUNTING

ENERGY ACCOUNTING DESCRIPTION

Energy is accounted for through monthly utility bills

AVERAGE UTILITY RATES

Utility Name	Average Rates
Green Mountain	\$0.09778/kWh

5. EMISSIONS CALCULATIONS

Pollution Prevention Factors		CO2	NOx	SO2
Building	Annual kWh Reduction	Carbon Dioxide (Pounds)	Nitrogen Oxide (Grams)	Sulphur Dioxide (Grams)
	City Hall	1,572	2,082	625
Fire Station	1,358	1,798	540	1,969
Total	2,930	3,880	1,165	4,247

Equivalent to:		Annual Number of Cars Taken	Annual Number of Acres of Trees Planted	Annual Number of American Homes Electricity Needs
Building	Annual kWh Reduction	Off the Road lbs CO2 /	lbs CO2 /	kWh / 10,000

		10,000	7,300	
City Hall	1,572	0.06	0.09	0.21
Fire Station	1,358	0.05	0.07	0.18
Total	2,930	0.12	0.16	0.39

6. RECOMMENDATIONS

MAINTENANCE AND OPERATIONS (M&O)

Maintenance and operations measures that often involve recommended changes in occupant behavior and maintenance practices that effect energy consumption.

City Hall

M&O Recommendations
Project Description
ENERGY STAR PC Power Management
Improved Lighting Controls Strategies
M&O Recommendations
Project Description
ENERGY STAR PC Power Management
Improved Lighting Controls Strategies

Fire Station

M&O Recommendations
Project Description
ENERGY STAR PC Power Management
Improved Lighting Controls Strategies

M&O recommendations for the City Hall and Fire Station include PC power management, installation of new programmable thermostats and improved lighting control strategies. Overall M&O procedures are very good for these two buildings with activities including:

- Manual setback of City Hall thermostat during unoccupied hours
- Scrupulous turning off of light fixtures when unoccupied
- Use of the Fire Station garage electric heater for freeze protection only
- Turning off the water heater when not in use
- Switching off the Fire Station AC unit during unoccupied periods.

All of these managerial measures significantly help energy savings. The M&O recommendations are provided for the owner's benefit. It is recommended that the ECMs in this report be implemented first as they will have a larger energy impact.

PC power management can help reduce equipment energy draw and equipment heat gain to the space (which would otherwise add to the cooling load). Computers with "sleep mode" that run on low power when not in use or the purchase of lower energy using Energy Star computers can have an effect. Energy Star recommends that computers enter sleep mode after 5-20 minutes of inactivity, or at a minimum, after 30-60 minutes of non-use for

additional energy savings. Computers should be switched off at night when not used to further conserve energy. It is possible to purchase timed power disconnects to ensure equipment is shutoff at night but these are usually not recommended for facilities this size, since the building occupants manage the building in an efficient manner. Switching off faxes and copiers at night will also help, however most of the newer models shutoff automatically after long periods of no use.

The existing manual thermostat at City Hall will continue to operate for some time, but replacing it with a programmable thermostat will provide for simpler operation of the HVAC system and potential for reduction in energy use. A typical programmable thermostat costs a few hundred dollars to install and can have a simple payback period of about 1.5 years due to setback temperatures during unoccupied periods. Actual realized energy savings might not be that high though since the building occupants are conscientious about setting back the temperature setpoint when they leave the building. It is up to occupants on whether they want to continue with the current manual thermostat control or would prefer something more automated.

The main recommended lighting strategy would be to install occupancy sensors to automatically shut off lights during unoccupied periods. Lights can still be equipped with manual overrides to ensure the lights turning on don't cause a nuisance if one is doing a presentation with a projector for instance. According to the building occupants though, everyone is mindful of switching off lights during unoccupied periods. Occupants should determine if this energy saving strategy will provide an added benefit to the current mode of operation.

