

AGENDA ITEM #9  
May 7, 2009

**Worksession**

**MEMORANDUM**

May 5, 2009

TO: County Council

FROM: *KL* Keith Levchenko, Senior Legislative Analyst

SUBJECT: **Worksession:** FY10 Operating Budget: Utilities

**T&E Committee Recommendation:** Approve the Utilities Non-Departmental Account (NDA) as recommended by the County Executive

*Subsequent to the Committee worksession, Councilmember Berliner suggested that the Council consider a \$560,000 (2 percent) reduction in funding for the Utilities NDA with the assumption that the County will work to maximize energy efficiency-related savings during FY10. T&E Committee Chairperson Floreen and Councilmember Leventhal expressed support for this concept. Note: If the savings are not realized, supplemental funding may be needed.*

As part of the annual Operating Budget review process, the Council reviews utility costs across all agencies and policy issues associated with utility<sup>1</sup> costs. This review covers utility costs for electricity, natural gas, water & sewer, fuel oil, and propane for the County Government, the College, MCPS, Park and Planning, and the entire bi-County area of WSSC.

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<sup>1</sup> Motor fuel costs are not included in the numbers presented in this memorandum. General Fund costs for motor fuels are budgeted in the Department of General Services-Division of Fleet Management Services. Motor fuel costs are also included in the various special funds and outside agency budgets.

Utility costs associated with County Government General Fund departments are included in the Utilities Non-Departmental Account. Utility costs associated with Tax and Non-Tax Supported Special Funds as well as the outside agencies are budgeted separately in each of those funds and agencies. The relevant sections from the Recommended Operating Budget are attached on ©1-6.

Agency staffs from County Government, Montgomery College, MCPS, and M-NCPPC have been invited to attend this worksession.

Agency representatives meet periodically through the Interagency Committee on Energy and Utilities Management (ICEUM) to discuss energy issues, including rate assumption ceilings for budget preparation (see ©7). Given the volatility of energy and fuel prices, and the unique circumstances of each agency in terms of its short and long-term contracting practices for energy, adopting specific rates applicable to all agencies is not feasible. However, the rate ceilings provide some helpful guidance to the agencies.

Utility budgets are based on these rate assumptions as well as projected changes in energy consumption at existing facilities and estimated energy requirements for new facilities coming on-line during FY10. Energy efficiency measures are taken into account as well. In FY09, each agency also had to absorb the impact of the energy tax increase approved by the Council last year. These increases are now built into the base of each budget this year. Finally, it is important to note that energy use is also greatly affected by the severity of weather conditions in a given year. The utilities budgets presented here assume a typical weather year.

**Fiscal Summary  
(All Agencies)**

The FY10 budgets for utilities by agency are summarized below.

**Table 1:  
Utility Costs by Agency**

Type of Utility	Actual		Approved FY09	CE Rec FY10	Change (FY10 vs. FY09)	
	FY07	FY08			\$\$	%
County Government	31,038,865	31,619,056	32,717,440	36,176,630	3,459,190	10.6%
MCPS	36,917,590	40,005,101	41,850,800	44,834,460	2,983,660	7.1%
Montgomery College	5,212,862	5,488,169	6,753,480	7,153,430	399,950	5.9%
WSSC*	21,376,000	23,338,000	25,790,000	28,908,000	3,118,000	12.1%
M-NCPPC	3,255,010	3,344,700	3,919,000	4,340,250	421,250	10.7%
<b>Total</b>	<b>97,800,327</b>	<b>103,795,026</b>	<b>111,030,720</b>	<b>121,412,770</b>	<b>10,382,050</b>	<b>9.4%</b>

\*FY09 approved includes Council budget supplement to cover Prince George's County Energy Tax costs

Overall, utility costs are recommended to increase by 10.3 million (or 9.4 percent). This increase is substantially higher than last year's increases and is driven primarily by increases in electricity costs assumed for FY10. Electricity costs account for 80 percent of all utility costs and these costs are recommended to increase by 9.5 percent. The following chart presents utility costs by type.

**Table 2:  
Utility Costs by Type (All Agencies)**

Type of Utility	Actual		Approved FY09	CE Rec FY10	Change (FY10 vs. FY09)	
	FY07	FY08			\$\$	%
Electricity*	77,210,887	83,495,407	88,962,850	97,421,275	8,458,425	9.5%
Water and Sewer	4,279,212	4,986,138	4,847,650	6,511,050	1,663,400	34.3%
Fuel Oil	467,427	364,622	928,580	799,680	(128,900)	-13.9%
Natural Gas	15,601,466	14,662,367	16,071,440	16,367,615	296,175	1.8%
Propane	241,335	286,492	220,200	313,150	92,950	42.2%
<b>Total</b>	<b>97,800,327</b>	<b>103,795,026</b>	<b>111,030,720</b>	<b>121,412,770</b>	<b>10,382,050</b>	<b>9.4%</b>

\*FY09 approved includes Council budget supplement to cover Prince George's County Energy Tax costs

**Fiscal Summary:  
(General Fund Non-Departmental Account)**

For the General Fund NDA (which accounts for most of the County Government's utility costs, utilities are recommended to increase by approximately \$2.5 million (or 9.8 percent) as shown in the following chart. As with utility costs across all agencies and funds, the NDA increase is mostly related to increases in electricity costs. However, increases in water and sewer and natural gas are also significant in FY10.

**Table 3:  
NDA Utility Costs by Type (General Fund Only)**

Type of Utility	Actual		Approved FY09	CE Rec FY10	Change (FY10 vs. FY09)	
	FY07	FY08			\$\$	%
Electricity	20,471,496	21,187,956	22,471,430	24,112,350	1,640,920	7.3%
Water and Sewer	815,166	1,056,152	936,350	1,444,950	508,600	54.3%
Fuel Oil	75,150	-	123,750	128,270	4,520	3.7%
Natural Gas	2,257,278	2,011,668	2,334,350	2,716,270	381,920	16.4%
Propane	-	250	1,000	1,060	60	6.0%
<b>Total</b>	<b>23,619,090</b>	<b>24,256,026</b>	<b>25,866,880</b>	<b>28,402,900</b>	<b>2,536,020</b>	<b>9.8%</b>

The Department of General Services (which manages County Government utility costs) is responsible for about 124 facilities (105 of which have significant energy costs and energy savings opportunities) and about 3.5 million square feet of space.

The Executive's recommendation includes \$1 million in estimated utility costs associated with the County Executive's proposed lease/purchase of the GE Building (a 400,000 square foot facility). According to OMB staff, this estimate is based on utility cost information for the building when it was last fully occupied several years ago plus inflation. Actual utility costs could be quite different depending on how the facility is built-out for any new uses. Offsetting reductions related to the GE Building are not expected to occur until FY11 and later.

Another \$128,650 is required to cover increased purchases of renewable energy credits in FY10 to achieve a 15% clean energy goal for 2010 (with a 20% goal for FY11). The balance of the increase (\$1.4 million) is the result of rate and consumption changes at existing facilities.

Over the past several years, actual costs in the NDA have been within about a \$140,000 range (up or down). The County's electricity rates are locked in through 2012, so any savings (or cost avoidance) in electricity (the largest energy category by far) must come from reduced consumption.

## Discussion

### FY10 Resource Conservation Plans

DEP expects to transmit the FY10 Resource Conservation Plans shortly. **Council Staff suggests that these plans be reviewed after budget if necessary.**

### GE Tech Park Lease/Purchase

The Council will likely take final action on the proposed lease-purchase at or about the same time as final action on the budget. Therefore, we will not know until late in the process whether the additional \$1.0 million estimate in utility costs associated with the lease/purchase are needed. **Council Staff suggests that for now, the T&E Committee support inclusion of the \$1.0 million in the Utilities NDA pending a decision by the Council on the lease/purchase issue. The T&E Committee concurs.**

### Fuel/Energy Tax

Last year, the Council increased fuel/energy taxes that raised approximately \$11.1 million in additional revenue. Most of the new revenue generated was used to temper increases in property tax rates. A portion of the increased revenue was also used to fund elements of the Climate Change Implementation NDA (including \$1.0 million for climate change related initiatives and \$200,000 in increased funding for the Clean Energy Rewards Program). The overall NDA totaled \$1.56 million.

The Executive is recommending no increase in the energy tax this year. The Council has not introduced any potential energy tax increase either. Given the public hearing notice and advertising requirements to consider an increase, the Council would likely have to formally act on the energy tax in June after the budget is approved. Therefore, certain budget assumptions would need to be made in advance of the formal action.

### Energy Analysis of County Government Facilities

Consistent with Council Bill 30-07 Buildings – Energy Efficiency and Montgomery County’s Climate Protection Plan, the Department of General Services (DGS) hired a consultant to do an energy analysis of Montgomery County facilities. The report text (without appendices) is attached on ©8-25. The report identifies what the consultant believes are reasonable targets for potential cost savings (60%), energy savings (45%), and greenhouse gas reductions (58,000 metric tons) by 2015. These annual cost savings would result in a payback period on the upfront capital costs (\$57 to \$67 million) of 8 to 10 years.

The Department of General Services is currently reviewing the analysis and will be identifying potential targets of opportunity for energy efficiency projects in the coming months. However, major energy efficiency savings are not expected to be obtained from this work until FY11 or FY12.

