



Energy and Water Management Plan

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. Per [34 Tex. Admin. Code §19.14 \(2016\)](#), these goals must be included in a comprehensive energy and water management plan (EWMP) submitted every fiscal year to the State Energy Conservation Office (SECO) by **Oct. 31**. 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 **Fiscal Year 2020**. Save this form as "EWMP-Agency-FY2020.docx" and return this form by email to seco.reporting@cpa.texas.gov no later than **Oct. 31**.

Please visit the [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

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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Title: Director

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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 No

If NO, please skip to [Section 4: Tenant Agency](#).

If YES, please complete the following:

Have you submitted, or will you be submitting by October 31, FY 2020, energy and water usage data for your agency and properties using the [ENERGY STAR Portfolio Manager](#) tool?

Yes No

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. Six old and inefficient 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 nine air handling units in the Lubbock HSC building, with JCI 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.
3. In Amarillo campus, two new air cooled, rotary screw chillers with variable drive and zero ozone depletion potential refrigerant, were installed. Replacement of chillers with HCFC refrigerants (R-22) are planned to comply with evolving federal regulations. The new chillers exceed the most recent state energy code performance requirements.
4. HID lights in the parking lots, and exterior building lights in the Amarillo and Abilene campuses were replaced with new LED fixtures. Exterior LED fixtures have been observed to be very reliable with zero failure rate. In addition, LED retrofits reduce electricity consumption, improve lighting quality, and provide better illumination. The payback period is within the expected service life of the fixtures.
5. In Odessa campus, one old and inefficient chiller with R-22 refrigerant was replaced with a variable drive, rotary screw air cooled chiller with R-134a refrigerant. The new chiller exceeds the most recent state energy code performance requirements.
6. There is plan to upgrade all classrooms with new LED light fixtures with dimming controls. In FY20, we have upgraded more than 300 fixtures in Odessa and Lubbock campuses.
7. Construction to replace two old, non-condensing boilers with new condensing boilers was completed in the Odessa campus.

Goals

The Goals section must summarize the future goals for utility conservation. Pursuant to [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 use 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 | FY2021 | FY2020 | 2 |
| Electricity | FY2021 | FY2020* | 5 |
| Transportation Fuels | FY2021 | FY2020 | 1 |
| Natural Gas | FY2021 | FY2020 | 2 |

*[Texas Government Code Section 388.005\(c\)](#).

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 etc. This is mainly for the Lubbock HSC building, where the AHUs are more than 35 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 effective 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.
4. Installation of condensing boilers for 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 conventional boilers.
5. Installation of LED troffers / 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. Retro or re-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.

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 (6) air handling units with DDC, pressure independent flow control valves, and fanwall system in the Lubbock Health Sciences Center building. (FY2021)
2. Retrofit ten air handling units with direct digital controls, and pressure independent chilled water flow control valves. (FY2021)
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 one chiller each in Abilene, and Odessa campuses in FY2021.
4. Install new condensing boilers in Amarillo (qty-2), Abilene (qty-2), and Odessa (qty-1) campuses. (FY2021)
5. Upgrade window glazing with low conductance and solar heat gain coefficient (SHGC) values in the Lubbock campus. (FY2021-22)
6. Continue to replace existing light fixtures with LED fixtures, occupancy sensors, and dimming controls.
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. (FY2021-22)
8. Evaluate building control systems and associated components at various locations. There is plan to upgrade control systems to improve equipment efficiencies in several campuses.
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.
11. A project has been initiated to add (2) new variable flow, 1500 ton electric chillers in the central plant of Lubbock campus. This will reduce energy cost significantly. Payback period is in the range of 15 to 20 years. (FY2021-22)

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 Mil)
2. Rebates from Utility Providers (up to \$40K)
3. LoanSTAR Revolving Loan Program from SECO (If needed)
4. Other Private Loan Program (If needed)

Transportation Fuel Consumption (if applicable)

If your agency maintains one or more state-owned vehicles and **does not** report fuel usage via the [Texas Fleet System](#), document the total gallons of transportation fuel used by your facility and fleet vehicles below.

Does your agency maintain one or more state-owned vehicles? Yes No

Does your agency report its fuel usage via the [Texas Fleet System](#)? Yes No No Vehicles

| Transportation Fuel Type | Amount |
|-------------------------------|----------------------------|
| Unleaded Gasoline* | click to enter use in kgal |
| Diesel | click to enter use in kgal |
| Bio-Diesel | click to enter use in kgal |
| E85 (Flex Fuel) | click to enter use in kgal |
| Compressed Natural Gas (CNG) | click to enter use in kgal |
| Unleaded for Gas Hybrids | click to enter use in kgal |
| Liquified Petroleum Gas (LPG) | click to enter use in kgal |
| Ethanol | click to enter use in kgal |

*Do not include unleaded gasoline for gasoline hybrids

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 - Engineering is continuously on the lookout for means by which to communicate energy conservation practices to the personnel and patients that occupy the facilities. Avenues available to

Facilities - Engineering are the announcement page of the TTUHSC and Facilities websites, memorandums, education at new hire orientations, mail services, plus the Directors of plant operations and maintenance.

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 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:

- Airside economizer, discharge air reset schedules, chiller staging, chilled water differential pressure control, and chilled water differential temperature control logic needs to be periodically reviewed, and incorporated or improved where applicable.
- Identify equipment that can be shut off during nights and weekends for all facilities. Also increase the band between heating and cooling temperature setpoints during unoccupied hours.

- 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)

If your agency maintains one or more state-owned vehicles and **does not** report fuel usage via the [Texas Fleet System](#), document the total gallons of transportation fuel used by your facility and fleet vehicles below.

Does your agency maintain one or more state-owned vehicles? Yes No

Does your agency report its fuel usage via the [Texas Fleet System](#)? Yes No No Vehicles

| Transportation Fuel Type | Amount |
|-------------------------------|--|
| Unleaded Gasoline* | click to enter use in kgal |
| Diesel | click to enter use in kgal |
| Bio-Diesel | click to enter use in kgal |
| E85 (Flex Fuel) | click to enter use in kgal |
| Compressed Natural Gas (CNG) | click to enter use in kgal |
| Unleaded for Gas Hybrids | click to enter in kgal |
| Liquified Petroleum Gas (LPG) | click to enter use in kgal |
| Ethanol | click to enter use in kgal |

*Do not include unleaded gasoline for gasoline hybrids

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](#)