ENERGY CONSERVATION MEASURES (ECMs)

City Hall

Energy Conservation Measures (ECMs)					
ECM	Project Description	Estimated Implementation Cost	Estimated Annual Savings (kWh/yr)	Estimated Annual Cost Savings	Simple Payback (years)
ECM 1	Install LED Exit Signs	\$284.81	543	\$53.12	5.4
ECM 2	Replace incandescent lights with CFLs	\$310.50	1,029	\$100.67	3.1
Total	(ECM 1+2)	\$595.31	1,572	\$153.78	3.9

Fire Station

Energy Conservation Measures (ECMs)					
ECM	Project Description	Estimated Implementation Cost	Estimated Annual Savings (kWh/yr)	Estimated Annual Cost Savings	Simple Payback (years)
ECM 3	Install LED Exit Signs	\$427.21	815	\$79.68	5.4
ECM 4a	Replace T12 fluorescent lights with T8 (4 hrs/day usage)	\$1,428.71	543	\$53.12	26.9
ECM 4b	Replace T12 fluorescent lights with T8 (8 hrs/day usage)	\$1,428.71	1,086	\$106.23	13.4
ECM 4c	Replace T12 fluorescent lights with T8 (12 hrs/day usage)	\$1,428.71	1,629	\$159.35	9.0

Total	(ECM 3+4a)	\$1,855.93	1,358	\$132.79	14.0
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Heating and cooling equipment in the City Hall and Fire Station are both less than 10 years old and therefore replacement is not recommended at this time. The ECMs that are recommended mainly pertain to lighting.

ECM 1 and ECM 3 involve replacing existing exit signs with new LED exit signs at the City Hall and Fire Station. While they are not excessively large energy users, they do run continuously throughout the year thus replacement with high efficiency LED fixtures has an attractive payback.

ECM 2 involves replacing an estimated 15 incandescent light bulbs with new CFL bulbs at City Hall. CFLs are readily available at home/hardware stores and the labor cost is assumed to be negligible making for a very attractive payback period.

ECM 4 involves replacing the existing T12 fluorescent light fixtures in the Fire Station with new T8 fixtures in order to reduce energy usage through lighting and cooling. Three scenarios, ECM 4a, 4b and 4c have been created for ECM4 in order to demonstrate the difference in energy/financial performance resulting from different lighting run-hours. Discussions with the mayor have indicated that the Fire Station is occupied intermittently so assumed run-hours per day started as low as four. As can be seen from the results, the more the lights run during the day the more attractive the payback.

ECMs 1-3 have attractive payback periods and should be pursued and ECM 4 has an attractive payback if usage is moderate to high, if actual usage is less than 7-8 hours per day on average, then the ECM is less attractive.

FACILITY IMPROVEMENT MEASURES (FIMs)

City Hall

Facility Improvement Measures (FIMs)
Project Description
Install double-pane, low-e coated windows
Install double-pane, low-e coated glass doors
Install weather sealing
Ceiling/roof insulation

Fire Station

Facility Improvement Measures (FIMs)
Project Description
Install weather sealing

The City Hall currently has single-pane clear windows. Single-pane clear windows provide poor insulating properties and contribute to solar heat gain which increases the cooling load. A recommended FIM is to replace the existing windows with new double-pane windows with low-emissivity (low-e) coating. Double-pane glass will increase the resistance to heat loss/gain and the low-e coating will help block infrared radiation from the sun which adds heat to the space. These same effects for the windows also apply to the doors.

Weather sealing will also help reduce the heating and cooling load for both buildings. In the Fire Station, the weather sealing is mainly needed along the bottom of the two doors between the office area and the garage. Weather sealing

helps reduce the loss of interior conditioned air and helps prevent the ingress of exterior unconditioned air. This can have a significant effect on heating and cooling consumption if large gaps are filled.

The City Hall is also a good candidate for roof/ceiling insulation. There is an existing single-layer of batt insulation above the ceiling but this could certainly be expanded upon economically. Spray-on foam insulation is easily applied and can be highly resistive to heat transfer.

