Energy and Water Management Plan

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Section 1: Instructions

Texas Government Code §447.009 requires each state agency and institution of higher education to set and report percentage goals for reducing its usage of water, electricity, transportation fuel and natural gas. According to 34 Tex. Admin. Code §19.14 (2016), these goals must be included in a comprehensive energy and water management plan (EWMP) submitted by **Oct. 31** of every fiscal year to the State Energy Conservation Office (SECO). This requirement is intended to streamline and standardize the energy reporting requirements of state agencies and institutions of higher education.

Please complete Section 2: Agency Information and Section 3: Providing Agency or Section 4: Tenant Agency, as applicable, for **the previous fiscal year**. Save this form as "EWMP-Agency Number-Agency Acronym-FY20##.docx" (e.g., EWMP-104-LBB-FY2021.docx), and return this form by email to seco.reporting@cpa.texas.gov no later than **Oct. 31**.

Please do not embed images, charts or graphics in your responses; however, you may provide hyperlinks to them.

Please visit SECO's Energy and Reporting website for more information. For questions about reporting, please contact seco.reporting@cpa.texas.gov or call 844-519-5676.

Section 2: Agency Information

Please provide the name and number (if applicable) of the agency that is submitting an Energy and Water Management Plan.

Agency Name: Texas Tech University Health Sciences Center

Agency Number: 739

Other agencies included in this summary: click to enter

Please provide the contact information for the person(s) responsible for implementation of the recommendations in the plan and the contact information for the person(s) responsible for reporting and submitting the plan, if different.

Implementation Contact

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Reporting/Submission Contact

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Section 3: Providing Agency

Does your agency occupy or manage a state-owned building and pay the utilities? Yes - Providing Agency

If NO, please skip to **Section 4: Tenant Agency**.

If YES, please complete the following:

Have you submitted, or will you be submitting by Oct. 31, 2021, energy and water usage data for your agency and properties using the ENERGY STAR Portfolio Manager tool? Yes - EnergyStar data submitted

Progress Report

The Progress Report Section must outline the progress of activities related to the implementation of projects from the previous Energy and Water Management Plan (if applicable), including continuation of or new preliminary energy audits, a summary of the results, utility efficiency and cost savings. Agencies should periodically conduct preliminary energy audits to identify new utility savings opportunities.

1. Four pneumatic controlled air handling units (AHUs) were refurbished with the new direct digital controls (DDC), fanwall systems, steam heating, and cooling coils. The air handling units utilize pressure independent control valves for chilled water flow. Improved equipment energy efficiency and performance has been achieved.
2. HSC Facilities completed projects to retrofit ten air handling units in the Lubbock HSC building, with direct digital controls (DDC). The pneumatic controls and associated valves were replaced. Based on the field measurement and verification, the temperature differential of chilled water has increased up to 150% as compared to standard control valve. This results in reduced chilled water flow. In addition, several VAV boxes were retrofitted to DDC.
3. In the Abilene campus, two new air cooled, scroll chillers with zero ozone depletion potential refrigerant, were installed. Replacement of chillers with HCFC refrigerants (R-22) are being done to comply with evolving federal regulations. The new chillers exceed the most recent state energy code performance requirements. The building electricity consumption has reduced up to 10%.
4. In the Abilene campus, two high efficient condensing heating boilers with associated pumps were installed. These boilers provide 1:10 turndown, and efficiency up to 96%.
5. Few classroom lightings were upgraded with new LED light fixtures and dimming controls. In addition, we have been upgrading lighting to LEDs for most of the renovation projects.
6. HVAC Control software, algorithm and system components are being upgraded in all TTUHSC campuses.
7. Two new rooftop units with enhanced controls, and high efficiency window glazing were installed in the Dallas Southwest Professional building. 19 pneumatic terminal boxes are upgraded to DDC.
8. Construction is in progress to install high efficient chillers, boilers, air units and associated terminal boxes with DDC, in the Midland campus.
9. From FY-2021, we are reporting electricity and gas usage in stead of steam and chilled water. So the electricity and gas usage are high for FY-21, but there are no thermal utilities. Hence the benchmark year in the Goals section has been changed to FY 2021.

Goals

The Goals Section must summarize the future goals for utility conservation. In accordance with Texas Government Code §447.009, each state agency and institution of higher education shall set percentage goals for reducing the agency's or institution's usage of water, electricity, transportation fuels and natural gas. The percentage goal should state a target year and reference the target goal relative to a benchmark year.

