



Department of
General Services



Annual Report on Energy-Efficient Purchasing

FY 2022-23

Department of General Services | Central Procurement Office | December 2023



Contents

BACKGROUND AND STATUTE..... 1

LIFE CYCLE COSTING 1

ENERGY EFFICIENCY STANDARDS 1

ENERGY STAR ANALYSIS 2

MULTIYEAR ENERGY STAR ANALYSIS..... 7

BACKGROUND AND STATUTE

This report on energy-efficient purchases for FY 2023 provides information on the State of Tennessee's procurement of energy-efficient equipment and appliances to meet the requirements of Tenn. Code Ann. § 4-3-1105(20).

Tenn. Code Ann. § 4-3-1105(20) requires the Department of General Services to prepare an annual report on the activities concerning the definition and implementation of an energy efficiency code for State procurement of equipment and appliances. The report shall include savings realized by the State as a result of the office's activities expressed in both units of energy saved and monetary cost-avoidance.

LIFE CYCLE COSTING

It is the policy of the State to use the life cycle cost of commodities as developed and disseminated by the federal government where feasible (Tenn. Code Ann. §12-3-906).

Where federal energy efficiency standards are established, life cycle cost shall be used in the contracting for major energy-consuming products. In determining life cycle costs, the acquisition cost of the product, the energy consumption, the projected energy cost over the useful life of the product, and the anticipated resale or salvage value of the products may be considered in the evaluation.

ENERGY EFFICIENCY STANDARDS

Pursuant to Tenn. Code Ann. § 12-3-905, State agencies shall use energy efficiency standards prescribed by Energy Star to purchase of major energy-consuming products. Energy Star is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy. It has established energy efficiency standards used by the federal government in its contracting for major energy-consuming products and energy-efficient best practices. The Energy Star's website (www.energystar.gov) lists qualified products and commodities meeting Energy Star's minimum energy specifications, life cycle cost calculations, and life cycle cost formula information. The Energy Star rating can currently be found on products in over 50 product categories. Where practical, the State uses Energy Star certification and this list of qualified products and commodities as acceptable brands and models as requirements in bid documents.

ENERGY STAR ANALYSIS

The Central Procurement Office is committed to helping reduce the State’s energy costs by identifying and creating contracts with the most energy-efficient product offerings available. In addition to reducing energy usage, Energy Star-rated products tend to offer longer service lives than conventional products, minimizing the frequency of replacement. Through statewide contracts, the Central Procurement Office continues to make strides to ensure agencies have access to the most energy-efficient products at the most beneficial price to the State. There are currently 9 statewide contracts that either exclusively lists Energy Star products or include Energy Star-rated offerings; two of these nine statewide contracts contain lease/rental options for Energy Star products.

In the following section, the Central Procurement Office has provided a summary, by commodity grouping, of the Energy Star products purchased or leased/rented through statewide contracts during FY 2023, along with the estimated savings associated with each. All the calculated energy savings and cost avoidance amounts are estimates and represent a comparison of Energy Star-rated commodities versus conventional commodities, where applicable.¹

To determine the estimated kilowatt hours (kWh) and gallons of water saved for each commodity, the energy consumption of Energy Star-rated products is measured against conventional energy consumption as defined by Energy Star or manufacturer specifications. The estimated lifetime kilowatt hour savings and gallon savings are calculated based on the product’s expected useful life as estimated by Energy Star. Electricity cost avoidance is calculated using the Tennessee average commercial electricity rate of \$0.1223 per kilowatt hour for FY 2023 (www.eia.gov) multiplied by the lifetime kilowatt hour savings. Water cost avoidance is calculated using the U.S. average water rate of \$0.00901 per gallon (www.energystar.gov) multiplied by the lifetime gallons saved. These savings are reported in present dollar values and do not reflect future electricity and water rate changes.

The Central Procurement Office has separated purchase contracts and lease/rental contracts for detailed analysis. Products purchased by the State through statewide contracts in FY 2023 will have energy savings realized over the product’s lifetime. Therefore, the reported cost avoidance will be realized over the useful life of each commodity, which ranges from five to eleven years. Savings for products leased or rented by the State through statewide contracts in FY 2023 are only estimated for a one-year lease/rental period.

¹Mailing machines, uninterruptible power systems, and additional Energy Star products denoted as Other Energy Star items are certified as Energy Star products, but the Energy Star program does not currently provide a comparison of energy use for these products versus conventional (non-Energy Star) products. Therefore, energy savings are not measured for these commodity groupings or items.

