

Fiscal Year 2013 Resource Conservation Plan

Montgomery County Public Schools
Rockville, Maryland

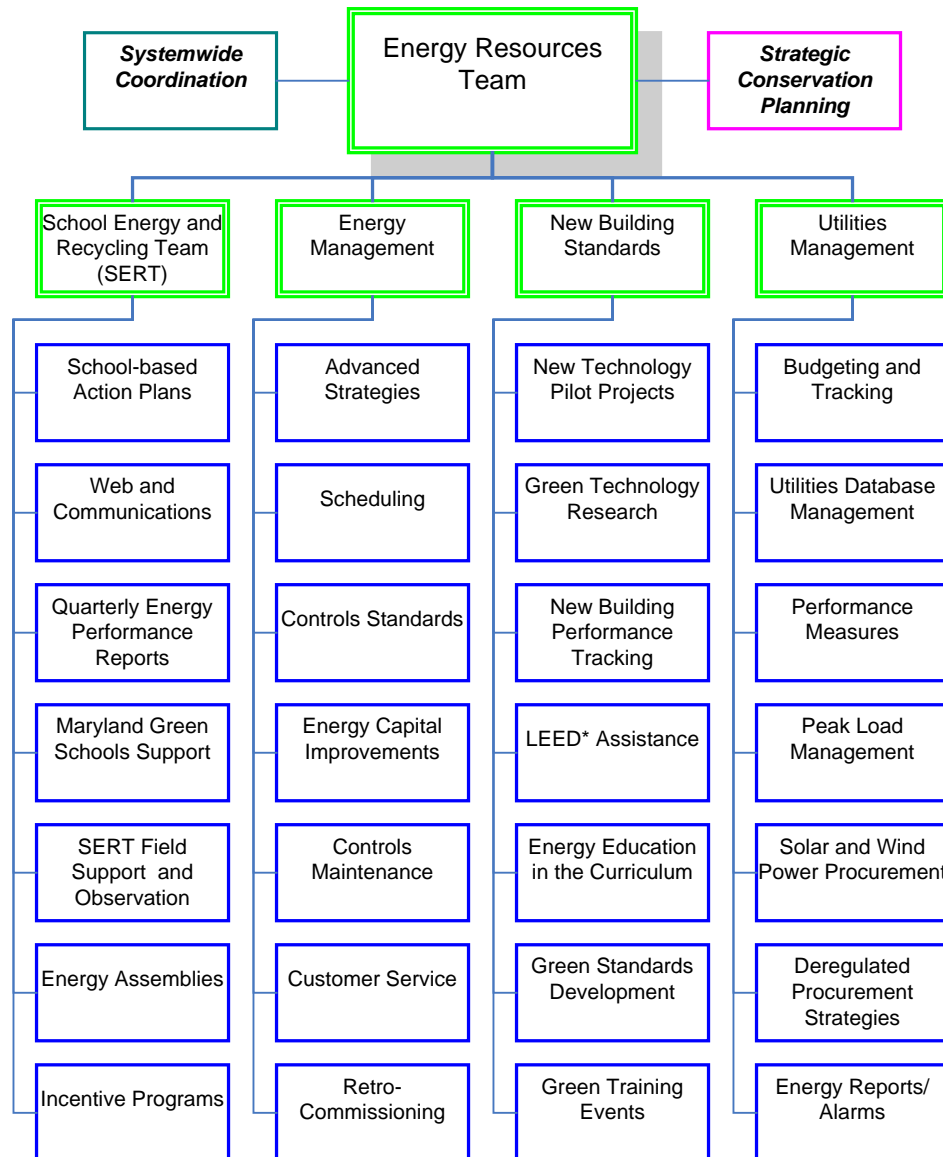


Pictured above: Boreholes being drilled for a geothermal heat pump system at Gaithersburg High School

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Introduction

Montgomery County Public Schools (MCPS) maintains a comprehensive program of resource conservation and management for its facilities. The following chart summarizes the program elements in place:



* LEED = Leadership in Energy and Environmental Design

The MCPS **Resource Conservation Plan** follows a standardized reporting format suggested by the Montgomery County Department of Environmental Protection. Energy information is formatted in predefined tables for easy reference and consistent tracking of data from year to year. The categories of information presented are [Facility Summary](#), [New Measures](#), [Existing Measures](#), and [Planned Measures](#). An [Innovations](#) section lists significant “firsts” achieved over the past year and an [Appendix](#) lists conservation policies and guidelines.

**Resource Conservation Plan
FY 2013**

Summary
Facilities owned or operated
by MCPS as of the end of **FY 2011 (June 30, 2011)**

Agency	Montgomery County Public Schools, Maryland				
Number of Facilities	223	Change in number of facilities	0		
Total square feet	23,737,288	Change in total square feet	421,625		
Average annual operating hours	3,220	Change in average annual operating hours	0		
Changes affecting energy consumption	<p>Expanding Community Use of Schools: MCPS schools are used for a growing number of outside groups scheduled through the Community Use of Public Facilities (CUPF). Annual operating hours are on the rise.</p> <p>Increasing Summer Use of Schools: Schools have been fully air-conditioned and are used over the summer for an increasing number of academic, extended learning opportunities (ELO), recreational, and community activities.</p>				
	Units	Total Consumption (Actual FY 2011)	Percent Change from Actual FY 2010	Total Cost (Actual FY 2011) \$	Percent Change from Actual FY 2010
Electricity	kWh	224,077,730	5.7%	\$29,249,127.28	7.4%
Natural Gas	therms	6,491,621	3.5%	\$9,358,013.83	-8%
Fuel Oil #2	gallons	37,906	-26.8%	\$108,177.35	-52%
Propane	gallons	35,736	-9.4%	\$74,176.45	1.0%
Water/Sewer	kgallons	406,639	-11.3%	\$2,540,013.65	10%
Total				\$41,329,509	4.1%

