



Department of
General Services



Annual Report on Energy-Efficient Purchasing

Fiscal Year 2016 - 2017

Department of General Services | Central Procurement Office | December 2017



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BACKGROUND AND STATUTE

This report on energy-efficient purchasing for fiscal year 2017 provides information on the State's procurement of energy-efficient equipment and appliances to meet the requirements of T.C.A. §4-3-1105(20).

T.C.A. §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 (T.C.A. § 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 (T.C.A. §12-3-906).

ENERGY-EFFICIENCY STANDARDS

Per T.C.A. § 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 nearly 50 product categories. This list of qualified products and commodities is used as acceptable brands and models on 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 availability of Energy Star rated products continues to increase while conventional options have continued to decrease. 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 10 statewide contracts that either exclusively list Energy Star products or include Energy Star rated offerings; three of these 10 statewide contracts contain lease/rental options of Energy Star products. There are also agency purchase agreements with 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 2017, 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 gallons 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 electricity rate of \$0.1034 per kilowatt hour for fiscal year 2017 (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 2017 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 two to eleven years. Savings for products leased or rented by the State through statewide contracts in fiscal year 2017 are estimated for a one-year lease/rental period only.

¹Mailing Machines, Uninterruptible Power Systems, and additional Energy Star items 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 18,912 Energy Star products for a total spend amount of \$7,487,136 in fiscal year 2017 through statewide contracts and agency purchase agreements. The commodity categories of items purchased from these contracts in fiscal year 2017 are listed below with the quantities and spend amount for each.

Purchase Contract Commodity	# of Units Purchased	Spend Amount
Appliances ²	140	\$74,356
Computers & Monitors	13,404	\$6,959,388
Lights & Lamps	3,978	\$20,105
Multi-Function Devices	212	\$73,202
Printers & Scanners	277	\$69,672
Uninterruptible Power Systems	100	\$69,538
Telephones & Televisions	406	\$81,411
Other Energy Star ³	395	\$139,464
TOTAL	18,912	\$7,487,136

The purchased Energy Star products are estimated to save approximately 3,361,038 kilowatt hours and 5,822,573 gallons of water over the course of the next 11 years. Using the current Tennessee electricity and water rates, these savings equate to an estimated \$384,905 in total cost avoidance over the course of two to 11 years.

PURCHASE CONTRACTS Lifetime Analysis						
Commodity	Estimated Useful Life	Lifetime kWh Saved	Electricity Cost Avoidance	Lifetime Gallons Saved	Water Cost Avoidance	Total Cost Avoidance
Appliances	10.37	361,740	\$37,395	5,822,573	\$52,461	\$89,856
Computers & Monitors	6	852,826	\$88,442			\$88,442
Lights & Lamps	2.31	1,754,608	\$181,383			\$181,383
Multi-Function Devices	6	192,858	\$19,937			\$19,937
Printers & Scanners	5.48	157,645	\$1,011			\$1,011
Telephones & Televisions	6.84	41,361	\$4,276			\$4,276
TOTAL		3,361,038	\$332,444	5,822,573	\$52,461	\$384,905

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. An annual summary of the

² The appliances category includes ice makers, refrigerators, dishwashers, clothes washers, clothes dryers, air purifiers, and dehumidifiers.

³ Other Energy Star items include power supplies, tablets, portable monitors, HVAC systems, and servers. The Energy Star program does not provide a comparison of energy use for these products versus conventional (non-Energy Star) products.

estimated kilowatt hours saved is provided below based on each 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 2017 will continue to be realized through 2027.