RECOMMENDATIONS SUMMARY

City Hall

M&O Recommendations
Project Description
ENERGY STAR PC Power Management
Installation of new programmable thermostats
Improved Lighting Controls Strategies

Fire Station

M&O Recommendations
Project Description
ENERGY STAR PC Power Management
Improved Lighting Controls Strategies

City Hall

Energy Conservation Measures (ECMs)					
ECM	Project Description	Estimated Implementation Cost	Estimated Annual Savings (kWh/yr)	Estimated Annual Cost Savings	Simple Payback (years)
ECM 1	Install LED Exit Signs	\$107.39	543	\$53.12	2.0
ECM 2	Replace incandescent lights with CFLs	\$25.88	1,029	\$100.67	0.3

Fire Station

Energy Conservation Measures (ECMs)					
ECM	Project Description	Estimated Implementation Cost	Estimated Annual Savings (kWh/yr)	Estimated Annual Cost Savings	Simple Payback (years)
ECM 3	Install LED Exit Signs	\$161.08	815	\$79.68	2.0
ECM 4a	Replace T12 fluorescent lights with T8 (4 hrs/day usage)	\$910.46	543	\$53.12	17.1
ECM 4b	Replace T12 fluorescent lights with T8 (8 hrs/day usage)	\$910.46	1,086	\$106.23	8.6
ECM 4c	Replace T12 fluorescent lights with T8 (12 hrs/day usage)	\$910.46	1,629	\$159.35	5.7

City Hall

Facility Improvement Measures (FIMs)
Project Description
Install double-pane, low-e coated windows
Install double-pane, low-e coated glass doors
Install weather sealing
Ceiling/roof insulation

Fire Station

Facility Improvement Measures (FIMs)
Project Description
Install weather sealing

APPENDIX A: UTILITY ANALYSIS DATA

Utility data for May 2010 was provided. The average utility rate was calculated, excluding the TDU Surcharges. This rate was found to be \$0.09778 / kWh and used to calculate the Total Electric Cost.

City Hall

Month	Consumption (kWh)	Total Electric Cost
1	1,566	\$153.12
2	1,247	\$121.93
3	1,078	\$105.41
4	842	\$82.33
5	826	\$80.77
6	803	\$78.52
7	1,314	\$128.48
8	1,066	\$104.23
9	1,329	\$129.95
10	1,170	\$114.40
11	768	\$75.10
12	1,000	\$97.78
Total	13,009	\$1,272.02

Fire Station

Month	Consumption (kWh)	Total Electric Cost
1	1191	\$116.46
2	1170	\$114.40
3	756	\$73.92
4	788	\$77.05
5	751	\$73.43
6	978	\$95.63
7	1500	\$146.67
8	1422	\$139.04
9	1485	\$145.20
10	1237	\$120.95
11	786	\$76.86
12	832	\$81.35
Total	12896	\$1,260.97

APPENDIX B: ECM INFORMATION

ECM 1

PROJECT NAME:	Enchanted Oaks	PROJECT NO.:	FEWE0701-ENCHOAKS			
PROJECT LOCATION:	City Hall	ESTIMATOR:	S. West			
SUBMITTAL:	PEA Cost Estimates	DATE:	7/23/2010			
SYSTEM DESCRIPTION:	Exit Lights Retrofit	CHECKED BY:				
Replace Incandescent Exit Signs w/ LED Signs	2 EA	\$25.00	\$50.00	\$21.00	\$42.00	\$92.00
<p>THIS IS A PRELIMINARY COST ESTIMATE WHICH DOES NOT REPRESENT ACTUAL CONSTRUCTION COSTS OR CONTRACTOR BID PRICES. UNIT PRICES FOR MATERIAL AND LABOR COSTS WERE DEVELOPED USING PUBLISHED COST DATA AND OTHER RELIABLE SOURCES. A CONSERVATIVE CONTINGENCY HAS BEEN INCLUDED IN THIS ESTIMATE TO ACCOUNT FOR UNKNOWN FACTORS BUT DESIGN DEVELOPMENT ISSUES, SCOPE CHANGES, AND MARKET CONDITIONS AT THE TIME OF BIDDING MAY AFFECT ACTUAL CONSTRUCTION COSTS.</p>						
TAX (ASSUMES TAX EXEMPT)		0.0%			\$0.00	\$0.00
SUBTOTAL			\$50.00		\$42.00	\$92.00
CONTINGENCIES		15.0%				\$13.80
DESIGN		0.0%				\$0.00
CONSTRUCTION ADMINISTRATION		1.5%				\$1.59

Energy

Incandescent Exit Signs (2 x 20W bulbs = 40W input)	2 EA	24	365	701
LED Exit Signs (9W input)	2 EA	24	365	158

