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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Stamford Memorial Hospital

Prepared by:

Jacobs Engineering Group

3/19/12

SECO
State Energy Conservation Office

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1. EXECUTIVE SUMMARY

A Preliminary Energy Assessment (PEA) site visit to Stamford Memorial Hospital, City of Stamford, TX was conducted on August 18, 2011 with the purpose of identifying viable Energy Conservation Measures (ECMs). This facility serves the local area as an emergency hospital and clinic. The present report documents this investigation.

This service was provided by Jacobs at no cost to Stamford Memorial Hospital 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 with 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 evaluated and recommended for implementation or further detailed analysis:

ECM 1: Replace all existing thermostats in the main hospital and clinic with programmable thermostats

ECM 2: Replace select Hospital and Clinic light switches with proximity and or timed light switches

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 $12,885, with an estimated capital requirement of $65,891, thus yielding a composite simple payback period of 5.11 years.

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. Stamford Memorial Hospital is encouraged to direct any questions or concerns to either of the following:

SECO	Jacobs
Stephen Ross	Scott West
1-800-531-5441, ext 3-1896	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.

The following table lists the recommended energy conservation measures (ECMs) for the hospital and clinic sites for Stamford Memorial Hospital.

<u>ENERGY CONSERVATION MEASURES (ECMs)</u>

ECM	Project Description	Estimated Implementation Cost ($)	Estimated Annual Energy Savings (kWh/Yr)	Estimated Annual Cost Savings ($/Yr)	Simple Payback (Years)
ECM 1:	Replace thermostats with Programmable Thermostats	$50,133	236,702	$7,506	6.68
ECM 2:	Replace select hospital light switches with proximity and or timed light switches	$15,758	73,330	$5,379	2.93
Total		**$65,891**	**310,032**	**$12,885**	**5.11**

Table 5 - Energy Conservation Measures

2. FACILITY DESCRIPTION

The Stamford Memorial Hospital campus is located at 1300 Mabee Street, Stamford, TX 79553. The main hospital facility serves as a local short term / emergency hospital. In addition, Stamford also has an accompanying outpatient clinic which routinely serves local patients.

The original hospital facility was built in 1969 and had a major expansion in 1974. The exterior walls are made of standard brick, while the interior walls consist of gypsum board or plaster on lathe. The roof structure is a standard flat built-up roof type. The flooring throughout the hospital consists of vinyl composition tile (VCT) and the glazing throughout the hospital consists of single pane glass.

The lighting fixtures in the building utilize T8 lamps with electronic ballasts which were installed during a previous lighting upgrade project.

The main hospital facility HVAC system consists of 4-pipe hot water/chilled water air handlers and fan coil units. Hot water boilers provide primary heating for the hospital and water-cooled chillers provide cooling, although more recently an air-cooled chiller was added to the chilled water circuit and one of the water-cooled chillers was decommissioned. All Hospital HVAC units are controlled by non-programmable thermostats. Hospital staff indicated that thermostat set-points vary widely from zone to zone. Currently, the facilities are not incorporating set-back temperatures during unoccupied hours.

Discussions with maintenance staff indicated that typical thermostat set-points tend to be set at more exaggerated values implying 1) that due to hospital expansion the current HVAC systems are no longer of adequate capacity to serve the total facility or have become exceedingly inefficient or 2) that the building envelope has either deteriorated or is inherently deficient.

The following table summarizes the HVAC system in the building:

Building	A/C Capacity	Air Conditioner	Furnace	Evaporator Coil
Hospital	5 Ton	Lennox HS25-651-2P	Lennox G24M-45100A2	Lennox CH33-48C-2F
	4 Ton	Lennox HS25-511-2P	Lennox G24M-34100A2	Lennox CH23-61
	Boiler		Sellers 60 HP	
	Boiler		Sellers 60 HP	
	Chiller	Carrier 125 Ton WC Chiller		
	Chiller	Trane 155 Ton AC Chiller		
Clinic	3 Ton	Lennox HS25-411-1P	Lennox G24M-375A2	Lennox
	3 Ton	Lennox HS25-411-1P	Lennox G24M-375A2	Lennox
	3 Ton	Lennox HS25-411-1P	Lennox G24M-375A2	Lennox
	3 Ton	Lennox HS25-411-1P	Lennox G24M-375A2	Lennox

