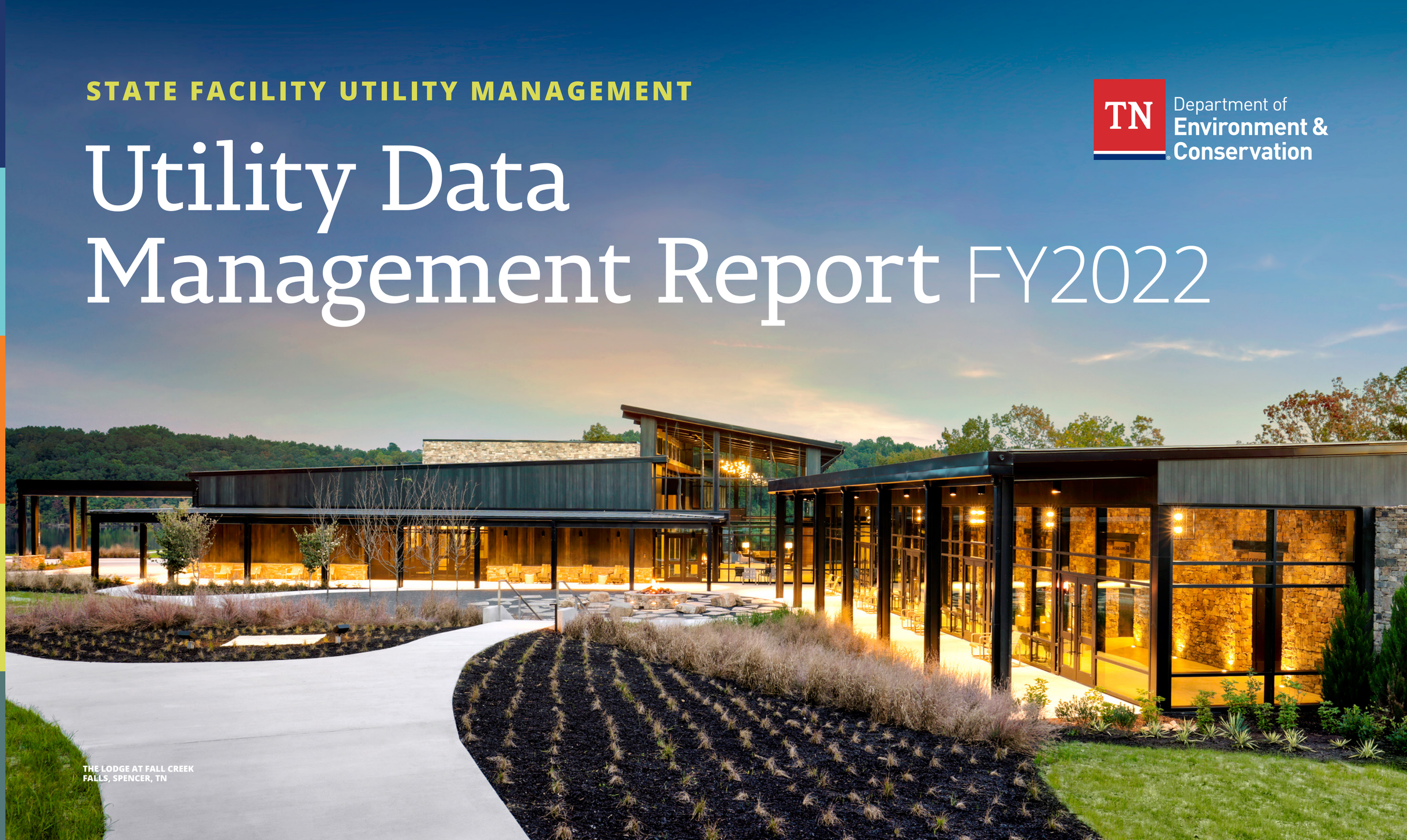
STATE FACILITY UTILITY MANAGEMENT

Utility Data Management Report FY2022

Department of Environment & Conservation



THE LODGE AT FALL CREEK FALLS, SPENCER, TN

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This report regarding State facility utility usage, cost, and rate data for State FY2020-FY2022 was prepared by the **Tennessee Department of Environment and Conservation's (TDEC) State Facility Utility Management (SFUM) team** under the guidance of Tenn. Code Ann. § 4-3-1012(3).

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Adoption, Assistance, and Training

The State Facility Utility Management (SFUM) team continues to provide technical assistance and additional training opportunities to Utility Data Management (UDM) platform end users (e.g., State fiscal personnel, utility and facility managers, building maintenance personnel, and sustainability professionals) from across the four organizational groups — General Government, Locally Governed Institutions, the Tennessee Board of Regents, and the University of Tennessee System. The intent of this report is to maximize UDM platform utilization and optimize overall energy management of State facilities.

Questions about this report or requests to become a registered UDM platform user can be directed to the SFUM team at tdec.sfum@tn.gov.

Executive Summary

This report provides in-depth utility usage, cost, and rate data and analyzes this data for State-owned and -managed facilities by utility type and organizational group. The Utility Data Management (UDM) platform allows State government agencies and higher education institutions to remotely track, benchmark, and report utility usage while automatically collecting monthly utility invoices. As a central hub for current and historical electric, water/sewer, natural gas, chilled water, steam, and propane billing data, this is a crucial resource for State fiscal personnel, State building maintenance personnel, utility and facility managers, sustainability professionals, and technical assistance providers.

Additionally, this report highlights case study examples of the UDM platform's features and benefits, ranging from identifying unauthorized utility bill charges and significant water leaks to accommodating remote and alternative workplace solutions (AWS).

FOUR ORGANIZATIONAL GROUPS

1. General Government
2. Locally Governed Institutions (LGIs)
3. The Tennessee Board of Regents (TBR)
4. The University of Tennessee (UT) System

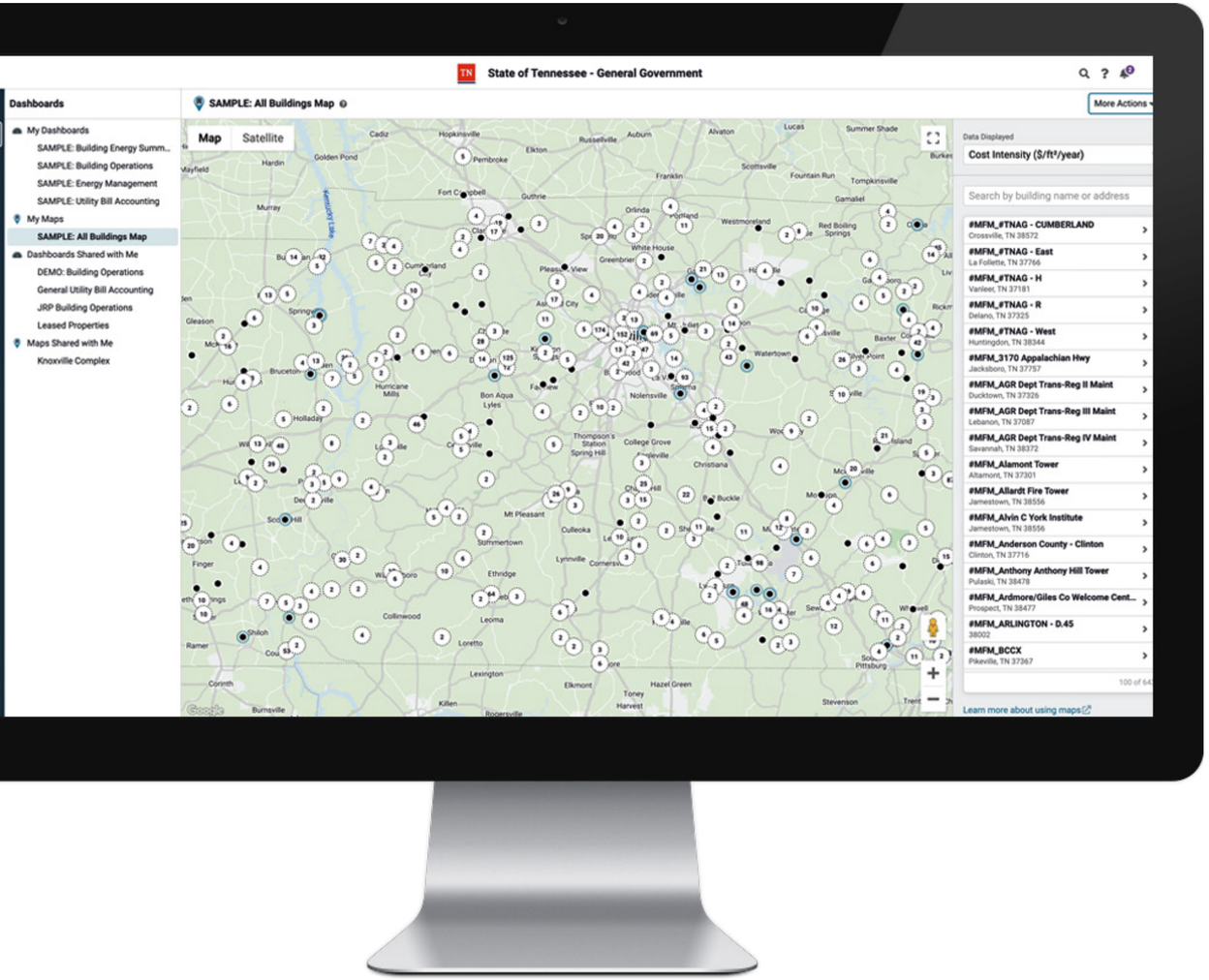
SERVING

8,100+
facilities

REPRESENTING

10,500+
utility meters

106M
square feet



FISCAL YEAR (FY)2022 UTILITY DATA

The State Facility Utility Management (SFUM) team's analysis for these 8,100+ facilities shows that the State of Tennessee spent approximately $207 million in FY2022, with electric representing 60% of the total utility costs.

17.4%
increase in State utility costs compared to FY2021

15.7%
increase in State utility costs compared to FY2020

This overall rise in usage and cost is primarily attributed to increases in utility rates and weather fluctuations, in addition to facility occupancy and hours of operation incrementally returning to pre-pandemic conditions.

About TDEC's SFUM Team

Residing in the **Office of Energy Programs (OEP)** within the **Tennessee Department of Environment and Conservation (TDEC)**, the SFUM team provides State government agencies and higher education institutions with actionable energy insights. This empowers personnel (e.g., State fiscal personnel, utility and facility managers, building maintenance personnel, and sustainability professionals) to understand and optimize their energy consumption and utility savings.

