

Montgomery County, Maryland
Resource Conservation Plans

Fiscal Year 2007

(July 1, 2006 – June 30, 2007)



In Support of
Energy Management Capital Projects and
Utility Operating Budgets

Prepared by the Member Agencies of the

**Interagency Committee on
Energy and Utilities Management
(ICEUM)**

January 2006

Resource Conservation Plans-FY 07

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INTRODUCTION

This document provides the Resource Conservation Plans submitted by member agencies of the Interagency Committee on Energy and Utilities Management (ICEUM), as required under Chapter 18A-9(d)(2) of the Montgomery County Code, in support of the FY 07 Energy Conservation Capital Improvement Projects and Utility Operating Budgets.

General Information

The Interagency Committee on Energy and Utilities Management (ICEUM) is responsible for coordinating County government energy conservation efforts, promoting energy efficiency, sharing information among agencies, providing technical assistance, and cooperating on the planning and implementation of energy conservation measures. The County Code lists the specific duties of ICEUM as follows:

1. Establish uniform utility unit costs for county operating budget proposes;
2. Prepare agency Resource Conservation Plans annually, describing current and anticipated energy conservation programs with actual and projected energy and cost savings; and
3. Advise the County Executive and County Council on energy conservation goals, cost savings and new technologies.

The plans contained in this document are prepared in accordance with item number 2, above. As in previous years, ICEUM members describe their energy management goals and objectives, and provide information on the performance of some of the efforts undertaken in previous years.

This document includes introductory materials and utility rate projections prepared by the Department of Environmental Protection.

The Department of Environmental Protection, Department of Public Works and Transportation's (DPWT) Division of Fleet Management, and the Office of Management and Budget do not have Energy Conservation Capital Improvement Projects or Utility Operating Budgets. These agencies provide information, technical support, and energy planning services to the Interagency Committee on Energy and Utilities Management.

ICEUM Members

The following individuals represent Executive Branch departments and independent agencies on the Interagency Committee on Energy and Utilities Management.

Agency	Primary Author of Resource Conservation Plan	Other Members
County Government-Facilities	Victor Sousa DPWT Division of Operations	Stephen Nash Division of Operations, DPWT
County Government-Vehicle Fleet		Sharon Subadan, Chief & Aubrey Bentham Division of Fleet Management Services, DPWT
County Government-Environmental Protection		Vacant, ICEUM Chair
County Government-Management and Budget		Bryan Hunt Office of Management and Budget
County Government Office of the County Attorney		Betty Ferber Susan Squires
County Government Procurement		Ed Stockdale
County Council		Chuck Sherer Council Staff
Montgomery County Public Schools	Ron Balon Energy Manager Facilities Management	Sean Gallagher , Assistant Director, Facilities Management Jeffery Price Utility Analyst Anja Caldwell & Karen Anderson Green Schools Program
Washington Suburban Sanitary Commission	Rob Taylor Energy Manager	
Montgomery College	Michael Whitcomb Office of Facilities	Edward Boone Consultant
Maryland National Park and Planning Commission	Richard Anderson Consultant	Nancy Keough

Utility Rates

The County Code charges ICEUM with the establishment of uniform utility unit costs for county operating budget purposes. To that end, ICEUM members develop utility rate projections each year. In order to utilize a consistent methodology for projecting energy costs, ICEUM members review trends in futures markets for energy commodities. Futures markets are also considered in projections of motor vehicle fuel costs; however, final rate projections are set based upon predictions of DPWT's Division of Fleet Management Services as to contractual costs for vehicle fuels.

ICEUM rates are intended as "caps" which individual agencies do not exceed in developing their budgets. Since each agency purchases different volumes and types of fuels (such as usage vs. demand for electricity) each agency sets its own budget rates for utilities, under the established ICEUM cap.

INTERAGENCY COMMITTEE ON ENERGY AND UTILITIES MANAGEMENT
UTILITY RATES
September 27, 2005

FY2006, FY2007

<u>Utilities</u>	<u>ACTUAL FY04</u>	<u>ACTUAL FY05</u>	<u>PROJECTED FY06</u>	<u>PROJECTED FY07</u>
Electricity	10.6 % increase over Actual FY 03	31.2% increase over Actual FY 04	15% increase over Actual FY05	37% Increase over Projected FY 06
No. 2 Fuel Oil	\$1.10 per gallon	\$1.60 per gallon	\$2.19 per gallon	\$2.09 per gallon
Natural Gas	\$1.08 per therm	\$1.33 per therm	\$1.86 per therm	\$1.70 per therm
Propane	\$1.20 per gallon	\$1.39 per gallon	\$1.82 per gallon	\$1.67 per gallon
Water & Sewer	0% increase over Actual FY 03	3% increase over Actual FY04	2.5% increase over Actual FY05	2.5% increase over Projected FY06
<u>Motor Fuels:</u>				
Unleaded	\$1.31 per gallon	\$1.70 per gallon	\$3.00 per gallon	\$2.72 per gallon
Diesel	\$1.28 per gallon	\$ 1.77 per gallon	\$2.80 per gallon	\$2.80 per gallon
CNG:	\$1.89 per gallon equivalent	\$1.92 per gallon equivalent	\$2.01 per gallon equivalent	\$2.45 per gallon equivalent
Ethanol	\$1.68 per gallon	\$1.95 per gallon	\$3.37 per gallon	\$2.61 per gallon

Notes:

1. Unit cost or percentage change is a cap. Individual agency unit costs may be below the ICEUM established number, but can not exceed the projection. Energy cost projections for FY06 and FY07 assume the fuel energy tax at the level established in FY05.
2. Electricity rate projections include the price premium for wind energy.
3. Motor fuels include State tax.
4. CNG rate excludes Federal excise taxes, which the County does not pay.

jmw:ICEUMUtilityRatesFINAL09_27_05

EXECUTIVE SUMMARY

Energy Management

The objective of an energy management program is to use engineering and economic principles to control the cost of energy needed to operate buildings and provide services. In order for energy management to be effective it is first necessary for the energy manager to understand how much energy is being consumed and by what specific activities or equipment it is used. With this information it becomes possible to identify opportunities for improvements in energy efficiency and to determine the amount of energy and money that can be saved by each measure. The energy manager can then compare the cost effectiveness of potential measures, and evaluate the effectiveness of measures that were implemented in the past. Each member of ICEUM currently has programs in place to provide energy management. However, programs differ widely among agencies, and the descriptions of energy management efforts presented in annual Resource Conservation Plans also differ widely in both content and format.

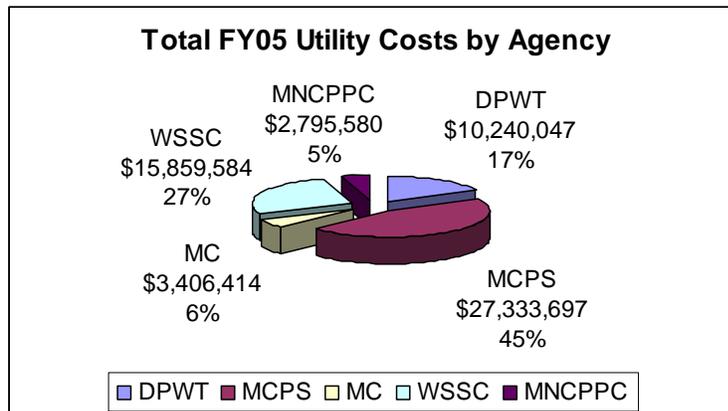
In order to provide some uniformity to the RCPs, summary forms contain the main components of energy planning. These forms are divided into sections on:

- general facilities characteristics,
- energy consumption information,
- existing energy management measures which are currently saving energy,
- new energy management measures implemented during the current fiscal year,
- and measures planned for implementation during future years.

Some agencies also provide summary information on vehicle fleet characteristics, fuel consumption, and vehicle purchases and retirement, as well as information on the solid waste stream and recycling. Narrative material is also provided to supplement and explain the information in the summary forms

Energy Costs

Utility costs fluctuate with rate changes and are influenced by a variety of external factors. The graph below shows the relative portion of the total energy budget for the County that is represented by costs for each agency, based on actual utility costs for FY 05.



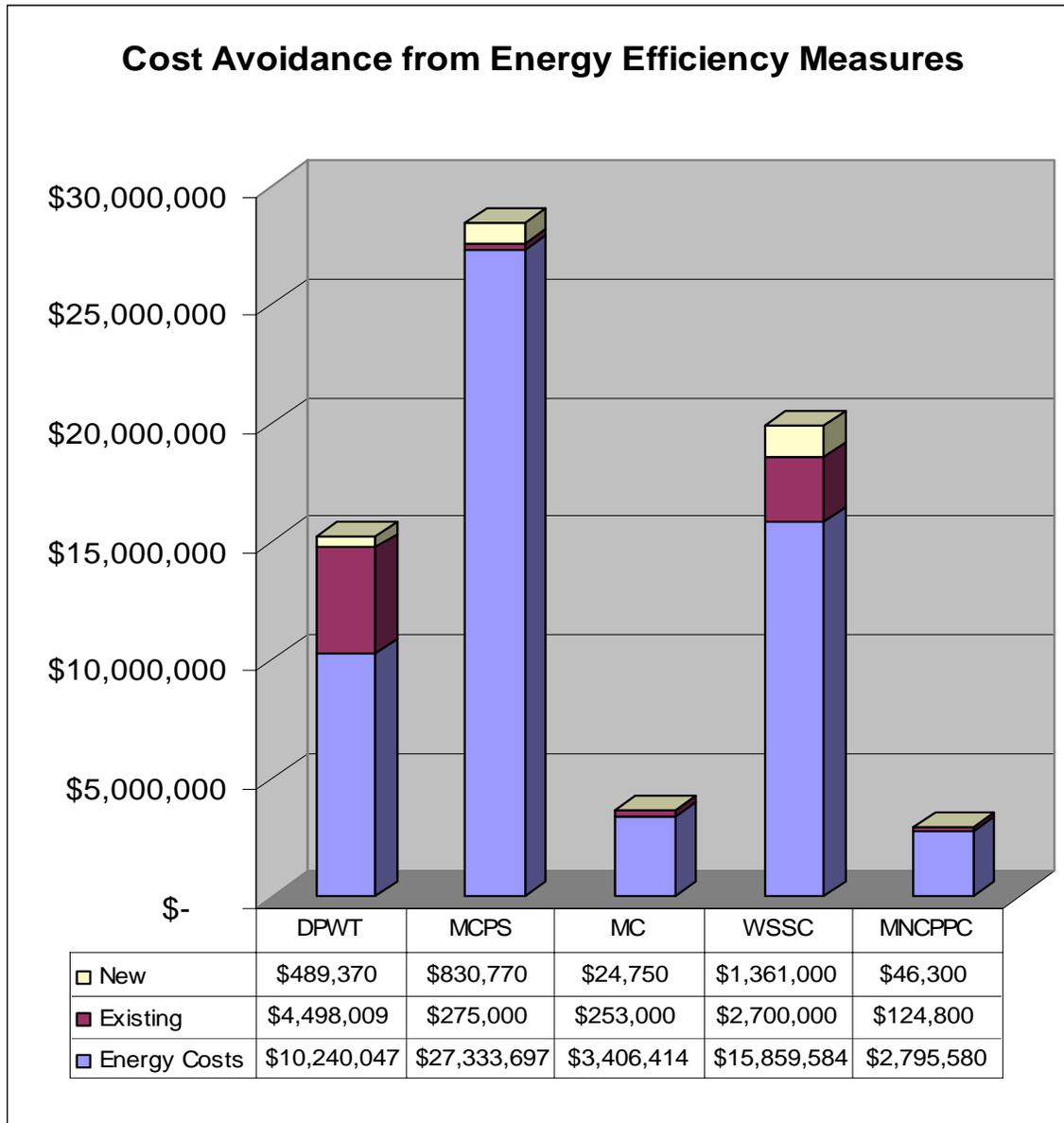
Energy Savings and Efficiency Measures

All ICEUM member agencies have been implementing energy efficiency measures as the primary component of their energy management programs. Individual measures that were implemented in the past, and estimates of the cost savings resulting from each measure are reported in the “Existing Measures” section of the summary forms of the Resource Conservation Plans. Measures that were implemented during the current year (FY06) are listed as “New Measures.” Energy saving measures planned for the coming fiscal year (FY07) are listed as “Planned Measures.” The initial costs of energy saving measures and annual energy cost savings for each agency are summarized in the table below:

<i>Energy Savings Measures by Agency</i>	Investment Costs	Total Savings
Existing Measures		
MCPS	\$265,000	\$275,000
Mont. College	\$1,955,000	\$253,000
WSSC	\$250,000	\$2,700,000
MNCPPC	\$252,200	\$124,800
DPWT	\$14,612	\$4,498,009
<i>total</i>	\$2,736,812	\$7,850,809
New Measures		
MCPS	\$968,000	\$830,770
Mont. College	\$125,000	\$24,750
WSSC	\$1,289,000	\$1,361,000
MNCPPC	\$67,500	\$46,300
DPWT	\$1,025,000	\$489,370
<i>total</i>	\$3,474,500	\$2,752,190
Planned Measures		
MCPS	\$1,683,000	\$1,286,000
Mont. College	\$200,000	\$21,750
WSSC	\$7,500,000	\$2,660,000
MNCPPC	\$67,500	\$31,000
DPWT	\$1,535,000	\$824,172
<i>total</i>	\$10,985,500	\$4,822,922
<i>Grand Total</i>	\$17,196,812	\$15,425,921

Without the implementation of the energy saving measures summarized in the table above, the FY 07 aggregate utilities budget for all agencies would have been higher by a total amount of **\$10,602,999**.

This cost avoidance is shown visually on the graph below. Total energy costs are presented as a separate bar for each agency. The cost savings are shown as the top portions of each bar, with savings from “New” measures represented by the yellow area at the very top of the bar, and savings from “Existing Measures” shown as the red band just below that. The table below the graph provides actual dollar amounts of annual energy costs and energy cost savings.



This graph shows the reductions in energy costs for each agency that have resulted from the implementation of “New Measures” and “Existing Measures.” These reductions represent avoided costs. The graph shows results only for those measures which are documented in the agencies’ Resource Conservation Plan summary forms, and for which dollar savings figures were provided.

Past performance has demonstrated that energy efficiency is a worthwhile investment. Current budgetary constraints, coupled with the uncertainty of future energy prices, further emphasize the need to use energy resources efficiently.

FY 2007

Resource Conservation Plan



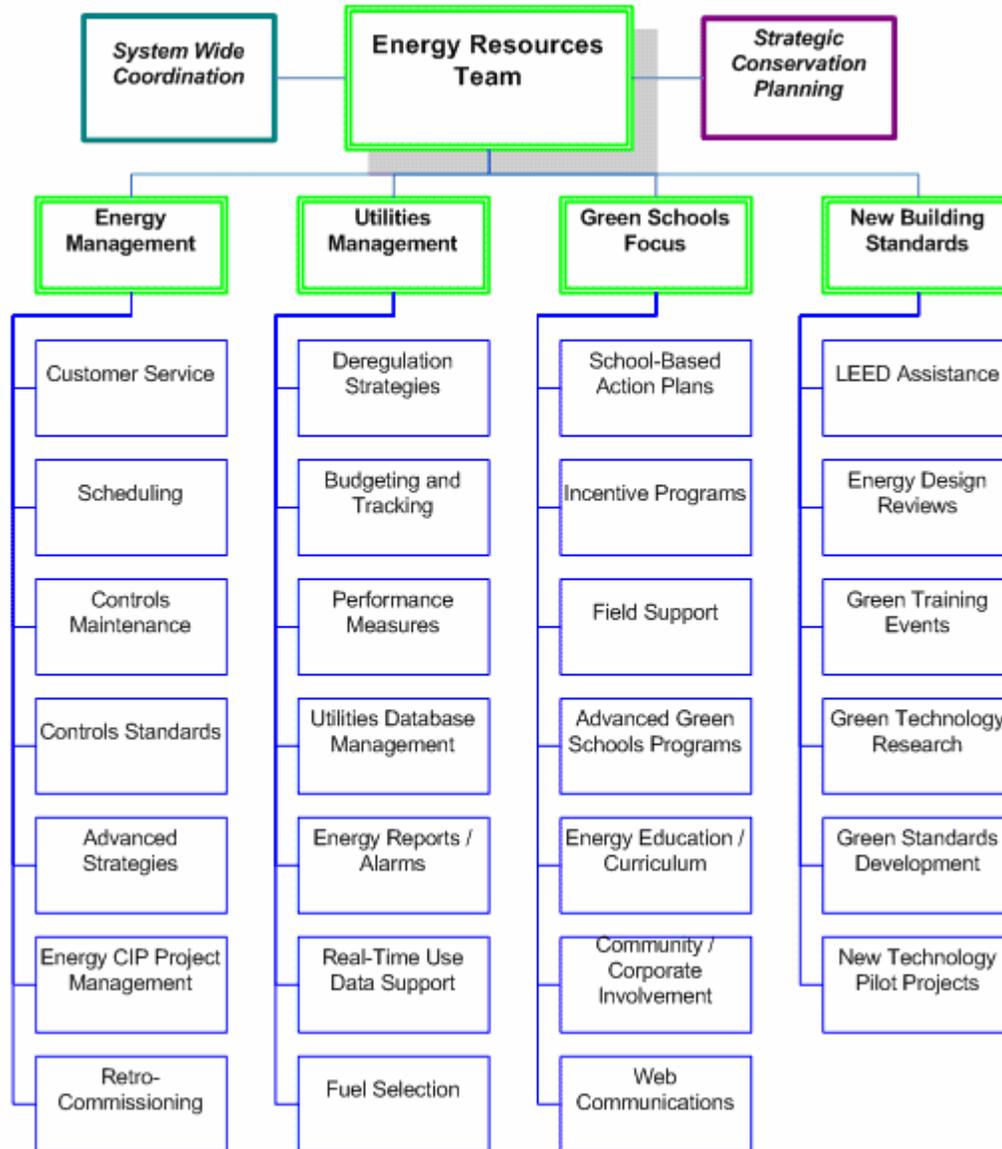
Montgomery County Public Schools
Maryland

Department of Facilities Management

January 2006

Summary

The 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:



For additional information on these program initiatives, please visit our website at: www.greenschoolsfocus.org

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 2007
Summary**

The information on this page reflects the facilities owned or operated
by this agency as of the end of **FY 2005 (June 30, 2005)**

Agency	Montgomery County Public Schools, Maryland				
Number of Facilities	219	Change in number of facilities		+2	
Total square feet	21,754,834	Change in total square feet		545,496	
Average operating hrs, year	2960	Change in avg. operating hrs, year		+20	
Other changes effecting energy consumption	<p>Technology Modernization: The Technology Modernization program adds a net 2,000 computers per year to the school system. Each 1,000 new computers increases MCPS plug loads by 150 kW, equivalent to the energy of an average elementary school.</p> <p>Portable classrooms: Surging enrollment has driven the use of relocatable classrooms (portables). Portables grew by 140 units in FY 2002, and by 57 in FY 2003, reaching a total of 819 classrooms in 719 portables in FY 2006. Portables are electrically heated and cost over twice as much per square foot to operate as permanent school facilities. The portables added in FY 2002 and FY 2003 alone equal the utility impact of three new middle schools.</p> <p>Expanding summer use of schools: MCPS uses schools for a growing number of summer programs, as do 5,000 outside groups scheduled through the Community Use of Public Facilities. Annual operating hours and air-conditioning energy use are on the rise. In FY 2002, the August electric bill for MCPS exceeded the September bill for the first time.</p>				
	Units	Total consumption (actual FY 2005)	Percent change from actual FY 2004	Total cost (actual FY 2005) \$	Percent change from actual FY 2004
Electricity	kWh	188,582,882	-3.5%	\$17,718,235	16.6%
Natural Gas (Firm)	therms	6,124,975	6.2%	\$7,487,467	24.9%
Natural Gas (Irate)	therms	0	0	0	0
Fuel Oil #2	gallons	236,461	59.5%	\$379,798	-31.0%
Propane	gallons	31,739	-2.7%	\$44,123	-17.2%
Water/Sewer	kgallons	394,809	2.3%	\$1,704,074	3.5%
Total				\$27,333,697	16.5%

New Measures

The **New Measures** table on the following page lists and describes energy retrofit activities occurring in the current fiscal year. Other new measures outside the Energy Capital Improvement Program (CIP) are described below.

New Construction: In addition to the indicated retrofits, new building design guidelines generate substantial energy savings in each MCPS construction project. For example, Spark Matsunaga Elementary School opened in 2001 with the first ground source heat pump HVAC system in Montgomery County Public Schools (MCPS). This highly efficient heating and cooling system is now being installed in Northwest #7, Clarksburg/Damascus #7 elementary schools and Richard Montgomery High School. 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 HVAC systems. New construction measures are not listed in this table due to the large number involved and because the cost and benefits of these measures are integrated into the total building design.

Utility Procurement: MCPS also controls utility costs through joint procurement efforts of deregulated energy supplies with other county and bi-county agencies.

Environmental Standards: Beyond energy conservation measures, MCPS seeks to be environmentally responsible in all aspects of facility design and operation. Selected new MCPS facilities are rated by the U.S. Green Building Council for certification under the Leadership in Energy and Environmental Design (**LEED**) program. This program recognizes sustainable design in facility sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Northwest Elementary School #7 is being designed as a **LEED** pilot project and was the first school in Maryland to register for **LEED** review. Lessons learned from the LEED process have been incorporated into the design and construction of all MCPS new construction projects.

Behavioral Measures: In addition to capital improvements, MCPS has long maintained a program of behavioral education to reduce energy use by facility users. The original **School Eco-Response Teams (SERT)** program (1991), and the more comprehensive **Green Schools Focus** (2002), continually promote and reward a culture of conservation in the school system. In FY 2005 and 2006, program staff was increased to provide frequent on-site monitoring of and assistance to schools in saving energy by trained energy facilitators. The program is expected to return more than twice its annual cost in new savings.

New Measures

This table shows information on resource conservation measures implemented during FY 2006
(July 1, 2005, through June 30, 2006)

Measures - New: (Implemented during FY 2006)	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 (\$)
Capital Improvement Projects:						
EMS Upgrades	7/05	\$500,000	-\$50,000			
Lighting Retrofits		0				
Total		\$500,000	-\$50,000			
Operations and Maintenance:						
Replace pin timers for ext lighting with digital	6/06	\$145,000	-\$15,000	Elect kWh	6,030,000	\$780,000
Roberto Clemente MS Performance Contract	10/05	\$323,000	-\$500	Elect kWh NG Therm	296,000 5,692	\$50,770
Total		0	0			
Description of Activities:						
<p>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, such as the Paragon EL (Exterior Lighting) 72, have digital accuracy, daily sunrise/sunset adjustments, 7-day capacitor backup for power outages, and can download programming from a notebook PC.</p> <p>Roberto Clemente Middle School Performance Contract: This project is a pilot for using energy service companies (ESCO's) to survey, recommend, and carry out energy conservation measures for a facility. The program cost is financed and the lease or loan payments are made from energy savings over a period of several years. Measures at Roberto Clemente Middle School included lighting, boiler control improvement, vending machine controls, energy management system improvement, retro-commissioning of the HVAC system, and gas phase air filters on major air-handlers to reduce the need for outside air.</p>						

Existing Measures

MCPS has made significant investments in energy conservation going back to 1980. The **Existing Measures** table on the following page highlights the past six years of projects using Energy CIP funding.

Behavioral Measures: In addition to capital improvements, MCPS has long maintained a program of behavioral education to reduce energy use by facility users. The original **School Eco-Response Teams (SERT)** program (1991), and the more comprehensive **Green Schools Focus** (2002), continually promote and reward a culture of conservation in the school system. These programs communicate with the schools through professional development events, newsletters, curriculum modules, informational flyers, e-mail, web sites, a telephone hot line, and site visits. As rewards for participation, the programs offer project grants, quarterly cash awards, contest prizes, publicity, and application for national Earth Apple Awards. These programs produce hundreds of thousands of dollars a year in utility savings for the school system and help to instill environmental responsibility in future generations.

*“The problem of energy conservation has been solved, technically.
All that remains is 20 years of implementation.”*

Amory Lovins, Ph.D., Rocky Mountain Institute

Existing Measures

This table shows information on resource conservation measures implemented during FY 2005

Measures - New: (Implemented during FY 2006)	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 (\$)
Capital Improvement Projects:						
Lighting Retrofit at Clopper Mill ES	12/04	\$ 70,000	(\$ 3,500)	Elect (kWh)	330,000	\$ 28,000
Waterless Urinals at MLK MS	10/04	\$ 10,000	(\$ 500)	Water (Gal)	560,000	\$ 4,000
Retro-Commissioning Wheaton / Edison HS	09/04	\$255,000	(\$ 8,000)	Elect (kWh)	420,000	\$ 43,000
Total		\$265,000	(\$12,500)			\$47,000
Operations and Maintenance:						
Shutdown of Network Computers	7/04	0	0	Elect (kWh)	3,060,000	\$275,000
Total		0	0			\$275,000
Description of Activities:						
<p>The “Internet Control of Relocatable Classrooms” is 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 relocatables. The savings for this project is high because portables originally contained only manual thermostats and ran essentially uncontrolled. The use of conventional 7-day programmable (but non-communicating) thermostats is impractical in this application because of the inability to verify programs at over 700 locations and the inability of 7-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 relocatables and save energy opportunistically. The newly developed system makes it feasible for the first time to efficiently control large numbers of small, relocatable buildings with a payback of under a year.</p> <p>Waterless Urinals: Urinals are being tested that use no water for flushing, while improving sanitation and reducing restroom odors. One school and maintenance depot will be tested this year, with an anticipated payback of less than 3 years. If successful, this technology will be applied to 50 restrooms scheduled for work under the Restroom Renovations CIP.</p> <p>Shutdown of Network Computers: In addition to using Energy Star computer equipment, this year MCPS has instituted the system-wide 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. Research is continuing to optimize these settings.</p>						

Existing Measures

This table shows information on resource conservation measures implemented prior to FY 2005

Measures - Existing: (implemented from FY 1998 to FY 2006)	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 (\$)
Capital Improvement Projects:						
Lighting Retrofits	01/98	\$ 644,633	(\$25,325)	Elect kWh	2,992,939	\$209,506
Lighting Retrofits	01/99	\$ 467,748	(\$18,376)	Elect kWh	2,171,687	\$152,018
Lighting Retrofits	01/00	\$ 241,693	(\$ 9,495)	Elect kWh	1,122,147	\$ 78,550
Lighting Retrofits	01/01	\$ 193,471	(\$ 7,601)	Elect kWh	898,259	\$ 62,878
Lighting Retrofits	01/02	\$1,544,630	(\$60,682)	Elect kWh	7,171,498	\$502,005
Lighting Retrofits	01/03	\$ 237,000	(\$ 9,377)	Elect kWh	635,496	\$ 54,485
EMS Upgrades	01/03	\$ 161,000	0	Elect kWh	442,000	\$ 31,800
				NGTherms	18,500	\$ 15,200
Cooling Tower Water Monitors	01/03	\$ 65,000	(\$15,000)	Water Gallons	2,800,000	\$ 12,000
Total		\$65,000				\$1,118,442
Operations and Maintenance:						
Total						
Description of Activities:						
<p>MCPS comprehensive lighting retrofits improve every lighting fixture in the building. 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 type. LED EXIT's consume only 5 Watts and never burn out, thus improving the safety of the facilities.</p> <p>Cooling tower water monitors detect excess water flow through cooling towers caused by malfunctioning controls and alert 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.</p> <p>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.</p>						

Planned Measures

Energy Capital Improvement Program: A significant backlog of profitable energy projects exists in MCPS for energy management, lighting, and water conservation. The **Planned Measures** table on the following page reflects the target areas for the coming fiscal year. Planned Measures outside of the Energy CIP are described below.

