



*National Association of
State Energy Officials*

Energy Efficient and Healthy K-12 Public School Facilities:

Opportunities for State Energy Offices and
State Education Agencies to Collaborate

2024



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Acknowledgements

The input and participation of many state officials and dedicated reviewers made this report possible. The text herein does not necessarily represent the views or policies of any particular organization, its officers, or affiliates. The analysis and any errors made are those of the authors alone. This publication was authored by Ed Carley, Senior Program Director, National Association of State Energy Officials (NASEO), and Jasmine Xie, NASEO Senior Program Manager with research and contributions by the National Council on School Facilities. NASEO thanks the following individuals for their contributions to this paper: Nathaniel Allen, Sam Petty, Sydney Applegate, Andrea Swiatocha, Anisa Heming, Carys Behnke, Jordan Wilkerson, Annabelle Swift, Nathan Cleveland, Caterina Hatcher, David Terry, and Cassie Powers.

This material is based upon work supported by the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy under the Building Technologies Office, Award Number DE-EE0009458.

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This report was developed with input and guidance from a diverse advisory committee convened by the National Association of State Energy Officials. Advisory committee memberships represent federal, state, nonprofit, association, and laboratory perspectives that provide meaningful expertise on challenges and opportunities around improving the quality and energy efficiency of K-12 school facilities across the country.

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Executive Summary

Maintaining energy efficient and healthy learning environments is a key responsibility of the nearly 20,000 local educational agencies (LEAs) across the United States. While many other state and local agencies and stakeholders impact K-12 facility quality and access to financial and technical resources, such as state boards of education, state boards of architects, and superintendents, this report focuses on the strategic partnerships between State and Territory Education Agencies and State and Territory Energy Offices. Collaboration among these agencies can help states better support energy efficient and healthy school facilities by lowering utility and maintenance costs for schools and improving the learning environment for students. Based on data collection, interviews, and extensive research, State Education Agencies and State Energy Offices should jointly consider the following recommendations:

- 1. Elevate Facility Energy Issues** – Elevate K-12 public school facilities in state governance and decision-making on education, health, energy, and the environment.
- 2. Access to Data** – On the state-level, develop school facilities energy-related data and information systems to support energy management.
- 3. Planning Assistance** – Develop cross agency state-level coordinated plans to support public school districts as they modernize their school facilities and efficiently use energy.
- 4. Supplemental Funding** – Leverage state and federal funds, along with private-sector financing, to address facility improvement needs.
- 5. Management Support** – Support school district leaders and facility managers with technical assistance and training.
- 6. Accountability** – Conduct facilities evaluations and establish state systems for facilities accountability.

Additionally, this report provides a rationale for considering energy concerns in an education context, where energy efficiency supports occupant health and comfort and provides fiscal benefits for school districts but must be planned and managed along with other education, health, and fiscal priorities and constraints.

According to the U.S. Energy Information Administration's 2018 Commercial Building Energy Consumption Survey (CBECS), the K-12 education sector was the second largest consumer of electricity and the largest consumer of natural gas among commercial buildings.¹ The K-12 education sector consumed approximately 266 trillion British Thermal Units (Btu) of natural gas and 327 trillion Btu of electricity in 2018.²

A 2020 Government Accountability Office (GAO) report found that nearly 36,000 of the nation's 100,000 K-12 public schools need heating, ventilation, and air-conditioning system replacements or upgrades. Pursuing all or a combination of the upgrades may impact the energy use of K-12 schools.³ In some cases, HVAC system upgrades or replacements may increase energy use, such as when air conditioning is added to facilities that previously only had heating systems, even if the new equipment is more efficient than the equipment being replaced.

For State Energy Offices, school energy programs can be an opportunity to support multiple goals – workforce development, helping communities manage their energy costs, supporting community resilience, increasing student and teacher energy literacy, and lowering emissions. For State Education Agencies, which may question the importance of focusing on energy issues over other pressing facility management issues, partnerships with State Energy Offices can unlock access to alternative means of financing facilities improvements through revolving loan funds, energy savings performance contracts, grants, and other resources. In addition to potential sources of funding, State Energy Offices may be able to provide expert advice in developing and managing energy projects. State Energy Offices have valuable experience administering federal funding from the U.S. Department of Energy and U.S. Environmental Protection Agency (EPA) to implement programs that improve energy efficiency and environmental quality.

K-12 Public School Facilities Infrastructure

Public school facilities support the people and programs in the nation's elementary and secondary (K-12) public schools. State Energy Office expertise with energy efficiency and public-private partnerships for the financing of publicly owned buildings, including federal and state grant programs and tax credits, can help state and local education agencies overcome the barriers to investing in K-12 schools. These buildings and grounds are essential to public education and communities. Their location, design, condition, and utilization affect education quality and opportunity, occupant health, and the environment.

School facilities must have reliable access to energy for adequate indoor lighting, thermal comfort, and air quality, all of which impact educational attainment for students and the wellness and comfort of building occupants.⁴ However, good stewardship of facility energy use, operations, maintenance, and capital improvements is a significant challenge, with an estimated \$85 billion underinvested in school buildings and grounds in 2021.⁵ To illustrate the challenge school districts face, a 2020 Government Accountability Office report found that nearly 36,000 of the nation's 100,000 K-12 public schools need heating, ventilation, and air-conditioning systems replacements or upgrades.⁶ While energy improvement projects can generate important environmental, occupant health and comfort, and fiscal benefits for school districts, they must be planned and managed in the context of other education priorities and fiscal constraints.

K-12 Public School Facilities Infrastructure Overview - FY2020 (in round numbers)

- 56 million student and staff occupants
- 8.1 billion square feet of facilities
- 100,000 schools
- 19,238 Local Education Agencies (regular school districts and charter LEAs)



Image: NASEO staff

The Need to Increase State Capacity for K-12 Public School Facilities

The K-12 education sector ranks as third largest in total floor space among all U.S. commercial building sectors.⁷ Managing this large network of public school buildings and grounds is complex and demanding. It requires local school district facility managers and boards of education to make capital investment decisions that involve millions of public dollars and will affect generations of students, faculty, staff, and community members who are served by the school infrastructure. Managing energy use will likely become more challenging as increasingly frequent extreme weather events change and increase school energy use. The average age of school buildings in the United States is 50 years, requiring school leaders and facility managers to adjust energy use and operations of old building infrastructure to new climate conditions such as by adding air conditioning equipment to buildings that did not previously have air conditioning.⁸ State policy, program, and funding interventions advanced through State Education Agencies and State Energy Offices can support school district facilities staff with these increasingly complex decisions, ensuring alignment between district-level facility energy management practices and statewide climate and energy policy responses.

Facility Stewardship is Complex and Demanding

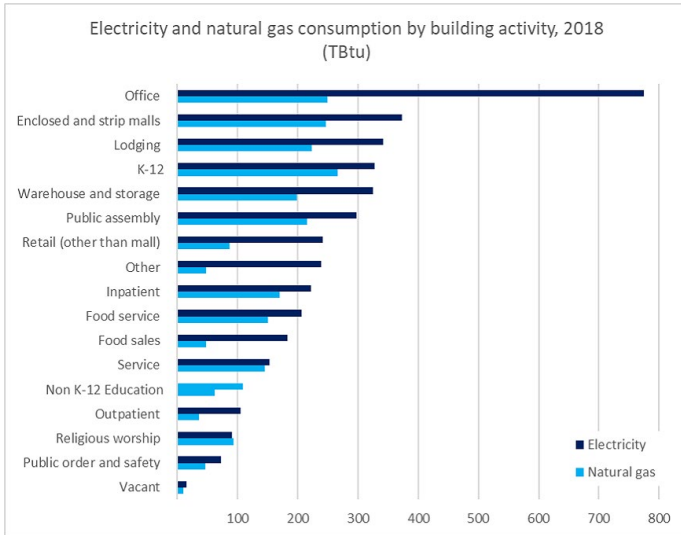
School facilities must be designed to support educational instruction, in addition to the daily care necessities of students for food, supervision, and health services. Most communities also use their public school buildings and grounds as shelter, community gathering spaces during emergencies, and for a broad range of civic, adult education, childcare, and recreational uses. At the height of the COVID-19 pandemic, closed public schools were used to distribute food to students and families. They operated as childcare centers for essential workers, and even as satellite health care facilities and vaccination centers for the general public. In Maryland, some K-12 school facilities serve as resiliency hubs for low- and moderate-income communities during weather emergencies and grid outages, providing back-up power through renewable energy systems that enable the buildings to function off the grid and offering heating, cooling, charging for small appliances and medical equipment, as well as refrigeration for temperature-controlled medication.⁹ Integral to supporting education and community uses, school facilities need to be safe and healthy places for students, staff, and community users. Facilities impact student achievement and teacher performance, in part through their impact on occupant physical and mental health. A study of 80 Virginia middle schools demonstrated a positive correlation between the quality of school facilities and student performance in certain academic topics, while also confirming a positive correlation between educator perceptions of facility quality with attitudes and behaviors towards their jobs.¹⁰ Similar findings are supported through a growing body of research.

At its peak, the COVID-19 pandemic prompted the addition of enhanced ventilation and indoor air quality measures in support of a safe return to in-person instruction. These important health and indoor air quality measures may introduce additional energy loads, presenting further incentive for school districts to optimize energy efficiency among all new and existing facility systems. In a survey conducted by the U.S. Green Building Council (USGBC) of respondents representing 4,000 school districts about air quality management during the pandemic, 71 percent expressed concerns about increased costs of energy usage.¹¹ To this end, research has demonstrated a link between improved ventilation rates and indoor air quality with decreased absenteeism, positing that in California, ventilation improvements would introduce just \$4 million in equipment costs, compared to an increase in \$33 million annually for attendance-linked funding to schools.¹² While concerns around the impact of facility quality on occupant health and safety are not new, recent events have accelerated changes in standards and practices and created an urgent focus on facilities.

To assist school district leaders and facility managers with meeting the demands for healthy and educationally suitable public school facilities that are also energy efficient, environmentally sustainable, and resilient, state agencies will need to consider introducing robust K-12 facilities governance, planning, data, funding, management, and accountability systems that rely on the expertise of State Energy Offices and State Education Agencies.

Energy Use in K-12 Public School Facilities is Likely to Increase

Energy efficiency generates environmental, occupant health and comfort, and fiscal benefits for school districts, but must be planned and managed in the context of other education, health, and budgetary priorities and constraints. This section provides a data context for understanding energy consumption and spending on school facilities.



