Background

The Board contracted the Commonwealth Educational Policy Institute (CEPI) associated with the Virginia Commonwealth University to conduct a study to examine resource utilization in the Division. A number of focus areas were identified: fiscal planning, facilities, personnel, course offerings, strategic planning, technology planning and utilization, policy development, communication, community relations, support operations, organizational development, leadership, and central administration. The desired outcome of the study is to gain efficiencies and improve effectiveness of how resources are allocated, aligned, and used to support the Board goals. In order to meet Goal 5: Establish efficient systems for development allocation, and alignment of resources to support the Division’s vision, mission, and goals, one arm of the Office of Support Services has:

- Researched the current and desired state of energy management,
- Reviewed the data on the capacity of each school building provided by the CEPI study, and
- Identified next steps for the remaining work to be completed to address the key issues summarized in the Resource Management Review.

Administrative Consideration (Rationale)

Energy Management

Staff was contacted by Energy Education, Inc., a company that specializes in cutting costs of energy by utilizing money already budgeted for utility bills to provide experts to develop and implement a customized energy management plan for each of our buildings. After an in-depth look of what we currently do to manage energy costs and what Energy Education, Inc. offers a school division, our staff would like to take a year to evaluate whether or not a revised energy management plan developed by our own staff will help us reduce the consumption of energy. Enclosure 1 describes our current state and desired state to help us reduce the consumption of energy.

Capacity Formulas

Staff is currently working to review all assumptions regarding programming and capacity. Dr. Carl Chafin, one of the team members participating in the CEPI study, will be meeting with staff on April 14, 2008, to discuss their methodology for the capacity of each building listed in the CEPI study. Staff will then develop recommendations for a revised formula for determining capacity and discuss with the Board the feasibility of moving forward with projects, delaying projects, changing the scope of projects, or eliminating projects altogether. Staff has targeted the School Board meeting on May 8 to present detailed information regarding capacity and enrollment projections for the short and long term. The direction given by the Board in May will be used with the Long Range Planning Advisory Committee over the summer to develop recommendations for the next CIP. Enclosure 2 lists the projects currently in the CIP.

Next Steps

A key issue identified in the CEPI study was to continue and apply in other service areas the Albemarle County schools and government collaborative model for service provisions in the organization and
management of the Human Resources Department. In an effort to formalize the collaborative work with the Office of Facilities Development in the implementation of Capital Improvement Projects, Standard Operating Procedures will be developed to insure clear, unambiguous roles for schools and local government personnel. The goal will be to insure process improvements are in place to manage the school projects. We are beginning with this clarity of roles on the Albemarle High School, Brownsville Elementary, and Greer Elementary projects.

Another key issue identified in the CEPI study is the use of detailed GIS and census-type methodologies for membership projecting and attendance zone planning at individual school levels. Staff is currently working with Tex Weaver in the Community Development Geographic Data Services Office to understand the possibilities and how this will help streamline or improve the work to project needed boundary changes or need for additional capacity.

**Budget Implications (Short and Long Term)**

Budget implications are not known at this time.

**Recommendation/Future Direction/Time Line**

Receive for information and discussion.

PREPARED:

REVIEWED: ___________________________ ITEM NUMBER:

RECOMMENDED:
I. Current State of Energy Management System

a. Energy Management System Functions

The Albemarle County Public Schools (ACPS) Building Services Department is fortunate to have a total direct digital control (DDC) energy management system with central control of all schools. The DDC systems are currently Siemens and Apogee technologies. Building Services employs two highly trained technicians who are capable of expanding the existing system, including updating and adding programming. Some of the systems capabilities include:

1. Optimized Start: Outside air and zone temperatures are monitored and the pre-occupancy start time is calculated each day
2. Freeze Protection: Boilers and circulating pumps are automatically started when outside temperature drops below 38 degrees Fahrenheit
3. Outside air to units functions only when the system is in “Occupied Mode”
4. Night setbacks for rooms are controlled at 58 degrees Fahrenheit
5. Some exterior and interior lighting are controlled by the energy management system and more lighting controls will be added
6. Control domestic hot water heaters and circulating pumps
7. Monitor equipment for unusual night operation
8. Monitor override timers for excessive use
9. Monitor critical equipment and activate paging system in case of failures
10. Schedule off-hour events (e.g., school must call ahead to schedule occupancy HVAC settings for an after-hours meeting room)
11. Shut down equipment on holidays or cancelled days (e.g., snow days)
12. Deactivate all equipment with one command in the event of an emergency

b. Lighting Upgrades

Upgrading T12 lights to T8 lights with electronic ballasts results in a higher quality of light at similar light levels and reduces power consumption up to 40%. Savings in energy costs produce a typical payback of two to three years. For most commercial facilities, lighting is responsible for 30% of the electric bill. By implementing energy-efficiency practices that reduce the lighting load by half, the electricity bill will likely see a cost reduction of 15%.

ACPS has already changed from T12 to T8 lights with electronic ballasts in many of the schools. Scottsville Elementary, Ivy Creek and Stone-Robinson Elementary are among recently upgraded lighting systems. The following list of schools or areas of schools are currently scheduled for lighting upgrades. The lighting in the remainder of schools will be upgraded, but are not currently scheduled in 2008.
1. Crozet Elementary
2. Henley Middle – Kitchen and bathrooms
3. Hollymead Elementary – Media center and bathrooms
4. Red Hill Elementary
5. Woodbrook Elementary – Kitchen
6. Murray High – Science laboratory and media storage areas

Additionally, motion sensor installations for the classrooms and hallways are currently scheduled.

c. Utility Tracking System
FASER is an energy information management and analysis software currently utilized by ACPS and has the following capabilities:

1. Identifies utility bill errors, system problems and recover overcharges using FASER's Energy Alarm bill-checking engine
2. Audits the cost avoidance of demand side management projects and performance contracts
3. Utilizes a powerful utility rate schedule library for rate comparison using actual metered history
4. Customizable rate schedules
5. Creates formula based virtual sub-meters for recharge accounting needs
6. Allows input and maintains raw meter reading data into FASER using a powerful handheld recorder
7. Establishes energy budgets
8. Determines the impact building activities have on energy consumption
9. Produces Informative, customizable reports with batch report processing and data export features

An example FASER report is included as an attachment, and the calendar year 2007 distribution of energy consumption for combined schools is shown in the following figure.
d. Monthly Energy Consumption Reviews
ACPS currently works with a contracted energy manager who is responsible for entering utility bills into the FASER program. Every month, the Director of Building Services, Deputy Director for Building Services, Environmental Compliance Manager, and HVAC technicians meet with the contracted energy manager to discuss trends and compile action items. The contracted energy manager spends approximately 18 hours per month tracking utility data and conducting monthly review meetings.

e. Energy Audits
When a building appears to have abnormal levels of energy consumption, an energy audit is conducted by our energy consultant and a HVAC technician to determine the source of the problem. The energy audit is typically conducted after operating hours.