**Council Staff suggests that this work be the subject of a future T&E Committee briefing after budget. The T&E Committee concurs.**

Wholesale Block Purchasing Versus Retail Purchasing of Total Energy Requirements

Last year, the Committee discussed MCPS' new method of purchasing electricity in the wholesale market through a broker, rather than through the traditional retail arrangement with a service provider. MCPS' expectation was that it could achieve a more stable price for energy procurement over time. The Department of General Services (DGS) is exploring the potential for using this model for County energy purchases as well to determine whether the MCPS method would be beneficial for the County, given its energy profile.

**T&E Committee Recommendation**

**The T&E Committee recommends approval of the Utilities NDA as recommended by the County Executive with the caveat that inclusion of the recommended utility costs associated with the GE Tech building are conditioned upon final approval by the Council of the Executive's recommendation to lease/purchase that facility.**

**Attachments**

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# Utilities

## MISSION STATEMENT

The goals of the County Government relating to utility consumption are to:

- achieve energy savings by the elimination of wasteful or inefficient operation of building systems;
- continue improvements in energy efficiency in all County operations; and
- obtain required energy fuels at the most favorable cost to the County.

## HIGHLIGHTS

This budget funds the utility costs for 235 (General Fund) facilities with approximately 5,184,578 total square feet, and over 66,528 streetlights and 772 traffic controlled signalized intersections.

## BUDGET OVERVIEW

The FY10 Recommended Budget for the tax supported Utilities non-departmental account (NDA) is \$28,402,900, an increase of \$2,536,020 or 9.8 percent from the FY09 Approved Budget of \$25,866,880. Allocation of these utilities expenditures is approximately: electricity, 84.9 percent; natural gas, 9.6 percent; water and sewer, 5.1 percent; and fuel oil, 0.4 percent. The total increase is due to unit rate cost increases, and from new or annualized facilities, streetlights, or traffic signals.

The FY10 Recommended Budget includes County government utilities expenditures for both tax and non-tax supported operations. Tax supported utilities expenditures related to the General Fund departments are budgeted in the Utilities NDA, while utilities expenditures related to special fund departments are budgeted in those funds. Some of these special funds, such as Recreation and portions of the Department of Transportation, are tax supported. Other special funds, such as Solid Waste, are not supported by taxes, but through user fees or charges for services.

Utilities expenditures are also found in the budgets of other County agencies: Montgomery County Public Schools (MCPS), Montgomery College, the Washington Suburban Sanitary Commission (WSSC), and the Maryland-National Capital Park and Planning Commission (M-NCPPC). The total budget request for these "outside" agencies is \$85,236,140 which includes the entire bi-county area of WSSC.

The FY10 Recommended tax supported budget for Utilities Management, including both the General Fund NDA (\$28,402,900) and the other tax supported funds (\$2,807,450), is \$31,210,350, an increase of \$3,133,550 or approximately 11.2 percent from the FY09 Approved utilities budget. The FY10 Recommended budget for non-tax supported utilities expenditures is \$4,966,280, an increase of \$325,640 or 7.0 percent from the FY09 Approved Budget.

In both the tax and non-tax supported funds, increased utilities expenditures result primarily from higher commodity unit costs due to market price fluctuations; greater consumption due to new facilities or services; and in some cases, a more precise alignment of budgeted costs with actual prior-year expenditures by utility type. Energy conservation and cost-saving measures (e.g., new building design, lighting technology, energy and HVAC management systems) help offset increased utility consumption or unit costs.

The Executive is recommending no change to the County's Energy Tax rate structure this fiscal year. The County's Interagency Committee on Energy and Utility Management (ICEUM) is currently projecting a cost change potential for Electricity (19.2%), Fuel Oil (25.0%), Natural Gas (2.6%), and Water and Sewer (20.0%). These projections reflect market concern about current world events on the commodities futures markets, or anticipated unit price changes by service providers. According to ICEUM, Motor Fuels, consisting of Unleaded Gasoline, Diesel, and Compressed Natural Gas, are expected to fluctuate upward based on current market trends. These fuels are purchased from various providers, and are budgeted in the Department of General Services, Division of Fleet Management Services; not the General Fund Utilities NDA. ICEUM also monitors changes in energy costs in the current year and will recommend appropriate changes, if necessary, prior to final Council approval of the FY10 Budget.

The following is a description of utility service requirements for departments which receive tax or non-tax supported appropriations for utilities expenditures. The utilities expenditures for the non-tax supported operations are appropriated within their respective operating funds but are described in the combined utilities presentation for reader convenience.

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**TAX SUPPORTED****Department of General Services**

The Department of General Services is responsible for managing all utilities for general County operations including all County office buildings, police stations, libraries, health and human services facilities, correctional facilities, maintenance buildings, and warehouses.

**Department of Transportation**

The Department of Transportation manages all County streetlights, traffic signals, traffic count stations, and flashing school signs. The utilities expenditures for these devices are budgeted here as this section designs, installs, controls, and maintains them. In addition, minimal utility costs for the Operations Center and Highway Maintenance Depots are budgeted in the Traffic Engineering component of the General Fund non-departmental account.

**Division of Transit Services - Mass Transit**

The Department of Transportation Mass Transit Facilities Fund supports all utilities associated with the Ride On transit centers and Park and Ride Lots.

**Department of Recreation**

The Department of Recreation funds all utility costs for its recreational facilities located throughout the County, such as swimming pools, community recreation centers, and senior citizen centers.

**Urban Districts**

Urban District utilities are supported by Urban District Funds, which are included in the operating budget for Regional Services Centers.

**NON-TAX SUPPORTED****Fleet Management Services**

The Department of General Services - Fleet Management Services utility expenditures are displayed in the Special Fund Agencies - Non-Tax Supported section, to reflect that Fleet Management Services expenditures are not appropriated directly but in the budgets of other departments.

The Department of General Services - Fleet Management Services Motor Pool Internal Service Fund supports all utilities associated with the vehicle maintenance garages in Rockville, Silver Spring, and Gaithersburg. Fuel for the County's fleet is also budgeted in that special fund, but these costs are not included in the utilities expenditures displayed in this section.

**Parking Districts**

The Parking Districts fund utility expenditures associated with the operation of all County-owned parking garages and parking lots.

**Liquor Control**

The Department of Liquor Control funds utility expenditures associated with the operation of the liquor warehouse, administrative offices, and the County-owned and contractor-operated retail liquor stores.

**Department of Environmental Protection, Solid Waste Services**

Solid Waste Services funds utility expenditures associated with the operation of the County's Solid Waste Management System. Utilities expenditures associated with the operation of the Oaks Sanitary Landfill maintenance building, the County's Recycling Center, the Resource Recovery Facility, and most of the Solid Waste Transfer Station are currently the responsibility of the operators. Only the site office and maintenance depot costs continue to be budgeted as an identifiable utilities expenditure in the Solid Waste Disposal Fund.

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## **Other Agencies**

Utilities for MCPS, Montgomery College, (bi-county) WSSC, and M-NCPPC are displayed in the charts on the following pages. These are the amounts requested in the budgets of those agencies.

## **LINKAGE TO COUNTY RESULT AREAS**

While this program area supports all eight of the County Result Areas, the following are emphasized:

- ❖ *An Effective and Efficient Transportation Network*
- ❖ *Safe Streets and Secure Neighborhoods*

## **PROGRAM CONTACTS**

Contact Bryan Hunt of the Office of Management and Budget at 240.777.2770 for more information regarding this department's operating budget.

## **PROGRAM DESCRIPTIONS**

### ***Utilities (for All General Fund Departments)***

The Utilities non-departmental account provides the General Fund utilities operating expense appropriations for the Department of General Services and the Department of Transportation. The utilities expenditures for other non-tax supported operations and other agencies are appropriated within their respective department or agency.

# BUDGET SUMMARY

	Actual FY08	Budget FY09	Estimated FY09	Recommended FY10	% Chg Bud/Rec.
<b>COUNTY GENERAL FUND</b>					
<b>EXPENDITURES</b>					
Salaries and Wages	0	0	0	0	—
Employee Benefits	0	0	0	0	—
<b>County General Fund Personnel Costs</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>—</b>
Operating Expenses	24,256,026	25,866,880	25,739,990	28,402,900	9.8%
Capital Outlay	0	0	0	0	—
<b>County General Fund Expenditures</b>	<b>24,256,026</b>	<b>25,866,880</b>	<b>25,739,990</b>	<b>28,402,900</b>	<b>9.8%</b>
<b>PERSONNEL</b>					
Full-Time	0	0	0	0	—
Part-Time	0	0	0	0	—
Workyears	0.0	0.0	0.0	0.0	—

## FY10 RECOMMENDED CHANGES

	Expenditures	WYs
<b>COUNTY GENERAL FUND</b>		
<b>FY09 ORIGINAL APPROPRIATION</b>	<b>25,866,880</b>	<b>0.0</b>
<b>Changes (with service impacts)</b>		
Add: Electricity for GE Building	749,110	0.0
Add: Natural Gas for GE Building	158,920	0.0
Enhance: Renewable energy (increasing to reach 20 percent by FY11)	128,650	0.0
Add: Water & Sewer for GE Building	84,390	0.0
Add: Fuel Oil for GE Building	7,520	0.0
Add: Propane for GE Building	60	0.0
<b>Other Adjustments (with no service impacts)</b>		
Increase Cost: Due to Rate and Consumption Changes	1,407,370	0.0
<b>FY10 RECOMMENDED:</b>	<b>28,402,900</b>	<b>0.0</b>

