



Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

City of Skellytown

Prepared by:

Jacobs Engineering Group



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1. EXECUTIVE SUMMARY

A Preliminary Energy Assessment (PEA) site visit for the City of Skellytown was conducted during the month of September 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 Skellytown 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: Lighting Retrofit: Replace existing incandescent exit sign lamps with LEDs.

ECM 2: Replace existing T12 fluorescent lamps and ballasts in City Hall with new T8 fluorescent lamps and ballasts.

ECM 3: Installation of new programmable thermostats.

ECM 4: Replace existing T12 fluorescent lamps and ballasts in the Community Center with new T8 fluorescent lamps and ballasts.

ECM 5: Replace existing incandescent lamps in the Community Center with compact fluorescent lamps (CFL).

ECM 6: Replacement of existing condensing units.

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 (Table 3). 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 \$5,698.52, with an estimated capital requirement of \$42,906.94 thus yielding a composite simple payback period of 6.3 years. Overall, it is estimated that by implementing these measures electric utility consumption in the building surveyed can be reduced by 60.1%.

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 Skellytown is encouraged to direct any questions or concerns to either of the following:

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

Jacobs
Scott West
817-347-5370

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

Jacobs reviewed two of the buildings that the City of Skellytown owns and operates.

2.1. City Hall

The City Hall building is located at 204 4th Street, Skellytown, TX 79080. The facility includes a basement, boiler room, and barn. The exterior of the City Hall building is brick veneer with metal standing seam as the predominant roofing material. The barn section is all metal. The entire building is 46,100 square feet.

The lighting fixtures in the building are T12 fluorescents with magnetic ballasts.

Climate in the building is controlled by seven DX, split systems. The condensing units are all 1996 Lennox units. There are three with a 4 ton capacity and EER rating of 8.6, two with a 3 ton capacity and EER rating of 8.7 and one with a 5 ton capacity and EER rating of 8.9. Five non-programmable thermostats control the systems.

Most of the space in the building is not being used; the goal is to renovate the building and rent the unoccupied areas out as office space.

2.2. Community Center

The Community Center is a 1,000 square foot concrete block building with a metal roof.

The lighting fixtures in the building are a mixture of T12 fluorescents with magnetic ballasts, incandescent flood lights and compact fluorescent lights (CFL).

Climate in the building is controlled by one DX, split system. The condensing unit is a 2004 Comfortmaker unit. Since this unit is under 10 years old it does not need to be replaced. The system is controlled by 2 programmable thermostats.

3. FACILITY ENERGY PERFORMANCE

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

Building	Electric			Natural Gas			Total	Total	EUI	ECI	SF
	kWh/Yr	MMBTU/Yr	\$Cost/Yr	MCF/Yr	MMBTU/Yr	\$Cost/Yr	\$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	\$/SF/Yr	
1 Elementary School (City Hall)	42,780	146	\$2,500.99	840.6	970	\$6,309.62	\$8,810.61	1,116	27	\$0.21	42,000
2 Community Center	2,602	9	\$311.27	22.6	26	\$356.98	\$668.25	35	35	\$0.67	1,000
	kWh/Yr	MMBTU/Yr	\$Cost/Yr	MCF/Yr	MMBTU/Yr	\$Cost/Yr	\$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	\$/SF/Yr	SF
	45,382	155	\$2,812.26	863.2	996	\$6,666.60	\$9,478.86	1,151	31	\$0.44	43,000

Table 1 - Energy Benchmarking

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	Average Rates
Electricity	\$0.0589 /kWh
Gas	\$7.55 /MCF

Table 2 - Utility Rates

5. RECOMMENDATIONS

ENERGY CONSERVATION MEASURES (ECMs)

Energy Conservation Measures (ECMs)					
ECM	Project Description	Estimated Implementation Cost	Estimated Annual Savings (kWh/yr)	Estimated Annual Cost Savings	Simple Payback (years)
ECM 1	Replace incandescent exit sign lamps with LEDs	\$113.81	272	\$15.99	7.1
ECM 2	Replace T12 fluorescent lights with T8 (City Hall)	\$19,305.15	45,572	\$2,684.17	7.2
ECM 3	Install programmable thermostats	\$1,062.20	34,780	\$2,048.54	0.5
ECM 4	Replace T12 fluorescent lights with T8 (Community Center)	\$860.85	2,278	\$134.15	6.4
ECM 5	Replace incandescent lights with CFLs (Community Center)	\$168.08	2,593	\$152.73	1.1
ECM 6	Replacement of existing condensing units	\$21,396.86	11,255	\$662.94	32.3