Table 1 – HVAC Schedule

3. FACILITY ENERGY PERFORMANCE

Current Performance:

Based on current utility data, the existing Stamford facilities have the following annual utility consumption, annual utility cost, Energy Use Index (EUI), and Energy Cost Index (ECI):

Hospital

ELECTRICITY			NATURAL GAS			TOTAL		EUI	ECI
kWh/Yr	MMBTU/Yr	$/Yr	MCF/Yr	MMBTU/Yr	$/Yr	MMBTU/Yr	$/Yr	kBTU/SQFT/Yr	$/SQFT/Yr
1,640,025	**5,596**	**120,231**	**4,374**	**4,501**	**28,431**	**9,970**	**148,662**	**200**	**2.94**

Clinic

ELECTRICITY			NATURAL GAS			TOTAL		EUI	ECI
kWh/Yr	MMBTU/Yr	$/Yr	MCF/Yr	MMBTU/Yr	$/Yr	MMBTU/Yr	$/Yr	kBTU/SQFT/Yr	$/SQFT/Yr
122,000	**416**	**8,944**	**327**	**336**	**2,126**	**752**	**11,069**	**99**	**1.45**

Table 2a: Current EUI & ECI

Projected Performance:

Based on current utility data, the post-project hospital is projected to have the following annual utility consumption, annual utility cost, Energy Use Index (EUI), and Energy Cost Index (ECI):

Hospital

ELECTRICITY			NATURAL GAS			TOTAL		EUI	ECI
kWh/Yr	MMBTU/Yr	$/Yr	MCF/Yr	MMBTU/Yr	$/Yr	MMBTU/Yr	$/Yr	kBTU/SQFT/Yr	$/SQFT/Yr
1,529,515	**5,219**	**112,129**	**3,870**	**3,982**	**25,152**	**9,201**	**137,281**	**182**	**2.72**

Clinic

ELECTRICITY			NATURAL GAS			TOTAL		EUI	ECI
kWh/Yr	MMBTU/Yr	$/Yr	MCF/Yr	MMBTU/Yr	$/Yr	MMBTU/Yr	$/Yr	kBTU/SQFT/Yr	$/SQFT/Yr
112,692	**385**	**8,261**	**208**	**207**	**1,305**	**591**	**9,566**	**77**	**1.25**

Table 2b: Projected EUI & ECI

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 - HOSPITAL

Utility Name	Utility	Estimated Rate - Hospital
Direct Energy	Electricity	$0.0721 / kWh - Summer $0.0746 / kWh - Winter
ATMOS Energy	Natural Gas	$6.78 / Therm - Summer $6.49 / Therm - Winter

Table 3 - Hospital Utility Rates

AVERAGE UTILITY RATES - CLINIC

Utility Name	Utility	Estimated Rate - Clinic
Direct Energy	Electricity	$0.0721 / kWh - Summer $0.0746 / kWh - Winter
ATMOS Energy	Natural Gas	$7.59 / Therm - Summer $11.2 / Therm - Winter

Table 4 - Clinic Utility Rates

5. RECOMMENDATIONS

ENERGY CONSERVATION MEASURES (ECMs)

ECM	Project Description	Estimated Implementation Cost ($)	Estimated Annual Energy Savings (kWh/Yr)	Estimated Annual Cost Savings ($/Yr)	Simple Payback (Years)
ECM 1:	Replace thermostats with Programmable Thermostats	$50,133	236,702	$7,506	6.68
ECM 2:	Replace select hospital light switches with proximity and or timed light switches	$15,758	73,330	$5,379	2.93
Total		**$65,891**	**310,032**	**$12,885**	**5.11**

Table 5 - Energy Conservation Measures

ECM 1: Involves replacing existing thermostats in the main hospital and clinic with electronic programmable thermostats. This measure allows for a more comfort-controlled environment and saves energy through an efficient temperature setback schedule during unoccupied hours.