Background

The SFUM team was formed in January 2017 following the issuance of Executive Order 63, which transferred the building management statutory responsibilities for State-owned and -managed properties from the Department of General Services (DGS) to TDEC (Tenn. Code Ann. §§ 4-3-1012 and 4-3-1017-1019). Among these responsibilities are the analysis and reporting on the State's aggregate annual energy costs and usage (Tenn. Code Ann. § 4-3-1012(3)). The SFUM team collects and analyzes data from utility bills for State-owned and -managed facilities to address this requirement.

The State's UDM platform allows the SFUM team, UDM platform end users (including facility managers and accounting staff), and other stakeholders to analyze utility data, track costs and usage, audit bills, and report on general energy efficiency practices across more than 8,100 facilities that can be divided into four organizational groups.[1]

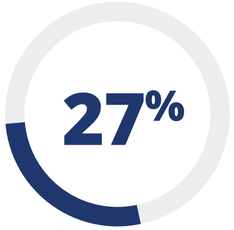
[1] The following percentages represent the share of the State building portfolio that is attributed to each organizational group.

FOUR ORGANIZATIONAL GROUPS

General Government

The Tennessee Board of Regents (TBR)

Locally Governed Institutions (LGIs)



The University of Tennessee (UT) System

UDM Platform Benefits

Several case studies in this report highlight the successful integration of the UDM platform into facility operations, which helps optimize energy use across these facilities.

For example, the UDM platform's bill audit feature helped flag energy usage spikes and water leaks at multiple facilities owned and operated by nine State agencies in FY2022.

This enabled the agencies to identify and correct issues early on before they cascaded into larger emergencies and aided the agencies in recuperating over $152,000 in related charges from their utility providers.

READ CASE STUDIES ››

With the UDM platform, State facility managers, accounting staff, and administrators can:

Support AWS with digital billing access.

Have greater visibility into utility usage and billing anomalies.

Increase capability for cross-functional collaboration.

Use enhanced reporting to perform analysis with detail and efficiency.

Objectives and Key Observations

This report aims to communicate the State's utility cost and usage and underscore the capabilities and benefits of the UDM platform, which has facilitated the transition from manual data collection, entry, and analysis.

This report compares utility usage data for FY2020, FY2021, and FY2022 by organizational group and the six types of utility commodities captured in the UDM platform for the State.

UTILITY COMMODITIES

- CHILLED WATER
- ELECTRIC
- NATURAL GAS
- PROPANE
- STEAM
- WATER/ SEWER

STATE UTILITY DATA FOR FY2022

$206,940,574

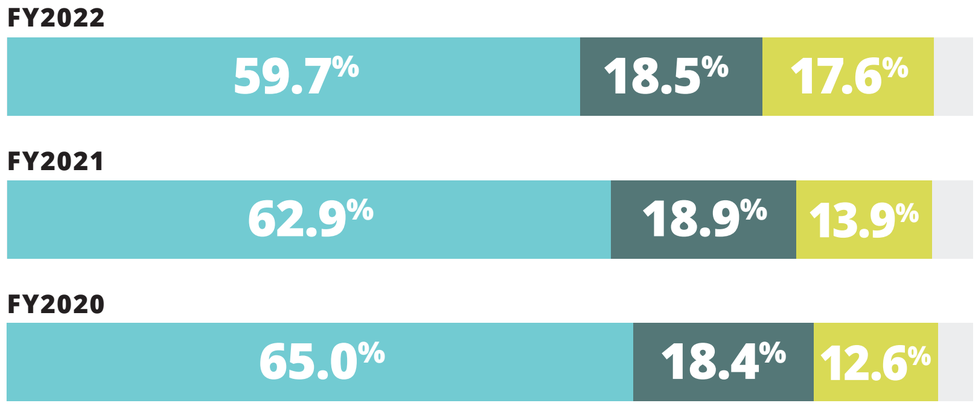
was spent over FY2022 on energy and water utilities across all State-owned and -managed facilities.

17.4%

increase ($30,674,175) in overall State utility costs compared to FY2021

PERCENTAGE OF TOTAL UTILITY COSTS

Electric, water/sewer, natural gas combined (Electric remains largest.)



COMMODITY COSTS

61.3%

increase in natural gas cost compared to FY2020

This may result from, but is not limited to, changes in rate structures or changes derived from contract negotiations.

WHY THE OVERALL INCREASE?

The increase in overall utility costs is primarily a result of increased usage of and rates for electric power and natural gas.

The overall rise in utility consumption and costs reflects a continued pattern of elevated utility rates for heating and cooling and weather fluctuations.

In addition, facility operating hours and energy consumption demands have risen due to a steady increase in building occupancy as State employees return to the office.

UDM Platform

- ABOUT THE UDM PLATFORM
- UDM PLATFORM MAINTENANCE
- UDM PLATFORM FUNCTIONALITY
- UDM PLATFORM USER BENEFITS
- USER TESTIMONIALS
- HIGHLIGHTS AND CASE STUDIES

TENNESSEE WELCOME CENTER,
KINGSPORT, TN

About the UDM Platform

The UDM platform is a central repository for past and current utility cost and usage data[2] of approximately 8,100 State-owned and -managed facilities. It is predominantly used for utility tracking, reporting, and benchmarking for General Government agencies and Higher Education institutions, as well as bill payment integration for General Government agencies.[3]

LAUNCHED IN
2019

SERVING
77
General Government agencies and Higher Education institutions

DATA REPRESENTING
8,100+
accounts

10,500+
utility meters

106M
square feet

A POWERFUL, EFFICIENT TOOL

Before the UDM platform was available, a significant effort was required to locate utility accounts, gather utility bills, and manually enter data. As a result, utility cost and usage data were rarely analyzed.

Since the platform's launch, the SFUM team has been providing aggregated utility usage and cost data for State facilities to help fiscal personnel, building maintenance personnel, utility and facility managers, sustainability professionals, and technical assistance providers gain insights into the energy consumption of State-owned and -managed buildings based on their utility data.


TENNESSEE STATE CAPITOL BUILDING, NASHVILLE, TN

[2] Cost and usage data for most utilities are predominately captured monthly. Some utility bills are captured on a quarterly or other basis.
[3] For FY2022, the UDM platform contains utility bill data for 99.99% of the utility meters that, as of March 30, 2023, have been identified for General Government agencies and Higher Education institutions.

UDM Platform Maintenance

State Portfolio

Three years of project development, configuration, and implementation were completed in May 2019. Today, the UDM platform works as a living information system as the SFUM team continually updates and improves data collection by working with facility managers, sustainability managers, and accounts payable (AP) staff for each of the 25 General Government agencies and 52 Higher Education institutions (Table 1.1) to update the current organizational groupings and hierarchy structures related to buildings, meters, and accounts, in addition to each building's unique building data, including:

- **Address**
- **Latitude and longitude**
- **Square footage**
- **Original construction date**
- **Use type (such as Office Buildings, Residence/Dorm (Student Housing), Data Centers, Laboratories, and Storage Facilities)**

In addition, customized fields were created to meet specific needs, including building status, county, management type, and building owners.

TABLE 1.1 | State Entities with Owned or Managed Building Stock (by Organization Type)

	GENERAL GOVERNMENT[4]	LOCALLY GOVERNED INSTITUTIONS (LGIs)[5]	TENNESSEE BOARD OF REGENTS (TBR)[6]	UNIVERSITY OF TENNESSEE (UT) SYSTEM[7]
SHARE OF PORTFOLIO (% of sq. ft.)	**34%**	**26%**	**13%**	**27%**
ASSET PORTFOLIO	**25 Agencies**	**6 Locally Governed Institutions**	**26 Tennessee Colleges of Applied Technology** **13 Community Colleges**	**5 Campuses** **2 Institutes**

[4] See Appendix C for a full list of General Government agencies.
[5] See Appendix D for a full list of Locally Governed Institutions.
[6] See Appendices E and F for a full list of Community Colleges and Tennessee Colleges of Applied Technology, respectively.
[7] See Appendix G for a full list of UT System campuses and institutes.

Project Implementation

To include as much historical data as possible, the SFUM team works with EnergyCAP, an energy management software application for managing utility bill data, to collect historical billing data from utility vendors providing service to State facilities as far back as each billing system will allow. Utility data is pulled from more than 378 utility vendors, with some dating back a decade (to 2012, in some cases).

The SFUM team establishes ongoing duplicate billing[8] for all Higher Education institutions and any General Government executive branch agencies that opted out of the UDM platform AP integration with Edison, the General Government's bill payment system.

The UDM platform captures each line item and every charge from a utility bill, which may include usage, cost, demand, power factor, customer charges, miscellaneous fees, credits, penalties, and erroneous or unauthorized charges such as taxes and charitable contributions. Bill line items associated with telecommunications, refuse, and vehicle fuels are captured in the UDM platform only if they appear as line items on a utility bill.

[8] To capture billing data for State entities not using the UDM platform for utility bill pay approval, the SFUM team established a method of receiving a physical or electronic duplicate bill (or the data from the bill) to manually enter into the UDM platform.

Bill Payment Integration with Edison

The UDM platform is successfully integrated with Edison through collaborative efforts with Finance and Administration's (F&A) Division of Accounts, the Edison team, and Strategic Technology Solutions (STS). This integration covers 22 of 25 General Government executive branch agencies, making the bill review, approval, payment, and reconciliation process more efficient.

The UDM platform bridges communication gaps and promotes collaboration among staff while proactively mitigating potential utility billing errors through automated bill audits and utility data reports that allow for efficient, more detailed analysis.

QUESTIONS? READ OUR FAQ

UDM Platform Functionality

The UDM platform is the State of Tennessee's utility and energy data hub. With the ability to provide analysis and reporting functions that were not readily available in the past, the UDM platform is a helpful tool for State personnel to improve their operations.

It is a one-stop-shop for the State's utility bill data. It utilizes ENERGY STAR® Portfolio Manager and Interval Data, both of which are summarized under the Highlights and Case Studies Section of the UDM report. The powerful analysis tools and easy-to-use web interface enable accounting, energy management, and sustainability professionals to work together to improve building operations.

LEARN MORE ABOUT THE UDM PLATFORM'S FEATURES

FACILITY / ENERGY MANAGERS CAN:

- **Identify potentially energy-inefficient facilities**
- **Assist in the evaluation of energy conservation projects**
- **Pinpoint and resolve faulty meters or water/gas leaks**
- **Support measurement and verification (M&V) efforts**
- **Track emissions**
- **Use this tool to aid in the pursuit of U.S. Environmental Protection Agency (EPA) ENERGY STAR ratings or other building certifications**

ACCOUNTING AND BUDGET STAFF CAN:

- **Identify billing errors**
- **Create utility budget forecasts**
- **Share standardized reports with leadership**

Further, the inclusion of AP integration into the UDM platform streamlines the utility bill accounting workflow. Automating bill entry, improving bill auditing, and simplifying cost allocations saves accounting and budget staff valuable time that can be spent on other tasks. However, AP integration is only available to General Government agencies.