## FUTURE FISCAL IMPACTS

Title	CE REC.					
	FY10	FY11	FY12	(\$000's)		
	FY13	FY14	FY15			
This table is intended to present significant future fiscal impacts of the department's programs.						
<b>COUNTY GENERAL FUND</b>						
<b>Expenditures</b>						
FY10 Recommended	28,403	28,403	28,403	28,403	28,403	28,403
No inflation or compensation change is included in outyear projections.						
<b>Subtotal Expenditures</b>	<b>28,403</b>	<b>28,403</b>	<b>28,403</b>	<b>28,403</b>	<b>28,403</b>	<b>28,403</b>

**COUNTY UTILITIES EXPENDITURES**

**EXPENDITURES BY DEPARTMENT/AGENCY**

	ACTUAL FY07	ACTUAL FY08	BUDGET FY09	RECOMMENDED FY10	CHANGE BUD/APPR	% CHANGE REC/APPR
<b>COUNTY GOVERNMENT TAX SUPPORTED OPERATIONS</b>						
<b>NON-DEPARTMENTAL ACCOUNT</b>						
Facilities	14,091,953	14,890,780	15,205,480	17,346,510	2,141,030	14.1%
Traffic Signals and Streetlighting	9,527,137	9,365,246	10,661,400	11,056,390	394,990	3.7%
<b>GENERAL FUND NDA EXPENDITURES</b>	<b>23,619,090</b>	<b>24,256,026</b>	<b>25,866,880</b>	<b>28,402,900</b>	<b>2,536,020</b>	<b>9.8%</b>
<b>OTHER TAX SUPPORTED OPERATIONS</b>						
Transit Services	71,775	86,831	68,000	102,400	34,400	50.6%
Recreation	2,761,999	3,099,038	2,141,920	2,705,050	563,130	26.3%
Urban Districts Funds	3,050	0	0	0	0	0.0%
<b>SUBTOTAL</b>	<b>2,836,824</b>	<b>3,185,869</b>	<b>2,209,920</b>	<b>2,807,450</b>	<b>597,530</b>	<b>27.0%</b>
<b>TOTAL TAX SUPPORTED</b>	<b>26,455,914</b>	<b>27,441,895</b>	<b>28,076,800</b>	<b>31,210,350</b>	<b>3,133,550</b>	<b>11.2%</b>
<b>COUNTY GOVERNMENT NON-TAX SUPPORTED OPERATIONS</b>						
Fleet Management Services	781,388	753,812	1,047,460	1,047,460	0	0.0%
Parking Districts	2,829,370	2,520,175	2,536,580	2,738,780	202,200	8.0%
Liquor Control	834,840	733,515	884,160	969,340	85,180	9.6%
Solid Waste Services	137,353	169,659	172,440	210,700	38,260	22.2%
<b>TOTAL NON-TAX SUPPORTED</b>	<b>4,582,951</b>	<b>4,177,161</b>	<b>4,640,640</b>	<b>4,966,280</b>	<b>325,640</b>	<b>7.0%</b>
<b>SUMMARY - COUNTY GOVERNMENT</b>						
TOTAL TAX SUPPORTED	26,455,914	27,441,895	28,076,800	31,210,350	3,133,550	11.2%
TOTAL NON-TAX SUPPORTED	4,582,951	4,177,161	4,640,640	4,966,280	325,640	7.0%
<b>TOTAL COUNTY GOVERNMENT</b>	<b>31,038,865</b>	<b>31,619,056</b>	<b>32,717,440</b>	<b>36,176,630</b>	<b>3,459,190</b>	<b>10.6%</b>
<b>OTHER AGENCIES TAX AND NON-TAX SUPPORTED OPERATIONS</b>						
Montgomery County Public Schools	36,917,590	40,005,101	41,850,800	44,834,460	2,983,660	7.1%
Montgomery College	5,212,862	5,488,169	6,753,480	7,153,430	399,950	5.9%
Washington Suburban Sanitary Commission	21,376,000	23,338,000	24,678,000	28,908,000	4,230,000	17.1%
M-NCPPC	3,255,010	3,344,700	3,919,000	4,340,250	421,250	10.7%
<b>TOTAL OTHER AGENCIES EXPENDITURES</b>	<b>66,761,462</b>	<b>72,175,970</b>	<b>77,201,280</b>	<b>85,236,140</b>	<b>8,034,860</b>	<b>10.4%</b>
<b>TOTAL UTILITIES EXPENDITURES</b>	<b>97,800,327</b>	<b>103,795,026</b>	<b>109,918,720</b>	<b>121,412,770</b>	<b>11,494,050</b>	<b>10.5%</b>

**COUNTY UTILITIES EXPENDITURES**

**EXPENDITURES BY ENERGY SOURCE**

	ACTUAL FY07	ACTUAL FY08	BUDGET FY09	RECOMMENDED FY10	CHANGE BUDGET/REC	% CHANGE BUDGET/REC
<b>COUNTY GOVERNMENT TAX SUPPORTED OPERATIONS</b>						
<b>NON-DEPARTMENTAL ACCOUNT</b>						
Electricity	20,471,496	21,187,956	22,471,430	24,112,350	1,640,920	7.3%
Water & Sewer	815,166	1,056,152	936,350	1,444,950	508,600	54.3%
Fuel Oil	75,150	0	123,750	128,270	4,520	3.7%
Natural Gas	2,257,278	2,011,668	2,334,350	2,716,270	381,920	16.4%
Propane	0	250	1,000	1,060	60	6.0%
<b>GENERAL FUND NDA EXPENDITURES</b>	<b>23,619,090</b>	<b>24,256,026</b>	<b>25,866,880</b>	<b>28,402,900</b>	<b>2,536,020</b>	<b>9.8%</b>
<b>OTHER TAX SUPPORTED OPERATIONS</b>						
Electricity	1,870,150	2,246,202	1,508,290	1,945,300	437,010	29.0%
Water & Sewer	304,571	276,316	322,990	401,190	78,200	24.2%
Fuel Oil	0	0	19,930	19,930	0	0.0%
Natural Gas	662,103	663,287	358,710	440,610	81,900	22.8%
Propane	0	64	0	420	420	
<b>SUBTOTAL</b>	<b>2,836,824</b>	<b>3,185,869</b>	<b>2,209,920</b>	<b>2,807,450</b>	<b>597,530</b>	<b>27.0%</b>
<b>TOTAL TAX SUPPORTED</b>	<b>26,455,914</b>	<b>27,441,895</b>	<b>28,076,800</b>	<b>31,210,350</b>	<b>3,133,550</b>	<b>11.2%</b>
<b>NON-TAX SUPPORTED OPERATIONS</b>						
Electricity	4,005,863	3,711,869	3,976,110	4,358,420	382,310	9.6%
Water & Sewer	144,882	113,158	227,340	221,760	(5,580)	-2.5%
Fuel Oil	0	0	0	0	0	
Natural Gas	432,206	352,134	436,150	385,060	(51,090)	-11.7%
Propane	0	0	1,040	1,040	0	0.0%
<b>TOTAL NON-TAX SUPPORTED</b>	<b>4,582,951</b>	<b>4,177,161</b>	<b>4,640,640</b>	<b>4,966,280</b>	<b>325,640</b>	<b>7.0%</b>
<b>SUMMARY - COUNTY GOVERNMENT</b>						
Electricity	26,347,509	27,146,027	27,955,830	30,416,070	2,460,240	8.8%
Water & Sewer	1,264,619	1,445,626	1,486,680	2,067,900	581,220	39.1%
Fuel Oil	75,150	0	143,680	148,200	4,520	3.1%
Natural Gas	3,351,587	3,027,089	3,129,210	3,541,940	412,730	13.2%
Propane	0	314	2,040	2,520	480	23.5%
<b>TOTAL COUNTY GOVERNMENT</b>	<b>31,038,865</b>	<b>31,619,056</b>	<b>32,717,440</b>	<b>36,176,630</b>	<b>3,459,190</b>	<b>10.6%</b>
<b>OUTSIDE AGENCIES TAX AND NON-TAX SUPPORTED OPERATIONS</b>						
Electricity	50,863,378	56,349,380	59,895,020	67,005,205	7,110,185	11.9%
Water & Sewer	3,014,593	3,540,512	3,360,970	4,443,150	1,082,180	32.2%
Fuel Oil	392,277	364,622	784,900	651,480	(133,420)	-17.0%
Natural Gas	12,249,879	11,635,278	12,942,230	12,825,675	(116,555)	-0.9%
Propane	241,335	286,178	218,160	310,630	92,470	42.4%
<b>SUBTOTAL</b>	<b>66,761,462</b>	<b>72,175,970</b>	<b>77,201,280</b>	<b>85,236,140</b>	<b>8,034,860</b>	<b>10.4%</b>
<b>TOTAL UTILITIES EXPENDITURES</b>						
Electricity	77,210,887	83,495,407	87,850,850	97,421,275	9,570,425	10.9%
Water & Sewer	4,279,212	4,986,138	4,847,650	6,511,050	1,663,400	34.3%
Fuel Oil	467,427	364,622	928,580	799,680	(128,900)	-13.9%
Natural Gas	15,601,466	14,662,367	16,071,440	16,367,615	296,175	1.8%
Propane	241,335	286,492	220,200	313,150	92,950	42.2%
<b>TOTAL UTILITIES EXPENDITURES</b>	<b>97,800,327</b>	<b>103,795,026</b>	<b>109,918,720</b>	<b>121,412,770</b>	<b>11,494,050</b>	<b>10.5%</b>

