



TEXAS MILITARY DEPARTMENT
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December 31, 2015

The Honorable Greg Abbott
Governor of Texas
P.O. Box 12428
Austin, TX 78711

Ms. Ursula Parks, Executive Director
Legislative Budget Board
P.O. Box 12666
Capitol Station
Austin, TX 78711

To the Honorable Greg Abbott, and Ms. Parks:

In accordance with Executive Order RP49, the Texas Military Department respectfully submits the enclosed FY16 Q1 Energy Conservation Plan.

If you have any questions or need additional information, please call me at 512-782-7219 or Mr. Bill Childs, 512-782-5001, Ext. 4205.

Respectfully,

A handwritten signature in black ink, appearing to read "A. Duane Waddill".

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A. Duane Waddill
Executive Director

Enclosure as stated.

cc: Ms. Alison Nathan
Training and Outreach Coordinator
State Energy Conservation Office

Texas Military Department



Resource Conservation Report

Q1 FY 2016

Resource Efficiency Plan

Summary

Texas Military Department (TMD) is committed to resource efficiency and conservation. To support this commitment, the agency has: (a) established goals for percentage reductions of resource usage; (b) established design guides with resource conservation and sustainability provision; (c) been observant of emerging technologies and techniques that facilitate resource reduction and independent resource generation.

This report for the First Quarter (Q1) FY16 provides supporting data and status on the commitments listed above.

Goals

Mandates & requirements. TMD strives to comply with, or make measureable progress toward compliance with, all State, Federal, and Department of Defense regulations, mandates, requirements, and design criteria governing resource efficiency, resource conservation, and sustainable resource practices. The following highlights major primary legal instruments impacting TMD resource efficiency operations. These lists are not all inclusive as there are various secondary instruments guiding the resource efficiency goals.

State regulations. The following are the primary State regulations applicable to the resource efficiency plan: (a) Texas Senate Bill 898; (b) Texas Senate Bill 1125; (c) Texas State House Bill 3693; (d) International Energy Efficiency Code 2009; (e) Texas Executive Order RP-49; (f) Texas Senate Bill 814, 73rd Legislative Session; (g) State Energy Conservation Office (SECO) Water Efficiency Standards for State Buildings and Institutions of Higher Education Facilities, dated 01 September 2011 (compliance on State owned property); (h) Texas Statutes and Code, Government Code, Title 10, Subtitle D, Chapter 2166, Subchapter I: Conservation of Energy and Water (compliance on State owned property); (i) State Energy Conservation Office (SECO), standards and guidelines, (compliance on State owned property).

Federal legislative requirements. The following are the primary Federal legislative requirements applicable to the resource efficiency plan: (a) Energy Conservation and Production Act of 1976 (ECPA); (b) National Energy Act of 1978; (c) Public Utility Regulatory Policies Act (PURPA); (d) National Energy Conservation Policy Act (NECPA); (e) Natural Gas Policy Act (PL 95-621); (f) Public Law 109-58: Energy Policy Act of 2005; (g) Public Law 110-140: Energy Independence and Security Act of 2007; (h) Executive Order 13423: Strengthening Federal Environmental, Energy, and Transportation Management, dated 24 January 2007; (i) Executive Order 13514; (j) International Code Council; (k) American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 90.1-2010; (l) American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 90.2-2007; (m) American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 189.1-2011; (n) Code of Federal Regulations (CFR) 433-435; (o) Federal Sustainable Buildings Memorandum of Understanding, dated 24 January 2006; (p) International Energy Conservation Code 2012 (IECC 2012), (q) Executive Order 13693.

Department of Defense regulations. The following are the primary Department of Defense regulations applicable to the resource efficiency plan: (a) AR 420-1 Army Facilities Management, Chapter 22: Army Energy and Water Management Program, dated 24 August 2012; (b) US Army Sustainable Design and Development (SDD) Policy for Army Facilities, dated 27 October 2010; (c) US Army Sustainable Design and Development (SDD) Policy for Army Facilities - Draft, dated 14 June 2013; (d) UFC 3-440-01: Active Solar Preheat Systems, dated December 2007; (e) UFC 3-440-04N: Solar Heating of Buildings and Domestic Hot Water, dated 16 January 2004; (f) UFC 1-200-02: High Performance and Sustainable Building Requirements, dated 01 March 2013; (g) LEED™ Green Building Rating System, Version 4.0.