UDM Platform User Benefits

FOR FACILITY AND ENERGY MANAGERS:

- **Data-driven detection of leaks:**
  Frequent review of usage data and utility bill audits for early detection and identification of leaks.
- **Increased visibility:**
  Access to utility cost and usage data helps prioritize energy and cost-saving measures in buildings, optimizing building energy usage.
- **Enhanced reporting and analysis:**
  Facility and energy managers can generate reports and perform analyses with much greater detail and speed than before.
- **Better benchmarking:**
  With the UDM platform, management staff can compare Energy Use Intensity (EUI) across similar building types and multiple other indicators to identify the best-performing buildings and their associated energy management practices.

FOR ACCOUNTING AND BUDGET STAFF IN GENERAL GOVERNMENT:

- **Improved AWS:**
  As a web-based platform, the UDM platform promotes AWS for AP staff. For example, it provides employees with more flexibility to work remotely.
- **Strengthened communication:**
  Bridges the contact gap between centralized and remote AP staff while promoting collaboration between AP and facility management staff.
- **Bill entry automation and reduction in billing errors:**
  Eliminates manual bill entry errors and enables staff to prioritize other tasks.
- **Process standardization:**
  Streamlines or standardizes F&A Division of Accounts and Edison utility business processes across agencies.
- **Bill auditing:**
  Easier identification of questionable bills, billing errors, and unauthorized charges by utility service providers.
- **Greater accountability:**
  Provides tracking for AP user workflow steps and activities.
- **Late fee mitigation:**
  Reports proactively identify bills that will be late in remitting payment to the utility vendor if they are not received by the State and paid promptly.

User Testimonials

"UDM implementation has been very beneficial, especially in my role in accounts payable. One of the significant benefits is the bill capture automation process that has eliminated having to manually enter key bills into the accounting system, which has reduced keying errors and improved invoice processing time.

I have also benefited from the UDM platform's built-in reports for missing bills, overdue bills, problem bills, late fees, and bill line details. These reports have helped my agencies avoid paying taxes and round up contributions applied by utility vendors on bills, as well as late fees due to missing bills.

Bill audits have also been a great tool in validating bills and flagging the problem bills for manual review. This has helped my agencies identify issues such as abnormal cost and usage, sometimes due to a toilet or faucet leak, a burst pipe, etc., which would have otherwise gone unnoticed promptly."

DEPARTMENT OF FINANCE & ADMINISTRATION, VETERAN SERVICES & TOURIST DEVELOPMENT CENTRAL ACCOUNTING SERVICES

"I have been using the fantastic UDM platform for about a year and I am so glad that this software is available for us to perform our job responsibilities. The platform has many tools and capabilities that are helping my organization in various ways. The bill processing features are easy to use, and they help to import all our bill information with a few clicks and save us time and effort. The UDM platform provides an excellent customer service feature to share data with customers quickly.

The platform offers a variety of reports to help me keep track of my data entries, flag and correct errors, evaluate my data, and quickly access cost information in detail. It has been a good experience for our organization and vendors; the UDM platform has helped us become highly efficient with all our utility management needs. It has literally helped our organization identify and save hundreds of thousands of dollars and identify problems and how to resolve them.

The responsiveness of the SFUM team to meet its customers' needs and continuously improve solutions to problems, such as leaks and other operational issues, in a fast manner is invaluable. The SFUM team collaborates with the customers to solve problems professionally and on time.

I would highly recommend using the UDM platform."

ACCOUNTANT, DEPARTMENT OF FINANCE & ADMINISTRATION, TDOT CENTRAL ACCOUNTING SERVICES

"Working in Energy Management, I have utilized the UDM platform in providing a number of reports for the Zone Managers of the Army National Guard sites so they can, in turn, alert their Non-Commissioned Officers for follow-up in case there were any possible water leaks or high natural gas or electricity usage and costs in question. The reports have saved us significant money, and last year I collected over $10,000 in credits for water leaks for the Military-Construction Facility Management Office (CFMO) Department.

I have provided other essential reports to help support the Energy Manager, Senior Management, Resource Management, and other CFMO employees requesting reports."

ENERGY/UTILITY PROGRAM MANAGEMENT SUPPORT, DEPARTMENT OF MILITARY

Highlights and Case Studies

This section outlines the UDM platform's key features and capabilities to help State employees make informed decisions regarding utility and building management.

Case studies demonstrate the UDM platform's ability to affect organizational and employee outcomes through pragmatic applications.

CASE STUDY #1

Identification of Unauthorized Charges

The UDM platform continues to assist General Government AP staff in identifying unauthorized charges, such as charitable contributions, taxes, or other fees from which the State is exempt, allowing them to seek utility vendor reimbursement.

For General Government, 94% of the 5,392 utility bills processed monthly for payment are automatically drafted by the utility provider. In FY2022, the UDM platform documented that General Government agencies were charged a total of $1,776.33 in "round-up" charitable contributions and taxes. These unauthorized charges are often found on bills set up for autopay and would have gone unnoticed without the UDM platform flagging them.

Before the UDM platform, AP staff could not review line-item charges — they could only view the total amount of each bill that the Department of Treasury reported as being drafted by utility providers. Agency efforts to identify prohibited charges from utility providers have removed unauthorized charges from future bills in the utility provider's bill system and resulted in the issuance of credits for the accounts.

Throughout FY2022, the Tennessee Wildlife Resource Agency (TWRA) has received over $1,636 in credits from various utility vendors for taxes charged to autopay bills paid by TWRA over the past 3.5 years.

$1,776

of unauthorized charges on autopaid bills were flagged by the UDM platform in FY2022.

CASE STUDY #2

Facilitation of AWS

The UDM platform continues to support AWS for General Government agency AP staff by providing a central repository for utility bills that can be accessed from anywhere. Utility bills are automatically uploaded, removing the need for AP staff to access paper bills and/or scan and upload bills to another system.

The UDM platform facilitates team collaboration using bill notes, assigned flags, shared dashboards, and reporting features. Multiple end users can simultaneously work in the UDM platform to review, approve, or edit the same batch or different batches of bills. The UDM platform's ability to track, record, and date individual user activities enabled agency fiscal personnel to embrace workplace flexibility since the onset of the COVID-19 pandemic.

CASE STUDY #3

Overpayment Detection

Leveraging the UDM platform, the SFUM team was able to alert several agencies within Tennessee, including TWRA, the Department of Military, and the Department of Safety and Homeland Security, of significant credits on their utility accounts due to past overpayment. However, these credits were not applied to their respective accounts because overpayment far exceeded the agencies' average monthly utility expenditure.

In all three instances, the SFUM team resolved these unused credits by working with the agencies' utility providers to send refund checks worth the overpayment amounts. These reimbursements, totaling over $17,000, enabled all three agencies to recoup thousands of dollars and immediately apply those funds to other utility and facility operations and maintenance expenses.

$17,072

in overpayment refund checks issued to three different General Government agencies.

CASE STUDY #4

Billing Discrepancy Validation

Department of Military

The SFUM team received a notification from the local utility provider for overbilling the Department of Military by $237.72 due to a faulty gas meter at the Readiness Center that had been overestimating consumption for a few months. Working with the SFUM team, the Department of Military's AP team verified through the UDM platform that the credit had been successfully applied to the account.

Public Defenders Conference (PDC)

After it was discovered that the utility provider had assigned the wrong electric meter to the State of Tennessee for the past seven years (resulting in the PDC overpaying by thousands of dollars), PDC was able to use the UDM platform to validate the projected credit amount owed to the State due to the error. Ultimately, the utility issued PDC a reimbursement check for $8,346.27, resolving the billing issue.

CASE STUDY #5

Utility Reimbursements

The UDM platform continues to be utilized by end users to ensure the expenses of the managed utility accounts do not exceed an agency's allocated budget. Fiscal and Energy Management personnel within the Department of Military use the UDM platform to generate monthly utility data spend reports that define cost and consumption for each building, which aids in creating supporting documentation for Federal and State reimbursement of Army Guard utility expenditures.

CASE STUDY #6

Identification of Billing Irregularities

In April 2022, the Department of Military observed that local utility provider had overestimated an armory's gas meter usage for six consecutive months, from November 2021 to April 2022. Using data from the UDM platform, the Department of Military could compare prior usage and costs to determine a baseline for typical natural gas consumption at the facility. As a result, the utility provider issued the Department of Military a credit of $2,462.94 for the overestimation.

CASE STUDY #7

Water Leak Detection

Department of General Services (DGS)

In June 2022, the UDM platform alerted the SFUM team and DGS staff of abnormally high-water usage at one of DGS' leased buildings in Nashville. Between May and June of 2022, the building's water usage increased from 31 centum cubic feet (CCF) to 15,509 CCF. This enormous water usage and billing increase, initially flagged by a UDM bill audit, indicated the strong possibility of a water leak. This was swiftly verified by DGS personnel. DGS worked with the local utility to make the appropriate repairs to resolve the leak, and ultimately received a water leak adjustment worth $118,336.21 for the duration of the leak.

Department of Children's Services (DCS)

In June 2022, the SFUM team and DCS were notified through a UDM bill audit of higher-than-normal water usage at a Nashville Tennessee Volunteer Challenge Academy (TNVCA) facility. Between May and June of 2022, the facility's water usage had increased from an average of less than 10 CCF to as high as 2,048 CCF at its peak — resulting in a billing increase of over $20,000. DCS and the utility provider identified the source of the increase (a leaky toilet in TNVCA's facility), fixed the leak, and even winterized the plumbing in TNVCA's adjacent buildings to prevent similar leaks from occurring in the future. After successful negotiations with the utility provider, a one-time courtesy water credit of $14,032 was granted to DCS.

Jackson State Community College (JSCC)

After the Savannah Center on JSCC's campus began to experience abnormally high water and sewer usage, the UDM platform alerted the SFUM team and JSCC of the increase and flagged the possibility of a water leak. JSCC identified two separate water leaks, which required extensive work by contractors to access the necessary areas to fix the leak.

JSCC ultimately worked with their local utility provider to obtain a leak adjustment that reduced their utility bill from $7,596 to $985, saving $6,611.

In total, these three institutions were reimbursed or credited $138,979 as a result of detections by the UDM platform.

CASE STUDY #8

Decision-Making Tool for End Users

DCS

The Deputy Commissioner and Executive Administrative Assistant for DCS used building stock information and utility data pulled from the UDM platform in a report presented to DCS' Commissioner regarding retention, opportunities to use funds differently, and suggestions on reducing DCS' physical footprint. The UDM platform data contained monthly utility expenditures for the last three years and identified the ownership type for each DCS building that was listed on their Real Property Inventory.