ECM 2

PROJECT NAME:	Enchanted Oaks	PROJECT NO.:	FEWE0701-ENCHOAKS				
PROJECT LOCATION:	City Hall	ESTIMATOR:	S. West				
SUBMITTAL:	PEA Cost Estimates	DATE:	7/23/2010				
SYSTEM DESCRIPTION:	Replace Incandescents with CFLs	CHECKED BY:					
Replace Incandescent Lights with CFLs	15 EA	\$0.00	\$0.00	\$1.50	\$22.50	\$22.50	
<p>THIS IS A PRELIMINARY COST ESTIMATE WHICH DOES NOT REPRESENT ACTUAL CONSTRUCTION COSTS OR CONTRACTOR BID PRICES. UNIT PRICES FOR MATERIAL AND LABOR COSTS WERE DEVELOPED USING PUBLISHED COST DATA AND OTHER RELIABLE SOURCES. A CONSERVATIVE CONTINGENCY HAS BEEN INCLUDED IN THIS ESTIMATE TO ACCOUNT FOR UNKNOWN FACTORS BUT DESIGN DEVELOPMENT ISSUES, SCOPE CHANGES, AND MARKET CONDITIONS AT THE TIME OF BIDDING MAY AFFECT ACTUAL CONSTRUCTION COSTS.</p>							
TAX (ASSUMES TAX EXEMPT)		0.0%			\$0.00	\$0.00	
SUBTOTAL			\$0.00		\$22.50	\$22.50	
CONTINGENCIES		15.0%				\$3.38	
DESIGN		0.0%				\$0.00	
CONSTRUCTION ADMINISTRATION		0.0%				\$0.00	

Energy

	QUANTITY	UNIT	HSR UNIT	HSR PRICE	HSR TOTAL
Incandescent Lights (60W apiece)	15	EA	4	365	1,314
CFL Lights (13W apiece)	15	EA	4	365	285

ECM 3

PROJECT NAME:	Enchanted Oaks	PROJECT NO.:	FEWED701-ENCHOAKS			
PROJECT LOCATION:	Fire Station	ESTIMATOR:	S. West			
SUBMITTAL:	PEA Cost Estimates	DATE:	7/23/2010			
SYSTEM DESCRIPTION:	Exit Lights Retrofit	CHECKED BY:				
Replace Incandescent Exit Signs w/ LED Signs	3 EA	\$25.00	\$75.00	\$21.00	\$63.00	\$138.00
<p>THIS IS A PRELIMINARY COST ESTIMATE WHICH DOES NOT REPRESENT ACTUAL CONSTRUCTION COSTS OR CONTRACTOR BID PRICES. UNIT PRICES FOR MATERIAL AND LABOR COSTS WERE DEVELOPED USING PUBLISHED COST DATA AND OTHER RELIABLE SOURCES. A CONSERVATIVE CONTINGENCY HAS BEEN INCLUDED IN THIS ESTIMATE TO ACCOUNT FOR UNKNOWN FACTORS BUT DESIGN DEVELOPMENT ISSUES, SCOPE CHANGES, AND MARKET CONDITIONS AT THE TIME OF BIDDING MAY AFFECT ACTUAL CONSTRUCTION COSTS.</p>						
TAX (ASSUMES TAX EXEMPT)		0.0%			\$0.00	\$0.00
SUBTOTAL			\$75.00		\$63.00	\$138.00
CONTINGENCIES		15.0%				\$20.70
DESIGN		0.0%				\$0.00
CONSTRUCTION ADMINISTRATION		1.5%				\$2.38

Energy

Incandescent Exit Signs (2 x 20W bulbs = 40W input)	3 EA	24	365	1,051
LED Exit Signs (9W input)	3 EA	24	365	237

