



# Cost Savings and Environmental Benefits from Department of Energy (DOE) Fiscal Year 2018 (FY18) Electronics Stewardship Activities

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# Overview

Annually collect electronics  
stewardship data

Calculate environmental and  
cost benefits

Share data and results

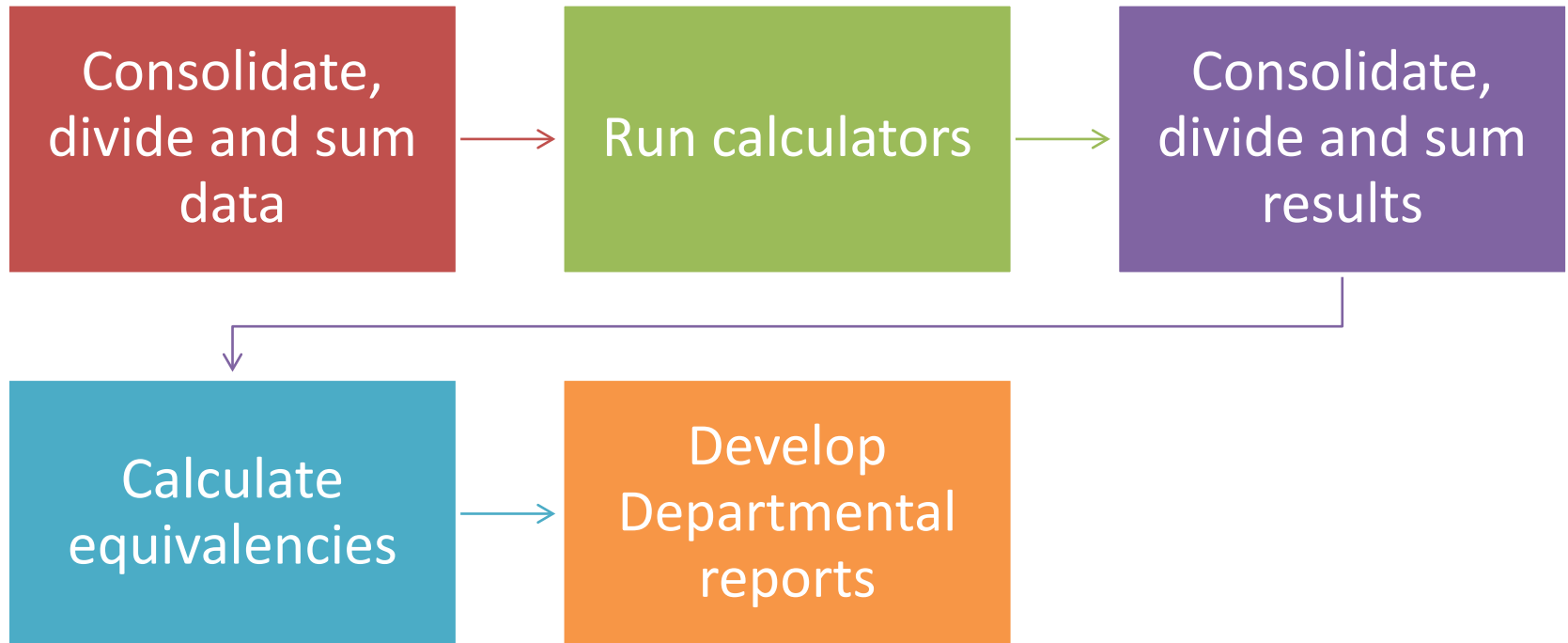


# Tools

- DOE Sustainability Dashboard
  - <https://sustainabilitydashboard.doe.gov/>
- Electronic Product Environmental Assessment Tool (EPEAT) Benefits Calculator
  - <https://greenelectronicscouncil.org/epeat-benefits-calculator/>
- Electronics Environmental Benefits Calculator (EEBC) Computer Products Version 4
  - <http://app2.erg.com/EEBC-Computerv4/eebcCalculator.do>
- EEBC Imaging Equipment Version 1
  - <http://app2.erg.com/EEBC-Imagingv1/eebcCalculator.do>
- EEBC Television Version 1
  - <http://app2.erg.com/EEBC-TVv1/eebcCalculator.do>
- Computer/Display Power Management Savings Calculator
  - <https://www.energystar.gov/sites/default/files/asset/document/LowCarbonITSavingsCalc.xlsx>



# Methodology










# DOE Sustainability Dashboard

The screenshot shows the DOE Sustainability Dashboard interface. At the top left is the "Sustainable Department of Energy" logo. The main title is "DOE Sustainability Dashboard" in large blue font, with the subtitle "Managed by DOE's Sustainability Performance Office" below it. A blue navigation bar contains a home icon, "Data" with a dropdown arrow, "Reports" with a dropdown arrow, "Resources", and "Administration". Below this is a green section titled "QUICK-START LINKS" with the question "What would you like to do?". Five icons represent different actions: "Enter Data" (person with data lines), "Review Flagged Data" (two people), "Create a Report" (document with person), "View OMB Scorecard" (target with arrow), and "View Completion Status" (person at a presentation board).



