Energy Conservation & Resource Efficiency Plan
For
The Texas Board of Professional Engineers
Quarter 4 Fiscal Year 2017

Introduction:

In accordance with the provisions of Executive Order RP-49, the Texas Board of Professional Engineers has developed a plan for conserving energy and has set a goal for reducing its usage of electricity, natural gas, and water. The executive order requires the plan to consist of the Resource Efficiency Plan and the Fleet Fuel Management Plan (vehicles). The Texas Board of Professional Engineers does not have vehicles assigned to the agency so that portion of the plan does not apply.

The Texas Board of Professional Engineers is a Self-Directed Semi-Independent agency and is focused on cost savings. The agency does not receive appropriations from the state and must fund all the agency costs.

RESOURCE EFFICIENCY PLAN

For

Texas Board of Professional Engineers

(Updated)

TABLE OF CONTENTS Page

INTRODUCTION
To
Texas Board of Professional Engineers (TBPE)

Overview

TBPE was created by the 45th Texas Legislature in 1937 following the New London School explosion in East Texas. Over three hundred students and teachers were killed as a result of improperly designed gas heating system. The Board was established to regulate the practice of engineering through licensing and rules of practice.

TBPE is classified as a small state agency with 31 full-time staff members. The Board, which governs the agency, is composed of six professional engineers and three public members appointed by the Governor and confirmed by the Senate for six-year staggered terms.

TBPE is one of a small number of state agencies participating in the Self-Directed Semi-Independent (SDSI) program. As part of this project, the agency receives no funds from appropriations; rather, all agency operations are funded from fees collected from licensing and enforcement activities.

Mission

Our mission is to protect the health, safety, and welfare of the people in Texas by regulating the practice of engineering through licensure of qualified individuals and compliance with the laws and rules.

Services

TBPE issues licenses to engineers and registers businesses providing engineering services to the public. It also enforces violations to the Texas Engineering Practices Act and Rules. Advisory opinions are issued to the public as appropriate to make interpretations of the Act and explain factual or hypothetical situations that may not be clear. The agency also oversees engineering exam administration and provides outreach to its licensees, schools, and the public.

Infrastructure & Energy Conservation

The agency occupies one building of approximately 9,246 gross square feet in Austin, which was constructed in May 1979. There is a basement that is not air conditioned and is used for storage.

Thermostat settings for the heating and air conditioning systems are regularly monitored and controlled as necessary. The hot water heater has a timer to ensure it heats water only during the time the members of the staff might be in the building.

The irrigation system is only used once a week, at the minimal setting to sustain the vegetation surrounding the facility. During rainy periods, the irrigation system is turned off completely.

Staff members are also instructed to turn off lights when they leave their offices for lunch or at the end of the day. Energy saving settings are enabled on computer workstations to ensure that monitors go to sleep after 20 minutes of inactivity.

1. **Accomplishments for FY 2005-2017**

1. The agency installed a dedicated air conditioning system for the computer room.
2. The agency had several additional thermostats installed in offices that previously shared the thermostat with the computer room.
3. The agency has replaced single pane windows with double pane windows on approximately 40% of the building.
4. The agency has re-sealed all windows in building.
5. The agency replaced all CRT computer monitors with flat panel monitors.
6. The soda machine was removed which reduces electrical consumption.
7. The refrigerator in the lunch room was replaced with an energy saving model.
8. New water saving toilets were installed in all agency bathrooms.
9. All fluorescent lights and ballasts were replaced with high efficiency F-32 T-8 system. This project replaced 0.75 amp ballast with a 0.28 amp unit.
10. The air system ductwork was cleaned.
11. The twenty five year old main electrical panel was replaced with an updated panel.
12. The landscape watering schedule was revised to reduce watering frequency and duration during high demand months.
13. The monthly thermostat monitoring schedule was revised.
14. Regularly scheduled maintenance is performed on air conditioning and heating units.
15. Texas Energy Engineering Services (TEES) performed an energy audit and evaluated the building for thermal loss issues and the potential for solar power installation.
16. The agency began participation in the Council on Competitive Government Statewide Management Services Project in cooperation with the State Energy Conservation Office (SECO). This includes utility tracking and recommendations for improvements by LPB Energy Consulting.
17. The agency worked with City of Austin to replace main electric meter that was reporting erroneous readings.
18. The agency replaced original flex duct from main trunk ducts to registers throughout the building and replaced all rooftop HVAC units with new, more efficient units at the end of first quarter 2012.
19. The agency has been following the City of Austin watering schedule for businesses due to continuing drought conditions.
20. For years 2012 - 2015, the agency achieved its goal of keeping total energy usage at least 5% less than the 2008 baseline.
21. As part of the agency's strategic plan implementation, a workgroup evaluated multiple components of the facility and made recommendations for future improvements. A tracking system for repairs and improvements was also created.
22. During FY 2015, repairs were made to the irrigation system to help conserve water.
23. The single 40 gallon water heater used by the facility was replaced in 2016 with a new, more efficient unit.
24. Roof condition assessment completed by engineering firm in preparation for roof replacement.
25. During FY 2017, additional single pane windows were replaced with double pane insulated windows along the south wall of the building.

