



Department of
General Services



Annual Report on Energy-Efficient Purchasing

Fiscal Year 2018 - 2019

Department of General Services | Central Procurement Office | December 2019



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BACKGROUND AND STATUTE

This report on energy-efficient purchasing for fiscal year 2019 provides information on the State'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

Per Tenn. Code Ann. § 12-3-905, State agencies shall use energy-efficiency standards prescribed by Energy Star for the 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 that has established energy-efficiency standards that are used by the federal government in its contracting for major energy-consuming products, as well as energy-efficient best practices. The Energy Star website (www.energystar.gov) provides a list of qualified products and commodities meeting Energy Star's minimum energy specifications, life cycle cost calculations, and life cycle cost formula information. Currently, the Energy Star rating can be found on products in over 50 product categories. Where practicable, 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. 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 through statewide contracts. There are currently 12 statewide contracts that either exclusively list Energy Star products or include Energy Star rated offerings; three of these 12 statewide contracts contain lease/rental options of 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 fiscal year 2019, along with the estimated savings associated with each. All of 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 electricity consumption of Energy Star rated products is measured against conventional electricity consumption as defined by Energy Star or manufacturer specifications. The estimated lifetime kilowatt hour savings and lifetime 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 \$0.105225 per kilowatt hour for fiscal year 2019 (www.eia.gov) multiplied by the lifetime kilowatt hour savings. Water cost avoidance is calculated using the current 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 changes in electricity and water rates.

The Central Procurement Office has separated purchase contracts and lease/rental contracts for detailed analysis. Products purchased by the State through statewide contracts and agency purchase agreements in fiscal year 2019 will have energy savings that are realized over the lifetime of the product. Therefore, the cost avoidance reported will be realized over the course of the useful life of each commodity, which ranges from five to 12 years. Savings for products leased or rented by the State through statewide contracts in fiscal year 2019 are estimated for a one-year lease/rental period only.

¹Mailing machines, uninterruptible power systems, and additional Energy Star products such as tablets, HVAC systems, and servers are classified 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 15,119 Energy Star products for a total spend amount of \$10,279,750 in fiscal year 2019 through statewide contracts. The commodity categories of items purchased from these contracts in fiscal year 2019 are listed below with the quantities and spend amount for each.

Purchase Contract Commodity	# of Units Purchased	Spend Amount
Appliances ²	133	\$86,916
Computers & Monitors	9,336	\$6,683,722
Lights & Lamps	3,418	\$21,118
Multi-Function Devices	279	\$77,952
Printers & Scanners & Fax Machines	111	\$55,760
Uninterruptible Power Systems	337	\$158,666
Telephones & Televisions	463	\$97,595
Other Energy Star ³	1,042	\$3,098,021
TOTAL	15,119	\$10,279,750

The purchased Energy Star products are estimated to save approximately 5,749,327 kilowatt hours and 1,664,638 gallons of water over the course of the next 12 years. Using the current Tennessee electricity and water rates, these savings equate to an estimated \$619,971 in total cost avoidance over the course of five to 12 years.

PURCHASE CONTRACTS Lifetime Analysis						
Commodity	Estimated Useful Life	Lifetime kWh Saved	Electricity Cost Avoidance	Lifetime Gallons Saved	Water Cost Avoidance	Total Utility Cost Avoidance
Appliances	11.28	284,934	\$29,982	1,664,638	\$14,998	\$44,981
Computers & Monitors	5.29	1,777,052	\$186,990			\$186,990
Lights & Lamps	5.53	3,552,979	\$373,862			\$373,862
Multi-Function Devices	6.00	82,082	\$8,637			\$8,637
Printers & Scanners	5.30	14,522	\$1,528			\$1,528
Telephones & Televisions	6.98	37,759	\$3,973			\$3,973
TOTAL		5,749,327	\$604,973	1,664,638	\$14,998	\$619,971

² The appliances category includes ice machines, refrigerators, dishwashers, clothes washers, clothes dryers, and dehumidifiers.

³ Other Energy Star products include thermostats, tablets, roof coatings, HVAC units, ventilators, and servers. The Energy Star program does not provide a comparison of energy use for these products versus conventional (non-Energy Star) products.

