

CORRESPONDENCE - January 4, 2022

The Honorable Larry Hogan
Governor
State House
100 State Circle
Annapolis, MD 21401

The Honorable Bill Ferguson
President
Senate of Maryland
State House, H-107
Annapolis, MD 21401

The Honorable Adrienne A. Jones
Speaker
Maryland House of Delegates
State House, H-101
Annapolis, MD 21401

Re: Report required by HB 630/Ch. 608(2) (MSAR # 13331) - Maryland Net Zero Energy School Initiative Grant Program Report

Dear Governor Hogan, President Ferguson, and Speaker Jones,

The Interagency Commission on School Construction (IAC) and the Maryland Energy Administration (MEA), in consultation with the Maryland Clean Energy Center (MCEC), welcomes the opportunity to make recommendations to the General Assembly for supporting the construction of energy-efficient net-zero-energy (NZE) Maryland public schools. Section 2 of Chapter 608 of the 2021 Maryland Laws requires that the IAC coordinate with MEA and MCEC to make recommendations on how to expand the Maryland NZE School Initiative Grant Program (Program) and how to provide additional funding for the Program. The three agencies have conducted this coordination and this report provides the required recommendations.

The IAC and MEA currently do not have access to data necessary to assess the energy efficiency (EE) of Maryland public prekindergarten through grade 12 (PK-12) school facilities, because the data is distributed amongst local entities. However, available information and staff experience strongly suggest that NZE design and construction can reduce the environmental impact of school facilities by reducing energy waste especially where energy efficiency is incorporated early in design. These recommendations focus on addressing the need for available data on school performance while also minimizing the total lifetime cost of facility ownership. In general, the state's energy performance goals for PK-12 facilities should integrate EE with greenhouse gas reduction goals by pursuing NZE outcomes primarily at the facilities-portfolio level instead of at the project level. The IAC supports investing additional construction dollars up front for improved EE when it will result in decreased total cost of school-facility ownership. This report discusses the brief history of NZE schools in Maryland and provides a set of recommendations to consider in formulating future NZE policies for PK-12 public school facilities.

History of NZE in Public PK-12 Schools in Maryland

To date, NZE has only a short history in Maryland public PK-12 schools, through an MEA-administered grant program that was funded by a merger settlement, overseen by the Maryland Public Service Commission, in the BGE service territory. Grant funds contributed an average of eight percent to the construction costs of each of three schools opened between 2017 and 2020. These successful projects show that new, replacement, and full-renewal school facilities built to NZE standard 1) can be constructed at a reasonable cost and 2) provide potential benefits to the State and to local education agencies (LEAs). Based on lessons learned during this pilot phase, this report includes recommendations that provide alternatives that more efficiently use funds, regardless of source, while delivering better performance and lower overall costs.

The first NZE school built in Maryland was Howard County Public Schools' (HCPSS') Wilde Lake Middle School in Columbia. HCPSS received State Capital Improvement Program (CIP) funding from the IAC in 2016 and 2017 of \$15,359,000 and an MEA grant disbursement of \$2,755,671 (approximately \$533,000 for design and \$2,222,000 for construction) for a total of \$18,114,761 out of a total cost of design and construction of about \$34 million for 106,221 gross square feet (GSF). The total cost including the cost of renewable energy technologies, including solar and geothermal, required to achieve the goal of NZE equated to about \$320 per GSF. This cost per GSF is 27.5% higher than the IAC's approved standard cost of construction with site development of \$251/GSF for FY 2015, which is the year in which the contract was bid.

Wilde Lake Middle School achieved NZE status primarily as a result of an efficient heating, ventilation, and air conditioning (HVAC) system that made use of demand-controlled ventilation within a well insulated building envelope. These items brought the overall designed energy use down to a level that could be offset fully by the available solar capacity installed on the building's roof and grounds. In operation since fall 2017, it was verified to have achieved NZE status in its first full year of operation.

Maryland's second and third NZE schools — Graceland Park/O'Donnell Heights Elementary/Middle School and Holabird Academy Elementary/Middle (E/M) School of the Baltimore City Public Schools System (BCPSS) — were designed and constructed together as a package. BCPSS received State Capital Improvement Program (CIP) funding from the IAC in 2017-2020 of \$47,625,000 and MEA grants of \$5,190,802 (approximately \$711,000 for design and \$4,480,000 for construction) for a total of \$52,815,802 out of a total cost of design and construction of about \$68,082,500 for two 94,070-GSF facilities. The total cost including the cost of renewable energy technologies, including solar and geothermal, required to achieve the goal of NZE equate to about \$362 per GSF. This cost per GSF is 3.7% higher than the IAC's approved standard cost of construction with site development of \$349 per GSF for FY 2018, which is the year in which the contract was bid.

Graceland Park/O'Donnell Heights E/M and Holabird Academy E/M achieved NZE design status primarily as a result of an efficient HVAC system that made use of demand-controlled ventilation within a highly insulative building envelope. These items brought the overall designed energy use down to a level that could be offset fully by the available solar capacity installed on site on the roofs. Having opened in fall 2020, the two facilities' operating profiles were distorted by COVID-19, which has required increased exchanges of conditioned air to reduce the risks of COVID-19 to building occupants. Additionally, both schools' first year of operation was during a period of unusual building occupancy, with many students learning remotely while the school building may have been open for student support services. Due to these factors, NZE performance for these two schools has not yet been verified.