Texas Military Department requirements. The following are the primary TMD guidelines applicable to the resource efficiency plan: (a) the Texas Army National Guard Energy Management Plan, ratified 14 July 15; (a) Texas Military Lighting Design Guide, dated 31 October 2013; (b) Illuminating Engineering Society of North America (IESNA) standards and guidelines, as applicable.

Organizational reduction goals.

- Reduce facility energy intensity (energy consumption per facility square footage) by 3% per fiscal year.
- Reduce facility water intensity (water consumption per facility square footage) by 2% per fiscal year.
- Generate 20% of electricity consumption on site through renewable electric energy technologies by 2020.

Organizational action goals.

Short term (1-3 years).

- Re-benchmarking. Conduct re-benchmark analysis biannually to evaluate the impact of current resource reduction and conservation measure and to inform and redirect future initiatives.
- Audits. Capital action plans include ASHRAE Level II, or equivalent, energy audits at 25% of facility inventory square footage annually.
- Building System Upgrades. The agency's major maintenance cycle process for facility renovation is designed and implemented to increase building efficiency for both energy and water consuming systems. The goal is to achieve 30% reduction in energy and water consumption through ASHRAE design standards and LEED Green Building best practices. All facilities are on a 20-year cycle for major maintenance and renovations.

- Exterior Lighting Upgrades. Upgrade exterior lighting fixtures to LED fixtures at 37 targeted facilities.
- Interior Lighting Upgrades. Upgrade exterior lighting fixtures to LED fixtures at 37 targeted facilities.
- Photovoltaic Solar Arrays. Install photovoltaic solar arrays at 10 target facilities.
- Rainwater/Condensate Harvest. Install rainwater/condensate harvesting systems at 10 targeted facilities.
- Controls Upgrades. Upgrade lighting and HVAC controls at 17 targeted facilities.
- Commissioning. Perform retro-commission of facilities to ensure all building systems are calibrated and maintained for optimum performance. Commission high-performance buildings on a five-year cycle and legacy facilities are to be commissioned with major maintenance projects and re-commissioned on a five-year cycle thereafter.
- Energy Management System. A new centralized building automation and energy management system is in design and scheduled to be deployed and activated later in FY16. This action will include 3 existing building automation systems with plans to expand to the remaining facility inventory as funding is available.

Long term (3-5 years).

- Building System Upgrades. The agency's major maintenance cycle process for facility renovation is designed and implemented to increase building efficiency for both energy and water consuming systems. The goal is to achieve 30% reduction in energy and water consumption through ASHRAE design standards and LEED Green Building best practices. All facilities are on a 20-year cycle for major maintenance and renovations.
- Exterior Lighting Upgrades. Locations with high intensity discharge exterior lighting will be upgraded to high efficient LED lighting technology in order to increase security and reduce electrical consumption.
- Controls Upgrades. The building automation controls systems will be integrated into the central Energy Management System in order to allow for coordinated schedule updates and system checks. There are various remote sites where the building controls will be brought into the Energy Management System in the future as funding allows.

Progress

Actions.

- Initiated an Energy Management Master Plan revision in Q1 FY16 (currently in progress).

- Implemented energy conservation design guidelines as applicable to facility maintenance, renovation, and construction project designs.
- Obtained Energy Manager in Training Certification for one energy management staff personnel in FY16.
- Successfully completed demand-response program with City of Austin and will develop better response capabilities for the FY16 demand-response season.

Projects.