Click to enter your agency's Goals content.

Utility	Target Year	Benchmark Year	Percentage Goal
Water	FY 2030	FY 2011	15
Electricity	FY 2023	FY 2021*	5
Transportation fuels	FY 2030	FY 2019	25
Natural gas	FY 2030	FY 2021	15

*Texas Health and Safety Code Section 388.005(c) and (f). Entities that began energy conservation tracking prior to Sept. 1, 2007, or in attainment areas, may substitute their own electricity benchmark years.

Strategy for Achieving Goals

The Strategy Section must describe how the agency or institution plans to prioritize and implement cost-effective utility efficiency measures in order to meet the established utility conservation goals.

1. Refurbish pneumatically controlled air handling units (AHU) with direct digital controls, multiple fan system, premium efficiency motors, pressure independent flow control valves, steam heating, new cooling and heating coils with higher fins/inch etc. This is mainly for the AHUs which are more than 30 years old.

2. Replace or retrofit older pneumatic, constant or variable air volume boxes with direct digital control (DDC) boxes for accurate and precise control of space conditions. The advantages of DDC are flexible controls, PID algorithm, no controller drift, no recalibration, and cost neutral based on life-cycle cost analysis.

3. Planned replacement of chillers with HCFC refrigerants (R-22) to comply with evolving federal regulations. The new chillers will exceed the most recent energy code performance requirements, and will operate with zero (0) Ozone Depletion Potential (ODP) and lower Global Warming Potential (GWP) refrigerants. Provides significant energy cost savings.

4. Installation of condensing boilers for the new buildings, and for replacement of existing boilers at the end of their expected service life. Condensing boilers are up to 96% efficient with turndown to 10%, corrosion resistant, and can be operated at a lower inlet water temperature with a higher efficiency as compared to the conventional boilers.

5. Installation of LED troffers / or tubes, LED wallpacks, and LED downlights and fixtures. As an example, replacement of existing fluorescent lamps and ballasts with LED fixtures in indoor locations, has typical payback of 5 to 7 years through energy and maintenance savings.

6. Explore installation of variable flow exhaust system for fume hoods to reduce the required total air flow when the sash is partially or fully closed. This approach would maintain acceptable air velocity at the sash, and reduce the exhaust of conditioned air.

7. Replacement of older electrical equipment, including motors and transformers. Payback period is less than 5 years with higher efficiency.
8. Continue to identify and replace damaged, missing, or inadequate insulation.
9. Energy assessment, Audit, and Retro-commissioning of existing facilities to ensure HVAC systems are fully functional, using accurate sensors, and optimal control algorithms.
10. Upgrade existing energy management control systems and components in the Lubbock and the regional campuses.
11. Improvements to the existing building envelopes to prevent energy waste.
12. Installation of pressure independent (PI) control valves for optimal chilled water flow control to the air handling units. TTUHSC Facilities has observed that these valves provide higher chilled water temp difference, and lower flow through the cooling coils.
13. Install hands-free, low water flow fixtures for water closets, sinks and urinals.
14. Installation of occupancy sensors to control lighting for all spaces in the HSC buildings.
15. Evaluate on site renewable energy options to generate power, or thermal utilities.

Implementation Schedule

The Implementation Schedule Section must outline a proposed timeline for implementing utility cost-reduction measures and a strategy for monitoring utility savings of the installed utility measures.

1. Refurbish (5) air handling units with DDC, pressure independent flow control valves, and fanwall system in the Lubbock Health Sciences Center building. (FY2022)
2. Retrofit pneumatically controlled air handling units with direct digital controls. (FY2022)
3. Install new chillers with zero (0) Ozone Depletion Potential (ODP) refrigerants (R-134a) to replace older and inefficient chillers with R-22 refrigerant. Plan is in motion to install two chillers w/ associated pumps in the Amarillo campus, and one chiller w/ associated pump in the Odessa campus. (FY2022)
4. Install new condensing heating boilers and associated pumps in Amarillo (qty-2), Abilene (qty-2), and Odessa (qty-1) campuses. (FY2022)
5. Install one fan coil unit in Abilene campus for energy reduction. (FY2022)
6. Continue to replace or retrofit existing light fixtures with LED fixtures (or tubes), occupancy sensors, and dimming controls, based on fund availability. (FY2022)
7. All light fixtures in the parking garage of the Dallas professional building, is in the plan to be replaced to meet the most recent energy code, and HSC security requirement. (FY2022)
8. The control systems and components are being upgraded to improve operational efficiencies.
9. Continue to replace pneumatically controlled terminal boxes with DDC VAV boxes.
10. Install hands-free, low water flow fixtures for water closets, sinks and urinals in public toilets. (New Construction)
11. A project has been initiated by TTU to add (2) new variable flow, 1500 ton electric chillers in the central plant of the Lubbock campus. This will reduce energy consumption and cost significantly. Payback period is in the range of 15 to 20 years. (FY2021-23)