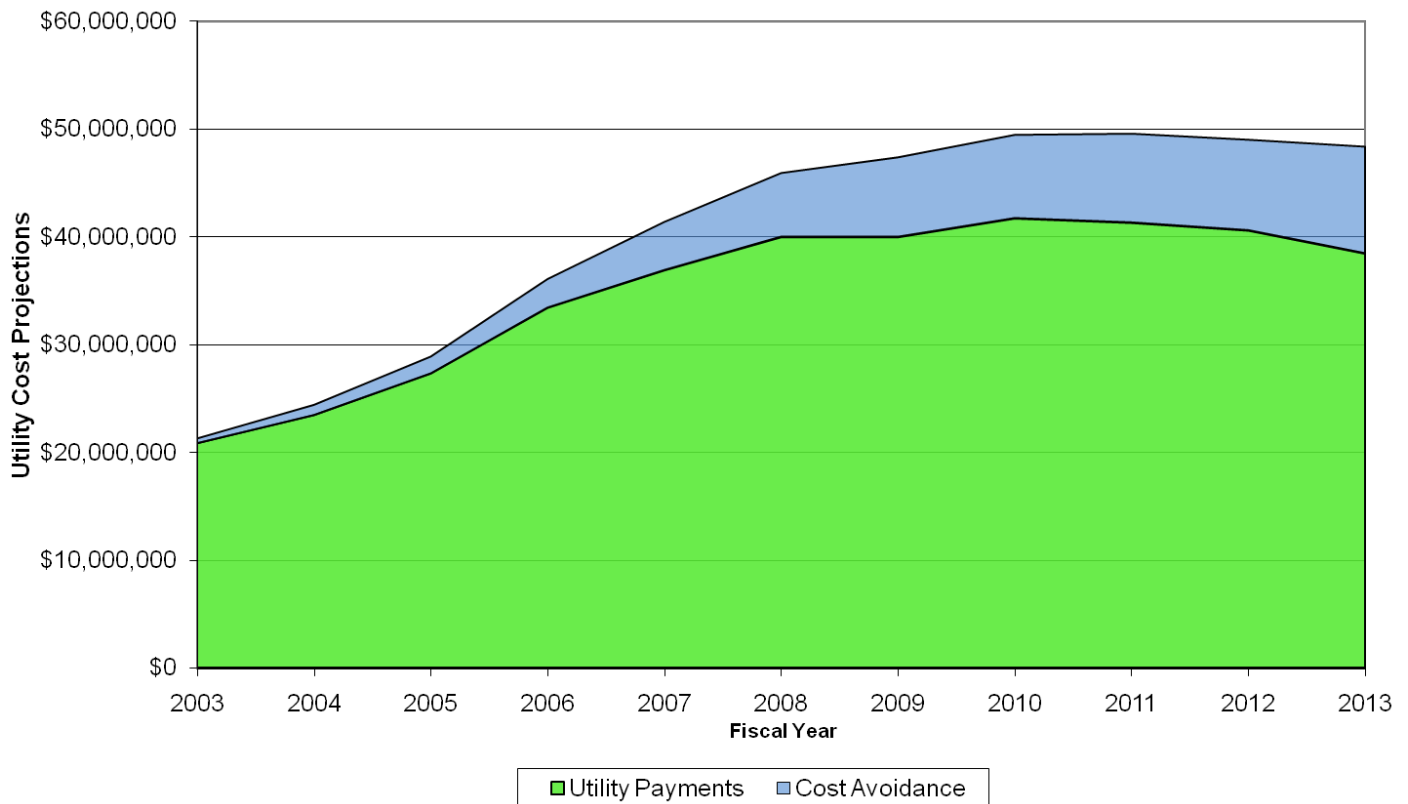
**Resource Conservation Plan
FY 2013
Summary**

One-Time Projects	Completion Year	Implementation Cost	Annual Cost Savings	Average Simple Payback (Years)
New Measures	FY 2012	\$3,164,317	\$381,250	8.3
Existing Measures	FY 2004 to FY 2011	\$9,544,477	\$4,755,803	2.0
Planned Measures	FY 2013	\$3,851,258	\$1,260,902	3.1
Subtotal		\$16,560,052	\$6,397,955	2.6
Recurring Annual Operations Programs		Annual Cost	Annual Cost Savings	Return on Investment
School Energy and Recycling Teams		\$964,266	\$2,029,035	210%
Peak Load Management		\$120,000	\$1,444,000	1,203%
Subtotal		\$1,084,266	\$3,473,035	320%
Grand Total MCPS Annual Savings			\$9,870,990	

Summary

Without the energy programs and conservation measures implemented by the Department of Facilities Management (DFM) just since Fiscal Year (FY) 2004, the FY 2013 utility request would be higher by approximately \$9,870,989. The chart below tracks the cost avoidance achieved by DFM each year of that time period. Despite the continued rapid growth of the school system, the MCPS energy program has succeeded in leveling the annual cost of utilities and is working towards reducing future request levels through procurement and consumption reduction strategies.

MCPS Growth of Utilities Cost Avoidance
From FY 2003 Baseline Year



New Measures

The **New Measures** table in this section lists and describes energy retrofit activities occurring in the current fiscal year. Other new measures in ongoing MCPS processes are described below.

New Construction: New building design guidelines generate substantial energy savings in each MCPS construction project. New construction measures are not listed in this table due to the large number of measures involved and because the cost and benefits of these measures are integrated into the building design.

The scope of the MCPS commitment to lean and green construction is exemplified by use of ground source heat pumps as a standard heating and cooling system and the goal of Leadership in Energy and Environmental Design (LEED) Silver certification as a minimum on all new schools and modernization projects.

More recent adoptions by MCPS in its design guidelines include the incorporation of Variable Refrigerant Flow (VRF) technology into all new administrative spaces. In addition, MCPS standards require that Demand Based Ventilation (DBV) be incorporated into all assembly areas, such as auditoriums, cafeterias, and multipurpose rooms.

VRF technology allows the effective waste heat recovery of one space to be transferred to another space within the same facility. This allows simultaneous heating and cooling to occur from a common condenser, which can be used to more accurately and more efficiently service a space as it helps to mitigate external environmental factors. VRF will be considered during new construction and modernization projects. The feasibility of this technology is being investigated for classrooms located in the core of a structure for future applications.

DBV technology takes advantage of savings opportunities made possible by a change to the ASHRAE ventilation standard 62.1, which allows reduced outside air intake into spaces while they are not fully occupied. This is performed by controlling outside air dampers based on continuously monitored CO₂ levels in the school system's newly constructed assembly areas. DBV is also being investigated for retrofitting purposed in existing facilities.

Ground Source Heat Pumps: Spark M. Matsunaga Elementary School opened in 2001 with the first ground source heat pump (GSHP) system in MCPS. This highly efficient heating and cooling system now is standard on MCPS new schools and modernizations wherever ground conditions permit. Ground source heat pumps exchange heat with the earth through fields of closed-loop wells and reduce annual heating and cooling energy by 30 percent compared to conventional Heating, Ventilation, and Air Conditioning (HVAC) systems. The following is a status list on the deployment of GSHP systems to date:

IN OPERATION:

- Bells Mill ES
- Cabin John MS
- Carderock Springs ES
- Cashell ES
- Cresthaven ES
- Cannon Road ES
- Garrett Park ES
- William B. Gibbs, Jr. ES
- Great Seneca Creek ES
- Francis Scott Key MS
- Little Bennett ES
- Spark M. Matsunaga ES
- Richard Montgomery HS
- Seven Locks ES

IN CONSTRUCTION:

- Beverly Farms ES
- Downcounty Consortium ES #29
- Gaithersburg HS
- Glenallan ES
- Herbert Hoover MS
- Paint Branch HS
- Weller Road ES

LEED Certification: In concert with energy conservation measures, MCPS seeks to be environmentally responsible in all aspects of facility design and operation. To comply with the *Montgomery County Green Buildings Law of 2006* for new buildings, all new schools and modernizations (excluding simple additions) that started design in FY 2008 or later will be certified by the United States Green Building Council under the LEED rating system. LEED directs sustainable design in the categories of: (1) Site Selection, (2) Efficient Use of Water, (3) Energy and Atmosphere, (4) Materials and Resources, (5) Indoor Environmental Quality, and (6) Innovative Design. Below is a table of MCPS schools affected by the LEED initiative through the construction phase.

LEED Initiatives

SCHOOL	Opening Date	LEED Status/Current Situation
Cashell ES	2009	Certified GOLD
William B. Gibbs, Jr. ES	2009	Certified GOLD
Francis Scott Key MS	2009	Certified GOLD
Cresthaven ES	2010	Certified GOLD
Carderock Springs ES	2010	Certified GOLD
Cabin John MS	2011	Final commissioning; construction credits to be submitted
Farmland ES	2011	Final commissioning; construction credits to be submitted
Garrett Park ES	2012	Design credits resubmitted with 4 classroom addition included
Cannon Road ES	2012	Final commissioning; construction credits to be submitted
Seven Locks ES	2012	Working on construction credits
DCC ES #29	2012	Design credits approved; school under construction
Gaithersburg HS	2013	Design credits submitted
Paint Branch HS	2013	Design credits submitted; school under construction
Hoover MS	2013	Design credits approved; school under construction
Beverly Farms ES	2013	Design credits submitted; school under construction
Weller Road ES	2013	Design credits being prepared; school under construction
Glenallan ES	2013	Design credits being prepared; school under construction

Utility Procurement: MCPS controls utility costs through competitive procurement of deregulated energy supplies. MCPS procures electricity in preplanned blocks of on-peak, off-peak, and around-the-clock products for various times of year. This is all managed through a wholesale account on the PJM Independent System Operator electric system.