Opportunities for Increased Energy Efficiency in PK-12 Facilities

Although, as noted above, detailed data on energy usage and efficiency specific to Maryland PK-12 school facilities is not currently available, it is likely that the EE of many existing LEA facilities lags contemporary standards. The current average age of Maryland PK-12 public school facilities is 30 years, out of a typical expected lifespan of 50-60 years. Although built to comply with the applicable energy code at the time of their design and construction, the HVAC systems performance of many of Maryland's PK-12 facilities have since been surpassed by new technologies. Due to the advanced age of many existing facilities, many replacement and/or full-renewal projects are likely to be undertaken in the coming years, which will provide opportunities for making significant improvements in energy efficiency.

Portfolio-Level Recommendations

A facility cannot achieve NZE status through the simple replacement of one or two energy-inefficient building systems. Achieving NZE status requires the coordination of a number of building systems through careful design, installation, and operation. Based on the IAC's general experience with school construction projects in Maryland, only by beginning the facility-design process with EE objectives in mind does it become possible to minimize a facility's energy footprint to the extent necessary to achieve NZE status. A set of EE measures sufficient to achieve NZE status can, in the vast majority of cases, only be implemented fully and at a reasonable cost when incorporated from the earliest stages of school planning and design. For the foreseeable future, NZE status at the individual building level is financially feasible only for newly designed and constructed (or wholly renewed) facilities. Accordingly, each LEA must take a whole-portfolio approach to achieving NZE status and must consider portfolio-level solutions that may include sourcing green power.

At the portfolio level, the State should consider taking the following actions:

Recommendation #1: Focus the state's efforts on moving LEAs towards achieving NZE status at the portfolio level, rather than at the project level. Protecting State and local budgets both now and in the future while obtaining the greatest possible EE and cost-saving gains in PK-12 facilities requires each LEA to consider its portfolio of facilities holistically and to analyze the total cost of ownership of each facility when planning the economical use of available resources.

Recommendation #2: Require that each LEA integrate EE, educational sufficiency, and fiscal sustainability within the planning and management of its school-facilities portfolio such that each of the three is optimized with the other two in mind. Achieving these three necessary objectives will often require a balancing of interests. Only through planning and management that fully integrates these three from the earliest stages will effective balancing be possible.

Recommendation #3: Establish a center of expertise for NZE portfolio management within the IAC with the capacity to provide direct technical assistance to LEAs, including

- a) Assisting each LEA in developing the capacity needed to assess, measure, and manage the EE of its portfolio of facilities;
- b) Identifying and sharing proven methods for increasing EE of facilities and for achieving NZE status at the facility and portfolio levels, while reducing their total cost of ownership and improving the educational environment;

- c) Coordinating resources between the IAC and MEA to support LEAs' achievement of long-term portfolio-management plans that optimize the blend of fiscal sustainability and EE;
- d) If so desired by an LEA, coordinating and supporting centralized procurement, by MCEC or other organizations with demonstrated capability, for technical services such as energy audits and/or contract-management services; and
- e) Intentional, programmatic outreach by MEA, MCEC, IAC and other organizations to promote EE solutions that LEAs can consider as they work to improve the EE of their portfolios.

Recommendation #4: Develop a framework for measuring the Energy Usage Index (EUI) values of facilities and incorporating the results into project planning, design, and funding decisions in order to improve portfolio sustainability and encourage LEAs to value minimized total cost of ownership versus minimized upfront costs.

Recommendation #5: Require that LEAs measure actual energy cost and consumption at the facility level and report the resulting data to the State on an ongoing basis. This would involve at a minimum reporting the actual monthly energy use by facility and by energy source. Pursuant to statute, the IAC and MEA are coordinating a working group of LEAs to develop a standard template for reporting a district's electricity usage. However, to fully inform decision making at the state and local levels, consumption of all types of energy must be measured at the facility level and made available for analysis

Recommendation #6: Mandate that LEAs implement real-time metering and reporting to the State of energy usage from new, replacement, and fully renewed school facilities, and make the cost of equipment for such metering and reporting eligible for State participation. Energy usage data is currently obtained from utility bills in monthly, or at best, daily increments. Optimal analysis of performance of buildings, operations, and maintenance requires hourly data derived from advanced metering and reporting equipment. The cost to install real-time data management equipment has a negligible impact on new or renewed facility construction. If mandated, the cost of energy-data-management equipment would be eligible for State participation under current IAC regulations, so no additional funding source would need to be established. Advanced metering capacity in existing facilities could be gradually expanded as LEAs implement retrofits and system replacements.

