



Department of
General Services



Annual Report on Energy-Efficient Purchasing

Fiscal Year 2015 - 2016

Department of General Services | Central Procurement Office | December 2016



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BACKGROUND AND STATUTE

This report on energy-efficient purchasing for fiscal year 2016 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 more than fifty-six 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 eleven statewide contracts that either exclusively list Energy Star products or include Energy Star rated offerings; three of these eleven statewide contracts contain lease/rental options of Energy Star products. There are also agency term contracts and local 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 2016, 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 consumption of Energy Star rated products is measured against conventional 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 \$0.1018 per kilowatt hour for fiscal year 2016 (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 and agency term contracts in fiscal year 2016 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 three to ten years. Savings for products leased or rented by the State through statewide contracts in fiscal year 2016 are estimated for the lease/rental period only, such as weekly, monthly, bi-annually, but less than one year.

¹Mailing Machines, Uninterruptible Power Systems, and additional Energy Star items such as tablets and building materials 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 35,818 Energy Star products for a total spend amount of \$5,874,411 in fiscal year 2016 through statewide and agency term contracts. The commodity categories of items purchased from these contracts in fiscal year 2016 are listed below with the quantities and spend amount for each.

Purchase Contract Commodity	# of Units Purchased	Spend Amount
Appliances ²	73	\$55,003
Computers & Monitors	29,768	\$5,380,383
HVAC ³	23	\$17,234
Lights & Lamps	4,856	\$29,862
Mailing Machines	79	\$12,583
Multi-Function Devices	18	\$46,305
Uninterruptible Power Systems	41	\$47,731
Telephones & Televisions	544	\$97,397
Other Energy Star ⁴	416	\$187,913
TOTAL	35,818	\$5,874,411

The purchased Energy Star products are estimated to save approximately 14,942,092 kilowatt hours and 3,682,883 gallons of water over the course of the next ten years. Using the current Tennessee electricity and water rates, these savings equate to an estimated \$1,564,702 in total cost avoidance over the course of three to ten 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	9.70	95,520	\$20,137	3,682,883	\$33,183	\$53,320
Computers & Monitors	5.42	11,136,952	\$1,133,742			\$1,133,742
HVAC	9	9,379	\$955			\$955
Lights & Lamps	3.75	3,597,491	\$366,225			\$366,225
Multi-Function Devices	6	34,336	\$3,495			\$3,495
Telephones & Televisions	6.99	68,414	\$6,965			\$6,965
TOTAL		14,942,092	\$1,531,518	3,682,883	\$33,183	\$1,564,702

² The appliances category includes ice makers, refrigerators, dishwashers, clothes washers, and clothes dryers. In prior fiscal year reports, ice makers were broken out into their own category.

³ The HVAC category includes multiple types of air conditioners; however, there is only an Energy Star calculator for the room air conditioner products. Only eight of the twenty-three units purchased were classified as room air conditioners, thus the savings figures are based only on those eight units.

⁴ Other Energy Star items include power supplies, tablets, building products, and other purchases. 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. An annual summary of the estimated kilowatt hours saved and the estimated electricity cost avoidance is provided below based on each commodity's useful life. The number of gallons saved and the water cost avoidance each year is not included in the analysis below as the amount is a relatively small percent of total savings. Most energy savings are realized within the next four years, but savings from Energy Star purchases made in fiscal year 2016 will continue to be realized through 2025.

Total kWh Saved and Cost Avoidance per Year		Total kWh Saved per Year by Purchased Commodity					
Fiscal Year	kWh Saved	Lights & Lamps	Computers & Monitors	Multi-Function Devices	Telephones & Televisions	HVAC	Appliances
2016	3,041,242	959,045	2,055,789	5,723	9,794	1,042	9,849
2017	3,041,242	959,045	2,055,789	5,723	9,794	1,042	9,849
2018	3,041,242	959,045	2,055,789	5,723	9,794	1,042	9,849
2019	2,802,553	720,356	2,055,789	5,723	9,794	1,042	9,849
2020	2,082,197		2,055,789	5,723	9,794	1,042	9,849
2021	884,413		858,005	5,723	9,794	1,042	9,849
2022	20,541				9,650	1,042	9,849
2023	10,891					1,042	9,849
2024	10,891					1,042	9,849
2025	6,880						6,880
Total	14,942,092	3,597,491	11,136,950	34,338	68,414	9,378	95,521