Table 3 - ECMs

ECM 1 involves replacing the existing exit sign with a new LED exit sign. While they are not excessively large energy users, they do run continuously throughout the year, thus replacement with high efficiency LED fixtures is a worthwhile measure.

ECM 2 involves replacing the existing T12 fluorescent lamps and magnetic ballasts in the City Hall building with T8 lamps and electronic ballasts in order to reduce energy usage through lighting and cooling. The energy savings compared to materials and labor costs make for an attractive payback period.

ECM 3 involves replacing non-programmable thermostats with programmable ones. This allows for a more controlled environment and eliminates energy waste due to inefficient temperature setback patterns by the occupants. These too have very attractive payback periods.

ECM 4 involves replacing the existing T12 fluorescent lamps and magnetic ballasts in the Community Center with T8 lamps and electronic ballasts in order to reduce energy usage through lighting and cooling. The energy savings compared to materials and labor costs make for an attractive payback period.

ECM 5 involves replacing incandescent lamps in the Community Center with CFLs. CFLs are readily available at home/hardware stores and the labor cost is assumed to be negligible making for an attractive payback period.

ECM 6 involves replacing a condensing unit that is greater than 10 years old. Most of these units are less than 5 tons, so a minimum SEER rating of 14 is required to ensure measurable energy savings and a reasonable payback time.

MAINTENANCE AND OPERATIONS RECOMMENDATIONS (M&Os)

N/A

FACILITY IMPROVEMENT MEASURES (FIMs)

N/A

6. EMISSIONS CALCULATIONS

	Annual kWh Reduction	Pollution Prevention Factors			Equivalent to:		
		CO2	NOx	S02	Annual Number	Annual Number	Annual Number
		Carbon Dioxide	Nitrogen Oxide	Sulphur Dioxide	of Cars Taken	of Acres of	of American Homes
		(Pounds)	(Grams)	(Grams)	Off the Road	Trees Planted	Electricity Needs
				lbs CO2 / 10,000	lbs CO2 / 7,300	kWh / 10,000	
City Hall	60,480	80,097	24,040	87,674	8.01	10.97	6.05
Community Center	2,820	3,735	1,121	4,088	0.37	0.51	0.28
Total	63,300	83,831	25,161	91,761	8.38	11.48	6.33

Table 9 - Emission Calculations

With the energy savings shown above, the resulting reduced amount of pollution has been calculated. Making the proposed improvements is equivalent to 8 cars being taken off the road, planting 11 acres of trees, and powering 6 American homes.

APPENDIX A: UTILITY ANALYSIS DATA

Electric					
Elementary School (City Hall)			Community Center		
Date	kWh	Cost	Date	kWh	Cost
Jul-09	6600	\$388.50	Jul-09	300	\$36.81
Aug-09	6600	\$388.50	Aug-09	290	\$35.59
Sep-09	4500	\$264.88	Sep-09	260	\$31.91
Oct-09	2880	\$168.21	Oct-09	259	\$30.22
Nov-09	4700	\$273.32	Nov-09	205	\$26.67
Dec-09	6240	\$352.56	Dec-09		
Jan-10	5440	\$310.08	Jan-10	274	\$31.27
Feb-10	6280	\$356.31	Feb-10	202	\$26.25
Mar-10	4160	\$241.28	Mar-10	288	\$32.25
Apr-10	2920	\$193.79	Apr-10	237	\$30.66
May-10	3520	\$205.44	May-10	196	\$25.87
Jun-10	6640	\$400.00	Jun-10	309	\$36.32
total	60480	\$3,542.87	total	2820	\$343.82