The 2018 Commercial Building Energy Consumption Survey (CBECS) found that the education sector, encompassing facilities for childcare, public and private K-12 schools, and post-secondary colleges and universities, is the second largest user of energy among all U.S. commercial building types (Figure 1).

Figure 1. U.S. Energy Information Administration. 2018 Commercial Buildings Energy Consumption Survey. Electricity and natural gas consumption by principal building activity. However, the energy use intensity (EUI) of K-12 education buildings is lower than most types of commercial buildings (Figure 2 and Figure 3).

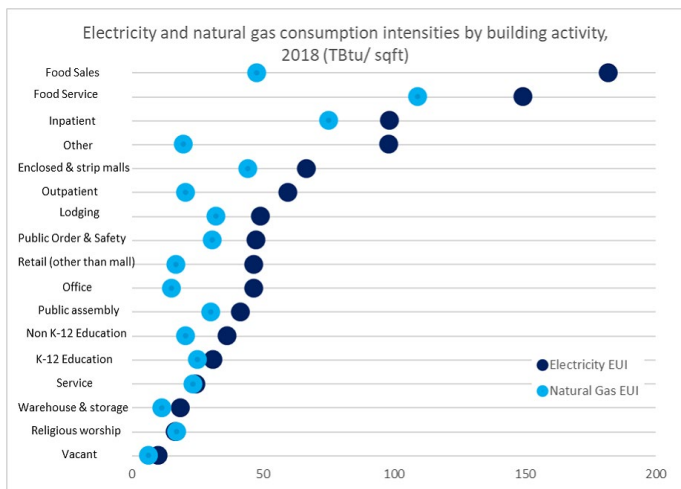


Figure 2. U.S. Energy Information Administration. 2018 Commercial Buildings Energy Consumption Survey. Electricity and natural gas intensities by principal building activity.

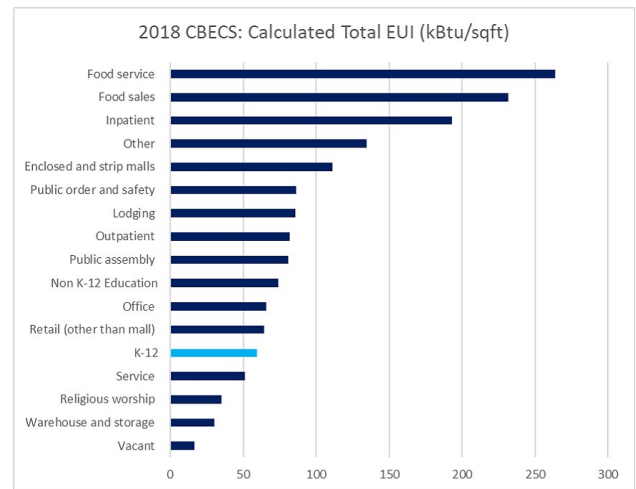


Figure 3. U.S. Energy Information Administration. 2018 Commercial Buildings Energy Consumption Survey. Calculated total energy intensities based on building type reports published in July 2023.¹³

Within the education sector, space heating accounts for the largest share of end-use consumption (42 percent). Cooling accounts for 11 percent, lighting accounts for 8 percent, and ventilation accounts for 6 percent. At the time of this report’s publication, the 2018 CBECS offers the most recent nationwide dataset of commercial building energy consumption. With increased ventilation to prevent public health-induced absenteeism among students and faculty during the COVID-19 pandemic and new cooling systems in response to rising average temperatures and more frequent extreme heat events, the education sector may demonstrate increased sector-wide EUI in future energy consumption reports. As a result, school district leaders and facility managers will need to adapt annual operating budgets to accommodate additional energy loads and costs, and look to optimize the efficiency of new and existing energy-dependent systems and operations.

K-12 Public School Maintenance and Operations Expenditures

Every year, the U.S. Census of Governments and the National Center for Education Statistics issue a fiscal survey. Local Education Agencies, which are responsible for traditional schools and charter schools, report their expenditures for maintenance and operations (M&O). M&O encompasses expenditures for utilities, cleaning, groundskeeping, school security, building maintenance, and non-capital repairs for buildings and grounds. Based on reported expenditures for all 50 states and the District of Columbia, M&O expenditures were \$60.4 billion in Fiscal Year 2019 (\$1,198 per student) before COVID-19 but increased to \$61.4 billion (\$1,216 per student) in FY2020 (Appendix D).

The state-by-state data for utility expenditures for FY2018-2020 can be found in Appendix E. At the time of this report's publication, this is the latest available data.

Utility expenditures likely rose in FY2021 and FY2022 as the focus on managing the spread of COVID-19 shifted from sanitizing surfaces and distancing occupants to trying to manage COVID-19 as an airborne virus. The Adams County School District 12 in Colorado, for instance, observed an increase in energy costs from \$3.8 million during the 2019-2020 school year to \$4.2 million during the 2020-2021 school year with partial occupancy during the COVID-19 pandemic, and \$5.6 million during the 2021-2022 school year after returning to full occupancy.¹⁴ In a survey conducted by USGBC of respondents representing 4,000 school districts about air quality management during the pandemic, 71 percent expressed concerns about increased energy use costs due to their efforts during the pandemic¹⁵

When analyzing the pre-pandemic FY2019 data, maintenance and operation of school facilities accounted for 9.2 percent of all LEA operating expenditures for elementary and secondary schools. Utilities were 21.1 percent of annual maintenance and operation of plant expenditures, representing 1.9 percent of total school district expenditures. While this represents a small portion of school budgets, the actual dollar amount is significant. \$11 billion of annual expenditures can be managed and likely reduced through proven energy efficiency measures and practices. State data showing these relationships between total elementary and secondary education spending, maintenance, and operations and utilities can be found in Appendix G.¹⁶

State Education Agencies and local districts may not prioritize energy savings measures or energy efficiency improvements because energy is a relatively small budget item and is treated as a "fixed cost." Reducing energy expenditures, however, can free up crucial funds for other budget requirements and be used to address annual facilities funding gaps. To support LEAs in conducting facility energy improvements, some State Energy Offices provide lists of approved energy service providers and contractors, template solicitation and contract documents, and other resources.¹⁷ Through these offerings, states can facilitate Energy Savings Performance Contracting (ESPC) for LEAs, which are typically offered through energy service providers to allow budget-neutral building improvements that require no up-front costs and are instead paid back through incremental energy cost savings. ESPC projects may include purchasing and installing new high-efficiency HVAC systems, insulation improvements, window replacements, LED lighting installations, and more. Using ESPCs, LEAs can make facility improvements that help improve occupant health, such as optimizing thermal comfort with adequate heating and air-conditioning systems, replacing outdated and poor-performing HVAC systems, and introducing smart controls for energy and indoor air quality systems. LEAs can also reinvest savings in other areas, including capital improvements to meet various health and safety needs, hiring and retaining teachers, and supporting the schools' educational mission.

LEAs should also consider leveraging changes to the tax code through the Inflation Reduction Act (IRA) that newly allows "elective pay," often called "direct pay," to tax-exempt entities such as local governments and school districts. These modifications to the tax code make certain clean energy tax

Energy Use Intensity can be measured using the EPA ENERGY STAR Portfolio Manager tool. This free tool outputs an ENERGY STAR score, which describes how a building's billed energy use, normalized for gross floor area, climate zone, and other building use characteristics, compares with the performance of an average building of the same property type.

credits effectively refundable, allowing K-12 school districts to claim payment for the full value of the credits to fund new clean energy and energy efficiency projects. Most prominently, districts can now access the 48E investment tax credit for energy properties (IRA Section 13102), the 45W commercial clean vehicle tax credit (IRA Section 13403), and the 179D energy efficient commercial buildings deduction tax credit (IRA Section 13303).¹⁸

The 48E investment tax credit covers a percentage of costs for installing new renewable energy systems and other qualified energy projects such as energy storage and is available for elective pay to eligible tax-exempt entities. The Section 45W tax credit is available for qualified commercial clean vehicles, including all-electric school buses, with the option for an elective payment for certain qualified tax-exempt entities like school districts. The 179D tax credit can be claimed for energy efficiency improvement projects, and while 179D is not eligible for elective pay, the tax code allows the transfer of tax deduction amounts into payments to engineers and designers responsible for the efficiency project(s).¹⁹

State Energy Offices are well-positioned to help newly eligible school districts, among other tax-exempt entities, navigate and maximize the impact of federal tax credits. In alignment with their core local engagement, technical support, and capacity-building competencies, State Energy Offices can help stakeholders identify and claim bonus credits set aside for low-income and environmental justice communities, identify procurement opportunities for clean energy projects to meet domestic content requirements, and disseminate best practices on direct ownership of clean energy assets.²⁰ State Energy Offices may also be able to assist LEAs with identifying other state, federal, or utility programs to pay for projects.

Improving the energy performance across existing school buildings to achieve compliance with high energy efficiency or zero energy performance standards can lower total annual operating costs, relieving economic pressures on school districts.²¹



Image: istockphoto/onurdongel

K-12 Public School Facilities Funding is Insufficient, Particularly in Low and Moderate-Income Communities

Low-income school districts face gaps in funding and technical support for modernizing school facilities. The projected shortfall in what school districts nationally should be spending for capital improvements to ensure healthy and safe facilities that are energy efficient, resilient, and environmentally sustainable is \$57.4 billion each year. The shortfall for operations and maintenance is \$28 billion on an annual basis.²² Current revenue sources are insufficient to achieve this level of required investment. State agencies and local districts will need to identify new revenue from federal sources and explore financing solutions including ESPC, tax credits, and zero-interest loans from state-supported financing programs such as the Energy Efficiency School Loan Program in South Dakota to help close this funding gap.²³

While the nation's elementary and secondary public school districts vary in enrollment size, geography, demographics, and access to capital from tax revenue, bond authority, and other sources of funding, they share many of the same types of facilities challenges. School districts with economically disadvantaged students making up 65 percent or more of their student population ("high poverty" school districts) spent 37 percent less per school on capital investments over a 10-year period than school districts with economically disadvantaged students making up less than 33 percent of their student population ("low poverty" school districts).²⁴ According to a 2020 GAO report describing the needs of K-12 public schools nationally, about half of the schools visited required HVAC system updates, with aged and leaking equipment damaging flooring and ceiling tiles and leading to mold and indoor air quality problems.²⁵ Chronic underinvestment in required capital projects due to budget constraints and the need to meet high operating costs are resulting in accumulated building deficiencies that negatively affect occupant health, safety, and educational attainment.

