



TFC Office of Energy Management (OEM) Report to Commission

APRIL 20, 2016



“The Stone Age did not end because we ran out of stones; we transitioned to better solutions. The same opportunity lies before us with energy efficiency and clean energy.”

Steven Chu; 1997 Physics Nobel Prize Winner, United States Secretary of Energy (2009–2013)

Office of Energy Management Current Staff:

- Farshad Shahsavary, P.E., CEM, M.A.S
Energy and Engineering Manager
- Wendell Cook, P.E., M.S.
Commissioning and Energy Engineer

Energy Management, Why?:

- **Money:** Utilities are over 40% of TFC's total budget
 - Around \$18 Million per year, approx. \$70,000 every working day, close to \$10,000 per work hour (based on 2040 hours of work time per year)
- **Legislative Mandate:** All State Agencies are mandated to conserve energy and utilities. RP49, G.C.2166, 447, and SB700 (83rd legislature).
 - SB700 requires all agencies to have a goal: With the current investment level in OEM and existing operating conditions we can only expect a moderate goal of 2% per year utility usage reduction. Considering that the utility costs will probably go up more than 2%, we may see a reversal in our historical gains. We can expect higher savings and reductions if the commission chooses to invest further and expand TFC Office of Energy Management (Potential 5% per year reduction possible).
- **TFC Commission Mandate:** We all know that the Commission is supportive of OEM efforts, especially by the Chair and Vice Chair. Also it is critical that the TFC executive management increase their current support for OEM. In order to achieve the potential utility cost and use savings, major investments in office of energy management is required. This includes direct budget and more personnel.
- **Setting the Example:** Because we are considered the experts in facility management science for the State, the TFC Resource Conservation Program has to be the Model for other State, governmental and non-governmental agencies.
- **Saving the Planet!!!!:** Why Waste Resources even if you can afford it?

Overview of SB700 (Texas G.C. 447.009):

- SECO shall prepare guidelines for preparation of the plan described in Subsection (a)(3) and develop a template for state agencies and institutions of higher education to use in creating the plan. (Energy Star Portfolio Manager is selected and OEM has already finished rating of all TFC facilities but there is still no template for the Plan from SECO)
- Each state agency and institution of higher education shall set percentage goals for reducing the agency's or institution's use of water, electricity, gasoline, and natural gas and include those goals in the agency's or institution's comprehensive energy and water management plan. (I believe 2% is achievable with the current situation)
- A state agency or an institution of higher education that occupies a state-owned building shall prepare and implement a five-year energy and water management plan and shall submit that plan to the office upon request.
- The agency or institution shall update its plan annually. A state agency or an institution of higher education that occupies a building not owned by the state shall cooperate addressing the energy or water management of that building.

Historical Trends (Electricity):

TFC	HB	Park	Account	Rcv	Invoice	Amount	Meter	Multiplie	Meter	Meter	Start	End	Service	Usage (KWH)	Payment
	3042	ing	Number	Date	Number		Number	r	Start	End	Date	Date			
2008 Grand Total						\$13,931,847.93								Correct Data not Available	
2009 Grand Total						\$14,196,807.11								195,334,041	
2010 Grand Total						\$13,525,329.51								190,905,906	
2011 Grand Total						\$12,548,720.03								*259,587,693	
2012 Grand Total						\$12,765,551.96								180,467,345	
2013 Grand Total						\$12,440,200.46								183,128,873	
2014 Grand Total						\$12,163,464.38								162,134,387	
2015 Grand Total						\$12,262,802.19								Correct Data not Available	
Area of TFC Properties we pay utilities for:														7,740,751 Sq. Ft.	
2009 TFC KWH per Sq. Ft. or EUI														25.23	
2014 TFC KWH per Sq. Ft. or EUI														20.95	
														20.48%	
2009 TFC cost per Sq. Ft.						\$1.83								Reduction in Electricity usage comparing 2015 to 2009	
2014 TFC cost per Sq. Ft.						\$1.57	16.72%	2009						Reduction in Electricity cost comparing 2015 to 2009	
Table 1. Number of Buildings and Electric Energy Use per Square Foot of Floor Area by Census Division															
Census division 7															
No. of buildings 142															
Median 15.0															
Average 17.2															

- 2009 EUI (Energy Use Intensity): 25.23, 2014 EUI: 20.95, **20.5% Reduction**
- 2009 Cost per Sq. Ft. : \$1.83, 2014 Cost per Sq. Ft. : \$1.57, **16.7% Reduction**
- Census Division 7 Median and Average EUI is 15.0 and 17.2 respectively.
“There is still potential room for improvement, probably up to 20% additional savings”

TFC Historical Utility Cost Comparison:

Overall Utility Cost Analysis:			
	FY08	\$17,927,473.87	
	FY09	\$18,311,417.49	
	FY10	\$17,343,070.40	
		\$53,581,961.76	
	Average of FY08,09,10:	\$17,860,653.92	
	FY13	\$16,129,344.49	
	FY14	\$15,933,962.61	
	FY15	\$16,018,029.49	
		\$48,081,336.59	
	Average of FY13,14,15:	\$16,027,112.20	
			-10% Reduction
			Average Over 1.8 Million Dollars or 10% a Year Reduction
			in Overall Utility Cost and Expenditure.