MCPS has adopted a similar methodology for the procurement of natural gas. The transition to the new method will be effective in July of 2012 at the beginning of FY 2013.

Through this procurement strategy, MCPS has realized an average annual cost avoidance of \$1.6 million since FY 2008 for electricity and is expected to save roughly \$300,000 in natural gas costs over the next five years. This method of procurement risk management helps to insulate MCPS from market volatility.

Solar Power Purchase Agreements: MCPS has established power purchase agreements (PPA) for on-site electric renewable energy generation that extend to 20 years. These contracts hold a stabilized rate below the cost of conventional grid electricity and provide additional risk management for electric rates well into the future.

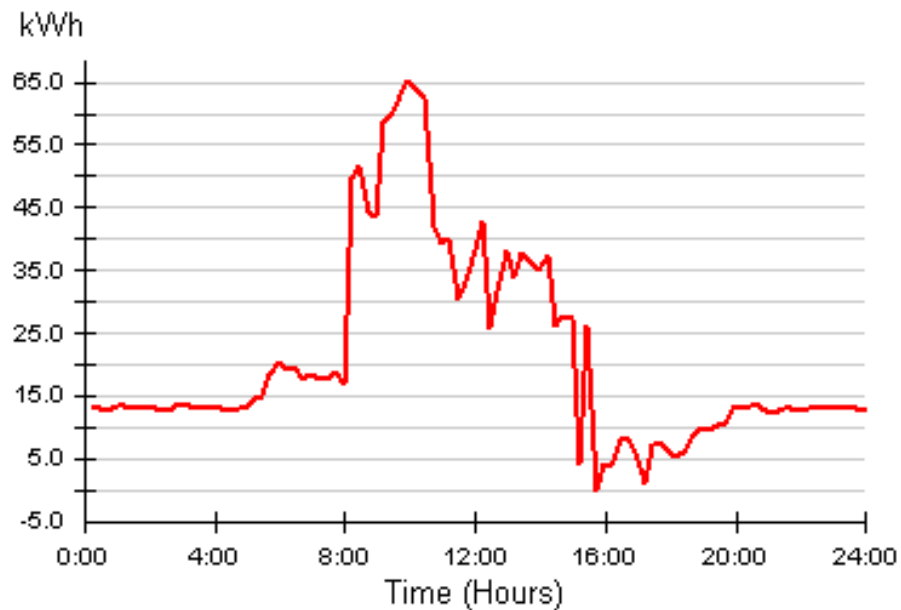
A PPA allows a government building owner to host the operation of a solar photovoltaic (PV) system on the roof of a building. A solar developer installs, owns, and maintains the solar array and sells power directly to the building owner. Unlike a government building owner, the developer is able to access significant cost offsets to solar projects available under state and federal tax incentives. The building owner benefits from electricity at below market rates, with no upfront cost or risk.

Existing: Large-scale PV systems from 80 kilowatts up to 319 kilowatts have been completed at eight schools. As a result, MCPS is one of the leading hosts of net-metered, solar power purchase agreements in Maryland with 1,264 kilowatts AC installed. The combination of these solar arrays is predicted to produce a capacity charge cost avoidance of about \$150,000 in FY 2013. A list of the existing systems is provided in the table below:

School	Capacity (kW AC)	Number of Panels	Construction Value (\$)	Completion Date
Clarksburg HS	260	1,466	\$1,504,000	1/23/2009
Lakelands Park MS	133	770	790,000	2/10/2009
College Gardens ES	86	497	510,000	2/12/2009
Richard Montgomery HS	135	784	804,000	6/30/2009
Francis Scott Key MS	100	564	578,000	12/20/2009
Quince Orchard HS	319	1,799	1,846,000	12/20/2009
Sargent Shriver ES	80	495	508,000	12/20/2009
Parkland MS	151	851	873,000	1/20/2010
Total:	1,264	7,226	\$7,413,000	

DFM expects to deter a significant fraction of the Peak Load Contribution (PLC) for our schools through hosting solar installations. Recent rate increases in PLC charges would have raised the utility cost for MCPS by \$4.5 million per year if not abated. The buildings with solar PV systems experience reduced annual PLC charges. As shown in the chart below, the load contribution during the 4:00–5:00 p.m. time period, when the PLC is typically assessed, was substantially reduced to a minimal level due to the power output from the solar PV system.

**Sample Profile for Lakelands Park Middle School
(Almost Zero PLC from 4:00–5:00 p.m.)**



Green Power Procurement: Prior to FY 2008, MCPS had procured 10 percent of its electricity as clean or renewable energy through purchase of renewable energy certificates (RECs). Since FY 2009, MCPS has purchased additional RECs to ensure that a minimum of 20 percent of its total electricity consumption is provided by renewable sources.

New Measures

This table shows information on resource conservation measures planned to be implemented in
FY 2012 (July 1, 2011 through June 30, 2012)

Measures—Planned:	Projected Completion Date (mo/yr)	Projected Initial Cost (\$)—After Rebates	Projected Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected and Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Projects:						
Energy Management System Upgrades	06/2012	1,436,972	(120,000)	Elect kWh	1,027,966	128,907
				NG Therm	29,781	40,174
Solar PV PPAs	06/2012	0	0	NA	NA	128,976
EECBG Projects	06/2012	1,624,000	(3,000)	Elect kWh	401,237	50,315
				NG Therm	10,443	14,087
Subtotal		3,060,972	(\$123,000)			362,459
Operations and Maintenance:						
Motors and Lights						
Thermostat Calibration Program	06/2012	103,345				18,790
Subtotal		103,345				18,790
FY 2012 Page Totals		\$3,164,317	(\$123,000)			\$381,249

*EECBG = Energy Efficiency Conservation Block Grant

Description of Activities

Energy Management Upgrades: The infrastructure of energy management systems (EMS) at MCPS has reached an age where many systems need to be upgraded or replaced. Advances in electronics and communications now enable greater savings from EMS than previously was possible.

Solar PV PPA: A power purchase agreement (PPA) allows a government building owner to host the operation of a PV system on the roof of the building. A solar developer installs, owns and maintains the solar array and sells power directly to the building owner. The building owner benefits from cheaper electricity and reduced demand charges at no upfront cost or risk.

Operational Savings by Occupants: The School Energy and Recycling Team (SERT) program continues to educate and monitor schools on minimizing use of resources.

Existing Measures

MCPS has made significant investments in energy conservation going back to 1980. The **Existing Measures Summary** table on the following page includes projects back to FY 2004. Subsequent detailed tables document the specific types of projects, investment, and savings by year.

The major accomplishments of this history include the following:

- Systemwide conversion to T8 lamps and electronic ballasts is 80 percent completed. In 2007 and 2008, lighting energy was reduced an additional 25 percent by systemwide re-lamping with new, super-efficient, 25-Watt T8 lamps featuring twice the lamp life.
- Incandescent fixtures have been eliminated wherever possible and replaced with permanent compact fluorescent fixtures. Exit signs have been replaced with maintenance-free LED models.
- Energy Management Systems have been installed in 191 schools which a central energy management office monitors and maintains. Internet-controlled electronic thermostats were installed in 685 portable classrooms in FYs 2003 and 2004.
- All network computers are signaled to shut down each day at 6:00 p.m. and must be manually restarted in the morning as needed. All new computers comply with Energy Star 4.0 low-energy ratings, including flat-panel monitors and high-efficiency power supplies.