ECM 4

PROJECT NAME:	Enchanted Oaks	PROJECT NO.:	FEWED701-ENCHOAKS			
PROJECT LOCATION:	Fire Station	ESTIMATOR:	S. West			
SUBMITTAL:	PEA Cost Estimates	DATE:	7/23/2010			
SYSTEM DESCRIPTION:	Replace T12 with T8s	CHECKED BY:				
Replace T12 fluorescents with T8s 48" length - 2 lamps/fixture	12 EA	\$45.00	\$540.00	\$20.00	\$240.00	\$780.00
<p>THIS IS A PRELIMINARY COST ESTIMATE WHICH DOES NOT REPRESENT ACTUAL CONSTRUCTION COSTS OR CONTRACTOR BID PRICES. UNIT PRICES FOR MATERIAL AND LABOR COSTS WERE DEVELOPED USING PUBLISHED COST DATA AND OTHER RELIABLE SOURCES. A CONSERVATIVE CONTINGENCY HAS BEEN INCLUDED IN THIS ESTIMATE TO ACCOUNT FOR UNKNOWN FACTORS BUT DESIGN DEVELOPMENT ISSUES, SCOPE CHANGES, AND MARKET CONDITIONS AT THE TIME OF BIDDING MAY AFFECT ACTUAL CONSTRUCTION COSTS.</p>						
TAX (ASSUMES TAX EXEMPT)		0.0%			\$0.00	\$0.00
SUBTOTAL			\$540.00		\$240.00	\$780.00
CONTINGENCIES		15.0%				\$117.00
DESIGN		0.0%				\$0.00
CONSTRUCTION ADMINISTRATION		1.5%				\$13.46

Energy

T-12 Fluorescents (74W/fixture)	12 EA	4	365	1,296
T-8 Fluorescents (43W/fixture)	12 EA	4	365	753

T-12 Fluorescents (74W/fixture)	12 EA	8	365	2,593
T-8 Fluorescents (43W/fixture)	12 EA	8	365	1,507

T-12 Fluorescents (74W/fixture)	12 EA	12	365	3,889
T-8 Fluorescents (43W/fixture)	12 EA	12	365	2,260

APPENDIX C: ENERGY STAR – PORTFOLIO MANAGER

Energy Star is a joint program between the US Environmental Protection Agency (US EPA) and the Department of Energy (US DOE) that promotes the efficient use of energy in multiple industries. One focus of the Energy Star program is on energy efficiency of existing buildings.

Portfolio Manager was created as an industry tool to aid those that work with existing buildings in benchmarking energy performance. Portfolio Manager benchmarking data is based on the Commercial Buildings Energy Consumption Survey administered by the US DOE Energy Information Administration every four years. The survey includes energy use figures from thousands of buildings throughout the United States for various end uses. For a particular building type (e.g. and office building), the building is compared statistically to similar buildings in the survey and assigned a score of 1-100. A score of 50 indicates an average building in terms of energy performance. A score of 1 means that the building is in the lowest 1% of buildings for energy performance and a score of 100, indicates performance in the top 1%.

Energy Star - Portfolio Manager			
Building	Site EUI (kbtu/sf/yr)	Source EUI (kbtu/sf/yr)	Energy Star Rating (1-100)
City Hall	5.2	17.4	100
Fire Station	6.4	21.3	100

Site Energy Use Intensity (EUI) uses figures of metered electrical kWh to the building and then converts them to kbtus. This is the same procedure used for EUI earlier in this report. Portfolio Manager also calculates source EUI for easier comparison among fuel types. Source EUI takes into account energy losses from the original fuel source. For electricity, the original fuel consumption occurs at the power plant where electrical conversion efficiencies are often 30-40% for traditional fossil fuel sources. Portfolio Manager uses a source-site factor (or ratio) to convert site energy to source energy and it uses the same figure for all grid-supplied electricity. The source-site factor for electricity is 3.340. So for the City Hall building, one would take the site EUI of 5.2 kbtu/sf/yr and multiply it by 3.340, this comes to a source EUI of 17.4 kbtu/sf/yr. The City Hall and Fire Station use Green Mountain Energy however, which provides primarily wind-generated power. While wind power doesn't consume fossil fuels, there is still a transportation and distribution loss between the wind farm and the buildings that it serves. In addition, there are times when wind production is low due to weather conditions. Regardless, the source-site ratio does not directly apply to a wind-generation power source. We have retained the typical Portfolio Manager source-site ratio however in order to show what the source energy use would be on a typical fossil fuel power plant.