ECM 2: Involves replacing select hospital light switches with proximity and/or timed light switches. This measure allows for a more controlled lighting environment and saves energy by automatically switching off the lighting for a given area while unoccupied.

Additional Recommendations:

With the projects outlined in this PEA document, the combined simple payback comes to 11.19 years when aggregated with the PEA that was produced in 2009. While this is not quite low enough to receive LoanSTAR funding from SECO, the below 10 year mark can probably be achieved through some additional energy conservation measures. Some energy conservation measure calculations are more complex than are typically handled in the Local Governments program. These ECMs often require energy simulation with hourly schedules and weather data. Some additional projects that might have quick paybacks include: chilled water temperature reset, supply air temperature reset for the air handling equipment and demand controlled ventilation for densely occupied areas such as waiting rooms and the cafeteria. Since new mechanical systems would most likely be involved in an energy retrofit per the 2009 PEA, the new DDC system should be robust enough to handle these control schemes.

One particular savings option that could have a quick payback is to clean and flush pipework systems on runs to fan coil units. Some thermal zones are having trouble achieving good temperature control and pipe scaling was

found to be a likely culprit. Pipework scaling reduces heat transfer effectiveness at the coil and increases the amount of pumping power required to overcome additional pressure drop. Water treatment to prevent scale is certainly recommended on an on-going basis to maintain good system operation.

These additional measures could likely be enough to bring the combined payback below 10 years, but there is also another way to qualify for LoanSTAR funding. The Hospital can "buy down" the loan amount to bring it within the 10 year payback. The 2009 PEA plus this current PEA come to a combined capital cost of $815,891 with an expected energy cost savings of $72,885/yr. A buy down amount of $87,041 to the capital cost of the project would be needed to submit for a LoanSTAR project assuming no other ECMs are developed. An Energy Assessment Report is required to apply for LoanSTAR funding which requires a more detailed energy audit and calculation procedure to show predicted savings. This would be a good time to pursue more detailed energy savings calculations.

A selection and cost quote has been provided from a controls manufacturer for the purposes of providing networked programmable thermostats along with occupancy sensors good for controlling HVAC and lighting. This manufacturer quote is provided in Appendix K.

6. EMISSIONS CALCULATIONS

		Pollution Prevention Factors			Equivalent to:		
	Annual kWh Reduction	CO2 Carbon Dioxide (Pounds)	NOx Nitrogen Oxide (Grams)	SO2 Sulphur Dioxide (Grams)	Annual Number of Cars Taken Off the Road lbs CO2 / 10,000	Annual Number of Acres of Trees Planted lbs CO2 / 7,300	Annual Number of American Homes Electricity Needs kWh / 10,000
Electricity	119,818	150,645	40,120	138,898	15.06	20.64	11.98
Natural Gas	190,214	76,354	60	0	7.64	10.46	19.02
Total	310,032	226,999	40,180	138,898	22.70	31.10	31.00

Table 6 - Emission Calculations

With the energy savings shown above, the resulting reduced amount of pollution has been calculated. Performing the proposed measures is equivalent to 22 cars being taken off the road, 31.1 acres of trees being planted, or 31 American homes being powered with electricity.