Tennessee Department of Corrections (TDOC)

The TDOC wanted to evaluate the energy efficiency of various correctional complexes in greater granularity. TDOC reviewed summary and monthly cost and consumption trend data generated from the UDM platform broken down by facility, account, and utility commodity (electric, natural gas, and water/sewer) for the Women's Tennessee State Prison and the Northeast Correctional Complex from June 2019 through May 2022. To better understand water and sewer usage for all 11 State-managed prisons across Tennessee, TDOC analyzed each prison's water and sewer costs and consumption over the past decade. UDM reports were generated for each prison listing the water/sewer accounts, current utility rate schedules, and meter serial numbers for each utility vendor, in addition to monthly water/sewer cost and consumption comparison trend reports grouped by account number and by site location for all State of Tennessee prisons from FY2013 through FY2022.

DGS

The State of Tennessee Real Estate Asset Management (STREAM) Division, a division of DGS, used various property and utility data pulled from the UDM platform that aided CBRE, a commercial real estate services firm, in performing lease analyses on Facility Revolving Fund (FRF) lease locations that have upcoming renewals.

CBRE obtained two years' worth of utility bill data for electric, natural gas, and water/sewer for each FRF lease location from the UDM platform, in addition to a list of lease location property details that allowed CBRE to group and review the data by county. CBRE used the data to run a cost analysis comparing the expected costs vs. actual metrics to help determine whether the FRF rental rate for each county was set at an appropriate amount to cover the average commercial building utility expenses for State-leased spaces in that area. This information will assist future renewal lease agreement term negotiations for DGS' 300+ leases in 70+ counties across Tennessee.

CASE STUDY #9

ENERGY STAR® Benchmarking

The ENERGY STAR benchmarking feature within the UDM platform allows users to exchange utility data between the ENERGY STAR Portfolio Manager and the UDM platform.

Building meter data can be automated or manually transferred and loaded directly to ENERGY STAR Portfolio Manager from the UDM platform, alleviating the need for users to log into multiple systems to import billing data.

As part of the data exchange, the UDM platform can retrieve updated energy use information and ENERGY STAR building ratings from Portfolio Manager, which allows users to report ENERGY STAR rating history or track energy efficiency improvements.

This graphic can be viewed under the meter profile from the Buildings & Meters module.

FIGURE 1.1 | Example of ENERGY STAR Score and Metrics for a General Government Building (UDM Platform, Buildings & Meters)

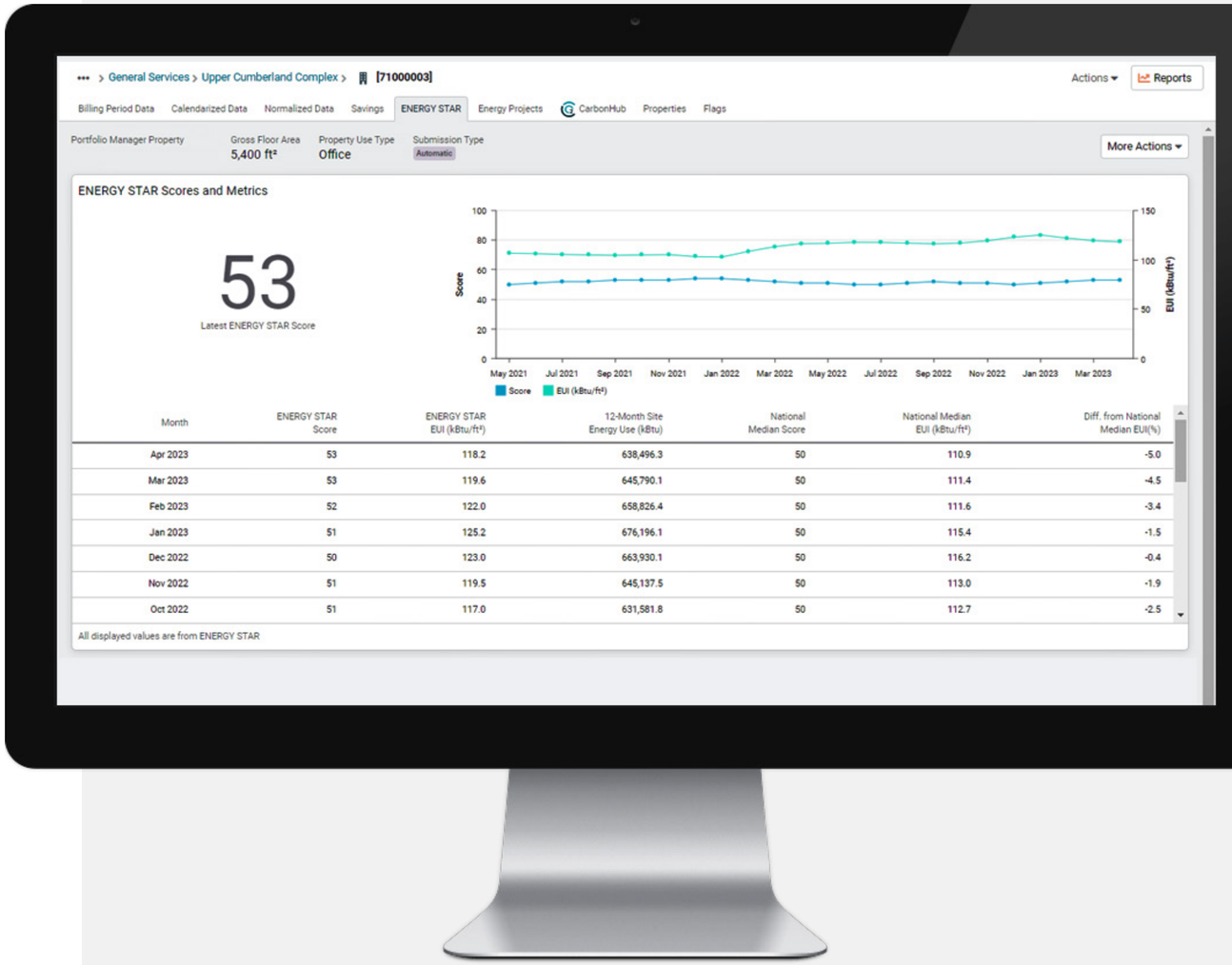
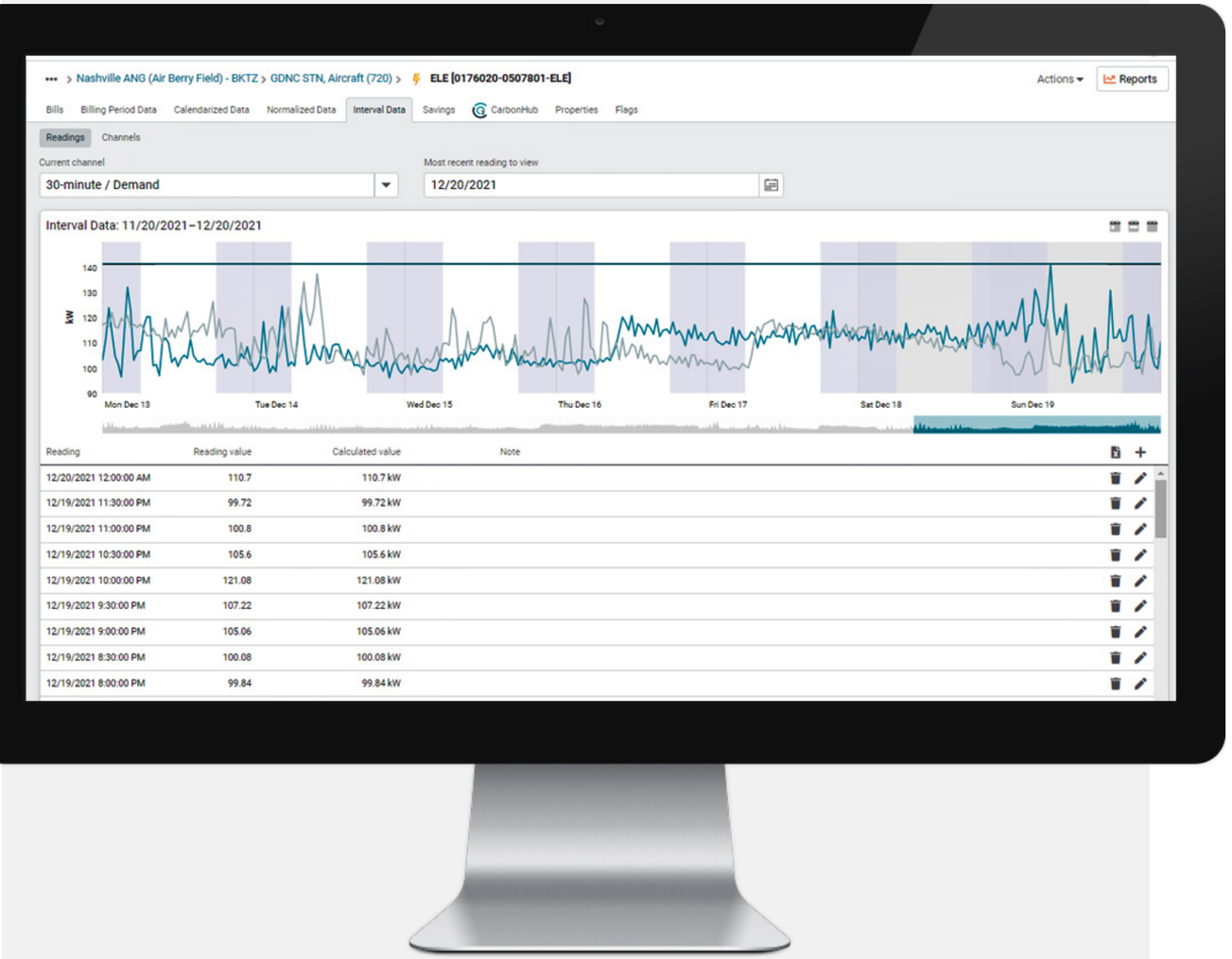


FIGURE 1.2 | Example of Interval Data for a General Government Building (UDM Platform, Buildings & Meters)



CASE STUDY #10

Interval Data Integration

Interval billing information can be collected for facilities with smart meters via the utility provider. With the introduction of specifically located submeters, a facility can determine the consumption and cost metrics for a particular piece of energy-consuming infrastructure. Submetering information can be imported into the UDM platform to assist users in assimilating the consumption profile for any energy efficiency-related action for the future.

Currently, the SFUM team is collecting interval billing information for several buildings. Here is an example of 30-minute interval data uploaded in the UDM platform from an emailed CSV file received quarterly from the utility vendor, Nashville Electric Service (NES). The data trend for Figure 1.2 demonstrates how the UDM platform can identify the day of the week and when a facility has sustained its largest demand load. This facility had its largest demand load on Sunday, December 19, 2021, at 6:30 AM.

This graphic can be viewed under the meter profile from the Buildings & Meters module.