**INTERAGENCY COMMITTEE ON ENERGY AND UTILITIES MANAGEMENT**  
**UTILITY RATES**  
**October 29, 2008**  
**FY2009, Fy2010**

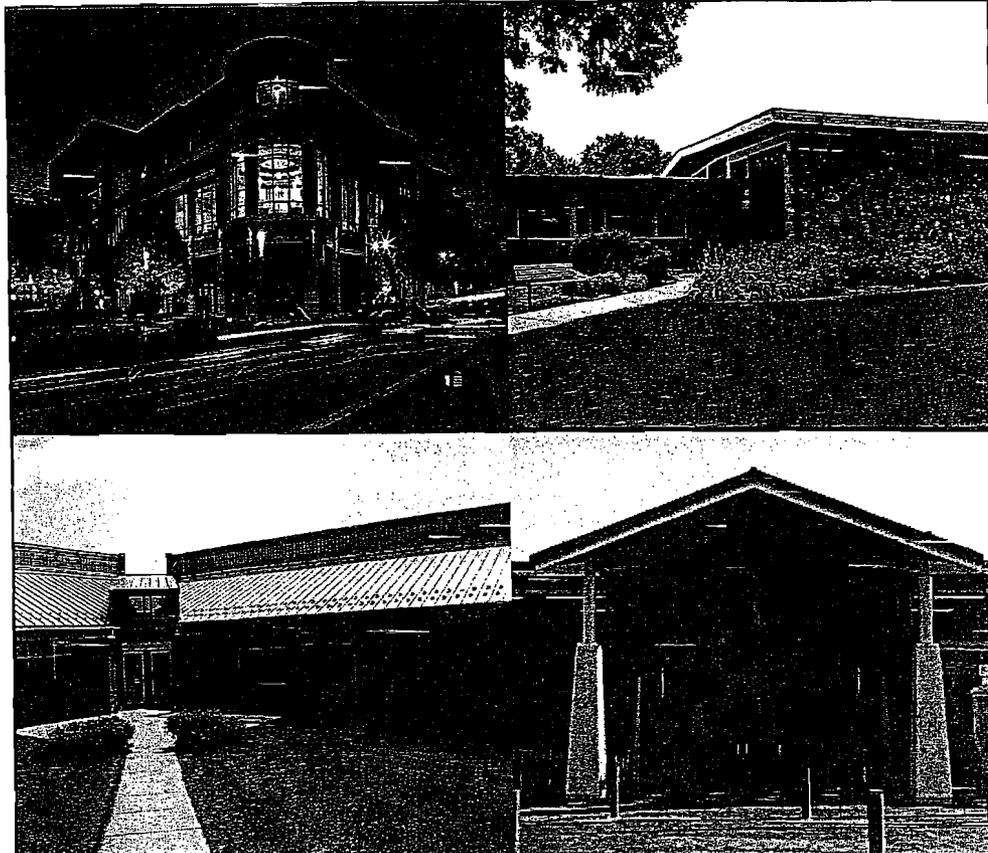
<u>Utilities</u>	<u>ACTUAL FY07</u>	<u>ACTUAL FY08</u>	<u>BUDGET FY09</u>	<u>PROJECTED FY09</u>	<u>PROJECTED FY10</u>
Electricity	95.6	100.0 4.4% over Fy07	105.9 5.9% over Fy08	108.3 8.3% over Fy08	126.2 26.2% over Fy08
No. 2 Fuel Oil	\$2.11 per gallon	\$3.12 per gallon	\$2.40 per gallon	\$3.00 per gallon	\$3.00 per gallon
Natural Gas	\$1.58 per therm	\$1.55 per therm	\$1.52 per therm	\$1.47 per therm	\$1.56 per therm
Propane	\$21.79 per gallon	\$2.27 per gallon	\$2.00 per gallon	\$2.60 per gallon	\$2.60 per gallon
Water & Sewer	7.3 % increase over Actual FY06	8.1 % increase over Actual Fy07	6.5% increase over Proj Fy08	13.0 % increase over actual Fy08	26.5% increase over Actual Fy08
COR Stormwater Fee					Starts here
<u>Motor Fuels:</u>					
Unleaded	\$2.40 per gallon	\$2.83 per gallon	\$2.68 per gallon	\$2.37 per gallon	\$2.49 per gallon
Diesel	\$2.33 per gallon	\$3.15 per gallon	\$2.76 per gallon	\$2.73 per gallon	\$2.87 per gallon
CNG:	\$2.12 per gallon equivalent	\$1.97 per gallon equivalent	\$2.08 per gallon equivalent	\$2.42 per gallon equivalent	\$2.07 per gallon equivalent
E 85	\$3.05 per gallon	\$3.12 per gallon	\$3.05 per gallon	\$3.68 per gallon	\$2.79 per gallon
B5	\$2.36 per gallon	\$3.49 per gallon	\$2.79 per gallon	\$2.78 per gallon	\$2.92 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 FY09 and FY10 assume the fuel energy tax at the level established for FY09.
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.
5. City of Rockville Stormwater Management Utility Fee is not included in the Water & Sewer rates.
6. Fy10 B5 projection is shown under the assumption that the blenders credit for biodiesel will be extended past its current October 2009 deadline.

# ENERGY ANALYSIS

MONTGOMERY COUNTY, MARYLAND  
DIVISION OF OPERATIONS, DPWT  
101 Orchard Ridge Drive  
Gaithersburg, Maryland 20878



## ENERGY ANALYSIS of MONTGOMERY COUNTY FACILITIES

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## A. EXECUTIVE SUMMARY

### 1. PROJECT SCOPE

EMG has been commissioned by Montgomery County Maryland, Department of General Services, Division of Real Estate and Management Services to focus on elements of the requirements of County Council Bill 30-07. The intent of adopted Bill 30-07 is for Montgomery County to lead by example by implementing enhanced energy management programs that reduce the energy consumption and Greenhouse gas footprint of county facilities. The Bill specifies that energy consumption of County facilities must be reduced by 25% by 2020. EMG is to focus on the following key elements of the adopted Bill:

- Provide energy consulting services to the Montgomery County Sustainability Workgroup.
- Energy Benchmark and develop an energy baseline for all facilities listed in the County portfolio.
- Develop a utility unit savings plan and a cost savings plan.
- Assist in assembling the initial report for County Council submission and approval.
- Create a database with energy usage data by building that will become the platform for tracking future usage and comparing targets and benchmarks.
- Support the Sustainability Workgroup at public hearings.
- Prepared Energy Analysis

### 2. ENERGY ANALYSIS METHODOLOGY

EMG has designed this program to be consistent with the mission and goals of the County Council for Montgomery County, Maryland. We understand the needs of the program and have performed similar services in the past. The following chart depicts the overall flow from Data gathering, thru benchmarking and prioritization, and energy plan implementation.

The goal of this Energy Analysis is to support a summarized condition plan for:

- 1.) Reducing the total energy consumption of all building owned and operated by Montgomery County.
- 2.) Reducing the cost of the consumption through procurement strategies.
- 3.) Replace energy consumed with clean or renewable energy sources where applicable.

The Project Approach to collect, document and analyze the County facilities energy data has been designed to achieve the following:

- Gather utility data for each building and benchmark against models by square footage, facility use, and type of structure.
- Create a prioritized list of buildings in comparison to the benchmarks with respect to buildings where significant savings can be expected.
- Provide an energy consumption target for each county facility.
- Provide an energy cost reduction target for each facility.
- Provide back up information and calculations to the County.
- Provide recommendations for follow up and implementation.

Of the 124 facilities considered, the following facilities were not included in the overall energy analysis:

Facilities:	Reason:
4 Facilities	Aquatic Centers
10 Facilities	Insufficient Utility Data
5 Facilities	Outside Variance Tolerance

A Variance Analysis should be instituted prior to Energy Audit engagement to validate input information of certain facilities including the 19 facilities not included in this analysis report.

The following facility types are included in the energy analysis:

Facility Type	# of Facilities
Courthouse	5
Educational	7
Entertainment and Culture Centers	4
Fire and Police Stations	11
Healthcare	8
Libraries	20
Lodging	3
Offices	9
Public Order and Safety Centers	7
Recreation	23
Service Facilities	7
Warehouses	1
<b>Total:</b>	<b>105</b>

Benchmarking of each of Montgomery County's facilities has been undertaken to establish a baseline, compare against the national average, and to prioritize the efforts of this Energy Analysis.

Based on the results of then benchmarking, the facilities have been prioritized based on their total anticipated annual energy cost reductions and reasonable targets have been set for reducing energy consumption, cost, and green house gas emissions.

The following chart shows the anticipated annual cost, energy consumption and green house gas emission savings and a gross representation of the corresponding capital investment anticipated for the implementation of measures required to reach the goal.