APPENDIX A: UTILITY ANALYSIS DATA

Electricity

Total Hospital Monthly Average

Month	Building	Usage kWh	Cost	Total Usage kWh	Total Usage BTUs	Total Cost
September-10	BLDG-Addtion	15,760	$ 1,061.28	196,200	669,463,318	$ 13,308.22
	Emergency	1,242	$ 132.20			
	Clinic	**16,720**	**$ 1,226.74**			
	Main Building	156,655	$ 10,336.82			
	APT CAT	5,507	$ 514.12			
	ADLT 400HPS	316	$ 37.06			
October-10	BLDG-Addtion	15,920	$ 1,069.88	168,898	576,304,778	$ 11,622.84
	Emergency	1,333	$ 140.71			
	Clinic	**12,240**	**$ 945.01**			
	Main Building	134,388	$ 8,968.23			
	APT CAT	4,701	$ 461.95			
	ADLT 400HPS	316	$ 37.06			
November-10	BLDG-Addtion	13,760	$ 934.41	114,628	391,125,546	$ 8,404.78
	Emergency	1,195	$ 127.83			
	Clinic	**6,000**	**$ 546.01**			
	Main Building	89,499	$ 6,357.31			
	APT CAT	3,858	$ 402.39			
	ADLT 400HPS	316	$ 36.83			
December-10	BLDG-Addtion	16,640	$ 1,131.62	124,241	423,928,105	$ 9,146.10
	Emergency	1,471	$ 155.56			
	Clinic	**6,160**	**$ 563.55**			
	Main Building	92,789	$ 6,677.03			
	APT CAT	6,865	$ 580.58			
	ADLT 400HPS	316	$ 37.76			
January-11	BLDG-Addtion	17,920	$ 1,233.54	122,052	416,459,438	$ 9,093.59
	Emergency	1,451	$ 153.80			
	Clinic	**6,240**	**$ 571.53**			
	Main Building	87,317	$ 6,381.72			
	APT CAT	8,808	$ 715.92			
	ADLT 400HPS	316	$ 37.08			
February-11	BLDG-Addtion	15,040	$ 1,023.89	100,002	341,220,376	$ 7,676.08
	Emergency	1,334	$ 142.01			
	Clinic	**5,440**	**$ 508.34**			
	Main Building	70,477	$ 5,360.73			
	APT CAT	7,395	$ 603.90			
	ADLT 400HPS	316	$ 37.21			
March-11	BLDG-Addtion	16,160	$ 1,138.69	116,380	397,105,871	$ 8,804.51
	Emergency	1,191	$ 128.57			
	Clinic	**6,160**	**$ 562.00**			
	Main Building	84,155	$ 6,195.99			
	APT CAT	8,398	$ 742.15			
	ADLT 400HPS	316	$ 37.11			
April-11	BLDG-Addtion	15,280	$ 1,044.12	121,866	415,823,346	$ 9,004.79
	Emergency	1,349	$ 143.11			
	Clinic	**5,840**	**$ 546.66**			
	Main Building	93,871	$ 6,693.26			
	APT CAT	5,210	$ 540.67			
	ADLT 400HPS	316	$ 36.97			

**Total Hospital Monthly Average (Cont.)*

May-11	BLDG-Addtion	15,680	$ 1,084.17	138,598	472,915,579	$ 10,145.28
	Emergency	1,303	$ 140.21			
	Clinic	**7,600**	**$ 698.91**			
	Main Building	107,877	$ 7,629.33			
	APT CAT	5,822	$ 555.91			
	ADLT 400HPS	316	$ 36.75			
June-11	BLDG-Addtion	15,840	$ 1,134.73	159,845	545,415,135	$ 11,828.20
	Emergency	1,292	$ 141.35			
	Clinic	**11,120**	**$ 938.61**			
	Main Building	125,876	$ 9,037.28			
	APT CAT	5,401	$ 538.71			
	ADLT 400HPS	316	$ 37.52			
July-11	BLDG-Addtion	17,200	$ 1,282.22	206,744	705,439,988	$ 15,636.76
	Emergency	1,128	$ 133.68			
	Clinic	**18,880**	**$ 1,534.78**			
	Main Building	162,770	$ 12,001.47			
	APT CAT	6,450	$ 644.95			
	ADLT 400HPS	316	$ 39.66			
August-11	BLDG-Addtion	15,440	$ 1,041.31	192,570	657,077,550	$ 13,006.11
	Emergency	1,101	$ 122.33			
	Clinic	**19,600**	**$ 1,405.88**			
	Main Building	150,139	$ 9,836.57			
	APT CAT	5,974	$ 562.56			
	ADLT 400HPS	316	$ 37.46			

Natural Gas

Hospital:

*** Annual Fuel Usage / Cost**

Month	Usage MCF	Usage kBtu	Cost
September-10	189	194,481	$ 1,427.70
October-10	184	189,336	$ 1,331.23
November-10	193	198,597	$ 1,422.81
December-10	390	401,310	$ 2,727.37
January-11	569	585,501	$ 3,459.11
February-11	684	703,836	$ 3,779.67
March-11	595	612,255	$ 3,316.94
April-11	495	509,355	$ 3,113.80
May-11	407	418,803	$ 2,618.76
June-11	275	282,975	$ 1,826.95
July-11	257	264,453	$ 1,693.00
August-11	136	139,944	$ 1,072.30
Annual Total	**4,374**	**4,500,846**	**$ 27,789.64**

Clinic:

*** Annual Fuel Usage / Cost**

Month	Usage MCF	Usage kBtu	Cost
September-10	2.3	2,367	$ 31.85
October-10	2.2	2,264	$ 30.35
November-10	4.7	4,836	$ 49.94
December-10	32.7	33,648	$ 249.71
January-11	88.3	90,861	$ 567.18
February-11	112.7	115,968	$ 641.05
March-11	51.8	53,302	$ 304.70
April-11	21.1	21,712	$ 148.34
May-11	4.1	4,219	$ 40.73
June-11	2.2	2,264	$ 28.84
July-11	2.7	2,778	$ 32.02
August-11	2.2	2,264	$ 31.60
Annual Total	**327**	**336,483**	**$ 2,156.31**

APPENDIX B: ECM INFORMATION

ECM 1: Install Programmable Thermostats
Cost Estimation - Hospital and Clinic

COST ESTIMATING ANALYSIS

PROJECT NAME:	Stamford Memorial Hospital	PROJECT NO:	FEWE0701-Stamfo
PROJECT LOCATION:	Stamford, TX	ESTIMATOR:	JDW
SUBMITTAL:	PEA Cost Estimates	DATE:	11/18/2011
EXM DESCRIPTION:	Installation of Programmable Thermostats	CHECKED BY:	Scott West

TASK DESCRIPTION	QUANTITY	LABOR		MATERIALS		TOTAL
	NO/UNIT	UNIT	COST	UNIT PRICE	COST	COSTS
Programmable Thermostats	85	$175.29	$14,900.00	$330	$28,050.00	$42,950.00
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	$0.00
Subtotal			$14,900.00		$28,050.00	$42,950.00
Contingencies	15.0%					$6442.50
Design	0.0%					$0.00
Construction Administration	1.5%					$740.89
Total						$50,133.39

Hospital Energy Savings Estimation		
Assumed U-Values Walls	0.3176	Btu/hr-ft^2-F
Assumed Wall Area	14,900	ft^2
Assumed U-Values Roof	0.088	Btu/hr-ft^2-F
Assumed Roof Area	40,493	ft^2
Heating Season Thermostat Set-point	70	F
Heating Season Thermostat Setback	60	F
Heating Season Setback Hours	4,380	hrs
Heating Equipment Efficiency	70%	
Cooling Season Thermostat Set-point	74	F
Cooling Season Thermostat Setback	85	F
Cooling Season Setback Hours	4,380	hrs
Performance of Cooling System	10.75	Btuh/Watt

(Hospital) Total Envelope UA - Value	16,398	Btu/hr-F
Heating Energy Savings	152,130	kWh/yr
Cooling Energy Savings	37,180	kWh/yr
Heating Cost Avoidance	3,276	$/yr
Cooling Cost Avoidance	2,727	$/yr
Clinic Energy Savings Estimation		
Assumed U-Values Walls	0.373	Btu/hr-ft^2-F
Assumed Wall Area	3770	ft^2
Assumed U-Values Roof	0.088	Btu/hr-ft^2-F
Assumed Roof Area	7630	ft^2
Heating Season Thermostat Set-point	70	F
Heating Season Thermostat Setback	60	F
Heating Season Setback Hours	4,380	hrs
Heating Equipment Efficiency	70%	
Cooling Season Thermostat Set-point	74	F
Cooling Season Thermostat Setback	85	F
Cooling Season Setback Hours	4,380	hrs
Performance of Cooling System	10.75	Btuh/Watt
(Clinic) Total Envelope UA - Value	2,168	Btu/hr-F
Heating Energy Savings	38,084	kWh/yr
Cooling Energy Savings	9,308	kWh/yr
Heating Cost Avoidance	820	$/yr
Cooling Cost Avoidance	683	$/yr
Simple Payback Calculation		
Total Heating Energy Savings	190,214	kWh/yr
Total Cooling Energy Savings	46,488	kWh/yr
Estimated Electricity Rate - Summer	0.0746	$/kWh
Estimated Electricity Rate - Winter	0.0721	$/kWh
Heating Cost Avoidance	4,096	$/yr
Cooling Cost Avoidance	3,410	$/yr
Simple Payback	**6.68**	years