Improved New School Design: MCPS has completed a comprehensive revision of its new construction design guidelines. This revision incorporates best practices from the LEED new construction design criteria and pilot project experience described in other sections of the RCP. MCPS believes that, at a minimum, new construction projects would score a 26 or better under the current LEED criteria. On a project-by-project basis, “stretch” measures will be included for pilot testing. As these measures and technologies prove themselves reliable and effective, the measure will be incorporated in the design guidelines.

New Green Schools: MCPS plans to continue Green Schools training and support to schools at the rate of 10 per year, with a goal of eventually having all middle and high schools become part of this program.

Water Conservation Retrofits: In the area of water conservation, MCPS plans to incorporate successful technologies from pilot studies into design for a 50-school Restroom Renovations Capital Improvement Project.

High-efficiency Relocatables: MCPS is holding a design competition for a high-efficiency relocatable classroom in the eventuality that additional units are ever needed.

“We hope for a delightful, safe and healthy world, with clean water, renewable power, economically, equitably, ecologically and elegantly enjoyed.”

William McDonough and Michael Braungart

Planned Measures

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

Measures - Planned: (for FY 2007)	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 (\$)
Capital Improvement Projects:						
EMS Upgrades	03/2007	\$ 1,055,000	-\$97,000	NG Therms	139,000	\$115,000
				Elect kWh	242,857	\$31,000
Lighting Retrofits	03/2007	\$ 500,000	-\$50,000	Elect kWh	850,000	\$125,000
Pilot Replacement Technologies		\$145,000	-\$15,000			\$35,000
Total		\$1,700,000	-\$162,000			\$306,000
Operations and Maintenance:						
Group Relamp with 25 W T8	1/07	\$1,683,000	-\$62,000	Elect kWh	10,710,000	\$1,286,000
Total		\$1,683,000	-\$62,000			\$1,286,000
Description of Activities:						

Energy Management Upgrades: The infrastructure of energy management systems at MCPS has reached an age where many systems need to be replaced or upgraded. Advances in electronics and communications now enable deeper savings from energy management systems (EMS) than previously was possible. Also, new network interface standards now can distribute real-time EMS data instantly to widely distributed facility users and staff. Access to building automation data across the Wide Area Network multiplies the value of energy management systems well beyond the simple energy savings shown above. These and other strategic improvements will be made during the systematic EMS upgrade initiative.

MCPS comprehensive lighting retrofits improve every lighting fixture in the building. 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 type. LED EXIT's consume only 5 Watts and never burn out, thus also improving the safety of the facilities.

Group Relamp with 25 W T8: Group relamping with new higher efficiency and longer life T8 lamps allow a 25 percent reduction in energy use in existing fixtures without loss of maintained lumen output. MCPS plans to change all existing lamps to take advantage of this new technology system wide.

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 school system in Maryland** to register a new building design for LEED Certification (NWES #7). Four building designs are now registered in total.
- 3) First **MCPS Green Schools** supported by Green Schools Focus staff and modeled on the national Green Schools program of the Alliance to Energy:
Thirty-one secondary schools have received training, including sessions on—
 - a. an **investigation-based approach** for energy and environmental activities,
 - b. use of professional instrument **toolkits**, and
 - c. **energy-related curriculum** materials and support.
- 4) First deployment of a **web interface in MCPS** to view real-time building information.
 - a. Twenty schools are now “online” to anyone on the MCPS-wide area network to view building environmental conditions through a web browser.
- 5) First use of a **web-based system to monitor daily electric profiles** in buildings and detect abnormal use patterns, control, and scheduling problems.
 - a. Forty-nine sites are installed under the PEPCO “CEO Online” subscription program.
 - b. A 10-building pilot project is testing a similar and less expensive approach completely owned by MCPS.
- 6) First MCPS use of the **automated scheduling database** operated by the ICB/Community Use of Public Facilities program to receive HVAC scheduling requests from three school clusters in place of paper calendars manually filled out by school staff.
 - a. This system will be extended to all elementary and middle schools in FY 2005.

- 7) First **network control** of power-saving settings on all MCPS computers.
- 8) First systematic **retro-commissioning** of MCPS facilities to correct control failures, improve comfort, and reduce energy expenses (six facilities to date).
- 9) First MCPS school opened with a **geoexchange system** for heating and cooling.
 - a. Spark Matsunaga Elementary School and Longview Center, 125,000 square feet.
 - b. First MCPS school to have no comfort complaints in the first two years of operation.
- 10) First school (Roberto Clemente Middle School) to receive **ESCO Performance Contract** for comprehensive energy audit and implementation of energy conservation measures.
 - a. First use of energy project financing through the Community Energy Loan Program of the Maryland Energy Administration
- 11) First use of **waterless urinals** (Martin Luther King Middle School) in a Maryland school.
- 12) New staff (**energy facilitators**) and program support designated to **visit schools monthly** and monitor and assist with energy saving plans.

Resource Conservation Policy and Guidelines

-  [BOE Policy On Energy Conservation](#)
-  [Electricity Guidelines](#)
-  [Heating Guidelines](#)
-  [Food Preparation Guidelines](#)
-  [Water Use Guidelines](#)
-  [MC Green Committee Report on LEED Point System](#)

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 set point.
- 2. 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.
- 3. 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.
- 4. Computers:** Shutting down computers not in use is important. Computers in our schools consume more energy than the lighting. **Teachers 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.
- 5. Lights:** Teachers should ensure lights are turned off when leaving the classrooms empty, 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 the gym is not in use.
- 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. Because most classroom lights are controlled by two or more switches, maximum lighting and lights nearest the windows should be used only when daylight is not available.

- 9. Exterior Lighting:** All outside lighting shall be **off** during daylight hours. Parking lot lights should be turned off at the close of the regular school day or evening activities (by 12:00 a.m. at the latest), and back on at 6:00 a.m. to 8:00 a.m. (unless sunrise is before 6:00 a.m.) Building service managers should seasonally check/reset the time clock for all outside lighting.
- 10. Cleaning Crews:** All lights will be turned **off** when students and teachers leave school. Building service workers will turn on lights only in the areas in which they are currently working.
- 11. Holidays and Breaks:** All electrical equipment will 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. Low-wattage radiant panels are acceptable.
- 13. Infiltration Control:** All windows and outside doors will be kept closed when cooling systems are in operation. Corridor doors and doors to classrooms will remain closed when HVAC is provided. Doors to unconditioned spaces, including gyms and pools, will be kept closed. Inspect automatic door closers weekly.
- 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 \$400.00 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. By BOE Action Item 12.8.2, vending machines serving food of "minimal nutritional value" must be unplugged or automatically turned off from midnight to the end of each school day.
 - c. Vending machines must be removed from the main entrance or lobby of all schools effective with the 2004-2005 school year.
 - d. Vending machines also may not be located anywhere in a corridor where it reduces the code egress path width.
 - e. Unplug vending machine units when "Sold Out" is displayed.
 - f. Unplug vending machine units for non-perishable items when vandal gates are closed.
- 15. 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 for successfully reducing light levels and saving energy.

**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 (avg. 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 three degrees 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 will be kept closed when heating systems are in operation. Corridor doors and doors to classrooms will remain closed when HVAC is provided. Doors to unconditioned spaces, including gyms and pools, will be kept closed. Inspect automatic door closers weekly.
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. 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 bibbs or to control irrigation.
5. **Car washes may not** use school water supplies.
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.



MC Green Committee Report on LEED Point System

Montgomery County Public Schools
Department of Facilities Management



Montgomery County Maryland

Green Committee Report on LEED Point System

Montgomery County Public Schools – Department of Facilities Management

- a. Who we are
- b. Our Mission
- c. Group responsible for Design and Construction at MCPS
- d. Types of Projects
- e. Environmental Initiatives
- f. Process of Designing Green
- g. Analysis of LEED Rating for MCPS Buildings

Appendix :

List of Green Building and High Performance Technology Pilots at MCPS
Organizational Chart of Montgomery County Public Schools
Organizational Chart of Department of Facilities Management within MCPS
FY 05 MCPS High Performance Green Building Plan
LEED 2.1 Scorecard for MCPS
Green Building at MCPS Powerpoint Handout



a. Who we are

Montgomery County Public Schools in Maryland has 217 facilities including schools and office buildings which represent approximately 20 million square feet for almost 140,000 students.

b. Our Mission

The Department of Facilities Management at Montgomery County Public Schools creates and maintains quality public facilities for learning through dedicated staff who optimize design, construction, and maintenance processes.

The Green Schools Focus at Montgomery County Public Schools instills environmental stewardship and conserves resources in Montgomery County Public Schools, through system-wide resource conservation training, rebate and incentive programs for saving energy, and leadership in future school energy and environmental design.

c. Group Responsible for Design and Construction at MCPS

The Department of Facilities Management (DFM) is responsible for all the design and construction at MCPS. The Division of Construction within the DFM oversees the design and construction process of all the MCPS facilities and collaborates with all the other divisions of the DFM including the Real Estate Team, the Division of School Plant Operations and the Division of Maintenance with the Indoor Air Quality Team.

The Energy Resources Team within the DFM has formed an in-house sustainability task force called the Green School Focus that collaborates with all the DFM Divisions on sustainability issues and green building.

Green reviews of MCPS construction projects are part of the scope of the Green Schools Focus.

d. Types of Projects

MCPS has a six year CIP (Capital Improvements Program) that identifies the need for capacity related projects, modernizations, new construction and systemic replacement of school facilities.



e. Environmental Initiatives

Several unique programs address green, high performance building, reduction of energy and resource consumption, waste management and recycling, transportation, outdoor environmental education, integrated pest management and green cleaning. The Green Schools Focus also provides staff training and curriculum integrated, "green" education of all MCPS students and teachers.

1. LEED Projects

The schools system will complete its first LEED (Leadership in Energy and Environmental Design) pilot project for a new green elementary school in 2006. An annual "MCPS High Performance Building Plan" has established strategies to get new school construction LEED certified (attached). MCPS Design and Construction standards have been updated to reflect elevated environmental, efficiency and health benchmarks for our facilities sheltering mostly children and young adults.

2 Green Building and High Performance Technology Pilots at MCPS

Several green building technology pilots at various locations are used to test new technologies before they are taken into consideration for MCPS design standards. A list of ongoing pilot projects is in the appendix .

3. Energy Education Programs at Schools

Based on the schools systems experience any building performance is also very much dependent on occupant's behavior, which can be optimized by continuous training in energy conservation at the schools. The SERT Program (School Eco Response Teams) awards school teams of teachers, students and building managers for energy and water conservation activities at their school and in the classrooms. The teams analyze and monitor the energy use of equipment, systems and lighting with provided tool kits and implement conservation activities and special conservation programs.

f. Process of Designing Green

MCPS has established an annually updated "MCPS High Performance Green Building Plan" that identifies the process and goals for green building and LEED at MCPS. A copy of the FY05 plan is attached.

g. Analysis of LEED Rating for MCPS Buildings

MCPS has one project, a new elementary school in Germantown, registered for a LEED certification with the US Green Building Council.

The school is expected to be significantly more energy efficient than similar buildings, has a geothermal heat pump system and several water saving features like waterless urinals and toilets



with low water use flush options. These high performance features are expected to generate significant annual savings in energy and water use compared to a conventional school building.

Latest MCPS architectural design standards have been updated to reflect a basic LEED certification level. At this point the building is under construction and on track for a LEED certification after completion in 2006.

The DFM is planning a thorough cost benefit analysis after project completion end of 2006 to determine plans for any future LEED projects. This cost/benefit analysis will determine how future budget adjustments will accommodate green building and high performance features.

Contact for Construction at MCPS:

James Song, Director of Division of Construction 301.548.7490

<http://www.mcps.k12.md.us/departments/construction/>

Contact for Green Building at MCPS:

Anja S. Caldwell, Green Schools Program Manager 301.279.3475

Several Powerpoint presentation of the Green Schools Focus at MCPS are available on the website at www.greenschoolsfocus.org. – MCPS Green Building.



Green Building and High Performance Technology Pilots at MCPS

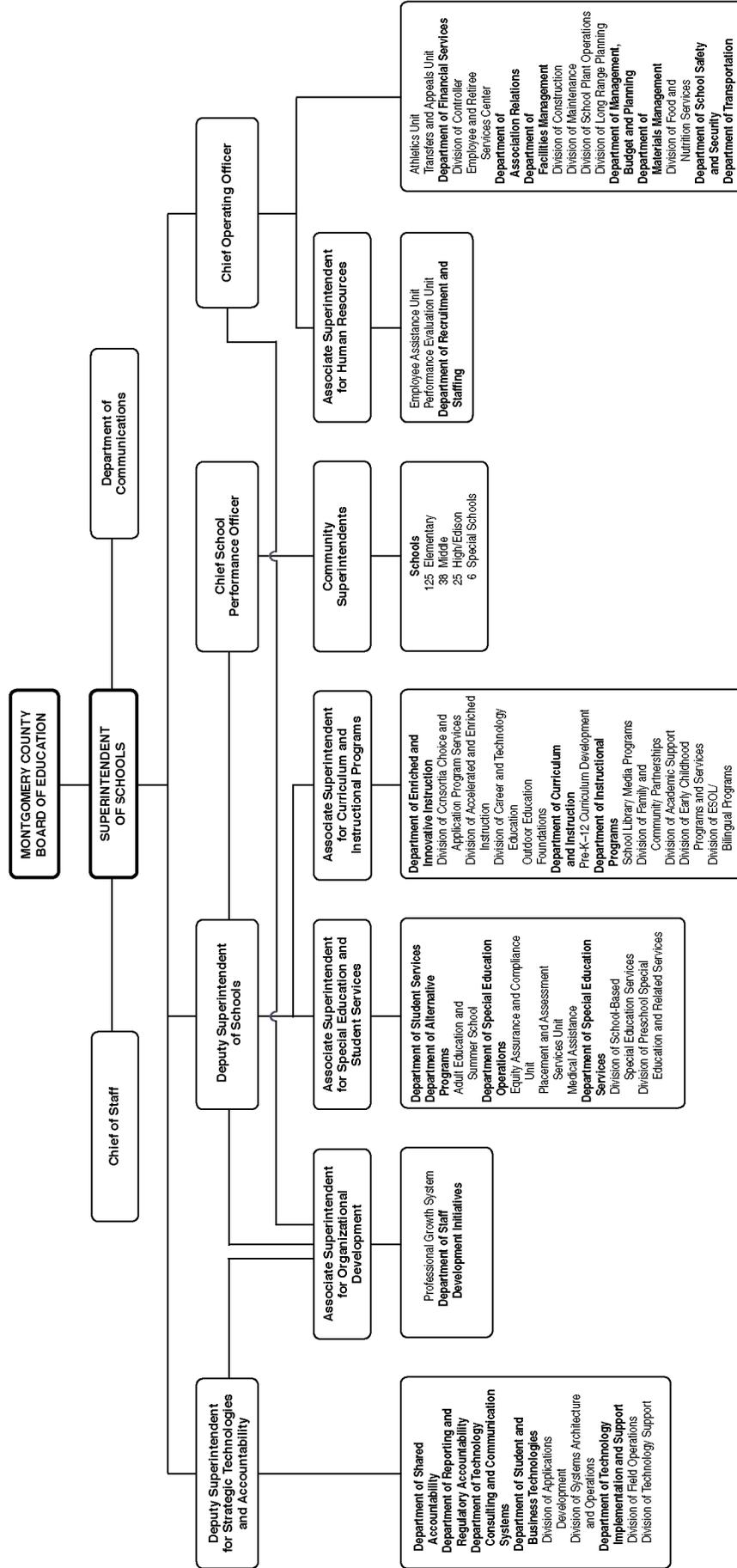
Type of Project	Location	Start Date
Site Design		
Vegetated Roof for Stormwater Management	Northwood HS	August 2005
Bioretention	Spark M. Matsunaga ES	2001
Rain Gardens	Eastern MS	2005
	Smith Center	
Pervious Paving	Northwood HS	2005
Native Plantings	Northwest #7 ES	
Water Efficiency		
Waterless no-flush Urinals	Shady Grove Depot (6)	2004
	Martin Luther King MS (18)	2004
	A. Mario Loiederman MS (6)	2005
Energy		
Light Dimming Ballasts	Woodfield ES	2002
Occupancy Sensors for Lighting	Montgomery Blair HS	1998
Lighting Retrofits (T12 to T8)	Various	Various
Exit Light Retrofits (incandescent to LED)	Various	Various
Photovoltaics	Smith Environm. Ed Center	
	Takoma Park MS	2005
	John Poole MS	
Wind Turbine	Smith Environm. Ed Center	
Green Power Procurement	5%	2004
EMS for portable classrooms	All schools	2004
Geoexchange field w/ hydronic heat pumps	Spark Matsunaga ES	2003
	Richard Montgomery HS	2006
	Northwest ES #7	2006
	Clarksburg/Damascus ES #7	2006
Hydronic Heat Pumps	Forest Knoll ES addition	
	Watkins Mill ES	
	Downcounty Cons. ES # 27	
	Northeast ES #16	
Solar Thermal	Lake Seneca ES	1985
Daylight Harvesting	Lake Seneca ES	1985
Ice Storage Cooling	Roberto Clemente MS	1992
Energy Star White Roof	Northwest ES #7	2006
High Performance roller blinds	Northwood HS	2004
Energy efficient electrical hand dryer	Rockville HS	2004



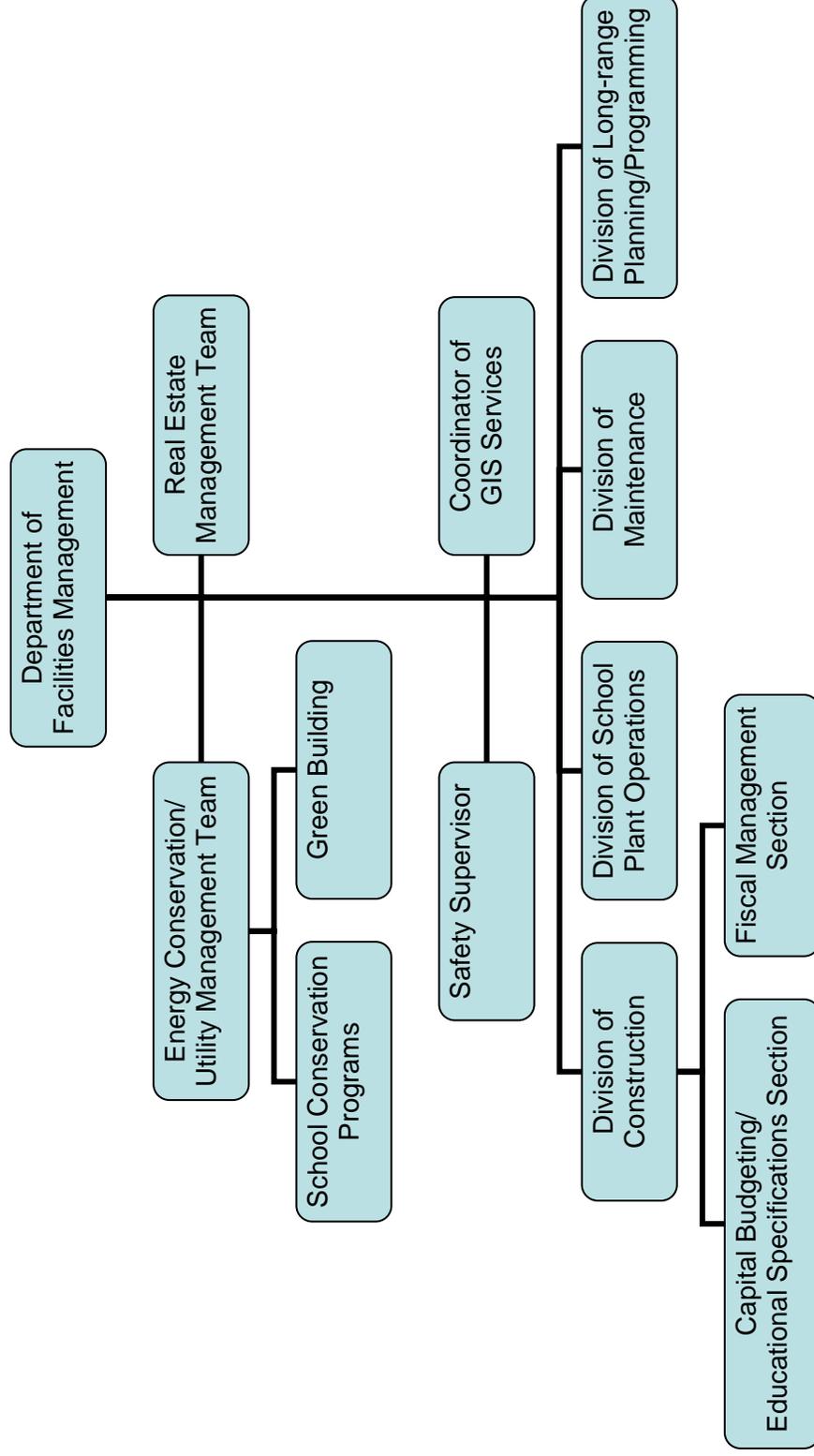
Green Building and High Performance Technology Pilots at MCPS - continued

<u>Type of Project</u>	<u>Location</u>	<u>Start Date</u>
Materials		
Construction Waste Recycling	Northwest ES #7	
Rubber Floor in lieu of VCT	TBD	
Local Materials	All projects	2004
Green Portable Classroom Pilot	TBD	
In-Vessel Food Composter	TBD	
Recycling	mandatory at all schools	
Indoor Environmental Quality		
Low emitting paints and sealants	Northwood HS	2005
Non-formaldehyde wood composites	Somerset ES	2005
Carbon Dioxide Monitoring	Northwest ES #7	2006
Green Cleaning	TBD	
Procurement		
Hybrid fleet for Green Schools Focus	Metro Park North	2003

MONTGOMERY COUNTY PUBLIC SCHOOLS FY 2006 ORGANIZATION



**Montgomery County Public Schools, Maryland
 Organizational Chart - Department of Facilities Management
 November 2005**





GREEN SCHOOLS FOCUS

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FY 05 High Performance Green Building Plan for MCPS

- 1. MCPS LEED™ Pilot Projects**
- 2. Greening of the MCPS Standard Design Guidelines**
- 3. Sustainable Design Review**
- 4. Training of MCPS Staff in High Performance Green Building Technologies and Processes**
- 5. Experience in High Performance School Design and LEED™ Requirement for MCPS Requests for Qualifications and Proposals**
- 6. Green Building Technology Pilots**
- 7. Operations and Maintenance of High Performance Green School Buildings**
- 8. LEED™ Application Guide for Schools**
- 9. MCPS LEED™ Application Template**
- 10. Updates**



1. MCPS LEED™ Pilot Projects

As a pilot project, the new Northwest Elementary School #7 in Germantown is currently being designed and evaluated for a certification under the LEED™ version 2.1 for new construction (Leadership in Energy and Environmental Design, see www.usgbc.org/leed) system. Three other schools, Clarksburg/Damascus ES #7, Northeast ES #16 and Downcounty Consortium ES #28 are also currently registered with the US Green Building Council. These schools are all part of the 2005-2010 CIP and scheduled for completion in September 2006.

The pilot of Northwest ES #7 was initiated at a MCPS system wide LEED™ Charrette in the summer of 2003 (see www.greenschoolsfocus.org). The project is scheduled to bid in January of 2005 with a completion date of September 2006. The project design incorporates several green building technologies as add alternates to ensure the base project is affordable within the allocated funds. Any additional initial investment costs for green building components will be identified and implemented as the project budget allows. The base project is currently at a basic LEED™ certification level and a recent assessment indicates that a LEED™ Silver certification can be achieved with the acceptance of all the identified additional alternates.

The construction budgets for these projects were allocated prior to the launch of the “High Performance Building Plan for MCPS 2003”(see www.greenschoolsfocus.org), which initiated the first MCPS green building initiative in FY 04. The schools have no additional budget allocations for high performance green building technologies that exceed current MCPS Facility Design Guidelines.

The Department of Facilities Management with the Division of Construction chose to apply the LEED™ rating system to the design process to streamline system integration and energy efficiency of these projects. This decision was based on the documented benefits of sustainable design practices and green building technologies. Research and data published by the US Green Building Council (USGBC, see www.usgbc.org) show significant potentials for cost savings in maintenance and operations of LEED™ schools.

Key to avoiding extra costs was introducing the LEED™ rating system early in the design process. All four schools had recently undergone feasibility studies and were going into schematic design, so the timing was right. Therefore all four elementary schools got registered for a LEED™ certification with the USGBC.

As the pilot projects are currently underway, project costs and benefits will be evaluated as a basis for developing project budgets for future LEED™ projects. A system wide goal for a LEED™ certification status and level will be determined when the merit of the current LEED™ pilots can be evaluated.



2. Greening of the MCPS Standard Design Guidelines

Facility Design Guidelines: A thorough review of the Facility Design Guidelines CSI Division 1 through 16 has taken place by a sustainable design consultant, project managers at the Division of Construction and the Green Schools Program Manager. The results and an index have been presented to the Director of School Plant Operations and the Division of Maintenance, including the IAQ Team, end of October 2004. A last review will be compiled by the Green Schools Focus and submitted to the Division of Construction for distribution to the AE team end of 2004.