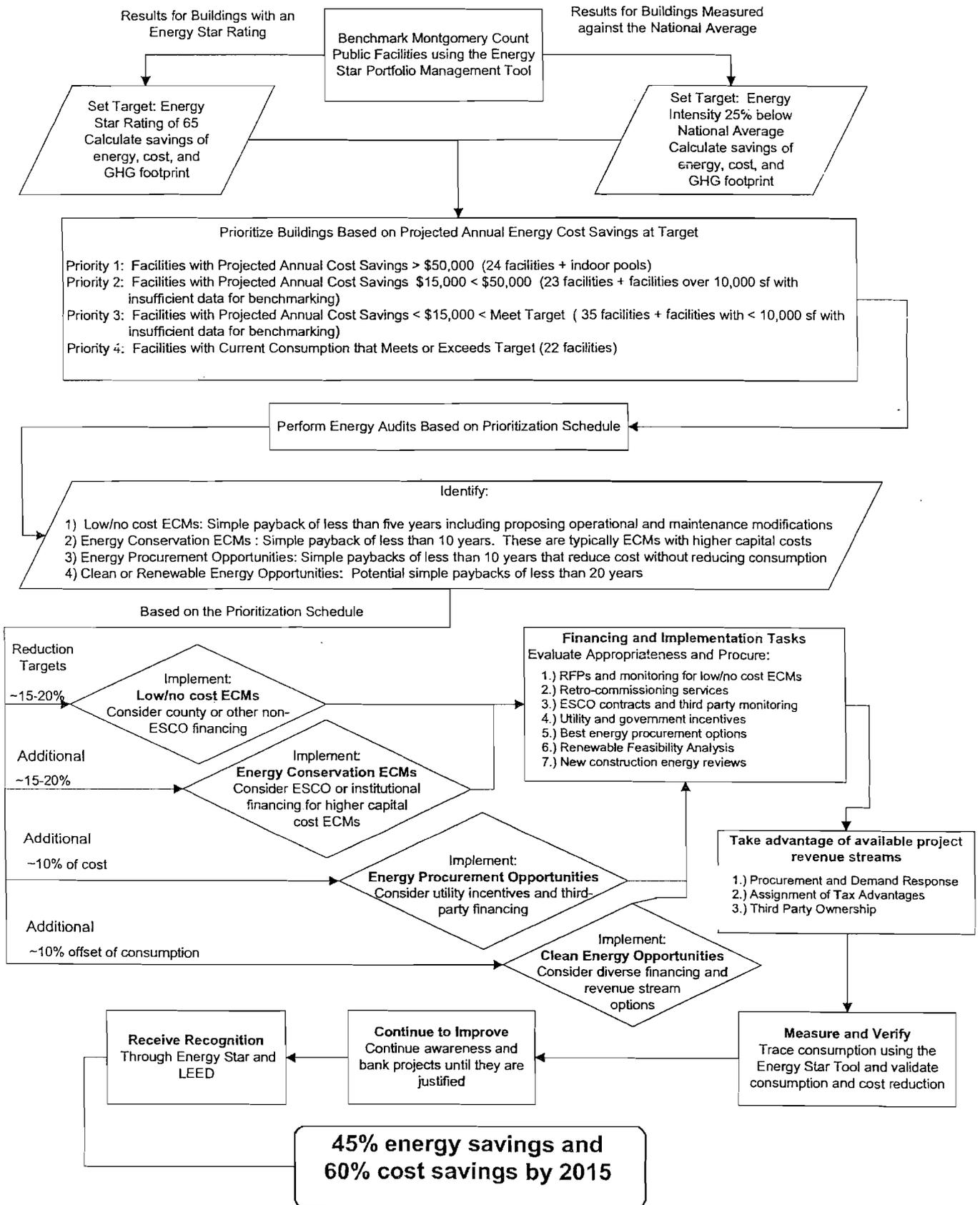
Phase	Target Completion Date	Gross Capital Cost	Annual Energy Savings @ Target (MMBTU)	Annual Energy Savings @ Target (%)	Annual Cost Savings @ Target (\$)	Annual Cost Savings @ Target (%)	GHG Reduction (MtCO2e)
I	2013	\$33 – 36 M	136,000	51%	\$4.2 – 4.8 M	51%	24,000
II	2014	\$5.8 – 6.3M	25,000	39%	\$760,000	39%	2,500
III	2015	\$1.9 -2.2M	9,000	24%	\$240,000	24%	1,500
IV ( if needed)	2016	If Needed	If Needed	If Needed	If Needed	If Needed	If Needed
Procurement	2013	\$9.0-11M	0	0%	\$1,100,000	100.0%	0
Renewables	2013	\$ 8.0 -10M	0	0%	\$ 980,000	100.0%	30,000
Totals	2015	\$57-67M	170,000	45%	\$7,200,000	60%	58,000*

\*This is the equivalent of removing over 10,000 cars off of Montgomery County's Roads.

Phase Four is optional, based on Progress and Realizations of Savings of first three Phases. Phase IV includes the potential of facilities that already meet our target to become even more energy efficient.

It should be noted that capital costs could potentially be offset with an array of incentive programs and financing options detailed later.

# Montgomery County Public Facility Management Plan



To achieve the stated goals, the EMG team first gathered and populated the benchmarking tool developed by the EPA. Once the benchmarking performance ranking or comparison rating was established, the EMG team prioritized the facilities into four energy study categories or phases.

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### 3. BENCHMARKING

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The U.S. Environmental Protection Agency has developed an Energy Management Program to assist public and private sector building owners and managers to benchmark and track energy performance in their buildings. The program is the Energy Star Portfolio Manager. The Portfolio Manager tool allows the input of historical utility data of a facility to be compared to normalized data of a large database of buildings of its peers. This Energy Performance Rating System is based on a simple 1-100 "score" where 50 is an average building. The rating normalizes factors such as weather, occupancy, operating hours, and other building-specific characteristics. The rating is based on actual billed energy data and captures the interactions of building systems not individual equipment efficiency. Energy Star Portfolio Manager can establish a rating in 11 building categories. There are not enough facilities entered into the database for other building types outside of the 11 building categories for Energy Star Portfolio Manager to establish a rating. The database is sufficient enough for these other building types to establish energy use comparisons. Montgomery County has 15 facilities that are in categories that can achieve a rating. There are 100 facilities that have energy use comparisons. There are 4 pool facilities that do not have either a rating or energy use comparison. The pool facilities have high energy consumption and will also be evaluated for energy consumption and cost reduction.

The energy consumption data that has been initially analyzed are electricity, natural gas, fuel oil, and propane. Water usage and water consumption data will be analyzed during the individual facility energy audit process. The following energy unit cost have been established for the benchmarking analysis; \$0.128 per Kwh of electricity, \$1.55 per therm of natural gas, and \$2.60 per gallon of fuel oil and propane.

Actual Building Information received from Montgomery County includes:

- Facility name
- Address
- Ownership entity
- Square footage
- Age (some facilities)
- Operating Hours (some facilities)
- 12 months of Energy Consumption data

Assumed Building Information includes:

- Age (some facilities)
- Number of computers
- Number of workers on Main Shift
- Operating Hours (some facilities)
- Energy Cost (standard blended rate used for all facilities)

## B. ENERGY ANALYSIS RESULTS

### 1. RESULTS

#### Variance Analysis

A variance analysis of the data produced by the benchmarking process was conducted to look for anomalies in the data.

Once the facility information and utility data is entered for each facility, it becomes possible to measure the difference between the national average and actual energy intensity for each facility. This difference can be studied to determine if there are anomalies in the input data that could allow us to suspect error.

From the raw data resulting from the analysis of each facility's energy consumption analysis through Energy Star's Portfolio Manager Tool, it was determined that an energy intensity factors greater than four correlated to data that was outside a three sigma (~95%) confidence level. The energy intensity factor is calculated as a ratio of the national average intensity of a facility against the actual energy intensity. For example, an energy intensity factor of four would correlate to a facility that had a calculated energy intensity of either one fourth ( $.25 = -4$ ) or four times ( $400\% = 4$ ) that of the national average energy intensity level for that particular facility.

Facilities with an energy intensity factor greater than two are included in the following chart. Five facilities with energy intensity factors greater than four were excluded from the rest of the study as it is assumed that there are errors in our known assumptions concerning each of these facilities.

Facility Name	National Average Site EUI (kBtu/Sq. Ft.)	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Energy Intensity Factor	Building Type
AFI Mobile Production Unit	65	16.4	2.96	Recreation
B.C.C. Seniors Center	65	288.6	(3.44)	Recreation
Center on Domestic Violence*	124	857.2	(5.91)	Health Care: Long Term Care (Nursing Home, Assisted Living)
CSAAC	77	15.8	3.87	Office
DFR – Aspen Hill Shelter*	87	3.1	27.06	Lodging
Gaithersburg Maintenance Depot	77	24.8	2.10	Service (Vehicle Repair/Service, Postal Service)
Germantown Police*	78	1,358.00	(16.41)	Fire Station/Police Station
Mental Health House*	124	11.3	9.97	Health Care: Long Term Care (Nursing Home, Assisted Living)
Piccard Drive Health Center*	124	657.1	(4.30)	Health Care: Long Term Care (Nursing Home, Assisted Living)
Police at Ardennes	78	340.9	(3.37)	Fire Station/Police Station
Police Special Operations	77	322.6	(3.19)	Office
S.S. Maint. Depot Building A	77	305.5	(2.97)	Service (Vehicle Repair/Service, Postal Service)

\*Facilities with an Energy Intensity Factor greater than 4 were removed from the study pending confirmation of facility input data

The output energy intensity factor of eight additional facilities was between two and four. These facilities were left in the study.

It is recommended that all of the assumptions regarding all of these facilities be confirmed either at the onset of the energy audit phase or before. All assumptions can be found in the checklist included in the "Statement of Energy Performance" that has been generated from each facility's data.