# FY18 Purchasing Data

	Number Purchased	Products Purchased	Percentage of Total Purchases
	76,603	EPEAT-registered computers (including desktops, integrated desktops, tablets, thin clients, and workstations), notebooks, and monitors (including computer monitors and signage displays)	96%
	3,541	EPEAT-registered printers, multifunction devices (MFDs), and copiers	94%
	306	EPEAT-registered televisions (TVs)	44%
	6,387	EPEAT-registered mobile phones	84%
	389	EPEAT-registered servers	55%



# Purchasing Data Consolidation and Division

- Desktops +
- Thin Clients +
- Work Stations

Desktops

- Monitors +
- Signage Displays

Monitors

- Blade Servers (50%)
- Rack Servers (50%)

Servers

- Color MFDs (50%)
- Black & White MFDs (50%) +
- Black & White Copiers

MFDs



# EPEAT Benefits Calculator Purchasing Data Entry

**Entered the number of products purchased by EPEAT level:**

- Mobile Phones
- Blade Servers
- Rack Servers
- Desktop Computers
- Monitors
- Notebook Computers
- Tablet Computers
- Integrated Desktop Computers





# EPEAT Benefits Calculator

## Purchasing Data Entry Screenshot

Mobile Phones Servers Computers and Displays Results

### Mobile Phones

Number of Units Purchased by EPEAT Level

Bronze	<input type="text" value="2"/>
Silver	<input type="text" value="643"/>
Gold	<input type="text" value="5742"/>

Region of use

Optional Data Entry



# EPEAT Benefits Calculator Purchasing Results Screenshot

	Energy savings in megajoules (MJ)	Energy savings in kilowatt hour equivalents (kWh eq)	Greenhouse gas emissions reduction, expressed as global warming potential (kg CO2 eq)	Non-hazardous solid waste reduction (kg)	Water consumption savings (liters H2O)	Acid po sa (kg S
Purchasing EPEAT Products	587,410.27	163,169.52	34,176.21	3,190.35	145,089.06	15
Optional Extended Life, Reuse, Recycling	0.00	0.00	0.00	0.00	0.00	0
<b>Total</b>	<b>587,410.27</b>	<b>163,169.52</b>	<b>34,176.21</b>	<b>3,190.35</b>	<b>145,089.06</b>	<b>15</b>
<i>Show me more details</i>						
Reduction in Environmental Impacts and Costs:						
By Product Category:						
By Product Type:						
By Product Lifecycle Phase (All Products):						
Raw Materials Extraction, Product Manufacturing and Transport	419,168.83	116,435.79	24,386.61	2,288.36	36,507.95	10





# EEBC Purchasing Data Entry

**Entered the number of products purchased by EPEAT level:**

- Color MFDs
- Black & White MFDs
- Black & White Printers
- Light-Emitting Diode (LED) TVs



# EEBC Purchasing Data Entry Screenshot

## Electronics Environmental Benefits Calculator – TVs

### EEBC Data Entry Form

XML File:

Extract to XML

Browse...

Import from XML

Generate reports, summary charts and equivalency table

Input - Use & EOL

Input - Purchasing

Purchasing Information

Add New Product

Product ID	Product Type	Number of Products	EPEAT Registered	EPEAT Tier	Edit <sup>1</sup>	Delete
	led	146	yes	Bronze	<a href="#">Edit</a>	<a href="#">Delete</a>
	led	35	yes	Gold	<a href="#">Edit</a>	<a href="#">Delete</a>
	led	125	yes	Silver	<a href="#">Edit</a>	<a href="#">Delete</a>



# EEBC Purchasing Results Screenshot




Results - Tables

Use and End Of Life	All Products	Summary Charts and Equivalency Table	Product 1	Product 2	Product 3
CRITERIA/ATTRIBUTES/ACTIONS	Energy savings (KWh eq)	Primary material savings (kg)	Greenhouse gas emission savings (kg of CE)	Air emission savings (kg)	Water emission savings
Purchasing Lifetime SUBTOTAL (All products)	7.66E4	2.79E4	1.41E4	5.52E4	1.11E4
<b>TOTAL</b>	<b>7.66e+4</b>	<b>2.79e+4</b>	<b>1.41e+4</b>	<b>5.52e+4</b>	<b>1.11e+4</b>