Total kWh Saved		Total kWh Saved per Year by Purchased Commodity					
Fiscal Year	kWh Saved	Lights & Lamps	Computers & Monitors	Printers & Scanners	Multi-Function Devices	Telephones & Televisions	Appliances
2017	1,003,549	759,571	142,138	28,767	32,143	6,047	34,883
2018	1,003,549	759,571	142,138	28,767	32,143	6,047	34,883
2019	479,445	235,467	142,138	28,767	32,143	6,047	34,883
2020	243,978		142,138	28,767	32,143	6,047	34,883
2021	243,978		142,138	28,767	32,143	6,047	34,883
2022	229,019		142,138	13,808	32,143	6,047	34,883
2023	39,962					5,079	34,883
2024	34,883						34,883
2025	34,883						34,883
2026	34,883						34,883
2027	12,907						12,907
Total*	3,361,038	1,754,608	852,826	157,645	192,858	41,361	361,740

*Sum of annual amounts may not appear to equal the totals reported due to differences in number rounding.

Lease/Rental Contracts:

The State also leased or rented Energy Star products through statewide contracts. In fiscal year 2017, the State leased/rented 2,917 products for a total of \$3,134,014. The State saved approximately 1,354,878 kilowatt hours of energy and 4,139,392 gallons of water through the use of 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 2017 only. The combined savings from electricity and water cost avoidance for leased/rented Energy Star products totals \$177,357 for fiscal year 2017.

LEASE/RENTAL CONTRACTS							
Savings Reported for FY 2017 Only							
Commodity	# of Items Leased/Purchased⁴	Spend Amount	Estimated kWh Saved	Electricity Cost Avoidance	Estimated Gallons Saved	Water Cost Avoidance	Total Estimated Cost Avoidance
Dishwashing Machine Rental	49	\$170,946	722,656	\$74,705	4,139,392	\$37,296	\$112,001
Multi-Function Device Lease	2,391	\$2,807,476	632,222	\$65,356			\$65,356
Mailing Machine Lease/Rental ⁵	477	\$155,592					
TOTAL	2,917	\$3,134,014	1,354,878	\$140,061	4,139,392	\$37,296	\$177,357

Combined Savings of Purchase and Lease/Rental Contracts:

Cost avoidance realized over the expected lifetimes of Energy Star products procured in fiscal year 2017 through purchase contracts and the cost avoidance realized during fiscal year 2017 through lease/rental contracts totals \$562,262. It is important to reiterate that total cost avoidance is calculated using current electricity and water rates and will be realized over the next 11 years for the purchase contracts while lease/rental products are realized during fiscal year 2017 only.

In total, the estimated 4,715,916 kilowatt hours of electricity saved results in a cost avoidance of approximately \$472,505 while the 9,961,965 gallons of water saved equals approximately \$89,757 in cost avoidance. To place these savings in perspective, the State's kilowatt hour savings are equivalent to the electricity needed to power 302 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 nine times (www.tnaqua.org).