SERT: In addition to capital improvements, MCPS has long maintained a program of behavioral education to reduce energy use by facility users. The SERT program continually promotes and rewards a culture of conservation in the school system. SERT communicates with the schools through group training and professional development events, newsletters, investigation-based activities, informational flyers, e-mail, websites, a telephone hotline, and, most importantly, regular site visits. As rewards for participation, the programs offer annual and quarterly financial awards. SERT provides support and recognition to students and schools participating in annual competitions, including awareness campaigns, poster contests, and digital arts contests. This program produces millions of dollars a year in utility savings for the school system and helps to instill environmental responsibility in future generations.

In FYs 2005 and 2006, SERT program staff was increased to provide frequent on-site monitoring of behavior and assistance to schools in saving energy by trained energy facilitators. The energy-saving results have been broad based and significant across the system. In FY 2009, 120 schools achieved the initial goal of a five percent reduction in electric use over the baseline year. Of those 120 schools, 90 significantly

exceeded the goal, scoring in the range of a 10 to 30 percent reduction in electric consumption. In FY 2011, cost avoidance for this program was \$2.49 million.

Peak Load Management (PLM): PJM Interconnection, LLC (PJM) is the independent system operator of the electric grid that serves MCPS. A significant charge instituted by PJM is the Peak Load Contribution (PLC) charge. This charge is assessed against all consumers of electric power on the five days of the summer when demand for power is at the maximum on the PJM system. This charge is based on each consumer's demand for electric power that coincides with PJM's five peak hours. The purpose of the charge is to recover the cost to have full generation and transmission capacity available for the highest demand periods. These PLC charges vary from year to year. They typically amount to 10 to 15 percent of MCPS' cost for electricity, or \$2.7 million to \$4 million. Charges based on the summer of 2012 assessments will be especially high with the potential of increasing MCPS electricity cost by \$4.5 million.

To defray part of these additional charges, DFM has developed a program to reduce peak electrical demands at facilities during the critical summer afternoon hours when the charges are most likely to be set. The program uses energy management systems (EMS) to curtail central plant chillers and pumps to many facilities during the critical hours each weekday, while SERT "energy sweepers" simultaneously walk the facility to turn off unnecessary lights and plug loads. During the summer of 2009, the program successfully reduced PLC charges by 20 percent, avoiding \$624,000 in the following year's utility costs.

In FY 2009, PLM was extended to all facilities through installation of advanced electric meters that record use in 15-minute intervals. Performance of schools at the critical hours was reviewed on a weekly basis by MCPS energy personnel for compliance with PLM directives. Where compliance was not achieved or other scheduling problems were observed, correctional measures were undertaken and tracked to completion in a database.

Cost avoidance for the efforts during the summer of 2011 has been calculated as \$1.44 million which will be realized mostly in FY 2013.

Existing Measures Summary

This table summarizes information on resource conservation measures implemented from
FY 2004 through FY 2011

Existing Measures	Completion Year	Implementation Cost	Annual Cost Savings	Average Simple Payback (Years)
All Types	FY 2011	\$722,743	\$265,719	2.7
All Types	FY 2010	\$747,734	\$248,074	3.0
All Types	FY 2009	\$1,700,000	\$490,560	3.5
All Types	FY 2008	\$2,420,000	\$984,510	2.5
All Types	FY 2007	\$2,769,000	\$1,921,940	1.4
All types	FY 2004 to FY 2006	\$1,185,000	\$845,000	1.4
Existing Measures Grand Totals		\$9,544,477	\$4,755,803	2.0

Please see the following **Existing Measures Details** tables for project descriptions and financial details on the above line items. Energy savings through operations and behavior change are accomplished through the **SERT** program.

Existing Measures

This table shows information on resource conservation measures implemented in
FY 2011 (July 1, 2010 through June 30, 2011)

Measures— Planned:	Projected Completion Date (mo/yr)	Projected Initial Cost (\$)—After Rebates	Projected Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected and Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Projects:						
Energy Management System Upgrades	06/2011	618,933	(60,000)	NG Therm	14,560	20,631
				Elect kWh	593,701	82,524
Lighting Retrofits	06/2011	103,810	(4,500)	Elect kWh	164,896	23,069
Solar PV PPAs	06/2011	0	\$0	NA	NA	139,495
FY 2011 Total		\$722,743	(\$64,500)			\$265,719

**Description of
Activities**

Energy Management Upgrades: The infrastructure of EMS at MCPS has reached an age where many systems need to be upgraded or replaced. Advances in electronics and communications now enable greater savings from EMS than previously was possible.

Lighting Retrofits: This program improves building light fixtures while introducing new technologies to reduce energy use.

Solar PV PPAs: A PPA allows a government building owner to host the operation of a PV system on the roof of the building. A solar developer installs, owns, and maintains the solar array and sells power directly to the building owner. The building owner benefits from cheaper electricity and reduced demand charges at no up-front cost or risk.

Operational Savings by Occupants: The SERT program continues to educate and monitor schools on minimizing use of resources.

This table shows information on resource conservation measures implemented in
FY 2010 (July 1, 2009 through June 30, 2010)

Measures— Planned:	Projected Completion Date (mo/yr)	Projected Initial Cost (\$)	Projected Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected and Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Projects:						
Energy Management System Upgrades	03/2010	747,734	(66,486)	NG Therm	26,897	37,387
				Elect kWh	1,091,582	149,547
Lighting Retrofits	03/2010	0	0	Elect kWh	0	0
Solar PV PPAs	03/2010	0	0	NA	NA	61,140
FY 2010 Totals		\$747,734	(\$66,486)			\$248,074

Description of Activities

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Operational Savings by Occupants: The SERT program continues to educate and monitor schools on minimizing use of resources.

This table shows information on resource conservation measures implemented in
FY 2009 (July 1, 2008 through June 30, 2009)

Measures—Existing	Projected Completion Date (Mo/Yr)	Projected Initial Cost (\$)	Projected Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected and Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Conservation Measures:						
Energy Management System Upgrades	03/2009	1,500,000	(121,250)	NG Therm	173,750	260,620
				Elect kWh	303,570	40,980
Lighting	03/2009	200,000	(20,000)	Elect kWh	340,000	45,900
Solar PV PPA	06/2010	0	0	NA	NA	45,860
FY 2009 Total		\$1,700,000	(\$141,250)			\$490,560

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Operational Savings by Occupants: The SERT program continues to educate and monitor schools on minimizing use of resources.

This table shows information on resource conservation measures implemented in
FY 2008 (July 1, 2007 through June 30, 2008)

Measures—Existing	Projected Completion Date (Mo/Yr)	Projected Initial Cost (\$)	Projected Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected and Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Conservation Measures:						
Energy Management Upgrades	03/2008	1,200,000	(97,000)	NG Therm	139,000	208,500
				Elect kWh	242,857	31,570
Lighting Retrofits	03/2008	500,000	(50,000)	Elect kWh	850,000	125,000
Energy Star 4.0 Computer Refresh	09/2007	120,000	0	Elect kWh	720,000	97,440
Subtotal		1,820,000	(147,000)			426,510
Operations and Maintenance:						
Group Re-lamp with 25 Watt T8—Phase 2	06/2008	600,000	(31,000)	Elect kWh	4,020,000	522,000
Subtotal		600,000	(31,000)			522,000
FY 2008 Total		\$2,420,000	(\$178,000)			\$984,510

Description of Activities

Energy Management Upgrades: The infrastructure of EMS at MCPS has reached an age where many systems need to be replaced or upgraded. Advances in electronics and communications now enable greater savings from energy management than previously was possible.