- Camp Mabry Building 10 LED Lighting Upgrades. Contract for the replacement of 200 lighting fixtures with high-efficiency LED fixtures issued in Q4 FY15. Construction scheduled for completion in Q2 FY16.
- Camp Mabry Building 11 LED Lighting Upgrades. Contract for the replacement of 335 lighting fixtures with high-efficiency LED fixtures issued in Q4 FY15. Construction scheduled for completion in Q2 FY16.
- Camp Mabry Building LED Street Lighting Upgrades. Contract for the replacement of 34 street lighting fixtures with high-efficiency LED fixtures issued in Q4 FY15. Construction scheduled for completion in Q2 FY16.
- MATES LED Exterior Lighting Upgrades. Contract for the replacement of 22 lighting fixtures with high-efficiency LED fixtures issued in Q4 FY15. Construction scheduled for completion in Q2 FY16.
- Temple LED Exterior Lighting Upgrades. Contract for the replacement of 18 lighting fixtures with high-efficiency LED fixtures issued in Q4 FY15. Construction scheduled for completion in Q2 FY16.
- BAC-UMCS Installation. Contract for the installation of new BAC-UMCS system of at the Fort Sam Houston, Camp Swift, and Camp Bowie maintenance facilities issued in Q4 FY15. Construction scheduled for completion in Q4 FY16.
- Camp Bowie Wash Platform Net Zero Water Renovation. Design phase of the design-build process for the construction of a net zero wash platform incorporating rainwater harvesting and graywater recycling initiated in Q4 FY14. Construction phase of the design-build process initiated construction in Q2 FY15. Construction still in process as of the end of Q1 FY16.
- Camp Mabry Bldg. 8 HVAC Repairs. Design for the upgrade of a 144,458 square foot facility's HVAC system components to include high-efficiency cooling tower, chillers, boilers, air handlers, pumps, and other components initiated in Q4 FY14. Design still in process as of end of Q1 FY16.

- Lubbock Boiler Replacement. Design for the upgrade of a 128,763 square foot facility's boiler system to high-efficient condensing boilers including motor upgrades for various system components completed in Q3 FY13. Construction initiated in Q3 FY14 and still in process as of the end of Q1 FY16.

- SECO Energy Major Maintenance. Investment grade audit of 9 facilities targeted for follow-up renovation design completed in Q2 FY15. Design for system and component upgrades and initial bidding completed in Q4 FY15. Re-design for rebidding still in process as of the end of Q1 FY16.

- Taylor RC Major Maintenance. Design for the renovation of a 10,776 square foot facility including high-efficiency HVAC systems, plumbing fixtures, and lighting fixtures completed in Q3 FY14. Contracted for construction in Q2 FY15 with construction initiated in Q3 FY15. Construction completed in Q1 FY16.

Assessments, audits, and studies.

- STAR Campaign FY16 audits. Energy audits of the STAR Campaign FY16 facilities (San Marcos, Pasadena, Grand Prairie, Houston Westheimer, Austin Fairview). These audits will serve as an input for energy efficiency design recommendations for capital improvement projects. Audits initiated in Q1 FY16 and scheduled to be completed in Q2 FY16.

Resource reductions.

Electricity. Table 1 depicts the total electricity usage and costs through the end of Q1 FY16 compared to the corresponding periods for FY15. Usage decreased by 12.4%. Costs decreased by 20.0%.

Table 1

Electricity Usage and Cost Comparison - FY16 versus FY15

Period	Usage (kWh)			Cost (\$)		% Change
	FY15	FY16	% Change	FY15	FY16	
September	4,281,253	4,243,960	-0.9%	\$ 379,714.00	\$ 373,491.00	-1.6%
October	3,443,586	3,114,803	-9.5%	\$ 335,209.00	\$ 280,398.00	-16.4%
November	3,271,215	2,273,470	-30.5%	\$ 349,132.00	\$ 197,275.00	-43.5%
Q1 Subtotal	10,996,054	9,632,233	-12.4%	\$ 1,064,055.00	\$ 851,164.00	-20.0%
December	3,221,561	-	-	\$ 275,402.00	\$ -	-
January	3,378,584	-	-	\$ 342,736.00	\$ -	-
February	3,268,988	-	-	\$ 299,997.00	\$ -	-
Q2 Subtotal	9,869,133	-	-	\$ 918,135.00	\$ -	-
March	3,194,650	-	-	\$ 297,483.00	\$ -	-
April	3,234,762	-	-	\$ 295,010.00	\$ -	-
May	3,599,376	-	-	\$ 335,808.00	\$ -	-
Q3 Subtotal	10,028,788	-	-	\$ 928,301.00	\$ -	-
June	4,331,567	-	-	\$ 386,607.00	\$ -	-
July	5,010,064	-	-	\$ 429,889.00	\$ -	-
August	4,967,266	-	-	\$ 434,845.00	\$ -	-
Q4 Subtotal	14,308,897	-	-	\$ 1,251,341.00	\$ -	-
Annual Total	45,202,872	9,632,233	-78.7%	\$ 4,161,832.00	\$ 851,164.00	-79.5%

Notes. Incomplete data available for October and November FY16. Data only reflects Texas Army National Guard usage and costs. Data for the Texas Air Guard, Texas State Guard, Counter Drug Task Force, and Texas Challenge Academy were not available at the time of this report.

