Leveraging Energy Performance Contracts for Healthy Learning Environments

How school district EPCs can provide the foundation of funding for healthy building improvements

The very foundation of K-12 educational performance lies in the strength of the physical learning environment. When the educational infrastructure begins to fail its purpose, it adversely impacts the students it is meant to support. In fact, environmental exposures in school buildings can impact student health, student thinking and student performance.¹

"Schools should be places where children can thrive. Yet outdated heating, ventilation, and air conditioning (HVAC) systems can make classrooms uncomfortable and expose students and teachers to indoor air pollution that can trigger allergies, asthma attacks, and long-term health problems."

The White House, Building a Better America²

The necessary upgrades are costly: aging facilities, combined with limited school budgets, have resulted in deferred maintenance of school buildings with an estimated \$270 billion necessary for infrastructure repairs.³

Additionally, the economic hardship for improving facilities is greatest for low-income, minority and rural school districts where students are "most likely to attend underfunded school facilities."⁴

An added and unavoidable cost on top of building maintenance is utilities, the second largest K-12 school expense following educator salaries, totaling nearly \$8 billion annually.

- 1 Schools for Health: Foundations for Student Success, Harvard T.H. Chan School of Public Health, 2021
- 2 Federal Resources for Addressing School Infrastructure Needs, Building a Better America, 2022
- 3 Better Buildings, U.S. Department of Energy, 2022
- 4 The 2021 State of Our Schools Report, 21st Century School Fund, International WELL Building Institute and National Council on School Facilities

Multiple studies have come to similar conclusions leading to the same question:

How can school districts fund necessary infrastructure upgrades to create the world-class learning environments their students deserve?

In this white paper we will discuss:

- The idea of indoor environmental quality (IEQ), which encompasses a wide range of factors, including contaminants found in air, dust and water
- The issues facing school facilities that need to be improved to transform them into world-class learning environments
- An innovative method for applying future energy cost savings toward these transformational infrastructure projects to defray or eliminate the need for raising additional school taxes or seeking bond referendums
- How school district facilities retrofits and upgrades can help deliver energy sustainability and environmental justice





IEQ and the Challenges Facing Educational Facilities Today

While terms like indoor air quality (IAQ) have been part of the facilities lexicon for decades, a newer term favored by the Harvard T.H. Chan School of Public Health is more encompassing: indoor environmental quality (IEQ). Focusing on IEQ in school facilities takes into account the many parameters affecting students and staff that impact their health and performance, including air contaminants, dust, water quality, mold and moisture exposure, thermal heath – heating and cooling levels inside of the buildings and lighting and views – the impact of proper lighting for learning activities.

"With the success of future generations at stake, stateof-the-art buildings should be the norm. We cannot achieve true health equity for our youth in decaying schools, and yet when it comes to updating our educational infrastructure, the U.S. is lagging behindwith our children paying the price."

Risa Lavizzo-Mourey, President Emerita and Former CEO of the Robert Wood Johnson Foundation (RWJF)

In fact, the Healthy Building Program team at Harvard developed a report detailing "The 9 Foundations of a Healthy Building."⁵ The nine foundations identified by the Harvard

5 Schools for Health: Foundations for Student Success, Healthy Building Program at the Harvard T.H. Chan School of Public Health, 2021 report represent key areas where school facilities can impact the health and performance of educators and students. This is a useful guide that we will refer to throughout this white paper as we explore ways school districts can respond to each of the areas detailed.

Here is a brief explanation of what each foundational area refers to in the context of a school building:



 Air Quality - the impact on air quality created by the choice of materials used in furnishings and building materials



- 2. Thermal Health the impact of thermal comfort standards for temperature and humidity within the facility
- **3. Moisture** the impact of roofing, plumbing, ceilings and HVAC equipment as potential sources of moisture and condensation spots
- 4. Dust & Pests the impact of preventative measures for reducing or removing dust and pests, such as sealing entry points, preventing moisture buildup and removing trash



- 5. Safety & Security to meet fire safety and carbon monoxide monitoring standards
- 6. Water Quality to meet the U.S. National Drinking Water Standards at point-of-use

Percent of Building Systems and Features in Fair and Poor Condition in Public Schools with All Permanent Buildings



U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, "Condition of America's Public School Facilities: 2012-13," NCES 2014-022, March 2014.