2. **Goals for Utility Consumption Reduction**

<u>The Vision of the agency regarding utility consumption is as follows:</u>

The TBPE will take every reasonable action to reduce energy use and use energy as efficiently as possible.

The Mission of the agency regarding utility consumption is as follows:

Provide a comfortable work environment for the staff of this agency within the efficient use of energy and other resources.

The utility reduction goals of the agency indicated below are in support of the agency's Vision, Mission and Goals.

Goal One

Determine and implement all cost effective energy and resource conservation measures that are compatible with the needs of the staff in the performance of their duties. Previously, the agency set a goal to reduce energy and resource use by 10% over the FY 04-09 period. In FY 2010, executive management reviewed the agency resource usage history and set a new goal of a 5% reduction from a FY 2008 baseline during the FY 2010-2012 period. By the end of FY 2012, the agency had achieved its goal of keeping total energy usage 5% below the baseline and the agency goal for FY 2016 – 2017 will be to maintain at least a 5% reduction from the 2008 baseline. Fiscal Year 2016 total energy consumption was 40% less than the baseline of 2008 due to water conservation efforts in the ongoing drought condition.
Compared to the baseline of FY 2008, September 2016 through August 2017 total energy consumption was about 62% less.

In order to decrease energy and resource consumption by 5% the following energy saving and resource reduction measures will be implemented:

- Track the energy usage after installation of new fluorescent lights and ballasts (high efficiency F-32 T-8 system). We anticipate an annual reduction in lighting power consumption of 15% to 20%.
- Track energy savings after replacement of approximately 40% of agency windows with double-pane windows and installation of window film in several offices. In addition, all windows were re-sealed in FY 2008.
- At the end of the workday, turn off all computers or have all computers go into system standby.
- Wrap the hot water heater with an insulated blanket and reduce the heating temperature to 110 degrees. This measure should reduce energy costs by approximately $75 per year.
- Track the energy usage after replacement of CRT screens with flat screen monitors for 27 workstations in agency. We anticipate a 30% reduction in monitor power consumption.
- Track water usage after revising landscape watering schedule to comply with City of Austin restriction and monitoring rain amounts. We anticipate a 30% reduction in water consumption.
- Agency arranged an energy audit through the State Energy Conservation Office (SECO) with Texas Energy Engineering Services. Meetings, initial inspection, and report was completed in FY 2008.
- Agency requested quotes for a long-term plan to complete replacement of agency windows with double-pane windows.
- Agency replaced original flex duct from main trunk ducts to registers throughout the building and replaced all rooftop HVAC units with new, more efficient units at the

end of first quarter 2012.
- Use the new HVAC system to maintain a constant temperature throughout the building and program the system to run less during unoccupied hours.
- Agency contracted with Texas Facility Commission in 2016 to replace the roof of the entire building. Construction should begin in November 2017.

Goal Two
Develop and implement effective utility conservation staff awareness.

In order to achieve savings, and to recognize additional opportunities for energy conservation, each staff person must be made aware and informed of how they can help and understand the advantage of their individual participation.

Goal Three
Develop and implement a utility consumption and cost tracking system.