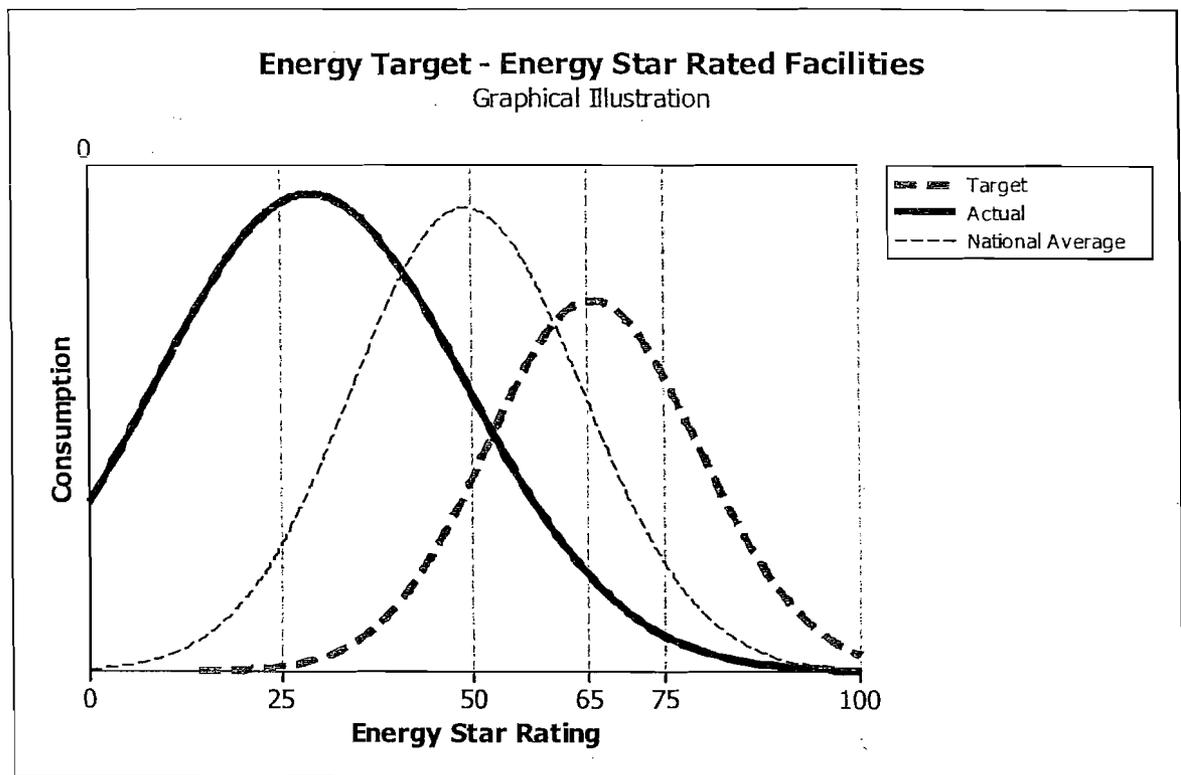
### Results

Energy Star's Portfolio Manager tool has the capability of comparing some building types energy use against data in its database related to buildings of the same type and giving the facility a 1-100 ranking. This is due to the fact that they have a significantly large data set to which to compare the facility and can compare the facility to the distribution of similar facilities in its database.

Of the 105 remaining facilities, fifteen are categorized as Courthouses, Warehouses, and Office Buildings and were able to receive an Energy Star Rating. The Energy Star Ratings of these buildings varied between 4 and 66. The fifteen Energy Star rated facilities represent nearly an annual consumption of 150,000 MMBTU at a cost of just over \$5.1 million.

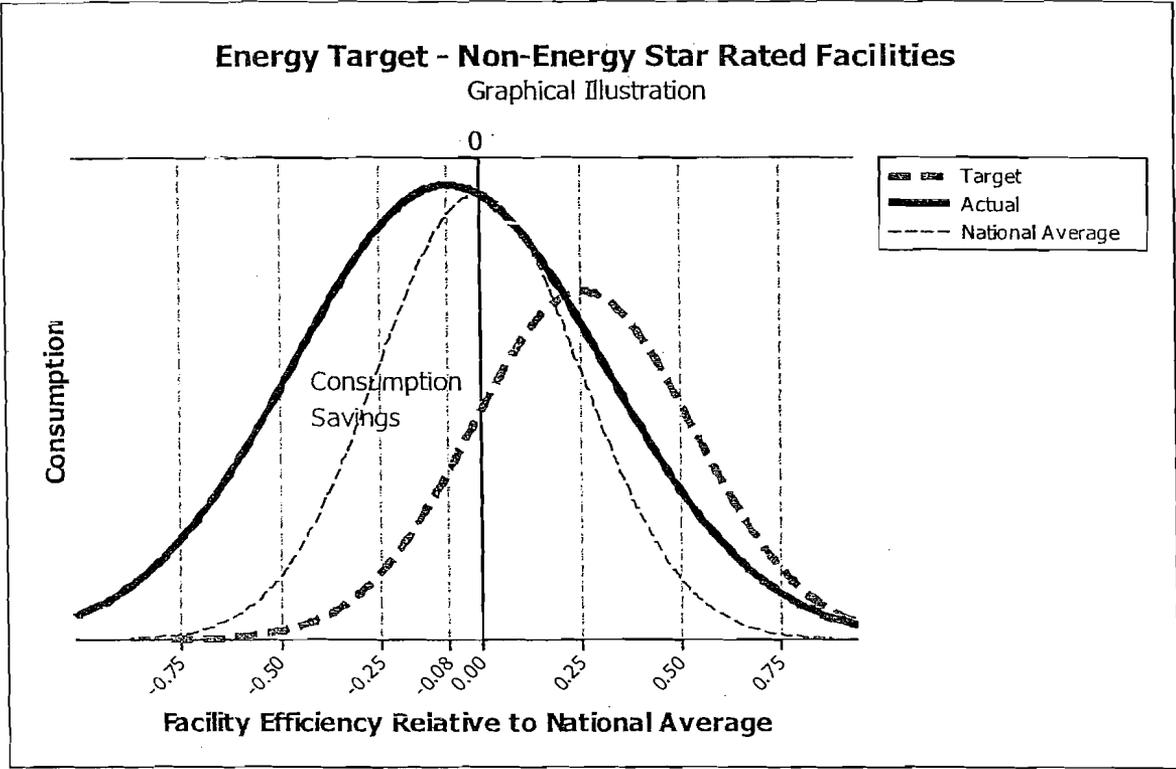
Based on an average Energy Star Rating of 65, we calculated the energy and cost savings of each building type and found that the county would save approximately \$2.1 million. As a rating of 65 is required for consideration in the LEED existing building program, this level of energy consumption was chosen as the target for these facilities.

The following graph illustrates consumption of the current, national average, and target consumption for building types rated by Energy Star. The savings of cost, consumption and GHG emissions is represented by the difference in area of the current and target histograms.



The remaining 90 buildings are of types that the Portfolio Manager does not give a rating. Instead, it measures these facilities against the national average of buildings of similar type in its database.

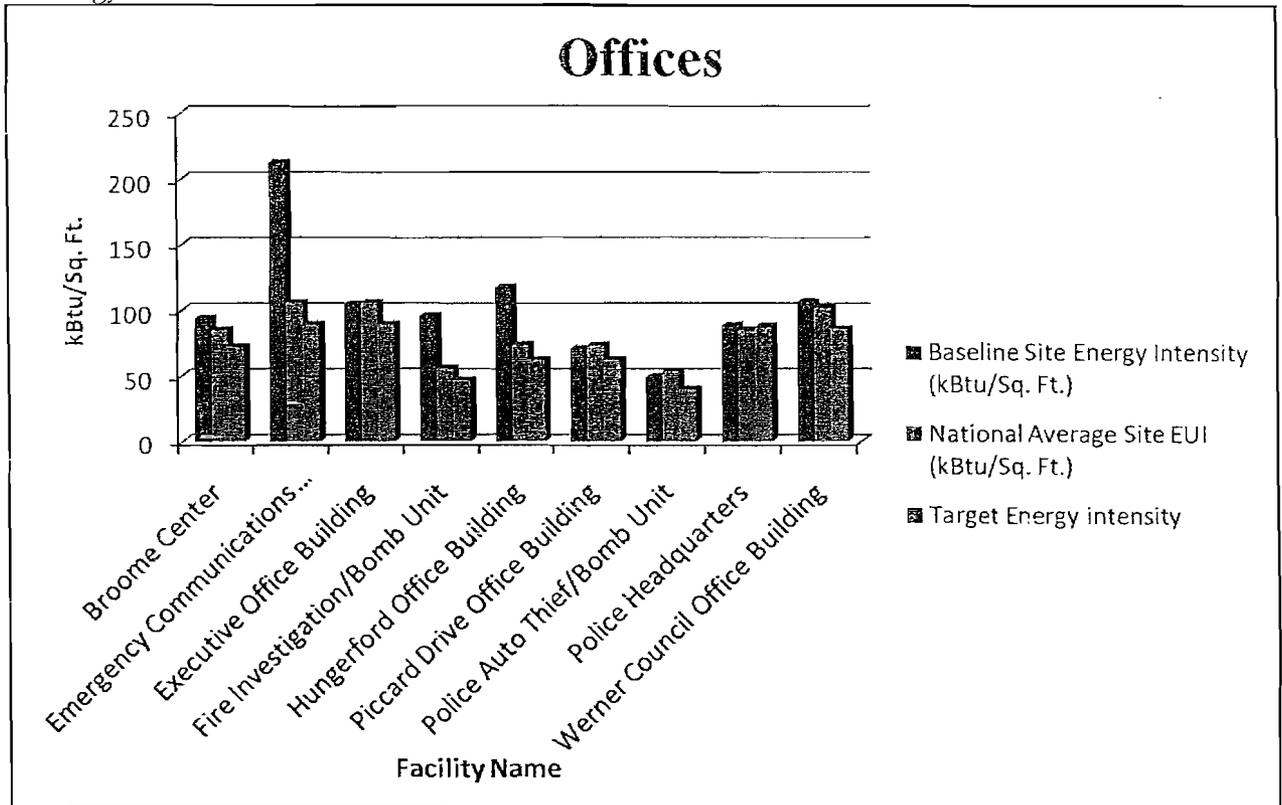
A histogram (shown below) displays the results in a distribution of the facilities relative to the national average. This data shows that the facilities average eight percent above the national average. Based on the energy consumption of these facilities and the goals of Montgomery County, we have chosen a target of 25% above the national average. Meeting this goal will result in an annual savings of approximately \$3.1 million. Graphically, cost and energy consumption savings is represented by the difference between the in the Actual and Target consumption histograms.