Using expanded tax incentives under the Inflation Reduction Act allowing direct pay for local governments, such as the 48E investment tax credit, the 45W commercial clean vehicle tax credit, and the 179D tax deduction for energy efficient commercial buildings (alone or in combination with grants and financing mechanisms like ESPC to conduct low-cost retrofit projects with short to medium (5-15 year) payback periods), LEAs can free up funding from annual operations budgets through energy cost savings. Low-cost retrofit projects may include envelope upgrades, efficient lighting installations, and insulation improvements. By packaging energy efficiency measures that reduce operational energy costs with mechanical ventilation measures for improved indoor air quality or AC to address extreme heat, LEAs can more reliably anticipate investments to generate positive returns or, at the very least, break even over the lifetime of the equipment upgrade. LEAs can utilize subsequent budget savings and state-supported financing solutions to implement combined renewable energy and energy efficiency projects that shield districts from future energy cost volatility.²⁶ Increasing efficiency at K-12 school buildings mitigates unnecessary energy costs, frees up funding for other crucial school district uses, and provides pathways for schools to manage future energy costs.

Federal Funding Opportunities for Facilities have Increased, but can be Difficult to Access

All school buildings and grounds need annual operations and maintenance funds, and periodic capital investments for major upgrades, repairs, or replacement. Between fiscal years 2009 and 2019, local school districts paid for 77 percent of school construction capital outlays, states contributed 22 percent, and the federal government contributed one percent. This contrasts with the national averages for the funding sources of school districts' total annual operating budgets, which were supported by about 46 percent state funding, 46 percent local funding, and 8 percent federal funding.²⁷ By participating in new multi-year federal funding programs, LEAs can increase federal funding contributions toward school construction capital outlays, encompassing major energy performance-enhancing facility projects on existing facilities.

The condition of public school facilities has emerged as a federal interest, with unprecedented levels of federal funding to address the need to replace antiquated mechanical systems and invest in facility improvements. The table below provides a summary of federal funding opportunities announced in recent years that can be used toward K-12 public school facilities.

Program Name	Enabling Legislation	State Agency Role	Eligible Uses
Elementary and Secondary School Emergency Relief Program (ESSER)	Coronavirus Aid Relief, and Economic Security Act, Coronavirus Response and Relief Supplemental Appropriations Act, and American Rescue Plan (ARP) Act	Three tranches of ESSER funding, totaling \$176 billion, were awarded as emergency relief grants to State Educational Agencies for the purpose of providing local educational agencies with funds to address the impacts of COVID-19 on learning and student and staff safety.	Facilities improvements, including testing, inspection, maintenance, or upgrade projects to improve indoor air quality are eligible uses of ESSER funds. ²⁸
Renew America's Schools Grant	Infrastructure Investment and Jobs Act (IIJA), Section 40541	The Renew America's Schools program offers \$500 million over five years in federal grant funding through the U.S. DOE, encouraging partnered applications between local educational agencies and nonprofit, community, or state partners.	Energy efficiency, indoor air quality, renewable energy, and alternative fuel vehicle projects for local education agencies. Efficiency projects may include insulation, windows, doors, and other measures to address the envelope of a building.
Clean Energy Tax Provisions for Public Buildings	Inflation Reduction Act Sections 13102, 13303, and 13403	The IRA expands or establishes tax incentives for the decarbonization and increased efficiency of buildings in the public sector, including tax-exempt organizations like school districts. State Energy Offices have a large role administering and maximizing the use of IRA funds and can offer technical assistance on using federal funds to leverage state, local, and private funds, such as financing through ESPC, state green banks, and revolving loan funds (RLF).	Broaden access to financing and funding for capital improvement projects across K-12 schools through direct-pay clean energy and energy efficiency tax credits. This funding can be stacked with federal and state grants and low-interest loans from state green banks and newly capitalized revolving loan funds.
Supporting American School Infrastructure Grants	Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Bill, 2023, H.R. 117-403	This program awarded \$37 million on a competitive basis to eight State Education Agencies through the U.S. Department of Education, to increase the capacity of states to support high-need LEAs in leveraging federal, state, and local resources to improve facility quality.	Help State Education Agencies build capacity to assist their high-need and low-wealth school districts with their facilities, primarily through technical assistance and training. ²⁹

Table 1: Federal Funding Opportunities to Support K-12 Public School Facility Improvements

In addition to direct grant opportunities, there are federal opportunities for technical assistance and training. DOE has established the Energy Efficient and Healthy Schools Program, which supports school facilities through funding and technical assistance to districts, as well as provides recognition for districts' efforts to conduct energy efficiency improvements and health upgrades.³⁰ The U.S. Environmental Protection Agency has considerable technical assistance and training around lead in water and indoor air quality. The U.S. Department of Education is establishing a National Center on School Infrastructure, which will provide a clearinghouse on school facilities and technical assistance, particularly in support of states and high-need school districts.

New technical and financial resources from the federal government can be challenging to secure for individual school districts. There are hard deadlines and particular requirements for applying, managing, and reporting on federal funds. Some states and school districts are also unaccustomed to using federal funds for their school facilities. However, this is an area where State Education Agencies and State Energy Offices can work together to help. More specifically, the state agencies can help districts access and use federal funding to address multiple state priorities while improving the condition of elementary and secondary public school facilities. State Energy Offices and other state agencies have experience managing federal grants and reporting requirements and can assist LEAs with navigating federal funding requirements.

Recommendations for Building State - Level K-12 Facilities Capacity

This section provides a brief rationale and recommendations for the capacity-building of State Education Agencies and State Energy Offices to assist local districts with delivering energy efficient, healthy, safe, educationally suitable, and resilient schools. The recommendations were developed with input from geopolitically diverse state education and state energy officials through data collection, in-depth interviews, and meetings conducted throughout 2022 and 2023, as captured in Figure 4 below.³¹ Using effective policies, programs, and practices can accelerate the equitable modernization of public school facilities, reduce energy costs, and improve the quality of buildings and grounds.

While many State Energy Offices' resources and funding are limited, most have a role in educating and working with State Education Agencies and school districts to prioritize energy efficiency during HVAC upgrades and replacements. State Energy Offices may consider offering financial assistance for the purchase of high-efficiency cooling equipment, establishing appliance standards for new installations (for products without existing federal standards), offering model procurement standards for public buildings to help manage future utility bill impacts, and enabling conversations with schools about meeting operational needs while also achieving state energy policy goals. State Energy Offices can work with State Education Agencies to connect energy efficiency projects to improved indoor air quality and other non-energy benefits.

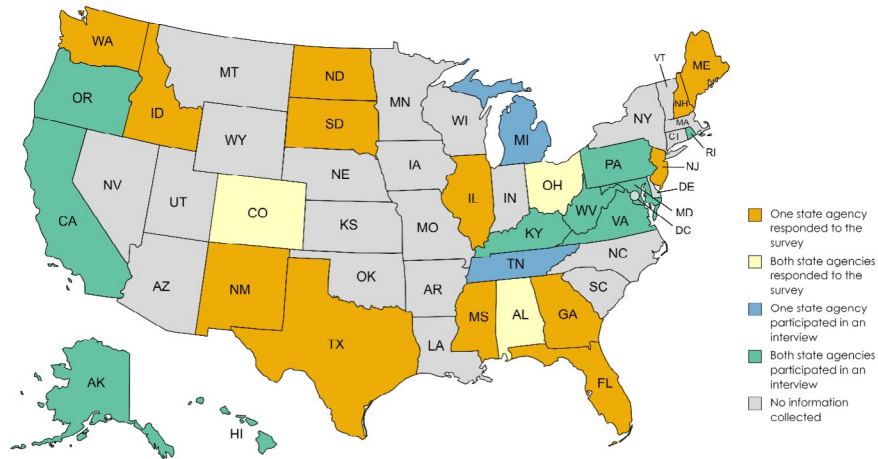
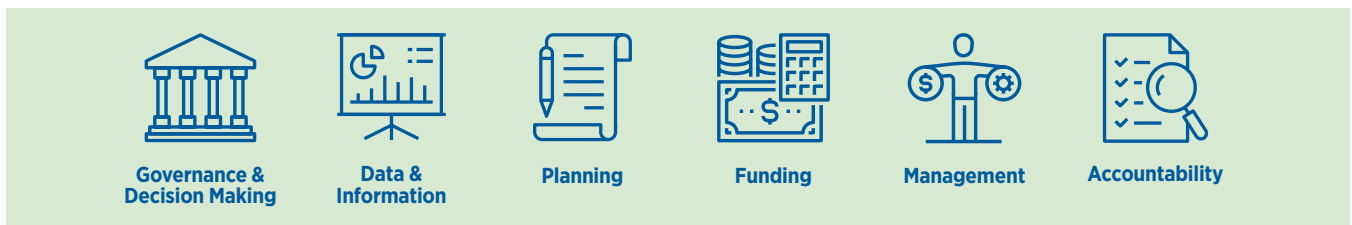


Figure 4. Summary of surveys and interviews conducted between 2022 and 2023 with representatives from State Education Agencies and/or State Energy Offices to inform this report.

NASEO gathered information on the institutional capacity of State Education Agencies and State Energy Offices to address the quality and energy efficiency of public school facilities. Based on these findings, State Education Agencies and State Energy Offices can consider collaboratively pursuing recommended actions that support energy efficient, educationally suitable, community supportive, environmentally sustainable, and resilient school districts.

The recommendations are organized around an established framework for the six elements of a well-managed K-12 facilities program, summarized in the figure below.³² Not all recommendations may apply to each state, but actions associated with this framework should benefit all states.





A. Elevate Facility Energy Issues – Elevate K-12 public school facilities in state governance and decision-making on education, health, energy, and the environment.

According to a 2017 study on the evolving role of the State Education Agency by the Consortium for Policy Research in Education (CPRE), State Education Agencies can support district school facilities in five essential ways:

- Articulate Vision, Priorities and Goals,
- Support Academic Improvement through Implementing Standards and Assessments,
- Design and Implement Accountability Systems,
- Administer, Implement, and Oversee State and Federal Funding Programs, and
- Develop Two-Way Communications with Stakeholders and the Public.³³

In addition to State Education Agencies supporting LEAs on facility efficiency and indoor air quality projects in these five ways, State Education Agencies can also develop a uniform approach for oversight and capacity-building for school construction, design, operation, and maintenance. In eight states, separate state-level school facilities authorities or agencies have been established to allocate and manage state capital construction outlays for elementary and secondary school districts.³⁴

State Education Agencies that fund district projects are responsible for reviewing and approving key planning, design, and construction documents, a process that may benefit from including State Energy Office reviewers who can weigh in on energy efficient and sustainable design. To address the COVID-19 pandemic, State Education Agencies prioritized funds for improving indoor air ventilation or purification to comply with public health recommendations. While these investments improved the indoor environmental quality of school buildings, increased ventilation resulted in higher energy use.