Purchase Contracts:

The State purchased 21,697 Energy Star products for a total spend amount of \$17,571,291 in FY 2023 through statewide contracts. The commodity categories of items purchased from these contracts in FY 2023 are listed below with the quantities and spend amount for each.

PURCHASE CONTRACT FY23 Spend Analysis		
Purchase Contract Commodity	# Of Units Purchased	Total Spend Amount
Appliances ²	273	\$166,840
Computers & Monitors	15,058	\$10,761,787
Lights & Lamps	747	\$4,329
Multi-Function Devices	134	\$58,366
Printers, Scanners & Fax Machines	498	\$227,483
Uninterruptible Power Systems	52	\$4,799
Telephones & Televisions	43	\$19,089
Other Energy Star ³	4,892	\$6,328,598
Grand Total:	21,697	\$17,571,291

The purchased Energy Star products are estimated to save approximately 3,402,779 kilowatt hours and 2,081,128 gallons of water over the next eleven years. Using the current Tennessee electricity and water rates, these savings equate to an estimated \$434,912 in total cost avoidance over five to eleven years.

PURCHASE CONTRACTS Lifetime Analysis						
Purchase Contract Commodity	Estimated Useful Life (YR)	Lifetime kWh Saved	Electricity Cost Avoidance	Lifetime Gallons Saved	Water Cost Avoidance	Total Utility Cost Avoidance
Appliances	10.80	255,434.00	\$ 31,240	2,081,128	\$ 18,751	\$ 49,991
Computers & Monitors	5.20	2,445,242	\$ 299,053	-	-	\$ 299,053
Lights & Lamps	4.30	242,908	\$ 29,708	-	-	\$ 29,708
Multi-Function Devices	6.00	185,975	\$ 22,745	-	-	\$ 22,745
Printers, Scanners & Fax Machines	5.80	256,368	\$ 31,354	-	-	\$ 31,354
Telephones & Televisions	6.50	16,852	\$ 2,061	-	-	\$ 2,061
Grand Total:		3,402,779	\$ 416,160	2,081,128	\$ 18,751	\$ 434,912

² Appliances includes air purifiers, clothes washers & dryers, refrigerators, freezers and dishwashers.

³ Other Energy Star includes thermostats, HVAC units, lighting/led strips, integrated desktops, tablets, computer workstations and servers.

The total savings will be realized over the useful life of each product. Each commodity grouping has varying lifetime expectancies, as detailed in the table above. The expected electricity savings for each commodity are summarized into the annual kilowatt hours saved per fiscal year for the commodity's useful life. The analysis below does not include the number of gallons saved and the total utility cost avoidance each year. Most energy savings are realized within the next five years, but savings from Energy Star purchases made in FY 2023 will continue to be realized through 2033.

Total kWh Saved		Total kWh Saved per FY by Purchased Commodity					
FY	Annual kWh Saved	Appliances	Telephones & Televisions	Multi-Function Devices	Printers, Scanners & Fax Machines	Computers & Monitors	Lights & Lamps
2023	628,170.17	23,651.29	2,592.61	30,995.83	44,201.37	470,238.84	56,490.23
2024	628,170.17	23,651.29	2,592.61	30,995.83	44,201.37	470,238.84	56,490.23
2025	628,170.17	23,651.29	2,592.61	30,995.83	44,201.37	470,238.84	56,490.23
2026	628,170.17	23,651.29	2,592.61	30,995.83	44,201.37	470,238.84	56,490.23
2027	588,627.02	23,651.29	2,592.61	30,995.83	44,201.37	470,238.84	16,947.08
2028	186,648.73	23,651.29	2,592.64	30,995.85	35,361.15	94,047.80	
2029	24,947.63	23,651.29	1,296.34				
2030	23,651.29	23,651.29					
2031	23,651.29	23,651.29					
2032	23,651.29	23,651.29					
2033	18,921.10	18,921.10					
Total:	3,402,779	255,434	185,975	16,852	256,368	2,445,242	242,908

Lease/Rental Contracts:

The State also leased or rented Energy Star products through statewide contracts. In FY 2023, the State leased/rented 3,365 products for \$1,393,839. The State saved approximately 10,146,747 kilowatt hours of electricity and 29,617,560 gallons of water using these products compared to conventional products. Since these products were not purchased, lifetime estimates were not included in the calculations. The amounts reported in the table below represent only estimated savings and cost avoidance for FY 2023. The combined savings from electricity and water cost avoidance for leased/rented Energy Star products total \$1,507,802 for FY 2023.