data not given, guess

Gas					
Elementary School (City Hall)			Community Center		
Date	CCF	Cost	Date	CCF	Cost
Jul-09	35	\$38.00	Jul-09	1	\$20.44
Aug-09	35	\$38.00	Aug-09	1	\$20.44
Sep-09	200	\$150.00	Sep-09	7	\$27.00
Oct-09	332.194	\$216.13	Oct-09	14	\$31.09
Nov-09	965.194	\$662.85	Nov-09	14	\$31.45
Dec-09	2389.555	\$1,940.33	Dec-09	40	\$52.00
Jan-10	1667.084	\$1,353.49	Jan-10	43	\$54.87
Feb-10	1890.245	\$1,342.62	Feb-10	49	\$54.75
Mar-10	801.953	\$514.35	Mar-10	3	\$22.99
Apr-10	284.301	\$191.24	Apr-10	13	\$28.29
May-10	43.817	\$46.25	May-10	1	\$21.01
Jun-10	40	\$43.00	Jun-10	1	\$20.44
total	8684.343	\$6,536.26	total	187	\$384.77

APPENDIX B: ECM INFORMATION

ECM 1: Lighting Retrofit: Replace existing incandescent exit sign lamps with LEDs.

Cost Estimate

JACOBS COST ESTIMATING ANALYSIS							
PROJECT NAME:	Skellytown			PROJECT NO.:	FEWE0701-SKELL		
PROJECT LOCATION:	City Hall (Old School)			ESTIMATOR:	K. Popp		
SUBMITTAL:	PE A Cost Estimates			DATE:	9/1/2010		
SYSTEM DESCRIPTION:	Exit Lights Retrofit			CHECKED BY:	T.Alexander		
TASK DESCRIPTION	QUANTITY		LABOR		MATERIALS		TOTAL COSTS
	NO/UNIT	UNIT	UNIT PRICE	COST	UNIT PRICE	COST	
Replace Incandescent Exit Signs w/ LED Signs	1	EA	\$24.50	\$24.50	\$73.00	\$73.00	\$97.50
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.							
TAX (ASSUMES TAX EXEMPT)			0.0%			\$0.00	\$0.00
SUBTOTAL				\$24.50		\$73.00	\$97.50
CONTINGENCIES			15.0%				\$14.63
DESIGN			0.0%				\$0.00
CONSTRUCTION ADMINISTRATION			1.5%				\$1.68
TOTAL							\$113.81

Total Energy Savings Calculations

Facility Name: City Hall (Old School) City: Skellytown
 Site Address: 204 4th Street County: Carson
 ECM Number: 1 Building Area: 46,100 SF
 ECM Description: Exit Lights Retrofit

Replace existing incandescent exit sign lamps with LEDs
 Elec Rate= 0.0589

Existing Conditions: 1 Number of florescent fixtures in area observed
 40 Wattage of fixtures observed in area
 9 Wattage of fixtures after retrofit

 8,760 Annual lighting hours
 0.031 kW savings due to lighting consumption
 272 Annual kWh savings due to lighting consumption

 272 Total Annual kWh savings
 \$16 Total Cost Savings

 \$114 Estimated Cost

 7.1 Simple Payback

Total Energy Savings Calculations

Facility Name: City Hall (Old School)
 Site Address: 204 4th Street
 ECM Number: 2
 ECM Description: T12 - T8 lighting retrofit

City: Skellytown
 County: Carson
 Building Area: 46,100 SF

Existing T12 lighting in City Hall could be upgraded to T8 lighting

	4 lamps	2 lamps	1 lamp	2 lamp (Barn)	Elec Rate=	0.0589
Existing Conditions:	140	59	62	9	Number of florescent fixtures in area observed	
	172	86	46	126	Wattage of fixtures observed in area	
	120	60	32	116	Wattage of fixtures after retrofit	
	4,380	4,380	4,380	4,380	Annual lighting hours	
	7.280	1.534	0.868	0.090	kW savings due to lighting consumption	
	31886	6719	3802	394	Annual kWh savings due to lighting consumption	
	1.44	1.44	1.44	2.44	Assumed kW/ton of cooling	
	2.07	0.44	0.25	0.03	Peak tons of cooling saved from lighting retrofit	
	2.98	0.63	0.36	0.06	kW savings due to cooling load reduction	
	2,051	432	245	43	Annual kWh savings due to cooling load reduction	
	13.65				Total Annual kW savings	
	45,572				Total Annual kWh savings	
	\$2,684				Total Cost Savings	
	\$19,305				Estimated Cost	
	7.2				Simple Payback	

ECM 3: Installation of new programmable thermostats.