While some State Energy Offices are limited in their involvement around school facility energy project decisions, others actively assist school districts with benchmarking energy use in school buildings within retrofit or new construction projects. One such example is the West Virginia Office of Energy through their Benchmarking and Transparency Initiative funded through the federal State Energy Program, which helps benchmark school buildings across the state to determine the highest-impact energy performance improvement opportunities. The West Virginia Benchmarking initiative partnered with the West Virginia Office of Energy, the West Virginia Department of Education's Office of School Facilities, and the West Virginia University Statler School of Engineering. Through this project, 193 public buildings and more than 400 schools in 33 of the 55 counties in the state have been benchmarked using the U.S. EPA's ENERGY STAR Portfolio Manager benchmarking tool.³⁵

Other State Energy Offices administer programs to train and place shared energy managers among school districts, staffing districts with the necessary technical expertise to ensure high quality facilities energy planning. Kentucky's School Energy Managers Project, which operated between 2008 and 2018, offers a prominent example of a state-led effort, spearheaded by the Kentucky School Board Association and the Kentucky Office of Energy Policy to hire dedicated shared energy managers across all participating school districts in the state that would help local boards of education adopt energy policies and implement energy management plans.³⁶

Likewise, State Energy Offices can consider the perspective of local school districts in their planning and programming related to energy efficiency, energy education, climate resilience, and building energy management. State Educational Agencies may act as a clearinghouse of local educational agency priorities, including how the design and energy systems within each district's school facilities can best serve the holistic educational and wellness needs of students, faculty, and staff. State Energy Offices can also align these priorities with program design that advances progress toward state energy, economic, and climate goals.

To include K-12 public school facility representatives in state governance and decision-making, State Education Agencies and State Energy Offices can work collaboratively to:

- A.1** Identify which state level agencies, government task forces, commissions, and public authorities have the authority to affect the planning, siting, design, construction, operations, maintenance, or financing of public school facilities.
- A.2** Identify state education policies that affect school facilities planning, siting, design, construction, operations, maintenance, or financing and share them with State Energy Offices and their facilities staff.
- A.3** Identify state energy and/or environmental policies that affect public school facilities planning, siting, design, construction, operations, maintenance, or financing, and share them with State Education Agencies and their facilities staff.
- A.4** Create a state task force or committee to identify the strengths and shortcomings of the state policy and program environment for efficient and healthy K-12 facilities, including state and local education representatives; health, environmental, and energy officials; and civic, industry, and labor stakeholders with interests in education, the environment, social justice, and health.
- A.5** Hold regular meetings among state agency representatives with responsibilities for and decision-making power over K-12 public school facilities.
- A.6** Create interagency memoranda of understanding or joint powers agreements to institutionalize the agency collaborations.
- A.7** Collaborate to create an informational campaign to educate local school board members, school facility managers, and administrators on the benefits of energy efficiency, energy education, climate mitigation, and climate resilience measures and their relationship to healthy and educationally appropriate school facilities.
- A.8** Help educators make use of resources from State Energy Offices, DOE, and EPA on using the building and grounds as educational tools in their curricula.



B. Access to Data – Develop state school facilities energy-related data and information systems to support energy management.

Data on school facilities is needed for planning, budgeting, management, decision-making, accountability, and research. Good facilities data and information is critical for states and districts to manage spending and meet education, equity, health, energy efficiency, climate mitigation, and resilience goals in the design, construction, and operation of public school facilities.

State Education Agencies regularly collect data on enrollment, attendance, student academic performance on standardized tests, district finances, pupil transportation, special education, and much more. This provides a foundation for collecting longitudinal facilities data from districts as well. However, detailed records on school facilities are mostly tracked at the district level, and most state-level agencies do not maintain a central repository of data on public school facilities. Based on research done for the 2021 State of our Schools, only about half of all states maintain data on the size of all school buildings in their states.³⁷

Collecting and sharing data on K-12 building characteristics for asset-based energy modeling or utility bill data for measured energy use was identified as an area with opportunities for education and energy office collaboration. Tracking and maintaining current data on facility assets or high-quality energy use data, however, requires considerable administrative effort, sometimes even customized software platforms that cost money to use. State agencies can contribute funds and workforce capacity to mitigate the cost of data tracking for school districts.

To develop state school facilities data and information systems that include energy use data, State Education Agencies and State Energy Offices can work collaboratively to:

- B.1** Identify which state agencies have data on public school facilities, what data is collected, the data definitions used in the collection, and schedule and quality control protocols for data collection. States can also coordinate data requests to reduce the reporting burden on local education agencies.
- B.2** Assign standardized state level data identifiers to use to track K-12 public school facilities data.
- B.3** Use the following common references to evaluate state level facilities data management and align with emerging national data definitions:
 - National Center for Education Statistics;³⁸
 - Common Education Data Standards;³⁹ and
 - ENERGY STAR Guidance for Energy Management in K-12 Schools.⁴⁰
- B.4** Review the strategy for K-12 educational facilities data management at the state level and develop a plan to make certain facilities data publicly available for increased building performance transparency and accountability.
- B.5** Enter into data sharing agreements between State Education Agencies and State Energy Offices on standardizing metric definitions, sharing data sets, and collecting new data.
- B.6** Direct information technology staff to recommend a plan for sharing and analyzing currently collected state school facilities data, perhaps through the use of GIS tools and other data management tools.
- B.7** Establish and fund state and local capacity to track and publish data on school facility conditions.
- B.8** Communicate with school districts about state guidelines on facilities data collection, definitions, and protocols.
- B.9** Budget for information technology capabilities to advance state-level data collection, management, and analysis activities for educational facilities.



Planning

C. Planning Assistance – Develop state plans to support public school districts to modernize their school facilities and efficiently use energy.

Operating and maintaining facilities are ongoing responsibilities that need regular planning guided by technical experts, facility occupants, and other stakeholders. Neither capital improvements nor operations can be done well without regular planning that engages a broad cast of stakeholders and technical advisors. Decisions made today will have reverberations for decades to come, so it is important to meet the most up-to-date education, health, energy, community, and environmental standards. HVAC systems and school facilities generally have long equipment lifecycles. It is important that investments in facilities made today do not become outdated and are maintained for optimal performance such that they can keep up with increasingly ambitious state climate and energy goals.

Several State Education Agencies interviewed by the authors of this report in 2022 identified statewide climate, energy efficiency, and decarbonization goals within their states. However, they noted that these goals did not always set explicit energy efficiency plans and priorities for the public education sector. Increasing collaboration and synergy between State Education Agencies, State Energy Offices, and local educational agencies (school districts) would improve schools' abilities to make the most effective investments in their facilities based on industry recommendations and guidance from state-employed building science experts.

State-level climate plans usually introduce climate change mitigation strategies by emissions source (e.g., buildings or transportation) and often rely on the public sector to lead by example for broad market transformation. Some state energy plans contain sector-specific energy use and emissions reduction goals for public buildings, including K-12 school facilities, or lay the groundwork for financing programs, lead-by-example building retrofit programs, or other efforts that have State Energy Offices supporting energy efficiency and health improvements for K-12 public schools.⁴¹ One such example is Iowa's Energy Plan, published by the Iowa Economic Development Authority (the State Energy Office) in December 2016. While state priorities and implementation strategies have evolved in the years since, the plan comprehensively scoped the benefits of offering diverse energy efficiency and renewable energy financing options for public buildings such as K-12 public schools, and encouraged state budgetary and legislative members to explore authorizing public schools to reinvest energy cost savings from efficiency measures into additional clean energy projects, rather than diverting avoided costs from annual operating budgets.⁴² School districts can lead by example in their efforts to undertake environmentally responsive improvements that advance mitigation and adaptation to climate change. In developing state-level planning documents, State Education Agencies and State Energy Offices can work collaboratively to ensure that the plans accurately prioritize energy-related objectives and outcomes for schools, among other building sector goals.

To develop state plans that support public school districts' efforts to modernize their school facilities and efficiently use energy, State Education Agencies and State Energy Offices can work collaboratively to:

- C.1** Propose specific language for statewide energy plans on advancing healthy, safe, and environmentally sustainable and equitable public school facilities.
- C.2** Partner with civic and community-based organizations to advance a vision for public school facilities quality and equity.
- C.3** Provide opportunities for State Energy Offices to comment during the process of reviewing and approving educational facility master plans, capital plans, education specifics, and/or school specific designs by State Education Agencies.
- C.4** Provide opportunities for State Education Agencies to weigh in on the development of relevant parts of statewide energy plans typically led by State Energy Offices.



Funding

D. Supplemental Funding – Leverage state and federal funds, along with private-sector financing, to address energy-related facility improvement needs.

Funding and financing support for facilities improvements was identified as an area where State Education Agencies and State Energy Offices can work collaboratively, ensuring equitable access to energy-related capital improvement and training funds for under-resourced LEAs. A 2017 Consortium for Policy Research in Education study on State Education Agency roles and responsibilities suggests that “to close the country’s long-standing racial and socioeconomic achievement gaps and address concerns about the nation’s overall educational performance, states and State Education Agencies will increasingly need to lead the effort.”⁴³

Funding is needed to advance state capacity for data and information management, energy management, state level planning, coherent state level governance and decision-making, state provided technical assistance and training, and state facilities accountability. This funding could help existing annual appropriations for construction go further by advancing planning strategies towards allocating funding to low-wealth and high-need districts, which has the potential to bring steady improvement to the energy efficiency and indoor air quality of the nation’s public school facilities.

State Education Agencies and State Energy Offices can work together to help school districts access federal funds available through the Infrastructure Investment and Jobs Act (IIJA)⁴⁴ and the Inflation Reduction Act⁴⁵, in addition to state funding and private capital, to advance educational facility energy efficiency, adequacy, and health.

