

REDUCTION OF ELECTRICAL CONSUMPTION, IMPROVE BUILDING ENVIRONMENTS
AND REDUCE HAZARDOUS WASTE

To dramatically reduce electrical consumption, improve building environments for all students and employees, reduce hazardous waste stream, reduce ongoing operation and maintenance cost and preserve cash by replacing all interior and exterior lighting fixtures at all (10) older facilities to meet new federal mandates. All of this in an extremely restrictive fiscal environment and at a time of intense focus on student, teacher and building performance. Like many great ideas in Dorchester, this all started on a hot July day in 2012 with a conversation between two colleagues over crabs and beer after the IAC announced the Energy Efficiency Initiative (EEI).

DCPS had investigated performance contracting for quite some time. While certainly a valid method of accomplishing difficult tasks, intuitively we recognized that “performance contractors” make their money by sharing savings, marking up supplier and subcontractor work and then providing long term financing to an owner that is palatable to operational cash flow. This makes the true cost large and the true savings quite smaller. In other words, a performance contract is nothing more than a financing vehicle. This seemed like a perfect opportunity to “self-perform” a performance contract such that the owner could enjoy ALL of the savings without the political and fiscal liability of long term debt.

The State of Maryland developed the Energy Efficiency Initiative in the FY2014 CIP process. In particular, the lighting replacement aspect would have a huge impact in all of our older facilities, especially the “open space” schools that have very few opportunities for natural light. Because renovation or replacement Capital funds are simply not available to address all building issues at ten sites at the same time, lighting upgrades could provide a big impact for little upfront cost. By simply replacing light fixtures, these “imperfect” schools had immediate improvement in the learning and working environment. Additionally, by reducing electrical costs by over \$400,000 per year, these funds can be directed to other areas of need in the District.

Innovation in Concept: This project was innovative because this was not delivered under a typical performance contract or with long term local bond debt. By researching traditional performance contracting and the relatively immediate rate of return specific to this scope, a risk was taken to pay for the local cost out of utility funds already budgeted.

Innovation in Design: No engineering fees were paid to design and execute this project. Rather, DCPS partnered with a national fixture manufacturer/distributor immediately upon announcement of the program by the State. Completion all of the engineering and rebate paper work and bid documents at no cost to any taxpayer.

Innovation in Procurement: By creatively “piggy backing” existing contracts DCPS procured all of the required equipment through existing statewide LEA contracts. This included fixture procurement, construction management and hazardous materials recycling. This allowed for:

- bulk purchasing of all the fixtures with volume discounts,
- direct school district purchase allowed for 6% cost avoidance on all material (sales tax). This is a common money maker for general contractors to “direct purchase” material and assign it to subcontractors. We used this to minimize local cost exposure and; hence, maximize Return on Investment (ROI)/payback,

- fixtures “assigned” to local electricians for installation on a labor only basis. This created work for electricians in our own community while avoiding typical markup of fixtures and equipment by distributors, contractors, etc.

Innovation in Execution: The work packages were bid in “bulk” but broken up by school. This allowed for a lowest cost per site award while providing opportunity for volume. This made the program attractive to both small and large electricians. The aggressive implementation of this program allowed for most sites to have a summer start and complete early in the school year. This allowed for maximizing positive impacts to our customers and maximizes electrical savings as soon as possible. By implementing exterior fixture replacements in the summer and fall; our traditional (and very expensive) fall exterior re-lamping program is now an anachronism and gained productivity!

By partnering with a local recycling vendor, ALL of the old components; except for the hazardous materials, were recycled at each site. This generated tens of thousands of dollars of additional cash that would otherwise have been “thrown away”. This was done at no additional cost under a price share agreement with the local recycling vendor.

This can be replicated in any organization with ongoing utility expenses. By using our professional networks (nationally, regionally and locally), business savvy from earlier private industry experience and common sense complex projects can be delivered very effectively and with huge impacts!

Measurable Examples Of The Improvements/Savings

The lighting and controls renovation program will save over 1,786,785 kWh of electricity per year. This amount of savings translates into a fiscal savings of between \$200,000 and \$400,000 per year depending on hours of usage and electrical rates. For example, the first school to be completed under this program; Sandy Hill Elementary School, used 87,930 KwHrs of electricity for the first month of school last year. For the first month of school this year the usage was 50,203 KwHrs. This is a net savings of 37,737 KwHrs (a 42% reduction), that equates to a \$4,527.24 savings in just ONE MONTH at ONE SCHOOL (This project is doing 10 schools, so we could possibly see over \$400,000 of savings every year in just utility savings!).

This is just the direct utility savings!

With the use of new fluorescent technology and cutting edge LED lighting solutions we now have lights that last 36,000 to 100,000 hours. This reduces the valuable custodial time spent changing light bulbs and allows focus to be shifted to other innovative projects. The savings doesn't stop there! The lower wattage new technology produces less heat providing savings on HVAC on hot days and helping reduce hotspots that increase the work needed to air condition our schools.

All of these areas of savings combine to make this project a financial winner for the school district with a projected Return on Investment of 26%. This is by far a conservative projection based on a flat cost of electricity and maintenance cost. While a four year payback period would be amazing on a project of this scope, we are cautiously optimistic that we will realize a payback in as little as 2 years!

Additionally, each fall, the Maintenance Department spends \$10,000 to \$15,000 to relamp site lighting systems for late fall, winter and early spring events. With the installation of the new LED lights, this expense is recaptured and the productivity gain can be assigned to other tasks!

How Does This Project Affect Student Achievement? According to a University of Georgia study on academic achievement in children, lighting was shown to be a major factor in the brain's ability to focus. Students that attended class in properly lit rooms received higher grades than students in poorly lit rooms. In addition to ocular benefits new lighting provides multiple psychological benefits to the students. Dimly lit rooms can negatively alter mood. Using solutions like new wrap fixtures and volumetric recessed fixture we've lit additional space such as dark corners and upper walls thus removing the "caving" effect often seen with older styles of lighting. This sense of openness and well lit areas positively affects students' mentality helping to provide an uplifting and engaging learning environment.

In a 2012 McGraw-Hill report it was shown that improved lighting in schools can provide many benefits. 70% of school reported improved test scores, 83% showed increased faculty satisfaction, and nearly a third saw reduced absenteeism!

Christopher J Hauge
School Facilities Engineer
Dorchester County Public Schools