Lease/Rental Contracts:

The State also leased or rented Energy Star products through statewide contracts. In fiscal year 2016, the State leased/rented products for 26,429 lease/rental periods for a total of \$2,730,901. The State saved approximately 1,736,401 kilowatt hours of energy and 7,137,733 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 2016 only. The combined savings from electricity and water cost avoidance for leased/rented Energy Star products totals \$241,077 for fiscal year 2016.

LEASE/RENTAL CONTRACTS							
Savings Reported for FY 2016 Only							
Commodity	# of Lease/Rental Periods	Spend Amount	Estimated kWh Saved	Electricity Cost Avoidance	Estimated Gallons Saved	Water Cost Avoidance	Total Estimated Cost Avoidance
Dishwashing Machine Rental	782	\$218,798	1,226,204	\$124,828	7,137,733	\$64,311	\$189,139
Multi-Function Device Lease	24,880	\$2,436,691	509,159	\$51,832			\$51,832
Printers, Scanners, & Fax Machines Lease	18	\$10,751	1,038	\$106			\$106
Mailing Machine Lease/Rental ⁵	749	\$64,661					
TOTAL	26,429	\$2,730,901	1,736,401	\$176,766	7,137,733	\$64,311	\$241,077

Combined Savings of Purchase and Lease/Rental Contracts:

Cost avoidance realized over the expected lifetimes of Energy Star products procured in fiscal year 2016 through purchase contracts and the cost avoidance realized during lease/rental periods through lease/rental contracts totals \$1,805,779. It is important to reiterate that total cost avoidance is calculated using current electricity and water rates and will be realized over the next ten years for the purchase contracts while lease/rental products are realized during the lease/rental period, e.g. monthly, quarterly lease/rental periods.

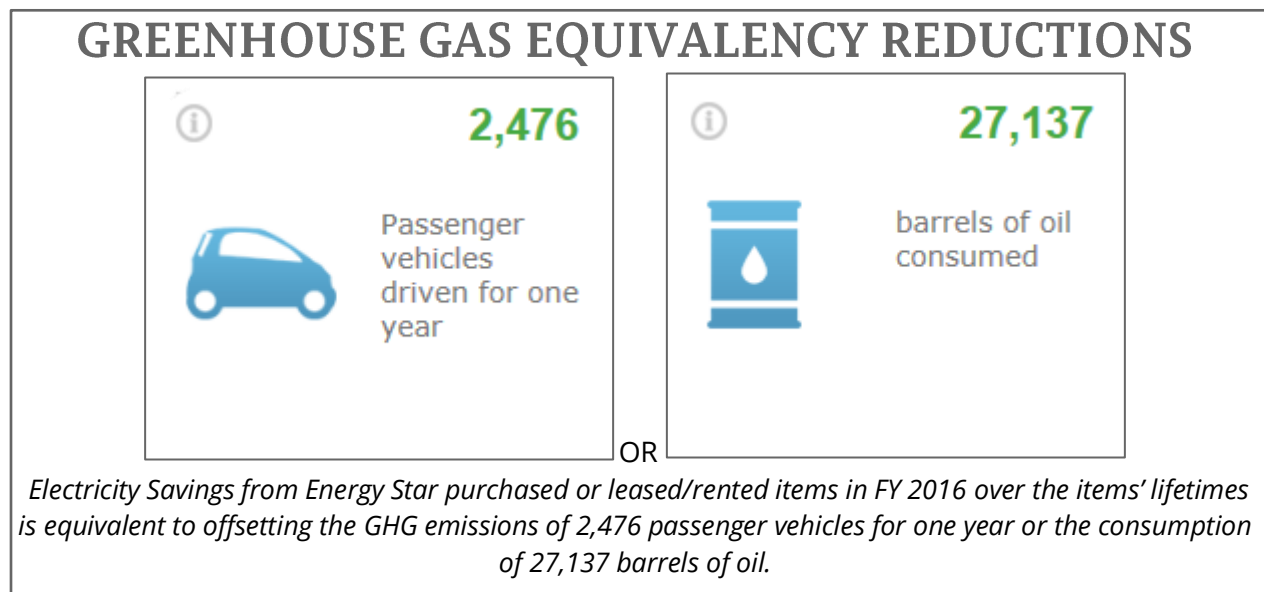
In total, the estimated 16,678,493 kilowatt hours of electricity saved results in a cost avoidance of approximately \$1,708,284 while the 10,820,616 gallons of water saved equals approximately \$97,494 in cost avoidance. To place these savings in perspective, the State's kilowatt hour savings are equivalent to the electricity needed to power 1,069 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 almost ten times (www.tnaqua.org).