In older school facilities built without air conditioning, adding air handling equipment is expensive. However, state agencies and local districts can work together to identify resources to manage cost and energy impacts, such as by using state revolving loan fund programs, ESPC, or other mechanisms to pay for retrofits in place of or in addition to bonds. State agencies may be able to identify strategies including whole building energy retrofits that use less costly efficiency measures to reduce the size of air conditioning units that are needed. Whole building retrofits and low-cost efficiency upgrades likewise facilitate ESPC, where achieving operational energy cost savings contribute to optimized project payback schedules. State-led ESPC programs, along with additional sources of funding and financing mechanisms, allow local districts to diversify their capital stack such that they do not need to rely solely on bond measures. Linking the addition of air conditioning and air filtration with efficiency measures to reduce uncontrolled infiltration of outside air into school buildings can limit the cost of HVAC systems by reducing the size of equipment required, improve air quality by ensuring that the conditioned air reaching classrooms has been properly filtered, and lower energy costs by reducing wasted energy for conditioned air that escapes the building.

There are several ways to reduce facilities inequity. One is to increase the funding for school facilities planning, design, and construction for low-wealth and high-need districts. Another is to get better value from the facilities funds already spent, by funding state-level capacity to help local districts experiencing resource and capacity constraints improve their knowledge and capabilities. A third is to leverage financing mechanisms including ESPC and state revolving loan fund programs and other public-private financing actions to facilitate alternative means for budget-constrained school districts to conduct urgent facilities repairs and energy upgrades.

Some State Energy Offices, such as the Texas State Energy Conservation Office through the Texas LoanSTAR program, supplement State Education Agency capital outlay contributions, helping local educational agencies secure financing from revolving loan funds.⁴⁶ Financing support also takes the form of technical assistance enabling streamlined ESPC for K-12 schools. The Colorado Energy Office and the Minnesota Department of Commerce Energy Division (the State Energy Office), among others, maintain pre-approved lists of vendors and energy service companies and offer support to facility managers on the investment grade audit, service provider selection, project implementation, and measurement and verification processes involved in the implementation of an ESPC.⁴⁷

The School Building Authority of West Virginia provides guidance on ESPC in its Policies and Procedures Handbook, including a Request for Proposals (RFP) Template for Energy Savings Performance Contract Projects.⁴⁸ Other states support bond issuances and award grant funding for LEAs. Through their School Capital Improvement Matching Program, Oregon provides matching grants between \$4 and \$8 million to individual districts that pass a general obligation bond through investments from local communities for various facility improvement projects.⁴⁹

To leverage state and federal funds, along with private-sector financing to address energy-related facility improvement needs, State Education Agencies and State Energy Offices can work collaboratively to:

- D.1** Access or appropriate funding to increase State Education Agency capacity to support local districts on school facilities.
- D.2** Designate or hire state-level staff to pursue facilities-related federal funding opportunities, starting with ESSER funding.
- D.3** Help local school districts access and utilize infrastructure related federal funding opportunities, including:
 - Section 48 elective pay investment tax credits for the installation of on-site solar, energy storage, and ground-source heat pumps; the Section 179D tax deduction for energy efficiency measures; and the Section 45W tax credit for the purchase of all-electric or hybrid plug-in electric school buses (IRA, Sec. 13102, 13403, and 13303).
 - Broad flexibility to use ESSER funding for facility improvements —anything permitted per Impact Aid eligible uses for school construction.
 - Broad flexibility to use American Rescue Plan Funding allocated to state and local governments for school infrastructure.
 - K-12 school bus electrification opportunities from the IIJA.
 - Retrofitting schools for health and energy efficiency from the IIJA.
 - Hazard mitigation funds for public facilities from FEMA.
 - Public sector eligibility for climate change modifications to public buildings from the IRA.
 - Public sector eligibility for climate change planning and implementation grants (IRA, Sec. 60114).
 - Matching funds through Greenhouse Gas Reduction Fund (IRA, Sec. 60103).
 - Revolving loan funds allocated to State Energy Offices by the IIJA.
- D.4** Understand which districts and schools serve the lowest wealth communities and have the greatest education needs to target outreach and support to these districts.
- D.5** Document cases of State Education and State Energy Agency collaboration that target low-wealth and high-need schools and districts to determine best practices and lessons learned.
- D.6** Leverage expertise from State Energy Offices to offer best practices for measurement and verification of savings and benefits from facility quality and energy efficiency improvement programs.
- D.7** Leverage expertise from State Energy Offices to assist local districts with energy savings performance contracting, contractor screening, and procurement and financial assistance to **hire third-party services**.
- D.8** Offer funding or low-cost financing to cover the marginal cost of room-level IAQ monitoring equipment, high efficiency new HVAC equipment, and other equipment.



E. Management Support – Support school district leaders and facility managers with technical assistance and training.

Technical support for school district facilities staff was identified as an area where State Education Agencies and State Energy Offices can pool technical expertise and resources to support energy management trainings and curriculum development to further engage faculty and students. The complexity and rising cost of facilities provides challenges for state and local public sector educational leaders. It is particularly difficult for small districts and overwhelmed suburban and urban districts faced with under-resourced and under-staffed school districts. It is difficult to dedicate the necessary level of personnel with expertise in facilities planning, management, or finance to advance critical preventive maintenance, planning, and project management, even when funds are available. School districts are often unable to offer salaries that are competitive with the private sector. This can make it difficult to attract the facility managers and building specialists with the technical experience and credentials for the facilities planning, design, construction, or management needed. As a result, a growing number of school districts are hiring contract employees and signing private management contracts for school facilities operations, maintenance, and capital projects. This trend means that districts must navigate an extensive marketplace of school facility consultants, contractors, and facility product vendors.

In addition to the time and resource-intensive process of soliciting third-party contractors, many school districts are tasked with developing technical assistance and training support for facility managers on their own. One key opportunity for State Education Agencies and State Energy Offices to help districts build capacity is to offer standardized technical contractor training materials across multiple districts that are subject to the same procurement and facility operation standards. Many State Energy Offices with ESPC programs compile template solicitation documents for LEAs to hire contractors or energy service companies, reducing the procurement effort required by capacity-constrained LEAs.

Along with offering technical assistance on facilities operations and management, several State Energy Offices administer environmental education programs, including annual teacher workshops and packaged energy management lesson plans to help both K-12 school students and staff adjust their energy consumption behaviors to become conscientious users of energy. The Tennessee Department of Environmental Conservation (TDEC) Office of Energy Programs (the Tennessee State Energy Office) hosts “Energy Education Camp” every summer for educators in the state. The program provides information and resources needed to teach on topics related to energy and energy conservation and shows how to involve students in service-learning projects that promote environmental stewardship. In addition to Energy Education Camp in the summer, TDEC offers Energy Education Workshops during the school year for both educators and students, connecting the broad topic of energy to science, technology, engineering, and math (STEM) subjects.⁵⁰

Nonprofits, the university sector, and industry associations can do more to assist states and districts with technical assistance and training, standardizing metrics, and establishing best practice guidance that is agnostic to specific vendors, but useful in the field. Although this work does not come without cost, the return on investment for this work on the current annual public expenditures of \$110 billion would be considerable. The West Virginia Benchmarking Initiative cited earlier in this report is one such example.

To support school district leaders and facility managers with technical assistance and training, State Education Agencies and State Energy Offices can work collaboratively to:

- E.1** Identify interest among school districts in participating in net zero energy or net zero energy-ready facilities pilot projects.
- E.2** Work with each other, the U.S. Department of Energy, and U.S. Environmental Protection Agency to develop curriculum on energy management, the impacts of extreme weather on schools and communities, opportunities for schools to support clean air, and healthy environments. The curricula would be for diverse audiences, including facility managers, school staff, students, and school leaders.
- E.3** Develop pre-qualified vendor or service provider lists and template procurement documents for school districts that do not have dedicated facilities management staff. This can help school districts with limited capacity to navigate the marketplace of third-party facility managers, energy services companies, owners' representatives, and product vendors.
- E.4** Offer trainings to facility managers, school staff, and school leaders about energy use, facility resilience, and environmental safety, and their impact on school and district budgets.
- E.5** Provide recognition and awards for facility managers for demonstrated improvements in energy performance.
- E.6** Offer and fund building operator certification trainings for facility managers to pursue particular credentials and continued education.
- E.7** Train school district facilities staff on ENERGY STAR Portfolio Manager to encourage facilities benchmarking and data management.
- E.8** Sponsor training for school administrators and staff on EPA's Tools for Schools to encourage the implementation of indoor air quality best practices.
- E.9** Identify NGOs that can develop case studies of effective practices piloted by local school districts, with a focus on low-wealth and high-need districts, on:
 - a. Net-zero and carbon neutral schools
 - b. Strategies for building electrification in existing buildings
 - c. Adoption of renewable energy sources including electric school buses and energy storage
 - d. School infrastructure and energy profiles as educational tools
 - e. Green schoolyards in urban heat islands
- E.10** Implement policies that allow schools to retain a portion of utility bill savings for reinvestment in school and facility energy management programs versus returning 100 percent of funds to their districts.



Accountability

F. Support facilities evaluations and state systems for facilities accountability.

Evaluating facility quality and performance is an important element of accountability, which State Education Agencies and State Energy Offices can facilitate by providing districts with facilities assessment tools to monitor and evaluate progress toward mandated or voluntary energy and environmental standards. There are many examples of high-quality stand-alone public school facilities that meet industry-led standards and guidelines for energy efficient and sustainable buildings. Newly constructed K-12 schools must comply with building energy codes in their local jurisdictions. New schools being constructed in jurisdictions that have adopted the latest version of the nonresidential building energy code, ASHRAE 90.1-2022, will demonstrate higher levels of energy efficiency than schools built in states or municipalities with older and less stringent energy codes.⁵¹ School districts may also wish to improve the energy efficiency of new construction or existing structures beyond statutory code requirements. Additionally, some states, such as Ohio, have comprehensive school facilities planning and design standards that they update regularly and can be used as models.⁵² Even voluntary standards or guidance are helpful to school district facility managers.

Table 2: *Building Standards and Design Guidance Related to Energy and Environmental Quality Systems (as of 2024)*

Building Standards and Design Guidance (as of 2024)

New Construction

ANSI/ASHRAE/IES 90.1-2022* - Energy Efficiency Standard for Sites and Buildings Except Low-Rise Residential Buildings
International Energy Conservation Code (IECC) 2021* - Energy Standards
International Building Code (IBC) 2021 - Building/Structural Standards
NFPA 90A-2021 - Fire Life Safety Standards

Operation of Existing Buildings

ASHRAE 55.1-2020 - Comfort Standards for Temperature, Relative Humidity, Air motion
ASHRAE 62.1-2022 - Ventilation and Indoor Air Quality Standards
ANSI/ASA 12.60-2010 (r2020) - School Noise and Acoustic Standards
ASHRAE Standard 100-2018 - Energy Efficiency in Existing Buildings
ASHRAE Standard 241 - Control of Infectious Aerosols

Design Guidance

ANSI/ASHRAE/AIA/USGBC/IES Advanced Energy Design Guide for K-12 Buildings - Achieving Zero Energy

* ASHRAE 90.1-2022 received a determination from the Department of Energy to achieve greater energy efficiency in buildings subject to the code. DOE is required by law (the Energy Policy and Conservation Act) to issue a determination of energy savings for each new energy code within one year of publication. Until the determination is published, ASHRAE 90.1-2019 is recognized by DOE as the most recent code.