Finance Strategy

The Finance Strategy Section must describe how the agency or institution plans to obtain funding for the recommended utility cost-reduction measures. This section should show the estimated cost of all projects and the funding sources to be used.

1. Internal Funding, including reinvestment of utility cost savings (up to $4 million)
2. Rebates from Utility Providers (up to $50K)
3. LoanSTAR Revolving Loan Program from SECO (If needed)
4. Other Private Loan Program (if needed)

Transportation Fuel Consumption

Does your agency maintain one or more state-owned vehicles? Yes - Has fleet

Does your agency report its fuel usage via the Texas Fleet System? Yes - Report to fleet system

Employee Awareness Plan

The Employee Awareness Plan Section must outline how the agency will make employees aware of utility cost-reduction measures, both directly (affecting change in behavior) and indirectly (not designed to affect behavior).

Facilities Energy Management is continuously on the lookout for means by which to communicate energy conservation practices to the personnel, students, and patients that occupy the facilities. Avenues available are the announcement page of the TTUHSC, Facilities websites, Memorandums, education at new hire orientations, stickers, mail services, and plant operations staff.

The key elements of TTUHSC's Utility Awareness Plan are to prevent waste and ensure conservation of resources. These initiatives are broken down into three categories: Direct (affecting change in behavior); Indirect (not designed to affect behavior, but will increase awareness); and Operations & Maintenance initiatives. Examples are listed below.

Direct Initiatives:

- Require all personnel to turn off lights, computers, printers, and any other office machine when labs and offices are unoccupied.
- Turn off lights in classrooms when classes are over.
- Strongly discourage idle classrooms from being used as study halls. The library or small study rooms are better alternatives.
- Allow vent hoods to be operated only when necessary.
- Strongly discourage the use of comfort-heating appliances to be used to supplement the building heating system.
- Instruct custodians to turn off lights in hallways and offices after cleaning.

Indirect Initiatives:

- Reduce the operating hours for air handlers and other mechanical systems.

- Reduce the temperature of hot water used for domestic purposes to 125°F.
- Consolidate laboratory functions.
- Install lighting occupancy sensors, where applicable.
- Ensure venetian blinds and shades are fully extended and closed as appropriate to reduce heating and cooling losses.

Operation & Maintenance Initiatives:

- Continuous monitoring and control of air handling unit operations, including airside economizer, unoccupied setup/setback schedules, discharge air reset schedules, chiller performance, sensor accuracy, chilled water and heating water system performance, etc.
- Identify equipment that can be shut off during nights and weekends for all facilities.
- Provide adequate deadbands between space air cooling and heating setpoints to reduce how often terminal boxes change operation modes and, where multiple boxes serve a space, minimize simultaneous heating and cooling.
- Replace filters on air handling units frequently.
- Periodically check temperature and humidity sensors for proper calibration.
- Install minimum air flow stops to ensure appropriate outside air at all times.
- Check steam traps and steam being lost through roof vents.
- Check ducts and pipes for missing or damaged insulation.
- Test and Balance (TAB) both the airside and waterside of the HVAC system.
- Perform regular preventive maintenance on all major and high energy use equipment.

Section 4: Tenant Agency

Progress Report

The Progress Report Section must outline the progress of the implementation of projects from the previous Energy and Water Management Plan or Resource Efficiency Plan (if applicable), including a summary of the results of the projects in terms of utility efficiency and cost savings.

Click to enter your agency's Progress Report.

Transportation Fuel Consumption (if applicable)

Does your agency maintain one or more state-owned vehicles? Choose an item.

Does your agency report its fuel usage via the Texas Fleet System? Choose an item.

Employee Awareness Plan

The Employee Awareness Plan Section must outline how the agency will make employees aware of direct utility consumption. Plans might include employee training, signage or recognition programs.

Click to enter your agency's Employee Awareness Plan.