MCPS Comprehensive Lighting Retrofits: This program improves building light fixtures. Fluorescent fixtures receive T8 lamps and electronic ballasts; 400-watt mercury vapor fixtures are replaced with 250-watt metal halide fixtures (with improved light output); incandescent fixtures are changed to compact fluorescent; and incandescent exit signs are changed to light emitting diode (LED). LED exit signs consume only five watts and have an extremely long life cycle, thus also improving the safety of the facilities.

Group Re-lamp with 25 watt T8: Group re-lamping with new higher-efficiency and longer-life T8 lamps allow a 25 percent reduction in energy use in existing fixtures without loss of light. MCPS plans to change all existing lamps to take advantage of this new technology systemwide. Pilot installation started in FY 2006. Financing was provided by the Maryland Energy Administration for full implementation in FY 2007 and FY 2008.

Energy Star 4.0 Computer Refresh Cycle: Computers in MCPS schools receive technology modernization on a four-year cycle. New computers meet the latest Energy Star criteria, version 4.0 B at the present time, including LCD flat panel monitors and high-efficiency power supplies to reduce energy use over existing equipment.

Existing Measures Details

This table shows information on resource conservation measures implemented in
FY 2007 (July 1, 2006 through June 30, 2007)

Measures—Existing	Projected Completion Date (Mo/Yr)	Projected Initial Cost (\$)	Projected Annual Net Impact On Maintenance Cost (\$)(-)	Fuel Type(s) Affected And Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Projects:						
Energy Management Upgrades	03/2007	1,200,000	(97,000)	NG Therm	139,000	208,000
				Elect kWh	242,857	31,000
Lighting Retrofits	03/2007	500,000	(50,000)	Elect kWh	850,000	125,000
Energy Star 4.0 Computer Refresh	09/2007	120,000	0	Elect kWh	720,000	97,440
Subtotal		1,820,000	(147,000)			461,440
Operations and Maintenance:						
Group Re-lamp with 25 Watt T8—Phase 1	6/2007	804,000	(31,000)	Elect kWh	5,360,000	680,000
Replace pin timers for exterior lighting with digital	6/2007	145,000	(15,000)	Elect kWh	6,030,000	780,000
Subtotal		949,000	(46,000)			1,460,000
FY 2007 Total		\$2,769,000	(\$193,000)			\$1,921,440

Description of Activities

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Group Re-lamp with 25 watt T8: Group re-lamping with new higher efficiency and longer life T8 lamps allow a 25 percent reduction in energy use in existing fixtures without loss of light. MCPS plans to change all existing lamps to take advantage of this new technology systemwide. Pilot installation started in FY 2006. Financing was provided by the Maryland Energy Administration, via a low-interest loan, for full implementation starting in FY 2007.

Replace Pin Timers with Digital: Until now unreliable electro-mechanical time clocks, using thumbscrew pins to set ON/OFF times, have operated all exterior lighting for schools. These clocks become unreliable as pins become loose, power failures cause loss of time, and the clocks do not compensate for monthly changes in sunrise/sunset times. As a result, lights are frequently on when not needed, resulting in a waste of hundreds of thousands of dollars each year. MCPS is installing modern technology digital clocks designed for exterior lighting as retrofits throughout the system. These electronic clocks, the Paragon EL (Exterior Lighting) 72, have digital accuracy, daily sunrise/sunset adjustments, seven-day capacitor backup for power outages, and can download programming from a notebook PC.

Existing Measures Details

This table shows information on resource conservation measures implemented in
FY 2004 through FY 2006

Measures—Existing	Date Implemented (Mo/Yr)	Initial Cost (\$)	Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected And Units	Units Saved Per Year	Annual Cost Savings (\$)
Energy Conservation Measures:						
Energy Management System Upgrades	1/2006	500,000	(50,000)	Elect kWh	354,000	45,000
Lighting Retrofit at Clopper Mill Elementary School	12/2004	70,000	(3,500)	Elect kWh	330,000	28,000
Internet Control of Portable Classrooms	8/2004	350,000		Elect kWh	5,000,000	450,000
Waterless Urinals at Martin Luther King Middle School	10/2004	10,000	(500)	Water Gal	560,000	4,000
Retro-Commissioning Wheaton/Edison High School	09/2004	255,000	(8,000)	Elect kWh	420,000	43,000
Subtotal		1,185,000	(62,000)			570,000
Operations and Maintenance:						
Shutdown of Network Computers	7/2004	0	0	Elect kWh	3,060,000	275,000
Subtotal		0	0			275,000
FY 2004–FY 2006 Total		\$1,185,000	(\$62,000)			\$845,000

Description of Activities

The “Internet Control of Portable Classrooms:” A first-of-its-kind application to relocatable classrooms of Carrier’s “Broadcast Energy Savings” (BES) technology. MCPS and Carrier jointly developed the approach in which an Internet interface allows MCPS to synchronize the HVAC schedules and thermostat set points at all portables. The savings for this project is high because relocatable classrooms originally contained only manual thermostats and ran essentially uncontrolled. The use of conventional seven-day programmable (but non-communicating) thermostats is impractical in this application because of the inability to verify programs at more than 500 locations and the inability of seven-day programmable thermostats to schedule holidays, breaks, and summer closings. The BES interface supports a 24-hour override to a setback temperature, or “snow day” command, allowing MCPS to shut down relocatable classrooms and save energy opportunistically. The newly developed system now makes it feasible to efficiently control large numbers of relocatable classrooms with a payback of under a year.

Shutdown of Network Computers: In FY 2005, MCPS instituted the systemwide shutdown of all 40,000 computers at the end of the evening via network controls. The network also sets Energy Star settings on each computer to deactivate the monitor after 30 minutes of idle time.

Existing Measures Details

This table shows information on resource conservation measures implemented in
FY 1998 through FY 2003

Measures—Existing	Date Implemented (Mo/Yr)	Initial Cost (\$)	Annual Net Impact on Maintenance Cost (\$)(-)	Fuel Type(s) Affected and Units	Units Saved Per Year	Annual Cost Savings (\$)
Energy Conservation Measures:						
Lighting Retrofits	01/1998	644,633	(25,325)	Elect kWh	2,992,939	209,506
Lighting Retrofits	01/1999	467,748	(18,376)	Elect kWh	2,171,687	152,018
Lighting Retrofits	01/2000	241,693	(9,495)	Elect kWh	1,122,147	78,550
Lighting Retrofits	01/2001	193,471	(7,601)	Elect kWh	898,259	62,878
Lighting Retrofits	01/2002	1,544,630	(60,682)	Elect kWh	7,171,498	502,005
Lighting Retrofits	01/2003	237,000	(9,377)	Elect kWh	635,496	54,485
Energy Management Upgrades	01/2003	161,000	0	Elect kWh	442,000	31,800
		0	0	NG Therm	18,500	15,200
Cooling Tower Water Monitors	01/2003	65,000	(15,000)	Water Gallons	2,800,000	12,000
Subtotal		3,555,175	(145,856)			1,118,442
Operations and Maintenance:						
Subtotal		0	0			0
FY 1998–FY 2003 Total		\$3,555,175	(\$145,856)			\$1,118,442

Description of Activities

MCPS Comprehensive Lighting Retrofits: This program improves building light fixtures. Fluorescent fixtures receive T8 lamps and electronic ballasts; 400-watt mercury vapor fixtures are replaced with 250-watt metal halide fixtures (with improved light output); incandescent fixtures are changed to compact fluorescent; and incandescent exit signs are changed to LED. LED exit signs consume only five watts and have an extremely long life cycle, thus improving the safety of the facilities.