Rating and certification systems have been developed to assure owners that the facilities they are constructing, modernizing or operating meet defined, consensus-based standards. Examples of these systems that have and can be used in schools include the Collaborative for High Performance Schools Criteria; the USGBC's Leadership in Energy and Environmental Design (LEED) rating system; the Green Building Initiative's Green Globes; ASHRAE Building EQ Program, and International Well Building Institute's WELL Building Standard.

Facilities energy and environmental quality standards must respond to changes in building science and human health knowledge, climate, and community priorities. They may also be adopted and updated on a local level to align with state and local energy and climate targets. The work of reviewing and revising educational facilities standards is an ongoing and necessary role a supervisory education agency could play. States Education Agencies can provide a framework and a process for establishing facilities standards. States in partnership with local school districts can use other state public sector partners including State Energy Offices and professional societies such as ASHRAE and other external partners to develop state level design, construction, and operational performance standards on energy efficient and healthy public school facilities.

To support facilities evaluations and state systems for facilities accountability, State Education Agencies and State Energy Offices can work collaboratively to:

- F.1** Ensure that school facilities meet existing standards for academic adequacy, safety, energy efficiency, indoor environments, and other standards as appropriate and required by relevant statutes.
- F.2** Ensure that new buildings are constructed to meet up-to-date building codes and standards such as those published by ASHRAE, the International Code Council, and other standard setting bodies.
- F.3** Use a collaborative process with stakeholders and technical experts to identify standards for meeting the desired outcomes for:
 - healthy school environments
 - educationally suitable facilities
 - energy efficient buildings
 - carbon neutral buildings
 - school facilities that are resilient to human and natural threats
 - school facilities that support a range of community activities
- F.4** Help schools comply with new policies or goals that may require all-electric new construction and/or disallow new fossil fuel infrastructure.
- F.5** Examine facility certification systems or programs to determine their role in assessment and accountability for their states.
- F.6** Identify tools to evaluate school facilities for:
 - healthy school environments
 - educational suitability
 - energy efficiency (e.g., ENERGY STAR Portfolio Manager)
 - carbon neutrality
 - resilience to human and natural threats
 - viability for renewable energy systems, such as geothermal heat pumps or photovoltaic panels (e.g., the PVWatts Calculator developed by the National Renewable Energy Laboratory)
 - viability for use of ESPC
 - eligibility for funding through state revolving loan funds or green banks
- F.7** Identify sources of funding that districts and states can use for conducting assessments and implementing retrofits, and establish communication plans to ensure Local Education Agencies are aware of such programs.
- F.8** Partner with local school districts to set energy use targets based on energy use and expenditure data.
- F.9** Develop technical assistance and training for school districts on using various types of facilities assessments.
- F.10** Offer technical assistance and examples of energy assessment and greenhouse gas emissions accounting tools to evaluate energy efficiency and progress toward carbon neutrality.
- F.11** Establish protocols for transparency of data collected in assessments and its comparison to standards.
- F.12** Provide support and encourage districts to participate in the Green Ribbon Schools Awards Program of the U.S. Department of Education.

Conclusion

Provided that adequate resources are made available, implementing the recommendations outlined in this report will support local school districts to deliver energy efficient and healthy school facilities. Leveraging energy efficiency projects and funding can enable local education agencies to address capital investment needs, lower operating costs, improve learning environments, and support local economic development goals. The multiple benefits of energy efficiency projects make them a “win-win” for State Education Agencies and State Energy Offices alike. As state and local governments seek to achieve energy efficiency, energy affordability, and air pollution reduction goals, emphasizing education and equity is important to their success. State Energy Offices, the primary energy planners and program administrators in most states, and State Education Agencies are well-suited to be strategic partners for addressing the landscape of energy-related needs in school districts to help improve the learning environment for students, teachers, and school officials across the country.



Image: NASEO staff

Endnotes

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Appendices

- Appendix A:** Data Sources, Definitions, and Methods
- Appendix B:** Local Education Agency Enrollment (V33) by State, FY2018-FY2020
- Appendix C:** Total Local Education Agency Elementary and Secondary Annual Operating Expenditures (TCURELSC) by State, FY2018-FY2020
- Appendix D:** Local Education Agency Maintenance and Operations (V40) Expenditures by State, FY2018-FY2020
- Appendix E:** Local Education Agency Utilities (V95) Expenditures and Trends by State, FY2018-FY2020
- Appendix F:** Local Education Agency Expenditures per Student by State for Total LEA Annual Operating Expenditures, M&O, and Utilities, FY2019-FY2020
- Appendix G:** Local Education Agency Utility Expenditures as a % of M&O and Total Annual Operating Expenditures

APPENDIX A: Data Sources, Definitions and Calculations

The data reported in Appendices A through G includes the expenditure reporting from the F-33 fiscal survey for all approximately 14,000 regular school districts and charter LEAs and other “non regular” LEAs. This state summary data is based on district data and charter data reported for 18,715 LEAs in FY18; 19,700 LEAs in FY19; and 19,672 LEAs in FY20. Calculations are all done using data from these tables.

The utility data (V95) was provided for 11,223 LEAs in FY18; 11,353 LEAs in FY19 and 11,702 LEAs in FY20. There were 12 states that did not have districts report utilities separately from the M&O (V40) expenditure data. For the missing data, we estimated utilities per student by taking the national average of all the reporting districts and dividing it by the total number of students for each fiscal year and then multiplying the enrollment (V33) by the national average per student cost for utilities.

District reporting of utilities does not separate energy spending from expenditures for water. We suspect that some districts might not be reporting refuse or recycling in their utility expenditures. There are separate codes for communication expenditures, so it is unlikely that internet or phone is mixed in with utilities, but we do not have good data to clarify this on a state-by-state basis. However, based on limited data on the ratio of water expenditures to energy (gas, oil, electricity, coal) we estimate that about 85% of school district reported utilities expenditures are for energy.

Local Education Agency (LEA): The government agency at the local level whose primary responsibility is to operate public schools or contract for public school services.

Enrollment: Count of pupils on pupil rolls in the fall of a school system's fiscal year. Also called fall membership or student membership. The F-33 file contains two values based on student enrollment: Fall Membership (V33) and Fall Membership-School Universe (MEMBERSCH). V33 is the count of students served by the reporting LEA (generally as reported on the CCD Local Education Agency Universe Survey), whereas MEMBERSCH is the sum of the student counts for all schools in the reporting LEA (as reported on the CCD School Universe Survey) aggregated to the LEA level. [V33, MEMBERSCH]

TCURELSC: Includes salaries, employee benefits, purchased services, and supplies, as well as payments made by states on behalf of school districts. Also includes transfers made by school districts into their own retirement systems. **Excludes expenditures for Non-Elementary/Secondary Programs (TNONELSE), debt service, capital outlays, and transfers to other governments or school districts.** "Current Expenditures for Public Elementary/Secondary Education." [TCURELSC is the sum of TCURINST, TCURSSVC, and TCUROTH] Expenditure for Instruction (TCURINST), Support Services (TCURSSVC), and Other Elementary/Secondary Programs (TCUROTH).

Operations and maintenance: Expenditures for building services (heating, electricity, air conditioning, property insurance), care and upkeep of grounds and equipment, nonstudent transportation vehicle operation and maintenance, and security services. [V40]

In FY15, three expenditure data items related to utilities and technology were added to the survey form. They are Utilities and Energy Services (V95), Technology-Related Supplies and Purchased Services (V02), and Technology-Related Equipment (K14).

https://nces.ed.gov/ccd/pdf/2021306_FY19F33_Documentation.pdf

For Appendix B, the data source for student enrollment by state is the fiscal survey F-33, U.S. Census of Governments and the National Center for Education Statistics; and Local Education Agency survey, including charters.

For Appendix C, the data source for total LEA expenditures by state is the fiscal survey F-33, U.S. Census of Governments and the National Center for Education Statistics; and Local Education Agency survey, including charters. These expenditure calculations exclude interest, capital outlays, and non-elementary and secondary school expenditures.

For Appendix D, the data source for maintenance and operations expenditures on LEA facilities is the fiscal survey F-33, U.S. Census of Governments and the National Center for Education Statistics; and Local Education Agency survey, including charters. The total expenditure calculations include expenses from custodial, minor repair, buildings and grounds maintenance, and security services.

For Appendices E, F, and G, the data source for maintenance and operations expenditures on LEA facilities is the fiscal survey F-33, U.S. Census of Governments and the National Center for Education Statistics; and Local Education Agency survey, including charters. **Brown text indicates that the value is an estimate based on the national average for utility expenditures.** "Brown text: estimates based on national average for utilities."