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. For each commodity, the expected electricity savings are summarized into the annual kilowatt hours saved per fiscal year for the duration of the commodity's useful life. The number of gallons saved and the total utility cost avoidance each year are not included in the analysis below. Most energy savings are realized within the next six years, but savings from Energy Star purchases made in fiscal year 2019 will continue to be realized through 2030.

Total kWh Saved		Total kWh Saved per Fiscal Year by Purchased Commodity					
Fiscal Year	kWh Saved	Computers & Monitors	Lights & Lamps	Multi-Function Devices	Printers & Scanners & Fax Machines	Telephones & Televisions	Appliances
2019	1,025,084	335,732	642,259	13,680	2,741	5,408	25,264
2020	1,025,084	335,732	642,259	13,680	2,741	5,408	25,264
2021	1,025,084	335,732	642,259	13,680	2,741	5,408	25,264
2022	1,025,084	335,732	642,259	13,680	2,741	5,408	25,264
2023	1,025,084	335,732	642,259	13,680	2,741	5,408	25,264
2024	485,242	98,389	341,686	13,680	815	5,408	25,264
2025	30,578					5,314	25,264
2026	25,264						25,264
2027	25,264						25,264
2028	25,264						25,264
2029	25,264						25,264
2030	7,028						7,028
Total*	5,749,327	1,777,052	3,552,979	82,082	14,522	37,759	284,934

Lease/Rental Contracts:

The State also leased or rented Energy Star products through statewide contracts. In fiscal year 2019, the State leased/rented 3,119 products for a total of \$3,161,427. The State saved approximately 1,022,095 kilowatt hours of energy and 1,244,606 gallons of water using these products in comparison 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 estimated savings and cost avoidance for fiscal year 2019 only. The combined savings from electricity and water cost avoidance for leased/rented Energy Star products totals \$118,764 for fiscal year 2019.

LEASE/RENTAL CONTRACTS							
Savings Reported for FY 2019 Only							
Commodity	# of Units Leased/ Purchased	Spend Amount	Estimated kWh Saved	Electricity Cost Avoidance	Estimated Gallons Saved	Water Cost Avoidance	Total Estimated Cost Avoidance
Dishwashing Machine Rental	17	\$74,846	254,331	\$26,762	1,244,606	\$11,214	\$37,976
Multi-Function Device Lease	2,906	\$3,011,567	767,764	\$80,788	N/A	N/A	\$80,788
Mailing Machine Lease/Rental ⁴	196	\$75,014	N/A	N/A	N/A	N/A	N/A
TOTAL	3,119	\$3,161,427	1,022,095	\$107,550	1,244,606	\$11,214	\$118,764

Combined Savings of Purchase and Lease/Rental Contracts:

Cost avoidance realized over the expected lifetimes of Energy Star products procured in fiscal year 2019 through purchase contracts and the cost avoidance realized during fiscal year 2019 through lease/rental contracts totals a combined \$738,735. It is important to reiterate that total cost avoidance is calculated using current electricity and water rates and will be realized over the next 12 years for the purchase contracts while lease/rental products are realized during fiscal year 2019 only.

In total, the estimated 6,771,423 kilowatt hours of electricity saved results in a cost avoidance of approximately \$712,523 while the 2,909,245 gallons of water saved equals approximately \$26,212 in cost avoidance. To place these savings in perspective, the State’s kilowatt hour savings are equivalent to the electricity needed to power 513 homes based on the average household electricity consumption in Tennessee (www.nespower.com). The State’s water savings are equivalent to the gallons of water needed to fill the Tennessee Aquarium in Chattanooga over two and half times (www.tnaqua.org).

⁴ Mailing Machines are classified 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.

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 fiscal year 2019 to previous fiscal years. The total cost avoidance from electricity and water savings through purchase and lease/rental statewide contracts has fluctuated over the last few reporting years. The estimated total cost avoidance over the lifetime of products purchased or leased/rented totaled \$2,085,650 in fiscal year 2013, \$1,895,238 in fiscal year 2014, \$822,589 in fiscal year 2015, \$1,805,779 in fiscal year 2016, \$562,261 in fiscal year 2017, \$1,192,972 in fiscal year 2018, and \$738,735 in fiscal year 2019. Detailed below are several factors that have impacted the fluctuation in estimated lifetime cost avoidance for fiscal years 2018 and 2019 by category.