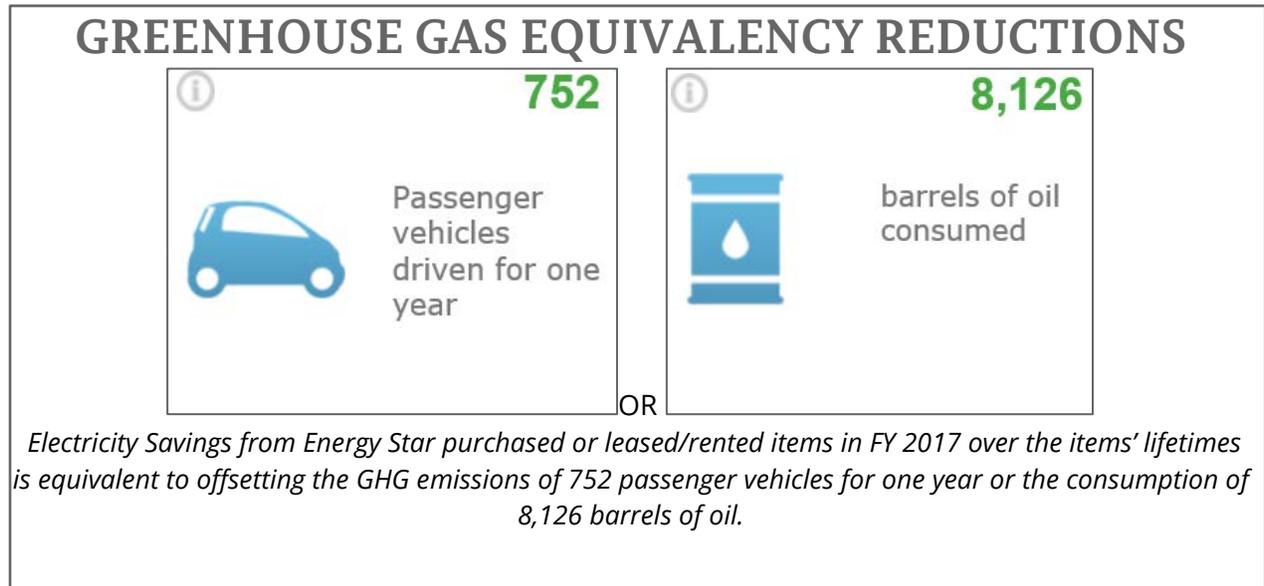
ESTIMATED REDUCTION IN CO₂ LEVELS

Over the expected lifetime of Energy Star products purchased or leased/rented in fiscal year 2017, the State estimates a reduction of electricity consumed by 4,715,916 kilowatt hours and

⁴ It should be noted that prior fiscal year reports showed the number of lease/rental periods rather than the number of items leased/rented in the fiscal year. Quantities have been adjusted from the monthly or quarterly lease/rental term to show the estimated number of individual items leased/rented.

⁵ 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.

the elimination of 7,737,488 pounds of carbon dioxide (CO₂) from polluting our atmosphere. This is equivalent to eliminating CO₂ emissions from the consumption of 8,126 barrels of oil or reducing the annual greenhouse gas (GHG) emissions of 752 passenger vehicles. This information was obtained using a calculator provided by the Environmental Protection Agency (www.epa.gov).



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 2017 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 \$1,895,238 in fiscal year 2014, \$822,589 in fiscal year 2015, and \$1,805,779 in fiscal year 2016. Total cost avoidance has dipped significantly in fiscal year 2017, as did the overall number of Energy Star items purchased or leased/rented. This dip in savings is attributable in large part to the dwindling energy usage differentiation between Energy Star items and conventional items. For example, the energy savings for an Energy Star laptop versus a conventional laptop are now only a fraction of a kilowatt and therefore do not factor into the State's estimated kilowatt savings. There are also product models that were certified as Energy Star items in prior fiscal years that are no longer consider Energy Star certified because the standards for energy efficiency have increased as manufacturers, both of Energy Star and conventional products, create newer models that achieve greater energy efficiency. Additionally, there continues to be an increasing lack of calculators available through the Energy Star program to estimate the energy savings for major energy use items such as HVAC systems and uninterruptible power systems. More than three percent of purchased Energy Star items in fiscal year 2017 could not be calculated

compared to less than one percent of items that could not be calculated in fiscal year 2016. Detailed below are several factors that have impacted the fluctuation in estimated lifetime cost avoidance for fiscal years 2016 and 2017.

Appliances:

- The number of Energy Star appliances purchased increased slightly this fiscal year compared to fiscal year 2016. Simultaneously, there was an increase in the estimated kilowatt hours saved and the number of gallons of water saved. This is likely due in part to the increased number of clothes washers, ice machines, and refrigerators purchased (approximately 62 more) in fiscal year 2016, all of which contribute significant electricity and water savings compared to conventional appliances.