APPENDIX B: Local Education Agency Student Enrollments for FY2018-FY2020, by State

STATES	FY18 Enrollment (V33)	FY19 Enrollment (V33)	FY20 Enrollment (V33)
Alabama	742,444	739,716	744,235
Alaska	132,872	130,963	132,017
Arizona	1,096,542	1,119,425	1,130,184
Arkansas	496,085	495,291	496,927
California	6,206,200	6,185,863	6,157,605
Colorado	907,410	908,490	909,819
Connecticut	516,799	511,982	509,087
Delaware	136,293	138,405	139,930
District of Columbia	87,315	88,493	89,878
Florida	2,833,094	2,846,444	2,858,461
Georgia	1,768,469	1,767,029	1,769,485
Hawaii	180,837	181,278	181,088
Idaho	301,054	309,812	310,712
Illinois	1,993,947	1,959,531	1,933,138
Indiana	1,053,808	1,055,351	1,046,413
Iowa	511,850	514,833	517,324
Kansas	497,068	497,705	497,955
Kentucky	680,978	677,821	691,996
Louisiana	715,135	711,235	710,439
Maine	179,665	179,949	179,770
Maryland	893,684	896,827	909,404
Massachusetts	954,031	951,631	948,950
Michigan	1,472,426	1,456,879	1,447,011
Minnesota	879,470	883,294	886,837
Mississippi	478,272	471,298	466,002
Missouri	915,412	913,441	911,254
Montana	146,668	147,709	148,598
Nebraska	323,766	326,164	329,672
Nevada	485,785	492,640	496,934
New Hampshire	178,926	177,972	176,687
New Jersey	1,407,502	1,401,935	1,410,736
New Mexico	334,341	333,537	330,501
New York	2,724,336	2,699,435	2,692,363
North Carolina	1,553,513	1,552,497	1,560,350
North Dakota	111,920	113,845	116,185
Ohio	1,704,399	1,694,305	1,689,867
Oklahoma	695,046	698,891	703,719
Oregon	580,643	581,687	582,616
Pennsylvania	1,708,022	1,712,521	1,713,651
Rhode Island	142,759	143,301	143,429
South Carolina	777,507	780,784	786,855
South Dakota	137,529	138,671	139,709
Tennessee	1,001,961	1,006,309	1,014,350
Texas	5,401,341	5,433,471	5,495,398
Utah	668,274	677,031	684,694
Vermont	86,754	87,642	87,162
Virginia	1,291,462	1,289,367	1,297,012
Washington	1,109,558	1,124,281	1,141,108
West Virginia	272,266	267,976	263,486
Wisconsin	860,752	859,329	855,397
Wyoming	94,186	94,213	94,614
Grand Total/Average	50,430,376	50,428,499	50,531,014

Appendix C: Total General Operating Expenditures (TCURELSC) for FY2018-FY2020, By State

STATES	FY18 Total Expenditures	FY19 Total Expenditures	FY20 Total Expenditures
Alabama	\$ 7,199,211,000	\$ 7,453,664,000	\$ 7,530,384,000
Alaska	\$ 2,355,281,000	\$ 2,408,877,000	\$ 2,417,683,000
Arizona	\$ 9,096,937,000	\$ 9,727,186,000	\$ 9,994,820,000
Arkansas	\$ 4,996,347,000	\$ 5,108,548,000	\$ 5,105,603,000
California	\$ 77,639,021,000	\$ 85,470,074,000	\$ 85,198,722,000
Colorado	\$ 9,216,166,000	\$ 9,982,433,000	\$ 10,524,254,000
Connecticut	\$ 10,304,242,000	\$ 10,532,837,000	\$ 10,455,862,000
Delaware	\$ 2,083,835,000	\$ 2,202,042,000	\$ 2,334,262,000
District of Columbia	\$ 1,950,922,000	\$ 1,956,989,000	\$ 2,074,071,000
Florida	\$ 26,284,126,000	\$ 27,268,525,000	\$ 28,206,073,000
Georgia	\$ 18,995,370,000	\$ 19,759,767,000	\$ 20,625,286,000
Hawaii	\$ 2,756,318,000	\$ 2,924,319,000	\$ 2,999,582,000
Idaho	\$ 2,319,161,000	\$ 2,448,977,000	\$ 2,552,134,000
Illinois	\$ 31,464,026,000	\$ 31,831,600,000	\$ 33,485,810,000
Indiana	\$ 10,684,318,000	\$ 10,808,646,000	\$ 11,335,075,000
Iowa	\$ 6,005,199,000	\$ 6,130,173,000	\$ 6,186,227,000
Kansas	\$ 5,805,668,000	\$ 5,950,994,000	\$ 6,339,832,000
Kentucky	\$ 7,563,906,000	\$ 7,651,478,000	\$ 7,884,513,000
Louisiana	\$ 8,213,616,000	\$ 8,382,028,000	\$ 8,457,981,000
Maine	\$ 2,617,831,000	\$ 2,691,013,000	\$ 2,729,944,000
Maryland	\$ 13,186,523,000	\$ 13,579,345,000	\$ 14,079,163,000
Massachusetts	\$ 16,193,221,000	\$ 16,925,219,000	\$ 17,664,957,000
Michigan	\$ 17,706,394,000	\$ 18,107,626,000	\$ 18,414,195,000
Minnesota	\$ 11,376,369,000	\$ 11,775,452,000	\$ 12,004,740,000
Mississippi	\$ 4,282,381,000	\$ 4,383,214,000	\$ 4,504,336,000
Missouri	\$ 10,015,705,000	\$ 10,256,917,000	\$ 10,280,203,000
Montana	\$ 1,712,297,000	\$ 1,765,893,000	\$ 1,797,508,000
Nebraska	\$ 4,144,498,000	\$ 4,154,150,000	\$ 4,260,617,000
Nevada	\$ 4,408,724,000	\$ 4,511,595,000	\$ 4,747,923,000
New Hampshire	\$ 2,891,176,000	\$ 2,965,030,000	\$ 3,013,096,000
New Jersey	\$ 27,315,253,000	\$ 28,558,567,000	\$ 28,988,776,000
New Mexico	\$ 3,195,214,000	\$ 3,393,111,000	\$ 3,731,028,000
New York	\$ 62,237,779,000	\$ 64,263,892,000	\$ 67,663,917,000
North Carolina	\$ 14,424,001,000	\$ 15,130,109,000	\$ 15,365,369,000
North Dakota	\$ 1,539,226,000	\$ 1,593,722,000	\$ 1,653,941,000
Ohio	\$ 21,734,011,000	\$ 22,523,580,000	\$ 22,893,027,000
Oklahoma	\$ 5,670,109,000	\$ 6,401,954,000	\$ 6,586,813,000
Oregon	\$ 6,896,732,000	\$ 7,231,356,000	\$ 7,463,124,000
Pennsylvania	\$ 27,626,214,000	\$ 28,492,148,000	\$ 29,020,577,000
Rhode Island	\$ 2,322,060,000	\$ 2,444,185,000	\$ 2,415,716,000
South Carolina	\$ 8,614,744,000	\$ 8,893,076,000	\$ 9,256,432,000
South Dakota	\$ 1,385,155,000	\$ 1,405,727,000	\$ 1,425,926,000
Tennessee	\$ 9,555,197,000	\$ 9,923,815,000	\$ 10,036,120,000
Texas	\$ 51,634,334,000	\$ 53,148,673,000	\$ 56,616,335,000
Utah	\$ 5,028,781,000	\$ 5,338,183,000	\$ 5,646,108,000
Vermont	\$ 1,689,174,000	\$ 1,754,500,000	\$ 1,822,203,000
Virginia	\$ 15,773,437,000	\$ 16,295,963,000	\$ 16,734,799,000
Washington	\$ 14,408,733,000	\$ 16,026,532,000	\$ 16,585,974,000
West Virginia	\$ 3,115,322,000	\$ 3,250,382,000	\$ 3,291,589,000
Wisconsin	\$ 10,466,232,000	\$ 10,730,869,000	\$ 10,798,620,000
Wyoming	\$ 1,519,293,000	\$ 1,528,251,000	\$ 1,573,539,000
Grand Total/Average	\$ 629,619,790,000	\$ 657,443,206,000	\$ 676,774,789,000

Appendix D: Total Maintenance and Operations Expenditures for FY2018-FY2020, by State

STATES	FY18 M&O (V40)	FY19 M&O (V40)	FY20 M&O (V40)
Alabama	\$ 685,252,000	\$ 720,310,000	\$ 719,917,000
Alaska	\$ 280,580,000	\$ 294,423,000	\$ 291,864,000
Arizona	\$ 1,101,358,000	\$ 1,127,376,000	\$ 1,160,544,000
Arkansas	\$ 508,995,000	\$ 527,086,000	\$ 540,346,000
California	\$ 7,317,224,000	\$ 7,994,777,000	\$ 7,951,501,000
Colorado	\$ 856,123,000	\$ 946,528,000	\$ 980,569,000
Connecticut	\$ 917,268,000	\$ 933,661,000	\$ 915,549,000
Delaware	\$ 215,834,000	\$ 220,157,000	\$ 236,885,000
District of Columbia	\$ 192,219,000	\$ 176,828,000	\$ 198,124,000
Florida	\$ 2,559,528,000	\$ 2,718,415,000	\$ 2,918,247,000
Georgia	\$ 1,415,797,000	\$ 1,490,993,000	\$ 1,570,921,000
Hawaii	\$ 269,139,000	\$ 301,622,000	\$ 297,093,000
Idaho	\$ 215,294,000	\$ 224,103,000	\$ 229,882,000
Illinois	\$ 2,535,741,000	\$ 2,612,604,000	\$ 2,681,719,000
Indiana	\$ 1,183,904,000	\$ 1,214,507,000	\$ 1,258,085,000
Iowa	\$ 507,299,000	\$ 527,106,000	\$ 530,310,000
Kansas	\$ 554,789,000	\$ 571,895,000	\$ 586,517,000
Kentucky	\$ 625,139,000	\$ 640,234,000	\$ 646,941,000
Louisiana	\$ 800,412,000	\$ 812,255,000	\$ 797,976,000
Maine	\$ 274,697,000	\$ 276,385,000	\$ 290,626,000
Maryland	\$ 1,190,833,000	\$ 1,230,243,000	\$ 1,254,704,000
Massachusetts	\$ 1,390,203,000	\$ 1,478,551,000	\$ 1,513,379,000
Michigan	\$ 1,553,369,000	\$ 1,613,817,000	\$ 1,582,921,000
Minnesota	\$ 776,966,000	\$ 800,711,000	\$ 785,654,000
Mississippi	\$ 444,773,000	\$ 452,617,000	\$ 458,853,000
Missouri	\$ 998,804,000	\$ 1,027,840,000	\$ 1,032,313,000
Montana	\$ 168,079,000	\$ 174,458,000	\$ 183,151,000
Nebraska	\$ 365,216,000	\$ 374,024,000	\$ 395,765,000
Nevada	\$ 418,593,000	\$ 429,570,000	\$ 431,335,000
New Hampshire	\$ 237,883,000	\$ 245,921,000	\$ 246,357,000
New Jersey	\$ 2,737,123,000	\$ 2,855,375,000	\$ 2,836,110,000
New Mexico	\$ 327,279,000	\$ 356,067,000	\$ 375,085,000
New York	\$ 5,166,061,000	\$ 5,244,234,000	\$ 5,435,549,000
North Carolina	\$ 1,162,313,000	\$ 1,249,963,000	\$ 1,218,535,000
North Dakota	\$ 133,765,000	\$ 137,129,000	\$ 140,047,000
Ohio	\$ 1,884,509,000	\$ 1,948,092,000	\$ 1,934,430,000
Oklahoma	\$ 609,968,000	\$ 668,068,000	\$ 690,671,000
Oregon	\$ 538,153,000	\$ 560,974,000	\$ 581,875,000
Pennsylvania	\$ 2,548,056,000	\$ 2,662,792,000	\$ 2,670,348,000
Rhode Island	\$ 188,736,000	\$ 195,095,000	\$ 192,098,000
South Carolina	\$ 819,202,000	\$ 853,102,000	\$ 890,235,000
South Dakota	\$ 142,680,000	\$ 143,907,000	\$ 145,909,000
Tennessee	\$ 774,274,000	\$ 798,027,000	\$ 797,085,000
Texas	\$ 5,632,733,000	\$ 5,640,744,000	\$ 5,951,631,000
Utah	\$ 488,593,000	\$ 478,485,000	\$ 491,805,000
Vermont	\$ 136,529,000	\$ 143,894,000	\$ 138,604,000
Virginia	\$ 1,408,293,000	\$ 1,457,027,000	\$ 1,464,824,000
Washington	\$ 1,212,326,000	\$ 1,249,456,000	\$ 1,253,874,000
West Virginia	\$ 324,692,000	\$ 341,108,000	\$ 331,939,000
Wisconsin	\$ 1,135,237,000	\$ 1,113,762,000	\$ 1,057,802,000
Wyoming	\$ 152,900,000	\$ 153,811,000	\$ 159,333,000
Grand Total/Average	\$ 58,084,733,000	\$ 60,410,129,000	\$ 61,445,837,000