RENTAL & LEASES FY23 Savings Analysis							
Commodity	# Of Units Leased/Rented	Spend Amount	Estimated kWh Saved	Electricity Cost Avoidance	Estimated Gallons Saved	Water Cost Avoidance	Total Estimated Cost Avoidance
Dishwashing Machine Rentals	21	\$ 97,249	5,088,054	\$ 622,269	29,617,560	\$ 266,854	\$ 889,123
Multi-Function Device Leases	3,338	\$ 1,292,078	5,057,085	\$ 618,482	-	-	\$ 618,482
Printers, Scanners & Fax Machines Leases	6	\$ 4,512	1,607	\$ 197	-	-	\$ 197
Grand Total:	3,365	\$ 1,393,839	10,146,747	\$ 1,240,948	29,617,560	\$ 266,854	\$ 1,507,802

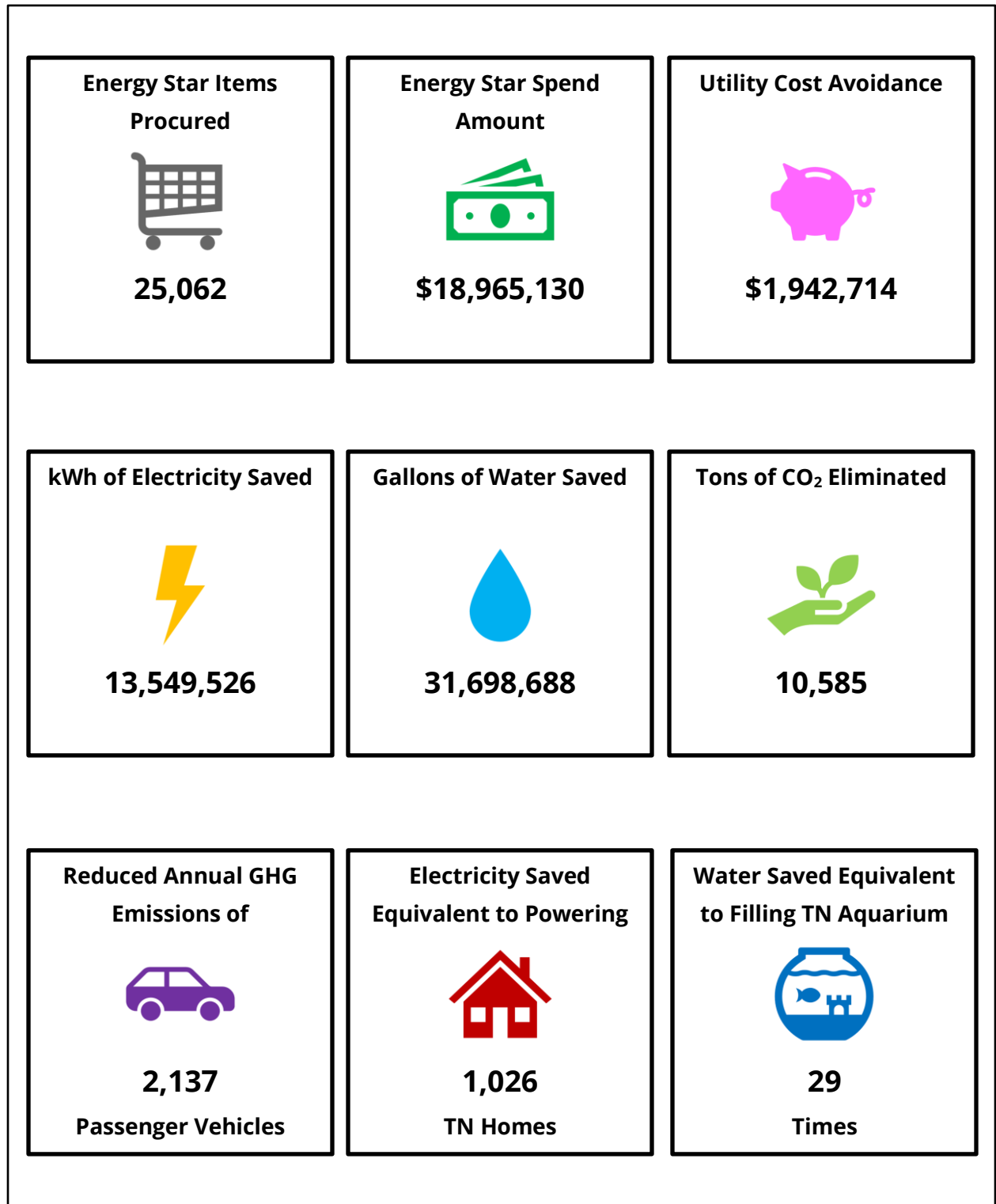
Combined Savings and Environmental Impact of FY 2023 Purchase and Lease/Rental Contracts:

Cost avoidance realized over the expected lifetimes of Energy Star products procured in FY 2023 through purchase contracts and the cost avoidance realized during FY 2023 through lease/rental contracts totals a combined \$1,942,714. It is important to reiterate that total cost avoidance is calculated using current electricity and water rates. Over the next eleven years, it will be realized for the purchase contracts, while lease/rental products are realized during FY 2023 only.

In total, the estimated 13,549,526 kilowatt hours of electricity saved results in cost avoidance of approximately \$1,657,108, while the 31,698,688 gallons of water saved equals approximately \$285,605 in cost avoidance. In other words, the State’s kilowatt-hour savings are equivalent to the electricity needed to power 1,026 homes based on the average household electricity consumption in Tennessee (www.nespower.com).

The State’s water savings are comparable to the gallons of water needed to fill the Tennessee Aquarium in Chattanooga over 29 times (www.tnaqua.org). Reducing 13,549,526 kilowatt hours of electricity consumption eliminates an estimated 10,585 tons of carbon dioxide (CO₂) from polluting our atmosphere. This is equivalent to reducing the annual greenhouse gas (GHG) emissions of 2,137 gasoline-powered passenger vehicles driven for one year. This information was obtained using a calculator provided by the Environmental Protection Agency (www.epa.gov). The chart on the following page summarizes the combined utility, cost savings, and environmental impact of all the Energy Star items procured in FY 2023 through purchase and lease/rental contracts.

FY 2023 Energy Star Item Purchasing Summary:



MULTIYEAR ENERGY STAR ANALYSIS

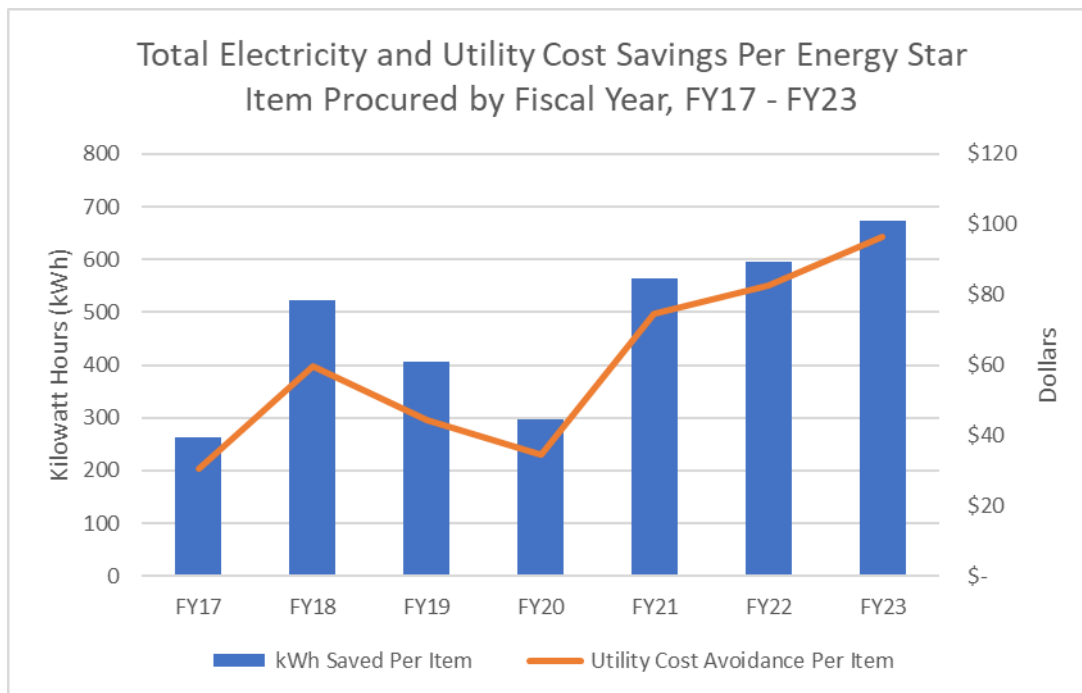
To examine trends in the State’s Energy Star purchasing and resulting cost avoidance, the Central Procurement Office has compared data from FY 2023 to earlier fiscal years. The total cost avoidance from electricity and water savings through purchase and lease/rental statewide contracts has fluctuated over the last several reporting years. This is affected by several factors, such as the total quantity of items procured, distribution of those items across the categories, and the efficiency of each item. The table below shows the variance year-over-year in electricity and water savings and the resulting estimated total utility cost avoidance from Energy Star purchases and leases/rentals.