THE LODGE AT PICKWICK LANDING, COUNCE, TN

Cost and Usage Data

- METHODOLOGY
- OVERALL STATE PORTFOLIO AND OBSERVATIONS
- FY2020-FY2022 COMPARISON
- FY2020-FY2022 UTILITY USAGE BY ORGANIZATIONAL GROUP

Methodology

This section presents a meta-analysis of the State building portfolio, including General Government agencies, LGIs, TBR, and the UT System. It also provides:

- **An overview of differences in utility cost and usage from FY2020 through FY2022.**
- **Utility usage for each organizational type.**

This study uses primary data gathered by accessing cost and usage information in the UDM platform. This sample of data contains 99.99% of utility billing data for known State meters for FY2022, gathered from 77 entities. (These percentages do not include the utility propane, as some agencies procure propane via purchase orders outside the UDM platform.)

Findings are limited to monthly data, as not all State-owned or -managed facilities offer data at more frequent intervals.

Data Collection

Over the past three fiscal years, the SFUM team, with assistance from agencies and campuses, collected 99.1% of all identified State meters in FY2020, 99.9% in FY2021, and 99.9% in FY2022.

IN FY2022

99.9%

of identified State meters were collected

OF ALL UTILITY BILLS

62%

are processed directly through the UDM platform

Original bills from utility vendors are received by the UDM platform, 62% of which are processed directly through bill payment system integration, making it easier for accounting personnel to process and collect the data. Select institutions (Higher Education and Legislative Branch General Government agencies, which account for the remaining 38%) are not set up for this integration. As a result, these institutions receive a bill directly issued for payment, and the UDM platform receives a duplicate bill.

The SFUM team relies on the State's agencies, campuses, and utility providers to inform them of new meters or accounts. Please notify the SFUM team of new meters or accounts for your organization by contacting **tdec.sfum@tn.gov**.

This ensures that the appropriate channels to receive ongoing bills for your organizations can be set up to support accurate cost and consumption data reporting.

Data Reconciliation and Limitations

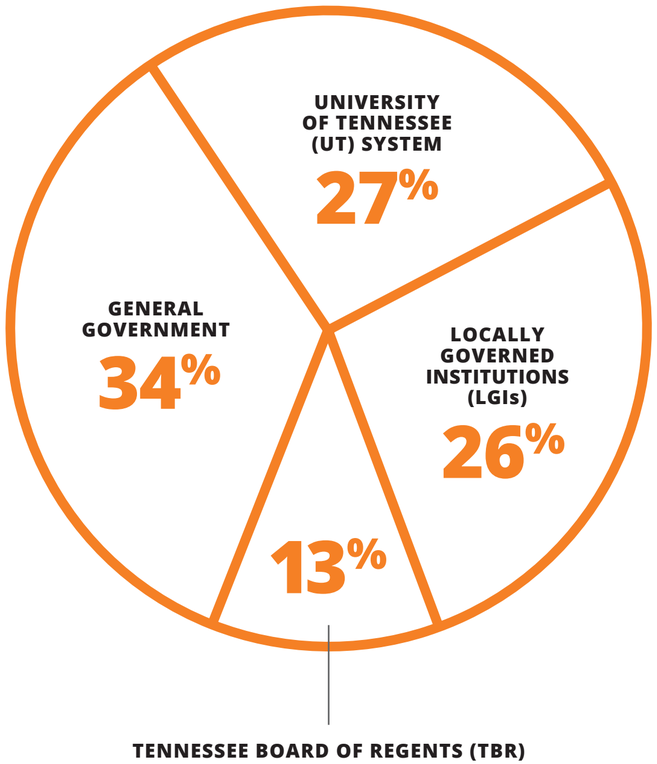
The SFUM team analyzes trends using a dataset from 15 different organization group databases within the UDM platform.

The UDM platform reports utility cost and usage data on a continual basis. As a result, these figures change frequently. These variations are due to delays in obtaining missing bills and notifications of additional accounts that cover this timeframe. This leads to slight variances in the usage or cost values from different datasets.

Data integrity and collection are the key foundational elements for a utility data management platform.

Overall State Portfolio and Observations

FIGURE 2.1 | FY2022 Share of Portfolio by Organizational Group (% of sq. ft.)



TOTAL UTILITY COSTS FOR FY2022

$206,940,574

spent on energy and water utilities across all State-owned and -managed facilities

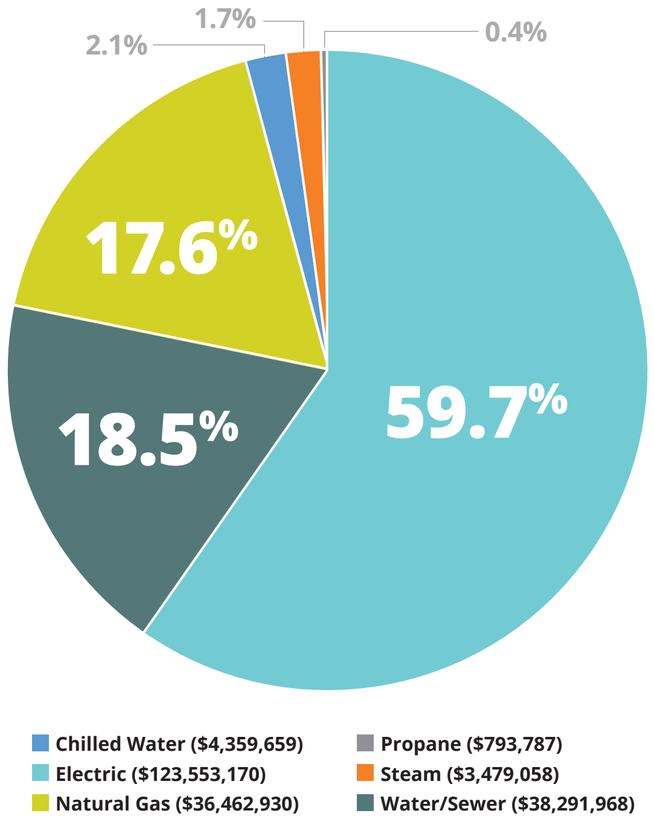
17.4% increase ($30,674,175) in State utility costs compared to FY2021

This increase is due to additional costs from rate changes, rising consumption due to weather fluctuations, and increased occupancy as the workforce returns to the office.

GREATEST COST DECREASE FROM FY2021 TO FY2022

Department of Corrections	$9,038,439 ↓
Department of Education	$1,026,492 ↓
Department of Mental Health and Substance Abuse Services	$705,741 ↓
Department of Transportation	$457,026 ↓
Department of Intellectual and Developmental Disabilities	$326,070 ↓

FIGURE 2.2 | FY2022 All State Utility Cost Profile



FY2020-FY2022 Comparison

TABLE 2.1 | Change in FY2020-FY2022 in Overall Cost and Overall Usage by Utility

UTILITY COMMODITY	USAGE CHANGE (%)	TOTAL USAGE CHANGE	COST CHANGE (%)	TOTAL COST CHANGE ($)
CHILLED WATER	11.6%	1,947,052 ton-hr	6.5%	$264,969
ELECTRIC	1.1%	13,290,344 kWh	6.3%	$7,357,105
NATURAL GAS	10.5%	6,743,602 Therms	61.3%	$13,856,126
PROPANE	50.6%	279,807 Therms	80.1%	$353,114
STEAM	-6.3%	-11,717 Mlb	37%	$940,141
WATER / SEWER	0.6%	18,724 kgal	16.2%	$5,348,077

TOTAL = **$28,119,532**

KEY TAKEAWAYS

- Substantial increases in natural gas and propane usage and cost.
- The financial impact was minimal despite a significant increase in chilled water usage.
- Although water/sewer costs considerably increased, the usage remained consistent with little change.
- Despite reductions in use, steam costs rose considerably in price.
- Electric usage and cost increased but remained consistent across all three years.

The State's overall utility costs increased 15.7% from FY2020 to FY2022.

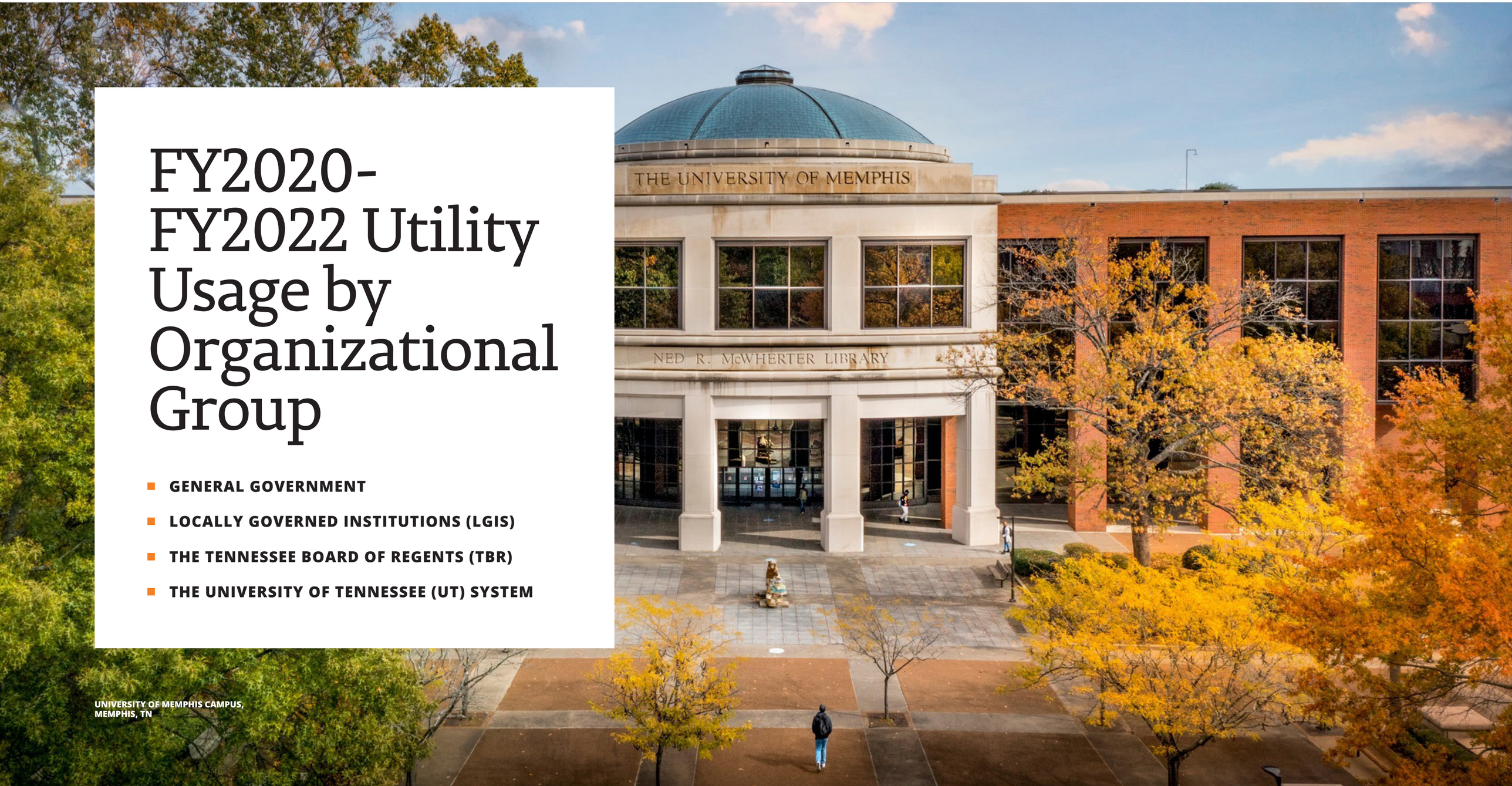
This can be primarily attributed to electricity rate structure changes, contract negotiations, weather fluctuations, and usage increases.