Both buildings have scored a 100 on the 1-100 scale. This means that both buildings are in the top 1 percentile of similar buildings in terms of energy performance. Local government buildings and fire stations are not building categories under Portfolio Manager so we benchmarked them in relation to general office buildings. Most office buildings have much more regular occupancy than for the City Hall and Fire Station buildings in Enchanted Oaks. The irregular operating hours of both buildings is the primary reason why energy consumption is so low compared to office buildings of a similar size. A secondary reason is also that energy management is fairly good at both facilities. Switching off lights, equipment and setting back or switching off HVAC equipment also contribute significantly to relatively low energy consumption.

APPENDIX D: FUNDING AND PROCUREMENT

NON-TRADITIONAL FUNDING METHODS

When traditional means of funding projects are not available, non-traditional funding may be desirable in order to implement beneficial projects. Energy and operational cost savings can be used to fund projects such as the ones recommended in this report. A couple of options are available when considering funding projects with cost savings.

The first way would be to secure a low interest loan and fund the projects internally by “fixing” the operational budgets over the term of the loan and use the savings to pay back the loan. Low interest loans are available through the State’s Texas LoanSTAR (Saving Taxes and Resources) Program.

The LoanSTAR Program has served as a national model for state and federal loan programs for energy efficiency retrofits, and is SECO’s most highly visible program. Legislatively mandated to be funded at a minimum of \$95 million at all times, to date the LoanSTAR Program has saved Texas taxpayers over \$250 million through energy efficiency projects, financed for state agencies, institutions of higher education, school districts, and local governments. The program’s revolving loan mechanism allows borrowers to repay loans through the stream-of-cost savings generated by the funded projects. The program will fund energy saving projects with a maximum combined simple payback of 10 years.

Currently the interest rate for all new loans funded from now until 8/31/2009 is set at 3% APR. The interest rate for the LoanSTAR Program is based on several factors which include money market rates and LoanSTAR administrative cost. Rates are evaluated and set every fiscal year, from 9/01 - 8/31.

In order to qualify for funding from the LoanSTAR Program, a detailed energy audit or energy assessment report (EAR) must be completed for the facility/department by a licensed professional engineer in the State of Texas. The purpose of the EAR is to validate the savings estimated in this PEA, through a very detailed approach, as well as confirm the scope of work required for each project.

To assure the borrower that projects are constructed according to the EAR and LoanSTAR technical guidelines, SECO performs design specification review and on-site construction monitoring at 50% and 100% complete.

Another non-traditional solution to funding these projects is to secure the services of a performance contractor. Performance contractors can finance projects in the same manner as the LoanSTAR program by using energy and operational savings as funding for the projects. Performance contractors can package projects with paybacks up to 20 years and pull from a large variety of financial resources for low-interest funding (including the LoanSTAR Program). For more information on this subject feel free to visit the SECO website or call Jacobs at the number shown on the front cover of this PEA.

APPENDIX E: GOVERNMENT LEGISLATION AND STANDARDS

Energy Efficiency Programs in Political Subdivisions

Senate Bill 12

An Act relating to programs for the enhancement of air quality, including energy efficiency standards in state purchasing and energy consumption.

House Bill 3693

An Act relating to energy demand, energy load, energy efficiency initiatives, energy programs, and energy performance measures.

HB 3693 and SB 12 Rules

The State Energy Conservation Office (SECO) has published rules on House Bill (HB) 3693 and Senate Bill (SB) 12 for persons who have an interest in the adoption of energy codes to have an opportunity to comment on newly published editions of the International Energy Conservation Code and the International Residential Code. The code manuals can be purchased at the **International Code Council** web site.

BACKGROUND

In 2001, the 77th Texas Legislature passed **Senate Bill 5 (SB5)**, also known as the Texas Emissions Reduction Plan, to amend the Texas Health and Safety Code. The legislation required ambitious, fundamental changes in energy use to help the state comply with federal Clean Air Act standards. It applied to all political subdivisions within 38 designated counties, later expanded to **41 counties**.

In 2007, the 80th Texas Legislature passed **Senate Bill 12 (SB 12)** which among other things extended the timeline set in SB 5 for emission reductions. Where SB 5 required political subdivisions to reduce their electrical consumption by five percent (5%) for five years beginning January 1, 2002, the SB 12 legislation requires that such entities establish a goal to make the five percent (5%) reductions each year for six years, effective September 1, 2007.