ECM 2: Install Timed/Proximity light switches
Cost Estimation - Hospital and Clinic

COST ESTIMATING ANALYSIS

PROJECT NAME:	Stamford Memorial Hospital	PROJECT NO:	FEWE0701-Stamfo
PROJECT LOCATION:	Stamford, TX	ESTIMATOR:	JDW
SUBMITTAL:	PEA Cost Estimates	DATE:	11/07/2011
EXM DESCRIPTION:	Installation of Timed/Proximity Light Switches	CHECKED BY:	Scott West

TASK DESCRIPTION	QUANTITY	LABOR		MATERIALS		TOTAL
	NO/UNIT	UNIT PRICE	COST	UNIT PRICE	COST	COSTS
Timed/Proximity Light Switches	108	$75.00	$8,100	$50.00	$5,400	$13,500
Tax (Assumes tax exempt)	0.0%				$0.00	$0.00
Subtotal			$7,650		$5,100	$12,750
Contingencies	15.0%					$2,025
Design	0.0%					$0.00
Construction Administration	1.5%					$232.88
Total						$15,757.87

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.

Hospital & Clinic Energy Savings Estimation		
Energy Saved - Hospital	71,595	kWh/yr
Energy Saved - Clinic	1,734	kWh/yr
Total Annual Energy Saved	**73,330**	kWh/yr
Estimated Electricity Rate - Summer	0.0746	$/kWh
Estimated Electricity Rate - Winter	0.0721	$/kWh
Energy Cost Savings - Hospital	5,252	$/year
Energy Cost Savings - Clinc	127	$/year
Total Energy Cost Savings	**5,379**	$/year
Simple Payback	**2.93**	**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%.

Site EUI (kBtu/SQFT/Yr)	Source EUI (kBtu/SQFT/Yr)	Energy Star Rating (1-100)
199.8	463.1	96

Hospital EUI and Energy Star Rating

Site EUI (kBtu/SQFT/Yr)	Source EUI (kBtu/SQFT/Yr)	Energy Star Rating (1-100)
98.7	228.4	39

Clinic EUI and Energy Star Rating

The main hospital scored quite well in Portfolio Manager. It should be noted that the typical building used for comparison in this category is a facility operating fully on a 24/7 schedule and near full capacity in terms of patient room use and staffing. Any operations that are less then this (i.e. reduced staff during the night shift or less than full patient rooms) naturally use less energy, and increase the favorability of results. The clinic scored within the expected range.

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.

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

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 COMMISION

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
Reubild 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

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NOT AVAILABLE

APPENDIX G: ELECTRIC UTILITY COST SUMMARY

**Supplemental Monthly Average*

Building	Rolling Monthly Average Usage			
	kWh	Total kWh	Mbtu	Total Mbtu
BLDG-Addtion	14,665	135,540	50,050	462,599
Emergency	1,184		4,040	
Clinic	9,385		32,030	
Main Building	104,293		355,953	
APT CAT	5,722		19,530	
ADLT 400HPS	292		996	

**Total Hospital Monthly Average*

Building	Rolling Average Cost		
	Monthly	Monthly Total	Annual
BLDG-Addtion	$ 1,098.32	$10,639.77	$127,677.26
Emergency	$ 138.45		
Clinic	$ 837.34		
Main Building	$ 7,956.31		
APT CAT	$ 571.98		
ADLT 400HPS	$ 37.37		