TFC Historical Electrical Cost Comparison:

Electricity Cost Analysis:			
	FY08	\$13,712,335.22	
	FY09	\$14,646,609.88	
	FY10	\$13,444,413.23	
		\$41,803,358.33	
	Average of FY08,09,10:	\$13,934,452.78	
	FY13	\$12,596,478.85	
	FY14	\$12,084,926.74	
	FY15	\$12,223,974.54	
		\$36,905,380.13	
	Average of FY13,14,15:	\$12,301,793.38	
			-12% Reduction
			Average over 1.6 Million Dollars or 12% a year Reduction
			in Electricity Cost and expenditure.

Proposed Energy Management Process:

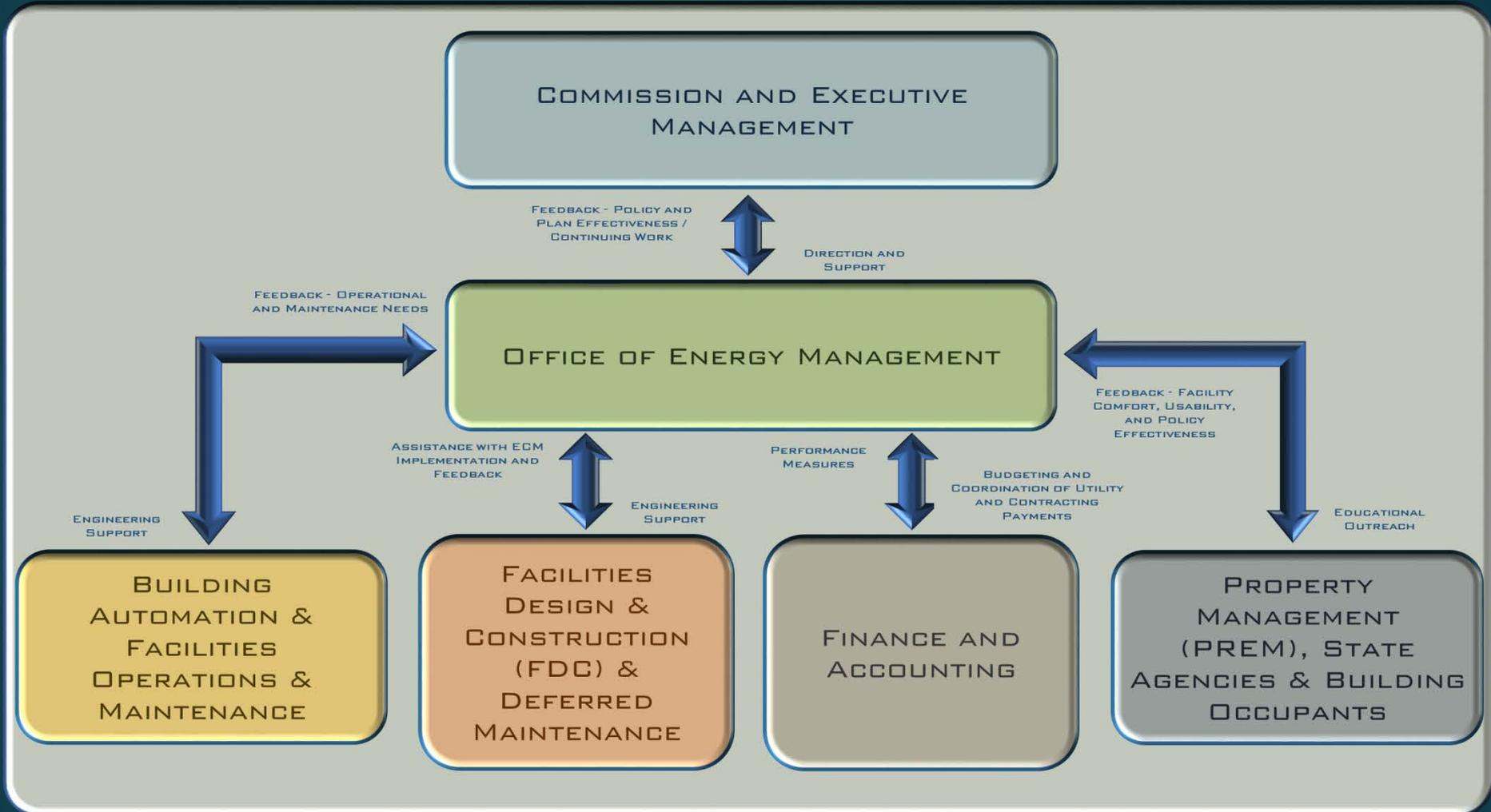
EPA Energy Star
Guidelines for
Energy
Management:



OEM Current Ongoing Efforts:

- Coordinating and managing energy conservation measures within TFC various departments and commission. Energy Work Group and Resource Conservation Committee are used to help this effort.
- Coordinating and managing TFC relationship with outside utility providers, governmental agencies, semi-governmental agencies, and vendors.
- Providing engineering support for several TFC departments and project management staff.
- Managing the \$4.3 million SECO funded Energy Performance Contract Project.
- Managing Summer implementation of Load Coop.
- Billing and utility consumption review.
- Building Automation operations enhancements through ongoing commissioning efforts and professional support for Building Automation department.
- Providing professional support for deferred maintenance projects (FDC) as well as documenting energy savings and projects.
- Conducting Retro-Commissioning; helping identify and address maintenance issues.
- Improving work flow processes between OEM and other TFC departments.
- Improving Maintenance and Building Automation processes.
- And.....

Office of Energy Management Interdepartmental Interaction Chart:



OEM Future Goals and Plans:

- Work Closer with Property Management and TFC Tenants through Outreach, Marketing (Energy Liaisons, additional funding and staffing needed).
- Continue developing ESCO (performance contracting) type energy projects.
- Have a more active role working with the industry and other governmental, non-profit, and private sector to help TFCs achieve better results.
- Coordinate and provide training for Maintenance and Property Management (additional funding and staffing needed).
- Expand and improve the Load Coop Program.
- Expand and improve billing and utility consumption reviews.
- Work closer with Building Automation Department to improve the management and control of the various environmental systems. (additional funding and staffing needed).
- Increase the support for deferred maintenance projects and document the energy savings and scopes (additional funding and staffing needed).
- Expand Retro-Commissioning effort and assist with identification and correction of maintenance issues. (additional funding and staffing needed).
- Improve work flow processes between OEM and other TFC departments (additional funding and staffing needed).

OFFICE OF ENERGY MANAGEMENT - INTERNAL ORGANIZATIONAL SCHEME

CURRENT PERSONNEL

ENERGY AND ENGINEERING DIRECTOR

- SUPERVISE AND DIRECT OVERALL OPERATION OF OFFICE OF ENERGY MANAGEMENT.
- OVERSEE DEVELOPMENT AND MANAGEMENT OF UTILITY CONTRACTS.
- OVERSEE DEVELOPMENT OF ENERGY PERFORMANCE CONTRACTS.
- OVERSEE CONTINUED DEVELOPMENT AND IMPLEMENTATION OF AGENCY ENERGY CONSERVATION GOALS/OBJECTIVES.
- PROVIDE GUIDANCE ON SELECTION AND INSTALLATION OF ENERGY EFFICIENT EQUIPMENT AND SYSTEMS FOR NEW CONSTRUCTION AND DEFERRED MAINTENANCE PROJECTS.
- OVERSEE UTILIZATION OF ENERGY REBATE PROGRAMS AND LOW COST ENERGY LOANS/GRANTS.
- ACT AS LIAISON BETWEEN OEM, THE TFC COMMISSION, EXECUTIVE DIRECTOR, AND THE GOVERNOR'S OFFICE

ENERGY AND COMMISSIONING ENGINEER / MANAGER

- OVERSEE AGENCY WIDE RETRO-COMMISSIONING AND ENERGY AUDIT EFFORTS.
- DEVELOP LONG TERM ACTION PLANS THAT ADDRESS OPERATIONAL ISSUES.
- PROVIDE ASSISTANCE WITH DEVELOPMENT AND ENGINEERING OVERSIGHT OF COMMISSIONING CONTRACTS.
- PROVIDE ASSISTANCE WITH DEVELOPMENT AND OVERSIGHT OF ENERGY PERFORMANCE CONTRACTS.
- COORDINATE/CONDUCT INTERNAL ENGINEERING DESIGN REVIEW FOR NEW CONSTRUCTION AND DEFERRED MAINTENANCE PROJECTS.
- ENSURE ALL NEW CONSTRUCTION AND DEFERRED MAINTENANCE PROJECTS HAVE OEM REQUIREMENTS INCORPORATED INTO THE DESIGN DOCUMENTS.
- PROVIDE OVERSIGHT/MANAGEMENT FOR OEM PROJECTS.
- COORDINATE/CONDUCT IN-HOUSE BUILDING MEP AND CONTROLS ASSESSMENTS.