FY2022 OVERALL UTILITY COSTS
$206,940,574

FY2020 OVERALL UTILITY COSTS
$178,821,041

FY2020-FY2022 Utility Usage by Organizational Group

- GENERAL GOVERNMENT
- LOCALLY GOVERNED INSTITUTIONS (LGIS)
- THE TENNESSEE BOARD OF REGENTS (TBR)
- THE UNIVERSITY OF TENNESSEE (UT) SYSTEM



UNIVERSITY OF MEMPHIS CAMPUS, MEMPHIS, TN

General Government

TOTAL UTILITY COSTS FOR FY2022

$75,204,110

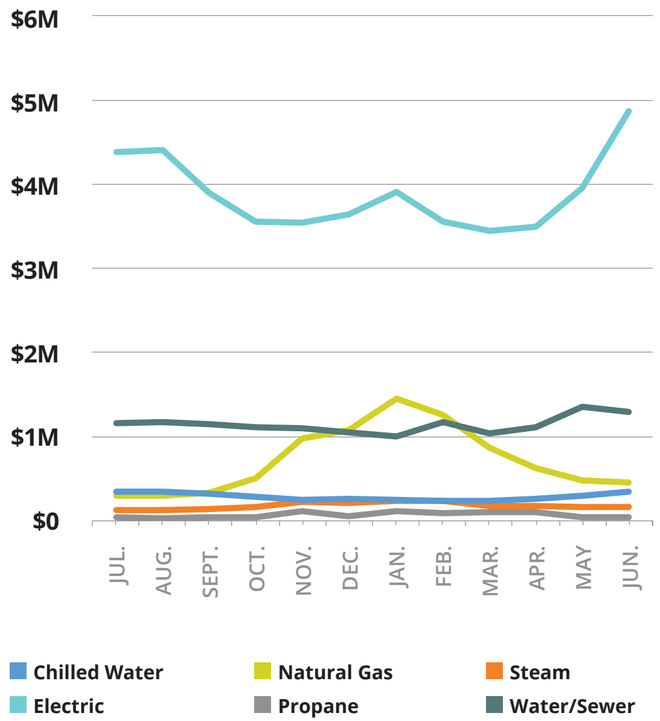
Electric power **62%**

Water/sewer **18.2%**

TABLE 2.2 | FY2022 Utility Cost by Commodity, General Government

COMMODITY	USAGE	UOM	COST	PERCENT
CHILLED WATER	13,888,176	ton-hr	$3,365,835	4.48%
ELECTRIC	434,325,223	kWh	$46,652,126	62.03%
NATURAL GAS	20,335,412	Therms	$8,601,771	11.44%
PROPANE	824,823	Therms	$777,769	1.03%
STEAM	105,968	MIb	$2,106,092	2.8%
WATER/SEWER	1,151,343	kgal	$13,700,517	18.22%

FIGURE 2.3 | FY2022 Commodity Cost per Month, General Government



General Government

TOTAL UTILITY COST PER YEAR COMPARISON

FY2022

$75,204,110

FY2021

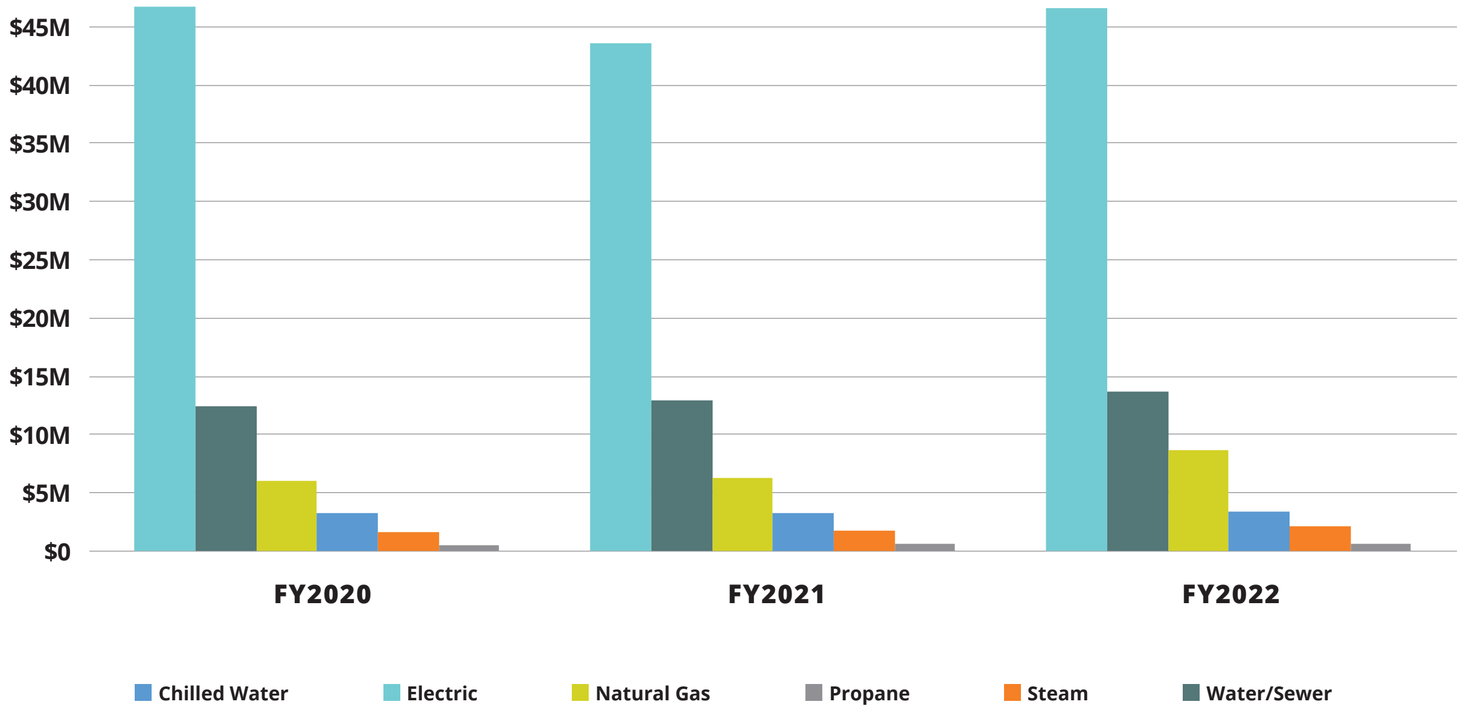
$68,490,174

FY2020

$70,378,763

WANT MORE DETAILED DATA? EMAIL US

FIGURE 2.4 | Commodity Cost per Year Comparison, General Government



Locally Governed Institutions (LGIs)

TOTAL UTILITY COSTS FOR FY2022

$44,995,246

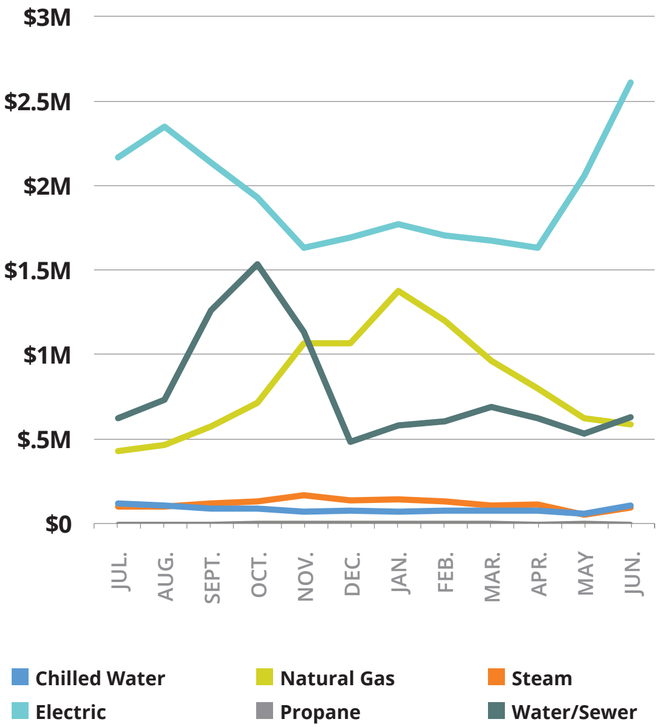
Electric power **51.9%**

Natural gas **21.9%**

TABLE 2.3 | FY2022 Utility Cost by Commodity, LGIs

COMMODITY	USAGE	UOM	COST	PERCENT
CHILLED WATER	4,854,500	ton-hr	$993,824	2.21%
ELECTRIC	229,254,890	kWh	$23,351,562	51.9%
NATURAL GAS	26,623,517	Therms	$9,846,281	21.88%
PROPANE	7,566	Therms	$15,918	0.04%
STEAM	69,235	MIb	$1,372,966	3.05%
WATER/SEWER	964,941	kgal	$9,414,695	20.92%

FIGURE 2.5 | FY2022 Commodity Cost per Month, LGIs



Locally Governed Institutions (LGIs)