ESTIMATED REDUCTION IN CO₂ LEVELS

Over the expected lifetime of Energy Star products purchased or leased/rented in fiscal year 2016, the State estimates a reduction of electricity consumed by 16,678,493 kilowatt hours and the elimination of 25,840,921 pounds of carbon dioxide (CO₂) from polluting our atmosphere.

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.

This is equivalent to eliminating CO₂ emissions from the consumption of 27,137 barrels of oil or reducing the annual greenhouse gas (GHG) emissions of 2,476 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 2016 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. Last fiscal year (2015) represented a dip in savings in comparison to other recent years. The estimated cost avoidance for this fiscal year is more in-line with historic estimated cost avoidance.

Detailed below are several factors that have impacted the fluctuation in estimated lifetime cost avoidance for fiscal years 2015 and 2016.

Appliances:

- The number of appliances purchased increased slightly this fiscal year compared to fiscal year 2015. Despite this slight increase, the estimated kilowatt hours saved declined. Simultaneously, there was an increase in the number of gallons of water saved. This is likely due in part to the increased number of clothes washers and dishwashers purchased (approximately eighteen more) in fiscal year 2016, which

account for more significant water savings than other appliances. The decrease in kilowatt hours saved may be explained by the narrowing difference in energy use between conventional and Energy Star items as appliances become more energy efficient even if they do not meet Energy Star certification standards.

Computers and Monitors:

- The number of computers and monitors purchased in fiscal year 2016 increased by 286% compared to fiscal year 2015. There were 14,064 monitors and 15,704 computers purchased in fiscal year 2016. Fiscal year 2015 represented a fairly significant dip in the number of computers and monitors purchased compared to the prior year, so the increase in fiscal year 2016 is more representative of typical annual purchase quantities.
- One factor potentially increasing the number of computers and monitors purchased is the State's Alternative Workplace Solutions (AWS) initiative. AWS is an initiative to mobilize the State workforce to promote productivity, efficiency, and flexibility across state government. As part of this initiative, employees need mobile equipment such as laptops and tablets, which may account for the increase in computers and monitors purchased.
- Another factor potentially impacting this increase is the lifespan of computers and monitors. Computers have an expected life cycle of approximately four years and monitors have an expected lifespan of seven years, so more computers and monitors may have been purchased to replace older computers reaching the end of their lifespan.

HVAC:

- In fiscal year 2015, the air conditioner statewide contract was allowed to expire. Spend was too low to justify a statewide contract and agencies have been instructed to use other statewide contracts or to use local purchase authority for air conditioner purchases.
- There were eleven fewer Energy Star certified air conditioners purchased in fiscal year 2016 compared to fiscal year 2015.
- The Energy Star calculator used to compare the electricity consumption of Energy Star items compared to conventional items was limited for fiscal year 2016. The calculator was only available for room air conditioners.