MULTIYEAR ENERGY STAR ANALYSIS			
FY	Lifetime kWh Saved	Total Gallons saved Lifetime	Total Utility Cost Avoidance
FY13	19,158,365		\$ 2,085,650
FY14	16,887,983	10,703,973	\$ 1,895,238
FY15	7,323,191	9,890,099	\$ 822,589
FY16	16,678,493	10,820,616	\$ 1,805,779
FY17	5,942,161	9,961,965	\$ 689,024
FY18	10,442,180	2,996,552	\$ 1,192,973
FY19	6,771,423	2,909,245	\$ 738,735
FY20	6,264,036	7,266,615	\$ 727,643
FY21	12,379,613	27,987,481	\$ 1,632,494
FY22	12,834,594	30,301,226	\$ 1,775,047
FY23	13,549,526	31,698,688	\$ 1,942,714

The chart below illustrates the efficiency of the calculated Energy Star items purchased and leased/rented with the kilowatt hours saved per item and the total utility cost avoidance per item. It is important to note that before FY 2017, lease and rental items were measured by the number of lease/rental terms procured within the fiscal year rather than the number of units leased/rented within the fiscal year. For example, two dishwashers rented would be reported as a quantity of 24 for the 24-month lease terms before FY 2017, rather than being reported as a quantity of two for the two dishwasher units that were rented. Therefore, only FY 2017-23 are reported below.

The noticeable increase in efficiency in the most recent fiscal years is due in part to improved capabilities in measuring electricity and water savings. In previous fiscal years, the Central Procurement Office has relied on EPA calculators to compare the Energy Star items to conventional items. Many of these EPA calculators need to be updated. For fiscal years starting from 2021, the Central Procurement Office utilized real-time data from the EPA to create up-to-date calculators to compare the electricity and water usage of Energy Star items purchased/leased/rented by the State to the utility usage of conventional models. In 2023, we have been able to improve our calculations and have thus updated all past applicable errors

found in recent fiscal years. The charts included in this report have been updated to display the most accurate depiction of energy savings data.



Detailed below are several factors that have impacted the fluctuation in estimated lifetime cost avoidance for FYs 2022 and 2023 broken down by Energy Star category for purchase contracts.

Appliances:

- The number of Energy Star appliances purchased decreased this fiscal year with 126 (-31.6%) lesser items compared to FY 2022. As a result, the total estimated kWh of electricity saved decreased.
- Out of the 273 appliances purchased in FY 2023, there were 79 water-consuming items, such as clothes washers and dishwashers. Overall, water-consuming items comprise a significant proportion, specifically 29%, which equates to nearly one-third of the entirety of appliance purchased. This is a direct increase from the previous year, which had only 16% of its appliances defined as water-consuming items.
- This year, there has been a departure from historical trends, as no dehumidifiers were procured, marking a notable absence in the overall acquisition of appliances. Overall, there was a decrease in the following: Residential Refrigerators, Residential Dishwashers, and Air Purifiers.

Computers and Monitors:

- Overall, the number of items purchased in this Energy Star category in FY 2023 decreased by 2,633 items (-15%) compared to FY 2022. However, the overall number of monitors purchased did increase by 6.8%, with 368 more monitors having been procured. There has been a significant decline in the number of laptops purchased this year, with there being a decrease of 24% with 2,269 fewer laptops being purchases. This marks a more pronounced contraction than the preceding year's decrease of 12%, where 1,351 fewer

laptops were acquired. The intensified reduction underscores a notable shift in the trend of laptop procurement over the course of these two consecutive years. There also was a significant decrease of 26.5% (732 units) in desktops procured this fiscal year than procured last fiscal year.