Other Guidelines: It was determined at the Green Spec Meeting in October 2004 that the following additional documents need to be compiled by sub-committees by end of 2004:

- Indoor Air Quality Management Plan during Construction
- Construction Waste Management Plan
- Review of HVAC and Commissioning Guidelines according to LEED™ Standards
- Review of Lighting Standards according to LEED™ Standards

3. Sustainable Design Review

A Sustainable Design and LEED™ Review by the Green Schools Focus will be part of the design review processes at the Division of Construction, from the feasibility study to the construction documents of all new construction projects and major renovations.

The project managers at the Green Schools Focus are to be invited by the Division of Construction to the various milestone design meetings with the design team. The project managers will compile the comments and distribute them to the consultants.

The LEED™ related categories of site, water, energy, materials and resources and IAQ will be the focus of the review, with an emphasis on energy efficiency of envelope, operations, building systems and lighting.

4. Training of MCPS Staff in High Performance Green Building Technologies and Processes

A LEED™ Intermediate workshop has been conducted for MCPS Department of Facilities Management staff in 2003. It is a goal to have all project managers at the Division of Construction certified as a LEED™ Accredited Professional by end of 2005.

The Green Schools Focus will continue to provide informal training sessions in the form of seminars, product presentations and luncheons at the Division of Construction. The Green Schools Focus will also continue to distribute information about conferences, seminars, workshops and tours focusing on high performance green schools and LEED™ on a national level and in the region.



5. Experience in High Performance School Design and LEED™ Requirement for Consultants Selection Process

In the consultants selection process firm experience in high performance green school design and LEED™ will be added to the criteria for Requests for Qualifications from consultants. MCPS advises consultants to have LEED™ Accredited Professionals on the design team working on capital MCPS projects.

The resumes of the design team members are part of the initial application and any changes or replacements in team members need to be approved by the Division of Construction at MCPS. Qualifications in regard to high performance green design and LEED™ will be submitted for review by the Green Schools Program Manager.

6. Green Building Technology Pilots

Several pilot projects for green building technologies have been started in 2004 for existing buildings and portables classrooms. The Green Schools Focus has developed a protocol to track these pilot projects and will distribute the proposed format among the divisions involved. The protocol will determine the evaluations of the technologies and continue to inform the design for new constructions and renovations. Current pilot projects are described in the latest MCPS Resource Conservation Plan.

7. Operations and Maintenance of High Performance Green School Buildings

Green Cleaning products and procedures according to the principles of the Green Seal guidelines have been introduced to the Division of School Plant Operations. The Division is evaluating the certification and plans to introduce a “Green Vendor Day”.

8. LEED™ Application Guide for Schools

MCPS is actively involved in the development of the LEED™ Application Guide for Schools (LEED™ AGS). The Green Schools Program Manager at MCPS is serving on the national USGBC LEED™ for Schools Committee as an elected member. The guide is scheduled for completion for summer 2005 and will be a supplement to LEED™ for New Construction Version 2.2.

MCPS’ experience in implementing LEED™ will inform the USGBC committee and the committee work will inform MCPS about future adaptations that are expected to facilitate the application of the LEED™ rating system to our schools.



9. MCPS LEED™ Application Template

MCPS has developed a general MCPS LEED™ Application Template which is modeled after the LEED™ Scorecard that determines the goal for individual credits for all projects and pilots. The scorecard is at the end of this plan on page 6 and 7.

The scorecard shall be distributed to all consultants at the beginning of any capital project to guide the design process.

This approach was chosen in lieu of developing a separate comprehensive MCPS LEED™ Application Guide, as initially intended in the 2003 High Performance Building Plan for MCPS under 5.2.3, since MCPS has now an active role in the USGBC committee mentioned under section 8. of this plan.

10. Updates

This plan will be reviewed and updated biannually in October, to coincide with the CIP budget submission planning cycle for Construction, and the annual DFM Resource Conservation Plan. A list of certification goals for upcoming projects will be updated and attached.



MCPS LEED™ -NC 2.1 Application Template 2004

	LEED™ 2.1 Prerequisites and Credits	All Projects	Pilot Projects	Site Specific	Not Likely	
SUSTAINABLE SITES	Site Prerequisite: Erosion & Sedimentation Control	X	X	X		
	Site Credit 1: Site Selection			X		
	Site Credit 2: Urban Redevelopment			X		
	Site Credit 3: Brownfield Redevelopment				X	
	Site Credit 4: Alternative Transportation	4.1 Public Transportation Access			X	
		4.2 Bicycle Storage & Changing Rooms	X	X		
		4.3 Alternative Fuel Refueling Station				X
		4.4 Parking Capacity		X	X	
	Site Credit 5: Reduced Site Disturbance	5.1 Protect or Restore Open Space		X	X	
		5.2 Development Footprint		X	X	
	Site Credit 6: Stormwater Management	6.1 Rate and Quantity		X	X	
		6.2 Treatment		X	X	
	Site Credit 7: Heat Island Reduction	7.1 Non-roof		X	X	
		7.2 Roof	X	X		
Site Credit 8: Light Pollution Reduction		X	X	X		
WATER EFFICIENCY	Water Credit 1: Water Efficient Landscaping	1.1 Reduce by 50%	X	X	X	
		1.2 No potable Use or No Irrigation		X	X	
	Water Credit 2: Innovative Wastewater Technologies			X		
	Water Credit 3: Water Use Reduction	3.1 20% Reduction	X	X		
3.2 30% Reduction			X			
ENERGY AND ATMOSPHERE	Energy Prerequisite 1: Fundamental Building Systems Commissioning	X	X			
	Energy Prerequisite 2: Minimum Energy Performance	X	X			
	Energy Prerequisite 3: CFC Reduction in HVAC&R Equipment	X	X			
	Energy Credit 1: Optimize Energy Performance	1.1 20% New/ 10% Existing	X	X		
		1.2 30% New/ 20% Existing	X	X		
		1.3 40% New/ 30% Existing	X	X		
		1.4 50% New/ 40% Existing			X	X
		1.5 60% New/ 50% Existing			X	X
	Energy Credit 2: Renewable Energy	2.1 5%		X	X	
		2.2 10%			X	X
		2.3 15%			X	X
	Energy Credit 3: Additional Commissioning		X	X		
	Energy Credit 4: Ozone Protection			X		
Energy Credit 5: Measurement and Verification		X	X			
Energy Credit 6: Green Power			X			



GREEN SCHOOLS FOCUS

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	LEED™ 2.1 Prerequisites and Credits	All Projects	Pilot Projects	Site Specific	Not Likely	
MATERIALS AND RESOURCES	Materials Prerequisite: Storage and Collection of Recyclables	X	X			
	Materials Credit 1: Building Reuse	1.1 Maintain 75% of Existing Structure & Shell			X	
		1.2 Maintain 100% Existing Structure & Shell			X	
		1.3 Maintain 100% of Structure & Shell & 50% of Non-shell			X	
	Materials Credit 2: Construction Waste Management	2.1 Divert 50%	X	X		
		2.2 Divert 75%	X	X		
	Materials Credit 3: Resource Reuse	3.1 Specify 5%		X	X	
		3.2 Specify 10%				X
	Materials Credit 4: Recycled Content	4.1 Specify 5%	X	X		
		4.2 Specify 10%		X		
	Materials Credit 5: Local/Regional Materials	4.3 20% Manufactured Locally	X	X		
		4.4 Of 20% Above, 50% Harvested Locally		X		
	Materials Credit 6: Rapidly Renewable Materials			X		
Materials Credit 7: Certified Wood		X	X			
INDOOR ENVIRONMENTAL QUALITY	Prerequisite 1: Minimum IAQ Performance	X	X			
	Prerequisite 2: Environmental Tobacco Smoke (ETS) Control	X	X			
	IEQ Credit 1: Carbon Dioxide (CO ₂) Monitoring	X	X			
	IEQ Credit 2: Increase Ventilation Effectiveness		X			
	IEQ Credit 3: Construction IAQ Management Plan	3.1 During Construction	X	X		
		3.2 Before Occupancy		X		
	IEQ Credit 4: Low-Emitting Materials	4.1 Adhesives & Sealants	X	X		
		4.2 Paints	X	X		
		4.3 Carpet	X	X		
		4.4 Composite Wood		X		
	IEQ Credit 5: Indoor Chemical and Pollutant Source Control		X			
	IEQ Credit 6: Controllability of Systems	6.1 Perimeter	X	X		
		6.2 Non-perimeter		X		
	IEQ Credit 7: Thermal Comfort	7.1 Comply with ASHRAE 55-1992	X	X		
		7.2 Permanent Monitoring System	X	X		
IEQ Credit 8: Daylight and Views	8.1 Daylight 75% of Spaces	X	X	X		
	8.2 Views 90% of Spaces	X	X	X		
INNOVATION AND DESIGN PROCESS	Credit 1: Innovation in Design (subject varies)	1.1 Additional Locally Manufactured Material	X	X		
		1.2 Green O&M Program	X	X		
		1.3 User Education Program	X	X		
		1.4 TBD		X	X	
	Credit 2: LEED™ Accredited Professional		X	X		

Created by Sustainable Design Consulting in Annapolis for MCPS facilities.

LEED™ Credit Scorecard

LEED™ Green Building Rating System, version 2.1

Name: **Montgomery County Public Schools - Design Standards**

Date: November 2005



26 36 7 Total Project Score

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platinum 52 or more points

		4	9	Materials & Resources		Possible Points
5	8	1	?	N		13
Y	?	N				
Y					Storage & Collection of Recyclables	
					Building Reuse, Maintain 75% of Existing Shell	1
					Building Reuse, Maintain 100% of Shell	1
					Building Reuse, Maintain 100% Shell & 50% Non-Shell	1
					Construction Waste Management, Divert 50%	1
					Construction Waste Management, Divert 75%	1
					Resource Reuse, Specify 5%	1
					Resource Reuse, Specify 10%	1
					Recycled Content, Specify 5% (post-consumer + 1/2 post-industrial)	1
					Recycled Content, Specify 10% (post-consumer + 1/2 post-industrial)	1
					Local/Regional Materials, 20% Manufactured Locally	1
					Local/Regional Materials, of 20% Above, 50% Harvested Locally	1
					Rapidly Renewable Materials	1
					Certified Wood	1

3 2 10 Indoor Environmental Quality

Possible Points 15

3	2	10	Indoor Environmental Quality		Possible Points
Y	?	N			15
Y	?	N			
Y					Minimum IAQ Performance
					Environmental Tobacco Smoke (ETS) Control
					Carbon Dioxide (CO2) Monitoring
					Ventilation Effectiveness
					Construction IAQ Management Plan, During Construction
					Construction IAQ Management Plan, Before Occupancy
					Low-Emitting Materials, Adhesives & Sealants
					Low-Emitting Materials, Paints
					Low-Emitting Materials, Carpet
					Low-Emitting Materials, Composite Wood
					Indoor Chemical & Pollutant Source Control
					Controllability of Systems, Perimeter
					Controllability of Systems, Non-Perimeter
					Thermal Comfort, Comply with ASHRAE 55-1992
					Thermal Comfort, Permanent Monitoring System
					Daylight & Views, Daylight 75% of Spaces
					Daylight & Views, Views for 90% of Spaces

3 2 Innovation & Design Process

Possible Points 5

3	2	Innovation & Design Process		Possible Points
Y	?	N		5
Y	?	N		
1				Innovation in Design: Green User Education Program
1				Innovation in Design: Green Housekeeping Plan
1				Innovation in Design:
1				Innovation in Design:
1				LEED™ Accredited Professional

5 8 1 Sustainable Sites

Possible Points 14

5	8	1	Sustainable Sites		Possible Points
Y	?	N			14
Y	?	N			
Y					Erosion & Sedimentation Control
					Site Selection
					Development Density
					Brownfield Redevelopment
					Alternative Transportation, Public Transportation Access
					Alternative Transportation, Bicycle Storage & Changing Rooms
					Alternative Transportation, Alternative Fuel Refueling Stations
					Alternative Transportation, Parking Capacity and Carpooling
					Reduced Site Disturbance, Protect or Restore Open Space
					Reduced Site Disturbance, Development Footprint
					Stormwater Management, Rate and Quantity
					Stormwater Management, Treatment
					Landscape & Exterior Design to Reduce Heat Islands, Non-Roof
					Landscape & Exterior Design to Reduce Heat Islands, Roof
					Light Pollution Reduction

3 2 Water Efficiency

Possible Points 5

3	2	Water Efficiency		Possible Points
Y	?	N		5
Y	?	N		
1				Water Efficient Landscaping, Reduce by 50%
1				Water Efficient Landscaping, No Potable Use or No Irrigation
1				Innovative Wastewater Technologies
1				Water Use Reduction, 20% Reduction
1				Water Use Reduction, 30% Reduction

6 5 6 Energy & Atmosphere

Possible Points 17

6	5	6	Energy & Atmosphere		Possible Points
Y	?	N			17
Y	?	N			
Y					Fundamental Building Systems Commissioning
Y					Minimum Energy Performance
Y					CFC Reduction in HVAC&R Equipment
2					Optimize Energy Performance, 20% New / 10% Existing
2					Optimize Energy Performance, 30% New / 20% Existing
2					Optimize Energy Performance, 40% New / 30% Existing
2					Optimize Energy Performance, 50% New / 40% Existing
2					Optimize Energy Performance, 60% New / 50% Existing
1					Renewable Energy, 5%
1					Renewable Energy, 10%
1					Renewable Energy, 20%
1					Additional Commissioning
1					Elimination of HCFC's and Halons
1					Measurement & Verification
1					Green Power

Green Building at MCPS



Department of
Facilities Management

Montgomery County Public Schools, Maryland

DFM Environmental Initiatives

- ▶ Tools for Schools – IAQ
- ▶ Integrated Pest Management
- ▶ MCPS Recycling Program
- ▶ Green Cleaning
- ▶ Energy Resources Team
 - Green Schools Focus

MCPS Department of Facilities Management

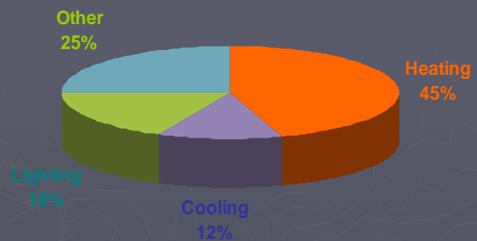
GREEN SCHOOLS FOCUS.org

- SERT + SERT Green Schools
 - ▶ School based Energy Conservation Programs since 1991, mandatory since 2004
- Green Building Program



MCPS Department of Facilities Management

MCPS Total Energy Use



2002/3	\$ 20 million	\$1.00/sf/year
2004/5	\$ 30 million	\$1.50/sf/year

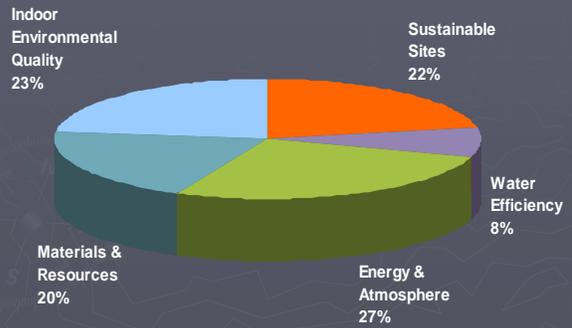
MCPS Department of Facilities Management

Why LEED™ NC for MCPS?

- ▶ Roadmap to meet Excellence Goals
- ▶ Reduction of Maintenance and Operation Costs
- ▶ 3rd Party Performance Verification
- ▶ Design to exceed code compliance
- ▶ Healthy and comfortable buildings
- ▶ Environmental stewardship

LEED Categories

Leadership in Energy and Environmental Design



LEED		Leadership in Energy & Environmental Design	
Total Project Score Possible Points 69			
1 Sustainable Sites Possible Points 10			
SS-1	1	1	1
SS-2	1	1	1
SS-3	1	1	1
SS-4	1	1	1
SS-5	1	1	1
SS-6	1	1	1
SS-7	1	1	1
SS-8	1	1	1
SS-9	1	1	1
SS-10	1	1	1
SS-11	1	1	1
SS-12	1	1	1
SS-13	1	1	1
SS-14	1	1	1
SS-15	1	1	1
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SS-92	1	1	1
SS-93	1	1	1
SS-94	1	1	1
SS-95	1	1	1
SS-96	1	1	1
SS-97	1	1	1
SS-98	1	1	1
SS-99	1	1	1
SS-100	1	1	1

LEED Certified Schools in the Area

- ▶ Third Creek ES in Raleigh, NC – LEED Gold
 - Project Cost -1.0%, Annual Savings \$ 25.6K
- ▶ Clearview ES in Hanover, PA – LEED Gold
 - Project Cost +0.07%, Annual Savings \$ 34K
- ▶ Langston Brown HS in Arlington, VA – LEED Silver

Introduction of LEED - Timeline

- ▶ Evaluation of Standard School Design by A/E Team in CD Phase - 2003 ✓
- ▶ Assessment of LEED System by DoC ✓
- ▶ LEED Pilot Charrette ✓
- ▶ High Performance Green Building Plan ✓
- ▶ LEED Pilot Registration ✓
- ▶ Pilot Cost and Performance Evaluation
- ▶ MCPS Green Building Resolution - 2006

MCPS Department of Facilities Management

LEED Pilot Charrette in 2003



MCPS Department of Facilities Management

1. Staff Training in High Performance Green Design + LEED

- ▶ LEED Intermediate Workshop
- ▶ LEED Accredited Professionals on Staff
- ▶ Green Newsletter
- ▶ Sustainable Design Conferences
- ▶ Product and Technology Seminars
- ▶ Sustainable Design Consultants

MCPS Department of Facilities Management

2. Green Review of Design Guidelines

- ▶ "No Brainers"
 - Easy to implement within standard budgets e.g. high recycled content and regional materials
- ▶ "Light Green" \$
 - Green technology with extra cost but high payback, specified as add. alternates e.g. occupancy sensors
- ▶ "Dark Green" \$\$
 - Innovative green technology with high environmental + educational benefits e.g. rainwater harvesting for toilet flushing

MCPS Department of Facilities Management

3. MCPS High Performance Building Plan - started in 2003

- ▶ Status of LEED™ Pilot Projects
- ▶ Sustainability Review of all School Designs
- ▶ LEED™ Accredited Professionals for A/E team and Contractors (on the team)
- ▶ Status of Sustainable Technology Pilots
- ▶ Greening of O & M – e.g. Green Cleaning
- ▶ LEED™ Application Guide for Schools
- ▶ MCPS LEED™ Application Template

4. Green Building Technology Pilots

- ▶ Geothermal
- ▶ Waterless Urinals
- ▶ Vegetated “Green” Roofs
- ▶ Transparent roller shades
- ▶ Rubber Floors *versus* Vinyl Tile
- ▶ Lighting Retrofits with Light sensors and *dimming*



SUSTAINABLE SITES

- **COMPACT FOOTPRINT/OVERLAPPING FIELDS:** By making the school a compact, two-story structure with double loaded corridors, we were able to avoid long wings and keep the building footprint closer to a tight square. The ball fields overlap one another to minimize environmental impact.
- **WETLANDS:** At Northwest ES 7, school site does not encroach on neighboring stream valley or wetlands on the property.
- **LIGHT POLLUTION REDUCTION**

NORTHWEST ES #7

- **SHADE and HIGH-ALBEDO:** Provide shade on play and parking paving from site trees and use high-albedo materials (such as concrete paving).
- **ENERGY STAR ROOF:** Energy Star-rated coating over built-up roofing to reduce heat island effect on the building's flat roofs.
- **GEOTHERMAL:** Both schools will utilize adjacent ball-fields for ground-source well fields (efficient mechanical system).
- **REFORESTATION/MEADOWS:** at Northwest ES 7.
- **NATIVE PLANTINGS:** Require no site watering.

CLARKSBURG/DAMASCUS ES #7

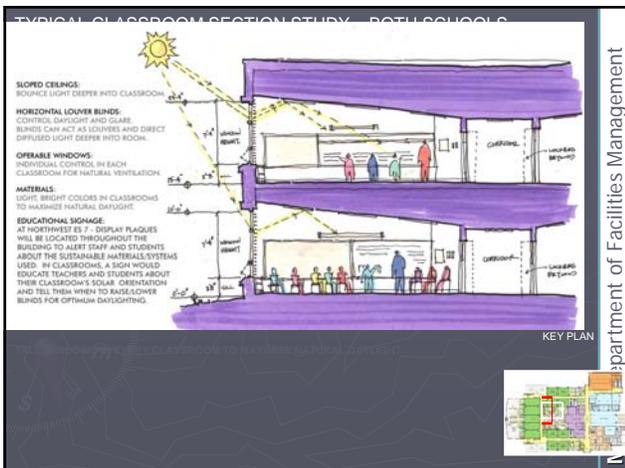
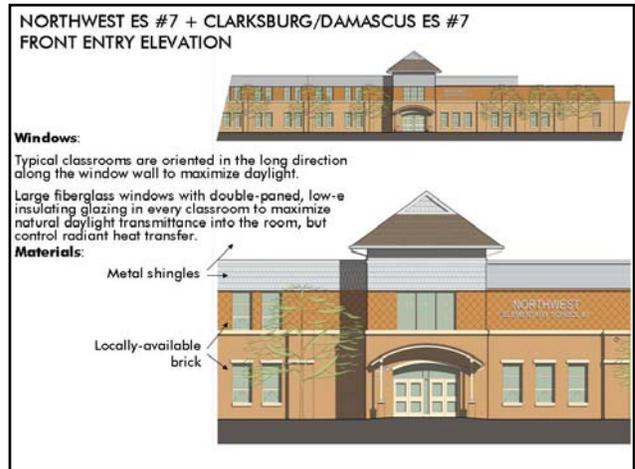
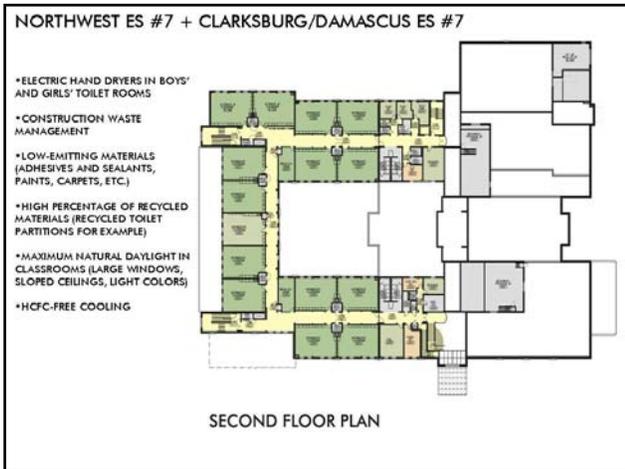
NORTHWEST ES #7 + CLARKSBURG/DAMASCUS ES #7

“GREEN”/“SUSTAINABLE” BENEFITS INCLUDE:

- BIKE STORAGE W/ SHOWER/CHANGING ROOMS
- WATERLESS URINALS
- DUAL-FLUSH TOILETS IN KINDERGARTEN CLASSROOMS
- LOW-FLOW AERATORS AND SHOWER HEADS
- SENSORED FAUCETS IN MULTI-FOUNT LAVATORIES
- FIBERGLASS WINDOWS W/ LOW-E, INSULATED GLASS
- COMMISSIONING DURING DESIGN, CONSTRUCTION, AND OCCUPANCY
- STORAGE AND COLLECTION OF RECYCLABLES (RECYCLING ROOM AT LOADING DOCK FOR SORTING)

FIRST FLOOR PLAN

FRONT ENTRY



Cost and Performance Comparison in 2007

- ▶ Northwest #7 ES – LEED Certified
- ▶ Clarksburg/Damascus #7 ES – Sustainable Design
- ▶ Brookview ES – Standard Design
- ▶ Arcola ES – Standard Design

Department of Facilities Management

Lessons Learned (so far)

- ▶ Get Leadership Commitment Day 1
- ▶ Start introducing LEED™ early
- ▶ Hire LEED™ **and** School experienced A/E and General Contractor
- ▶ Start w/ small pilots with plan for more
- ▶ Commit lower and aim higher
- ▶ Add min. of X% to Construction Budgets
- ▶ Educate, educate, educate...

MCPS Department of Facilities Management

Green Building at MCPS



Department of
Facilities Management

Montgomery County Public Schools, Maryland



**MONTGOMERY COUNTY DEPARTMENT
OF PARK AND PLANNING**

RESOURCE CONSERVATION PLAN

Fiscal Year 2007

January 20, 2006

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RESOURCE CONSERVATION PLAN

Fiscal Year 2007

The Maryland-National Capital Park and Planning Commission Department of Park and Planning, Montgomery County

I. INTRODUCTION

The Maryland-National Capital Park and Planning Commission was established by the Maryland General Assembly in 1927. The Commission serves the bi-county area of Prince George's and Montgomery Counties. This area has a population of 1.7 million citizens and extends over 1,000 square miles adjacent to the Nation's Capital. The purpose, powers, and duties of the Commission are found in Article 28 of the Annotated Code of Maryland. Pursuant to this Article, the Commission is empowered to:

- acquire, develop, maintain, and administer a regional system of parks and defined as the Metropolitan District;
- prepare and administer a general plan for the physical development in the areas of the two Counties defined as the Regional District; and
- conduct a comprehensive recreation program.

The Commission's function in Montgomery County is carried out by The Montgomery County Department of Park and Planning under the guidance of The Montgomery County Park and Planning Board.

The Department oversees the acquisition, development, and management of a nationally recognized, award winning park system providing County residents with open space for recreational opportunities and natural resources stewardship. The current system represents more than 30,000 acres and 382 parks of different sizes, types, and functions, including stream valley, conservation, regional, special, local, and community parks.

This report presents the accomplishments as of January 2006 and the plans for the 2007 fiscal year of the Montgomery County Park and Planning Commission to conserve energy and water resources as part of a comprehensive Resource Conservation Plan launched July 2003.