Computers and Monitors:

- The number of Energy Star computers and monitors purchased in fiscal year 2017 decreased significantly compared to fiscal year 2016. There were 14,064 monitors and 15,704 computers purchased in fiscal year 2016 compared to 4,309 monitors and 9,095 computers purchased in fiscal year 2017.
- The Alternative Workplace Solutions (AWS) initiative may explain the decrease in monitors purchased. AWS is an initiative to mobilize the State workforce to promote productivity, efficiency, and flexibility across state government. As a result, more tablets and portable monitors were purchased at an increase of 60 and 17 more purchases in fiscal year 2017 respectively. Both tablets and portable monitors are Energy Star certified but do not have Energy Star calculators to estimate electricity savings. Additionally, with more employees working in a mobile capacity, fewer fixed workstations with multiple monitors would be needed.
- Another potential factor impacting the dip in Energy Star computer and monitor purchases is the historical ebb and flow of the State's computer purchases. Historically, the Energy Star computer and monitor category has seen the greatest increases and decreases from fiscal year to fiscal year. This is due in part to the refresh cycles of employee computers due to the lifespan of these devices at four years for monitors and seven years for computers. Looking back since fiscal year 2013 with 30,955 Energy Star computers and monitors purchased, the number of devices decreased by 12,612 devices (41%) in fiscal year 2014, decreased again by 10,629 devices (138%) in fiscal year 2015, increased significantly by 22,054 devices (286%) in fiscal year 2016, and decreased again by 16,364 (55%) in fiscal year 2017. With last fiscal year seeing such a significant increase in purchases similar to the number of devices purchased in fiscal year 2013, it is likely that purchases will continue to decline in the coming years.

Lights and Lamps:

- The number of lights and lamps purchased in fiscal year 2017 decreased slightly compared to fiscal year 2016. This may be due in part to the exclusion of lighting on the building materials contract within fiscal year 2017, with lighting now being sourced through the industrial supplies contract. Changes in product offerings on statewide contracts tend to result in dips in product purchases through statewide contracts and lags in reporting as end users learn how to process orders in the transition. This decline

may also be a result of switching from conventional light bulbs to Energy Star light bulbs which have a longer product lifespan and would need replacement less frequently.

Multi-Function Devices, Printers, and Scanners:

- The number of multi-function devices, printers, and scanners purchased in fiscal year 2017 increased by more than 400 devices. The primary factor behind this increase is simply the inclusion of purchases made under the office supplies contract that were not previously available for inclusion in this report. When excluding these purchases, the number of multi-function device purchases between fiscal years 2016 and 2017 remained relatively stable at 18 and 14 devices respectively.

Uninterruptible Power Systems:

- There was a slight increase in the number of uninterruptible power systems purchased in fiscal year 2017 compared to fiscal year 2016 at 100 and 41 items respectively. Fiscal year 2016 represented a decrease in the number of uninterruptible power systems purchased; the number purchased in fiscal year 2017 is more in line with historical purchase years.

Telephones and Televisions:

- There was a slight decrease of 25% in the number of telephones and televisions purchased in fiscal year 2017 compared to fiscal year 2016. The number of telephones purchased decreased significantly with 536 purchased in fiscal year 2016 and 339 purchased in fiscal year 2017. This may be due to the AWS initiative, in which employees are switching from a physical phone to a “soft phone” that operates through software with the use of a headset.

ENVIRONMENTALLY PREFERRED PURCHASING

In addition to promoting Energy Star certified products, the Central Procurement Office supports and encourages the procurement of environmentally-preferred products. Four years ago, the Central Procurement Office created environmentally-preferred purchasing categories for statewide contracts in Edison, the State’s enterprise resource planning system, to assist the State in tracking its energy-efficient and environmentally-preferred purchases. Through these tracking categories, the Central Procurement Office can better capture our energy-efficient and environmentally-preferred purchasing efforts and identify areas for further improvement. It is important to note that this report captures environmentally preferred purchases that are specifically identified as such in one of two ways: 1) the Central Procurement Office flags items with an environmentally-preferred purchasing category code when setting up a line item in Edison, or 2) the supplier identifies environmentally preferred items in reports provided to the Central Procurement Office for purchases not made through Edison line items. All items identified as Energy Star certified are verified through the Energy Star website. The other

environmentally preferred categories (e.g. green, recycled content) are based on third-party certifications or information provided by the manufacturer. Due to the fact that environmentally preferred purchases are identified in part by the supplier, it is possible that there are additional environmentally-preferred purchases that are not being captured in this report.