- This fiscal year witnessed a 15% decrease in "Computer & Monitor" item purchases, yet the Energy Star category showed a commendable 6% uptick in estimated lifetime kWh of electricity saved, signaling a simultaneous emphasis on energy efficiency despite the reduction in acquisition volume.
- Historically, the "Computers & Monitor" category has had the most significant fluctuations from year to year. This is due in part to the four-year life cycle of the laptops and desktop computers as well as the refresh cycle the State uses to ensure computers are maintained and replaced appropriately.

Lights and Lamps:

- The number of lights and lamps purchased in FY 2023 increased by 52% with 255 additional lights and lamps having been procured this fiscal year. As a result, the acquisition of Energy Star lights and lamps this year contributed to a remarkable 66% increase in the estimated lifetime kWh saved, showcasing a substantial enhancement in energy efficiency.
- This Energy Star category has benefitted from the improvement to our in-house calculators. In the current fiscal year, we tailored the calculator to comprehensively capture and analyze various types of lightbulbs, expanding its capability to recognize a wider range of wattages. This improvement has allowed us to customize the variety of wattages the calculator recognizes, ultimately capturing additional types of LED light bulbs.
- Within this category, the notable difference was primarily driven by the substantial increase in the acquisition of two specific LED light bulb types. This year witnessed a significant surge, with a 12.5-fold increase in the purchase of 12-watt LED light bulbs and a ninefold increase in the procurement of 18-watt LED light bulbs, underscoring the pronounced impact of these items on the overall category.

Multi-Function Devices, Printers, Scanners, and Fax Machines:

- The procurement of multi-function devices experienced a noteworthy increase in FY 2023, surging by 99 devices—four times more than the previous fiscal year. This substantial increase has resulted in an additional 172,160 kilowatt-hours (kWh) saved over the lifetime for this Energy Star category, highlighting a commendable advancement in energy efficiency within this specific equipment category.
- The procurement of printers, scanners and faxers also experienced a noteworthy increase in FY2023, surging by 383 devices- four times more than the previous fiscal year. Most of this surge came from the procurement of 346 additional Standard Format printers. There was also a notable increase in the procurement of Scanners, witnessing a 6.5-fold increase.

Uninterruptible Power Systems:

- The Uninterruptible Power Systems category witnessed a remarkable surge in procurement, the number of items acquired quadrupling in comparison to the previous fiscal year. This is particularly noteworthy given the context of a 96% decrease in the

procurement of Energy Star uninterruptible power systems in FY 2022 when compared to the figures from FY 2021.

- Uninterruptible power systems are Energy Star-certified items; however, the Environmental Protection Agency does not have a calculator to measure the energy savings for these items when comparing them to conventional models. The estimated kWh savings and electricity cost avoidance from these Energy Star uninterruptible power systems is unknown.

Telephones and Televisions:

- This category experienced a remarkable surge in procurement, acquiring 23 office phones and 20 televisions this year. The significance of this increase is underscored by the fact only one item related to this category was purchased in the preceding fiscal year.
- This Energy Star category has been the most volatile category regarding the number of procurements recorded each fiscal year. This could partly be due to the nature of remote work in the State of Tennessee. However, we hope to dig more into this category in future years.

Other Energy Star Items:

- The number of Other Energy Star items purchased in FY 2023 witnessed an exceptional surge, increasing 52-fold, with an additional 4,798 items procured. This increase is unsurprising, given that two sub-category types experienced significant upticks in procurement, collectively accounting for 99% of the overall increase, with 4,746 more items being purchased.
- Historically this category has included servers, thermostats, HVAC systems and ventilation equipment, and lighting items. Since 2022, the State has identified three additional Energy Star sub-categories this fiscal year, which will be collected and reported moving forward. The new sub-categories are Tablets, Integrated Desktops, and Computer Workstations.
- The sub-category that experienced the most remarkable surge was Tablets, witnessing the acquisition of an additional 4,209 units this fiscal year.
- The items that fall under this category, are in fact, Energy Star-certified items; however, the Environmental Protection Agency does not have a calculator to measure the energy savings for these items when comparing them to conventional models. The estimated kWh savings and electricity cost avoidance from these Energy Star items are not known.

Central Procurement Office
312 Rosa L. Parks Avenue, 3rd Floor
William R. Snodgrass Tennessee Tower
Nashville, TN 37243
(615) 741-1035
<https://www.tn.gov/generalservices/procurement.html>



Tennessee Department of General Services, Authorization
No. 321270, electronic only. December 2023. This public
document was promulgated at a cost of \$0.00 per copy.