Cooling Tower Water Monitors: Monitors are installed and detect excess water flow through cooling towers caused by malfunctioning controls and alerts maintenance staff. The monitors send a pager signal to the responsible person, including the type of alarm and the facility number. Monitors were installed on 92 cooling towers owned by MCPS, averting water losses of hundreds of thousands of gallons per year.

Operations and Maintenance: As a policy, the Division of Maintenance uses high-efficiency replacement equipment when replacing failed equipment in facilities. The incremental cost for efficiency is low at the point of equipment replacement and not tracked.

Planned Measures

Energy Conservation Measures (ECMs): Potential ECMs are continuously researched for application to our schools. Those proposals that pass the tests of cost effectiveness and durability are scheduled for funding through a variety of mechanisms, including current revenues (utility funds), leases, energy conservation loans, bonds, or grants, and the Energy Capital Improvement Project. These investments produce cost avoidance estimates as shown on the table of planned measures on the following page.

Current technologies under investigation and trial include:

- LED lamps and fixtures, for both interior and exterior general lighting. LED lamps are rapidly surpassing other artificial light sources in efficiency, cost, life expectancy, and color-rendering quality. For all these reasons, LED lamps are widely expected to become the dominant light source for schools and offices within 10 years and cut lighting energy use by a factor of three.
- Replacing HID lamps in gyms with high-bay fluorescent T5 fixtures. Fluorescent lamps do not have a restrike time limitation and so can be controlled by occupancy sensors to turn off when not needed.
- Using a minimal EMS installation to control the central plant of the remaining 13 non-EMS schools. This measure captures most of the available savings for HVAC scheduling and peak load management while these schools await modernization or major mechanical upgrades, including full DDC control systems.

Included under ECMs are solar electric power purchase agreements (PPAs). A PPA allows a government building owner to host the operation of a PV system on the roof of the building. DFM has extended this procurement model for solar power to all new schools and modernizations where feasible. For existing buildings, the solar PPA model also has been integrated into replacement roofing projects, where feasible. During calendar year 2012, new state regulations which govern renewable energy requirements may change for the state of Maryland. MCPS is monitoring whether these changes will be conducive for the expansion of its solar program.

Operations and Maintenance: All three electric distribution companies serving MCPS have been required by the state of Maryland to provide incentive programs for consumers to improve energy efficiency of their homes and businesses. This measure is part of the *EmPower Maryland Efficiency Act*, legislation passed in 2008, designed to reduce total electrical energy consumption in Maryland by 15 percent by the year 2015.

In FY 2012, MCPS will have taken advantage of over \$100,000 of incentives on commissioning and lighting projects which will lead to reduced operating costs. Some of these funds will help to reduce capital construction costs while others will be directly reinvested into projects, such as more lighting retrofits or building envelope improvements, such as window replacements. MCPS will continue this trend in FY 2013.

Planned Measures

This table shows information on resource conservation measures planned to be implemented in
FY 2013 (July 1, 2011 through June 30, 2013)

Measures—Planned:	Projected Completion Date (mo/yr)	Projected Initial Cost (\$)—After Rebates	Projected Annual Net Impact on Maintenance Cost (\$) (-)	Fuel Type(s) Affected and Units	Estimated Units Saved Per Year	Projected Annual Cost Savings (\$)
Energy Projects:						
Energy Management Upgrades	06/2012	2,106,183	(140,000)	Elect kWh	1,713,277	218,132
				NG Therm	49,634	57,030
EMS Temperature Setpoint Modifications	06/2012	20,000	0	Elect kWh	1,064,729	135,560
				NG Therm	11,798	13,556
Lighting Retrofits	06/2012	1,501,731	(30,000)	Elect kWh	4,243,359	540,258
Solar PV PPAs	06/2012	0	0	NA	NA	207,577
Retrocommissioning	06/2012	120,000	(20,000)	Elect kWh	471,259	60,000
				NG Therm	8,703	10,000
Subtotal		3,747,914	(\$190,000)			1,242,113
Operations and Maintenance:						
Thermostat Calibration Program	06/2012	103,345		Elect kWh	147,582	18,790
Subtotal		103,345				18,790
FY 2013 Page Totals		\$3,851,259	(\$190,000)			\$1,260,903

Description of Activities

Energy Management Upgrades: The infrastructure of EMS at MCPS has reached an age where many systems need to be upgraded or replaced. Advances in electronics and communications now enable greater savings from EMS than previously was possible.

Lighting Retrofits: This program improves building light fixtures while introducing new technologies to reduce energy use. In FY 2013, MCPS will close out a previous project in which all electronic ballasts in the system are capable of driving lower wattage T8 lamps and install 25-watt lamps where possible.

Solar PV PPA: A power purchase agreement (PPA) allows a government building owner to host the operation of a PV system on the roof of the building. A solar developer installs, owns, and maintains the solar array and sells power directly to the building owner. The building owner benefits from cheaper electricity and reduced demand charges at no up-front cost or risk.

EMS Temperature Setpoints: MCPS will be seeking to tighten up tolerances on EMS sensors to help put better freeze protection and setback temperatures in place to better conserve energy when buildings are not occupied.

Operations and Maintenance: As a policy, the Division of Maintenance uses high-efficiency replacement equipment when replacing failed equipment in facilities. The incremental cost for efficiency is small at the point of equipment replacement and not tracked to date. Starting in FY 2012, replacement projects will be tracked for major equipment replacements, such as central chillers, boilers, AHUs, and larger circulation pumps.

Operational Savings by Occupants: The SERT program continues to educate and monitor schools on minimizing use of resources.






Significant Technology and Program Advances in Resource Conservation

- 1) First use of **Internet-communicating thermostats** in a U.S. school system to control HVAC in portables.
- 2) **First public school system in Maryland** to register a new building design for LEED certification and first to achieve a LEED Gold certification (Great Seneca Creek Elementary School was LEED Gold certified in 2007).
- 3) Started deployment of a **Web interface in MCPS** to view real-time building information.
 - Seventy schools are now online to anyone on the MCPS-wide area network to view building environmental conditions through a Web browser.
- 4) Started use of a **Web-based system to monitor daily electric profiles** in buildings and detect abnormal use patterns, control, and scheduling problems.
 - As of FY 2009, all school sites now are installed under the Potomac Electric Power Company (PEPCO) “CEO Online” subscription program.
- 5) Started MCPS use of the **automated scheduling database** operated by the Interagency Coordinating Board/Community Use of Public Facilities (ICB/CUPF) program to receive HVAC scheduling requests from three school clusters in place of paper calendars manually filled out by school staff.
 - This system was extended to all elementary and middle schools in FY 2005.
- 6) Started **network control** of power-saving settings on all MCPS computers.
- 7) Started systematic **retro-commissioning** of MCPS facilities to modernize energy management controls, correct control failures, improve comfort, and reduce energy expenses.
- 8) The first MCPS school opened with a **GeoExchange system** for heating and cooling. In FY 2013, 22 schools have GeoExchange systems either existing or planned.

- 9) New staff (**energy facilitators**) and program support designated to **visit schools monthly** and monitor and assist with energy saving plans.
- 10) Started use of Community Energy Loan Program (CELP) financing from the Maryland Energy Administration for new energy conservation opportunities, including the premium for GeoExchange at the new Richard Montgomery High School and the conversion to 25-watt T8 lamps listed next.
- 11) Started use of **new technology 25-watt T8 lamps** in a systemwide retrofit to reduced lighting energy use 25 percent, including the following:
 - Use of building service staff to implement a systemwide energy retrofit.
 - Use of students to assist staff in a systemwide energy retrofit.
- 12) Started use of **electronic time clocks to control exterior lighting**, including the following:
 - Use of automatic compensation for time of sunrise and sunset.
 - Use of capacitor back-up to hold time and program over power outages.
 - Use of automatic changeover for daylight saving time.
- 13) Started use of **Energy Star 4.0** standard in computer technology renewal cycle, including the following:
 - **Flat panel displays.**
 - **“80+” efficiency** power supplies in CPUs.
- 14) FY 2008—Started use of **wholesale electric procurement**, buying blocks of power to stabilize rates over time below standard offer service.
- 15) FY 2009—Started use of **solar photovoltaic power purchase agreements** to install production scale solar power arrays on schools at no upfront cost to MCPS. Initial phase includes 1.4 MW ac of installed capacity.