3. **Energy Consumption Comparison**
There is one gas, one electric, and one water meter serving the agency. During FY 2006, the agency spent $19,400, spent $18,001 in FY 2007, and $17,700 in FY 2008. The agency again lowered expenditures to $17,364 in FY 2009, in spite of record setting high temperatures. Based on historical data, FY 2010 was predicted to be lower than 2009. However, FY 2010 ended justly slightly higher than 2009 at $17,561. FY 2011 proved to be an impossible year for the agency to reach its goal of reducing overall usage below the baseline of 2008. A record breaking drought and heat wave caused an increase in electricity and water usage. There were over 80 days of 100 degree temperatures in 2011. Also, there was abnormally cold weather in December 2010 and January 2011 which spiked natural gas consumption. Total energy costs in FY 2011 were $20,240. While funds are limited for further energy efficient building improvements this year, the agency will monitor its consumption patterns and try to adjust usage to reduce costs. The agency is anticipating a significant improvement in the performance of the new heating and cooling system installed. At the end of fiscal year 2013, overall energy usage was less than that of 2012 and less than the baseline of 2008 in two of three categories. Total energy cost to the agency was $18,765. Overall energy consumption at the end of the year was approximately 35% less than the baseline year 2008. The water usage will be adjusted to conserve resources.
During the first quarter of FY 2014 resulted in less overall energy consumption than the first quarter of FY 2013 by approximately 33% and 50% less than the first quarter of the baseline year 2008. The second quarter of FY 2014, however, brought drastic weather changes to the area. Some of the coldest weather in decades impacted the region in a series of weekly events. This resulted in higher electricity and natural gas usage by the agency compared to 2013 and 2008. The increase in usage in this quarter alone may be enough to push overall consumption above the target level for this year.
During the third quarter of FY 2014, water and natural gas usage were held below 2008 consumption, but electricity exceeded third quarter 2008 usage. Electricity consumption was slightly higher than the same time period in 2013 as well.
Fiscal Year 2014 total energy usage ended more than 50% below the baseline of 2008, even though electricity and natural gas usage increased due to extreme weather conditions during the year. Total energy cost grew to $21,000 for the first time.
Electricity and natural gas usage in FY 2015 was very similar to FY 2014 and the baseline year of 2008, while water usage was less than in 2014 and only a fraction of 2008. Thus, overall usage throughout FY 2015 was significantly less than in 2014 and the baseline year

of 2008.
From September through May of Fiscal Year 2016 total energy consumption was significantly higher than the same time period of Fiscal Year 2015. The noticeable increase stemmed from increased water consumption driven by faults in the irrigation system and the need to water the landscape more due to drought conditions. Both electricity and natural gas consumption were kept well below the level of 2015.
While total overall usage was slightly higher than 2015, it was still 40% less than the baseline year of 2008.
Total energy conservation was significant during Fiscal Year 2017 (September 2016 – August 2017), about 62% less than the same time period in FY 2008. With close monitoring and favorable weather conditions, usage was also less than FY 2016.

4. **Schedule and Monitoring of Implementation**

Implementation Schedule

The following actions and schedule will be used:

1. Continue to monitor operations that affect energy and resource use and make recommended changes as needed.
2. Continue to determine equipment needs that will improve energy efficiency and resource utilization and recommend an implementation schedule based upon financial resources as needed.

Monitoring Strategy

The monthly costs and use of electricity, gas, and water will be checked quarterly and compared to the base year of FY08 to determine if progress is being made to meet planned efficiencies. It must be noted that while usage rates may drop due to efficiencies and improvements, overall costs may increase due to rising energy costs. Costs and usage rates are tracked by the agency. A team of agency staff evaluated all components of the facility to create a tracking system of all repairs and to recommend future improvements to the facility.

5. **Financing Strategy**

The primary financing for the identification and implementation of energy conservation measures will be through inclusion in the yearly budget. Since the agency is part of the SDSI project, the agency is tasked with operating like a business. All reductions in energy and resource consumption will positively affect the operations and budget of the agency. At the August 2011 Board meeting, the Board approved funds for a major renovation of the building's AC/Heat system and duct work. The project was completed in December 2011. Energy consumption will continue to be tracked monthly.
The agency has budgeted to replace the entire building roof in FY 2017, but it is unclear if this will increase energy efficiency in the building. Additional double-pane window replacement is also taking place.

6. **Utility Awareness Plan (UAP)**

The agency will include both direct and indirect awareness in the development of its UAP. We support the efforts of State Energy Conservation Office (SECO) regarding energy efficiency awareness.

The intent of direct awareness activities is to bring about an appropriate culture change whereby informed staff not only act in prescribed ways to conserve energy, but also

become encouraged and facilitated to be proactive in their own ongoing discovery of new energy and resource conservation opportunities. Various means to foster and reward this incentive will be explored, including appropriate forms of recognition.

In addition to utility awareness, the agency also has implemented a recycling program. During FY 2009 the agency began utilizing single-stream recycling, encouraging staff to recycle all metals, plastic, or glass. In addition, the agency recycles all used paper products.