The environmentally preferred purchasing category codes are detailed in the table below along with the fiscal year 2017 spend attributed to each category.

Category Name	Category Definition	FY 2017 State Spend Amount
Energy Star	Items certified by energystar.gov.	\$10,621,150
Green	Items that have qualities that protect the environment or have replaced artificial ingredients with natural ingredients; e.g. low VOC paint, organic cleaners.	\$7,003
Recycled Content	Items made out of recycled content, e.g. cardboard boxes, paper, and building materials.	\$748,338
Recyclable	Biodegradable items, compostable items, or items sent to a recycling facility.	\$537,455
Flex Fuel Vehicle*	Vehicle designed to run on gasoline or any blend of up to 85% ethanol (E85).	\$6,657,041
Hybrid Vehicle*	Vehicle that combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system	\$133,925

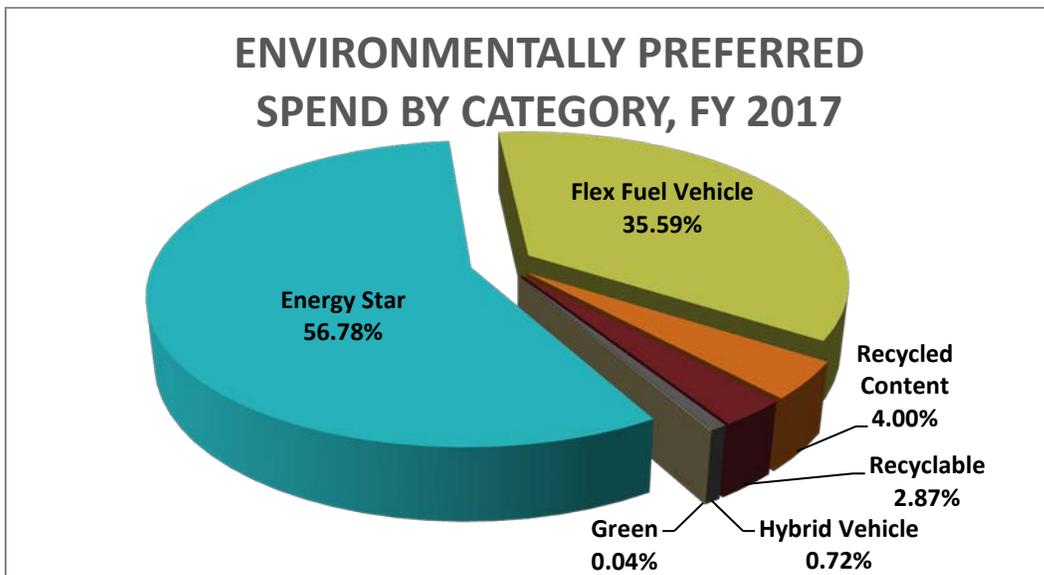
* Vehicle categories include only lease/rental contracts; purchased vehicles are covered in a separate report submitted by Motor Vehicle Management.

Through the Central Procurement Office’s environmentally preferred product tracking procedures, the State identified the following environmental savings opportunities in fiscal year 2017.

- **Green:** The State purchased 184 gallons of Low Odor/VOC flooring adhesive, reducing the level of air-polluting toxins released. The State also purchased approximately 90 “green” batteries and power supplies.
- **Recycled Content:** The State purchased approximately 47,215 paper products with a percentage of recycled content including: envelopes with 30% recycled content, cardboard boxes with 40% recycled content, and office paper comprising 20% recycled content. The unit of measure varies for these products with many items being sold in packs, boxes, or reams so the 47,215 paper products reflects the number of pre-packaged units purchased. The State also purchased more than 2,500 square yards of carpet with a minimum of 10% recycled content.

