

# Energy Conservation Measures (ECMs)

## Evaluated but Not Funded

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The primary requirement of an Energy Performance Contract (EPC) is that the recommended measures be paid for with the energy and operational savings achieved through the upgrades. In every EPC there are always ECMs which cannot be included because they generate insufficient energy savings to justify the cost. The following measures were evaluated but were not included as part of this project. However, many of these ECMs could be included in this project if Howard County chooses to extend the term of the project from 13.5 years to 15 years.

### Replacement of Rooftop Units at the Dorsey Building

Three (3) existing, self-contained, direct gas-fired Mammoth rooftop units are in poor condition and should be replaced with energy-efficient, appropriately-sized new units with variable speed drives installed. This measure was excluded because of the less-than-desirable economics of the measure, as well as due to the uncertain nature of the future of the building. However, if it is determined that the building will remain in the ownership of Howard County for next several years, then this upgrade should be considered.

### Re-Commissioning and Repair of VAV Boxes

The VAV boxes at the Detention Center (DC), Central Library (CL), Scaggsville Public Safety Complex (SPSC) and East Columbia Library (ECL) were considered in the scope of this measure. At the DC, the cell block area contains VAV boxes with pneumatic controls and pneumatic damper actuators. An inspection above the ceiling within the cell block area revealed that conditioned air was blowing into the ceiling space (see "Duct Leakage" measure discussed later in this section). This is most likely due to ductwork that has been blown open by over pressurization caused by the non-functioning inlet guide vanes on the air handlers. The VAV Boxes within the Administrative area of DC contain electric controllers and 2-way valves on the reheat coils. The facility staff also indicated that they have problems with reheat coils overheating the spaces. The VAV boxes, controllers and reheat coil valves should be checked for proper operation and fully re-commissioned. We propose a similar re-commissioning approach at the other three buildings listed above. This measure has not been included at this time and if ESG were to propose this to Howard County it would be structured as a cost-per-VAV-box scenario.

### Upgrade VAV boxes to DDC

We examined replacing the VAV boxes at the DC with similar new DDC (Direct Digital Controls) units. The measure was considered in lieu of the measure discussed above, *Re-Commissioning and Repair of VAV Boxes*. The measure was excluded due to lack of excess savings.

### **Re-commission Pneumatic Controls**

The pneumatic controls in several of the buildings are older and some of the components are in need of repair/replacement and calibration. ESG considered including an allowance for the purposes of surveying to identify the deficiencies and recommend appropriate corrective actions for the re-commissioning of pneumatic controls, actuators, valve actuators and controllers. The measure was considered at the Dorsey building but was excluded due to lack of excess savings.

### **Duct Leaks in Detention Center**

It was noted during the field survey at the DC that the space between the ceiling and the roof was very well conditioned which is indicative of significant duct leaks. ESG recommends that the County investigate this further to determine the source and extent of the leaks and then make the necessary repairs. There were not sufficient savings to provide an allowance in this project for the purposes of this study.

### **Energy Cap**

Howard County requested that ESG evaluate the purchase of the Energy Cap program to generate a database and historical reference for energy usage in the government buildings. This measure has not been included due to lack of excess savings.

### **Water**

Most EPCs include water conservation measures. ESG did evaluate the conversion of toilets, urinals and sink aerators to low-flow fixtures as well as rainwater harvesting and some laundry upgrades. However, the payback period was too long for inclusion in this project. If Howard County initiates a Phase II project for an EPC on all remaining buildings this measure would most likely be included due to the economies of scale.

### **Premium Efficiency Motors**

We considered installing newer, more efficient electric motors on pumps and air handlers. The cost to replace currently functioning motors is high and the payback is typically longer than desirable. Hence the measure is not included in this project. We recommend that Howard County replace existing motors with premium-efficiency motors as the units fail.

### **Infrared Heaters at Scaggsville PSC**

The fire engine portion of the Scaggsville Public Safety Complex (SPSC) building is heated by hot-water unit heaters. There are large amounts of heat loss each time the garage doors are opened for the emergency vehicles. High bay work shop spaces with intermittent garage door openings can utilize infrared heaters to reduce the amount of heat loss each time the doors are opened in the winter. An infrared heater does not heat the air, but instead warms only people through direct radiation. This measure is not included due to the lack of excess savings. The measure would require bringing new natural gas service to the building, which is included with the proposed boiler replacement measure. However, additional expenditure incurred from extending the gas supply from the boiler mechanical room to the fire engine garage, makes the measure's economics rather marginal, so it is not included.

### **Thermal Equalizers**

The Central Library contains a high peak roof on the upper level. During the winter months, heat rises from the floor level and collects in the high peak, which reduces the effectiveness of the air heating system due to thermal stratification. We considered installing thermal equalizers, which are fans that mix warm air with the colder air, thus improving the overall comfort and the heating system's effectiveness. The measure is excluded due to lack of excess savings.

### **Electrical power correction**

The electric power enhancing device, USES<sup>®</sup>, is a device that uses magnetic fields to manage power consumption by holding voltage up during short duration brown-outs, and preventing voltage spiking, by rapidly absorbing energy in its magnetic choke system. This Measure has not been included due to lack of excess savings.

### **Energy Demand Response**

The electrical grid in the Northeast corridor is greatly burdened and the Independent System Operator, PJM (Pennsylvania, Jersey, Maryland) has initiated a financial rebate program that is based on reducing the electrical demand on peak days. We examined this program, and recommended it to the County for further action. The measure is not included as part of the project