TN Department of General Services

Annual Report on Energy-Efficient Purchasing

FY 2023-24

Department of General Services | Central Procurement Office | December 2024

Contents

BACKGROUND AND STATUTE

This report on energy-efficient purchases for FY 2024 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 11 statewide contracts that either exclusively lists Energy Star products or include Energy Star-rated offerings; three of these eleven 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 2024, 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 $0.1168 per kilowatt hour for FY 2024 (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 2024 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 thirteen years. Savings for products leased or rented by the State through statewide contracts in FY 2024 are only estimated for a one-year lease/rental period.

[1]Mailing 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 28,035 Energy Star products for a total spend amount of $16,333,245 in FY 2024 through statewide contracts. The commodity categories of items purchased from these contracts in FY 2024 are listed below with the quantities and spend amount for each.

PURCHASE CONTRACT FY24 Spend Analysis		
Purchase Contract Commodity	**# Of Units Purchased**	**Total Spend Amount**
Appliances[2]	581	$357,687
Computers & Monitors	12,021	$6,898,132
Consumer Electronics	83	$18,387
Lights & Lamps	8,335	$50,528
Multi-Function Devices	268	$94,755
Printers, Scanners & Fax Machines	296	$128,940
Uninterruptible Power Systems	52	$17,405
Other Energy Star[3]	6,399	$8,767,411
Grand Total:	**28,035**	**$16,333,245**

The purchased Energy Star products are estimated to save approximately 13,018,008 kilowatt hours and 3,407,486 gallons of water over the next eleven years. Using the current Tennessee electricity and water rates, these savings equate to an estimated $1,551,205 in total cost avoidance over five to thirteen 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	11.00	561,280	$ 65,558	3,407,486	$ 30,701	$ 96,259
Computers & Monitors	5.40	1,647,449	$ 192,422	-	-	$ 192,422
Consumer Electronics	6.40	11,396	$ 1,331	-	-	$ 1,331
Lights & Lamps	12.50	10,529,006	$ 1,229,788	-	-	$ 1,229,788
Multi-Function Devices	6.00	212,958	$ 24,874	-	-	$ 24,874
Printers, Scanners & Fax Machines	4.50	55,919	$ 6,531	-	-	$ 6,531
Grand Total:		**13,018,008**	**$ 1,520,503**	**3,407,486**	**$ 30,701**	**$ 1,551,205**

[2] Appliances includes air purifiers, clothes washers and dryers, refrigerators, dehumidifiers, freezers and dishwashers.

[3] Other Energy Star includes thermostats, HVAC units, lighting/led strips, commercial clothes washers 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 2024 will continue to be realized through 2036.

Total kWh Saved		Total kWh Saved per Fiscal Year by Purchased Commodity					
Fiscal Year	Annual kWh Saved	Consumer Electronics	Lights & Lamps	Appliances	Multi-Function Devices	Computers & Monitors	Printers, Scanners & Fax Machines
2024	1,247,861.81	911.68	842,320.48	51,025.48	36,094.58	305,083.15	12,426.44
2025	1,247,861.81	911.68	842,320.48	51,025.48	36,094.58	305,083.15	12,426.44
2026	1,247,861.81	911.68	842,320.48	51,025.48	36,094.58	305,083.15	12,426.44
2027	1,247,861.81	911.68	842,320.48	51,025.48	36,094.58	305,083.15	12,426.44
2028	1,241,648.61	911.68	842,320.48	51,025.48	36,094.58	305,083.15	6,213.24
2029	1,048,775.99	911.68	842,320.48	51,025.48	32,485.10	122,033.25	
2030	894,257.64	911.68	842,320.48	51,025.48			
2031	894,257.64	911.68	842,320.48	51,025.48			
2032	894,257.64	911.68	842,320.48	51,025.48			
2033	894,257.64	911.68	842,320.48	51,025.48			
2034	894,257.59	911.68	842,320.48	51,025.43			
2035	843,232.16	911.68	842,320.48				
2036	421,616.08	455.84	421,160.24				
Total:	**13,018,008**	**11,396**	**10,529,006**	**561,280**	**212,958**	**1,647,449**	**55,919**

Lease/Rental Contracts:

The State also leased or rented Energy Star products through statewide contracts. In FY 2024, the State leased/rented 12,055 products for $2,253,588. The State saved approximately 24,252,373 kilowatt hours of electricity and 35,400,803 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 2024. The combined savings from electricity and water cost avoidance for leased/rented Energy Star products total $3,151,638 for FY 2024.