## 2. FACILITY ANALYSIS

Each building type was analyzed based on energy intensity. Energy intensity is typically expressed in kbtu/sf/yr. This allows for a normalized comparison of building type of different sizes as well as converting both electrical and heat energy units to the same base energy unit. The following graphs compare the Actual energy intensity with that of the national average and that of our target. The energy intensities of some facilities are notable from the graphs located in Appendix A. The graph illustrating the results of the Office Buildings is included below.

The facilities that were identified in the variance analysis can be identified in these bar chart as well. Again, the reasons for some of the large differences between the national average of consumption and the actual consumption may be that utility data is missing, square footage data is incorrect, or the building shares a meter with a non-typical load among other things. A checklist confirming the data entered will be compared to observed conditions during an on-site energy audit.



Offices

It also should be noted that non-anticipated loads have a higher proportional effect on the energy intensity of smaller buildings and energy audits should reveal these loads.

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### 3. PRIORITIZATION

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Based on the results of our benchmarking, we developed a prioritization plan based on four phases designed to capture the facilities with the largest potential energy consumption and cost savings.

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#### 3.1 PRIORITIZATION PHASES

Based upon the results established by Portfolio Manager, the facilities were categorized into 4 priorities or further study and implementation phases.

Priority Phase	Description
1	Facilities that have a potential to achieve \$50,000 or greater annual energy cost savings if target is met. 24 facilities and 4 indoor pools in Phase 1.
2	Facilities that have a potential to achieve \$15,000 to \$50,000 annual energy cost savings if target is met. 23 facilities in Phase 2.
3	Facilities that have a potential to achieve \$0.00 to \$15,000 annual energy cost savings if target is met. 35 facilities in Phase 3.
4 (optional)	Facilities that are currently at target. 22 facilities in Phase 4. Phase Four is optional, based on Progress and Realizations of Savings of first three Phases. If savings targets are not met, Phase IV will be implemented. Cost and Savings will be later determined.

## C. ENERGY PLAN IMPLEMENTATION

### 1. RECOMMENDED SERVICES

Based on the list of facilities in each of the four Priority Phases and in order to achieve the established goals, the following list of services is recommended:

- Countywide Operations and Maintenance Program
- Full Energy Audit for each facility
- Identify and Implement No/Low Cost Energy Conservation Measures
- Identify and Implement High Cost Energy Conservation Measures
- Identify Clean or Renewable Opportunities
- Identify Energy Procurement Opportunities
- Identify Financing Options
- Measure and Verify Results

#### 1.1 COUNTYWIDE OPERATIONS AND MAINTENANCE PROGRAM

The Countywide Operations and Maintenance Program is designed to establish facility operation and maintenance procedures for each category. The procedures will be instituted by the maintenance personnel associated with each building. The intent is to provide an ongoing, routine inspection of equipment and systems. The Program will be reevaluated and modified and updated after the initial On Site Energy Audit.

#### 1.2 ENERGY AUDIT AND ENERGY CONSERVATION MEASURES

The energy audit will include an analysis of all utility consumption data, included will be electrical, natural gas, fuel oil and propane consumption. The energy audit consists of an on-site assessment to determine current conditions, itemize the energy consuming equipment (i.e. air conditioning, fans and blowers); review lighting systems both exterior and interior; and review efficiency of all such equipment. In addition, The Auditors will also consider structural elements, such as the building envelope, for energy efficiency. Recommendations will be made on implementing cost-saving energy conservation materials and methods. The Auditors will estimate the projected payback period on each energy-saving recommendation and prioritize accordingly.

##### 1.2.1 Energy and Water Usage

The Auditors will survey 100% of the facility, common areas, office areas, maintenance facilities and mechanical rooms to document utility related equipment, including heating systems, cooling systems, air-handling systems and lighting systems.

##### 1.2.2 Recommendations for Energy Savings Opportunities

Based on the information gathered during the energy audit, the utility rates and recent consumption data and engineering analysis, the Auditors will identify opportunities to save energy and provide probable construction costs, projected energy/utility savings and provide a simple payback analysis.

### 1.2.3 Analysis of Energy Consumption

Based on the information gathered during the on-site assessment and the utility billing history, the Auditors will conduct an analysis of the energy usage of all equipment, and identify which equipment is using the most energy and what equipment upgrades may be necessary. This information will be used to identify which equipment upgrades or replacements that may provide a reasonable return on the investment by Montgomery County. The analysis for any upgrades or replacements should include life cycle cost analysis for economic justifications.

### 1.2.4 Energy Audit Process

- Interview Montgomery County staff and review plans and past upgrades;
- Perform energy audit for each facility;
- Perform a preliminary evaluation of the utility system serving each facility;
- Analyze findings utilizing Energy Conservation Measure cost benefit worksheets.
- Determine if any energy efficiency measures are required;
- Make preliminary recommendations for system improvements, if needed.
- Determine what incentives are available for energy efficiency opportunities;
- Estimate initial cost and changes in operating and maintenance costs based on implementation of energy efficiency measures;
- Ranking of recommended cost measures based on largest payback; and
- Determine what cost-effective measures can be taken, including the projected payback timeframe.

## 1.3 CLEAN AND RENEWABLE ENERGY OPPORTUNITIES

Clean energy is defined as energy that is generated and used in the highest feasible mode of environmental and social responsibility. Power from sources such as the sun (solar power) and wind are renewable and do not cause harmful emissions. Fuel cell generators are also considered renewable energy.

State and Federal government agencies are dedicated to promoting clean energy as an alternative to traditional sources of energy. As such, they have developed a number of programs to promote the use of clean energy sources by potentially providing technical assistance and/or financial incentives based on project feasibility.

The following table summarizes some potential applications of Clean/ Renewable Energy Sources for the Montgomery County Facilities.

Clean/ Renewable Energy Sources	Technical Description
Solar Power	Use reflective materials that concentrate the sun's heat energy to drive a generator that produces electricity.
Photovoltaics (Solar Panels)	Use semiconductor materials to convert sunlight directly into DC electricity.
Geothermal	Geothermal energy uses the ground temperature as a thermal sink for heat rejection in the summer and heat gain in the winter which allow for more efficient HVAC systems
Solar Heating	Use solar collectors to absorb the sun's energy to provide low-temperature heat used directly for hot water or space heating. Used in applications with high hot water usage.
Wind Turbine	Uses motion of wind spinning a propeller to generate electricity from the mechanical rotation of a small generator.
Fuel Cell	Uses chemical reaction involving hydrogen and oxygen to create electric power. It continuously produces power as long as there is a supply of hydrogen gas and oxygen (from the air)
Combined Heat and Power (CHP) (co-generation)	Simultaneous production of electricity and heat from a single fuel source. It provides onsite generation of electrical and/or mechanical power and waste-heat recovery for heating, cooling, dehumidification, or process applications.

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## 1.4 Low/No Cost ECMs

### 1.4.1 Low/No Cost ECMs

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Low/No Cost ECMs are defined as being Energy Conservation Measures that require little or no capital relative to its associated energy cost savings. Some of these measures may be recommending changes to the programming of a facility's energy management system, changing light fixtures or bulbs, sealing the envelope of the building with weather-stripping or door seals, repairing steam traps or outside air dampers, etc. It is important that these measures are undertaken first to aid in determining the financial payback of more expensive ECMs.

For example; Assume an older facility with a water boiler that consumes \$1M worth of heating fuel a year. A equipment vendor would suggest that this would justify the installation of a \$1M condensing boiler that would result in a 10% improvement in efficiency and a annual savings of \$100,000 with a simple payback of ten years. It may be found that by controlling air leakage through some doorways, retro-commissioning the energy management system and repairing some broken ventilation dampers could for an initial cost of \$40,000 could cut the annual fuel bill to \$700,000. The new water boiler now has a simple payback of over 14 years.

### 1.4.2 Commissioning

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After a facility is constructed and before the general contractor turns over the keys to the new owner, the facility should be commissioned. This is the process of making sure that all of the building systems are operating as designed. From an energy perspective, the commissioning of the HVAC and other energy consuming systems is critical. By commissioning a facility, an HVAC contractor assures the new owner that the HVAC will consume the energy that it was designed to consume. Commissioning is always recommended and should be included in the scope of any significant renovation or new construction project.