Appliances:

- The number of Energy Star appliances purchased increased this fiscal year with 19 (17%) more compared to fiscal year 2018. The estimated number of gallons saved increased 20%, while the estimated electricity savings declined by 37%. This is likely due to the types of appliances that were purchased this fiscal year compared to last fiscal year.
- The number of refrigerators purchased increased by 57 (nearly 200%) while the number of ice machines purchased declined by 3 (over 70%). The Energy Star refrigerators purchased save an average of 70 kWh per year compared to conventional refrigerators while the Energy Star ice machines purchased save 1,400 kWh per year on average compared to conventional ice machines. Therefore, although the total number of Energy Star appliances purchased in fiscal year 2019 increased significantly, the types of appliances purchased did not contribute as high an electricity savings as the appliances purchased in fiscal year 2018.
- Additionally, the ice machines purchased this fiscal year were significantly more efficient in terms of the expected water use with the models purchased this year each saving an additional 700 gallons per year above the machines purchased in fiscal year 2018.

Computers and Monitors:

- Overall the number of Energy Star items purchased in the computers and monitors category in fiscal year 2019 decreased by 2,703 items (22%) compared to fiscal year 2018. The number of computers purchased declined by nearly 50% with 4,998 fewer computers purchased, but the number of monitors purchased increased over 133% with an additional 2,295 monitors purchased. The electricity savings anticipated as a result of the computer and monitor Energy Star items purchased decreased by 39%, which is to be expected with the overall decrease in the number of Energy Star items purchased.
- The seemingly significant increase in the number of monitors purchased this fiscal year compared to last fiscal year is explained when looking at additional prior years. The number of monitors purchased this fiscal year is in line with the number of monitors typically purchased in fiscal years 2015 and 2017.
- The decline in computer purchases may be explained by two things: 1) an increase in the number of tablets purchased, and 2) a four-year computer purchase cycle. There were an

additional 423 (381%) Energy Star tablets purchased in fiscal year 2019 compared to fiscal year 2018. More tablets may be purchased as an alternative to laptop computers. Tablets are Energy Star certified items, but there is not a calculator by the Environmental Protection Agency to estimate the energy savings for Energy Star tablets compared to conventional models. As a result, the number of Energy Star tablets purchased by the State are tracked but are not analyzed in the same way as the laptop and desktop computers. The estimated kWh savings and electricity cost avoidance from these Energy Star tablets is not known.

- Historically, the computers and monitors category has had the largest fluctuations from year to year. This is due in part to the four-year life cycle of the laptops and computers as well as the refresh cycle the State utilizes to ensure computers are maintained and replaced appropriately. The number of computers purchased in fiscal year 2019 is similar to the number purchased four years prior in fiscal year 2015.

Lights and Lamps:

- The number of lights and lamps purchased in fiscal year 2019 declined 33% by 1,712 lights and lamps compared to fiscal year 2018. The number of kWh estimated to be saved as a result of the Energy Star lights and lamps purchased declined 43%, which is slightly above the anticipated decline that would be anticipated with a 33% decline in purchased items. This decline in electricity savings is likely because the weighted lifetime of all the lights and lamps purchased in fiscal year 2019 is expected to be 5.53 years versus the 6.09 years expected of the lights and lamps purchased in fiscal year 2018. With the items purchased in fiscal year 2018 lasting slightly longer, it is logical that the amount of electricity savings would also be higher.

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

- The number of multi-function devices, printers, scanners, and fax machines purchased in fiscal year 2019 increased by 125 devices, 47% more than the prior fiscal year's purchases. With the increase in purchased items, there was also a comparable increase in the electricity savings at 39%. The purchase increase is likely due to the re-procurement of the contract for multi-function devices within this fiscal year. With the contract ending and a new contract going in to effect, many of the multi-function devices originally purchased neared the end of their life cycle and needed to be replaced.