RENTAL & LEASES FY24 Savings Analysis							
Commodity	Units Leased/ Rented	Total Spend Amount	Estimated kWh Saved	Electricity Cost Avoidance	Estimated Gallons Saved	Water Cost Avoidance	Total Estimated Cost Avoidance
Dishwashing Machine Rentals	31	$ 144,333	6,081,568	$ 710,327	35,400,803	$ 318,961	$ 1,029,288
Monitors Lease	1	$ 69	151	$ 18	-	-	$ 18
Multi-Function Device Leases	12,015	$ 2,103,942	18,168,725	$ 2,122,107	-	-	$ 2,122,107
Printers, Scanners & Fax Machines Leases	8	$ 5,245	1,929	$ 225	-	-	$ 225
Grand Total:	**12,055**	**$ 2,253,588**	**24,252,373**	**$ 2,832,627**	**35,400,803**	**$ 318,961**	**$ 3,151,638**

Combined Savings and Environmental Impact of FY 2024 Purchase and Lease/Rental Contracts:

Cost avoidance realized over the expected lifetimes of Energy Star products procured in FY 2024 through purchase contracts and the cost avoidance realized during FY 2024 through lease/rental contracts totals a combined $3,151,638. It is important to reiterate that total cost avoidance is calculated using current electricity and water rates. Over the next thirteen years, it will be realized for the purchase contracts, while lease/rental products are realized during FY 2024 only.

In total, the estimated 37,270,381 kilowatt hours of electricity saved results in cost avoidance of approximately $4,353,181, while the 38,808,289 gallons of water saved equals approximately $349,663 in cost avoidance. In other words, the State's kilowatt-hour savings are equivalent to the electricity needed to power 2,824 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 35 times (www.tnaqua.org). Reducing 37,270,381 kilowatt hours of electricity consumption eliminates an estimated 29,774 tons of carbon dioxide (CO_2) from polluting our atmosphere. This is equivalent to reducing the annual greenhouse gas (GHG) emissions of 6,945 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 2024 through purchase and lease/rental contracts.

FY 2024 Energy Star Item Purchasing Summary:

Energy Star Items Procured	Energy Star Spend Amount	Utility Cost Avoidance
40,134	$18,631,189	$4,702,843

kWh of Electricity Saved	Gallons of Water Saved	Tons of CO_2 Eliminated
37,270,381	38,808,289	29,774

Reduced Annual GHG Emissions of	Electricity Saved Equivalent to Powering	Water Saved Equivalent to Filling TN Aquarium
6,945 Passenger Vehicles	2,824 TN Homes	35 Times

MULTIYEAR ENERGY STAR ANALYSIS

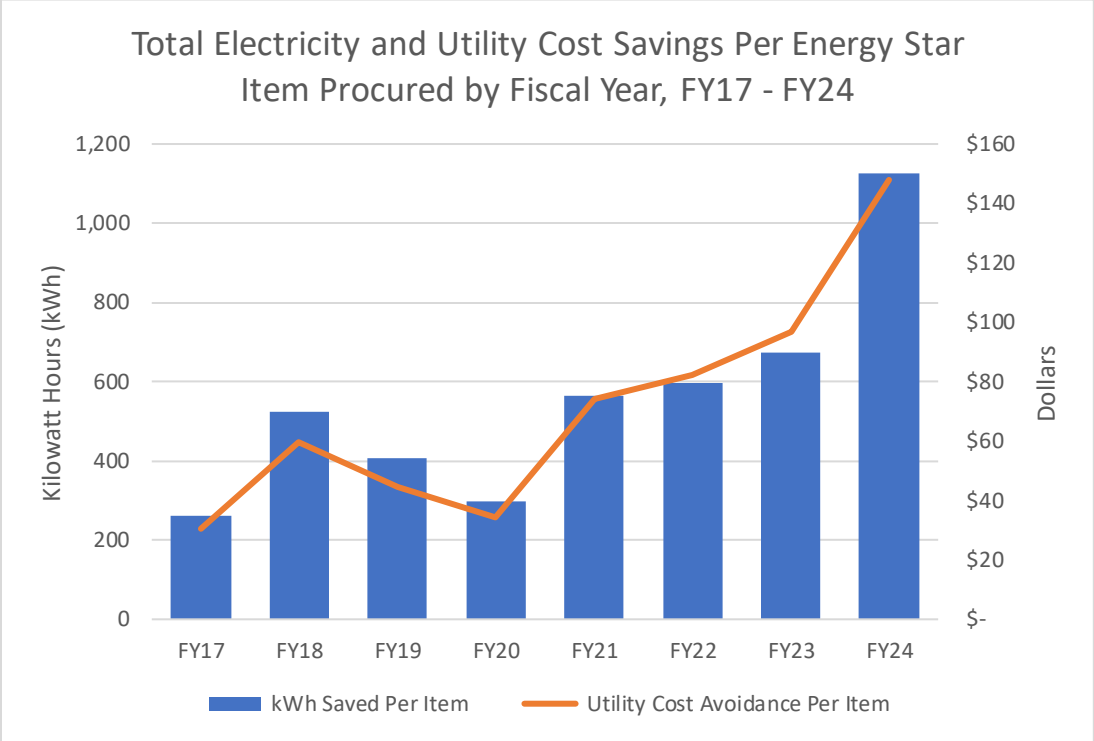
To examine trends in the State's Energy Star purchasing and resulting cost avoidance, the Central Procurement Office has compared data from FY 2024 to earlier fiscal years. The total cost avoidance from electricity and water savings through purchase and lease/rental statewide contracts has fluctuated 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
FY24	**37,270,381**	**38,808,289**	**$ 4,702,843**

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 2017-24 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. Since 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 2023 and 2024 broken down by Energy Star category for purchase contracts.