Appendix—Montgomery County Public Schools

Resource Conservation Policy and Guidelines

-  [Board of Education Policy On Energy Conservation](#)
-  [Electricity Guidelines](#)
-  [Heating Guidelines](#)
-  [Food Preparation Guidelines](#)
-  [Water Use Guidelines](#)

POLICY

BOARD OF EDUCATION OF MONTGOMERY

Related Entries: ECM, ECM-RA
Responsible Office: Supportive Services

Energy Conservation

A. PURPOSE

To ensure that Montgomery County Public Schools pursues energy conservation efforts and practices that continue to preserve our natural resources while providing a safe and comfortable learning environment for all staff and students

B. ISSUE

The nation is experiencing a depletion of its natural resources which include crude oil, natural gas, and other energy sources. The Montgomery County Public Schools is committed to reducing its consumption of natural resources and still improving the quality of its educational programs. The Montgomery County Board of Education desires to work with other agencies of government and plan school system activities so that the learning environment of essential education programs are not curtailed or compromised.

C. POSITION

1. The superintendent of schools shall continue to establish procedures to ensure the conservation of natural resources by personnel at all levels of the school system, which shall include the following practices:
 - a) Generation of a system wide resource conservation plan that outlines goals and objectives
 - b) Development of acceptable energy conservation guidelines as outlined in the resource conservation plan
 - c) Continued development and implementation of conservation programs
 - d) Performance of energy studies on all new MCPS construction
 - e) Monitoring the general operation and maintenance of all heating, ventilation and air-conditioning equipment

- f) Procurement and consumption management of fossil fuels and electricity
 - g) Continuing reminders to staff and students of the need for conservation of all natural resources
2. MCPS will participate in a coordinated effort by government authorities to establish appropriate resource conservation plans and utility price monitoring systems to ensure that public schools have adequate supplies of essential fuels and can obtain these at the best possible prices.

D. DESIRED OUTCOME

Create a healthy and comfortable learning environment while controlling energy consumption more efficiently and diverting the otherwise rising utility costs towards educational programs. Continue development of energy conservation efforts that proportionally reduces energy consumption in new and existing facilities.

E. IMPLEMENTATION STRATEGIES

1. Should natural resources be insufficient to meet normal operating needs, the superintendent will develop further plans for the consideration of the Board of Education to conserve energy.
2. Copies of this policy and the annual resource conservation plan will be sent to appropriate school system and county government officials.

F. REVIEW AND REPORTING

This policy will be reviewed on an on-going basis in accordance with the Board of Education's policy review process.

Policy History: Adopted by Resolution No. 654-73, November 13, 1973; amended by Resolution No. 285-97, May 13, 1997.

Electricity

- 1. Temperature Set Point:** The maximum cooling level is 76° F. Set thermostats accordingly. Some temperature variation will occur as equipment cycles on and off. Report cooling problems only if room temperature measured with a thermometer stays three degrees or more above or below set point.
- 2. Controls:** Do not attempt to tamper with energy management or HVAC controls on equipment. Any problems with controls or equipment should be dealt with promptly through the work order system. Provide frequent inspection of pneumatic controls, including system filter/dryer, automatic bleed, and compressor run time. Test and calibrate all pneumatic thermostats at the start of each cooling season.
- 3. Computers:** Shutting down computers not in use is important. Computers in our schools consume more energy than the lighting. **Staff and students should shut down the computer at the end of each use, unless a new user is waiting.** Sweeps should be made to shut down all computers immediately after school hours and before weekends, holidays, and breaks. Use of **flat panel monitors** is encouraged whenever procuring new displays. Flat panel monitors use 70 percent less energy than CRT models and help reduce excessive heat build-up in computer labs and closets.
- 4. Lights:** Teachers should ensure lights are turned off when leaving the classrooms unoccupied, even for a few minutes. Every effort should be made to avoid accidentally leaving lights on in storerooms, crawl spaces, attics, and other unoccupied spaces. Corridor lighting should be reduced in over-illuminated areas and turned off during unoccupied periods. Gym, auditorium, and stadium lights should be controlled on a tight schedule. Gym lights should be turned off during class periods when the gym is not in use.
- 5. Light Levels:** Light levels may be reduced to the acceptable levels for different activities as listed on the attached chart, **Recommended Footcandle Levels**. Your SERT energy facilitator will provide you with instruments and instructions to reduce light levels successfully and save energy.
- 6. Task Lighting:** Use a desk lamp (with compact fluorescent bulb) instead of overhead lighting as much as possible, especially at teaching stations when students are out. Computer labs should use compact fluorescent uplights (torchiere lamps) to improve visibility of computer screens, and save energy by turning out overhead lights.

7. **Lighting Maintenance:** Maintain automatic lighting controls, occupancy sensors, or daylight sensors where installed. Light fixtures and lenses should be cleaned annually and the date documented.
8. **Daylighting:** Whenever possible, teachers should utilize natural light instead of artificial light. Window shades should be adjusted to make best use of daylighting. Most classroom lights are controlled by two or more switches, so artificial lighting can be reduced when daylight is available.
9. **Exterior Lighting:** All outside lighting should be **off** during daylight hours. Building security lighting should be on from dusk to dawn daily. Parking lot lights should be turned off at the close of the regular school day or evening activities (by 12:00 midnight at the latest) and back on at 6:00 a.m., to dawn (unless sunrise is before 6:00 a.m.). Building service managers should notify the maintenance depot of any irregularities in exterior lighting control.
10. **Cleaning Crews:** All lights are to be turned **off** when students and teachers leave school. Building service workers are to turn on lights only in the areas in which they are working currently.
11. **Holidays and Breaks:** All electrical equipment should be shut down or unplugged per checklists before long weekends and school breaks.
12. **Off-Peak Use:** When possible, electricity use (for kilns, laminators, etc.) should be scheduled prior to 12:00 noon when lower, off-peak rates are in effect.
13. **Infiltration Control:** All windows and outside doors are to be kept closed when cooling systems are in operation. Corridor doors and doors to classrooms should remain closed when HVAC is provided. Doors to gyms and pools are to be kept closed. Report faulty door closers to the maintenance depot.
14. **Vending Machines:** Vending machines are major electric users that often cost more to operate than the school receives in revenues. A typical soft drink machine costs over **\$500** per year to operate. Measures should be taken to minimize the number of vending machines and the hours of use.
 - a. Review your school's vending machine use and have little-used units removed.
 - b. Vending machines must be removed from the main entrance or lobby of all schools effective with the 2004–2005 school year.
 - c. Unplug vending machine units when "Sold Out" is displayed.
 - d. Operation of vending machines must be controlled automatically per the specifications on the following page.

Vending Machine Specification for Montgomery County Public Schools

Effective Date: August 1, 2006

Application: This specification applies to all vending machines in Montgomery County Public Schools (MCPS), located inside the buildings or in outside areas surrounding the school buildings. These items include beverages, such as soft drinks, fruit juice and juice beverages, water, sports drinks, and snacks, such as cookies, crackers, chips, ice cream, and candy.