Recommendation #7: Require that each LEA evaluate solar energy as part of the LEA's long-term school-portfolio planning, including potential reductions in total cost of ownership through the selection of energy sources, providers, business models, and purchasing methods. Per existing statute, IAC already requires LEAs' project design-development documents for new building and major-renovation projects to include an evaluation of solar technology potential. This proposed requirement would mandate that LEAs consider solar solutions at the portfolio level rather than only at the project level in order to ensure 1) the consideration of EE opportunities located outside of near-term projects and 2) holistic and comprehensive consideration of EE across the entire portfolio.

Project-Level Recommendations

Recommendation #8: Require that LEAs integrate the evaluation of NZE construction options into the early-planning and schematic-design phases for each new, replacement, and full-renewal school

construction project, including consideration of the potential use of power-purchase agreements (PPAs) and energy-as-a-service (EaaS) options for single or multiple projects where they will increase the energy efficiency of the facilities without increasing the total cost of ownership. Current statute requires only an evaluation of solar energy in the design-development phase. This requirement would raise the level of the required evaluation from the solar-energy-only level to the full NZE level and move the evaluation to the earlier phases of the project-planning process where it will be more effective and valuable.

Recommendation #9: Require that, for planned new, replacement, and full-renewal school construction projects, each application to the IAC for State funding model the proposed facility's EUI.

Recommendation #10: Recommend that all State-funded new school facilities be built with the capacity to become powered by solar (open options- rooftop, purchase, net metered, etc.). Adding solar to a facility that was not designed and built to accommodate it is not always feasible and rarely is cost effective. However, funds are not always available at the time of construction to support the installation of solar. Therefore, to enable the cost-effective installation of solar post-construction, the facility must be designed and constructed to be solar-ready. This can be done at negligible cost.

Recommendation #11: Investigate and consider the provision of using bond funding or alternative financial resources to incentivize LEAs to replace obsolete, inefficient or functionally depleted building systems with technologies that meet contemporary standards for EE as adopted by the IAC when those building systems have reached the end of their useful lifespan. Although NZE status is not a feasible objective for existing facilities that are not being replaced or fully renewed, this does not mean that EE gains cannot be achieved with or should not be sought within existing PK-12 facilities. At times, a building system that impacts EE will reach the end of its useful lifespan at a time when the facility's other systems have not yet done so, and so the system will require replacement outside of a facility replacement or full renewal. In the case of such needed system replacements (often called capital maintenance), the State can foster increased EE by incentivizing LEAs to select energy-efficient replacement systems.

Funding Recommendations

School facilities are long-term community investments that typically have lifespans of 30 years before needing renovation and of 50-60 years before needing full renewal or replacement. New NZE schools, as well as EE upgrades to existing facilities, could benefit from long-term bond funding that reflects the time horizon for these projects. Bond financing is not limited to larger projects, as smaller projects are often wrapped into larger bonds. The financial markets' strong supply of lender capital seeking long-term, environmentally responsible investment opportunities bodes well for issuing "green" bonds and similar durable instruments.

Recommendation #12: Provide funding to support the expansion of LEAs' portfolio planning to include the evaluation of NZE comprehensively at the portfolio and project levels. In light of facilities' long lifespans and the need for ongoing portfolio planning and management, the state should consider funding to support implementation of long-term plans that increase the EE of school portfolios while reducing their total cost of ownership. One approach would be a State-operated program that provides a small amount of incremental planning-and-design funding to help school systems incorporate NZE concepts into portfolio plans and facility designs, because new modeling and energy accounting will be required to ensure the attainment of NZE goals. MEA's Resilient Maryland program has successfully used this approach, which provides a small amount of upfront funds to help offset the cost of analyzing, planning and designing clean and resilient

distributed-energy resources (DER) systems such as microgrids and resiliency hubs. Funds should be provided on an as-needed basis to address demonstrated gaps in funding after other available resources have been exhausted. One-time State-funded grants should be directed towards activities that build LEA capacity to achieve and maintain durable energy savings if not NZE status. Any grant funding beyond should be reserved to finance LEAs' incremental costs to materially increase the energy efficiency of portfolios as a whole, and in those instances when no other forms of capital finance are available.

Recommendation #13: Recommend to LEAs that they consider consulting with MEA, MCEC, energy-service firms, and other applicable organizations when evaluating potential alternative funding mechanisms to support portfolio- and project-level actions. MCEC indicates that it has the capacity to provide financing assistance; facilitate pooled procurements of private sector energy experts and service providers to expedite planning and assessment; pre-qualify vendors and manage contract deliverables for the benefit of local school districts; and prepare template requests for proposals (RFPs) and solicit vendor proposals in a centralized, COMAR-compliant manner to assist school districts in procurement of the services needed. MCEC also has the capacity to raise capital and negotiate contract terms advantageous to LEAs when implementing energy performance contracts. This arrangement may allow transactions in which third parties carry debt obligations on behalf of the State. Alternative finance and business models like these – already adopted by many other public jurisdictions across North America – increase EE while reducing the total cost of facility ownership. MCEC can arrange similar solutions for the benefit of Maryland LEAs interested in such services. LEAs should always consult bond counsel to understand the potential impacts of such arrangements on debt capacity before they enter into those arrangements.

Best Regards,



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Interagency Commission on School Construction

cc: Sarah Albert, Department of Legislative Services (5 copies)