Natural gas. Table 2 depicts the total natural gas usage and costs through the end of Q1 FY16 compared to the corresponding periods for FY15. Usage decreased by 77.0%. Costs decreased by 76.8 %.

Table 2

Natural Gas Usage and Cost Comparison - FY16 versus FY15

Period	Usage (MMBtu) FY15	Usage (MMBtu) FY16	% Change	Cost (\$) FY15	Cost (\$) FY16	% Change
September	1,229	1,185	-3.6%	\$ 13,267.00	\$ 11,653.00	-12.2%
October	2,824	1,662	-41.1%	\$ 22,603.00	\$ 10,074.00	-55.4%
November	9,045	161	-98.2%	\$ 64,709.00	\$ 1,628.00	-97.5%
Q1 Subtotal	13,098	3,008	-77.0%	\$ 100,579.00	\$ 23,355.00	-76.8%
December	13,460	-	-	\$ 104,068.00	\$ -	-
January	18,269	-	-	\$ 115,708.00	\$ -	-
February	13,620	-	-	\$ 80,713.00	\$ -	-
Q2 Subtotal	45,349	-	-	\$ 300,489.00	\$ -	-
March	9,929	-	-	\$ 55,214.00	\$ -	-
April	3,017	-	-	\$ 24,899.00	\$ -	-
May	1,963	-	-	\$ 15,077.00	\$ -	-
Q3 Subtotal	14,909	-	-	\$ 95,190.00	\$ -	-
June	1,403	-	-	\$ 13,884.00	\$ -	-
July	1,303	-	-	\$ 13,404.00	\$ -	-
August	1,065	-	-	\$ 11,135.00	\$ -	-
Q4 Subtotal	3,771	-	-	\$ 38,423.00	\$ -	-
Annual Total	77,127	3,008	-96.1%	\$ 534,681.00	\$ 23,355.00	-95.6%

Notes. Incomplete data available for October and November FY16. Data only reflects Texas Army National Guard usage and costs. Data for the Texas Air Guard, Texas State Guard, Counter Drug Task Force, and Texas Challenge Academy were not available at the time of this report.

Propane. Table 3 depicts the total propane usage and costs through the end of Q1 FY16 compared to the corresponding periods for FY15. Usage decreased by 100.0%. Costs decreased by 100.0%.

Table 3

Propane Usage and Cost Comparison - FY16 versus FY15

Period	Usage (Gal)			Cost (\$)		
	FY15	FY16	% Change	FY15	FY16	% Change
September	0	0	0.0%	\$ -	\$ -	0.0%
October	5,123	0	-100.0%	\$ 9,350.00	\$ -	-100.0%
November	14,582	0	-100.0%	\$ 21,019.00	\$ -	-100.0%
Q1 Subtotal	19,705	0	-100.0%	\$ 30,369.00	\$ -	-100.0%
December	0	-	-	\$ -	\$ -	-
January	7,984	-	-	\$ 11,686.00	\$ -	-
February	6,357	-	-	\$ 12,025.00	\$ -	-
Q2 Subtotal	14,341	-	-	\$ 23,711.00	\$ -	-
March	1,420	-	-	\$ 3,323.00	\$ -	-
April	3,121	-	-	\$ 4,994.00	\$ -	-
May	0	-	-	\$ -	\$ -	-
Q3 Subtotal	4,541	-	-	\$ 8,317.00	\$ -	-
June	2,365	-	-	\$ 3,784.00	\$ -	-
July	4,542	-	-	\$ 5,374.00	\$ -	-
August	0	-	-	\$ -	\$ -	-
Q4 Subtotal	6,907	-	-	\$ 9,158.00	\$ -	-
Annual Total	45,494	0	-100.0%	\$ 71,555.00	\$ -	-100.0%

Notes. Incomplete data available for October and November FY16. Data only reflects Texas Army National Guard usage and costs. Data for the Texas Air Guard, Texas State Guard, Counter Drug Task Force, and Texas Challenge Academy were not available at the time of this report.

Water usage. Table 4 depicts the total water usage and costs through the end of Q1 FY16 compared to the corresponding periods for FY15. Usage decreased by 8.0%. Costs decreased by 30.7%.