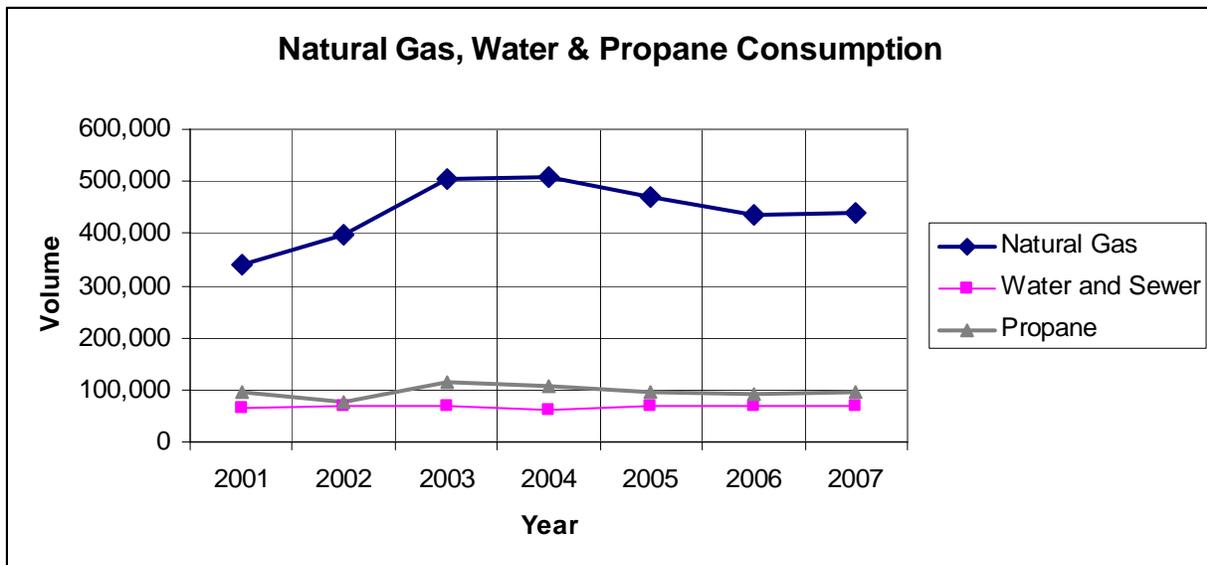
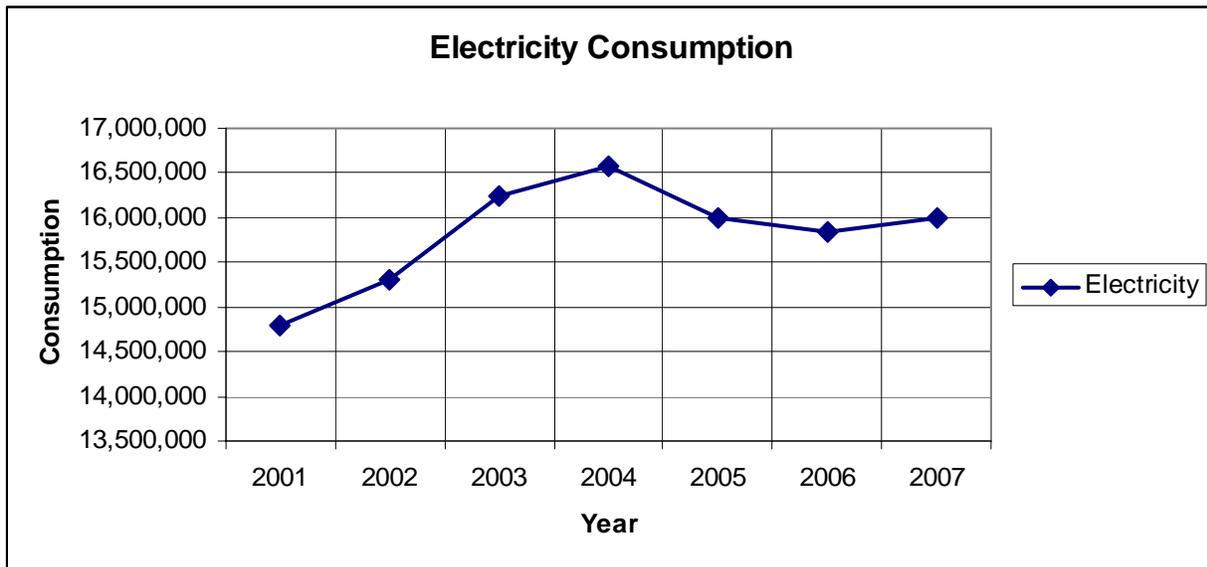
II. RESOURCE CONSERVATION PLAN – Fiscal Year 2005

The overall goal of the comprehensive Resource Conservation Plan is to establish

programs and projects that will efficiently use energy and water resources to fulfill the mission of the Commission to serve the citizens and visitors of Montgomery County.

Energy and water are critical components to the day to day operation of the park system. The Resource Conservation Plan strives to improve operations and maintenance practices to efficiently use electricity, natural gas, propane, and water to provide the programs offered by the parks.

Though the implementation of a series of best management practices the Montgomery County Park and Planning Commission was able to continue to reduce consumption in 2006 as shown on the following charts:



The program focused on the following activities:

Expand the Employee Awareness Program

Implement additional operations improvements to reduce consumption

Complete the installation of the “Web Based Faser Report Programs” on computers for Divisions Managers and Key Facility Operations Staff

Issue Quarterly Progress Reports

Implement a series of broad based improvements the following facilities to reduce consumption.

- Athletic Field Lighting Operations County Wide
- Parks Maintenance Complexes
- Golf Course Maintenance Facilities
- Montgomery County Office Building
- Parkside Headquarters

III. Actual Costs – Fiscal Year 2005

Energy rates and costs increased again in fiscal year 2006 but remained within the budget estimates established for the budget year.

The increase in costs over the prior year is \$332,400. If consumption had not been reduced the increase would have exceeded \$540,000.

The total costs were \$2,795,580 in fiscal year 2005:

Parks	\$1,606,514
Enterprise	\$1,189,066

IV. BUDGET – Fiscal Year 2006

Due to the hurricanes in the fall of 2005, hotter than normal summer temperatures in the summer of 2005, shortages in domestic oil and natural gas drilling and refinery capacity, and increased international terrorism, prices for all energy commodities are at record highs in fiscal year 2006.

Even with the projected reductions in consumption for the year the utility budget began this year with an increase due to the changes in natural gas market rates of \$197,500.

The total costs are projected to be \$3,320,894 in fiscal year 2006:

Parks	\$1,999,200.00
Enterprise	\$1,321,694.00

V. RESOURCE CONSERVATION PLAN – Fiscal Year 2007

Plans are underway to continue to reduce consumption growth on an annual basis. The

objective is to reduce the increase from the average annual growth of 7% per year to less than 2% per year.

The program activities in fiscal year 2007 are:

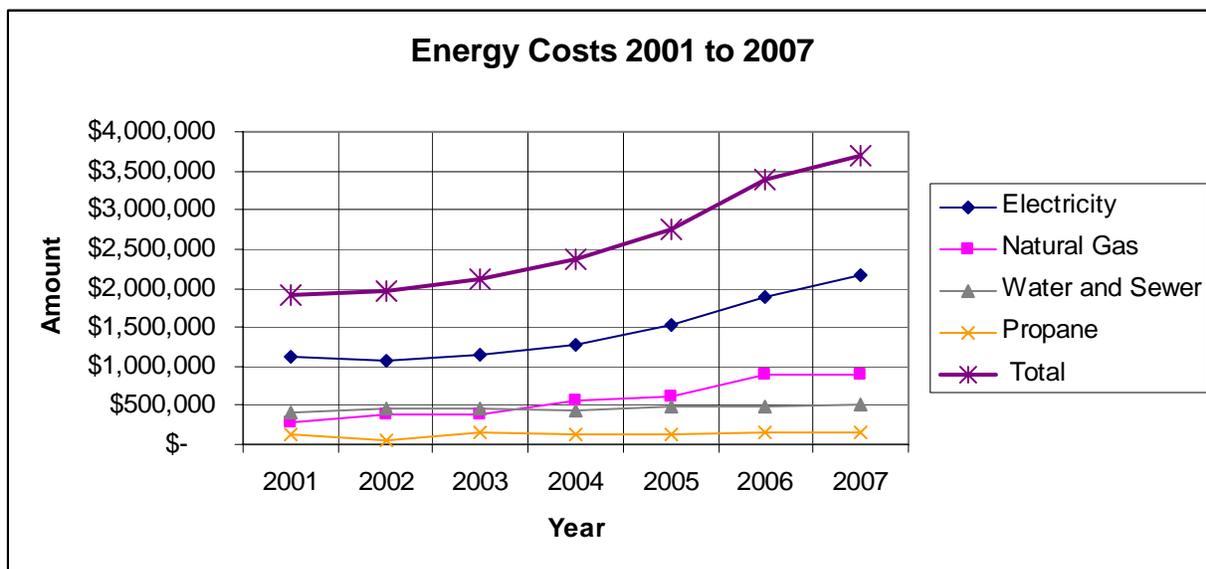
- Continue the employee awareness and participation program
- Implement additional operations and maintenance improvements
- Implement energy retrofit projects at recreation centers
- Implement water conservation programs county wide
- Implement an Energy Investment Project Improvement Program for key Enterprise facilities

VI. BUDGET – Fiscal Year 2007

The proposed budget for fiscal year 2007 is \$3,700,685:

Parks	\$2,218,467
Enterprise	\$1,482,218

The costs for energy for the period 2001 to 2007 are as follows:



RESOURCE CONSERVATION PLAN Fiscal Year 2007

Summary

Agency	Maryland-National Capital Park and Planning Commission		
Number of Facilities	202 Facilities that have utilities	Change in number of facilities	0
Total square feet	757,637	Change in total ft ²	0
Average operating hrs/year	Varies	Change in avg. operating hrs/year	None
Other changes effecting energy consumption	<p>The implementation of a comprehensive energy management and water conservation program by the three operating Divisions: North Parks Region, South Parks Region, and Enterprise Operations contributed to additional consumption reductions. In prior years consumption increased by an average of 7% per year.</p> <p><u>In 2006 the consumption decreased as follows:</u></p> <p>Electricity -3% Natural Gas -8% Propane -11%</p> <p><u>2006 Increases due to the hotter than normal summer in 2005:</u></p> <p>Water +8%</p> <p><u>Energy Unit Costs variances in 2006 were:</u></p> <p>Electricity +19% Natural Gas +14% Propane +3% Water +12%</p> <p>MNCPPC implemented a series of actions to reduce consumption and to stay on budget. The results of the program decreased consumption and avoided an additional \$200,000 increase.</p>		

Existing Measures

Fiscal Years 2000 to June 2005

Measures - Existing: (implemented from FY 98 to FY 05)	date implemented (mo/yr)	initial cost (\$)	annual net impact on maintenance cost (\$)	fuel type(s) effected and units	units saved per year	annual cost savings (\$)
Capital Improvement Projects:						
Equipment Replacement Project	FY 2000 to FY 2005	\$115,500 est.	\$21,400 on Annual Service Costs	Electricity, Natural Gas, and Propane	252,000 kWh, 7,300 therms & 2,600 Pounds	\$34,500 est. Annual Cost Avoidance
Equipment Retrofit Projects	FY 2000 to FY 2005	\$46,000 est.	\$8,000 on Annual Service Costs	Electricity, Natural Gas, and Propane	122,000 kWh, 4,000 therms & 600 Pounds	\$19,800 est. Annual Cost Avoidance
Controls Improvements	FY 2000 to FY 2005	\$17,400 est.	NA	Electricity	163,000 kWh 4,600 therms	\$18,000 est. Annual Cost Avoidance
Lighting Projects	FY 2000 to FY 2005	\$10,800 est.	NA	Electricity	46,000 kWh	\$21,000 est. Annual Cost Avoidance
Sub - Total		\$189,700 est.			583,000 kWh, 15,900 therms & 3,200 Pounds	\$93,300 Annual Cost Avoidance
Operations and Maintenance:						
Operations and Maintenance Best Management Practice and Programs	FY 2000 to FY 2005	\$62,500 est.	\$3,000	Electricity, Natural Gas, and Propane	210,000 kWh, 12,500 therms & 1,800 Pounds	\$31,500 est. Annual Cost Avoidance
Total		\$252,200			793,000 kWh, 28,400 therms & 5000 Pounds	\$124,800 est. Annual Cost Avoidance

New Measures 2006

July 1, 2005 through June 30, 2006

Measures - New: (Implemented during FY 05)	date implemented (mo/yr)	initial cost (\$)	annual net impact on maintenance cost (\$)	fuel type(s) effected and units	units saved per year	annual cost savings (\$)
Capital Improvement Projects:						
Selected Heat Pump and HVAC Roof Top Unit Replacements	January 2006 to December 2006	\$15,500	\$3,000 on annual service costs	Electricity and Natural Gas	60,000 kWh, 2,000 therms	\$6,000
Installation of Programmable Thermostats	January 2006 to December 2006	\$4,000	NA	Electricity and Natural Gas	10,000 kWh, 500 therms	\$1,600
Installation of lighting controls interior and exterior	January 2006 to December 2006	\$3,000	NA	Electricity	10,000 kWh	\$1,200
Upgrade of selected lighting at key facilities	January 2006 to December 2006	\$15,000	\$2,000 on annual service costs	Electricity	75,000 kWh	\$7,500
Sub-Total		\$37,500	\$5,000			\$16,300
Operations and Maintenance:						
Employee Training and Participation Programs	January 2006 to December 2006	\$10,000	NA	Electricity, Natural Gas, and Propane	70,000 kWh, 3,600 therms	\$15,000 Annual Cost Avoidance
Facilities Conditions Studies and Major Projects Assessments	January 2006 to December 2006	\$5,000	NA	Electricity, Natural Gas, and Propane	TBD	TBD
Un-occupied Cycle Controls Program	January 2006 to December 2006	\$15,000	\$4,500	Electricity and Natural Gas	60,000 kWh, 3,000 therms	\$15,000 Annual Cost Avoidance
Sub-Total		\$30,000	\$4,500			\$30,000
Total		\$67,500	\$9,500			\$46,300

Planned Measures 2007

July 1, 2006 through June 30, 2007

Measures - Planned: (for FY06)	projected completion date (mo/yr)	projected initial cost (\$)	projected annual net impact on maintenance cost (\$)	fuel type(s) effected and units	estimated units saved per year	projected annual cost savings (\$)
Capital Improvement Projects:						
Equipment Replacement Project	First Quarter FY 06	\$20,000 est.	\$5,000 on Annual Service Costs	Electricity, Natural Gas, and Propane	64,000 kWh, 1,800 therms & 300 Pounds	\$8,000 est. Annual Cost Avoidance
Controls Improvements	First Quarter FY 06	\$7,500 est.	NA	Electricity	42,000 kWh	\$3,000 est. Annual Cost Avoidance
Lighting Projects	Third Quarter FY 06	\$10,000 est.	NA	Electricity	9,500 kWh	\$6,000 est. Annual Cost Avoidance
Sub-Total		\$37,500	\$5,000			\$17,000
Operations and Maintenance:						
Best Management Practices Programs	Entire Year	\$10,500	NA	Electricity, Natural Gas, and Propane	25,000 kWh, 1,000 therms & 300 Pounds	\$5,000 Annual Cost Avoidance
Employee Training and Participation Programs	Entire Year	\$9,500	NA	Electricity, Natural Gas, and Propane	25,000 kWh, 1,000 therms & 300 Pounds	\$4,000 Annual Cost Avoidance
Operations and Maintenance Improvement Programs	Entire Year	\$10,000	NA	Electricity, Natural Gas, and Propane	25,000 kWh, 1,000 therms & 300 Pounds	\$5,000 est. Annual Cost Avoidance
Sub-Total		\$30,000	NA			\$14,000
Total		\$67,500	\$5,000			\$31,000

THE MARYLAND - NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Utility Budget Projection by Fund /Cost

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>2006 Budget</u>	<u>2006 Budget</u>	<u>2007 Budget</u>
	<u>ACTUAL</u>	<u>ACTUAL</u>	<u>ACTUAL</u>	<u>APPROVED</u>	<u>Projection</u>	<u>Proposed</u>
ADMINISTRATION						
2220 Electricity	\$ 81,411	\$ 85,336	\$ 114,699	\$ 122,400	\$ 125,300	\$ 144,095
2210 Natural Gas	\$ 12,554	\$ 17,093	\$ 20,250	\$ 20,000	\$ 24,600	\$ 27,060
2230 Water and Sewer	\$ 3,814	\$ 3,874	\$ 5,404	\$ 4,500	\$ 4,500	\$ 4,700
1903 Propane						
Sub Total	\$ 97,779	\$ 106,303	\$ 140,353	\$ 146,900	\$ 154,400	\$ 175,855
PARKS						
2220 Electricity	\$ 602,151	\$ 669,121	\$ 751,496	\$ 954,300	\$ 971,200	\$ 1,116,880
2210 Natural Gas	\$ 196,156	\$ 261,238	\$ 291,895	\$ 302,300	\$ 376,300	\$ 413,930
2230 Water and Sewer	\$ 352,217	\$ 355,156	\$ 350,784	\$ 412,200	\$ 412,200	\$ 425,000
1903 Propane	\$ 78,182	\$ 67,952	\$ 71,986	\$ 80,100	\$ 85,100	\$ 86,802
Sub Total	\$ 1,228,706	\$ 1,353,467	\$ 1,466,161	\$ 1,748,900	\$ 1,844,800	\$ 2,042,612
Admin & Parks Total	\$ 1,326,485	\$ 1,459,770	\$ 1,606,514	\$ 1,895,800	\$ 1,999,200	\$ 2,218,467

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>2006 Budget</u>	<u>2006 Budget</u>	<u>2007 Budget</u>
	<u>ACTUAL</u>	<u>ACTUAL</u>	<u>ACTUAL</u>	<u>APPROVED</u>	<u>Projection</u>	<u>Proposed</u>
ENTERPRISE						
2220 Electricity	\$ 485,528	\$ 532,518	\$ 694,798	\$ 751,963	\$ 765,963	\$ 880,857
2210 Natural Gas	\$ 161,473	\$ 274,390	\$ 305,564	\$ 317,925	\$ 392,925	\$ 432,218
2230 Water and Sewer	\$ 100,251	\$ 64,926	\$ 115,577	\$ 75,821	\$ 75,821	\$ 78,000
1903 Propane	\$ 50,278	\$ 50,907	\$ 58,385	\$ 61,683	\$ 65,183	\$ 66,487
Sub Total	\$ 797,530	\$ 922,741	\$ 1,174,324	\$ 1,207,392	\$ 1,299,892	\$ 1,457,562
PROPERTY MANAGEMENT						
2220 Electricity	\$ 14,464	\$ 9,917	\$ 9,320	\$ 14,308	\$ 14,608	\$ 16,799
2210 Natural Gas	\$ 3,124	\$ 4,471	\$ 4,756	\$ 5,193	\$ 6,393	\$ 7,032
2230 Water and Sewer	\$ 1,047	\$ 686	\$ 666	\$ 801	\$ 801	\$ 825
1903 Propane						
Sub Total	\$ 18,635	\$ 15,074	\$ 14,742	\$ 20,302	\$ 21,802	\$ 24,657
Enterprise & Pro. Mgt. Total	\$ 816,165	\$ 937,815	\$ 1,189,066	\$ 1,227,694	\$ 1,321,694	\$ 1,482,218

Overall Totals	\$ 2,142,650	\$ 2,397,585	\$ 2,795,580	\$ 3,123,494	\$ 3,320,894	\$ 3,700,685
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	<u>Cost</u>	<u>Cost</u>	<u>Cost</u>	<u>Cost</u>	<u>Cost</u>	<u>Cost</u>
Electricity	\$ 1,183,554	\$ 1,296,892	\$ 1,530,313	\$ 1,842,971	\$ 1,877,171	\$ 2,158,632
Natural Gas	\$ 373,307	\$ 557,192	\$ 662,464	\$ 645,418	\$ 800,218	\$ 880,240
Water and Sewer	\$ 457,329	\$ 424,641	\$ 472,432	\$ 493,322	\$ 493,322	\$ 508,525
Propane	\$ 128,460	\$ 118,859	\$ 130,371	\$ 141,783	\$ 150,283	\$ 153,289
Total	\$ 2,142,650	\$ 2,397,585	\$ 2,795,580	\$ 3,123,494	\$ 3,320,994	\$ 3,700,685

	<u>Consumption</u>	<u>Consumption</u>	<u>Consumption</u>	<u>Consumption</u>	<u>Consumption</u>	<u>Consumption</u>
Electricity	16,232,298	16,569,759	15,998,956	15,840,000	15,840,000	15,998,400
Natural Gas	504,471	507,781	469,436	435,500	435,500	439,855
Water and Sewer	66,975	63,043	68,222	70,000	70,000	70,700
Propane	113,289	105,205	93,834	92,800	92,800	93,728

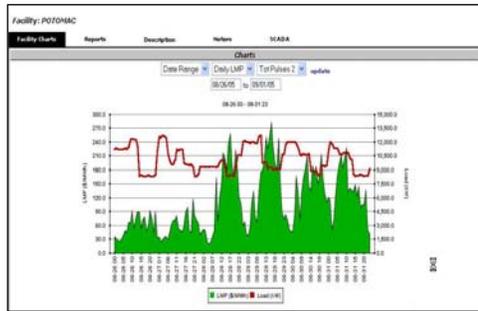
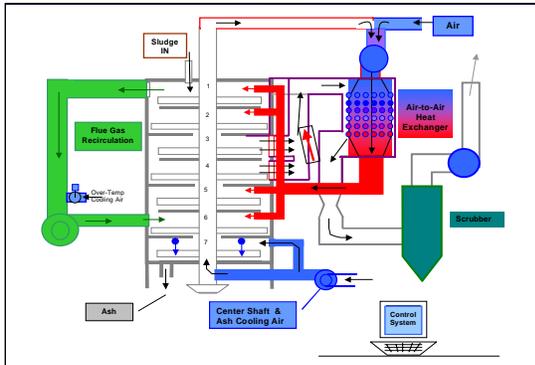
<u>Units</u>	<u>Cost per Unit</u>					
KWH	\$ 0.073	\$ 0.078	\$ 0.096	\$ 0.116	\$ 0.119	\$ 0.135
THER	\$ 0.740	\$ 1.097	\$ 1.411	\$ 1.482	\$ 1.837	\$ 2.001
GAL	\$ 6.828	\$ 6.736	\$ 6.925	\$ 7.047	\$ 7.047	\$ 7.193
KGAL	\$ 1.134	\$ 1.130	\$ 1.389	\$ 1.528	\$ 1.619	\$ 1.635



WASHINGTON SUBURBAN SANITARY COMMISSION
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RESOURCE CONSERVATION PLAN



WASHINGTON SUBURBAN SANITARY COMMISSION





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Resource Conservation Plan- FY'07

*Prepared by Rob Taylor, Energy Manager
Washington Suburban Sanitary Commission*

January 2007



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Summary

The information on this page reflects the facilities owned or operated
By WSSC as of the end of **FY 05 (June 30, 2005)**

Number of Facilities	201	Change in number of facilities	0
Total square feet	N/A	Change in total ft ²	N/A
Average operating hrs/year	N/A (most 24/7)	Change in avg. operating hrs/year	N/A
Other changes effecting energy consumption	See Narrative		

Utilities:	units	total consumption (actual FY 05)	percent change from actual FY 04	total cost (actual FY 05) \$	percent change from actual FY 04
Electricity	kWh	206,275,690	-2%	\$15,054,198	+36%
Natural Gas (firm)	therms	305,330	+3%	\$368,616	10%
Natural Gas (Irate)	therms	404,834	-7%	\$391,699	14%
Fuel Oil #2	gallons	26,210	-40%	\$44,856	+16%
Propane	gallons	77	-99%	\$215	-98%
Water/Sewer	gallons	N/A	N/A%	N/A	N/A%
Total				\$15,859,584	34%



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New Measures

This table shows information on resource conservation measures implemented during FY 06
(July 1, 2005 through June 30, 2006)

Measures - New: (Implemented during FY 05)	date implemented (mo/yr)	initial cost (\$)	annual net impact on maintenance cost (\$)	fuel type(s) effected and units	units saved per year	annual cost savings (\$)
Capital Improvement Projects:						
Energy Performance Project Phase IIA - Parkway Solids Handling Upgrade (startup/commissioning)	1/06	\$1,289,000	-\$291,000	N/A	N/A	\$291,000
Total, CIP						\$291,000
Operations and Maintenance:						
Pump Turbine Utilization (Rocky Gorge)	7/05 – 6/06	\$0	\$0	Electric	1,670,000 kWh	\$150,000
Derceto Water Pumping Optimization System	4/06	\$0	\$0	Electric		\$760,000
Electric Supply/Load Shifting – Capacity	7/05 – 6/06	\$0	\$0	Electric	5 MW	\$160,000
Total, O&M					1,670,000 kWh 5 MW	\$1,070,000
Page Total					1,670,000 kWh 5 MW	\$1,361,000
Description of Activities:						
See narrative						



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Existing Measures

This table shows information on resource conservation measures implemented prior to FY 06

Measures - Existing: (implemented from FY 98 to FY 05)	date implemented (mo/yr)	initial cost (\$)	annual net impact on maintenance cost (\$)	fuel type(s) effected and units	units saved per year	annual cost savings (\$)
Capital Improvement Projects:						
Variable Frequency Drives	FY 01-03	\$250,000		Electric	1,000,000 kWh	\$50,000
					1000 kW	\$50,000
Energy Performance Project- Phase IIA					9,000,000 kWh	\$700,000
Total, CIP					10,000,000 kWh 1000 kW	\$800,000
Operations and Maintenance:						
Load Curtailment	FY 98-05	\$0		Electric	3,000 kW	\$100,000
Pump Turbine Utilization (Rocky Gorge)	FY 98-05	\$0		Electric	2,000,000 kWh	\$150,000
Aggregated Electric Supply Procurement- Pepco/BGE accounts	FY 00-03	\$0		Electric	0	\$150,000
Energy Performance Project- Phase IIC- Electric Supply/Supply Mgmt.						\$1,500,000
Total, O&M					2,000,000 kWh 3,000 kW	\$1,900,000
Page Total					12,000,000 kWh 4000 kW	\$2,700,000
Description of Activities:						
See narrative						



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Planned Measures

This table shows information on resource conservation measures planned
To be implemented in FY 07 (July 1, 2006 through June 30, 2007)

Measures - Planned: (for FY06)	projected completion date (mo/yr)	projected initial cost (\$)	projected annual net impact on maintenance cost (\$)	fuel type(s) effected and units	estimated units saved per year	projected annual cost savings (\$)
Capital Improvement Projects:						
Energy Performance Project- Phase IIB	10/08	\$7,500,000		Electricity	5,555,000 kWh	\$500,000
				Natural Gas	333,000 therms	\$500,000
Total, CIP		\$7,500,000				\$1,000,000
Operations and Maintenance:						
Energy Performance Project- Phase IIC- Electric Supply & Supply Mgmt. Services	6/07					\$1,500,000
					5000 kW	\$160,000
Total, O&M						\$1,660,000
Page Total					5,555,000 kWh 5000 kW 333,000 therms	\$2,660,000
Description of Activities:						
See narrative						



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ENERGY MANAGEMENT- MISSION:

The mission of this Section is to optimize the usage, reliability, and cost of electricity, natural gas, fuel oil, propane, and diesel fuel in conjunction with maintaining or improving the quality of operation and maintenance of all water/wastewater treatment plants, pumping stations, storage sites and field offices.