References: Maryland Code, Education, Section 7-423, Division II, Title 7, Subtitle 4, “Health and Safety of Students”

Board of Education Policy JPG: *Wellness: Physical and Nutritional Health*; MCPS Regulation JPG-RA: *Wellness: Physical and Nutritional Health*; Board of Education Policy ECA: *Energy Conservation*

Timing Controls: Vending machines in MCPS schools must have an integrated timing device to automatically shut off operation of the machine in accordance with nutrition policies established by the Board of Education and energy conservation policy.

Automatic shut off is to include the following features:

1. Prohibit access to products
2. Turn off all lighting
3. Turn off refrigeration

Hours of Operation

Machines containing approved items-

- Non-perishable—7:00 a.m. until midnight, with refrigeration timed to resume one hour before access.
- Perishable—Refrigeration units remain on 24 hours; however, access by students is limited to 7:00 a.m. until midnight.
- Machines containing items not approved for sale during the instructional day must be programmed for automatic shutoff from midnight until the end of the instructional day. Refrigeration may be timed to resume one hour before access.
- Vending machines in teachers’ lounges must be operational from 5:30 a.m. until midnight. Refrigeration may be timed to resume one hour before access.

Approved Items:

Beverages (container size not to exceed 16 ounces except for unflavored water)

- Flavored, non-carbonated water
- 100 percent fruit juice
- Fruit juice beverages with a minimum 50 percent fruit juice
- Low-fat or nonfat milk
- Sports drinks (only allowed in the immediate area of the gymnasiums)

Snacks

- Single-serving size packages
- 7 grams or less of fat (except for nuts and seeds)
- 2 grams or less of saturated fat
- 15 grams or less of sugar (except for fruit)

**Recommended Footcandle (fc) Levels For
Voluntary SERT De-Lamping Projects**

Corridor and Stairways	10–20 fc
<ul style="list-style-type: none"> ▪ As low as 10fc—for high reflectivity flooring/walls (white or pastel) ▪ Up to 20 fc for dark-colored flooring 	
Conference Rooms	30 fc at table height
Reception Areas	20 fc (average ambient) 50 fc (on-task surface/desk)
Classrooms	30 fc (reading/writing)
Art class	75 fc (preferably natural lighting)
Computer labs	15 fc
Restrooms	15 fc
Gyms	30 fc
Cafeteria (seating area)	30 fc
Cafeteria (food prep area)	75 fc

Heating

1. **Temperature Setpoint:** The maximum heating level is 70° F. Set thermostats accordingly and recheck monthly. Some temperature variation will occur as equipment cycles on and off. Report heating problems only if room temperature measured with a thermometer stays 3° or more below set point.
2. **Controls:** Building staff or occupants should not attempt to manually control equipment by tampering with energy management or HVAC controls of equipment. Any problems with controls or equipment should be dealt with promptly through the work order system. Provide frequent inspection of pneumatic controls, including system filter/dryer, automatic bleed and compressor run time. Test and calibrate all pneumatic thermostats at the start of each heating season.
3. **Hours:** During non-school hours, heat is furnished only for MCPS activities and user groups with reservations through the ICB/CUPF. Consolidate necessary MCPS evening activities into the minimum number of zones possible. HVAC will not be provided for an individual to use a classroom or office outside of normal hours. HVAC systems will remain off during cleaning, except when ventilation is required for waxing or stripping activities.
4. **Filters:** Replace filters of all equipment at recommended intervals. Maintain documentation per your building maintenance plan.
5. **Boiler Maintenance:** Fuel oil burners should be cleaned and tuned for optimum combustion twice yearly.
6. **Pumps:** Only one main heating pump should be operated, except where additional pumps are provided for separate zones. Do not operate main pump and standby pump at the same time.
7. **Unit Ventilators:** Maintain unit ventilators free of obstruction, such as books, plants, and furnishings, both on the top grill and at the bottom intake, so that air can circulate efficiently throughout the room.
8. **Infiltration Control:** All windows and outside doors are to be kept closed when heating systems are in operation. Corridor doors and doors to classrooms should remain closed when HVAC is provided. Doors to gyms and pools are to be kept closed. Report faulty door closers to the maintenance depot.
9. **Storage Spaces:** Close unused storage rooms and set thermostat controls, where installed, to the lowest possible temperature setting that will prevent freezing.
10. **Personal Electric Space Heaters:** Personal space heaters will not be permitted. Such units, in addition to having high energy costs, are a fire and safety hazard. Only heaters installed by the Division of Maintenance for emergency use will be permitted; others will be confiscated.

Food Preparation

Cooking Equipment

1. Preheat only equipment to be used 15 minutes before using.
2. Reduce temperature or turn equipment off during slack periods.
3. Cook full loads on every cooking cycle when possible.
4. Use the correct size equipment for all operations.
5. Avoid slow loading and unloading of ovens and opening doors unnecessarily.
6. Keep equipment clean for efficient operation.

Hot Food Holding and Transporting

1. Preheat equipment before loading.
2. Always use at full capacity when possible.
3. Clean thoroughly daily.

Refrigeration Equipment

1. Keep doors tightly closed and avoid frequent or prolonged opening.
2. Place food in refrigerator or freezer immediately upon arrival from supplier.
3. Keep evaporator coils free of excessive frost.
4. Keep condenser coils free of dust, lint, or obstructions.
5. Unplug equipment that is not needed.

Ware Washing Equipment

1. Always operate equipment at full capacity when possible.
2. Flush after heavy meal periods—clean thoroughly, daily.

Water Heating

1. Repair leaking faucets as soon as possible.
2. Reduce storage temperature to 120° F where possible.
3. Insulate hot water pipes.

Ventilating System

1. Use only the number of fans necessary at all times to provide adequate ventilation.
2. Turn fans off upon completion of cooking.
3. Operate two-speed fans on the lower speed when possible.
4. Keep filters and extractors clean.

WATER USE

GENERAL

1. **Be alert for water leaks** and water main breaks. Look for continuous water flow through the water meter at any time, ponding of water around the building, and report leaks to maintenance immediately. A broken water main can release tens of thousands of dollars in water a week until it is repaired.
2. **Report and repair leaking faucets** and faulty flush valves promptly. Check and adjust valves for proper timing annually.
3. **Water is an MCPS resource and not to be given away** or used by outsiders. Users scheduled through ICB are allowed to use water related to their activities. Do not provide free water to road maintenance tankers or any other non-MCPS agency.
4. Do not allow local residents to use school hose bibs or to control irrigation.
5. **Car washes may not** use school water supplies. Off-site arrangements may be made with a local gas station to hold a car wash for fund-raising.
6. The utility budget pays for bottled water only in elementary school portable classrooms.

IRRIGATION

These general guidelines are supplied for the education of individuals operating turf irrigation equipment to help with the successful management of healthy turf.

1. **Avoid Excess Watering.** Excessive watering promotes fungal growth and prevents the development of long, deep root systems needed for healthy turf.
 - a. **Use a simple rain gauge.** Turf in our climate needs only 1” of water per week for optimum health. Use weather reports or your school’s rain gauge to determine whether irrigation is needed each week.
 - b. **With timer systems, check zones for proper saturation levels.** Make sure water saturates the root zone when irrigating but no further. No runoff should occur from the area being watered.
 - c. **Make sure irrigation systems are turned off when it rains.** The installation of rain switches on automated irrigation systems is highly recommended.
2. **Irrigate only in early morning or late evening hours.** This timing minimizes evaporation to the air.
3. **Irrigate only two or three times a week.** This interval promotes deeper root growth, which establishes healthier and sturdier turf.