**Total Hospital Annual Electricity Usage / Cost*

Building	Total Electric Usuage kWh/yr	Total Electric Usage kBtu/yr	Total Electric Cost/yr 2010- 2011
Clinic	122,000	416,281	$ 10,048
Hospital	1,640,025	5,595,998	$ 117,629

APPENDIX H: GAS UTILITY COST SUMMARY

Hospital: Area: 50,538

Month	Usage MCF	Usage kBtu	Cost
September-10	189	194,481	$ 1,427.70
October-10	184	189,336	$ 1,331.23
November-10	193	198,597	$ 1,422.81
December-10	390	401,310	$ 2,727.37
January-11	569	585,501	$ 3,459.11
February-11	684	703,836	$ 3,779.67
March-11	595	612,255	$ 3,316.94
April-11	495	509,355	$ 3,113.80
May-11	407	418,803	$ 2,618.76
June-11	275	282,975	$ 1,826.95
July-11	257	264,453	$ 1,693.00
August-11	136	139,944	$ 1,072.30
Total	4374	4,500,846	$ 27,789.64

Clinic: Area: 7,630

Month	Usage MCF	Usage kBtu	Cost
September-10	2.3	2,367	$ 31.85
October-10	2.2	2,264	$ 30.35
November-10	4.7	4,836	$ 49.94
December-10	32.7	33,648	$ 249.71
January-11	88.3	90,861	$ 567.18
February-11	112.7	115,968	$ 641.05
March-11	51.8	53,302	$ 304.70
April-11	21.1	21,712	$ 148.34
May-11	4.1	4,219	$ 40.73
June-11	2.2	2,264	$ 28.84
July-11	2.7	2,778	$ 32.02
August-11	2.2	2,264	$ 31.60
Total	327	336,483	$ 2,156.31

APPENDIX I: BUILDING ENVELOPE U-VALUE CALCULATIONS

** U Value:*		
Roof	0.088	Btu/hr-ft^2 ^{o}F
Glazing	1.2	Btu/hr-ft^2 ^{o}F
Exterior Wall	0.097	Btu/hr-ft^2 ^{o}F

** Total Glazed Area*		
Hospital	9,571	ft^2
Clinic	942.5	ft^2

**** Hospital/Clinic Applicable Dimensions:***

	Hospital		**Clinic**
	General Area	Emergency Area	General Area
Roof Area ft^2	40,493	7,361	7,630
Exterior Perimeter ft	1,490	202	377
Exterior Wall Area ft^2	14,900	2,020	3,770
Glazed Area ft^2	9,491	80	943

**** Hospital/Clinic Heat Transmission: Btu/hr-^{o} F***

	Hospital		**Clinic**
	General Area	Emergency Area	General Area
Roof	3,563	648	671
Exterior Walls	1,445	196	366
Glazed Areas	11,389	96	1,131
Btu/hr - ^{o}F	**16,398**	**940**	**2,168**

APPENDIX J: UTILITY SAVINGS PROJECTIONS

Existing: EUI & ECI

Building	Area ft^2	Total Electric kBtu/yr	Total Gas kBtu/yr	Total Energy Cost/yr	EUI kBtu/ft^2 Anually	ECI \$/ft^2 Anually
Clinic	7,630	416,281	336,483	$ 12,204.33	**99**	**$1.60**
Hospital	50,538	5,595,998	4,500,846	$ 145,418.88	**200**	**$2.88**

Projected: EUI & ECI

Building	Area ft^2	Total Electric kBtu/yr	Total Gas kBtu/yr	Total Energy Cost/yr	EUI kBtu/ft^2 Anually	ECI \$/ft^2 Anually
Clinic	7,630	384,521	206,540	$ 9,566	**77**	**$1.25**
Hospital	50,538	5,218,922	3,981,778	$ 137,281.49	**182**	**$2.72**

** Projected Total Hospital Annual Electricity Usage / Cost*

Building	Total Electric Usage kWh/yr	Total Electric Usage kBtu/yr	Projected Annual Electric Utility Cost
Clinic	112,692	384,521	**$ 8,212**
Hospital	1,529,515	5,218,922	**$ 111,452**

** Projected Total Hospital Annual Gas Usage Usage / Cost*

Building	Total Gas Usage kBtu/ yr	Projected Annual Gas Cost
Clinic	206,540	**$ 1,305**
Hospital	3,981,778	**$ 25,152**

APPENDIX K: MANUFACTURER QUOTES

West, Scott P.