Cost Estimate

JACOBS COST ESTIMATING ANALYSIS							
PROJECT NAME:		City of Skellytown		PROJECT NO.: FEWE0701-SKELL			
PROJECT LOCATION:		City Hall		ESTIMATOR: K. Popp			
SUBMITTAL:		PEA Cost Estimates		DATE: 9/1/2010			
SYSTEM DESCRIPTION:		Install Programmable Thermostats		CHECKED BY: T. Alexander			
TASK DESCRIPTION	QUANTITY		LABOR		MATERIALS		TOTAL COSTS
	NO/UNIT	UNIT	UNIT PRICE	COST	UNIT PRICE	COST	
Programmable Thermostat	5	EA	\$49.00	\$ 245	\$133.00	\$ 665	\$910.00
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.							
TAX (ASSUMES TAX EXEMPT)		0.0%				\$0.00	
SUBTOTAL				\$245.00		\$665.00	
CONTINGENCIES		15.0%				\$136.50	
DESIGN		0.0%				\$0.00	
CONSTRUCTION ADMINISTRATION		1.5%				\$15.70	
TOTAL						\$1,062.20	

Energy Savings Calculation

Facility Name: City Hall (Old School)
 Site Address: 204 4th Street
 ECM Number: 3

City: Skellytown
 County: Carson
 Building Area: 46,100 SF

ECM Description: Install Programmable Thermostats

Opportunity: When the space is unoccupied, setpoint temperature can change to reduce heating/cooling load

Assumed U-Values Walls	0.124 Btu/hr-ft ² -F	Electric Rate:	0.0589
Assumed Wall Area	8,626 ft ²		
Assumed U-Values Roof	0.064 Btu/hr-ft ² -F		
Assumed Roof Area	46,500 ft ²		
Heating Season Thermostat Setpoint	70 F		
Heating Season Thermostat Setback	60 F		
Heating Season Setback Hours	1,456 hrs		
Heating Equipment Efficiency	100%		
Cooling Season Thermostat Setpoint	72 F		
Cooling Season Thermostat Setback	85 F		
Cooling Season Setback Hours	3,276 hrs		
Performance of Cooling System	1.22 kW/ton		
Total Envelope UA - Value	4,046 Btu/hr-F		
Electric Heating Energy Savings	17,264 kWh/yr		
Electric Heating Cost Reduction	1017 \$/yr		
Cooling Energy Savings	17,516 kWh/yr		
Estimated Electricity Rate	\$0.059 per kWh		
Cooling Cost Savings	1032 \$/yr		
Annual Cost Savings	\$2,049		
Installed cost	\$1,062		
Simple Payback	0.5 years		

ECM 4: Replace existing T12 fluorescent lamps and ballasts in the Community Center with new T8 fluorescent lamps and ballasts

Cost Estimate

JACOBS COST ESTIMATING ANALYSIS							
PROJECT NAME:	Skellytown			PROJECT NO.: FEWE0701-SKELL			
PROJECT LOCATION:	Community Center			ESTIMATOR: K. Popp			
SUBMITTAL:	PEA Cost Estimates			DATE: 9/1/2010			
SYSTEM DESCRIPTION:	Replace T12 with T8s and Repl			CHECKED BY: T. Alexander			
TASK DESCRIPTION	QUANTITY		LABOR		MATERIALS		TOTAL COSTS
	NO/UNIT	UNIT	UNIT PRICE	COST	UNIT PRICE	COST	
Replace T12 fluorescents with T8s 48" length - 4 lamps/fixture	10	EA	\$41.75	\$417.50	\$32.00	\$320.00	\$737.50
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.							
TAX (ASSUMES TAX EXEMPT)		0.0%				\$0.00	\$0.00
SUBTOTAL				\$417.50		\$320.00	\$737.50
CONTINGENCIES		15.0%					\$110.63
DESIGN		0.0%					\$0.00
CONSTRUCTION ADMINISTRATION		1.5%					\$12.72
TOTAL							\$860.85