TOTAL UTILITY COST PER YEAR COMPARISON

FY2022

$44,995,246

FY2021

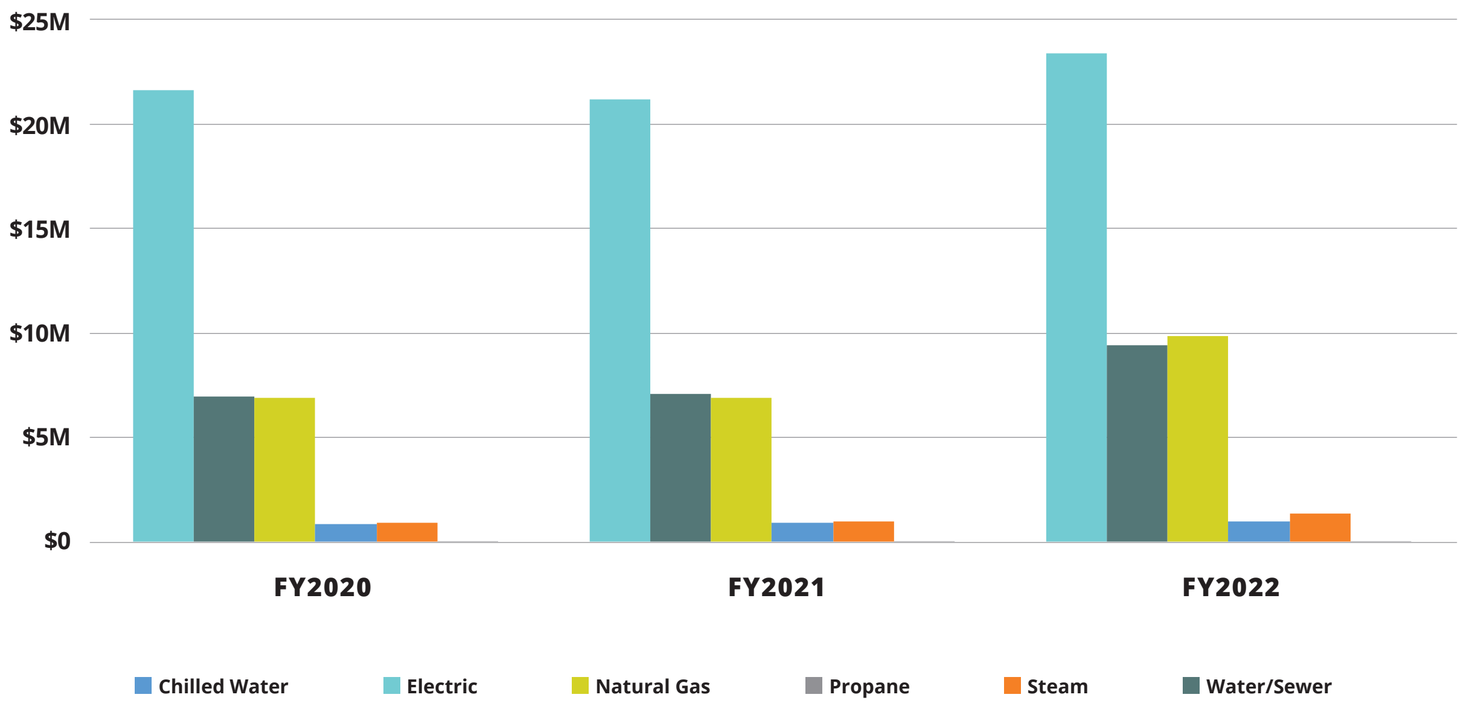
$37,100,362

FY2020

$37,302,869

WANT MORE DETAILED DATA? EMAIL US

FIGURE 2.6 | Commodity Cost per Year Comparison, LGIs



The Tennessee Board of Regents (TBR)

TOTAL UTILITY COSTS FOR FY2022

$24,478,239

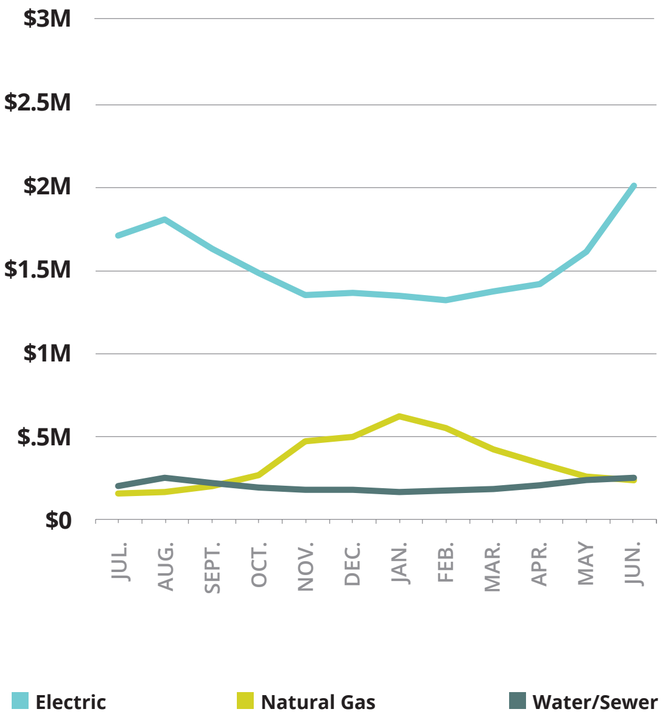
Electric power **74.6%**

Natural gas **16.3%**

TABLE 2.4 | FY2022 Utility Cost by Commodity, TBR

COMMODITY	USAGE	UOM	COST	PERCENT
ELECTRIC	172,538,791	kWh	$18,254,488	74.57%
NATURAL GAS	4,534,020	Therms	$3,985,565	16.28%
PROPANE	0	Therms	$100	0.00%
WATER/SEWER	163,604	kgal	$2,238,086	9.14%

FIGURE 2.7 | FY2022 Commodity Cost per Month, TBR



The Tennessee Board of Regents (TBR)

TOTAL UTILITY COST PER YEAR COMPARISON

FY2022

$24,478,239

FY2021

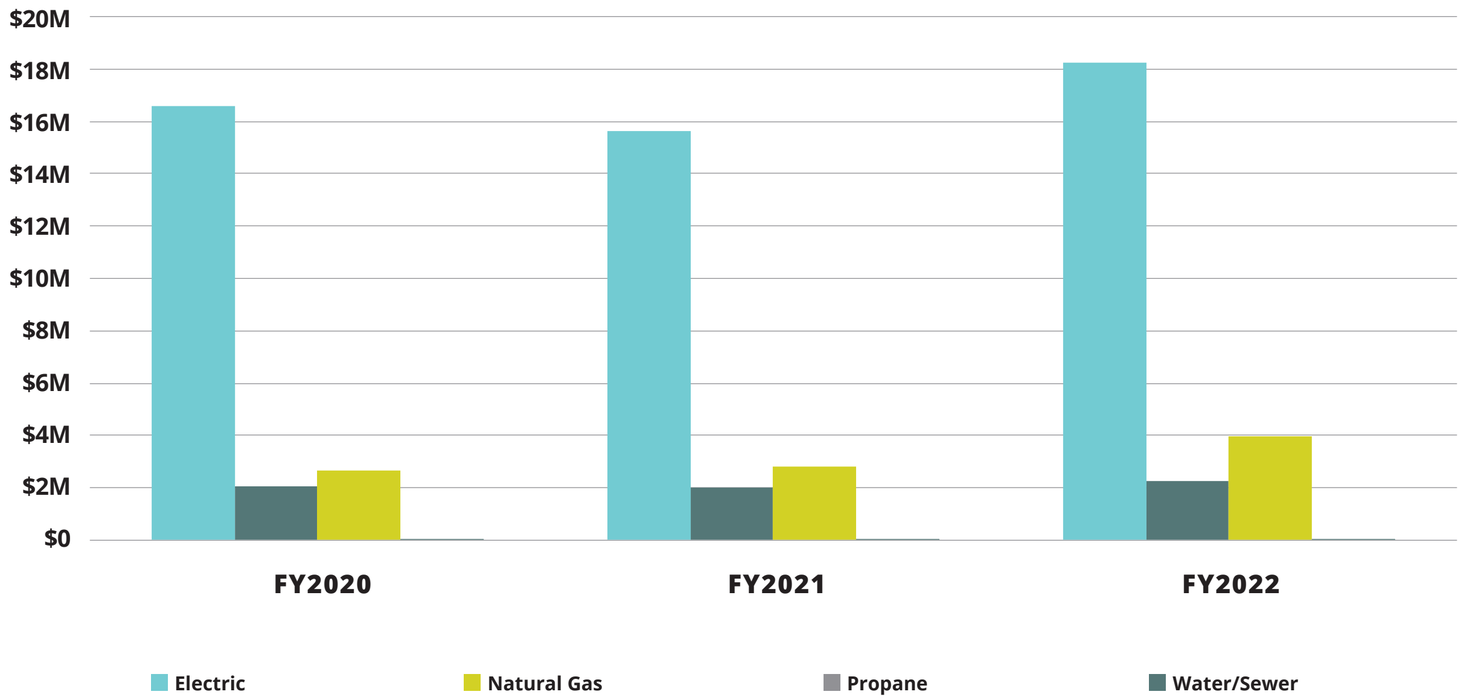
$20,454,304

FY2020

$21,298,693

WANT MORE DETAILED DATA? EMAIL US

FIGURE 2.8 | Commodity Cost per Year Comparison, TBR



The University of Tennessee (UT) System

TOTAL UTILITY COSTS FOR FY2022

$62,262,978

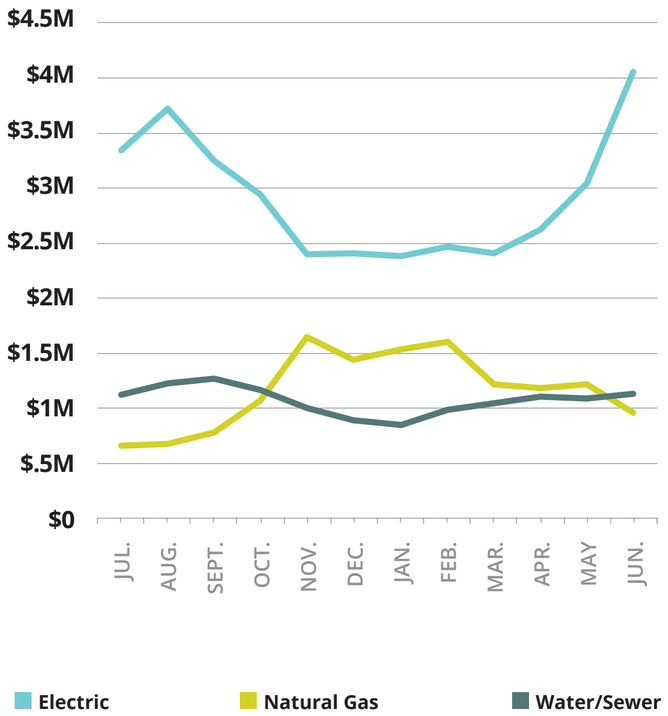
Electric power **56.7%**

Natural gas **22.5%**

TABLE 2.5 | FY2022 Utility Cost by Commodity, UT System

COMMODITY	USAGE	UOM	COST	PERCENT
ELECTRIC	396,796,154	kWh	$35,294,995	56.69%
NATURAL GAS	19,591,660	Therms	$14,029,314	22.53%
WATER/SEWER	981,081	kgal	$12,938,670	20.78%