7. Noise - the impact of external and internal noises, such as traffic, construction and machinery



8. Lighting & Views - the impact of proper lighting electronically and through windows for comfortable viewing



9. Ventilation - refers to the ability to meet or exceed local outdoor air ventilation rate guidelines to control indoor sources of odors, chemicals and carbon dioxide

Each of these areas represents a set of challenges facing school districts across the country. Some of these foundation areas are more prominent depending on the region where the school is located, for example, heating and moisture issues in the northeast and cooling issues in the southwest. But every school district, regardless of its location or region, faces the question of high energy costs as well as construction management for any capital improvement project undertaken.

Financial Challenges

School districts face student population changes, aging infrastructure, rising energy costs, reduced annual operating budgets, and increased electricity usage (plug load) demands in the classroom.⁶ Educational funding in the United States depends primarily on state and local resources with a smaller amount received from the federal government. And those school districts serving high-poverty areas, with greater numbers of students of color, receive less funding per student than districts in low-poverty areas, which predominantly serve white students, highlighting the system's inequity.⁷

Infrastructure challenges are often most apparent in lowincome, minority and rural school districts and in many urban school districts that are experiencing a decline in enrollment. As enrollment decreases, so does district funding, making it difficult to implement needed school improvements. Simply increasing taxes for education capital projects can be detrimental to families, especially in poorer communities.

"Rebuilding our school system should be regarded as an investment in upgrading the basic infrastructure of our economy."

Dr. Min Sun, Associate Professor in Education Policy, University of Washington

- 6 Better Buildings, U.S. Department of Energy, 2022
- 7 Public education funding in the U.S. needs an overhaul, Economic Policy Institute, 2022

Energy Performance Contracts Can Cover the Foundations

When schools are provided with a method for reinvesting district energy savings into deteriorating buildings that have been historically neglected, students from all backgrounds are able to thrive. This is the goal of energy performance contracts (EPCs), where savings on future energy costs are applied to create energy-efficient buildings by capturing the saved funds and applying them toward converting legacy buildings or building new world-class facilities to benefit students and communities.

An energy savings project or EPC offers a method for leveraging complex energy-savings initiatives, energy retrofits, and energy performance contract programs in compliance with energy performance contract statutes, federal and state funding, and utility rebates. An EPC is a highly specialized engineering project that relies on savings calculations as the foundation of its financial structure.

Once developed, an EPC project will include technical factors such as degree days, utility rate structures, monitoring, and verification protocols, and many other complex aspects of energy engineering in order to appropriately represent the project your district wishes to undertake. An EPC provides a level of guaranteed energy savings while moving critical projects forward, reducing long term costs, and providing a healthy student environment.

EPCs: Providing the Foundation of Funding for Healthy Building Improvements

The diagram and discussion points on the following page cover four key areas where an EPC is able to provide coverage for the foundations:

- 1. Heating, Ventilation and Air Conditioning (HVAC) including heating, cooling fans, and digital temperature controls; Proper HVAC ensures comfortable humidity levels and reduces incidences of mold
- 2. Building Envelope including windows, doors, roof, weatherization, and air sealing
- 3. Lighting including lighting and lighting controls
- 4. Alternative Energy & Renewables including solar PV, CHP, geothermal, wind, and battery storage

Importantly, an EPC can be used to cover most, if not all, of the elements identified in the 9 Foundations of a Healthy Building report outlined earlier. Some areas overlap the items listed by the Healthy Buildings Team, other areas, like water quality, may not be specifically addressed. However, the match-up is close and the savings produced during an EPC energy savings project can be applied toward additional improvements in many cases.

EPCs Help Deliver Sustainability and Environmental Justice

There is more to Energy Performance Contracts (EPCs) than merely providing a financial shortcut to capital-intensive projects. EPCs leveraged for energy savings projects can also deliver an opportunity for transforming school districts into balanced, eco-friendly environments that advance sustainability practices and build on the broader agenda of environmental justice.