#### 1.4.2.1 Enhanced Commissioning

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As a result of the energy efficiency ratings required to obtain LEED and Energy Star building certifications and to hold designers and system installers accountable for their system designs, some facility owners are asking for commissioning of building systems to be performed by a third party to the installation contractor of the designer. This is being called "enhanced commissioning" and gives the facility owner the benefit of an independent opinion as to the fitness and energy efficiency of newly installed equipment. This service is independent of the design and build contracts and should be weighed regarding cost/benefit as a buildings energy consumption will be known after a year of service and can then be compared against the design consumption. Buildings with expected annual energy costs greater than \$100,000/yr. as well as buildings designed to meet strict energy efficiency target (for LEED points, for example) typically could justify enhanced commissioning. Done to meet LEED standards, enhanced commissioning is worth one LEED point.

### 1.4.2.2 Retro-commissioning

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Retro-commissioning or re-commissioning is the process of performing the commissioning process on a facility in which the buildings functions or original design parameters have changed since the original commissioning. It is not uncommon for even young buildings to be utilized and operated in a manner different than was originally intended and retro-commissioning is almost always a justified low cost ECM for facilities that haven't been commissioned in the past three to five years. Retro-commissioning for a small facility may be as minor as checking set temperatures on water heating equipment and making sure that programmable thermostats are set and operating correctly. Sometimes, these items can be checked and/or recommended in an energy audit and implemented by on-site maintenance personnel. Retro-commissioning for a large, complex facility can be very involved and require a few days to weeks of on-site work by a qualified service provider. It is not uncommon for a simple retro-commissioning project to decrease a facilities energy consumption by 10% or more. In short, retro-commissioning is a service that typically pays for itself in a short period.

### 1.4.3 Financing for Low/No cost ECMs

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Financing for low cost ECMs can come from many sources. Sometimes minimal capital costs can be met through an existing annual facility or maintenance budget. Utilities and state and federal programs often provide financial assistance for many simple projects. If self-financing is not an option, these ECMs can be carefully blended with higher capital cost ECMs in an energy performance contract.

Low/No cost ECMs should be identified and specified in an energy audit.

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## 1.5 TYPICAL ENERGY CONSERVATION MEASURES

A typical Energy Conservation Measure (ECM) requires capital investment in order to implement. In many cases, significant investments in a building system can provide a return on investment through energy efficiency. HVAC and building envelope upgrades can often be justified by their resulting reduction in energy costs. Government-owned buildings often take advantage of an energy service companies to provide funding, development, and installation for these projects. ESCO financing will be discussed later.

An energy audit will identify potential higher capital ECMs that should be considered. A good energy audit will consider and explain the interactions of competing ECMs such as the boiler example in the previous section.

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## 1.6 ENERGY PROCUREMENT OPPORTUNITIES

### 1.6.1 Load Management and Smart Metering

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Energy efficiency improvement is defined as reducing the energy required for a given unit of physical work or economic output. Efficiency gains are distinct from load management (short-term reductions in use during peak demand periods) or reductions in energy use from reduced economic activity. Two load side management programs available are demand response and smart metering. A Smart meter generally refers to a type of advanced meter (usually an electrical meter) that identifies consumption in more detail and more frequent intervals than a conventional meter; and optionally, but generally, communicates that information via some network back to the local utility for monitoring and billing purposes. It is anticipated that the Montgomery County facilities will be able to implement projects that will take advantage of Smart Meters for a reduction in cost of provided electricity.

## 1.6.2 Demand Response

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In electricity grids, demand response (DR) is similar to dynamic demand mechanisms to manage customer consumption of electricity in response to supply conditions, for example, having electricity customers reduce their consumption at critical times or in response to market prices. The difference is that demand response mechanisms respond to explicit requests to shut off, whereas dynamic demand devices passively shut off when stress in the grid is sensed. Demand response can involve actually curtailing power used or by starting on site generation which may or may not be connected in parallel with the grid. PJM is the Regional Transmission Organization that offers Demand Response program to Maryland. They have multiple Demand Response programs that can lead to a reduction in electricity cost and/or cash rebates for participation. Projects can be implemented to maximize the value of these programs.

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## 1.7 SOURCES OF FUNDING

### 1.7.1 Self-funding

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Sometimes, energy efficiency projects that have rapid returns on investment or have low capital requirements can be self-funded by governments. Maintenance or permanent improvement funds can potentially be tapped and later refunded by the savings in the utility budget. Self-funding can often be augmented with state, federal, and utility incentive programs. The benefit of this funding mechanism is that all of the savings stay internal to the finances of the facility. The drawbacks are that of internal implementation responsibility as well budgetary constraints on even small capital projects.

### 1.7.2 Energy Performance Contracting: ESCO

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The most common form of funding for energy efficiency projects is energy performance contracting.

The advantage of an energy performance contract is that the facility owner hires one Energy Service Company (ESCO) with single source responsibility who can likely complete large, complex projects in a short time frame. In addition, the ESCO has the responsibility of project financing and is repaid through future energy savings.

Although a energy performance contract is often the preferred financing arrangement, there are some drawbacks that should be considered, such as:

- It is common for an ESCO to offer energy solutions that focus on their area of expertise and product lines that they represent. This may not be the optimum solution for the facility of the county.
- It is in an ESCOs best interest to maximize their profit. Depending on the contract language, this can lead to either a situation that only includes the most profitable energy efficiency projects or it could include more machinery than is necessary in order to take advantage of profits that can only be realized with projects with a high initial capital cost.
- There is a booming demand for energy performance contracts and that many ESCOs are new to the marketplace and more established companies are being forced to rely on less experienced project managers and may emphasize profits over quality of service.
- The most effective whole building approach including maintenance and operational measures as well as clean technology opportunities are often not identified and addressed by ESCOs as it is not necessarily their area of expertise or in their financial interest.

In order to take advantage of the benefits of energy performance contracts while avoiding their pitfalls, the following is recommended:

- An energy audit should be completed for each facility to determine if a performance contract is a viable option for the facility. It would also serve to develop an energy base line and the potential scope of ECMs that will be needed should the county decide to develop an RFR for procurement of an Energy Performance Contract.

- Typical performance contracts can be complex with many considerations that may be used to maximize profits of the ESCO in place of maximizing benefit to the municipality. There are many contract parameters that need to be well understood and negotiated with ESCOs including the parameters used to establish the baseline energy consumption, methods for adjusting the baseline, the finance rate, the terms of any required maintenance agreements, the baseline fuel costs, anticipated utility rate inflation, etc. The energy auditors can be used as a third party to serve on the RFR development team and/or lead the procurement process.

It is generally agreed that Energy Performance Contracting can be an excellent method for financing energy capital projects in the public sector, but care must be taken in the procurement process to maximize their benefit.

### 1.7.3 Other Sources of Project Financing

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The federal government has many tax incentives that can be utilized by government agencies even though they do not pay taxes. Federal tax credits are currently offered for renewable energy. Sale of these tax credits or third-party ownership of the renewable energy equipment with sale of the energy back to the agency are two ways that tax credits can be taken advantage of by a governmental agency. In addition, EPACT, is a federal program that allows tax deductions for building energy efficiency improvements. Although the benefit of this tax deduction is usually taken by private building owners against profits, the legislation allows the designer of facilities for government agencies or nonprofit organizations to take the tax deduction for buildings that meet EPACT standards. Understanding this benefit can assist the government agency to negotiate the best rate for their services.

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## 1.8 MEASUREMENT AND VERIFICATION

Some implemented energy conservation measures will require performance verification. For these measures, it is necessary to develop a Measurement and Verification (M&V) Plan.

The objective of this plan is to make sure that the equipment is performing as originally specified and that the projected savings are being realized.

M&V can be performed at the system or component level, and might include:

- Chillers
- Boilers
- Variable speed drive applications
- Pumps
- Lighting systems

The equipment will be monitored using sensors and data collection equipment to determine energy efficiency curves. For example, in a typical chiller test, the chiller is monitored for a certain period so varying load conditions can be recorded. Then, the developed chiller efficiency curves will be compared to the manufacturer's published efficiency curve.

### 1.8.1 General Requirements

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During M&V, the engineering company will require the following assistance from the operating staff of the facility:

A copy of the manufacturer's published performance curves for each device to be tested.

Operating conditions for the equipment performance curves. (For example, for a chiller test, the engineers will need to know the chiller hot water temperature, chilled water temperature, air temperatures, and so on. For a variable speed drive, they will require the temperature and frequency of the drive.)

Address, contact information, and procedures for accessing the facilities where the equipment is housed.

It is necessary to work directly with the building operating staff to determine which equipment to run during the tests and at what settings. (For example, which chiller to lead with, the condenser water set point, chilled water set point, and other information that is needed to conduct the test.)

### 1.8.2 M&V Deliverables

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At the end of the M&V assessment, a report is compiled that presents the findings of the equipment tests. The manufacturer's data is incorporated into the report for comparative purposes. This report will include a brief summary of findings along with performance curves.

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## 1.9 STAY COMMITTED TO SUSTAINABILITY

Energy awareness should be maintained at all of Montgomery County's facilities. No/low cost ECMs including operation and maintenance practices should be continually reviewed for additional energy conservation potential. And, as a result of the energy audits and clean technology and procurement related feasibility studies, some potential projects will return simple payback periods that extend them past the intended payback of our target. These projects should be banked and periodically reviewed against energy cost and potential incentives to re-evaluate their justification.

Once justified ECMs, procurement, and clean technology have been implemented and their savings realized and measured, Montgomery County can receive recognition through the national LEED program as well as the Energy Star program.