II. Energy Education (EEI)

a. Program Overview
Energy Education (EEI) builds customized, comprehensive people-driven energy conservation programs that help organizations reduce their consumption of electricity, natural gas, fuel oil, and water, allowing the financial savings which can be invested in the school district.

EEI’s fees, approximately $979,200, are paid over the course of 4 years and are presumably paid from the cost avoidance resulting from energy education.
b. **Software Overview – EnergyCAP Professional**
Part of Energy Education’s contract includes teaching the energy manager to track utility data in the EnergyCAP Professional software, which is solely distributed by EEI. EnergyCAP Professional is software for domestic public school districts that need straightforward utility bill tracking, energy management reports and calculation of the cost avoidance attributable to energy management activities. This software is not available unless a school district is or has been in a contract with EEI, but equivalent software is available from other vendors. Attachment 1 compares EnergyCAP to FASERv5 software.

c. **Baseline Calculation, Weather Data, and Cost Avoidance**
The money that is paid to EEI is promoted as being from the “cost avoidance” calculated and not actual cost savings. Note that utility bills could increase while still achieving cost avoidance. Cost avoidance is the dollars that you avoided spending due to the implementation of energy management activities. In other words, had you not performed energy management activities, your out-of-pocket utilities expense would have been this much more. Attachment 2 explains the fundamentals of cost avoidance and attachment 3 describes how weather impacts consumption.
## III. Building Services Recommendation

The following table uses numbers provided by EEI’s Savings Matrix from 2/19/2008 to show the cost avoidance differences between independently hiring an energy manager and contracting with EEI. The energy accounting software estimate is for Metrix 4, which has the same capabilities as EnergyCAP Professional, which is solely offered by EEI. The proposal for Metrix 4 is included as an attachment. Please note that ACPS currently has an energy tracking software (FASER), but it does not allow for a cost avoidance calculation.

**Figure 2: Cost Avoidance Estimate without EEI Contract**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Year 8</th>
<th>Year 9</th>
<th>Year 10</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACPS Savings (15% less than EEI)</td>
<td>$486,200</td>
<td>$534,650</td>
<td>$588,200</td>
<td>$646,850</td>
<td>$711,450</td>
<td>$782,850</td>
<td>$861,050</td>
<td>$946,900</td>
<td>$1,042,100</td>
<td>$1,145,800</td>
<td>$7,746,050</td>
</tr>
<tr>
<td>EEI Proprietary Program Implementation²</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Energy Educator/Mgr</td>
<td>73,000</td>
<td>74,825</td>
<td>76,696</td>
<td>78,613</td>
<td>80,578</td>
<td>82,592</td>
<td>84,657</td>
<td>86,773</td>
<td>88,942</td>
<td>91,166</td>
<td>817,842</td>
</tr>
<tr>
<td>Estimated Seminar Travel²</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Energy Accounting Software (Metrix 4)³</td>
<td>17,995</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>28,795</td>
</tr>
<tr>
<td>District's Total Investment⁴</td>
<td>90,995</td>
<td>76,025</td>
<td>77,896</td>
<td>79,813</td>
<td>81,778</td>
<td>83,792</td>
<td>85,857</td>
<td>87,973</td>
<td>90,142</td>
<td>92,366</td>
<td>846,637</td>
</tr>
<tr>
<td>Net Savings⁸</td>
<td>$395,205</td>
<td>$458,625</td>
<td>$510,304</td>
<td>$567,037</td>
<td>$629,672</td>
<td>$699,058</td>
<td>$775,193</td>
<td>$858,927</td>
<td>$951,958</td>
<td>$1,053,434</td>
<td>$6,899,413</td>
</tr>
<tr>
<td>District’s Return on Investment⁶</td>
<td>434%</td>
<td>603%</td>
<td>655%</td>
<td>710%</td>
<td>770%</td>
<td>834%</td>
<td>903%</td>
<td>976%</td>
<td>1056%</td>
<td>1140%</td>
<td>815%</td>
</tr>
<tr>
<td>Fees avoided by not contracting with EEI⁷</td>
<td>$1,009,200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assumed Percentage Reduction in Cost Avoidance</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assumed Reduction in 10-Yr Cost Avoidance⁸</td>
<td>$363,745</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACPS Savings by not contracting with EEI⁹</td>
<td>$645,455</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. This row shows the cost avoidance estimated by Energy Education, Inc. (EEI) while incorporating a 15% reduction in assumed cost avoidance through not contracting with EEI.
2. These rows show that the costs of contracting with EEI and attending their seminars are avoided through hiring an energy manager and providing training internally.
3. The EnergyCAP software is only provided through EEI. This row shows the pricing for an equivalent software that can be procured without contracting with EEI.
4. District's total investment includes the energy manager salary and software.
5. The net savings is the ACPS Savings (row 1) minus the District's Total Investment (row 6).
6. The District's Return on Investment is the Net Savings divided by the ACPS Savings.
7. These fees are the EEI fees over the course of 4 years and the seminar fees.
8. This row lists the amount of cost avoidance potentially lost by not contracting with EEI.
9. This row lists the cost avoidance that ACPS Building Services can potentially achieve by hiring an energy manager independent of EEI.
After reviewing EEI’s proposal and collecting data from EEI’s references, ACPS Building Services Department recommends the following course of action:

a. *Energy Manager*

   It is recommended that ACPS hire a full-time energy manager, without contracting with EEI, to perform the following duties:

   1. Track energy consumption and cost avoided
   2. Night audits at the frequency of about 2-3 schools each evening
   3. Energy conservation education at each school
   4. Monthly reports to principals and annual reports to School Board
   5. Manage upcoming energy conservation projects, including lighting upgrades from T12 to T8 lights and motion sensors in hallways and classrooms

b. *Evaluate Upgrading Current Energy Tracking Software*

   FASER, the current program used by ACPS, is no longer available for purchase. Good Steward Software, LLC, obtained all rights to FASER in late 2002 following Enron’s bankruptcy. Good Steward Software offers technical support to those FASER users who subscribe to a FASER Maintenance Agreement. FASER technical support is being gradually phased out and will be unavailable after January 2008. Building Services would like the future energy manager to evaluate upgrading the FASER software.