Energy Savings Calculations

Facility Name: Community Center City: Skellytown
 Site Address: 204 4th Street County: Carson
 ECM Number: 4 Building Area: 1,000 SF
 ECM Description: T12 - T8 lighting retrofit

Existing T12 lighting in the Community Center could be upgraded to T8 lighting

Elec Rate= 0.0589

4 lamps

Existing Conditions: 10 Number of florescent fixtures in area observed
 172 Wattage of fixtures observed in area
 120 Wattage of fixtures after retrofit

4,380 Annual lighting hours
 0.520 kW savings due to lighting consumption
 2278 Annual kWh savings due to lighting consumption

1.44 Assumed kW/ton of cooling
 0.15 Peak tons of cooling saved from lighting retrofit
 0.21 kW savings due to cooling load reduction
 146 Annual kWh savings due to cooling load reduction
 0.73 Total Annual kW savings
 2,424 Total Annual kWh savings
 \$143 Total Cost Savings

\$861 Estimated Cost

6.0 Simple Payback

ECM 5: Replace existing incandescent lamps in the Community Center with compact fluorescent lamps (CFL).

Cost Estimate

JACOBS COST ESTIMATING ANALYSIS							
PROJECT NAME:	Skellytown			PROJECT NO.: FEWE0701-SKELL			
PROJECT LOCATION:	Community Center			ESTIMATOR: K. Popp			
SUBMITTAL:	PEA Cost Estimates			DATE: 9/1/2010			
SYSTEM DESCRIPTION:	Replace Incandescents with CFL			CHECKED BY: T. Alexander			
TASK DESCRIPTION	QUANTITY		LABOR		MATERIALS		TOTAL COSTS
	NO/UNIT	UNIT	UNIT PRICE	COST	UNIT PRICE	COST	
Replace Incandescents with CFLs	8	EA	\$10.00	\$80.00	\$8.00	\$64.00	\$144.00
100 Watt Incandescent to 26 Watt CFLs							
<p style="text-align: center;">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		\$0.00	\$144.00
CONTINGENCIES		15.0%					\$21.60
DESIGN		0.0%					\$0.00
CONSTRUCTION ADMINISTRATION		1.5%					\$2.48
TOTAL							\$168.08

Energy Savings Calculations

Facility Name: Community Center City: Skellytown
 Site Address: 204 4th Street County: Carson
 ECM Number: 4 Building Area: 1,000 SF
 ECM Description: Incandescent to CFLs Lighting retrofit

Existing Incandescent lighting in the Community Center could be upgraded to CFLs

Elec Rate= 0.0589

100 Watt Incandescent to CFLs

Existing Conditions: 8 Number of incandescent fixtures in area observed
 100 Wattage of fixtures observed in area
 26 Wattage of fixtures after retrofit

4,380 Annual lighting hours
 0.592 kW savings due to lighting consumption
 2593 Annual kWh savings due to lighting consumption

1.44 Assumed kW/ton of cooling
 0.17 Peak tons of cooling saved from lighting retrofit
 0.24 kW savings due to cooling load reduction
 167 Annual kWh savings due to cooling load reduction
 0.83 Total Annual kW savings
 2,760 Total Annual kWh savings
 \$163 Total Cost Savings 2,760

\$168 Estimated Cost

1.0 Simple Payback

Energy Savings Calculations

Facility Name: City Hall (Old School)
Site Address: 204 4th Street
ECM Number: 6
ECM Description: Replace Condensing Units

City: Skellytown
County: Carson
Building Area: 46,100
Predominate Use: Air Cooling

Opportunity: Replace GCS16-513-75-6Y condensing units with a higher efficiency units Elec. Rate= 0.0589

3 Number of units
4 Tons per unit
8.6 Estimated existing EER
1.40 Estimated existing kW/ton
14.0 New equipment EER
0.86 New equipment kW/ton
788 Estimated equivalent full load hours

Estimated peak kW Savings: 6.5 kW
Total Estimated kWh Savings: 5,089 kWh per year
Cost Savings: \$300 per year