# FY18 Power Management Data

	Number Power Managed	Products Power Managed	Percentage of Total Eligible	Percentage Exempted
	79,135	Desktop computers	96%	21%
	251,378	Monitors	99%	9%
	79,134	Notebook computers	96%	21%



# Power Management Data Consolidation and Division

Desktop Computers

- Computers power managed (50%)

Notebook Computers

- Computers power managed (50%)

Notebook Displays

- Same as number of notebook computers power managed



# Power Management Data Entry

## **Entered the number power managed:**

- Desktop Computers
- Desktop Monitors
- Notebook Computers
- Notebook Displays





# ENERGY STAR Power Management Data Entry Screenshot

## ENERGY STAR Computer Power Management Savings Calculator

*Instructions: Use this simple calculator to estimate typical savings from activating power management features that automatically place computers into a low-power "sleep" mode after a period of inactivity (required fields in red).*

### Number of Devices with Power Management Features Enabled\*


1) Enter the number of desktop computers	79,135
2) Enter the number of desktop monitors	251,378
3) Enter the number of notebook computers	79,134
4) Enter the number of notebook displays	79,134



# ENERGY STAR Power Management Results Screenshot







## ENERGY STAR Computer Power Management Savings Calculator

### Savings Estimate

	Annual Savings		3-Year Totals	
	Energy (kWh)	Dollars (\$)	\$ Dollar Savings	Pollution Preve
				Tons of CO2 Emissions Prevented
Savings from desktop monitors going into sleep mode:	42,355,299.2	\$5,218,172.86	\$14,480,904.72	97,840.7
Savings from notebook displays going into sleep mode:	2,756,948.7	\$339,656.07	\$942,576.53	6,368.6
<i>Total savings from monitor/display sleep mode:</i>	45,112,247.9	\$5,557,828.94	\$15,423,481.24	104,209.3
Savings from desktop computers going into sleep mode:	17,669,763.3	\$2,176,914.84	\$6,041,136.85	40,817.2
Savings from notebook computers going into sleep mode:	2,625,354.1	\$323,443.63	\$897,585.52	6,064.6
<i>Total savings from computer sleep mode:</i>	20,295,117.4	\$2,500,358.47	\$6,938,722.37	46,881.7
 <b>Total savings :</b>	<b>65,407,365.3</b>	<b>\$8,058,187.40</b>	<b>\$22,362,203.61</b>	<b>151,091.0</b>



# FY18 Reuse and Recycling Data

	Products	Reused	Responsibly Recycled
	Computers (including desktops, thin clients, and tablets), notebooks, and computer monitors	7,571	12,853
	Printers, copiers, and multifunction devices	1,141	1,080
	Televisions	10	109
	Mobile phones and personal digital assistants	1,094	1,300
	Servers	208	473
	<i>Percentage of itemized electronics reused and recycled</i>	100%	100%
	Mixed loads of electronics	198,675 kg	763,674 kg
	<i>Percentage of mixed loads of electronics reused and recycled</i>	100%	95%



# Reuse and Recycling Data Consolidation and Division

- Desktops +
- Thin Clients

Desktops

- Mobile Phones +
- Personal Digital Assistants

Mobile Phones

- Blade Servers (50%)
- Rack Servers (50%)

Servers

- Color MFDs (50%)
- Black & White MFDs (50%) +
- Black & White Copiers

MFDs



# EPEAT Benefits Calculator Reuse and Recycling Data Entry

**Entered the number of products reused and recycled:**

- Mobile phones
- Servers
- Desktop computers
- Monitors
- Notebook computers
- Tablet computers



# EPEAT Benefits Calculator Reuse and Recycling Data Entry Screenshot

Mobile Phones Servers **Computers and Displays** Results

## Computers and Displays

### Desktop Computer

#### Monitor

Number of Monitors Purchased by EPEAT Level

Bronze	<input type="text" value="181"/>
Silver	<input type="text" value="506"/>
Gold	<input type="text" value="27500"/>

Region of use

#### Optional Monitor Data Entry

##### Electricity

Unit energy cost during use (cost/kWh)

Energy cost during use (specify currency)

##### Extended Product Use, Donating the Product for Reuse, and Recycling

How long do you plan to use the products on average (in months)?

How many of the products purchased above do you plan to donate for reuse by another user?