c. *Energy Policy Presented to School Board*

   Building Services recommends creating an Energy Policy that is aligned with local government’s recent policy. Attachments 4 and 5 are policies other school divisions have created. Attachment 6 is the recently adopted energy management policy for Albemarle County.
<table>
<thead>
<tr>
<th>Feature</th>
<th>EnergyCAP Enterprise</th>
<th>FASER v5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bill Tracking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Track any type of utility bill (any commodity, energy or non-energy)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Track any level of bill details (taxes, various charges, KW demand)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bill entry screen layout looks like actual bill</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bill entry screen shows past history with tables and graphs</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>&quot;Fat finger&quot; tests to catch obvious keying errors (select bill entry “audits” from a list of 40+ available tests)</td>
<td>Yes – User-defined</td>
<td>Yes – Fixed</td>
</tr>
<tr>
<td>Provisions for complex unbundled/deregulated accounts with multiple vendors</td>
<td>Yes</td>
<td>Partial</td>
</tr>
<tr>
<td><strong>Rate schedules</strong> can recreate and verify accuracy of bills, wizard to easily create simple to complex rate schedules</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Bill audits</strong> to spot potential problems</td>
<td>Yes – User-defined</td>
<td>Yes</td>
</tr>
<tr>
<td>User-defined work flow process for optional supervisor approval of bills</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Bill ‘Batch Entry’ with batch control totals</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Flexible interface with A/P systems; use EnergyCAP as a “smart” front-end to the bill payment process</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Scanned image of each bill can be retrieved and viewed</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Tracks Interval Data (15-minute ‘raw’ data from large electric meters)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Budgets – Create and manage multiple budgets, print reports</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Submeter Readings – establish reading routes, enter readings manually or via upload of data from RouteStar or text file</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Simple or complex formulas to split usage and costs in shared facilities using Virtual Meters: example: Split electric bill to two agencies 60%-40%</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Assign costs to submeters and virtual meters via rate schedules</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tenant and customer/reimbursable account billing using rate schedules</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>EDI 810 bill entry – Electronic Data Interchange formats accepted as well as CSV flat file for bill import</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Accrual functions for month and year-end accounting needs</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Organizational Structure**

<table>
<thead>
<tr>
<th>Total flexibility for regions, departments, divisions, units, sites, etc. No limits on levels or complexity</th>
<th>Yes</th>
<th>No – Fixed Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unlimited number of buildings, meters, accounts, vendors</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>&quot;Treeview&quot; interface to easily navigate within organization</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>User-defined fields for building, meter, account, vendor data</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Unlimited number of user-defined “groups” of meters or buildings for reporting</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Data importer allows new user to easily lay out entire structure (accounts, meters, buildings, etc) in Excel and import to EnergyCAP.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Security & Access**

<p>| Login requires user name and password | Yes                  | No                   |
| Variable levels of user access (view only, view &amp; edit, etc) | Yes                  | No                   |
| User access can be limited to specific buildings, depts., etc | Yes                  | No                   |</p>
<table>
<thead>
<tr>
<th>Reports</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerViews – Exclusive EnergyCAP feature! Instant charts, continuously updated, of cost, use, unit cost and current year vs. last year</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Over 150 available reports</td>
<td>Yes</td>
<td>No – Limited number</td>
</tr>
<tr>
<td>Reports use Crystal Reports engine</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Crystal Reports can be used to design new reports</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Report settings can be saved as Favorites</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Many reports can be packaged into batches; one click runs many reports</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Flexible options for filtering report data</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Reports can be exported to many file formats</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Reports can be directly emailed (no prior export required)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Special export formats designed specifically for Excel</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deployment</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Standalone version for a single PC</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>LAN client-server version using Microsoft SQL Server</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Web-based with browser client</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Web-based with ‘rich’ Windows client (port 80, no ODBC)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialty Features</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanned image of each bill can be retrieved and viewed</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Tenant and reimbursable account billing using rate schedules</td>
<td>Yes</td>
<td>Partial</td>
</tr>
<tr>
<td>Weather normalization using tried and true statistical techniques first pioneered by the EnergyCAP development team in 1983.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cost Avoidance – Measurement &amp; verification of savings in accordance with U.S. Dept of Energy and industry standards.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Loadshape manager creates normalized load profiles – benefits electric procurement process, helps ensure the best possible quotes/bids</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rate/Tariff analysis compares your rates with alternatives</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Production tracking – occupancy, production, etc</td>
<td>Yes</td>
<td>Partial</td>
</tr>
<tr>
<td>Electric interval data features: import via CSV or MV-90 format, charting, analysis, application of rate schedule to range of dates</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Issue Tracker – track and manage meter and bill related issues</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Custom Spreadsheets – design a spreadsheet of bills or bill line item details</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Use the following guide to select which version of EnergyCAP Enterprise is Best for you:

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>EnergyCAP Enterprise versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility bill tracking. Comprehensive tracking of utility bills. Any commodities, any level and type of bill details. Includes: work flow manager; link to scanned bill images; memo and message system; user-friendly treeview interface; ability to track standard and deregulated bills (separate LDC/supplier charges).</td>
<td>Client-Server</td>
</tr>
<tr>
<td></td>
<td>Included</td>
</tr>
<tr>
<td>Feature</td>
<td>Included</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Rate/Tariff Analysis.</strong> Rate wizard creates and maintains any number of simple or complex rates; use rate engine to (1) verify bill cost, (2) run alternative analysis – “what would I have paid if this account had been on rate TOU1 instead of rate GS1?”</td>
<td></td>
</tr>
<tr>
<td><strong>Bill Audits.</strong> A library of 50 audits that check bills for various problems (such as excessively high or low usage, cost, unit cost, demand; duplicates; abnormal dates; missing bills); user-defined sensitivity settings and user-defined audit groups.</td>
<td></td>
</tr>
<tr>
<td><strong>Issue Tracker.</strong> Easily track savings opportunities and problems; assign to any user, track status, email to building managers.</td>
<td></td>
</tr>
<tr>
<td><strong>Budgets.</strong> Use historical cost and consumption unit data to create any number of budgets on a detailed meter-by-meter and month-by-month basis. Chart and report budget vs. actual, indicating surplus/deficit.</td>
<td></td>
</tr>
<tr>
<td><strong>Contract Tracker.</strong> Track and administer energy supply contracts.</td>
<td></td>
</tr>
<tr>
<td><strong>PowerViews.</strong> An EnergyCAP exclusive, PowerViews are usage, cost, demand and unit cost trend charts and graphs that are automatically displayed and constantly updated.</td>
<td></td>
</tr>
<tr>
<td><strong>Benchmarking Charts.</strong> Create any number of ‘peer groups’ and instantly rank the buildings by cost/sq ft, usage/sq ft and peak watts/sq ft. Rank meters by usage &amp; cost per day and unit cost. Indicates the group average and instantly highlights ‘outliers’ – abnormal meters, buildings and bills.</td>
<td></td>
</tr>
<tr>
<td><strong>Greenhouse Gas Tracking and Reporting.</strong> Calculate GHG emissions resulting from the energy use tracked in EnergyCAP via accounts, meters, bills and counters and the resultant estimated emissions from indirect use. Report GHG emissions via standard reports, trend charts and PowerViews. (see note 3)</td>
<td></td>
</tr>
<tr>
<td><strong>ENERGY STAR Benchmarking Interface.</strong> EPA’s popular ENERGY STAR Portfolio Manager ranks each building against a peer group and provides an energy efficiency rating. Using EnergyCAP 5.0 you can configure your buildings for the ENERGY STAR interface by entering required building attributes (such as number of occupants, hours of occupancy, etc.) The next EnergyCAP update (summer 2008) will submit your data automatically and return the rating results. (see note 6)</td>
<td></td>
</tr>
<tr>
<td><strong>Weather data tracking; degree day charts and reports.</strong> Track average daily temperature for any number of weather stations. Degree days are automatically calculated and charted for quick year-to-year comparisons. Enter data manually or download weather data from AccuWeather.com on the fifth of the month. (Advanced statistical analysis of use vs. weather is in the Cost Avoidance module.) See a sample of EnergyCAP technology at <a href="http://www.energycap.com/weather">http://www.energycap.com/weather</a>. (see note 4)</td>
<td></td>
</tr>
<tr>
<td><strong>Any number of user logins; configurable access levels.</strong> Each user has a login name, strong password, list of accessible menus and features. Users can be limited to individual buildings, departments or organizational levels.</td>
<td></td>
</tr>
<tr>
<td><strong>Interval and production data tracking.</strong> Track electric meter interval data (usually 15, 30 or 60-minute intervals); many options for charting, auditing, aggregating and analyzing. Track other electric meter channels (KVAR, power factor, current, voltage, etc) and track any time-series data, such as production, occupancy, weather, energy efficiency index, etc. (see note 5)</td>
<td></td>
</tr>
<tr>
<td><strong>Split bills by percentages.</strong> Automatically split bills for shared facilities. Example: Public Safety Building is charged 60% to Police Dept and 40% to Fire Dept. Split each actual bill into two ‘virtual bills’ for reports and general ledger chargebacks.</td>
<td></td>
</tr>
<tr>
<td><strong>Export bills to Accounts Payable or General Ledger.</strong> After entry and auditing, export bill records to an intermediate file. The intermediate file is then imported into an A/P or G/L system for payment. EnergyCAP is used as a ‘smart front end’ on the A/P system, one that performs detailed</td>
<td></td>
</tr>
<tr>
<td><strong>Import bills from vendors using a flat file format.</strong> Flat file formats (Excel-like spreadsheets) are more readily available than EDI 810 format. EnergyCAP’s flat file importer is very flexible. Recommended when you can receive 50 or more bills at a time in electronic format.</td>
<td>Option</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Import bills from vendors using EDI 810 electronic data interchange format.</strong> Some major vendors use industry-standard EDI 810 format. EnergyCAP can import version 3030 and 4010 files. A unique ‘map’ is developed for each trading partner.</td>
<td>Option</td>
</tr>
<tr>
<td><strong>Accruals.</strong> Create estimated bills (accruals) based on actual historical bills when it’s necessary to ‘fill up’ an accounting period with data. Accrued bills can be exported to G/L and then reversed after close-out or when the actual bill is received. (An Accrual Report (included in all versions) based on daily costs can be used in place of the full Accrual module when all you need is a simple year-end estimate of not-yet-received bills.)</td>
<td>Option</td>
</tr>
<tr>
<td><strong>Multiple simultaneous users.</strong> Allows more than one user to access EnergyCAP at the same time.</td>
<td>Included</td>
</tr>
<tr>
<td><strong>Enter or import submeter readings, create bills/chargebacks for customers.</strong> Most often used on university campuses and military installations to create chargeback ‘invoices’ for reimbursable and self-supporting activities. Submeter readings can be keyed or imported from meter reading systems. (note 5)</td>
<td>Option</td>
</tr>
<tr>
<td><strong>Cost Avoidance.</strong> Calculates the cost avoidance (the dollar savings) attributable to energy management projects by comparing today’s bills with a pre-retrofit ‘baseline’ year. Comparisons are automatically adjusted for billing period length, weather, energy unit prices and other variables in accordance with the U.S. Department of Energy’s ‘whole building method’ of energy savings measurement &amp; verification. (see <a href="http://www.EVOWorld.org">www.EVOWorld.org</a>) We pioneered cost avoidance methodology in 1985; it’s been used on tens of thousands of buildings over the last twenty years.</td>
<td>Option</td>
</tr>
<tr>
<td><strong>Tracks Over 500 meters.</strong> Suitable for larger organizations (Fortune 1000 corporations, large cities and government agencies, major universities); ability to track over 500 utility meters, up to 100,000 meters per dataset.</td>
<td>Included</td>
</tr>
<tr>
<td><strong>Web access.</strong> EnergyCAP database can be accessed via Internet using a browser (for view-only access) or using an installed version of EnergyCAP (for data entry, editing and analysis).</td>
<td>Option</td>
</tr>
<tr>
<td><strong>Advanced scripts.</strong> VB scripts used for advanced functions, including channel data comparisons, single/multiple regressions and peak search. For advanced users only.</td>
<td>Option</td>
</tr>
</tbody>
</table>

**Notes:**

1. Client-Server version requires you to provide a Microsoft SQL Server (2000 or later) license and associated operating systems and server hardware.
2. Desktop versions include MSDE (a ‘lite’ version of Microsoft SQL Server), so the package is ready to ‘plug and play.’ You may connect Desktop versions to your own copy of Microsoft SQL Server that is running on a network server.
3. Use of web-based conversion factor database indexed by time and location will be available for an additional fee. Allows client to download and apply conversion factors automatically.
4. Automatic import of weather data from AccuWeather.com will be available for an additional fee. Allows client to download weather data automatically on the fifth of the month.
5. EnergyCAP is not a metering or data acquisition system and is not connected to metering equipment. Meter data must be acquired/logged by another system and then imported into EnergyCAP. This process can be automated.
6. Automatic submittal of building attribute data and return of energy efficiency rating will be available for an additional fee.
Cost Avoidance Fundamentals

Cost Avoidance is the dollars that you avoided spending due to the implementation of energy management activities. In other words, had you not performed energy management activities, you out-of-pocket utilities expense would have been this much more.