Lights and Lamps:

- The number of lights and lamps purchased in fiscal year 2016 decreased by approximately 10% compared to fiscal year 2015. The State initiative to reduce energy costs and consumption across state facilities, known as EmPower TN, may have impacted the number of lights purchased and reported under statewide contracts since EmPower TN lighting improvement projects may be processed under separate agreements outside of statewide contracts. Due to differences in how these projects are funded and how the lights and lamps are procured, the information for energy savings is not captured through the Central Procurement Office. Through the EmPower TN initiative, the number of Energy Star lights and lamps has likely increased in fiscal year

2016; however, any additional savings are captured and reported outside of the Central Procurement Office.

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

- Spend on statewide contract 400 multi-function devices (MFD) increased approximately 32% between fiscal years 2015 and 2016. This increase in spend for multi-function devices corresponds to a decrease of 57% in spend for printers, scanners, and fax machines. The idea behind statewide contract 400 was to consolidate the various printers, scanners, and fax machines across the State into fewer multi-function devices thus reducing costs and equipment footprints. The increase in MFD purchases and leases in comparison to leases for printers, scanners, and fax machines shows that statewide contract 400 is working as designed.

Uninterruptible Power Systems:

- There was an 86% decline in the number of uninterruptible power systems purchased in fiscal year 2016 compared to fiscal year 2015. Two factors may have resulted in the decline of purchases. First, agencies usually purchase these machines when building a new data center. The Central Procurement Office is unaware of any major data center constructions during fiscal year 2016. Second, the uninterruptible power systems last approximately five years after purchase, and there were a significant number of systems purchased in fiscal year 2014.

Telephones and Televisions:

- This product category was not included in the fiscal year 2015 report. These product categories now have calculators available on the Energy Star website that were used to determine the energy savings and cost avoidance resulting from purchases of Energy Star telephones and televisions versus conventional items.

ENVIRONMENTALLY-PREFERRED PURCHASING

In addition to promoting Energy Star certified products, the Central Procurement Office supports and encourages the procurement of environmentally-preferred products. Three 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 2016 spend attributed to each category.

Category Name	Category Definition	FY 2016 State Spend Amount
Energy Star	Items certified by energystar.gov.	\$8,605,312
Green	Items that have qualities that protect the environment or have replaced artificial ingredients with natural ingredients; e.g. low VOC paint, organic cleaners.	\$24,913
Recycled Content	Items made out of recycled content, e.g. cardboard boxes, paper, building materials.	\$683,294
Recyclable	Biodegradable items, compostable items, or items sent to a recycling facility.	\$452,303
Flex Fuel Vehicle*	Vehicle designed to run on gasoline or any blend of up to 85% ethanol (E85).	\$5,154,082
Hybrid Vehicle*	Vehicle that combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system	\$105,466

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

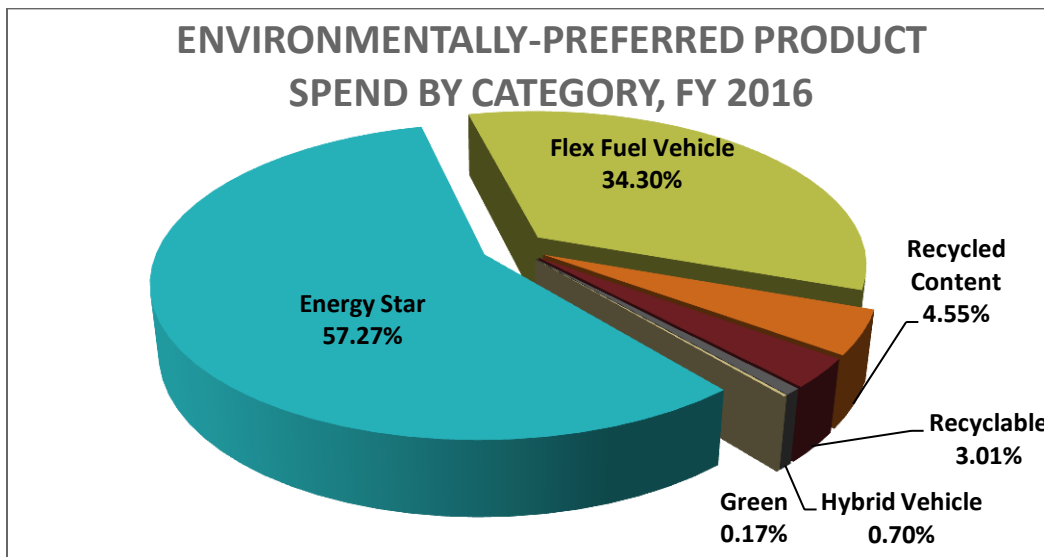
Through the Central Procurement Office’s environmentally-preferred product tracking procedures, the State identified the following environmental savings opportunities in fiscal year 2016.