SB 12 amended the Health and Safety Code Section 388.005, in part, by requiring affected political subdivisions to: implement all cost-effective energy-efficiency measures, establish a goal to reduce electricity consumption by 5 percent each year for 6 years, and report efforts and progress annually to the State Energy Conservation Office (SECO). The report details the efforts being undertaken by SECO to provide assistance and information to affected entities, as well as the progress and efforts made by political subdivisions in meeting the energy efficiency mandates of SB 5/SB 12.

Meeting Your Energy Efficiency Goals

In terms of energy efficiency, the biggest step is requiring new buildings to meet the state's energy performance standards. These standards call for better weather stripping, more efficient air conditioners, stricter insulation guidelines, switches to turn off water heaters, tighter building envelopes and energy-efficient windows for new buildings. Under the new law, municipalities and counties can continue to make local amendments to the state energy codes as long as they are not less stringent than the statewide standard.

Source: <http://www.seco.cpa.state.tx.us/sb5compliance.htm>

USEFUL WEBSITES:

A. DATABASE OF STATE INCENTIVES FOR RENEWABLE ENERGY

www.dsireusa.org

DSIRE provides information on state, local, utility, and selected federal incentives that promote renewable energy.

B. OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

www.eere.energy.gov

EERE is a resource site containing hundreds of web sites and thousands of online documents regarding energy efficiency and renewable energy. Also included are direct links to the Department of Energy offices and programs.

C. PUBLIC UTILITIES COMMISSION

www.puc.state.tx.us/electric/projects/25309/25309.cfm

This link provides a source of information for the Energy Efficiency Grant Program. This includes the Program Application and Guidelines as well as a list of eligible counties and utilities.

D. REBUILD AMERICA

www.rebuild.org

Rebuild America is a program under the Office of Energy Efficiency and Renewable Energy that focuses on energy efficiency solutions as community solutions. The site provides community partnerships ideas, tools, resources, and energy-smart technologies for help in fulfilling locally designed efficient energy solutions. Categories included are building renovation, new construction, renewable technologies, green building, city lighting, alternatively fueled vehicles, downtown revitalization, and more.

E. STATE ENERGY CONSERVATION OFFICE

<http://www.seco.cpa.state.tx.us>

The Texas State Energy Conservation Office provides information about various programs that are offered and how they may be implemented. SECO's programs focus on energy cost and consumption at the institutional, industrial, transportation, and residential levels.

F. TEXAS GENERAL LAND OFFICE

www.glo.state.tx.us

The primary mission of the General Land Office (GLO) is the management of state lands and mineral right properties. GLO manages an oil and natural gas program and a state electric power program. These programs provide gas and electricity to state agencies and public school districts at a discounted cost. The proceeds from the programs help to fund the state's Permanent School Fund.

APPENDIX F: SERVICE AGREEMENT



Local Governments and Municipalities

Preliminary Energy Assessment Service Agreement

Investing in our communities 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 The Town of Enchanted Oaks, hereinafter referred to as Partner, to identify energy cost-savings potential. To achieve this potential, SECO and Partner have agreed to work together to complete an energy assessment of mutually selected facilities.

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

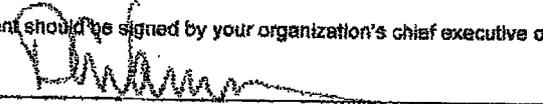
Principles of the Agreement

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

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

Acceptance of Agreement

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

Signature: 

Date: 11/12/09

Name (Mr./Ms./Dr.): Donald G. Warner III

Title: Mayor

Organization: Town OF Enchanted Oaks

Phone: 903-451-2222

Street Address: 111 Deerwood Drive

Fax: 903-451-2222

Mailing Address: PO Box 5019

E-Mail: enchantedoaks@earthlink.net

Mabank , 75156

County: Henderson

Contact Information:

Name (Mr./Ms./Dr.): Donald G. Warner III

Title: Mayor

Phone: cell 903-603-3303

Fax: 903-451-2222

E-Mail: enchantedoaks@earthlink.net

County: Henderson

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

Jacobs 5/13/10 SR

Rec'd: 11/17/09