Avoided Spending

Cost avoidance is avoided spending, not dollar savings. Avoided cost is a much more direct and accurate term than dollar savings, and that's why we use it. Consider the following example:

<table>
<thead>
<tr>
<th>Month</th>
<th>Gallons of Oil Used</th>
<th>Cost per Gallon</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 2000</td>
<td>1,000</td>
<td>$0.80</td>
<td>$800</td>
</tr>
<tr>
<td>Feb 2003</td>
<td>900</td>
<td>$1.20</td>
<td>$1,080</td>
</tr>
<tr>
<td>Difference</td>
<td>Down 100</td>
<td>Up $ 0.40</td>
<td>Up $280</td>
</tr>
</tbody>
</table>

If you asked your accountant or controller how you did, she would say that you didn't save anything. In fact, your savings were negative — you "lost" $280, because an extra $280 had to come out of the checkbook in February 2003. Dollar savings implies that a simple comparison between the dollars spent then and now is made. This is not how we calculate cost avoidance.

Today is the reference point

This brings us to the second important concept, and that is that cost avoidance uses today as the reference point, because all energy management initiatives result in some positive (hopefully) benefit today.

Considering the above example, we can see that our energy management initiative was successful — it reduced our oil consumption from 1,000 to 900 gallons.

Using today as the reference point, we ask, "What would I have used if I had not implemented energy management?" The answer is 1,000 gallons — your consumption would have stayed the same. The next question is, "What would I have spent?" Since the cost of gas today is $1.20/gallon, you would have spent:

1,000 gallons x $1.20/gallon = $1,200

Finally, we can calculate our avoided cost due to energy management.

Estimated cost today without energy management (1,000 gal @ $1.20/gal) = $1,200
Actual cost today thanks to energy management (900 gal @ $1.20/gal) = $1,080
Cost avoidance due to energy management = $120

So, we have our answer. Our cost avoidance is $120. The controller might argue the point because her budget shows a $280 loss, not a $120 gain. But, without energy management, we would have spent $120 more.

Calculating Cost Avoidance

The proceeding example introduced the method used to calculate cost avoidance. The process can be described as follows:
1. Record the consumption in the pre-retrofit period.
2. Record the consumption and cost in the post-retrofit period; i.e., today.
3. Calculate what the pre-retrofit consumption would have cost in today's dollars at today's rate.

Cost avoidance uses two reference points. The first one is today — what you used and what you spent today.
The second is the pre-retrofit period — what you used before you initiated an energy management project. The pre-retrofit period is the "yardstick" used to measure how far you've come. In Energy CAP it's called the BASELINE.

Let's do another example using the process outlined above.
1. Baseline consumption Baseline cost  
   20,000 KWH $1,152.39
2. Today's consumption Today's cost  
   15,000 KWH $1,500.00($ .10/KWH)
3. Baseline consumption at today's rate:  
   20,000 KWH @ $.10/KWH = $2,000.00
4. Cost Avoidance Cost Avoidance  
   step 3 – step 2: $2,000 – $1,500 = $500

Notice that the Baseline Cost of $1,152.39 is irrelevant and doesn't enter into the calculation. Those prices aren't available to us today. Simply stated, we don't care what we spent in the baseline year.

**Only Get Credits for YOUR Efforts**

One of the most important concepts in energy accounting and cost avoidance is that you only get credit for your efforts. Some examples of ways you can improve cost avoidance are:
- Installing retrofit projects, such as relamping and HVAC control systems
- Cutting hours of usage
- Setting back thermostats
- Energy awareness campaigns
- Changing rate schedules, such as from a standard rate to time-of-use

There are many factors that will affect your bills by causing consumption to go up or down. If you have no control over them, you deserve neither the credit nor the blame. These are "independent variables" because they are independent of your control. Examples are:
- Colder winter weather
- Hotter summer weather
- Longer hours of occupancy
- Fewer days in the billing period
- Utility company raised the rates
- New construction has increased the floor area

**Adjusting the Baseline**

The calculations presented previously simply compared the "raw" baseline with the current bill. This is only fair if there have not been any changes in the weather, billing period, or other non-energy management areas.

If there have been these types of changes (and there usually are), we must make adjustments for them — we must adjust the baseline. This introduces a new step into the cost avoidance calculation process.

1. Record the consumption in the pre-retrofit period.
2. Record the consumption and cost in the post-retrofit period; i.e., today.
3. Adjust the baseline (step 1) for weather, billing period, and other uncontrollable factors so that it is comparable to today's conditions. This is called the "without CAP" consumption and cost because it shows what you would have used/spent in the absence of a cost avoidance program. Remember, we always adjust the baseline "up" to today's conditions.

**Independent Variables That Affect Cost Avoidance**

Any factor that we cannot control is independent, such as the weather, the number of days in the billing...
period, the cost of one KWH of electricity, etc. We can't take credit if these factors help us, nor take the blame if they hurt us.

In order to compare "apples-to-apples" we must make adjustments for these independent variables. The basic approach is to adjust the baseline up to today's conditions. We never adjust today's current bills — we only adjust the baseline. This is such an important concept we'll say it again — we always adjust the baseline up to today's conditions, and never adjust the current bills.

Example 1:

<table>
<thead>
<tr>
<th>Month</th>
<th>Elec Use</th>
<th>Days in the Bill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 2000</td>
<td>12,550 KWH</td>
<td>29</td>
</tr>
<tr>
<td>Feb 2003</td>
<td>14,600 KWH</td>
<td>33</td>
</tr>
</tbody>
</table>

We can't compare the bills directly because one of the independent variables, billing period length, isn't "apples-to-apples." We will adjust the Feb 2000 bill up to the Feb 2003 bill by calculating what we would have used in Feb 2000 if the bill had been 33 days long.

Example 2:

<table>
<thead>
<tr>
<th>Month</th>
<th>Gas Use</th>
<th>Ave Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 2000</td>
<td>5,600 CCF</td>
<td>29.5</td>
</tr>
<tr>
<td>Feb 2003</td>
<td>14,600 CCF</td>
<td>31.7</td>
</tr>
</tbody>
</table>

Again, the weather isn't "apples-to-apples" so we need to adjust Feb 2000 to show what we would have used in Feb 2003 if the weather had been milder (an average of 31.7°F).

**Cost Avoidance is an Estimate!**

The most important concept is that cost avoidance is an estimate — an approximation. We have no way to precisely or exactly calculate cost avoidance — there are too many variables that cannot be tracked and accounted for. EnergyCAP's cost avoidance values are reasonable estimates derived from a widely-accepted methodology which is consistently applied month-after-month, and which is easy to understand and simple and inexpensive to use.

**Using Average Unit Price (Average Unit Cost)**

EnergyCAP uses the current average unit price to calculate the dollar value of avoided energy usage. For example, if you have avoided consuming 10,000 KWH and the average unit price of electricity on today's bill is $0.10/kwh, the cost avoidance will be calculated as 10,000 x .10 = $1,000.

The International standard (see below) specifies that pricing methodologies take into account all elements of cost (energy, peak demand, etc) and account for incremental/marginal rates.