MAJOR INITIATIVES:

Energy Information System (EIS)

Our Intranet-based energy billing and tracking system is entering its 3rd year of successful operation and is continually being developed to adapt to more advanced billing methods and the growing complexity of the de-regulated electricity market. EIS now includes detailed information for actual FY'04 and FY'04 bills including consumption, demand and costs. FY'05's milestones included:

- *Electronic verification of supplier invoices.*
In FY 05 WSSC began receiving invoices from our Broker/Supplier, Constellation Energy Projects & Services (CEPS) that were based upon a combination of real-time energy prices and block purchases made at fixed prices. The invoices associated with this energy procurement are much more complex (approximately 10 MB for an 11 invoice batch) relative to utility tariffs in that they rely on dynamic price data (PJM hourly LMP rates) and incorporate additional calculations for hedge-related components. EIS was extended to enable WSSC to set up the block purchase specifications that define the allocation of energy to different accounts, and to automatically verify the invoices that are sent via spreadsheets by CES.
- *Integration of facility SCADA tag data for plants with flow and interval meter data.*
EIS was extended to enable queries to the SCADA database for relevant tags such as interval energy use and production levels. Facility reports were created to incorporate this real-time operational data with real-time energy price data from PJM. This enabled operations, such as water production, to be viewed with the context of real-time energy price and usage. Load curtailment effectiveness also was analyzed using this feature.
- *Extension of report generator.*
Revisions to the EIS report generator were made to increase its effectiveness in generating cross-account "roll-up" type reports in a timely manner.

Advanced Electrical Metering

WSSC's program to upgrade non-interval and monthly read meters with advanced meters is 80% completed, with the addition of tie-ins at Central Avenue WPS, Anacostia 2 WWPS, and Seneca WWTP. These data connections allow the utility (Pepco, BGE, and Allegheny) to collect more accurate metered information via a telephone/cellular phone network. The pulse count data is collected and stored in WSSC's SCADA system, where it is uploaded by EIS and available for viewing graphically on EIS. All 8 new meters at GL and PH account locations with BGE and Allegheny are completed. Currently underway is the replacement of the remaining 5 of 17 Pepco meters at various FO, WPS, and WWPS locations. All meters should be upgraded by mid FY'06, and will allow WSSC to add the electric load from these locations to our energy block and PLC capacity so the most competitive wholesale prices can be achieved.



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Real-Time Metering Data

Progress continues on our efforts to remotely monitor real-time electric load and kWh consumption from the utility revenue electric meters. Meters at 14 locations have been tied into SCADA with pulse count data; the EIS then converts the count totals to kWh and kW every 15 minutes so that invoice cost and consumption will be able to be verified immediately at the meter reading date. The information gathered is used to select optimum supply pricing options, provide real-time demand aggregating, provide capability of on-site energy management, and verify electric utility meter readings for faster and more accurate cost tracking. SCADA programming work has been completed on 12 sites, and real-time metered data can now be seen on our EIS. Our goal is to add another 4 sites by the end of FY'06 and complete a total of 20 by the end of FY'07.

Energy Performance Project

Phase IIA:

Constellation Energy Projects & Services Group (CEPS) is wrapping up the last of nine Energy Conservation Measures as part of a \$10 million capital energy efficient upgrade of aeration, solids handling, grit removal, peak shaving electric generation, HVAC modifications, and variable speed drives at Western Branch, Parkway, Piscataway, Damascus, and RGHB. This energy performance project has already produced dramatic savings at our facilities and is the first of its kind at WSSC and one of the most comprehensive in the water and wastewater industry, combining design, construction, monitoring, energy guarantee, and maintenance, into one project. The guaranteed energy and energy related savings resulting from the installation - initially estimated at \$750,000/yr (note: based on current energy rates and initial performance tests, the annual savings will be closer to \$1,000,000/yr) - will pay for 100% of the capital funds required over a 15-year period. CEPS and WSSC will monitor the performance of the new equipment to insure that the projected savings will be met. WSSC is receiving a low-interest (1.2-%) loan from MDE's Water Quality Revolving Loan Fund for this project. WSSC has already realized significant savings (approximately \$800,000) from the project as construction of many ECMs have been complete for sometime. This phase (IIA) of the work is expected to be completed before the end of CY 2005.

Phase IIB:

1. CEPS and their sub-consultants, have completed the investigation of all major WSSC water pumping stations, Potomac, and Patuxent water treatment plants, selected wastewater pumping stations, major field offices, and Western Branch under Phase IB (feasibility study), and are preparing their final proposal for equipment and controls upgrades at these facilities. The proposal will include 30% design, construction, annual energy guarantee, monitoring & verification, and maintenance, with a payback maximum of 15 years. Upgrades being proposed include:
 - Emergency generator with electric peak shaving at Seneca WWTP
 - Biosolids incinerator upgrades at Western Branch WWTP
 - Pumping upgrades at Anacostia II WWPS
2. Final scope of work and pricing for Phase IIB is expected to be finalized in November 2005, with Commission approval and start of project by January 2006. Capital cost is estimated to be \$7,200,000, with annual savings projected to be \$1,000,000 per year.



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AEE Award:

In September 2005, WSSC’s Energy Performance Project (all Phases) was awarded the “Environmental Project of the Year” from the Association of Energy Engineers (AEE). The award recognized the “innovative energy saving project at an environmental facility where operational and operating savings could be substantiated”, combining demand and supply side efficiency savings into one project.

Derceto Energy Optimization -Water Distribution System

In July 2005, a contract was awarded to Derceto Inc. to develop a SCADA-based software system to automatically control pumping and storage to optimize energy costs, water quality and system demand. The system is being designed to adapt to changing real-time hourly electricity pricing (PJM-RT) to automatically adjust pump operations, tank storage levels and maximize water turnover rates. The WSSC water pumping and storage model is being configured, and the system is scheduled to be installed and operational at WSSC by May 2006. The estimated \$738,000/yr. energy savings from the use of most efficient pumping configurations and load shifting from peak to off-peak times will be tracked in our EIS system.

Turbine Operation

Due to the relatively low amount of rainfall this year and the corresponding low water level at Rocky Gorge Reservoir, the Rocky Gorge Water Pumping Station, pump turbines (700 HP each) could only be run a total of 4972 hours in FY’05. However, a substantial savings was still realized-\$193,000 in electricity costs. The turbines are run in lieu of electric motors when the reservoir level permits.

FY’07 ENERGY BUDGET REQUEST DETAILS:

The purpose of these activities is to provide for the purchase of electricity, natural gas, propane, and diesel fuel associated with the operation of all Commission facilities.

	FY’04 ACTUAL	FY’05 ACTUAL	FY’06 BUDGET	FY’07 REQUEST
WSSC ENERGY COSTS	\$11,713,012	\$16,253,211	\$17,338,000	\$20,883,000

ENERGY BUDGET ANALYSIS:

Electricity Market

BGE and Pepco took wholesale bids in December ’04 and January 2005 for the new fixed price POLR (Provider of Last Resort) rates, starting in 6/1/05. For large Type III accounts (over 600 kW peak demand), the new fixed price POLR expired 5/31/05, at which time all large commercial and industrial customers purchased from a 3rd party supplier or defaulted to the utility POLR hourly spot market service. For medium Type II accounts (Pepco: 25-600 kW and BGE: 60-600 kW), the POLR service was to expire 5/31/06, but will be extended to 5/31/07 based on a recent Public Service Commission (PSC) Order.

Since the BGE/Pepco POLR service Type I (Pepco 0-25 kW and BGE 0-60 kW) and Type II bids were taken in December ’04/ January ’05, electricity market prices have increased dramatically due to the run up in



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natural gas and crude oil prices. Due to these higher prices, many Type I and II customers have opted to stay or return to the new POLR rates. Currently Type I and Type II rates are cheaper than market bid rates. For large (Type III) accounts, the BGE and Pepco POLR hourly spot market supply rates are about 45% higher than the old (pre-6/1/05) fixed rate option POLR rates.

a) Electrical Supply- BGE Accounts

The Pepco Energy Services (PES) supply contract for BGE P accounts -Patuxent, Parkway, Rocky Gorge, and RGHB- expired in June 2004. BGE SOS for GL accounts expired on 6/30/04. All the 29 G accounts are now under BGE's new POLR Type I service which is currently priced less than the market. Our G accounts are most likely to remain on POLR throughout FY'06. BGE POLR- Type I service expires in 5/31/08 and BGE POLR Type II service was to expire in 5/31/06 – but will extend through May 31, 2007, according to a recent PSC Order. Supply for our Type II GL accounts (4) are being purchased under our interval meter block load and day ahead wholesale bidding methodology (see “d” below) through October '05. Starting October '05, these 4 GL accounts will be returned to BGE POLR Type II service. Such GL type II winter rates are far below current winter market prices.

b) Electrical Supply: Pepco Accounts

All Pepco GS accounts (100) are now under Pepco's new POLR Type II service which is currently priced less than the market. GS accounts will thus remain on POLR Type II rates throughout FY'06. Supply for the smallest Pepco MGT accounts (14) also is being purchased under Type II POLR rates, as this is the most economical choice throughout FY'06.

c) Electrical Supply- BGE, Pepco, Allegheny, and SMECO Interval Accounts: FY'05

WSSC's Compressively Bid Wholesale Power Purchase Program (CEPS EPC-Phase IIC): In November 2003, WSSC decided to abandon the aggregation group and investigate supply procurement using the flexibility of WSSC's ability to shift and manage load as well as guaranteeing suppliers a substantial base load. In order to be in the position to take advantage of the de-regulated electricity market, the Commission granted the Energy Manager in November 2003 the authority to approve (in conjunction with the WSSC Procurement Group) energy commodity prices and contracts. This was culminated in negotiating a final agreement in March 2004 using CEPS (EPC- Phase IIC) under their existing Energy Performance Contract. The services included competitively bid wholesale energy and capacity supply for WSSC's interval accounts (all BGE/Pepco Type III and some Type II - approximately 93% of consumption), real time and day ahead LMP purchasing on the PJM grid, and supply load management services. The agreement guaranteed WSSC with a minimum of 6% savings compared to the utilities' POLR, and flexibility to take advantage of volatile electric markets quickly to lock in savings. CEPS's efforts will tie together existing WSSC initiatives such as energy conservation with new real time load management programs such as water system optimization and utilization of back-up generation to reduce WSSC energy costs and minimize financial risks. Using a pre-qualified wholesale bidders list of 14 suppliers, bids were taken twice in May 04 before final prices were accepted for FY'05, on 5/18/04. During the first 11 month billing cycle for fiscal year '05, a savings of 15.17% compared to the BGE and PEPCO POLR rates were realized. On a dollar basis, this represented savings of \$1,543,638 compared to POLR rates.



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With wholesale prices for power having trended upwards during the last year, Type I and Type II POLR service and Standard Offer service (SOS) for Allegheny and SMECO accounts, respectively, have remained well below current market based prices. Such accounts will continue to remain on



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POLR and SOS until the expiration of the current Allegheny rates effective on May 31, 2006 and SMECO rates effective on December 1, 2005.

d) Electrical Supply- BGE and Pepco Interval Accounts: FY'06 to date:

Wholesale forward market energy prices are currently trading over 50% above May 04 prices (when original blocks were purchased by WSSC/CES). Taking into account line losses, CES markup, and distribution costs, it is reasonable to expect an overall increase of 20% for FY'06 prices over FY'05.

Since the initial purchase on 5/18/04, WSSC has taken the following procurement actions to mitigate upward trending energy costs during FY '06:

- 1) Wholesale block purchases for July and August '05. With real time hourly prices soaring due to near record heat and rising natural gas and crude oil prices this summer, this block purchase along with the purchase made on 5/18/05 allowed WSSC to realize well over \$1,000,000 in savings compared to the alternative of buying power on hourly wholesale prices for the period June '05 through August '05.
- 2) Wholesale block purchases for 100 percent of WSSC's type III accounts for the remainder of 2005. Since this purchase (back in May'05) the market has increased by about 60% for this period. Compared to current trading forwards, this represents a savings of about \$1.3 million dollars for the period October '05 through December '05.
- 3) Block purchases for about 50 percent of WSSC's type III accounts for the first 6 months of 2006. Since this purchase (back in May'05) the market has increased by about 66% for this period. Compared to current trading forwards, this represents a savings of about \$1.2 million dollars for the period January '06 through June '06.

e) Wind Power

WSSC continues to participate in the Montgomery County Renewable Energy Certificate purchasing program for 5% of its total kWh load. The current Renewable Energy Certificate adds approximately \$157,000 to our yearly energy cost. The existing contract expires in June 2006; WSSC is exploring new ways to purchase wind energy and also lock in constant electricity generation rates over a long term period to counter the increasing costs of fossil fueled generation plants.

Natural Gas Supply

a) Natural Gas Supply: Firm and Interruptible Accounts

WSSC has been purchasing natural gas since 2001 through a joint contract managed by Montgomery College. This has enabled WSSC to mitigate wild price fluctuations experienced in the spot market by locking in competitive rates on either a monthly or yearly NYMEX basis. Since 2003, increasing power plant demand, decreasing drilling productivity, volatility in the Middle East, and a generally strong economy, market pricing has increased. Hurricanes Katrina and Rita exacerbated the situation, and due to damage in the Gulf Coast of production and pipeline capacity, we are forecasting an increase of 50% in gas prices in the FY'05-FY'07 time frame



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Montgomery County Energy Tax

Montgomery County Energy Tax remains at \$.0129/kWh, and accounted for a \$1,500,000 per year premium in FY'05.

Operational Changes affecting FY'07:

Project	Description	Cost Effect
Derceto Water Pumping Energy Efficiency System	Software system is being designed by Derceto, Inc. using EPA Net model of WSSC's water pumps, storage facilities, control valves, plant constraints and historic flow data.	Decrease by \$738,000/yr .



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Basis for Energy Consumption and Cost Projections

Energy consumption and cost projections are based on WSSC's MOST historical data and workload indices for the FY'07 Program/Budget.

Historical Data	FY '00 Actual	FY 01 Actual	FY '02 Actual	FY '03 Actual	FY '04 Actual	FY '05 Actual	FY '06 Proj.	FY '07 Proj.
Field Office (SF)	559,133	559,133	559,133	559,133	559,133	559,133	509,133	509,133
Water Treated (MG)	59,714	60,189	59,605	60,737	61,089	61,576	61,138	61,320
Water Pumped- Boosted (MG)	14,886	19,021	13,295	12,174	13,626	10,686	13,637	10,642
Waste Water Pumped (MG)	33,220	32,534	30,765	37,017	37,464	34,678	34,806	31,656
Waste Water Treated (MG)	18,852	18,866	17,270	20,486	22,891	23,119	25,638	26,006

FY'07 Electric Rates

FY'07 electric rates are estimated to be 40% higher than actual FY'05 rates, due to the following:

- Crude oil prices have increased significantly causing volatility in the natural gas market
- Natural gas (see below) prices have increased dramatically. During the last two years, all new wholesale generation is gas fired.
- As part of our agreement to purchase 5% of our electricity with wind power starting in FY'05, our electricity cost for this premium is \$157,000 higher in FY'05 and beyond.
- Without our new hourly pricing procurement strategy (which includes a combination of competitively bid energy block and capacity purchases) accompanied by managed load shifting, our rates would be 20%-30% higher- close to the utility POLR hourly spot market rates. We are saving approximately \$.01/kWh by buying under this strategy.

FY'07 Natural Gas Rates

FY'07 natural gas rates are estimated to be 50% higher than natural gas prices during FY '05. Such a dramatic price increase is largely attributed to:

- Continued instability in the Middle East and the high, world demand for oil. As oil prices have traded higher so have natural gas prices. All new generation in the U.S. is natural gas fired.
- High temperatures during the summer of 2005 have caused natural gas prices to increase.
- The devastating impacts of Hurricanes Katrina and Rita on domestic oil and natural gas production in the Gulf Coast region. Currently, 100% and 80% of offshore Gulf Coast oil and natural gas production, respectively, are shut-in. This loss of natural gas production represents roughly 20% of domestic production.

Water Pumped, Treated, Waste Water Pumped, Treated:

Historical (FY'00- FY'05) kWh/MG indices have been applied to projected treatment and pumping efficiencies (MG/kWh), based on Budget's projected FY'07 flows for all water treatment and wastewater treatment plants; kWh were adjusted for changes in efficiency and operational changes including the effect of the Derceto Water Pumping System Energy Efficiency program; \$/kWh



**WASHINGTON SUBURBAN SANITARY COMMISSION
FY 2007
RESOURCE CONSERVATION PLAN**

projected rates for FY'07 were based on forward rates from the electricity market, then applied to each category of facilities (WTP, WWTP, WPS, etc.) to estimate total projected cost.

Field Offices:

Historical kWh/SF indices have been applied to projected SF to determine projected FY'07 kWh; SF was adjusted for FY'07 by eliminating Hyattsville FO; kWh were adjusted for changes in efficiency; \$/kWh projected rates for FY'07 were based on new POLR rates from Pepco and BGE, and applied to total SF to estimate total cost.

Dams, WMMVs, PRVs and Tanks:

Electric consumption was projected based on kWh 3-5 year historical averages; kWh total was applied to projected \$/kWh POLR rates to estimate total cost.



**MONTGOMERY
COLLEGE**

RESOURCE CONSERVATION PLAN

FY 2007



Takoma Park & Germantown Solar Energy Installations

**Prepared
By
The Office of Facilities
January 2006**

EXECUTIVE SUMMARY

This Resource Conservation Plan (RCP) is prepared by the Montgomery College Office of Facilities, to support the College's FY 2007 Energy Management Capital Improvements Program (CIP) and Utility Operating Budget requests for funding.

This document describes the Montgomery College energy organization, discusses energy consumption, and summarizes resource conservation program accomplishments and plans. Tables present information on historical utility consumption and utility budget estimates. The Capital Improvements Program (CIP) Project Description Forms (PDF) that impact the College Energy Management are also contained in this document.

In FY 2006, the Energy Management Program focused on the energy efficient design of the Takoma Park Campus expansion. This includes the construction and commissioning of the new 111,000 Gross Square Foot(GSF) Student Services Center(SSC) and East Campus Central Plant which will be opening Spring 2006 and which incorporate the latest sustainable and energy efficiency technologies. Construction began in FY 2006 for the King Street Art Center and West Campus Central Plant. In FY 2006 the College continued to incorporate Green Building design requirements into programming documents with the intent to obtain at least a LEED Rating for all new construction projects.

In FY 2006, the College again participated in the joint procurement of deregulated utility supplies of electricity and natural gas and 5% of the College's electricity is being generated from wind power. In support of the recently completed College Master Plans, the College finished updating Utility Master Plans for all three campuses. In FY 2006 the College continued to participate as a member of the County sponsored Environmental Policy Implementation Task Committee(EPITC) and prepared its annual Environmental Action Plan and participated as a member of the Green Building Technical Committee.

Montgomery College is requesting \$125,000 for the FY 2007 College Energy Management Capital Improvements Program(CIP) for various energy retrofits, and new energy programs. An additional \$125,000 is requested for the FY 2007 operating budget that funds one energy staff position and other operating budget energy projects. This request is the same as in past fiscal years. The FY 2007 utility operating budget request is \$5,511,066, a 27.8% increase over the FY 2006 request, primarily due to increased unit costs and the addition of new building space.

Montgomery College is dedicated to implementing and maintaining a life cycle cost-effective, low-risk energy management program. Although all energy conservation and environmentally friendly opportunities are considered, only those opportunities which are of the appropriate level of technology, have a high probability of success and meet the lowest net present value criteria will be implemented. To ensure that the Resource Conservation Program is operating as predicted, the appropriate databases are maintained. The goal of the program is to provide safe, comfortable, economical and environmentally friendly facilities, which will enhance the learning environment and contribute to student success at Montgomery College.

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APPENDIX A	A-1

Energy Conservation CIP, No. 816611, PDF
Planned Lifecycle Asset Replacement CIP, No. 926659, PDF
Takoma Park Central Plant, CIP, No. 016600, PDF
Montgomery College FY 2007, Utility Projection Report, January 9, 2006
ICEUM Utility Rates, FY06&FY07, September 27, 2005

GENERAL INFORMATION

Montgomery College was founded in 1946 and established its first campus in Takoma Park in 1950. Since then the College has grown rapidly, adding a second campus at Rockville in 1965 and a third campus in Germantown in 1976. The College operates a total of 46 buildings in excess of 1.7 million gross square feet (GSF), on the three campuses with additional off campus leased space. The buildings consist of classrooms, offices, laboratories, libraries, meeting rooms, gymnasiums, child care centers, natatoria and greenhouses. In addition to the programs offered at each campus, the College offers regular college credit programs and non-credit courses in off-campus locations throughout the County. Classes are held in campus facilities seven (7) days a week. The hours of use are generally from 7:00 a.m. until 11:00 p.m. on weekdays, and at various times during the day on Saturdays and Sundays. Some evening classes are held on Saturday or Sunday, but there are frequently intramural and varsity activities in the Physical Education buildings as well as community use (rentals) of other spaces on the weekends. The College's computer center is located on the Rockville Campus and is operational 24 hours a day. Classes are in session during the summer at all three campuses. The College's administrative and academic offices are open year-round. Central plants on the Rockville and Germantown campus distribute heating and cooling water for environmental conditioning of the spaces.

Montgomery College began its resource conservation program prior to the oil embargo in 1973, is a charter member of the Interagency Committee on Energy and Utility Management (ICEUM), and has submitted a Resource Conservation Plan in support of the utility operating budget since January 1976. The Office of Facilities is responsible implementing the Resource Conservation Plan. The College has been a member of the Electricity Deregulation Task Force, has participated with other agencies in the joint procurement of the Electricity Supply and has been the lead agency for the joint procurement of natural gas supply. In FY2004, the College joined other County agencies in forming the Environmental Policy Implementation Task Force (EPITF), and assisted in producing the first Environmental Policy Issues and Action Report.

ENERGY & ENVIRONMENT ORGANIZATION

The Office of Facilities, under the direction of Mr. David J. Capp, provides college-wide support services for all three campuses and the central administration of the College, and is responsible for those activities associated with energy use, energy conservation planning, energy management and environmental issues. In February 1987, Montgomery College hired an Energy Manager who reports directly to the Chief Facilities Officer, and is responsible for implementing the energy components of the Resource Conservation Plan. See Figure 1.

Office of Facilities Energy Organization Chart

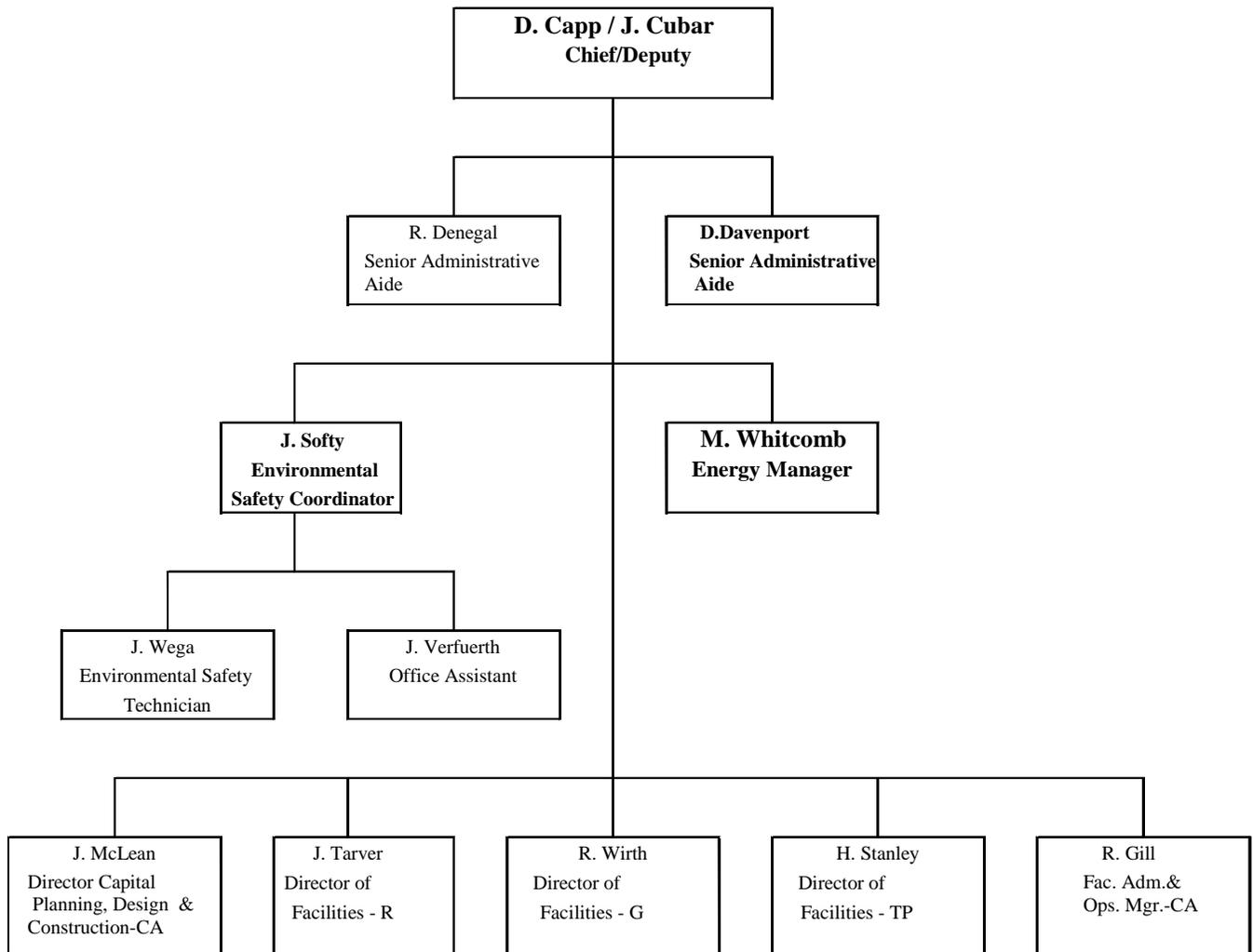


Figure 1

The Energy Manager coordinates energy efficient design of new and renovated buildings with the Director Capital Planning, Design and Construction, and coordinates energy audits, Utilities Master Plans and retrofits with the three Campus Directors for Physical Plant, and the Administrative Services Manager, Central Administration. The Energy Manager also coordinates with the Deputy Chief's, Senior Administrative Aide on matters relating to utility bills and the utility bill accounting database. In FY 2005, the College contracted consultant services to provide assistance with utility deregulation issues.