How many of the products purchased above do you plan to recycle at the end of service?

Number of monitors disposed of at end of life





# EPEAT Benefits Calculator Reuse and Recycling Results Screenshot

	Energy savings in kilowatt hour equivalents (kWh eq)	Greenhouse gas emissions reduction, expressed as global warming potential (kg CO2 eq)	Non-hazardous solid waste reduction (kg)	Water consumption savings (liters H <sub>2</sub> O)
Purchasing EPEAT Products	1,302,281.33	403,766.04	13,644.97	2,722,640.00
Optional Extended Life, Reuse, Recycling	1,837,559.11	495,558.11	662,978.10	5,857,530.00
<b>Total</b>	<b>3,139,840.44</b>	<b>899,324.16</b>	<b>676,623.07</b>	<b>8,580,170.00</b>





# EEBC Reuse and Recycling Data Entry

**Entered the recycled weight of:**

- Mixed electronics loads

**Entered the number of products reused and recycled:**

- Cathode Ray Tube (CRT) monitors
- Color MFDs
- Black & White MFDs
- Black & White printers
- LED TVs





# EEBC Reuse and Recycling Data Entry Screenshot

Equipment End-of-Life Information (Reuse and Recycling)	
Reused:	Total number of Units
Desktop computers (CPUs):	<input type="text"/>
Cathode ray tube monitors (CRTs) ENERGY STAR 4.*:	<input type="text" value="14"/>
LED monitors:	<input type="text"/>
Notebook computers:	<input type="text"/>
Mobile telephones:	<input type="text"/>
Total number of units reused	<input type="text" value="14"/>
Recycled:	
CPUs:	<input type="text"/>
CRTs:	<input type="text" value="104"/>
LEDs:	<input type="text"/>
Notebook computers:	<input type="text"/>
Mobile telephones:	<input type="text"/>
Amount (kg) of mixed office electronics recycled	<input type="text" value="763674"/>
Total number of units recycled (excluding mixed office electronics reported above)	<input type="text" value="104"/>



# EEBC Reuse and Recycling Results Screenshot

Results – Tables

Use and End Of Life | All Products | **Summary Charts and Equivalency Table**

CRITERIA/ATTRIBUTES/ACTIONS	Energy savings (KWh eq)	Primary material savings (kg)	Greenhouse gas emission savings (kg of CE)	Air emission savings (kg)	Wa emis savings
Use Lifetime SUBTOTAL (All Products)	0.00E0	0.00E0	0.00E0	0.00E0	0.0
End-of-life Management SUBTOTAL (All Products)	2.13E7	5.97E5	7.91E5	2.41E6	9.2
Purchasing Lifetime SUBTOTAL (All products)	0.00E0	0.00E0	0.00E0	0.00E0	0.0
<b>TOTAL</b>	<b>2.13e+7</b>	<b>5.97e+5</b>	<b>7.91e+5</b>	<b>2.41e+6</b>	<b>9.22</b>



# Results Conversion

- Exported/copied results data from tools into an Excel spreadsheet
  - EPEAT Benefits Calculators
    - Raw Materials Extraction, Product Manufacturing and Transport
    - Optional Extended Life, Reuse, Recycling
  - EEBC
    - Purchasing First Year SUBTOTAL (All Products)
    - End-of-life Management SUBTOTAL (All Products)
  - ENERGY STAR
    - Energy, Dollars, Greenhouse Gas Emissions



# Results Spreadsheet Screenshots

A	B	D	E	F	G
		Energy savings in kilowatt hour equivalents(kWh eq)	Greenhouse gas emissions reduction, expressed as global warming potential(kg CO2 eq)	Non-hazardous solid waste reduction(kg)	Water consumption savings(liters)
By Product Lifecycle Phase (All Products):	Raw Materials Extraction, Product Manufacturing and Transport	513,088.99	292,627.88	<0.01	1,022
By Product Lifecycle Phase (All Products):	Optional Extended Life, Reuse, Recycling	7,201,808.74	1,919,013.25	2,969,583.50	30,074
Servers Workaround	Optional Extended Life, Reuse, Recycling	549,831.61	142,503.65	270,141.76	1,621

A	B	C
	Energy savings (KWh eq)	Primary material savings (kg)
1		
2	Purchasing First Year SUBTOTAL (All Products)	505000.00
3	End-of-life Management SUBTOTAL (All Products)	1680000.00