Estimated Cost: \$9,724

Simple Payback: 32.4 years

Facility Name: City Hall (Old School)
Site Address: 204 4th Street
ECM Number: 6
ECM Description: Replace Condensing Units

City: Skellytown
County: Carson
Building Area: 46,100
Predominate Use: Air Cooling

Opportunity: Replace GCS16-413-75-6Y condensing units with a higher efficiency units Elec. Rate= 0.0589

2 Number of units
3 Tons per unit
8.7 Estimated existing EER
1.38 Estimated existing kW/ton
14.0 New equipment EER
0.86 New equipment kW/ton
788 Estimated equivalent full load hours

Estimated peak kW Savings: 3.1 kW
Total Estimated kWh Savings: 2,469 kWh per year
Cost Savings: \$145 per year

Estimated Cost: \$4,797

Simple Payback: 33.0 years

Facility Name: City Hall (Old School)
Site Address: 204 4th Street
ECM Number: 6
ECM Description: Replace Condensing Unit

City: Skellytown
County: Carson
Building Area: 46,100
Predominate Use: Air Cooling

Opportunity: Replace GCS16-653-75-7Y condensing unit with a higher efficiency unit Elec. Rate= 0.0589

1 Number of units
5 Tons per unit
8.9 Estimated existing EER
1.35 Estimated existing kW/ton
14.0 New equipment EER
0.86 New equipment kW/ton
788 Estimated equivalent full load hours

Estimated peak kW Savings: 2.5 kW
Total Estimated kWh Savings: 1,935 kWh per year
Cost Savings: \$114 per year

Estimated Cost: \$3,438

Simple Payback: 30.2 years

Facility Name: Community Center
Site Address: 204 4th Street
ECM Number: 6
ECM Description: Replace Condensing Unit

City: Skellytown
County: Carson
Building Area: 46,100
Predominate Use: Air Cooling

Opportunity: Replace HS29-653-2Y condensing unit with a higher efficiency unit Elec. Rate= 0.1227

1 Number of units
5 Tons per unit
9.2 Estimated existing EER
1.30 Estimated existing kW/ton
14.0 New equipment EER
0.86 New equipment kW/ton
788 Estimated equivalent full load hours

Estimated peak kW Savings: 2.2 kW
Total Estimated kWh Savings: 1,762 kWh per year
Cost Savings: \$216 per year

Estimated Cost: \$3,438

Simple Payback: 15.9 years

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	25.0	37.4	100
Community Center	33.6	60.6	N/A

Site Energy Use Intensity (EUI) uses figures of metered energy (electrical, kWh and any other fossil fuel types, such as natural gas, MCF) 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. This ratio is specific to the type of energy used. Grid purchased electricity has a Source-Site Ratio of 3.340; Natural Gas has a ratio of 1.047. Because Skellytown uses both types of energy, their overall Source-Site Ratio is a weighted average of the two.

The Community Center building does not have an Energy Star Rating because of its size – to provide a comparison for that building type, Portfolio Manager requires that the building be larger than 5,000 square feet. The Community Center building did not comply with this requirement, and thus could not receive a Energy Star rating.

The utility data given to compute the energy performance do not contain a complete 12 month reporting period, which is required in order to submit to Energy Star for the purpose of achieving the Energy Star label. The data provided ran from 10/2009 to 06/2010. The data was normalized across one year in order to obtain an indicative Energy Star score.

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.

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>

APPENDIX F: SERVICE AGREEMENT



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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 ___City of Skellytown___, 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: Michelle Tindall

Date: 10/8/09

Name (Mr./Ms./Dr.): Michelle Tindall

Title: City Secretary

Organization: Municipal

Phone: 806-848-2477

Street Address: 400 W 4th

Fax: 806-848-2599

Mailing Address: P.O. Box 129

E-Mail: skelly@amaonline.net

Skellytown, TX 79080

County: CARSON

Contact Information:

Name (Mr./Ms./Dr.): Michelle Tindall

Title: City Secretary

Phone: 806-848-2477

Fax: 806-848-2599

E-Mail: skelly@amaonline.net

County: CARSON

Please sign and mail or fax to: Theresa Sifuentes, Local Governments and Municipalities Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1896. Fax 512-475-2569.

Jacobs 5/13/10 SRV