EnergyCAP's average unit price method complies with the standard and is fair, reasonable and appropriate in most situations wherein reducing the consumption of one unit of energy avoids one unit of cost. However, there may be some unique cases in which a more rigorous pricing approach is indicated. For example, this method works well for electric accounts when the reduction of energy and demand are proportional. However, if you have an electric rate with very high demand charges and you reduce demand significantly but not energy usage, or conversely you reduce energy usage but have no effect on peak demand, this method will under or overstate cost avoidance. You are cautioned to be aware of these situations and adjust cost avoidance appropriately (and be sure to document your actions).

Report Check 13 is a tool designed to quickly illustrate for electric meters if KWH reduction is proportional to KW reduction. This report calculates the UNADJUSTED* reduction % for both KWH and KW vs. the baseline period and shows the DIFFERENCE in reduction. When the KWH and KW reductions are about the same
percentage, the Check 13 graph will show a horizontal line at about the zero point. This is a good indicator that reductions are proportional and therefore average unit price is a fair estimation.

If KWH reduction is consistently greater than KW, then average unit price may still be a fair estimation if the cost per KW is relatively low, i.e., if the demand component of the bill is minor. If, however, demand costs are high, then this condition can indicate that the average unit price method will overestimate cost avoidance. It’s best to use the incremental unit price method discussed below and substitute a fair unit price determined by a separate analysis. For example, if the average unit price is $0.10/kwh but the demand reduction is not proportional, you may determine that using a unit price of $0.085/kwh is more reasonable.

If KWH reduction is consistently lower than KW, then average unit price may underestimate cost avoidance, particularly when demand costs are high. The worst case is no KWH reduction but high KW reduction. In this case, the default settings will cause cost avoidance to be calculated as zero when in fact there has been considerable cost avoidance. An external analysis is required and manual adjustments are required.

*Unadjusted reduction vs. the baseline is used for both KWH and KW because no mechanisms exist to adjust KW; therefore KW cannot be adjusted. To keep it comparable to KWH, no adjustments are used for either.

![Unadjusted KWH/KW Reduction Comparison](image)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2004</td>
<td>1,500.0</td>
<td>4.8</td>
<td>776.5</td>
<td>5.6</td>
<td>48.2%</td>
<td>-16.7%</td>
<td>64.90%</td>
</tr>
<tr>
<td>Feb 2004</td>
<td>1,636.4</td>
<td>5.4</td>
<td>1,079.0</td>
<td>5.3</td>
<td>20.5%</td>
<td>0.7%</td>
<td>19.82%</td>
</tr>
<tr>
<td>Mar 2004</td>
<td>1,387.5</td>
<td>6.1</td>
<td>1,070.0</td>
<td>6.5</td>
<td>22.9%</td>
<td>-6.7%</td>
<td>29.55%</td>
</tr>
<tr>
<td>Apr 2004</td>
<td>1,459.0</td>
<td>9.1</td>
<td>899.0</td>
<td>6.9</td>
<td>40.8%</td>
<td>23.9%</td>
<td>16.98%</td>
</tr>
<tr>
<td>May 2004</td>
<td>2,142.9</td>
<td>9.6</td>
<td>1,790.0</td>
<td>8.8</td>
<td>16.5%</td>
<td>8.7%</td>
<td>7.73%</td>
</tr>
</tbody>
</table>

In the example above, look at the March bill. Unadjusted KWH was reduced from 1,387.5/day in the base year to 1,070.0/day in the current year, a reduction of 22.9%. Unadjusted demand increased from 6.1/day to 6.5/day, an increase of 6.7% (a negative reduction). The overall difference in reduction percentage is 29.55% (see the arrow on the graph). In fact, all months show that KWH was reduced more than KW. That indicates that for this particular meter, use of a "blended" average unit cost may be inappropriate. It also indicates that energy management efforts have been successful in reducing total energy usage but not peak demand. If peak demand charges are high for this account, the overall impact on bottom-line cost might be mediocre, even though usage has been reduced by 20% or more.

mk:@MSITStore:C:\DOCUME~1\check\LOCALS~1\Temp\Temporary%20Directory%2... 3/12/2008
Incremental Unit Price

EnergyCAP allows you to use an incremental unit price as an alternative to average unit price. You can use the CAP Adjust tab from Meter Properties to create a CAP Adjustment for one month or multiple months. Use the 'Incremental Unit Price' option and then enter a unit price. Energy CAP will calculate cost avoidance as follows: (1) the net usage difference is calculated (i.e. adjusted baseline use (also called Without CAP use) minus current actual use), (2) this is multiplied times the incremental unit price to give cost avoidance.

IMPORTANT -- This method should ONLY be used when it is appropriate to calculate cost avoidance as use avoidance times incremental unit price. This is NOT appropriate when: (1) there has been a reduction in peak demand -- this method is usage only and does not address demand reductions, (2) the reduced usage crosses rate schedule pricing tiers (if so, be sure to 'blend' the unit prices appropriately), (3) the usage has been totally eliminated (if so, be sure to take minimum or customer charges into account as well).

Measurement and Verification (M&V) Methods

"Measurement and verification (M&V)" is the terminology commonly used to describe the practice of measuring energy savings and verifying cost avoidance. EnergyCAP's Cost Avoidance module is an M&V tool — it is one method available to measure and report energy and cost savings.

The U.S. Department of Energy recently headed an effort to develop a written standard to define and describe various M&V options. Energy CAP is considered an "Option C -- Whole Building" method of M&V under this standard.


EnergyCAP is in full compliance with this government standard.
Understand Weather Data

EnergyCAP uses the mean daily temperature in the weather adjustment process. Although other weather variables -- notably wind velocity, amount of sunshine and humidity -- have an impact on building energy consumption, mean daily temperature is a relatively simple and reliable indicator of relative (year-to-year) weather severity. Additional weather variables are not used because:

- It is often difficult/expensive to obtain daily wind velocity, sunshine and humidity data for baseline and current years.
- The addition of more independent weather variables means that the statistical weather adjustment process needs more data points. This requires either daily energy consumption data for a one-year baseline or monthly consumption data for a three-year baseline. Both alternatives present problems in obtaining and entering the data.
- Additional weather variables don't improve the accuracy of the cost avoidance calculation process enough to justify their use.

Mean daily temperature is the "middle value" between the day's high (max) and low (min) temperatures. (We don't use the term "average" because the average is usually calculated as the sum of the 24 hourly observations divided by 24.)

EnergyCAP uses its own terminology to describe the relationship between the outside temperature and a building's need for heating and cooling.

Heating Needed Below (Degrees) is the outside temperature at which the building's internal heat gains (from lights, equipment, occupants) just balances with the heat loss so that no heat is needed. When the outside temperature drops just one more degree, the heating system must switch on in order to maintain the set indoor temperature level. (In FASER, this point is called the Winter Balance Point Temperature. It was changed in EnergyCAP to Heating Needed Below because that's more descriptive.)