From: Chuck Wahlen [cwahlen@telkonet.com]
Sent: Wednesday, March 07, 2012 3:23 PM
To: West, Scott P.
Subject: Estimate
Attachments: Stamford Memorial Hospital Estimate.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Scott,

I attached an estimate for the addition of our technology to what you are designing for the Stamford Memorial Hospital project. If you can provide me with fan motor sizes for the FCU's that you will be upgrading to throughout the building, we can provide an estimate of savings based on our technology being deployed throughout the building. On average we see decreased run times on the FCU fan of between 30-50%, and decreased load on the central plant due to the valves being closed of between 10-25%. As you can imagine, it is easy for us to calculate energy saving based on fan motor size, but not in regards to central plant load reductions.

We made a few assumptions while generating this estimate.

1. The IT department within the facility will not want us on their network, so we'll run our own cabling and simply integrate with their router at the exterior of their network.
2. In the suites we will need two occupancy sensors to effectively manage the HVAC within that space.
3. Based on the age of the facility, we'll need to use more EcoConnect interfaces than normal, as the construction of the time period (with lathe and plaster) inhibits wireless communication.

All of the assumptions listed are variables that could change when we see the site and take wireless signal samples, but we wanted to provide you with a worst case scenario cost estimate, so included the parts and labor required to overcome these assumptions.

Drop me a note if you have any questions.

Thanks,

Chuck

Chuck Wahlen LEED AP, CTS / Account Executive Energy Management/Telkonet 10200 Innovation Dr. Milwaukee,WI 53226 / email cwahlen@telkonet.com /office 414-302-2262 / cell 414-484-9642 / fax 414-258-8307 www.telkonet.com

telkonet

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telkonet

PROVISIONAL QUOTE

Date: 2012-03-07
QUOTE # 22658
Expiration Date: 2012-03-14

For Stamford Memorial Hospital

Stamford, TX
3257732725
Customer ID #56140

Salesperson	Job	Shipping Method	Shipping Terms	Delivery Date	Payment Terms	Due Date
Chuck Wahlen	#22658	UPS	Ground			

Qty	Item #	Description	Unit Price	Discount	Line Total
1	NT5000	EcoCommander Gateway Server	$1650.00		$1,650.00
10	NT7000	EcoConnect Coordinator	$275.00		$2,750.00
85	SS6000	EcoInsight Digital Thermostat	$199.00		$16,915.00
90	SS6200	EcoView Occupancy Sensor	$60.00		$5,400.00
85	INSTALL	Installation	$140.00		$11,900.00
1	MISC-S	Network Install and Configuration	$3000.00		$3,000.00
2	C5E-1000	Spool of Cat5E - 1000'	$150.00		$300.00
10	TPE-102S	Trendnet TPE-102S POE Splitter	$50.00		$500.00
1	VX-SWP2612	VersaTek VX-SWP2612 Switch	$535.00		$535.00
				Total Discount	$0.00
				Subtotal	$42,950.00
				Sales Tax (6.25%)	$1753.13
				Total	$44,703.13

Quotation prepared by: David Wurtz

Customer agrees to pay all charges for the indicated shipping terms. Shipping charges may be determined at time of shipment.

A service charge of 1.5% per month (18% annual) will be assessed on delinquent amounts. Customer is responsible for paying collection or attorney fees incurred in our attempt to collect delinquent amounts, regardless of whether suit is instituted or not.

This quote for products and/or services is provisional in nature and can not be guaranteed to meet any particular purpose or application.

To accept this quotation, sign here and return: _____

Thank you for your business!

Thank you for your business!

Telkonet SmartEnergy, 10200 Innov ation Dr. Suite 300, Milwaukee, WI 53226
Phone 414.223.0473 - Fax 414.258.8307 - sales@telkonet.com