Uninterruptible Power Systems:

- There was a significant increase in the number of Energy Star uninterruptible power systems purchased in fiscal year 2019 compared to fiscal year 2018 with 242 additional items purchased (255%). This is likely due to improved reporting of detailed uninterruptible power system purchases identified this year and represents an increase in tracked purchases of these items rather than a true increase in new purchases as verified by comparing total contract spend year-over-year, which has been mostly consistent for the past three years. 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

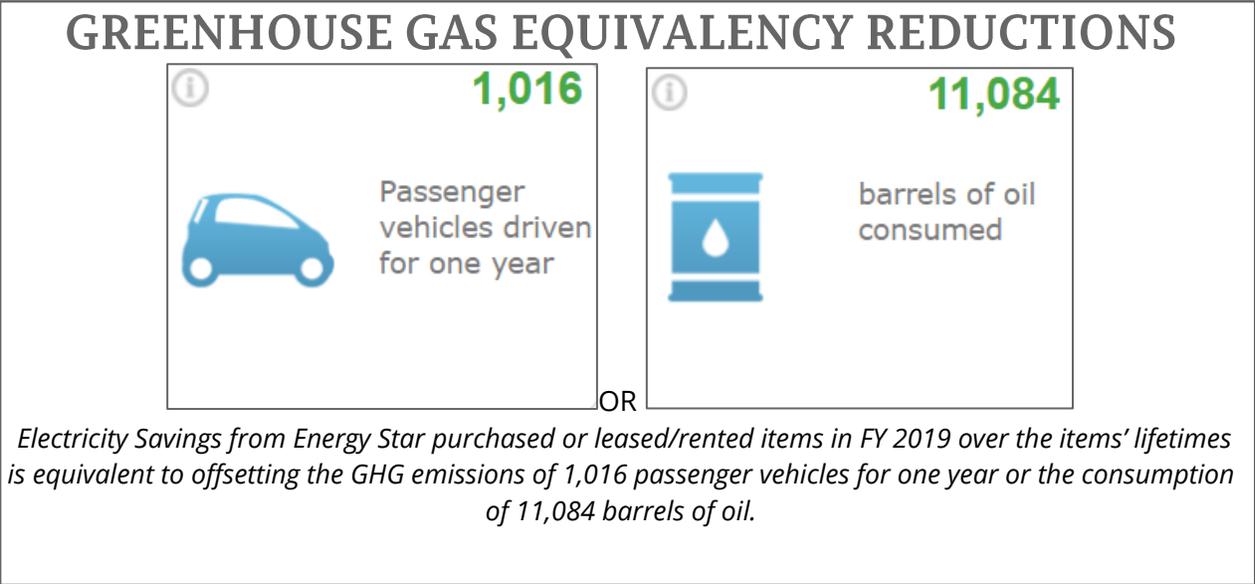
models. The estimated kWh savings and electricity cost avoidance from these Energy Star uninterruptible power systems is not known.

Telephones and Televisions:

- There was an increase of 116 items (33%) in the number of telephones and televisions purchased in fiscal year 2019 compared to fiscal year 2018. The estimated kWh electricity savings also increased by 26% compared to fiscal year 2018, which is in line with the 33% increase in purchased items.
- There was a small decline in the number of Energy Star televisions purchased since fiscal year 2018, which is likely due to the declining number of television models available for purchase that are Energy Star certified. In November 2018 there were over 900 manufactured television models listed as Energy Star certified and in November 2019 there were under 50 models (www.energystar.gov).
- There was a 44% increase in the number of Energy Star certified telephones purchased this fiscal year. This increase may in part be due to the fact that the current contract for these telephones was not fully in place for all of fiscal year 2018 so fiscal year 2019 was the first full year of contract purchases.

ESTIMATED REDUCTION IN CO₂ LEVELS

Over the expected lifetime of the Energy Star products purchased or leased/rented in fiscal year 2019, the State estimates a reduction of electricity consumed by 6,771,423 kilowatt hours and the elimination of 10,554,999 pounds of carbon dioxide (CO₂) from polluting our atmosphere. This is equivalent to eliminating CO₂ emissions from the consumption of 11,084 barrels of oil or reducing the annual greenhouse gas (GHG) emissions of 1,016 passenger vehicles. This information was obtained using a calculator provided by the Environmental Protection Agency (www.epa.gov).



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>



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