Cooling Needed Above (Degrees) is the same concept but during the cooling season.

Heating Need (Degrees) in indicates how many degrees the outside temperature is below the Heating Needed Below point. For example, for a building that has a Heating Needed Below temperature of 55 degrees, an outside temperature of 20 degrees means that the heating system has to "make up" for the 35 degree difference. This is a Heating Need of 35 degrees. (The common terminology used by FASER and the National Weather Service is Heating Degree Days. However, for a number of reasons that we won't go into here, the Degree Day concept has proven to be very confusing, so it is not used in EnergyCAP.)

The Heating Need for any given day is calculated as: Heating Needed Below Temperature minus Mean Daily Temperature. In the example above, Heating Need = 55 - 20 = 35 degrees of heating needed.

The daily Heating Need degrees can be added up for a month or a year and compared with other months or years to provide a good indicator of relative weather severity.

It's important to note that the Heating Need is specific to a building, because different buildings
have different Heating Needed Below temperatures based upon the amount of roof and wall insulation, number of windows, type and intensity of interior lighting, number of occupants, etc. The Cooling Need (Degrees) is the same concept but during the cooling season.
RE: POLICY 9.9 ENERGY CONSERVATION

Associate Director of Operations and Construction Marty Misicko reported that seven years ago, the school board hired an energy manager to conserve energy and reduce utility costs. Dr. Misicko stated that at that time, an energy policy was developed but was never formally adopted. He advised that due to the projected increases in both fuel and utilities, staff recommended that the school board adopt an energy conservation policy that would authorize the superintendent to develop guidelines intended to reduce utility consumption in all county school facilities. School board consideration of the following policy will be given at its October 12, 2005 meeting. Superintendent Weber will form a committee of administrators and principals to review the administrative guidelines below before they are finalized.

9.9 ENERGY MANAGEMENT POLICY

It is the policy of the School Board that all Roanoke County Public Schools shall make every effort to conserve energy and natural resources while in the operation of all facilities.

The superintendent is authorized and directed to develop short and long range guidelines for facilities management, energy awareness, and conservation measures.

DRAFT - 9.9 AR ENERGY CONSERVATION GUIDELINES

I. Purpose:
To establish short and long range guidelines for all staff members of Roanoke County Public Schools regarding facilities management, energy awareness, and energy conservation.

II. Procedures:
The teacher will be responsible for implementing the guidelines during the time he/she is present in the classroom.

The principal will be held responsible for the total energy usage of his/her building. The principal will be provided information reflecting the energy consumption for his/her building on a monthly basis.

All savings are calculated using August 1997-July 1998 as the base year. All calculations are based on weather adjustments, changes in square footage, additions or deletions in HVAC equipment and computer additions.

Specific areas of emphasis include lighting, heating, and cooling and water consumption.
A. Lighting:
1. The custodians will be responsible for turning hall lights on and off daily. Hall lights should be turned on 10 minutes before students are to arrive for classes. Hall lights should be turned off immediately after students are dismissed for the day.

2. Teachers and coaches shall turn off lights unless the classroom is in use. If there is ample ambient light from windows turn the classroom lights off. All lights are to be turned off when the room is to be unoccupied for 10 minutes or longer.

3. Outside lights should be off during the daylight hours and weekends. Outside lights will be routinely lit from dusk until custodians leave for the evening. Outside lights will be turned on when the cafeteria and custodial staffs arrive for work and will be turned off at dawn.

4. When in the building during non-school hours, custodians should turn lights on only in the specific area in which they are working.

5. All personnel restroom lights should be turned off when unoccupied.

6. Support staff shall turn off lights in all areas that are unoccupied. They are also responsible for turning on lights at the beginning of the day and off when they leave for the end of the day.

B. Heating Equipment

1. The heating temperature range is from 68 to 71 degrees throughout the school system.

2. Individual classroom and office doors will be closed when the heating equipment is in operation.

3. In those buildings with central controls, the start time for the heating equipment will be set to start as late as possible while still allowing time to heat the building to the guideline temperatures. In those buildings with classroom controls the heat will be turned on by the custodian daily and set back to 55 degrees by the teacher when he/she leaves at the end of each day. On nights which are extremely cold the setback should be set to 60 degrees.

4. The principal will be responsible to ensure that the custodial staff performs an end of the day shutdown checklist. (These checklists are given out at the beginning of each school year by the energy manager.)

5. The principal and energy manager will work together to maintain a comfortable temperature in each school.

6. Electric space heaters are prohibited due to fire regulations. Any space heater found in the buildings will be confiscated by the energy manager and stored until the owner picks it up.

C. Air Conditioning

1. During the summer break, air conditioning will be used only in schools having summer school and in office areas. The principal, head custodian and energy manager will maintain a building
temperature in occupied areas to range from 74 to 78 degrees.
2. The cooling temperature is from 74 to 78 degrees throughout the
school system.
3. All classroom and office doors will be closed when air conditioning
systems are in operation.
4. In those buildings with central controls, the start time for air
conditioning will be set 30 minutes before students are to start
class. In buildings with classroom controls the air conditioning will
be turned on by the custodian daily and turned off 30 minutes after
students are dismissed.
5. The principal will be responsible to insure that the custodial staff
performs an end of the day checklist.

D. Miscellaneous
1. All employees are to turn off printers, monitors, speakers,
computers, laminating equipment, copy machines and other office
machines at the end of each day. Only network servers should be
left on.
2. Custodians should turn off all exhaust fans in restrooms nightly.
3. The Head Custodian at each school will be responsible for a
complete and total shutdown of the school when closed each
evening. He/she will be responsible for reporting water leaks to
maintenance.
4. A fee will be charged for any energy consuming personal items. The
fees will be collected by the school bookkeeper who will send them
to the Energy Manager to be deposited in the electricity account of
Roanoke County Public Schools. The Energy Manager will keep a
list of staff who have paid the fees. Any items that have not been
paid for will be confiscated in the office of the Energy Manager until
picked up by the owner. Yearly fees are as follows:
a. Refrigerators - $15.00
b. Microwave Ovens - $5.00
c. Coffee Makers - $20.00
d. Toaster Ovens - $20.00
e. Radiant Foot Warmers - $5.00
f. Lamps - $7.00
g. SPACE HEATERS ARE NOT PERMITTED!

The school principal or supervisor will be responsible for seeing that
all fees for personal energy consuming items are collected and sent
to the Energy Manager for deposit.

III. Accountability:
The school principal will be held accountable for building conformity to energy policy
guidelines.
The Energy Manager will submit a monthly report to the school principal or building supervisor. A report will be submitted to the superintendent if a school or building receives a failing report for 2 consecutive months.