FIGURE 2.9 | FY2022 Commodity Cost per Month, UT System



The University of Tennessee (UT) System

TOTAL UTILITY COST PER YEAR COMPARISON

FY2022

$62,262,978

FY2021

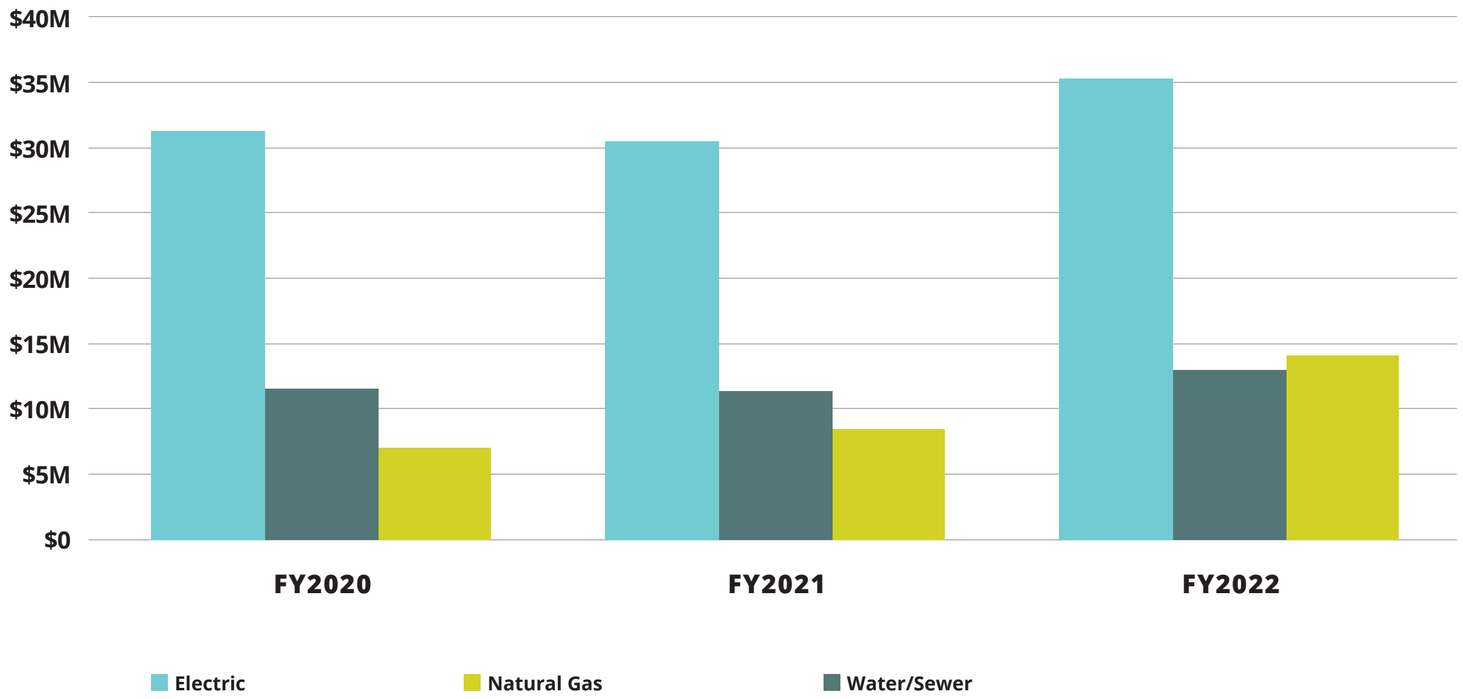
$50,221,559

FY2020

$49,840,716

WANT MORE DETAILED DATA? EMAIL US

FIGURE 2.10 | Commodity Cost per Year Comparison, UT System



Current Offerings

- ACCESSING THE UDM PLATFORM
- ENERGY LIAISON PROGRAM (ELP)

TENNESSEE STATE LEGISLATIVE PLAZA, NASHVILLE, TN

Accessing the UDM Platform

Access to the UDM platform is available to all State employees of participating General Government agencies, LGIs, TBR schools, and UT System schools (for a complete list of participating agencies, see **Appendices**).

READY TO REGISTER?

Questions about this report or requests to become a registered UDM platform user can be directed to the SFUM team at tdec.sfum@tn.gov.

Energy Liaison Program (ELP)

Launched in January 2023, the ELP is designed to provide resources, training, professional development opportunities, and a peer learning network for State personnel (e.g., facility managers, building maintenance personnel, and sustainability professionals). Leveraging the features and benefits of the UDM platform, the ELP aims to help energy liaisons identify potential energy savings opportunities in their facilities.

Interested in becoming an energy liaison? Are you new to your role? Send a note to the SFUM team at tdec.sfum@tn.gov.

Additional Info

- APPENDICES
- ACKNOWLEDGMENTS

AYRES HALL, UNIVERSITY OF TENNESSEE, KNOXVILLE, TENNESSEE

Appendices

APPENDIX A

List of figures from UDM dashboard screenshots

FIGURE 1.1, P. 23

Example of ENERGY STAR® Score and Metrics for a General Government Building (UDM Platform, Buildings & Meters)

FIGURE 1.2, P. 24

Example of Interval Data for a General Government Building (UDM Platform, Buildings & Meters)

APPENDIX B

Utility Usage Calculations

TABLE 2.1, P. 29

Change in FY2020-FY2022 in Overall Cost and Overall Usage by Utility

Calculations for each utility commodity:

Usage Change (%) = (FY2022 usage - FY2020 usage) / (FY2020 usage)

Total Usage Change = (FY2022 usage - FY2020 usage)

Cost Change (%) = (FY2022 cost - FY2020 cost) / (FY2020 cost)

Total Cost Change ($) = (FY2022 cost - FY2020 cost)

APPENDIX C

List of General Government Agencies

Department of Agriculture
Department of Children's Services
Department of Commerce & Insurance
Department of Correction
Department of Economic & Community Development
Department of Education
Department of Environment & Conservation
Department of General Services
Department of Health
Department of Human Services
Department of Intellectual & Developmental Disabilities
Department of Mental Health & Substance Abuse Services
Department of Military
Department of Safety & Homeland Security
Department of Tourist Development
Department of Transportation
Department of Veterans Services
Legislative Services
National Civil Rights Museum
Tennessee Bureau of Investigation
Tennessee District Attorneys General Conference
Tennessee District Public Defenders Conference
Tennessee Rehabilitative Initiative in Correction
Tennessee Secretary of State
Tennessee Wildlife Resources Agency

APPENDIX D

List of Locally Governed Institutions (LGIs)

Austin Peay State University

East Tennessee State University

Middle Tennessee State University

Tennessee State University

Tennessee Tech University

University of Memphis

APPENDIX E

List of Tennessee Board of Regents (TBR) Community Colleges

Chattanooga State Community College

Cleveland State Community College

Columbia State Community College

Dyersburg State Community College

Jackson State Community College

Motlow State Community College

Nashville State Community College

Northeast State Community College

Pellissippi State Community College

Roane State Community College

Southwest Tennessee Community College

Volunteer State Community College

Walters State Community College

APPENDIX F

List of Tennessee Board of Regents (TBR) Tennessee Colleges of Applied Technology (TCAT)

TCAT Athens

TCAT Chattanooga

TCAT Covington[9]

TCAT Crossville

TCAT Crump

TCAT Dickson

TCAT Elizabethton

TCAT Harriman

TCAT Hartsville

TCAT Hohenwald

TCAT Jacksboro

TCAT Jackson[10]

TCAT Knoxville

TCAT Livingston

TCAT McKenzie

TCAT McMinnville

TCAT Memphis

TCAT Morristown

TCAT Murfreesboro

TCAT Nashville

TCAT Northwest

TCAT Oneida

TCAT Paris

TCAT Pulaski

TCAT Ripley[11]

TCAT Shelbyville

APPENDIX G

List of the University of Tennessee (UT) System Facilities

CAMPUSES

The University of Tennessee – Chattanooga

The University of Tennessee – Health Science Center at Memphis

The University of Tennessee – Knoxville

The University of Tennessee – Martin

The University of Tennessee – Southern at Pulaski[12]

INSTITUTES

The University of Tennessee – Institute of Agriculture

The University of Tennessee – Space Institute

[9] TCAT Covington, along with TCAT Ripley, will merge with TCAT Northwest in Fall 2023. For the purposes of this report, each of these institutions is still separate.
[10] TCAT Whiteville has become part of TCAT Jackson as of October 2021.
[11] TCAT Ripley, along with TCAT Covington, will merge with TCAT Northwest in Fall 2023. For the purposes of this report, each of these institutions is still separate.
[12] The UT System acquired the University of Tennessee Southern at Pulaski in early FY2022. This is the first year that this entity will be included in the UDM Report.

APPENDIX H

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APPENDIX I

Abbreviations and Acronyms

AP – Accounts Payable

AWS – Alternative Workplace Solutions

CBRE – Commercial Real Estate Services Firm

CCF – Hundred Cubic Feet

CFMO – Construction Facility Management Office

COVID-19 – Coronavirus Disease 2019

EPA – U.S. Environmental Protection Agency

EUI – Energy Use Intensity

DCS – Tennessee Department of Children's Services

DGS – Tennessee Department of General Services

ELP – Energy Liaison Program

F&A – Tennessee Department of Finance & Administration

FRF – Facility Revolving Fund

FY2020 – Fiscal Year 2020 (July 1, 2019 – June 30, 2020)

FY2021 – Fiscal Year 2021 (July 1, 2020 – June 30, 2021)

FY2022 – Fiscal Year 2022 (July 1, 2021 – June 30, 2022)

kgal – Kilogallon

kWh – Kilowatt hour

LGIs – Locally Governed Institutions of Higher Education

Mlb – Thousand Pounds (of Steam)

M&V – Measurement and Verification

OEP – TDEC Office of Energy Programs

PDC – Public Defenders Conference

SFUM – State Facility Utility Management

Sq. ft. – Square foot/feet

STREAM – State of Tennessee Real Estate Asset Management

STS – Strategic Technology Solutions

TBR – Tennessee Board of Regents

TDEC – Tennessee Department of Environment & Conservation

TDOC – Tennessee Department of Corrections

TDOT – Tennessee Department of Transportation

TNVCA – Nashville Tennessee Volunteer Challenge Academy

TWRA – Tennessee Wildlife Resources Agency

UDM – Utility Data Management

UOM – Unit of Measurement

UT – University of Tennessee

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IMAGE ATTRIBUTION

Cover photo of The Lodge at Fall Creek Falls by Attic Fire Photography.

Photo of the Tennessee Welcome Center in Kingsport courtesy of the TN Department of Tourist Development.

Photo of The Lodge at Pickwick Landing by Aerial Innovations Southeast.

Photo of the Ned R. McWherter Library on the University of Memphis campus courtesy of the University of Memphis.