- Green:** The State purchased 168 gallons of Low Odor/VOC paint, reducing the level of air-polluting toxins released. The State also purchased approximately 195 “Green” batteries and power supplies.

Note: The reported spend on green items appears to have decreased significantly since fiscal year 2015; however, this is due to a misclassification of laptops purchased. In fiscal year 2015, there were laptops classified as green items that accounted for \$490,960 of the reported green spend. These laptop purchases for fiscal year 2016 have been correctly classified as Energy Star items and are reported in the Energy Star category.

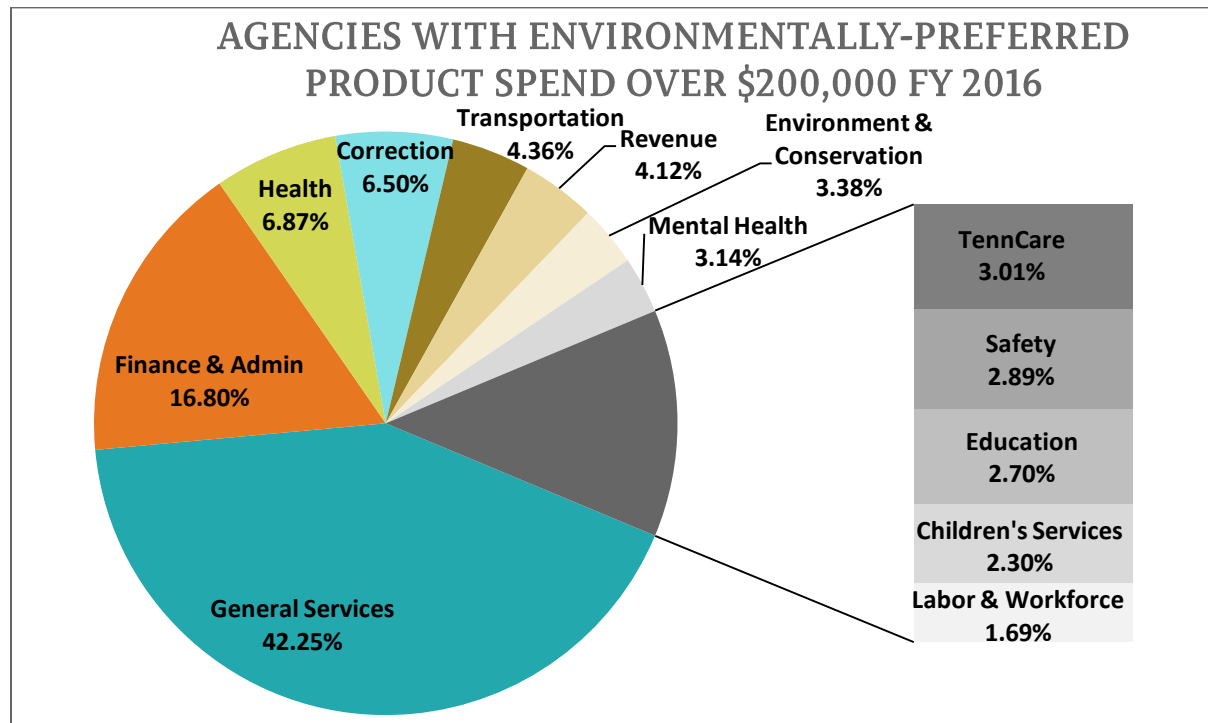
- **Recycled Content:** The State purchased approximately 52,264 products with a percentage of recycled content. This is a significant increase from the 21,868 recycled-content products purchased in fiscal year 2015. The unit of measure varies for these products with many items being sold in packs, such as reams of paper, so the 52,264 products reflects the number of pre-packaged units purchased. Purchased products with recycled content include: bag liners with 5% recycled content, envelopes with 30% recycled content, cardboard boxes with 40% recycled content, office paper comprised of 20% recycled content, and acoustical ceiling tiles with up to 73% recycled content.
- **Recyclable:** The State recycled 30,083 light bulbs/tubes and 5,188 pounds of ballasts and CFL bulbs through the Lamps Recycling Services contract. The State also recycled 3,585,228 pounds of paper through the Shredding Services contract. An estimated 30,660 trees were saved through the Shredding Services contract (estimate provided by the contract supplier).
- **Flex Fuel and Hybrid Vehicle:** Statewide contracts available for vehicle leases resulted in the utilization of approximately 1,290 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. Spend increased significantly in the Recycled Content and Recyclable categories from the previous reporting period.