The school or building will be assessed the cost of utilities in the amount equal to the excess calculated by subtracting from the actual costs of the utility and equal to the estimated cost based upon the degree days of the months for which the school or building failed.
POLICY 4-2.7 ENERGY MANAGEMENT CONSERVATION POLICY

The Montgomery County School Board is committed to conserve energy and natural resources while exercising sound fiscal policy. To fulfill this commitment, the School Board directs the division superintendent and his/her agents to develop short- and long-term strategies in the area of facilities management that deal with energy awareness and energy consumption.

The Director of Facilities and Planning and the Energy Manager will identify an Energy Management Team that will include representatives from the departments of Facilities and Planning, Management Services, and Technology along with representatives from the principal, administrative assistant, and faculty groups. This team will be responsible for developing day-to-day procedures for energy management in the Montgomery County Public School division.

Implementation of this policy is the joint responsibility of School Board members, administrators, teachers, support personnel, and students, and its success is based on cooperation at all levels. The strategies shall include the following:

1. The principal or building administrator is expected to be an active part of energy management at his/her facility. Judicious use of various energy systems is required to ensure that an efficient energy posture is maintained on a daily basis.

2. The head/senior custodian at each facility and/or his/her designee is responsible for a complete shutdown of the facility in accordance with specific procedures developed as stated above when the building is closed each evening.

3. Every employee and every student needs to be an active part of the energy management program. Everyone affiliated with the Montgomery County school division will be asked to be an “energy saver” as well as an “energy consumer.”

4. The energy manager is responsible for conducting energy audits and making conservation program recommendations for each facility on an ongoing basis. Accurate records of energy consumption and costs will be maintained for each facility, and information will be provided to the principal/building manager on the progress of the energy conservation program at his/her facility.

5. All unnecessary lighting in unoccupied areas should be turned off on a regular basis during the day. All lights should be turned off when students, teachers, support staff, and/or administrators leave their areas. In the evening, custodians should turn lights off in all areas except those in which they are working.

6. All computers (except for network servers that must be left on), monitors, printers, scanners, copy machines, laminating equipment, and other office machines should be turned off at the end of the day by the classroom teacher or the office staff.

7. Decisions on new construction and replacement systems shall include a life cycle cost analysis to ensure energy efficiency where possible.

8. Within sixty (60) days, comprehensive energy conservation procedures will be developed by the Energy Management Team and implemented in all Montgomery County Public School facilities. These procedures will be the foundation for full implementation of the energy conservation program.


Adopted: April 2004

http://policy.mcps.org/4-2.7.htm 3/12/2008
ENERGY MANAGEMENT AND CONSERVATION

Purpose:
This policy is intended to support the reduction of energy consumption in Albemarle County office buildings, sustain the County's commitment to environmental improvement, and ensure a successful partnership with ENERGY STAR®. Guidelines are provided in this policy concerning practices aimed at lowering energy consumption, as well as effective use and procurement of energy-consuming equipment. Through implementation of this policy, a positive environmental impact and cost savings for the County should result.

Applicability:
This policy applies to the County of Albemarle local government buildings and employees.

Authority
This policy is provided under the authority of the County of Albemarle County Executive’s Office.

Scope

A. Heating, Ventilation, and Air Conditioning

1. During occupied hours, the buildings will be cooled or heated to a pre-determined temperature range based on the 2004 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Thermal Comfort Standard (ASHRAE 55-2004):
   - Heating Season – 68°F to 75°F
   - Cooling Season – 73°F to 79°F
2. During unoccupied building hours (weekday evenings, weekends, and holidays), the temperature will be set back to the following temperatures to allow the County to efficiently and economically conserve energy:
   - Heating Season – 63°F
   - Cooling Season – 84°F
3. Cooling and heating for scheduled meetings/events outside of routine business hours will be provided based on need and/or a scheduled request. Each Department should provide General Services with a list of individuals authorized to request off-hour/holiday heating or cooling. General Services must be notified with the dates, times and location of special events at least 48 hours in advance. These requests should be kept to a minimum to assure the most efficient and economical operation of facilities.
4. Building occupants and staff are requested to keep windows and outside doors closed while the air conditioning and heating are on.
5. Personal space heaters are prohibited. These heaters use an inordinate amount of energy, can be a fire hazard, and also work against the pre-settings of the thermostat. Employees are encouraged to dress for their personal thermal comfort. Exceptions may be granted by the General Services Department for employees with a medical condition or some extenuating circumstance.
6. Timers will be installed on hot water heaters to ensure they are turned off when not in use. Heat traps and insulation may be installed on hot water heaters, as feasible, in order to conserve energy.
B. **Lighting**

1. Lights are to be turned off in unused areas, with the exception of emergency lighting. 
   - When an employee leaves his/her office, he/she should turn all lights off. 
   - Custodial staff will turn off lights in the building after cleaning is completed each afternoon/evening. 
2. Compact fluorescent bulbs (CFLs) are to be used in desk lamps, in place of halogen or incandescent bulbs. 
3. Occupancy sensors are to be installed where logistically feasible, and shall be specified in all construction and renovation projects. 
4. All renovation and construction projects that involve lighting must be approved by General Services Environmental Compliance Manager and Chief of Public Works to ensure that light levels and equipment types meet certain industry standards for energy efficiency. (e.g. T-8 bulbs and electronic ballasts should be used as they provide the most efficiency)

C. **Electronic Equipment**

1. Computers, printers, and copiers shall be turned off at the end of each work day. It is acceptable to leave fax machines on if a fax is expected overnight, but otherwise, fax machines should be turned off as well. 
2. During work hours, all capable PCs should be programmed for the highest energy saving mode appropriate for the particular PCs using the power options feature.

D. **Procurement**

1. To the extent legally permissible, products carrying the ENERGY STAR® label (e.g. appliances, electronic equipment, roofing, etc.) shall be given procurement preference. 
2. If ENERGY STAR® labeled products are not available, the purchase of energy efficient equipment should be pursued.

E. **Building Envelope**

1. Window, door, roofing and other insulation materials will be periodically inspected for efficiency (e.g. air-tightness, etc.) by the General Services Department (or certified contractor) in order to evaluate any need for replacement or updating.

F. **Periodic Internal Audits**

1. To ensure this policy is successfully implemented, internal audits will be conducted periodically by the County's Energy Management Team, or designee(s). 
2. Audits will cover all sections of this procedure, and all County government facilities. 
3. Audit results will be documented and retained by the Environmental Compliance Manager. 
4. Audit findings will be addressed by the County's Energy Management Team.

Issued:

_________________________________________  ____________________________
Robert W. Tucker, Jr.                                      February 27, 2008
County Executive                                      Date