7. **Description of Agency Facility**

The agency occupies one building of approximately 9,500 gross square feet in Austin, which was constructed in May 1979. There is a basement that is not conditioned and is used for storage. A complete description is in Attachment A.

8. **History of Agency Utility Use**

The agency's utility consumption and cost is tracked by the agency.

	(KWH)	(MBTU)	(Gal)
FY 2003	138,560	1,905	1,784,800
FY 2004	133,120	113	688,600
FY 2005	142,720	110	859,100
FY 2006	143,920	109	1,385,000
FY 2007	148,960	234	685,700
FY 2008*	136,240	157	845,800
FY 2009	131,360	150	834,900
FY 2010	149,600	227	623,100
FY 2011	163,040	176	777,000
FY 2012	152,320	108	645,100
FY 2013	152,720	108	482,900
FY 2014	158,080	241	262,500
FY 2015	155,040	237	179,600
FY 2016	145,200	127.8	442,000
FY 2017**	146,720	74.53	221,800

***Baseline Year**

**** Current Year**

9. **Savings Monitoring and Evaluation Plan**

The agency will determine various measurement and verification (M&V) applications appropriate to and commensurate with the variety of energy conservation measures (ECMs) that are implemented in order to confirm the resulting consumption reductions and related costs savings.

The agency will balance the cost of obtaining the measurements and performing the calculations with the benefit that is produced. Generally, the M&V should not cost more than 10% or so of the savings. However, in low risk ECMs this percentage may be reduced, and in high risk ECMs this percentage may need to be increased.

The agency will review the specific needs of each ECM installation when making decisions on what M&V to apply. The agency will also specify installation acceptance requirements and functional performance requirements for each installation.

During FY 2008 the Agency began participation in the Council on Competitive Government Statewide Management Services Project in cooperation with the State Energy Conservation Office (SECO). This includes utility tracking and recommendations for improvements by LPB Energy Consulting. This service was discontinued due to late processing of the agency utility invoices and failure to recognize fluctuations in meter readings.

10. **Project Implementation Update**

Continuous Commissioning
The building will be checked quarterly to ensure that there is no significant damage to it or to the operating systems.

Retrofit Commissioning and Design Review
Any utility systems or equipment that is installed will be checked to ensure they are working according to the design before the project is finalized as complete.

Operational Energy Conservation
Agency procedures include specific requirements related to the operation of heating and air-conditioning equipment, such as temperature set points, relative humidity, and hours of operation. Water conservation is practiced by only watering once a week. Also, included are the current energy and water related design requirements and guidelines.

Energy Manager
The energy manager is the executive director.

Energy Audit and Report
The Energy Audit and Report was completed by Texas Energy Engineering Services during FY 2008. Minor recommendations were made and it was stated that the agency has the potential for the Energy Star rating through EPA. The Agency will consider this evaluation.

11. **Agency Contacts**

Designated Official
The designated official responsible for the implementation of the recommendations included in the Resource Efficiency Plan is the deputy executive director.

Primary Contact Person for Resource Efficiency Plan
Lance Kinney, Ph.D., P.E.
Executive Director
Texas Board of Professional Engineers
1917 South Interstate 35
Austin, Texas 78741-3702
Phone: (512) 440-7723
Fax: (512) 440-0417

Alternate Contact Person for Resource Efficiency Plan
Jeff Mutscher
Chief Financial Officer
Texas Board of Professional Engineers

Appendix A: Description of Agency's Facility

The Texas Board of Professional Engineers occupies a one-story (basement under part of the executive suite) building at 1917 South Interstate 35 in Austin, Texas. It has approximately 9,474 square feet of conditioned space and an unconditioned basement that is used for storage and access to the crawl space. The area under the executive suite is open covered parking. Perimeter parking is on the south and east sides of the building.

The building, built in May 1979, is configured such that almost all the administrative area is on the perimeter and is glass around the entire perimeter of the building. Most of the interior is storage or workspace. The grounds are irrigated.

A park area of approximately one acre is on the north side of the building. It includes a walking trail and benches. Part of the area is watered by an irrigation system.

A gas meter supplies the hot water heater, which is in the unconditioned basement and the heating unit of the HVAC units that are on the roof. All other utility systems are electric.

Water, wastewater, and electricity are supplied by the City of Austin. Gas is supplied by Texas Gas Service.