BUILDING CONTROLS SPECIALIST

- PROVIDE CONTINUOUS OVERSIGHT AND TESTING OF BUILDING CONTROLS SYSTEMS.
- PROVIDE ASSISTANCE WITH IN-AGENCY RETRO-COMMISSIONING WORK.
- PROVIDE PROGRAMMING ASSISTANCE FOR SMALL SCALE IN-AGENCY ENERGY CONSERVATION PROJECTS.
- ACT AS LIAISON TO BUILDING AUTOMATION.
- ASSIST WITH REVIEW OF TECHNICAL AND DESIGN DOCUMENTS.
- (1-2 POSITIONS)

COMMISSIONING SPECIALIST

- ASSIST COMMISSIONING MANAGER WITH LARGER SCALE RETRO-COMMISSIONING PROJECTS AND OTHER RELATED TASKS.
- CONDUCT ONGOING RCX OF BUILDING ENVIRONMENTAL SYSTEMS, INCLUDING IDENTIFICATION OF FUNCTIONAL ISSUES WITH BUILDING SYSTEMS, REPORTING ON THESE ISSUES, AND ASSISTING WITH DEVELOPMENT OF SOLUTIONS.
- SUPPORT FDD AND OEM WITH ENGINEERING AND TECHNICAL ISSUES.
- ASSIST WITH REVIEW OF TECHNICAL AND DESIGN DOCUMENTS.
- (1-2 POSITIONS)

BILLING AND UTILITY SPECIALIST

- COORDINATE INFORMATION FROM VENDOR BILLING SYSTEMS WITH IN-HOUSE UTILITY DATABASE.
- TRACK AND REPORT UTILITY AND ENERGY REBATE DATA, INCLUDING ANOMALIES AND REASONAL USAGE TRENDS.
- TRACK, REPORT, AND WORK WITH UTILITY PROVIDERS TO RESOLVE BILLING ANOMALIES.
- ASSIST ENERGY MANAGEMENT STAFF WITH DETERMINING TRENDS IN UTILITY USAGE/COSTS, AND RESOLVING BILLING, TECHNICAL, AND DATA MANAGEMENT SYSTEM ISSUES.
- ACT AS LIAISON TO FISCAL/ACCOUNTING.

ENERGY STEWARD

- COORDINATE EDUCATIONAL OUTREACH PROGRAM AND ENERGY EFFICIENCY AND SUSTAINABILITY CAMPAIGN.
- COORDINATE OEM ACTIVITIES WITH PROPERTY MANAGEMENT STAFF.
- COORDINATE MEETINGS BETWEEN DIFFERENT TFC DEPARTMENTS AND OEM STAFF.
- ASSIST WITH DOCUMENTATION TO SATISFY OEM AND AGENCY NEEDS.
- ACT AS A CHAMPION FOR OEM TO PROPERTY MANAGEMENT AND TENANT AGENCIES.
- (1-2 POSITIONS)

DESIRED FUTURE PERSONNEL

TFC Office Energy Management Potential:

- Our Agency has the potential for additional 20% reduction in utility usage (and cost).
 - The potential financial savings can exceed \$3,000,000 per year (based on today's prices).
 - In our opinion, achieving this lofty goal takes between 5- 7 years.
 - The commission can not expect to achieve this potential with the current level of investment in Office of Energy Management. Currently only 2% a year reduction can be expected.
 - OEM recommends management consulting assistance to compare the current level of investment in TFC Office of Energy Management to other known well established programs like the ones in University of Texas and Texas A&M University. This work can be done by OEM and TFC Internal Audit or optionally an outside management consulting firm can be used to accomplish this task.

CLOSING ARGUMENT:

- TO REALIZE THE POTENTIAL UTILITY SAVING OPPORTUNITIES (\$3,000,000 COST AVOIDANCE PER YEAR): MAJOR INVESTMENT IN OFFICE OF ENERGY MANAGEMENT (OEM) AND PREVENTIVE MAINTENANCE IS NEEDED.
- Important to note: If the price of the utilities start to increase again (very possible, probably 3.5% a year) and there is no further investment in OEM and preventive maintenance, some of the past gains may reverse, even if we can achieve a realistic 2% a year reduction in usage.



- increasing the current level of staffing and funding for OEM is the best way to ensure continuing reduction in utility usage and expenditures.



Q&A

A stylized graphic featuring the letters 'Q', '&', and 'A' in a bold, blue, rounded font with a white outline and a drop shadow. The 'Q' is on the left, the ampersand is in the middle, and the 'A' is on the right. Above the 'Q' is a red question mark, above the ampersand is a yellow question mark, and above the 'A' is a green exclamation mark.