# Results Spreadsheet Screenshots

A	B	C	D	E
	Energy savings in kilowatt hour equivalents(kWh eq)	Greenhouse gas emissions reduction, expressed as global warming potential(kg CO2 eq)	Non-hazardous solid waste reduction(kg)	Water savings
<b>Purchasing</b>	1,033,288.99	559,047.88	13,454.00	
<b>Use</b>	65,407,365.29	45,679,849.85		
<b>EOL</b>	30,770,640.35	5,274,103.57	3,377,275.26	
<b>TOTAL</b>	97,211,294.63	51,513,001.29	3,390,729.26	

A	B	C	D	E
<b>Directly to DOE</b>				
Energy	65,407,365.29	Annual energy used by	5,384.21	Households
GHG Emissions	45,679,849.85	Annual emissions from	9,781.55	Passenger cars
Toxic Substances	7,266.81	Weight of	3,204.06	Bricks
Non-hazardous solid waste	3,377,275.26	Annual waste produced by	1,815.74	Households
Costs	8,238,850.65		8.24	Million



# FY18 Purchasing Results

<i>FY18 Savings</i>	<i>Benefits to DOE</i>	<i>Benefits to Manufacturers &amp; Suppliers</i>
Energy		1,033,289 kWh
Greenhouse Gas Emissions		559,048 kg CO <sub>2</sub> eq
Non-Hazardous Solid Waste		13,454 kg
Water Consumption		1,022,327 L
Acidification Potential		330 kg SO <sub>2</sub> eq
Smog Formation Potential		5,125 kg O <sub>3</sub> eq
Eutrophication Potential		27 kg N eq
Toxic Substances	7,267 kg	
Materials		225,715 kg
Costs		\$53,660



# FY18 Power Management Results

<i>FY18 Savings</i>	<i>Benefits to DOE</i>
Energy	65,407,365 kWh
Greenhouse Gas Emissions	45,679,850 kg CO <sub>2</sub> eq
Costs	\$8,058,187





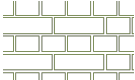


# FY18 Reuse and Recycling Results

<i>FY18 Savings</i>	<i>Benefits to DOE</i>	<i>Benefits to Other Parties</i>
Energy		30,770,640 kWh
Greenhouse Gas Emissions		5,274,104 kg CO <sub>2</sub> eq
Non-Hazardous Solid Waste	3,377,275 kg	
Water Consumption		31,695,544 L
Acidification Potential		15,319 kg SO <sub>2</sub> eq
Smog Formation Potential		142,860 kg O <sub>3</sub> eq
Eutrophication Potential		20,186 kg N eq
Materials		656,050 kg
Costs	\$180,663	\$2,377,020







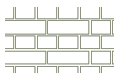




# FY18 Electronics Stewardship Results (DOE-only)

Savings		Equivalent to	
Energy	65,407,365 kWh	Annual energy used by 5,384 US households	
Greenhouse Gas Emissions	45,679,850 kg CO <sub>2</sub> eq	Annual emissions from 9,782 passenger cars	
Toxic Substances	7,267 kg	Weight of 3,204 bricks	
Non-Hazardous Solid Waste	3,377,275 kg	Annual waste produced by 1,816 US households	
Costs	\$8,238,851	\$8.2 million	



# FY18 Electronics Stewardship Results (DOE and Other Parties)

Savings		Equivalent to	
Energy	97,211,295 kWh	Annual energy used by 8,002 US households	
Greenhouse Gas Emissions	51,513,001 kg CO <sub>2</sub> eq	Annual emissions of 11,031 passenger cars	
Non-Hazardous Solid Waste	3,390,729 kg	Annual waste produced by 1,823 US households	
Water Consumption	32,717,871 kg	Water used to fill 13 Olympic swimming pools	
Toxic Substances	7,267 kg	Weight of 3,204 bricks	
Materials	881,765 kg	Weight of 24 tractor-trailers (18 wheelers)	
Costs	\$10,669,531	\$10.7 million	



# Annual Information Brief



## Office of Environment, Health, Safety and Security Information Brief



April 2019

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### **FY18 Electronics Stewardship Results and Benefits**

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#### **OVERVIEW**

Sustainable management of our electronic assets throughout their lifecycle is required by Federal mandate, and results in significant cost savings and environmental benefits. This Information Brief provides a summary of the Department of Energy (DOE) electronics stewardship activities in fiscal year 2018 (FY18), and the calculated positive impact of these activities. The reported electronics stewardship activities of each DOE site contribute to this positive impact both within and outside DOE.



# Annual Procedures

- Departmental Information Brief
- Program Office calculations and summary fact sheets
- Offer to assist sites in individual benefits calculations



# Questions?

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