Appliances:

- The number of Energy Star appliances purchased in FY 2024 more than doubled compared to FY 2023. This significant growth directly contributed to a marked rise in the total estimated kWh of electricity saved.
- This year, notable growth occurred in key appliance categories, including clothes washers, compact refrigerators, and residential refrigerators, each of which experienced nearly double the number of units purchased compared to the previous year.
- Out of the 581 appliances acquired in FY 2024, 128 were water-consuming items, such as clothes washers and dishwashers. Although the total number of water-consuming appliances increased, they now represent 22% of all purchases, down from nearly one-third in FY 2023.
- Clothes washers were the largest contributor to energy savings, accounting for 62% of the total savings in this category. Of the total lifetime savings of $96,258.98, clothes washers alone generated $59,700.23 in savings.

Computers and Monitors:

- Overall, the number of items purchased in this Energy Star category in FY 2024 decreased by 3,037 items (-20%) compared to FY 2023. A significant factor in this decrease is the sharp reduction in computer and laptop purchases, which dropped by 31%, equating to

2,909 fewer units. While this represents a steeper decline than the previous year's 24% drop with 2,269 fewer units purchased, the overall trend shows a notable acceleration in the reduction of laptop procurements over the past two years, indicating a clear shift in purchasing behavior.

- Historically, the "Computers and 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. Potential external factors contributing to this trend include the changing landscape of remote work and efforts to reduce the State's office footprint. These shifts have led to fewer physical desktops and workstations being required in office spaces statewide.

Consumer Electronics:

- This category is the only one to undergo recategorization in recent history. Previously known as *Telephones and Televisions*, it was redefined in FY 2024 to include an additional commodity: DVD players. The inclusion of DVD players and corresponding purchases in the past year prompted this change.
- Notably, the State purchased more than twice as many televisions this year. However, the estimated total lifetime kWh saved decreased, primarily due to the smaller size of the televisions purchased, which resulted in lower energy savings per unit.
- 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 increasing nature of remote work in the State of Tennessee.

Lights and Lamps:

- In FY 2024, the number of lights and lamps tracked increased significantly, totaling 8,335 units compared to 747 units in the previous year. This notable change is largely due to improved tracking capabilities, which allowed for a better accounting and analysis of various types of light bulbs and fixtures. As a result, the acquisition of Energy Star lights and lamps contributed to an estimated savings of 10,529,006 lifetime kWh, reflecting 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 both LED and CFL light bulbs, as well as indoor light fixtures.
- The notable difference within this category was primarily driven by our enhanced ability to track additional types of light bulbs and fixtures. Last year, we tracked only 10 different LED wattage bulbs. This year, we expanded our tracking to include 30 different wattage types of LED bulbs, 10 different wattage types of CFL bulbs, and an additional 1,965 indoor light fixtures. This improvement in tracking enabled us to more accurately convert these items into energy savings.

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

- The procurement of multi-function devices experienced a noteworthy increase in FY 2024, surging by 134 devices—doubled from the previous fiscal year. This substantial increase has resulted in an additional 26,983 kilowatt-hours (kWh) saved over the lifetime for this Energy Star category, highlighting a noteworthy increase in energy efficiency within this specific equipment category.
- It is important to note that while there has been an increase in the purchase of multifunction devices, there has been a decline in the number of printers, scanners, and fax machines purchased this year. Notably, the balance between printers and scanners has shifted, with more scanners purchased and fewer printers, and no specific fax machines acquired. The absence of standalone fax machine purchases indicates that faxing is becoming increasingly less common, with a greater need for multifunctional devices that serve a variety of purposes beyond just faxing.

Uninterruptible Power Systems:

- The Uninterruptible Power Systems category has remained consistent in procurement, with the number of items acquired unchanged compared 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 FY 2021. While there has been no growth, we have made significant progress in identifying more accurate purchases.
- 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.

Other Energy Star Items:

- An additional 1,507 items were procured this fiscal year, reflecting a 30% increase, primarily driven by the identification of new sub-categories. Last year, only seven sub-category units were included, but this year we successfully identified three additional types.
- Tablets emerged as the most significant sub-category, with a remarkable increase of 1,318 units procured. This represents more than a twofold increase in the number of tablets acquired accounting for 20% of all items procured within this category.
- Traditionally, this category has encompassed a variety of products, including servers, thermostats, HVAC systems, ventilation equipment, tablets, integrated desktops, computer workstations, and lighting items. However, this year, the State identified three additional Energy Star sub-categories for inclusion and reporting going forward: Commercial Clothes Washers, Indoor Light Fixtures (bulbs) and Free-Standing Ranges.
- While all items in this category are Energy Star-certified, the Environmental Protection Agency (EPA) does not currently provide a calculator to measure the energy savings or electricity cost avoidance for these products when compared 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. MV3W52-1, electronic only, April 2025. This public document was promulgated at a cost of $0.00 per copy.