The College maintains a vehicle fleet to support the functions of the various College departments. In addition to road vehicles, the College maintains various vehicles such as mowers, tractors and powered carts. The Director of Facilities, Germantown is responsible for College-wide maintenance support of these vehicles and staffs an auto maintenance shop on that campus.

The Energy Manager represents the College on the Interagency Committee on Energy and Utility Management (ICEUM), is a member of the County Deregulation Task Force and represents the College as the lead agency in the procurement of natural gas supply for the County.

ICEUM MEMBER: Mr. J. Michael Whitcomb, P.E.
Energy Manager
Central Administration
Room 315
900 Hungerford Drive
Rockville, MD 20850
Phone No. (301) 251-7375.
Fax No. (301) 251-7379
e-mail: mike.whitcomb@montgomerycollege.edu

Mr. Whitcomb has been a member of the ICEUM committee, representing various county agencies since its formation in 1983. Mr. Whitcomb has served as the Interim Chairman of ICEUM, and is a former member of the Montgomery County Citizens Energy Conservation Advisory Committee (ECAC). Mr. Whitcomb is a Registered Professional Mechanical Engineer in the State of Maryland, a Certified Energy Manager and holds a B.S. in Mechanical Engineering and a Masters in Engineering from the University of Maryland.

In FY 2004 the Montgomery County Government initiated the Environmental Policy Implementation Policy Task Force (EPITF) which was approved by resolution by the Montgomery County Council. The goal of the task force is to provide interagency coordination and guidance on issues impacting the environment such as energy, transportation, recycling and hazardous waste. Mr. David Capp, Chief Facilities Officer is a member of the EPITF and is supported by Mr. Mike Whitcomb and Mr. John Softy who serve on the EPITF Technical Subcommittee. Mr. Softy is the College's Environmental Safety Coordinator, responsible for College-wide safety and environmental (hazardous waste management) issues. An Environmental Action Plan has been submitted since FY 2004.

The College's recycling program is coordinated at the by Mr. Robert Wirth, Director of Facilities, Germantown Campus and managed by each Campus Facilities Director. Mr. Wirth prepares the Annual Recycling Report.

Resource Conservation Plan
Summary
FY 2006

The information on this page reflects the facilities owned or operated
by this agency as of Fall of FY 2006

Agency	Montgomery College		
Number of Facilities	43 Owned 4 Leased 47 Total	Change in number of facilities	+1(School of Art & Design)
Total square feet	Gross (1,865,751) Net Assignable (1,122,055) Conditioned (1,420,206)	Change in total ft ²	+12,402
Average operating hrs/year	4640	Change in avg. operating hrs/year	+20
Other changes effecting energy consumption	<p>1. Information Technology: Similar to other agencies, the College continues to expand its information technology capabilities. Most classrooms are being retrofitted with Smart Instructor Work Stations(SIWS) that include computers to control electronic audio and video multi-media presentation devices. Many traditional multi-purpose classrooms are being retrofitted with computer workstations to meet the “high tech” demands of the educational programs. A traditional classroom might consume 2-3 watts/sf while the newer energy intensive classrooms might consume 2-3 times that amount. New computer equipment is more efficient and complies with the EPA’s Energy Star requirements.</p> <p>2. Expansion: The College continues to expand to meet the demands of its educational programs and to meet the needs of its student population. In FY 2001, approximately 39,000 GSF was added and approximately 175,000 GSF was added in FY 2002, This is a 14% space increase. Additionally starting in FY 2000 approximately 8 properties were purchased for demolition in FY 2002 & 2003 for the Takoma Park/Silver Spring Campus expansion. In FY 2006 the 110,504 GSF Takoma Park/Silver Spring, Student Service Center was commissioned and construction began on the redevelopment of the Giant Bakery Property into the 125,000GSF King Street Arts Center on that campus. New and renovated buildings are required to meet strict resource conservation and green building guidelines, using the latest life-cycle cost effective technologies. A 20 year College-wide Master Plan has been prepared and a Utilities Master Plan has been completed in order to determine the most lifecycle cost effective means of providing utility infrastructure.</p> <p>3. Competitive Procurement of Utilities: The College has joined with other County Government agencies and local municipalities to procure utilities. This initially resulted in an approximate 7% savings on electricity generation and transmission compared to the Standard Offer Service(SOS) provided by the utility, but savings were marginal for FY05. The College was previously the lead agency for the joint procurement of the supply of natural gas. Energy commodity(electricity, fuel oil, & natural gas) prices remain volatile,</p>		

making utility budget predictions difficult. Deregulated procurement has required additional staff and consultant hours for procurement and verification of bills. Approximately 15% additional man-hours are required for this effort.

4. New and Renovated Building Design: The College continues to improve and refine the energy efficient design process to meet the requirements of the Montgomery County Code. The College has developed Energy Design Guidelines specifically tailored to the needs of the College's design and project management teams. All buildings undergo rigorous analysis during the design process which results in an estimated 40% reduction in energy and maintenance costs. Efficiently designed buildings are no more costly to design and build than inefficient buildings. Sustainable and renewable technologies are incorporated into all building designs. Commissioning ensures that buildings are built to the specifications and are turned over to the operations and maintenance staffs in proper operating order. Small scope alterations and renovations are also scrutinized for energy opportunities. Based upon the evaluation criteria established by the U.S. Green Building Council Leadership in Energy and Environmental Design(LEED), the College has established a goal of all future buildings attaining at least a LEED Certification.

5. Utility Master Planning and Central Plant Technology: The recommendations of utility master plans continue to be implemented on the three campuses. Highly efficient central plant technology has been implemented on the Rockville and Germantown buildings and are proving more cost effective in light of the condition of aging building equipment and deregulated utility pricing. A new central plant and distribution system was designed in late FY 2003 for the Takoma Park/Silver Spring Campus. The plant is being installed in the basement of the new Student Service Center to serve the East Campus while a new central plant to serve the West Campus is being installed in the King Street Arts Center. A College-wide Utility Master Plan consultant study was completed in FY2006 in response to the recently completed College-wide Master Plan. Utility Master Planning is a lifecycle cost effective method of determining the optimum development of utility infrastructure, particularly for College Campus environments.

6. Building Automation Controls and BACnet System Integration: Standardization of communications protocols(BACnet) by the American Society of Heating, Refrigeration and Air Conditioning Engineers(ASHRAE) and acceptance by the engineering and manufacturing community has resulted in building control system integration capabilities and open competition. Integration also allows communications between building system components through the building automation system which increases capabilities while reducing costs. These systems are also capable of communicating over existing building networks, which eliminates redundant networks and further reduces costs. The College has introduced this technology on all three campuses and is incorporating it into all new building designs. A College-wide controls mater plan will be prepared in FY 2006.

7. Recycling and Hazardous Waste Disposal: The College has an active recycling and hazardous waste disposal program. The results of the recycling program for FY 2005 are reported in the summary sheets.

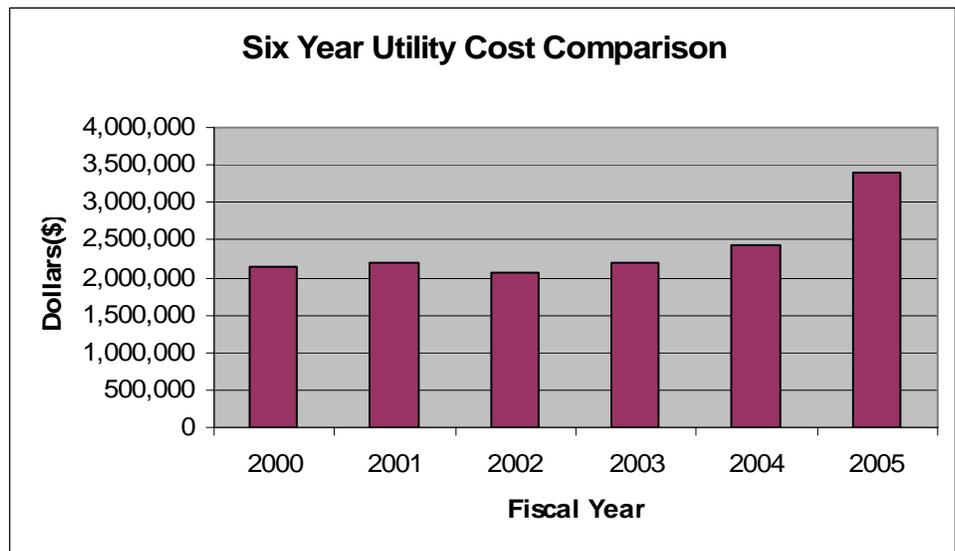
8. Vehicle Fleet: The College maintains approximately 54 vehicles to support the various functions of the College. The fleet is maintained by the Director of Facilities on the Germantown Campus. These vehicles are described on the summary sheets. The College also maintains various other specialty vehicles, such as mower, tractors, forklifts and carts. These are not included in the summary sheets.

9. Capital Improvement Projects - The College Resource Conservation Program projects are funded primarily by three Capital Improvement Projects(CIP), Energy Conservation(No. 816611), Planned Lifecycle Asset Replacement(No. 926659) and Takoma Park Central Plant(No. 016600). The Resource Conservation Program does however influence decisions made in all capital and operating projects that involve the consumption of resources by the College community. \$125,000 for staff salary and energy projects is included in the operating budget.

10. Renewable Solar Energy: The College currently has 83 kW of solar photovoltaic electric capacity and a 900 evacuated tube solar thermal array. These generate approximately 160,000 kWh of electricity and 183,960 kWh of thermal energy saving the College approximately \$25,000 annually.

11. Utility Management Databases; The College continues to monitor utility expenditures and maintain utility consumption databases. This activity has proved valuable since the recent deregulation and resulting competitive procurement of electricity and natural gas has resulted in numerous billing errors. Timely monitoring and accurate records has allowed resolution of disputes with suppliers. Due to the increase quantity and complexity of billing issues since deregulation, the College has obtained consultant services to assist in billing monitoring and resolution. Accurate records and monthly monitoring also provide early warnings of unusual operating conditions that result in changes to utility consumption. In FY 2006 the utility management database will be updated to a WEB based platform with expanded reporting features.

The chart below shows the College-wide utility cost comparison for the past six fiscal years. Last years increased cost was due primarily to increases in the unit costs for electricity, natural gas and the phase-out of refunds from the deregulated sale of the utility generating assets.



12. Occupant Awareness Programs: The College continues to promote occupant energy awareness. In FY 2006 a Facilities Energy Management Web Pages will be developed.

College Utility Consumption & Cost Comparison(FY04-FY05)

Utilities	Total Consumption Actual FY 05	Consumption Percent Change From Actual FY 04	Total Cost Actual FY 05	Cost Percent Change From Actual FY 04
Electricity	28,281,748 kWh	+6.82%	\$2,520,601	+40.13%
Firm Natural Gas	176,630 therms	+13.68%	\$229,998	+41.16%
Interruptible Rate Natural Gas	440,090 therms	+8.37%	\$473,948	+41.31%
Fuel Oil #2	35,005 gal.	+12.63%	\$56,163	+63.68%
Propane	2,637 gal	-24.66%	\$8,124	+93.43%
Water	18,926 kgal	+17.09%	\$58,871	+16.66%
Sewer	11,869 kgal	+5.20%	\$58,709	+14.48%
Total			\$3,406,414	+39.76%

New Measures

This table shows information on resource conservation measures implemented during FY 06
(July 1, 2005 through June 30, 2006)

Measures	Date Implemented (mo/yr)	Initial Cost (\$)	Annual Net Impact On Maintenance Cost (\$)	Fuel Type Affected And Units	Units Saved Per Year	Annual Cost Savings (\$)
Capital Improvement Projects:						
Lighting	Various	50,000	(2,000)	Elect.	125,000	9,500
HVAC	Various	50,000	(2,500)	Elect., N.Gas & Fuel Oil	50,000 kWh, 5000 Th	3,750 4,600
Controls	Various	25,000	(2,000)	Elect.N.Gas & Fuel Oil	25,000 kWh 5000 Th	2,200 4,700
Total		125,000	(6,500)			24,750
Operations and Maintenance:						
Total						
Description of Activities:						

New measures consist of Lighting, HVAC & Controls, New Building and Renovated Building Design and Central Plant Technologies that reduce energy cost, reduce energy consumption and reduce maintenance costs.

Existing Measures

This table shows information on resource conservation measures implemented prior to FY 05
(FY98 TOFY05)

Measures	Date Implemented (mo/yr)	Initial Cost (\$)	Annual Net Impact On Maintenance Cost (\$)	Fuel Type Affected And Units	Units Saved Per Year	Annual Cost Savings (\$)
Capital Improvement Projects:						
Lighting	Various	25,000	(5,000)	Electricity	752,500 kWh	74,000
HVAC & Controls	Various	705,000	(10,000)	Elect., N. Gas & Fuel Oil	537,500 kWh 15,000 therms	41,000 11,000
New Building Design	Various	600,000	(15,000)	Elect., N. Gas & Fuel Oil	730,000 kWh 25,000 therms	51,000 16,000
Central Plant Technology	Various	400,000	(10,000)	Elect., N. Gas & Fuel Oil	714,000 kWh 15,000 therms	50,000 10,000
Total		1,955,000			2,734,000 kWh 50,000 Th	253,000
Operations and Maintenance:						
N/A						
Total		N/A			N/A	N/A
Description of Activities:						
Existing measures consist of Lighting, HVAC & Controls, New Building and Renovated Building Design and Central Plant Technologies that reduce energy cost, reduce energy consumption and reduce maintenance costs.						

Planned Measures

This table shows information on resource conservation measures planned to be implemented in FY 07 (July 1, 2006 through June 30, 2007)

Measures	Date Implemented (mo/yr)	Initial Cost (\$)	Annual Net Impact On Maintenance Cost (\$)	Fuel Type Affected And Units	Units Saved Per Year	Annual Cost Savings (\$)
Capital Improvement Projects:						
Tech Center Retrofit Lighting, HVAC & Controls	June 2005	200,000	(8,000)	Elect., N.Gas & Fuel Oil	150,000 kWh 7200 Th	16,000 5,750
Total		200,000	(8000)			21,750
Operations and Maintenance:						
N/A						
Total		N/A	N/A			N/A
Description of Activities:	<p>The Technical Center on the Rockville Campus was renovated in the late 1980s with energy technology of the era. New lighting, HVAC and controls technology now available will provide energy and maintenance savings while improving occupant comfort.</p> <p>Utility Master Planning – To support the utility requirements for the College wide expansion described in the College’s Master Plan submitted in the Spring of FY2004, the College has commissioned an update to the College’s 1991 Utility Master Plan. Utility Master Planning is a useful planning tool which provides life cycle cost effective recommendations for supplying utilities and central plant infrastructure to campus environments.</p>					

Summary Page - Vehicle Fleet

Vehicle Type or Vehicle Group (other than AFVs) Existing Fleet During FY04	No. of Vehicles	Type of Fuel	Units	Total Units per Year	Cost per Unit	Total VMT per Year
Trucks	24	Unleaded	Gals	3,700	\$ 2.24	63,000
Vans	28	Unleaded	Gals	3,900	\$ 2.24	66,000
Dump Truck	1	Diesel	Gals	118	\$ 2.47	2,000
Car	1	Unleaded	Gals	1,180	\$ 2.29	20,000

Changes in Vehicle Fleet From FY04 to FY05

New Vehicles Purchased	No. of Vehicles	Fuel Type	Units	Expected Average Units per Year	Expected Average VMT per Year
Vans	2	Unleaded	Gals	600	10,000
Car	0	Unleaded	Gals	2,000	20,000
Truck	3	Unleaded	Gals	500	3,700
Old Vehicles Retired	No. of Vehicles	Fuel type	Units	Average Units per Year	Average VMT per Year
Vans	1	Unleaded	Gals	2,000	20,000
Car	0	Unleaded	Gals	2,000	20,000
Truck	2	Unleaded	Gals	400	3,700
AFVs Purchased	Type or Group	Fuel Type	Units	Expected Average Units per Year	Expected Average VMT per Year
N/A					

Summary Page - Solid Waste & Recycling*

Waste Type	Quantity Collected (pounds/yr)	% of Total
Corrugated Cardboard	28,854	1.1
Co-mingled Containers	28,235	1.0
Co-mingled Paper/Cardboard	465,302	17.1
Yard Waste	579,596	21.3
Solid Waste For Disposal	1,608,290	59.0
Total	2,722,694	100.0

Summary Page – Other Recycling*

Waste Type	Quantity Collected (pounds/ yr.)	% of Total
Oils – motor, hydraulic, etc.	8,260	100
Anti-Freeze	1,700	100
Auto Batteries & Power Supplies	3,385	100
Fluorescent Light Tubes	530	100
Scrap Metal	24,100	100
Computer Equipment	152,710	100
Printer Toner Cartridges	480	100

* Based upon January 2005 Annual Recycling Report for Calendar Year 2004.

CONCLUSIONS

The FY 2007 Montgomery College Resource Conservation Program is a well-balanced, environmentally friendly, low risk, high return on investment program, based upon results of Master Planning and Best Practice Resource Conservation efforts. All investments are selected based upon their life cycle cost effectiveness and on their high probability for success. Utility consumption figures indicate that energy conservation measures implemented have had a positive, cost-effective impact. The potential exists for significant savings in lighting and controls, which continue to be identified during the walk-through and detailed energy audits. All new or renovated buildings undergo rigorous analysis to determine the optimum life cycle cost effective systems and meet or exceed the requirements of the Montgomery County Building Energy Design Guidelines. It is the College's goal to attain at least the U.S. Green Building Council LEED Certificate Rating on all future building designs. To ensure that the program is proceeding as predicted, various databases have been developed to provide accountability for the energy dollars spent. Montgomery College is confident that the FY 2007 Resource Conservation Program will meet the goal of providing safe, reliable, environmentally friendly and economical facilities which enhance the learning environment at Montgomery College.

APPENDIX A

Energy Conservation CIP, No. 816611, PDF

Planned Lifecycle Asset Replacement CIP, No. 926659, PDF

Takoma Park Central Plant, CIP, No. 016600, PDF

Montgomery College FY 2007, Utility Projection Report, January 9, 2006

ICEUM Utility Rates, FY06&FY07, September 27, 2005

Energy Conservation: College -- No. 816611

Category
Agency
Planning Area
Relocation Impact

Montgomery College
Montgomery College
Countywide

Date Last Modified
Previous PDF Page Number
Required Adequate Public Facility

October 11, 2004
20-7 (05 App)
NO

EXPENDITURE SCHEDULE (\$000)

Cost Element	Total	Thru FY04	Rem. FY04	Total 6 Years	FY05	FY06	FY07	FY08	FY09	FY10	Beyond 6 Years
Planning, Design and Supervision	1,394	1,393	1	0	0	0	0	0	0	0	0
Land											
Site Improvements and Utilities	59	59	0	0	0	0	0	0	0	0	0
Construction	2,582	1,830	2	750	125	125	125	125	125	125	0
Other	133	130	3	0	0	0	0	0	0	0	0
Total	4,168	3,412	6	750	125	125	125	125	125	125	0

FUNDING SCHEDULE (\$000)

G.O. Bonds	2,074	1,318	6	750	125	125	125	125	125	125	125	0
Current Revenue:												
General	1,994	1,994	0	0	0	0	0	0	0	0	0	0
Federal Aid	49	49	0	0	0	0	0	0	0	0	0	0
State Aid	51	51	0	0	0	0	0	0	0	0	0	0

ANNUAL OPERATING BUDGET IMPACT (\$000)

Maintenance				-1,140	-140	-160	-180	-200	-220	-240	0
Energy				-3,130	-385	-440	-495	-550	-600	-660	0
Program-Staff				0	0	0	0	0	0	0	0
Program-Other				0	0	0	0	0	0	0	0
Offset Revenue				0	0	0	0	0	0	0	0
Net Impact				-4,270	-525	-600	-675	-750	-820	-900	0
Workyears				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DESCRIPTION

This project provides funding to (1) continue development of a Collegewide energy management program, (2) implement life-cycle cost effective energy conservation measures based upon energy audits, and (3) review new building/renovation designs for compliance with Montgomery County Code, Ch. 8 Building Energy Performance Standards. Typical project activities include retrofits and modifications of lighting, controls, and HVAC equipment; building envelope modifications; solar energy retrofits; computer equipment for equipment control and energy-use monitoring; HVAC system evaluation/balancing studies; long-range energy/utility planning studies; central plant design plans (GT/TP); and waste management studies. Typical payback on lighting, controls, HVAC and solar energy modifications is two to five years.

JUSTIFICATION

As mandated by Ch. 8 of the County Code and supported by the College, County Council, the Interagency Committee on Energy & Utility Management (ICEUM), and the Citizens Energy Conservation Advisory Committee (ECAC), an energy cost reduction program has been developed. This program consists of energy audits performed by College staff to identify life cycle cost effective retrofits, including an aggressive lighting retrofit program.

STATUS

Continuing project. New construction and building renovation projects under review during FY05-06 include the Takoma Park Campus expansion and planning for new buildings on the Rockville and Germantown campuses. Campus utilities master plans were completed in FY90 (RV) and FY92 (TP and GT) and work is being coordinated with the outcome of the Collegewide Facilities Condition Assessment (8/02).

OTHER

The following fund transfers have been made from this project: \$21,420 to Central Plant Distribution System project (#886676) (BOT Resolution #90-102 (6/18/90)); \$70,000 to Fine Arts Renovation (#906601) (BOT Resolution #94-114 (9/19/94)), and \$7,000 to Planning, Design & Construction project (#906605) (BOT Resolution #01-153 (10/15/01)). Beginning in FY98, the portion of this project funded by County Current Revenues migrated to the College's Operating Budget. It is anticipated that migration of this portion of the project will promote a desirable consistency with County budgeting practices and encourage greater competition in an environment of scarce resources. Reflecting the migration of this portion of the project, the College's Operating Budget includes funds for this effort.

FY2006 Appropriation: \$125,000 (G.O. Bonds).

* Project expenditures will continue indefinitely.

APPROPRIATION AND EXPENDITURE DATA	COORDINATION	MAP	
Date First Appropriation FY81 (\$000)	This project is coordinated with the scheduled building renovations on the Rockville and Takoma Park Campuses, and the planned construction of new buildings on the Rockville, Gemantown and Takoma Park Campuses. ICEUM & ECAC Facility Planning: College (#886686) PLAR: College (CIP#926659) Roof Replacement: College (CIP#876664) Takoma Park Central Plant (CIP#016600)		
Initial Cost Estimate			1,008
First Cost Estimate			
Current Scope FY02			3,918
Last FY's Cost Estimate			4,168
Present Cost Estimate			4,168
Appropriation Request FY06			125
Supplemental Appropriation Request FY05			0
Transfer			0
Cumulative Appropriation Expenditures/Encumbrances			3,543
Unencumbered Balance	49		
Partial Closeout Thru FY03	0		
New Partial Closeout FY04	0		
Total Partial Closeout	0		

Planned Lifecycle Asset Replacement: College -- No. 926659

Category **Montgomery College**
 Agency **Montgomery College**
 Planning Area **Countywide**
 Relocation Impact **None**

Date Last Modified **January 3, 2005**
 Previous PDF Page Number **20-14 (05 App)**
 Required Adequate Public Facility **NO**

EXPENDITURE SCHEDULE (\$000)

Cost Element	Total	Thru FY04	Rem. FY04	Total 6 Years	FY05	FY06	FY07	FY08	FY09	FY10	Beyond 6 Years
Planning, Design and Supervision	1,249	340	9	900	100	100	150	150	200	200	0
Land											
Site Improvements and Utilities											
Construction	19,332	7,108	124	12,100	900	1,400	1,850	2,350	2,800	2,800	0
Other											
Total	20,581	7,448	133	13,000	1,000	1,500	2,000	2,500	3,000	3,000	0

FUNDING SCHEDULE (\$000)

G.O. Bonds	18,641	5,508	133	13,000	1,000	1,500	2,000	2,500	3,000	3,000	0
Current Revenue:											
General	1,940	1,940	0	0	0	0	0	0	0	0	0

ANNUAL OPERATING BUDGET IMPACT (\$000)

DESCRIPTION

This project provides funding for a comprehensive lifecycle renewal and replacement program to protect the investment in College facilities and equipment and to meet current safety and environmental requirements. Funding also provides for project management staff and/or services. This collegewide project is targeted at deteriorating facilities and deferred maintenance of major building systems. This project includes: (1) HVAC system renovation/replacement; (2) major mechanical/plumbing equipment renovation/replacement; (3) interior and exterior lighting system renovation/replacements; (4) electrical service/switchgear renovation/replacement; (5) building structural and exterior envelope refurbishment; (6) parking lot/roadway/sidewalk replacement; (7) asbestos removals not tied to building renovations; (8) major carpet replacement; (9) underground petroleum tank upgrades; and (10) site utility replacement/improvements.

JUSTIFICATION

In August 2002, the College completed a comprehensive building system/equipment assessment, including site utilities and improvements, that identified deficiencies, prioritized replacements and upgrades, and provides the framework for implementing a systematic capital renewal program to complement on-going preventive maintenance efforts. The College continues to have a significant backlog of major building systems and equipment renovations and/or replacements due to the age of the Campuses and deferral of major equipment replacement. Key components of the HVAC, mechanical and electrical systems are outdated, energy inefficient, and costly to continue to repair. The renovation and/or replacement of major building systems, building components and equipment, and site improvements will significantly extend the useful life of the College's buildings and correct safety and environmental problems. The Collegewide Facilities Condition Assessment identified a \$57.8 million deferred maintenance backlog for the three campuses. If additional financial resources are not directed at this problem, College facilities will continue to deteriorate leading to higher cost renovations or building replacements.