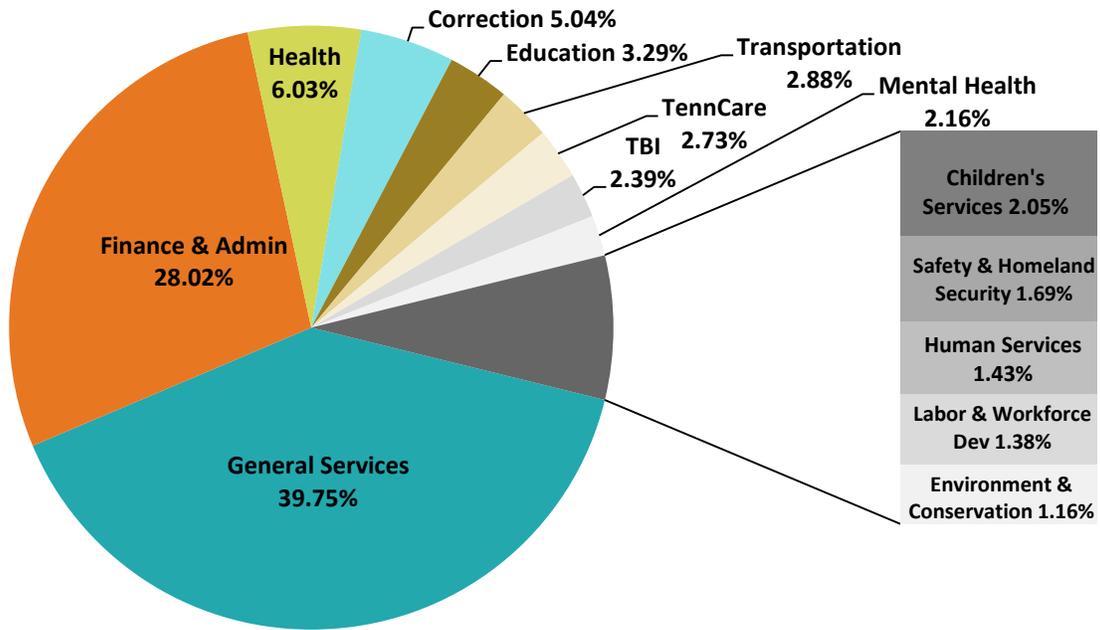
- **Recyclable:** The State recycled approximately 245 tons of scrap metal and 3,732 pounds of light bulbs and ballasts through the lamps, batteries, and scrap metal recycling services contract, which generates revenue for the State. The State also recycled 4,875,237 pounds of paper through the shredding services contract.
- **Flex Fuel and Hybrid Vehicle:** Statewide contracts available for vehicle leases resulted in the use of approximately 1,325 flex fuel rated vehicles and 20 hybrid vehicles during the fiscal year.

The majority of environmentally-preferred product spend was on Energy Star products at 57%, as depicted in the chart below. Flex Fuel Vehicles, Recycled Content, Recyclables, Hybrid Vehicles, and Green products account for smaller portions of the total spend.



The chart below illustrates spend for agencies that spent more than \$200,000 on environmentally preferred products during fiscal year 2017. These agencies represent the top users purchasing from environmentally-preferred contracts at approximately 94% of all environmentally preferred product spend.

AGENCIES WITH ENVIRONMENTALLY PREFERRED SPEND OVER \$200,000 FY 2017



The State purchased additional environmentally preferred products through the industrial supplies and office supplies catalog contracts that do not fall within the above designated categories because Edison does not allow for itemized tracking of catalog items. Using the industrial supplies contract, State agencies purchased environmentally preferred products—such as rechargeable tools, low-flow faucets, and energy-efficient motor supplies—totaling \$1,106,387. Of this, \$52,641 was for WaterSense certified items such as toilet bowls, showerheads, and faucets and \$75,746 was for Energy Star certified items such as televisions and lights that were included in the Energy Star Analysis section earlier in the report. Using the office supplies contract, State agencies purchased \$1,458,621 in environmentally preferred products, including recycled paper products, recycled/refilled ink and toner cartridges, non-toxic adhesives and markers, and energy-efficient office equipment such as business machines and computer accessories.

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