Table 4

Water Usage and Cost Comparison - FY16 versus FY15

Period	Usage (kWh)	Usage (kWh)	% Change	Cost (\$)	Cost (\$)	% Change
	FY15	FY16		FY15	FY16	
September	4,122	6,316	53.2%	\$ 33,016.00	\$ 45,024.00	36.4%
October	7,267	8,197	12.8%	\$ 49,317.00	\$ 35,839.00	-27.3%
November	4,590	194	-95.8%	\$ 36,818.00	\$ 1,706.00	-95.4%
Q1 Subtotal	15,979	14,707	-8.0%	\$ 119,151.00	\$ 82,569.00	-30.7%
December	3,914	-	-	\$ 32,297.00	\$ -	-
January	4,383	-	-	\$ 34,947.00	\$ -	-
February	4,709	-	-	\$ 30,007.00	\$ -	-
Q2 Subtotal	13,006	-	-	\$ 97,251.00	\$ -	-
March	4,088	-	-	\$ 34,330.00	\$ -	-
April	3,910	-	-	\$ 32,446.00	\$ -	-
May	4,246	-	-	\$ 35,933.00	\$ -	-
Q3 Subtotal	12,244	-	-	\$ 102,709.00	\$ -	-
June	4,216	-	-	\$ 34,362.00	\$ -	-
July	5,333	-	-	\$ 38,802.00	\$ -	-
August	5,630	-	-	\$ 44,167.00	\$ -	-
Q4 Subtotal	15,179	-	-	\$ 117,331.00	\$ -	-
Annual Total	56,408	14,707	-73.9%	\$ 436,442.00	\$ 82,569.00	-81.1%

Notes. Incomplete data available for October and November FY16. Data only reflects Texas Army National Guard usage and costs. Data for the Texas Air Guard, Texas State Guard, Counter Drug Task Force, and Texas Challenge Academy were not available at the time of this report.

Renewable power generation. Table 5 depicts the total renewable power generation through the end of Q1 FY16 compared to the corresponding periods for FY15. Generation decreased by 11.2%.

Table 5

Renewable Power Generation - FY16 versus FY15

Period	Generation (kWh)		% Change
	FY15	FY16	
September	50,657	56,251	11.0%
October	48,089	38,636	-19.7%
November	36,347	25,135	-30.8%
Q1 Subtotal	135,093	120,022	-11.2%
December	27,094	-	-
January	31,580	-	-
February	31,919	-	-
Q2 Subtotal	90,593	-	-
March	42,078	-	-
April	43,412	-	-
May	45,739	-	-
Q3 Subtotal	131,229	-	-
June	56,404	-	-
July	65,045	-	-
August	61,538	-	-
Q4 Subtotal	182,987	-	-
Annual Total	539,902	120,022	-77.8%

Notes. Incomplete data available for October and November FY16. Data only reflects Texas Army National Guard usage and costs. Data for the Texas Air Guard, Texas State Guard, Counter Drug Task Force, and Texas Challenge Academy were not available at the time of this report.

Potential Resource Saving Actions

Net zero upgrades. Offset energy consumption at facilities via onsite energy generation through the use of various alternative types of local renewable energy generation techniques (i.e. solar photovoltaic arrays, solar concentrating generators, wind generation, geothermal, etc.). Evaluate and pursue local renewable energy generation technologies when economically feasible and operationally practical.

Water reclamation upgrades. Offset water consumption at facilities via onsite water reclamation. Water reclamation can be achieved through various techniques (i.e. rain water harvesting, and condensate recovery, gray water recycling, atmospheric water generation, etc.). Evaluate and pursue water reclamation technologies when economically feasible and operationally practical.

Behavior Modification Campaign. We have instituted a Red Yellow Green scorecard program where major occupiable facilities are graded based on current year reductions when compared to the same period of prior years. This program has been successful and we plan to expand on this program in order to increase its impact on our energy and water conservation efforts.

Fleet Fuel Management Plan

Summary

TMD operates and maintains a vehicle fleet of less than 100 vehicles. The agency is committed to reducing its fuel consumption and evaluating alternative fuel vehicles for future investment.

Goals

TMD will strive to offset 5% of fleet fossil-fuel consumption each FY with alternative fuel consumption.

Progress

Data on fleet fuel consumption not available at the time of this report.

Potential Resource Saving Actions

The agency will continue to evaluate alternative fleet fuel technologies (i.e. propane, CNG, hybrid, electric) for consideration in future fleet vehicle procurements as economically feasible and operationally practical.