Plans and Studies

Schematic Design for Curtain Wall Remediation - Macklin Tower (5/25/01), Curtain Wall and Building Envelope Investigation - Macklin Tower (3/16/01), Collegewide Facilities Condition Assessment (8/02), and Collegewide Facilities Master Plan (January, 2004).

Cost Change

Cost increase to fund corrective work identified in the Facilities Condition Assessment, including project administration.

STATUS

Ongoing.

OTHER

The following fund transfers have been made from this project: \$47,685 to Takoma Park Child Care Center (#946657) (BOT Resol. #93106, #9426 & #94128); \$185,000 to Rockville Surge Building (#966665) (BOT Resol. #11-2291 - 1/21/97); and \$7,000 to Planning, Design & Construction (#906605) (BOT Resol. #01-153). The following fund transfers have been made into this project: \$15,000 from Central Plant Distribution System (#386676) (BOT Resol. #98-82 - 6/15/98) and \$25,000 from Clean Air Act (#956643) (BOT Resol. # 98-82 - 6/15/98). Beginning in FY98, the portion of this project funded by County Current Revenues migrated to the College's Operating Budget. Reflecting the migration of this portion of the project, the College's Operating Budget includes funds for this effort.

FY2006 Appropriation: \$1,500,000 (G.O. Bonds).

* Project expenditures will continue indefinitely.

APPROPRIATION AND EXPENDITURE DATA	COORDINATION	MAP	
Date First Appropriation FY93 (\$000)	This project is coordinated with the Rockville, Takoma Park and Germantown Campus Utility Master Plans, building renovations on the Rockville and Takoma Park Campuses, and the following projects: Elevator Modernization: College (CIP#046600) Energy Conservation: College (CIP#816611) Facility Planning: College (CIP#886686) Life Safety Improvements: College (CIP#046601) Macklin Tower Alterations (CIP#036603) Roof Replacement: College (CIP#876664) TP Central Plant (CIP#016600)		
Initial Cost Estimate			3,000
First Cost Estimate			
Current Scope FY03			22,081
Last FY's Cost Estimate			20,581
Present Cost Estimate			20,581
Appropriation Request FY06			1,500
Supplemental			
Appropriation Request FY05			0
Transfer			0
Cumulative Appropriation			8,581
Expenditures/			
Encumbrances			7,488
Unencumbered Balance			1,093
Partial Closeout Thru FY03			0
New Partial Closeout FY04	0		
Total Partial Closeout	0		

Takoma Park Central Plant -- No. 016600

Category **Montgomery College**
 Agency **Montgomery College**
 Planning Area **Takoma Park**
 Relocation Impact **None.**

Date Last Modified **January 3, 2005**
 Previous PDF Page Number **20-18 (03 App)**
 Required Adequate Public Facility **NO**

EXPENDITURE SCHEDULE (\$000)

Cost Element	Total	Thru FY04	Rem. FY04	Total 6 Years	FY05	FY06	FY07	FY08	FY09	FY10	Beyond 6 Years
Planning, Design and Supervision	345	336	9	0	0	0	0	0	0	0	0
Land											
Site Improvements and Utilities	5,323	0	600	4,723	2,643	1,040	1,040	0	0	0	0
Construction											
Other											
Total	5,668	336	609	4,723	2,643	1,040	1,040	0	0	0	0

FUNDING SCHEDULE (\$000)

G.O. Bonds	2,834	168	304	2,362	1,322	520	520	0	0	0	0
State Aid	2,834	168	305	2,361	1,321	520	520	0	0	0	0

ANNUAL OPERATING BUDGET IMPACT (\$000)

Maintenance				-40	-4	-4	-8	-8	-8	-8	0
Energy				-100	-10	-10	-20	-20	-20	-20	0
Program-Staff				-40	-4	-4	-8	-8	-8	-8	0
Program-Other				-250	-25	-25	-50	-50	-50	-50	0
Offset Revenue				0	0	0	0	0	0	0	0
Net Impact				-430	-43	-43	-86	-86	-86	-86	0

DESCRIPTION

This project provides for the design and construction of a central heating and cooling plant on the Takoma Park Campus as recommended in the College's campus utilities master plan (October 1991). The plan for a Campus central plant was further developed in the Campus facilities master plan (February 1998) where it was recommended that the plant be located in the planned Student Services Center on the north end of the existing Campus. This project is integrated into the overall planning and coordination for the Campus expansion project. The project includes installation of boilers and chillers with associated equipment, the provision of natural gas service, and the construction of a hot water and cold water distribution piping system to eleven existing campus buildings.

JUSTIFICATION

This project implements the recommendations of the campus utilities master plan (10/91) and campus facilities master plan (2/98). The Campus' existing heating and cooling equipment is typically 20-30 years old and beyond its useful economic life. Due to the age of the equipment and increasing maintenance problems and costs, the Campus is experiencing a significant increase in mechanical system problems and heating/cooling outages. Based on a life cycle cost analysis, the installation of a central heating/cooling plant offers significant equipment replacement, energy and maintenance savings to the College.

Plans and Studies

Takoma Park Campus Utilities Master Plan (October 1991); Takoma Park Campus Facilities Master Plan (February 1998); and Program Justification and Description Report for Students Services Ctr (3/27/98) and Takoma Park Campus Central Plant & Dist. System (8/15/99).

Cost Change

Decrease due to change in project scope.

STATUS

Design phase. The Takoma Park central plant project implements a portion of the Campus' utilities master plan. The need to provide new systems for heating and cooling campus buildings was articulated in the utilities master plan and satisfying this requirement is critical to the planned renovation of the existing campus buildings. The planning for the central plant project was integrated into the plan for the Takoma Park Campus expansion with the September 1999 submission of the Part I/II facility program for the project to the State. The State approved the project program in July 2000. The College awarded an engineering design contract for this project in December 2001 and the central plant design is being coordinated with the design of the Student Services Center as part of the Campus expansion project. The facilities program for the project has been revised to reflect the relocation of the Cultural Arts Center and the concomitant decision to not extend the piping distribution system over the WMATE/CSX tracks to the College's Georgia Avenue expansion site. The revised program reflects a total cost reduction of \$846,000, which includes a reconciliation of the state and county funding amounts for design and construction administration (\$280,000), and a reduction in the pipe distribution system (\$566,000).

OTHER

State share of project based on anticipated eligible costs. Design fees above approximately 7% of estimated construction costs may not be eligible for State reimbursement.

FY06 Appropriation: \$2,080,000 (\$1,040,000 -- G.O. Bonds and \$1,040,000 -- State Aid).

APPROPRIATION AND EXPENDITURE DATA			COORDINATION	MAP
Date First Appropriation	FY01	(\$000)	Takoma Park Campus Expansion (#996662) Montgomery College asserts that this project conforms to the requirements of relevant local plans, as required by the Maryland Economic Growth, Resource Protection and Planning Act.	
Initial Cost Estimate		5,204		
First Cost Estimate				
Current Scope	FY05	5,668		
Last FY's Cost Estimate		5,668		
Present Cost Estimate		5,668		
Appropriation Request	FY06	2,080		
Supplemental Appropriation Request	FY05	0		
Transfer		0		
Cumulative Appropriation		3,598		
Expenditures/Encumbrances		3,578		
Unencumbered Balance		10		
Partial Closeout Thru	FY03	0		
New Partial Closeout	FY04	0		
Total Partial Closeout		0		

Montgomery College Office of Facilities FY2007 Utility Projection Report
1/9/2006

UTILITY	ACTUAL	Actual	ACTUAL	9/30/2005 Proj.	9/30/2005 Proj.	9/30/2005	9/30/2005 Proj.	9/30/2005 Proj.	9/30/2005
	FY 2003	FY 2004	FY 2005	CONSUMP. CHNG. FY 2006	UNIT. CHNG. FY 2006	PROJECTED FY 2006	CONSUMP. CHNG. FY 2007	UNIT. CHNG. FY 2007	PROJECTED FY 2007
ELECTRICITY									
kWh	26,901,141	26,474,982	28,281,748	1,825,000	28,281,748	30,106,748	1,958,700	30,106,748	32,065,448
Cost (\$)	1,669,152	1,798,698	2,520,601	178,303	242,526	2,941,429	255,414	994,491	4,181,334
UNIT(\$/kWh)	0.0620	0.0679	0.0891	0.0977	0.0086	0.0977	0.1304	0.0327	0.1304
N.GAS (Firm)									
Therms (t/tn)	148,024	155,377	176,630	36,500	176,630	213,130	39,300	213,130	252,430
Cost (\$)	107,764	162,936	229,998	66,795	93,235	390,028	65,631	(34,101)	421,558
Unit (\$/therm)	0.728	1.049	1.302	1.83	0.53	1.83	1.67	(0.16)	1.67
N.GAS (Irate)									
Therms (t/tn)	425,376	406,098	440,090	9,910	440,090	450,000	0	450,000	450,000
Cost (\$)	243,037	335,400	473,948	15,856	230,196	720,000	0	(76,500)	643,500
Unit (\$/therm)	0.571	0.826	1.077	1.60	0.52	1.60	1.43	(0.17)	1.43
WATER									
kilogallons	22,236	16,163	18,926	3,124	18,926	22,050	2,075	22,050	24,125
Cost (\$)	59,039	50,462	58,871	9,966	1,503	70,340	6,785	1,764	78,889
Unit (\$/kgal)	2.66	3.12	3.11	3.19	0.08	3.19	3.27	0.08	3.27
SEWER									
kilogallons	15,964	11,282	11,869	4,181	11,869	16,050	2,075	16,050	18,125
Cost (\$)	65,920	51,285	58,709	21,198	1,467	81,374	10,790	2,087	94,250
Unit (\$/kgal)	4.13	4.55	4.95	5.07	0.12	5.07	5.20	0.13	5.20
NO.2 FUEL OIL									
Gallons (gal)	41,000	31,080	35,005	5,995	35,005	41,000	0	41,000	41,000
Cost (\$)	40,069	34,312	56,163	13,129	20,498	89,790	0	(4100.00)	85,690
Unit (\$/gal)	0.98	1.10	1.60	2.19	0.59	2.19	2.09	(0.10)	2.09
PROPANE									
Gallons (gal)	0	3,500	2,637	863	2,637	3,500	0	3,500	3,500
Cost (\$)	0	4,200	8,124	1,571	(3,325)	6,370	0	(525)	5,845
Unit (\$/gal)	0.00	1.20	3.08	1.82	(1.26)	1.82	1.67	(0.15)	1.67
TOTAL COST(\$)	2,184,981	2,437,293	3,406,414	306,816	586,100	4,299,330	338,621	873,115	5,511,066
Total Cost	2,290,000	2,786,000	3,406,414						
Approved Budget			3,548,980			4,310,468			5,710,675
SURPLUS/(DEFICIT)	105,019	348,707	142,566			11,138			199,609

NOTES:

1. ICEUM 09/27/2005 Utility Rates & 05/04 Utility Tax Increase
2. 9/30/2005 FY2006 Consumption Change & Unit Change Compared to Actual FY2005
3. 9/30/2005 FY2007 Consumption Change & Unit Changed Compared to 9/30/2005 Projected FY2006

INTERAGENCY COMMITTEE ON ENERGY AND UTILITIES MANAGEMENT
UTILITY RATES
September 27, 2005

FY2006, FY2007

<u>Utilities</u>	<u>ACTUAL FY04</u>	<u>ACTUAL FY05</u>	<u>PROJECTED FY06</u>	<u>PROJECTED FY07</u>
Electricity	10.6 %increase over Actual FY 03	31.2% increase over Actual FY 04	15% increase over Actual FY05	37% Increase over Projected FY 06
No. 2 Fuel Oil	\$1.10 per gallon	\$1.60 per gallon	\$2.19 per gallon	\$2.09 per gallon
Natural Gas	\$1.08 per therm	\$1.33 per therm	\$1.86 per therm	\$1.70 per therm
Propane	\$1.20 per gallon	\$1.39 per gallon	\$1.82 per gallon	\$1.67 per gallon
Water & Sewer	0% increase over Actual FY 03	3% increase over Actual FY04	2.5% increase over Actual FY05	2.5% increase over Projected FY06
<u>Motor Fuels:</u>				
Unleaded	\$1.31per gallon	\$1.70 per gallon	\$3.00 per gallon	\$2.72 per gallon
Diesel	\$1.28 per gallon	\$ 1.77 per gallon	\$2.80 per gallon	\$2.80 per gallon
CNG:	\$1.89 per gallon equivalent	\$1.92 per gallon equivalent	\$2.01 per gallon equivalent	\$2.45 per gallon equivalent
Ethanol	\$1.68 per gallon	\$1.95 per gallon	\$3.37 per gallon	\$2.61 per gallon

Notes:

1. Unit cost or percentage change is a cap. Individual agency unit costs may be below the ICEUM established number, but can not exceed the projection. Energy cost projections for FY06 and FY07 assume the fuel energy tax at the level established in FY05.
2. Electricity rate projections include the price premium for wind energy.
3. Motor fuels include State tax.
4. CNG rate excludes Federal excise taxes, which the County does not pay.

jmw:ICEUMUtilityRatesFINAL09_27_05

**INTERAGENCY COMMITTEE ON ENERGY AND UTILITIES MANAGEMENT
UTILITY RATES**

September 28, 2004

FY05, FY06

Note: Unit cost or percentage change is a cap. Individual agency unit costs may be below the ICEUM established number, but can not exceed the projection. Energy cost projections for FY05 and FY05 assume the fuel energy tax at the level established in FY05.

	<u>BUDGETED FY04</u>	<u>BUDGETED FY05</u>	<u>NEW PROJECTED FY05</u>	<u>PROJECTED FY06</u>
Electricity	9.2 % increase over Actual FY 03	21% increase over Actual FY 03	35.5% increase over Actual FY 04	20% increase over Projected FY 05

Electricity rate projections include the price premium for wind energy and generation procurement credits. Electricity rate projections do not include divestiture credits.

No. 2 Fuel Oil	\$ 0.84 per gallon	\$ 0.86 per gallon	\$ 1.57 per gallon	\$ 1.42 per gallon
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Natural Gas	\$ 1.00 per therm	\$ 0.98 per therm	\$ 1.25 per therm	\$ 1.24 per therm
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Motor Fuels:

Note: Includes \$0.235 per gallon State tax.

Unleaded	\$ 1.10 per gallon	\$ 1.35 per gallon	\$ 1.55 per gallon	\$ 1.45 per gallon
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Note: Includes \$0.245 per gallon State tax.

Diesel	\$ 1.05 per gallon	\$ 1.30 per gallon	\$ 1.41 per gallon	\$ 1.45 per gallon
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Note: CNG rate excluded Federal excise taxes, which the County does not pay.

CNG: (\$/gallon equivalent):

Slow Fill	\$ 1.00 per g.e.	\$ 0.90 per g.e.	no longer used	no longer used
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Fast Fill	\$ 1.25 per g.e.	\$ 1.49 per g.e.	\$ 1.26 per g.e.	\$ 1.30 per g.e.
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Ethanol	\$ 1.45 per gallon	\$ 1.68 per gallon	\$ 1.91 per gallon	\$ 1.80 per gallon
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Propane	\$ 1.00 per gallon	\$ 1.00 per gallon	\$ 1.26 per gallon	\$ 1.16 per gallon
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Water & Sewer	0% increase over Actual FY 03	3% increase over Actual FY 03	3% increase over Actual FY 04	3% increase over Projected FY 05
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FY 2007

Resource Conservation Plan

**Department of Public Works and Transportation
Division of Operations
Engineering and Management Services Section**

January 2006

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I. Executive Summary

The Department of Public Works and Transportation (DPWT), Engineering and Management Services Section (EMS) in the Division of Operations has enacted numerous energy efficiency programs and continues to foster activities that enhance energy efficiency, and reduce utility costs to ensure energy efficient operation of facilities.

The Division of Operations within DPWT has for more than ten years, accomplished millions of dollars in energy savings by implementing our Energy Design Guidelines into new and renovation projects to ensure efficient operation and maintainability of mechanical and electrical systems. The Energy Design Guidelines document has been extremely effective in providing basic building design parameters for mechanical, lighting and envelope systems. The document is now being revised to provide specific design guidance for various building types such as libraries, indoor pools, fire stations, community centers, etc.

In response to Electricity Deregulation, which became effective in June 2004, DPWT has pioneered a unique energy purchasing methodology that allows same day bidding and contract award. To date, DPWT has awarded several 14 to 17 months contracts, with various suppliers for a total of \$27 M, with total savings of \$1.97 M when compared to May 2004 SOS prices and \$2.4 M when adjusted for actual SOS costs as published in May 2005. To bring this about, the County enacted in 2004 a new Procurement Regulation that delegates electricity procurement authority from the CAO to the Director DPWT and created a unique procurement document titled "Request for Energy Proposals" (RFEP) to select and qualify potential bidders. See more details in Section II.B. The RFEP also enabled award of the largest Green energy contract for any Municipality. Montgomery County including 17 agencies and Municipalities now purchase wind energy Renewable Energy Credits RECs equal to 5% of the total yearly energy consumption. The contract may be re bid or negotiated after two years.

Montgomery County received a 2005 NACo Award for its work as the lead procurement agency for an 178 member Aggregation Group.

The DPWT programs has been successful in consistently providing millions in savings by: 1) leading and implementing the electricity procurement program, 2) by promoting energy conscious design practices to ensure the implementation of energy savings opportunities in new designs and retrofit of existing systems and 3) by auditing utility bills resulting in thousands of dollars in cost avoidance payments and obtaining refunds from utility companies and 4) by implementing various Capital Improvement projects.

II. Energy Management

A. Utility Budget and Bill Auditing

The Division of Operations is responsible for tracking and auditing all utility invoices from various utility providers for County facilities to insure accurate budget projections. Due to reorganization, EMS has added new responsibilities to the task of managing utility cost to include the parking district and traffic lights. The new customized utility bill tracking software has now been further enhanced to accept electronic billing data in XML or practically any format. The system undergoes constant upgrading, to keep up with a growing number of utility accounts and to be able to track multiple suppliers for our electricity and gas accounts. The custom software enhances the Division's expertise to recognize billing anomalies and obtain refunds from utility companies. In FY 04-05, E& MS was successful in identifying \$197,483 due to incorrect billing charges and incorrect sales tax charges resulting in thousands of dollars in refunds. Obtaining refunds from utility companies is a very tedious and time-consuming process. The Division of Operations has successfully and relentlessly pursued this task.

B. Electricity Procurement

With the advent of electric deregulation there has been drastic changes occurring in the US electricity industry and a greater need to anticipate changes in provision of electricity and related services. Effective June 2004, electricity supply rates have been deregulated allowing commercial customers to choose the electricity supplier. Under current settlements in Maryland, a default Standard Offer Service (SOS) will still be available from the Local Electricity Distribution Company (EDC). The new default rate will not be mandated by regulatory agencies. Initially market forces will establish SOS rates with each EDC holding a series of auctions with its suppliers. In June 2004 the new default service rate increased to an average of 44 % over previous years. In June 2005 SOS rates would also increase, however the average increase was about 15% this time. Another departure from the norm in June 2005 was the vanishing of SOS for large electricity accounts. These rates for these accounts are now computed on an hourly basis (whatever the market rate). The County agencies are major consumers of utility services spending upward of \$53 million annually for 3,200 separate accounts on electricity alone.

The County Task Force on Electric Deregulation was established in June 1997 to develop recommendations regarding public policies and strategic actions to be taken by various agencies prior to, during transition to, and under the coming electric utility deregulation. The task force membership represents a broad spectrum of county agencies and townships. The Division of Operations took the leadership role in establishing prospective suppliers and has also lead in contracting the procurement of electricity for all agencies. Cost effectiveness and reliability being fundamental to the procurement process.

In preparation to avoid "default service" rates, and to be a successful player in the volatile energy market Division of Operations has taken several steps to facilitate "same day" bidding

and contract award for 17 county agencies and municipalities. This process has now evolved to utilize a larger number of suppliers and to have the ability to conduct .web based reverse auctions. Thus, a regulation was enacted to shift electricity procurement authority from the CAO to the Director DPWT. Concurrently, the Division of Operations took the lead and as a cooperative effort among County Agencies, crafted a procurement document nicknamed “Request for Energy Procurement” or RFEP. This document has now been implemented several times and is responsible for a combined \$2.4M in savings. See next page chart for details of electricity bidding and contract awards.

Table I: Cumulative savings through Jan. 2006 - All Participants

Participant	# of accounts	combined Kwh Load ending Jan. 2006	Savings below June 2004 SOS	bid award to date	No. of SL accounts	No. of Type III accounts (*)	No. of Type II accounts	No. of Type I & other acc	Total No. of accounts awarded	Percent Savings below SOS	Agency share of total load	Agency percent accounts awarded	No. of accounts awarded (2638 total)
CC Village	3	369,711	\$670	\$18,383	1	0	1	0	2	3.78%	0.08%	66.67%	0.08%
CC, Sec 5	1	56,312	\$75	\$2,619	1	0	0	0	1	2.97%	0.01%	100.00%	0.04%
City of Rockville	107	15,774,446	\$97,143	\$859,686	3	2	11	0	16	12.74%	3.36%	14.95%	0.61%
College Park	30	1,707,178	\$3,342	\$85,528	1	0	11	0	12	4.07%	0.36%	40.00%	0.45%
Gaithersburg	95	5,455,542	\$9,573	\$290,688	13	1	9	0	23	3.41%	1.16%	24.21%	0.87%
Glen Echo	3	55,246	\$74	\$2,569	1	0	0	0	1	2.97%	0.01%	33.33%	0.04%
HOC	156	11,849,628	\$11,458	\$716,601	0	0	23	0	23	1.62%	2.52%	14.74%	0.87%
MCC	41	21,694,262	\$40,122	\$1,323,166	0	2	26	0	28	3.13%	4.62%	68.29%	1.06%
MCG	966	97,835,068	\$421,111	\$5,323,844	1	1	88	0	90	8.59%	20.82%	9.32%	3.41%
MCPS	259	208,781,341	\$946,582	\$12,603,646	0	11	188	0	199	8.12%	44.42%	76.83%	7.54%
MNCPPC	531	27,149,242	\$158,110	\$1,613,000	2	8	61	0	71	10.87%	5.78%	13.37%	2.69%
PG County	411	76,582,666	\$304,918	\$4,123,706	3	5	45	0	53	7.98%	16.29%	12.90%	2.01%
RHA	3	0	\$0	\$0	0	0	0	0	0		0.00%	0.00%	0.00%
Somerset	4	189,262	\$330	\$9,680	1	0	1	0	2	3.53%	0.04%	50.00%	0.08%
Takoma Park	19	2,005,039	\$2,546	\$104,184	1	0	1	0	2	2.51%	0.43%	10.53%	0.08%
Town of Kensington	8	445,049	\$954	\$22,567	1	0	1	0	2	4.41%	0.09%	25.00%	0.08%
Town of Laytonsville	1	49,730	\$67	\$2,313	1	0	0	0	1	2.97%	0.01%	100.00%	0.04%
Totals for Aggregation Group	2,638	469,999,722	\$1,997,076	\$27,102,181	30	30	466		526	7.95%	100.00%	2,638	19.94%

Total Number of accounts	30	30	744	1834	2638	
Percent number of accounts awarded by type	100%	100%	59.66%			
Percent number of accounts remaining to be awarded	0%	0%	40.34%	100%		
* Large Type II accounts incl.						
Percent share of total load by account type	10.13%	19.78%	65.32%	4.48%		99.71%
Percent of load remaining to be awarded for each account type (1)	0%	0%	35-45%	4-6%		

Status: To date we have awarded all type III and SL accounts which account for 29.9 % of the load and 59.7 % of type II accounts which make up 65 % of the total load Remaining to be awarded are 1834 type I accounts, responsible for 4.48 % of the total load and 278 Type II accounts 35-45% of the combined load.

(1) Due to varying term duration for each award, remaining load can only be estimated.

C. Design Review Team

The Division of Operations Design Team has received the DPWT Team Recognition Award for excellence. The team has been credited with saving millions of dollars in current and future operational costs for its dedication to review and verify the adequacy of mechanical and electrical design parameters.

The Division of Operations will eventually maintain and operate all new buildings under design and as such, the Division participates in the design and, construction of County government facilities under the executive branch of Montgomery County Government and supports facilities spanning a wide variety of functions associated with the County Government and public services.

Under the Division of Operations, the Engineering and Management Services (EMS) sets and enforces the Energy Design Guidelines standards for the Division as a whole, based on simultaneous consideration of energy efficiency, indoor air quality and maintainability. EMS prepares the Energy Program of Requirements (EPOR) for all new building designs as well as retrofits and provides technical guidance to the sections as needed on the path to reliable, economical facilities that are free of indoor air quality problems. As such, the division has played and it will continue to perform a key role in the energy efficiency of county buildings assisting the Design Division by enforcing the Energy Design Guidelines to ensure adequate mechanical design and construction of new facilities.

The Division of Operations experience is showing that energy-efficient building design pays immediately and can be successfully enforced. The Division of Operations provides energy engineering and timely review of project plans and specifications for all new and retrofit CIP projects. The Division is also responsible for producing a blue print for envelope and mechanical and lighting systems design to include energy analysis and life cycle costs for all design projects. It is worthy to note that this cost avoidance measure is not immediately visible; however, to date several millions of dollars have been saved through this effort.

D. Energy Conservation Projects

The Division of Operations implemented several energy conservation programs in FY04 including the replacement / retrofit of time clocks with programmable counterparts, adding photo cell for parking lots, and replacing faulty wiring on fixture ballasts in several facilities to increase bulb life. Other efforts include an energy study for the Executive Office Building and the Judicial Center. These all electric buildings, the study will determine the feasibility of retrofitting the heating plant with Natural Gas and identify capital costs as well as savings due to reduced energy cost. The computer model will also be used to evaluate additional energy saving alternatives.

III. Energy Design Guidelines

A. Background

In 1985 County legislation targeted a roughly 40 percent energy reduction in the design of new county facilities. At that time the Division of Operations began developing comprehensive, integrated design guidelines for new buildings. A series of research grants and projects brought together new technologies, cost control concepts and design process improvements

Mechanical systems typically account about 30% of the total energy consumption in a typical building. Today, with the prospect of ever increasing energy rates during due to unregulated energy suppliers and the loss of Standard Offer Service, principally, there needs be an effort to optimize mechanical systems design to achieve equitable savings in the operation and maintenance of mechanical equipment.