The chart below illustrates spend for agencies that spent over \$200,000 on environmentally-preferred products during fiscal year 2016. These agencies represent the top users purchasing

from environmentally-preferred contracts at approximately 90% of all environmentally-preferred product spend.



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 \$1,437,931. Of this, \$27,186 was for WaterSense certified items such as toilet bowls, showerheads, and faucets and \$122,286 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 \$733,905 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.

ENVIRONMENTALLY-PREFERRED PURCHASING IMPROVEMENT GOALS

The Central Procurement Office has undertaken considerable efforts and set ambitious goals to improve the State's environmentally-preferred purchasing. The Office set improvement goals last fiscal year that were implemented in fiscal year 2016. The Office also set goals for the next three to five fiscal years.

Implemented Goals from Last Year:

- WaterSense was included as a requirement for HVAC and plumbing systems purchased through the statewide contract for Electrical, HVAC, and Plumbing Maintenance and Repair, when available. As additional statewide contracts are up for re-solicitation in the coming years, WaterSense certified products will continue to be considered as a requirement in the product specifications.
- To evaluate the natural gas (therms) saved through the use of Energy Star products, it was determined that the energy source(s) for each facility owned or maintained by the State would need to be made available. The energy source (e.g. electricity or natural gas water heater) must be provided when using the Energy Star calculators. In the event a list of all energy source(s) in each facility is made available, the Central Procurement Office would then have to determine the facility in which each Energy Star item is installed or utilized in order to accurately break out the energy savings by energy type (electricity and natural gas). At this time, measuring energy savings from natural gas versus electricity does not seem feasible.
- The Central Procurement Office worked with additional suppliers, primarily technology-related suppliers, to gather energy-efficient and environmentally-preferred products reports for statewide contracts with catalog items that do not allow for itemized tracking in Edison. This enabled the Central Procurement Office to track energy savings and cost avoidance for items that were not previously evaluated in this report.
- The Central Procurement Office identified the Small Package Delivery Services statewide contract as an industry with suppliers that may be capable of reporting the State's Scope 3 emissions in relation to its use of a national delivery carrier.

Goals for FY 2016 through FY 2021:

- Continue efforts to have agencies track their energy-efficient and environmentally-preferred purchases through agency term contracts and local purchase authorities by attributing the environmentally-preferred purchasing codes developed by the Central Procurement Office at the time the agency is creating the item in Edison.
- Continue efforts to gather energy data from suppliers along with their quarterly spend reports. Expand the number of suppliers providing energy and environmentally-preferred purchase information and streamline the process for gathering these reports.
- Continue to explore the option of having suppliers report their direct and indirect greenhouse gas emissions relative to the State's business in order to estimate the State's Scope 3 emissions. Scope 3 emissions include greenhouse gas emissions from sources not owned or directly controlled by the State but that are related to the State's activities (www.epa.gov).

Central Procurement Office
312 Rosa L. Parks Avenue, 3rd Floor
William R. Snodgrass Tennessee Tower
Nashville, TN 37243
(615) 741-1035

<http://www.tn.gov/generalservices/section/central-procurement-office>



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