This is because the benefits of implementing school district energy savings projects are not solely financial. Implementing EPCs to improve school district infrastructures is not just about the immediate energy savings but amassing a substantial collective difference. Consider the broad footprint of school districts nationwide. Each facility that undergoes a transformative retrofit contributes immensely to reducing overall energy consumption. The sheer scale of urban school districts—in terms of student population, numbers of facilities and geographical spread—offers a unique multiplier effect to the environmental gains accomplished via EPCs. Achieving this displacement of energy dependency across the vast scale of districts can significantly lower the regional, and subsequently, national carbon footprint.

EPCs are comprehensive in nature: they enhance both the physical and the educational environment. Facilities and infrastructures requiring updates are not restricted to the structural or mechanical aspects; they also extend to the learning environments within. For example, well-lit classrooms, efficiently cooled gymnasiums during hotter months or warmly-heated auditoriums in the winter, all contribute significantly to the overall learning experience.

Sustainability and Learning

From a sustainability perspective, EPCs enable school districts to integrate the newest technologies – from more efficient HVAC control systems to programmable LED lighting – while modernizing facilities to create environments that are more conducive to today's dynamic contemporary learning requirements. Additionally, these EPC-based energy savings projects provide opportunities to incorporate educational initiatives about energy conservation and sustainability, effectively using a district's infrastructure as a teaching tool or living lab.

Through these projects, educators obtain real-world examples for teaching students about sustainability, energy efficiency, and environmental stewardship. This holistic approach to sustainability has the potential to spark a culture shift within our schools, instilling future generations with environmental literacy and an ingrained consciousness of their role in promoting a green future.



Environmental Justice

Aging and inefficient school facilities often contribute to inequities in educational outcomes. When school district administrators embrace EPCs and upgrade facilities, they also notably advance the cause of environmental justice. By creating comfortable, well-maintained, and energy-efficient learning environments, district administrators ensure that each student, irrespective of their socio-economic background, has access to a conducive, quality educational space, which significantly advances equality in educational outcomes.

The impact of transformative EPCs stretches far beyond the school buildings, touching families, communities, and local businesses. Energy savings and carbon footprint reductions catalyze broader conversations within the community about renewable energy, reduction of waste, and shared responsibility for the environment – now and in the future.

The comprehensive nature and exceptional scale of EPCs are instrumental in making a significant, lasting impact on our school districts' sustainability initiatives. It's not just about the financial savings but about moving our educational institutions—and, by extension, our communities—towards a brighter and more sustainable future.

Ultimately, as we reflect on the potential of EPCs, it becomes evident that these contracts are more than a financial tool; they are vital instruments of transformation for school districts, promising the benefits of energy savings and impactful sustainability. In leveraging EPCs, school districts become more than places of learning, but nurturing hubs steering towards a future that acknowledges the urgency of sustainability and increases equity. In doing so, these districts also advance the agenda of environmental justice in the communities where they are located.

EPCs Create Healthy Buildings



ESCO vs Owner's Rep

When conducting an EPC energy savings project, there is an important distinction between an energy services company (ESCO) and an owner's representative (OR) firm.

An Energy Services Company (ESCO) is the vendor that completes a school district's energy efficiency upgrades and performs the necessary construction as required for an energy performance contract. The ESCO delivers on the detailed scope, timeline, and energy savings that have been guaranteed. In the ESCO-only model, the school district directly manages the ESCO.

An Owner's Rep (OR) firm acts as a school district's representative for the scope of the entire energy performance contract. The OR firm is responsible for the entire process of developing a detailed request for proposal (RFP), soliciting bids from multiple ESCOs, validating the chosen ESCO's proposal,

EPC Stakeholder Structure Model 1: School District Directly Manages ESCO



and ensuring that the ESCO holds true to its contract, inclusive of the school district's energy savings goals.

In this way, the Owner's Rep ensures that a school district receives everything it was promised during an energy savings project by working closely with the ESCO and managing the process of the energy savings project.

EPC Stakeholder Structure Model 2: Owner's Rep Directly Manages ESCO



Transformational Learning Environments

While school districts face numerous challenges, creating and maintaining a healthy environment for learning excellence need not be one of them. Through proper processes and best practices, an energy performance contract can be used as the means for applying energy savings toward upgrading and retrofitting older school district infrastructures and transforming them into world-class learning environments.

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