B. Overview

The Building Design Guideline and the Division of Operations Energy Design Guideline documents are two documents that reflect our policy on designing new buildings with energy efficiency components. The goal of Energy Design Guideline is to improve the design of new facilities to meet low energy budgets and minimize life-cycle costs. These documents are updated as needed to reflect new technologies. The terms “green building”, “green technology”, “sustainable building” or “sustainable design”, and “energy efficient design” have been used interchangeably. Sustainable Building Design encompasses five different areas only one of which addresses mechanical systems. The Energy Design Guidelines will specifically address energy consuming mechanical and lighting equipment and will facilitate compliance with “Green Building” design practices. The following components of energy efficient technology are only part of what the Division of Operations accomplishes by enforcing the Guidelines. Each technology provides a contribution based on implementation of new technology. Following is a list of technologies and estimated percent implementation completion.

Lighting

Historically, lighting was the biggest energy user in county facilities. Due to implementation of new technology, the current cost distribution for lighting is now about 15 %. In the late 1980's a major revolution occurred in lighting technologies for buildings. New technology lamps, ballasts, fixtures and sensors entered the market that could provide energy savings of 40 to 90 percent in every office lighting application, from fluorescent lighting to down-lights to exit signs. Virtually every existing light fixture in county facilities had become “economically obsolete”.

A 40 % energy savings is achieved by the replacement of T12 to T8 fluorescent lamps. Likewise, replacing incandescent fixtures with compact fluorescents provides an energy savings of 71 %. The estimated savings contribution for this technology assumes 15 % total energy consumption for lighting and that the program is now 100 % complete. Further maintenance costs may now be reduced by incorporating new technology that substantially increases

longevity of T8 fluorescent tubes. The use of High output T5 bulbs will be implemented for the replacement of Metal halide bulbs in warehouses and repair garages.



Motors and Variable Fluid Flow

Design Guideline promotes Use of premium efficiency motors and Variable Frequency Drives. The use of premium efficient motors in new designs and retrofits has a significant contribution in our energy conservation program. An assessment program is now underway, however, it is estimated that through the efforts of new design and retrofits, about half of all fans and pumps (7 1/2 HP or larger) in all buildings, have been fitted with premium efficiency motors. In addition, about 15% of all fans and pumps now utilize variable speed drives through new design and retrofits. The combination of VFD and premium efficiency motors is responsible for a sizable energy savings. Premium efficiency motors typically achieve a 4% energy savings over “standard motors.

Variable speed drives can reduce fan and pump motor energy usage by 50 % or more.



Energy Management System (EMS)

Depending on application and building type, the largest area of energy consumption in County facilities lies in Heating, Ventilating, and Air-Conditioning (HVAC) operations. To control this energy use, the Division of Operations undertook installation of energy management systems in all facilities. All HVAC systems are remotely monitored by computer dial-up on a daily basis. A significant additional benefit of the energy management and control systems is improved temperature control in work spaces and faster response to temperature problems in monitored buildings. A retrofit program is now underway to go one step further and actually be able to control equipment operation in addition to just monitoring performance.

The chart below quantifies the net average energy savings for typical building components. The energy savings attributed to each component is the combination of two or three different technologies working together to achieve the desired result.

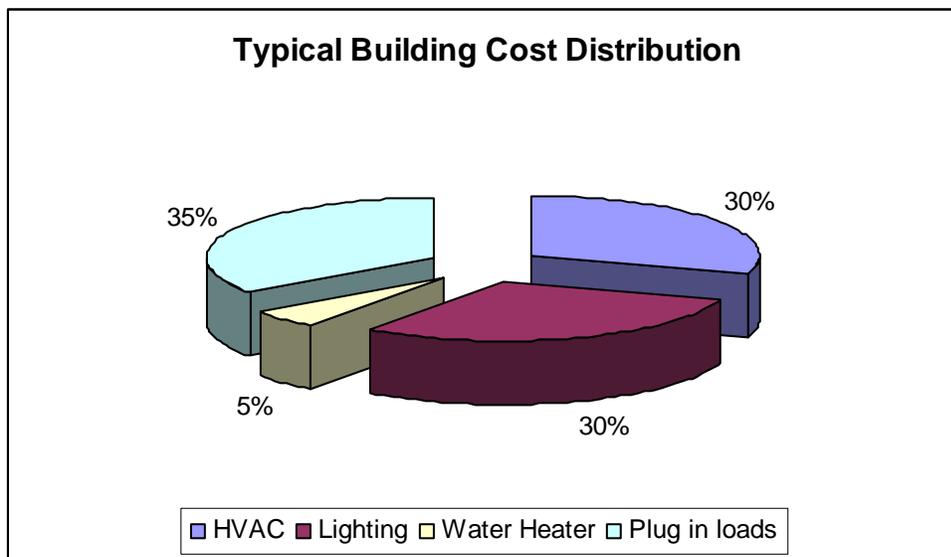


Table 2: Typical energy cost distribution by selected building components.

In the figure above, the total energy savings from component individual contribution include reduced energy consumption by implementation of an energy efficient envelope.

Pumps and fans: Savings are derived from the use of energy efficient motors over conventional in conjunction with variable frequency drives wherever possible enabling pumps and fans to operate at their lowest speed to sustain air/fluid flow requirements resulting in 35-45% energy savings over constant volume machines.

Space Cooling and Heating: Savings are achieved through the careful selection of high efficiency and properly sized equipment and the use of heat recovery equipment when life cycle costs show that economic feasibility. Indoor swimming centers are a prime example. The waste heat from dehumidification equipment is utilized for heating pool water or reheat of indoor air to control humidity. The use of heat recovery air handlers are also extensively promoted to decrease the cost of tempering outside air during heating or cooling season.

Domestic Hot Water: The Division of Operations has been promoting the use of Natural Gas water heaters and boilers in lieu of electrically operated devices to further enhance savings. The chart below shows the relative cost for the same amount of energy using electricity or Natural Gas. On the average it would cost twice as much to heat a building with electricity in lieu of Natural Gas.

The Division of Operations also promotes the use of high efficiency boilers (90-95% efficient), over conventional boilers and furnaces (75-80% efficient) to promote even more savings.

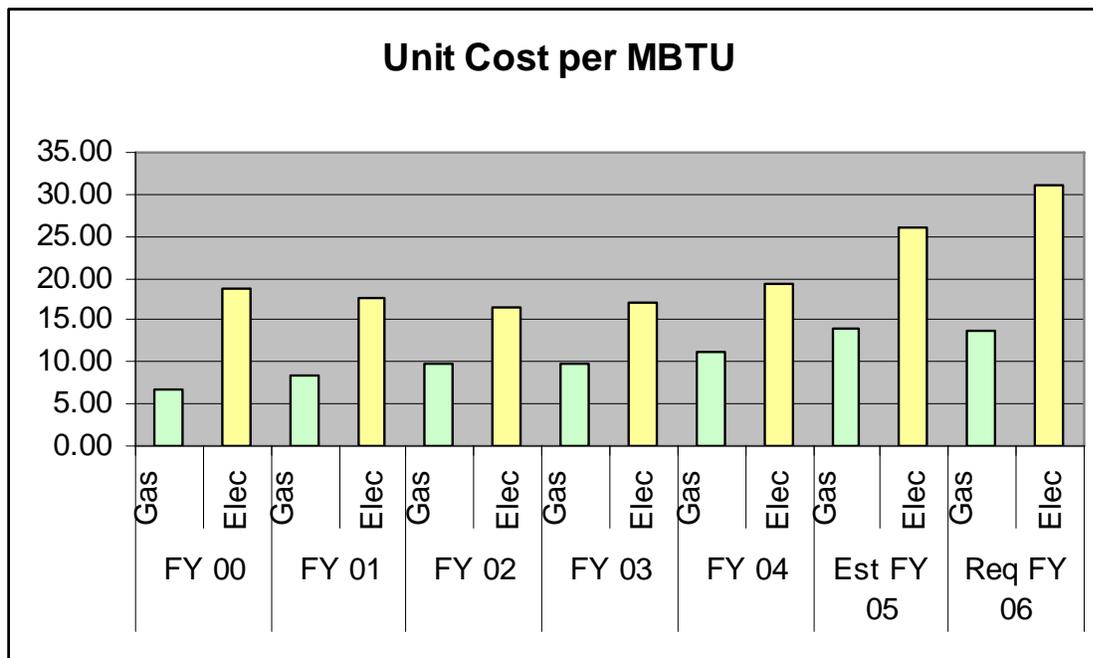


Table 3-: Electricity and Natural Gas cost for 1000 BTU units of Energy

The following are not included in the figure above but are worth mentioning:

Energy Source: The use of natural gas in lieu of all-electric provides a savings of approximately forty five cents for every dollar spent in electricity given that the cost of electricity is approximately twice as much as Natural gas, for the same unit (amount) of energy. (see Table 2)

Deregulation: The new electricity supply contract has resulted in an estimated \$3.9 M savings in electricity contract procurement through May 2003, an additional \$1.6M by renewing the existing contract through May 2004 and as of this date an additional \$2.4M through December 2005.

EMS: Energy management systems can reduce operating cost as much as 25% by providing remote monitoring and *control* of HVAC and lighting systems.



Building Envelope

In the past, more special considerations were given to high performance glass or high efficiency insulation that could enhance the performance of HVAC equipment. All new designs are required to use double pane energy efficient glass and low “E” coatings where analysis shows that there is an economic benefit. Each building is evaluated separately through life cycle analysis to determine if the predicted savings occur at an acceptable break even point. The use of this technology enhances the performance of HVAC equipment. Low “E” type windows can achieve 25% energy savings over conventional single pane type. Day-lighting techniques whenever feasible can provide an additional 5-10% additional savings

Envelope and EMS: Although not mentioned in Table 2 as an energy savings contributor, envelope and EMS enable all other components to operate even more efficiently. Just like energy efficient motors and variable frequency drives are able to provide minimum air/water flows when coupled to fans and pumps as compared to constant flow counterparts, the use of Building envelope also plays a very important role. The use of insulating materials and energy efficient windows can decrease cooling/heating requirement and reduce equipment size, first and operating cost as much as 25 %. The Energy management system is also responsible for across the board operating cost savings by enabling remote monitoring and operation of all building HVAC components and lighting which may now be programmed to be used only when needed.



Energy Star Buildings

Reducing energy use in buildings also directly reduces atmospheric pollution and greenhouse gasses from power plants. Recognizing this link, the US EPA recently started promoting systematic efficiency improvements to facilities as a major environmental initiative. Energy Star Buildings is both a program of technical guidance and a recognition label for

efficient buildings. To earn the Energy Star label, a facility must perform better than 75 percent of similar facilities nationwide in energy efficiency.

At the Division of Operations the Energy Star survey process is integrated into a larger program of facility assessments. The assessments identify tasks that may be assigned to various Division of Operations sections and programs for action. Projects that require capital improvements to the facility, have an acceptable payback period through energy savings, and are not covered under other programs, will be assigned to the Energy Conservation CIP.

The Division of Operations showed its commitment to energy efficiency by hosting on August 20, 2004, an ENERGY STAR Conference. Attendees included energy managers and design professionals from Fairfax and Arlington Counties. Several topics were presented including Local Government perspective on “Green Building” design and energy efficiency considerations to be observed during the LEED process. In addition, building “benchmarking” was explained in detail in an “on hands” training environment.

IV. Utility Budget

A. Overview

County facilities can be categorized as Government Service Centers, the Executive Office Building and Judicial Center, Libraries, Police Stations, Parking Lots, Detention Centers, Transmitter Sites, Community Health Centers, Day Care Centers, Halfway Houses, Community Recreational and Swim Centers, and Supporting Maintenance Shops and warehouses. The ages of these facilities vary from new to over 100 years old. The hours of operation vary from about 60 hours a week to continuous 24-hour operation. The end uses of energy are primarily lighting, heating, air-conditioning, computers, and domestic hot water.

Table 4: Utility Budget

UTILITY TYPE	ACTUAL FY04	ACTUAL FY05	BUDGET FY06	ESTIMATED FY06	REQUESTED FY07	FY07 REQUEST / FY06 BUDGET
ELECTRICITY						
COST	\$5,190,679	\$7,528,649	\$8,853,490	\$8,775,715	\$10,962,141	123.82%
KWH's (000's)	79,243,142	84,401,895	0	85,549,964	89,053,589	
COST/KWH	0.0655	0.0892	0.0000	0.1026	0.1231	
WATER AND SEWER						
COST	\$694,845	\$736,571	\$799,940	\$764,175	\$804,747	100.6%
GALLONS (000's)	89,280	90,423	0	91,080	93,122	
COST/GALLON	7.7827	8.1458	0.0000	8.0162	8.6419	
FUEL OIL #2						
COST	\$72,269	\$213,798	\$87,060	\$294,421	\$298,916	343.34%
GALLONS (000's)	56,701	130,325	0	131,000	133,000	
COST/GALLON	1.2746	1.6405	0.0000	2.2475	2.2475	
NATURAL GAS						
COST	\$1,038,625	\$1,602,755	\$1,549,980	\$2,303,264	\$2,471,947	159.48%
THERMS (000's)	935,973	1,114,262	0	1,143,763	1,227,528	
COST/THERM	1.1097	1.4384	0.0000	2.0138	1.3760	
Prof. Services	195,062	185,888	214,112	200,000	200,000	
Charges fm SWS	170,410	225,010	201,760	225,010	225,010	
TOTAL COSTS	\$7,361,890		\$7,735,690	\$9,634,198	\$11,708,939	

The Utility budget also includes a premium for the purchase of Green energy. The upcoming electricity procurement effort will include 5% of the total use (kWh) to be "green energy." The energy type will be energy produced by wind mills located in the Western part of the State or West Virginia and will benefit the County's air shed.

Net changes to electrical usage for new and leased facilities through next fiscal year are demonstrated in tables on subsequent pages for; "Projected Changes in Electrical Usage". This projection includes both increases in electrical costs to cover new and leased facilities. Reductions in costs resulting from current and future energy retrofit projects appear in the "new facilities" table. Additional information on new and leased facilities tables demonstrates "Projected Additions in Natural Gas Usage", and "Projected Additions in Water Usage".

Table 5: New Construction Projects - Projected Utility Usage in FY06 and FY07

	Net Area (Sq. Ft.)	Energy Use (kWh/SqFt)	Occupied Year	FY06	FY07	FY 2006	FY 2007
				PrRte factor	PrRte factor	Change (kWh)	Change (KWh)
ELECTRICITY							
SS Fire Station #1 (Police portion)	24,753	25.00	FY06	7/12	12/12	360,981	618,825
Germantown Library	43,911	19.50	FY06	4/12	12/12	285,422	856,265
Brookville Service Park 1	80,000	8.00	FY06		8/12	0	426,667
Rockville Library	85,975	20.50	FY07		12/12	0	1,762,488
Multi-Agency Driver Training	5,410	20.00	FY07		10/12	0	90,167
Seven Locks Tech Ctr Phase 1	13,335	14.80	FY07		6/12	0	98,679
Seven Locks Tech Ctr Phase II	35,442	15.00	FY07		2/12	0	88,605
(Main Depot Bldg)						0	0
SubTotal	288,826					646,403	3,941,694
	Net Area (Sq. Ft.)	Therms/Ft2 ESTIMATED	Occupied Year	FY06	FY07	FY 2006	FY 2007
				PrRte factor	PrRte factor	New Usage (Therms)	New Usage (Therms)
NATURAL GAS							
SS Fire Station #1 (Police portion)	24,753	0.80	FY06	7/12	12/12	11,551	19,802
Germantown Library	43,911	0.53	FY06	4/12	12/12	7,758	23,273
Brookville Service Park 1	80,000		FY06	0/12	8/12	0	0
Rockville Library	85,975	0.55	FY07	0/12	12/12	0	47,286
Multi-Agency Driver Training	5,410	0.50	FY07	0/12	10/12	0	2,254
Seven Locks Tech Ctr Phase 1	13,335	0.52	FY07	0/12	6/12	0	3,467
Seven Locks Tech Ctr Phase II	35,442	0.45	FY07	0/12	2/12	0	2,658
(Main Depot Bldg)	0		0	0/12	0/12	0	0
SubTotal	288,826					19,309	98,741
	Net Area (Sq. Ft.)	Gal/Ft2 ESTIMATED	Occupied Year	FY06	FY07	FY 2006	FY 2007
				PrRte factor	PrRte factor	New Usage (kGal)	New Usage (kGal)
WATER							
SS Fire Station #1 (Police portion)	24,753		FY06	7/12	12/12	0	0
Germantown Library	43,911	14.50	FY06	4/12	12/12	212	637
Brookville Service Park 1	80,000		FY06	0/12	8/12	0	0
Rockville Library	85,975	15.00	FY07	0/12	12/12	0	1,290
Multi-Agency Driver Training	5,410	17.00	FY07	0/12	10/12	0	77
Seven Locks Tech Ctr Phase 1	13,335	5.40	FY07	0/12	6/12	0	36
Seven Locks Tech Ctr Phase II	35,442	5.40	FY07	0/12	2/12	0	32
(Main Depot Bldg)	0		0	0/12	0/12	0	0
SubTotal	288,826					212	2,071

New Leased Facilities- Projected Utility Usage in FY06 and FY07							
	Net Area	Energy Use	Occupied	FY06 PrRte	FY07 PrRte	FY 2006 Change	FY 2007 Change
ELECTRICITY							
Carroll House Shelter@W. Reed	7,500	28.00	FY05	12/12	12/12	210,000	210,000
Lincoln School	20,000	25.00	FY05	7/12	12/12	291,667	500,000
SubTotal	27,500					501,667	710,000
	Net Area (Sq. Ft.)	Therms/Ft2 ESTIMATED	Occupied Year	FY06 PrRte factor	FY07 PrRte factor	FY 2006 Change Therms	FY 2007 Change Therms
NATURAL GAS							
Carroll House Shelter@W. Reed	7,500	0.55	FY05	12/12	12/12	4,125	4,125
Lincoln School	20,000	0.52	FY05	7/12	12/12	6,067	10,400
Natural Gas Total	27,500					10,192	14,525

	Net Area (Sq. Ft.)	Gal/Ft2 ESTIMATED	Occupied Year	FY06 PrRte factor	FY07 PrRte factor	FY 2006 Change (kGal)	FY 2007 Change (kGal)
WATER							
Carroll House Shelter@W. Reed	7,500	25.00	FY05	12/12	12/12	188	188
Lincoln School	20,000	22.00	FY05	7/12	12/12	257	440
Water Total	27,500					444	628

**FY 2007
Summary**

The information on this page reflects the facilities owned or operated by this agency as of the end of FY 05 (June 30, 2005)

Agency	MC Government DPWT Division of Operations				
Number of Facilities	183	Change in number of facilities		6	
Total square feet	3,674,938	Change in total ft ²		288,826	
Average operating hrs/year	Not available	Change in avg. operating hrs/year		Not available	
Other changes effecting energy consumption					
Utilities:	units	total consumption (actual FY 05)	Percent change from actual FY 04	total cost (actual FY 05) \$	Percent change from actual FY 04
Electricity	kWh	84,401,895	(+)6.51%	7,528,649	(+)45.01%
Natural Gas (firm)	therms	1,114,262	(+)19.14%	1,602,755	(+)54.34%
Natural Gas (Irate)	therms				
Fuel Oil #2	gallons	130,325	(TBD) %	213,798	(TBD) %
Propane	gallons				
Water/Sewer	gallons	90,423	(+)6.1%	894,845	1.28%
Total				10,240,047	

New Measures

This table shows information on resource conservation measures implemented during FY 06
(July 1, 2005 through June 30, 2006)

Measures - New: (Implemented during FY 06)	date implemented (mo/yr)	initial cost (000\$)	annual net impact on maintenance cost (\$)	fuel type(s) effected and units	units saved per year	annual cost savings (\$)
Capital Improvement Projects:						
HVAC/Elec. Replacement	FY 06	800		Elec.	100,000	6,000
Energy Conservation	FY 06	225	(15,000)	kWh	635,000	50,000
Total CIP		1,025	(15,000)			56,000
Operations and Maintenance:						
Description of Activities:						
Electricity Procurement Savings	FY06					315,000
Energy Design Guidelines	FY06			Elec. (kWH)		80,683
Energy Design Guidelines	FY06			Gas (Th.)		37,687
Total Operations & Maintenance		1,025	(15,000)			433,370
Total CIP and Operations & Maintenance		1,025	(15,000)		735,000	489,370

Existing Measures

This table shows information on resource conservation measures implemented prior to FY 06

Measures - Existing: (implemented from FY 00 to FY 05	date implemented (mo/yr)	initial cost per year (\$000)	annual net impact on maintenance cost (\$)	fuel type(s) effected and units	units saved per year	annual cost savings (\$) *
Capital Improvement Projects:						
Elevator Modernization	FY 02	1,326	(2,000)	Elec. (kWh)	30,000	8,000
Elevator Modernization	FY 03	937	(6,000)	Elec. (kWh)	30,000	10,000
Elevator Modernization	FY 04	365	(6,000)	Elec. (kWh)	30,000	8,000
Elevator Modernization	FY 05	365	(6,000)	Elec. (kWh)	30,000	8,000
HVAC/Elec. Repl.:MCG	FY00	1518	-	Elec. (kWh)	2,550,400	306,048
HVAC/Elec. Repl.:MCG	FY01	1029	-	Elec. (kWh)	1,728,833	207,460
HVAC/Elec. Repl.:MCG	FY02	1819	-	Elec. (kWh)	3,056,117	366,734
HVAC/Elec. Repl.:MCG	FY02	1500	-	Elec. (kWh)	2,520,158	302,419
HVAC/Elec. Repl.:MCG	FY04	800	-	Elec. (kWh)	1,344,083	161,290
HVAC/Elec. Repl.:MCG	FY05	800	-	Elec. (kWh)	1,344,083	161,290
Energy Conservation	FY98	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY99	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY00	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY01	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY02	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY03	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY04	225	(15,000)	Elec. (kWh)	835,000	65,000
Energy Conservation	FY05	225	(15,000)	Elec. (kWh)	835,000	65,000
Life Safety Systems: MCG	FY01	225	(10,000)	N/A		10,000
Life Safety Systems: MCG	FY02	225	(10,000)	N/A		15,000
Life Safety Systems: MCG	FY03	225	(15,000)	N/A		15,000
Life Safety Systems: MCG	FY04	225	(15,000)	N/A		10,000
Life Safety Systems: MCG	FY05	225	(15,000)	N/A		10,000
Hungerford Office Building DDC	FY00	\$157.000		Elec. (kWh)	205,107	\$12,450
Council Office Bld DDC	FY99	\$73.000		Elec. (kWh)	271,829	\$16,500
Gaithersburg Library DDC	FY99	\$122.000		Elec. (kWh)	144,152	\$8,750
Gaithersburg Maintenance Depot DDC	FY99	\$31.000		Elec. (kWh)	228,533	\$13,872

EOB - VFD Replacement (2AHUs)	FY 03	\$42,499	(\$ 1,500)	Elec. (kWh)	25,725	\$2,595
JC - VFD Replacement (4AHUs)	FY 03	\$24,540	(\$ 1,000)	Elec. (kWh)	18,988	\$2,677
Parking lots: install photo cells and time clocks for lighting control	FY 04	\$18,000	(\$2,000)	Elec. (kWh)	15,840	\$ 2,950
Upper County Community Center Replace EMS	FY05	\$79,598	(5,300)	Elec. (kWh)	222,212	\$17,777
EOB/JC Energy Study	FY05	\$94,873	(6,300)	Elec. (kWh)	264,850	\$21,188
Ballast Retrofits	FY05	\$62,261	(4,900)	Elec. (kWh)	173,813	\$13,905
Total CIP		\$13,862	\$-221,505	Elec. (kWh)	20,270,209	\$2,192,783
Operations and Maintenance:						
Electricity Procurement savings below SOS	FY00	100				280,000
Electricity Procurement savings below SOS	FY01	100				280,000
Electricity Procurement savings below SOS	FY02	100				280,000
Electricity Procurement savings below SOS	FY03	100				287,000
Electricity Procurement savings below SOS	FY04	200				288,000
Electricity Procurement savings below SOS	FY05	150				297,000
Energy Design Guidelines	FY00			Elec. (kWh)	791,360	39,568
Energy Design Guidelines	FY01			Elec. (kWh)	320,750	19,245
Energy Design Guidelines	FY02			Elec. (kWh)	1,787,300	107,238
Energy Design Guidelines	FY03			Elec. (kWh)	285,033	17,102
Energy Design Guidelines	FY04			Elec. (kWh)	198,450	15,876
Energy Design Guidelines	FY05			Elec. (kWh)	1,104,538	173,384
Energy Design Guidelines	FY00			Gas(Therms)		46,437
Energy Design Guidelines	FY01			Gas(Therms)		28,171
Energy Design Guidelines	FY02			Gas(Therms)		193,651
Energy Design Guidelines	FY03			Gas(Therms)		36,116
Energy Design Guidelines	FY04			Gas(Therms)		27,103
Energy Design Guidelines	FY05			Gas(Therms)		261,747
Total Operations & Maintenance		750		kWh	4,487,431	\$2,305,226
Total CIP and Operations & Maintenance		14,612		kWh	24,757,640	\$4,498,009

Planned Measures

This table shows information on resource conservation measures planned to be implemented in FY 07 (July 1, 2006 through June 30, 2007)

Measures - Planned: (for FY07)	projected completion date (mo/yr)	projected initial cost (\$000)	projected annual net impact on maintenance cost (\$)	fuel type(s) effected and units	estimated units saved per year	projected annual cost savings (\$) *
Capital Improvement Projects:						
Elevator Modernization	FY07	500	(1,000)	Elec. (kWh)	12,500	1,000
Energy Conservation	FY 07	225	(8,000)	Elec. (kWh)	462,500	37,000
HVAC/Elect. Replacement	FY 07	800		Elec. (kWh)	75,000	6,000
Total		1,525	(9,000)			71,000
Operations and Maintenance:						
Utility Database Management Bill overcharge & sales tax refund	FY07	10				250,000
Electricity Procurement (savings below SOS)	FY07	0.0				400,000
Energy Design Guidelines	FY07			Elec (kwh)	985,025	\$78,802
				Gas(Therms)		\$24,370
Total		10				\$753,172
Total CIP and Operations & Maintenance		1,535				\$824,172

* Savings based on reduced energy consumption and reduced maintenance