Appendix E: Total Utility Expenditures for FY2018-FY2020, by State

STATES	FY18 Utilities (V95)	FY19 Utilities (V95)	FY20 Utilities (V95)
Alabama	\$ 216,768,000	\$ 223,078,000	\$ 203,305,000
Alaska	\$ 86,414,000	\$ 88,400,000	\$ 88,624,000
Arizona	\$ 287,384,000	\$ 281,158,000	\$ 265,507,000
Arkansas	\$ 107,512,000	\$ 104,399,000	\$ 104,762,000
California	\$ 1,576,374,800	\$ 1,577,395,065	\$ 1,428,564,360
Colorado	\$ 161,563,000	\$ 168,980,000	\$ 155,532,000
Connecticut	\$ 131,266,946	\$ 130,555,410	\$ 118,108,184
Delaware	\$ 20,672,000	\$ 20,530,000	\$ 29,424,000
District of Columbia	\$ 38,790,000	\$ 36,875,000	\$ 35,537,000
Florida	\$ 634,735,000	\$ 643,079,000	\$ 603,430,000
Georgia	\$ 408,661,000	\$ 424,404,000	\$ 413,720,000
Hawaii	\$ 56,746,000	\$ 60,021,000	\$ 55,482,000
Idaho	\$ 76,467,716	\$ 79,002,060	\$ 72,085,184
Illinois	\$ 506,462,538	\$ 499,680,405	\$ 448,488,016
Indiana	\$ 319,505,000	\$ 326,108,000	\$ 301,378,000
Iowa	\$ 115,483,000	\$ 119,239,000	\$ 109,262,000
Kansas	\$ 141,493,000	\$ 143,284,000	\$ 132,488,000
Kentucky	\$ 166,068,000	\$ 161,672,000	\$ 155,378,000
Louisiana	\$ 154,778,000	\$ 153,175,000	\$ 138,981,000
Maine	\$ 51,206,000	\$ 56,475,000	\$ 48,786,000
Maryland	\$ 159,560,000	\$ 162,175,000	\$ 143,576,000
Massachusetts	\$ 184,910,000	\$ 187,139,000	\$ 170,964,000
Michigan	\$ 291,637,000	\$ 297,563,000	\$ 269,266,000
Minnesota	\$ 220,554,000	\$ 227,367,000	\$ 204,445,000
Mississippi	\$ 121,481,088	\$ 120,180,990	\$ 108,112,464
Missouri	\$ 262,484,000	\$ 267,575,000	\$ 235,669,000
Montana	\$ 28,301,000	\$ 27,496,000	\$ 27,302,000
Nebraska	\$ 82,236,564	\$ 78,990,000	\$ 77,662,000
Nevada	\$ 111,092,000	\$ 110,777,000	\$ 103,965,000
New Hampshire	\$ 45,447,204	\$ 45,626,130	\$ 40,991,384
New Jersey	\$ 357,505,508	\$ 358,913,010	\$ 327,290,752
New Mexico	\$ 79,133,000	\$ 85,051,935	\$ 76,676,232
New York	\$ 691,981,344	\$ 694,705,680	\$ 624,628,216
North Carolina	\$ 348,364,000	\$ 354,909,000	\$ 326,365,000
North Dakota	\$ 28,427,680	\$ 28,539,600	\$ 26,954,920
Ohio	\$ 396,352,000	\$ 398,665,000	\$ 357,694,000
Oklahoma	\$ 125,766,000	\$ 128,858,000	\$ 117,805,000
Oregon	\$ 102,732,000	\$ 105,781,000	\$ 98,979,000
Pennsylvania	\$ 440,783,000	\$ 447,879,000	\$ 395,849,000
Rhode Island	\$ 38,814,000	\$ 41,220,000	\$ 35,201,000
South Carolina	\$ 198,587,000	\$ 188,791,000	\$ 178,990,000
South Dakota	\$ 34,405,000	\$ 33,816,000	\$ 31,726,000
Tennessee	\$ 252,117,000	\$ 255,308,000	\$ 237,420,000
Texas	\$ 1,567,079,000	\$ 1,529,804,000	\$ 1,426,929,000
Utah	\$ 113,031,000	\$ 112,561,000	\$ 108,930,000
Vermont	\$ 22,035,516	\$ 22,122,270	\$ 20,221,584
Virginia	\$ 556,707,000	\$ 572,228,000	\$ 552,114,000
Washington	\$ 281,827,732	\$ 282,937,290	\$ 155,670,000
West Virginia	\$ 79,304,000	\$ 77,306,000	\$ 71,686,000
Wisconsin	\$ 195,180,000	\$ 197,913,000	\$ 176,229,000
Wyoming	\$ 35,017,000	\$ 35,177,000	\$ 33,313,000
Grand Total/Average	\$ 12,711,201,636	\$ 12,774,884,845	\$ 11,671,466,296

Appendix F: Total Expenditures, Calculated per Student, by State

STATES	FY18 Total Expended per Student	FY19 Total Expended per Student	FY20 Total Expended per Student	FY18 M&O per Student	FY19 M&O per Student	FY20 M&O per Student	FY18 Utilities per Student	FY19 Utilities per Student	FY20 Utilities per Student
Alabama	\$ 9,697	\$ 10,076	\$ 10,118	\$ 923	\$ 974	\$ 967	\$ 292	\$ 302	\$ 273
Alaska	\$ 17,726	\$ 18,394	\$ 18,313	\$ 2,112	\$ 2,248	\$ 2,211	\$ 650	\$ 675	\$ 671
Arizona	\$ 8,296	\$ 8,689	\$ 8,844	\$ 1,004	\$ 1,007	\$ 1,027	\$ 262	\$ 251	\$ 235
Arkansas	\$ 10,072	\$ 10,314	\$ 10,274	\$ 1,026	\$ 1,064	\$ 1,087	\$ 217	\$ 211	\$ 211
California	\$ 12,510	\$ 13,817	\$ 13,836	\$ 1,179	\$ 1,292	\$ 1,291	\$ 254	\$ 255	\$ 232
Colorado	\$ 10,157	\$ 10,988	\$ 11,567	\$ 943	\$ 1,042	\$ 1,078	\$ 178	\$ 186	\$ 171
Connecticut	\$ 19,939	\$ 20,573	\$ 20,538	\$ 1,775	\$ 1,824	\$ 1,798	\$ 254	\$ 255	\$ 232
Delaware	\$ 15,289	\$ 15,910	\$ 16,682	\$ 1,584	\$ 1,591	\$ 1,693	\$ 152	\$ 148	\$ 210
District of Columbia	\$ 22,343	\$ 22,115	\$ 23,077	\$ 2,201	\$ 1,998	\$ 2,204	\$ 444	\$ 417	\$ 395
Florida	\$ 9,278	\$ 9,580	\$ 9,868	\$ 903	\$ 955	\$ 1,021	\$ 224	\$ 226	\$ 211
Georgia	\$ 10,741	\$ 11,182	\$ 11,656	\$ 801	\$ 844	\$ 888	\$ 231	\$ 240	\$ 234
Hawaii	\$ 15,242	\$ 16,132	\$ 16,564	\$ 1,488	\$ 1,664	\$ 1,641	\$ 314	\$ 331	\$ 306
Idaho	\$ 7,703	\$ 7,905	\$ 8,214	\$ 715	\$ 723	\$ 740	\$ 254	\$ 255	\$ 232
Illinois	\$ 15,780	\$ 16,244	\$ 17,322	\$ 1,272	\$ 1,333	\$ 1,387	\$ 254	\$ 255	\$ 232
Indiana	\$ 10,139	\$ 10,242	\$ 10,832	\$ 1,123	\$ 1,151	\$ 1,202	\$ 303	\$ 309	\$ 288
Iowa	\$ 11,732	\$ 11,907	\$ 11,958	\$ 991	\$ 1,024	\$ 1,025	\$ 226	\$ 232	\$ 211
Kansas	\$ 11,680	\$ 11,957	\$ 12,732	\$ 1,116	\$ 1,149	\$ 1,178	\$ 285	\$ 288	\$ 266
Kentucky	\$ 11,107	\$ 11,288	\$ 11,394	\$ 918	\$ 945	\$ 935	\$ 244	\$ 239	\$ 225
Louisiana	\$ 11,485	\$ 11,785	\$ 11,905	\$ 1,119	\$ 1,142	\$ 1,123	\$ 216	\$ 215	\$ 196
Maine	\$ 14,571	\$ 14,954	\$ 15,186	\$ 1,529	\$ 1,536	\$ 1,617	\$ 285	\$ 314	\$ 271
Maryland	\$ 14,755	\$ 15,142	\$ 15,482	\$ 1,332	\$ 1,372	\$ 1,380	\$ 179	\$ 181	\$ 158
Massachusetts	\$ 16,973	\$ 17,785	\$ 18,615	\$ 1,457	\$ 1,554	\$ 1,595	\$ 194	\$ 197	\$ 180
Michigan	\$ 12,025	\$ 12,429	\$ 12,726	\$ 1,055	\$ 1,108	\$ 1,094	\$ 198	\$ 204	\$ 186
Minnesota	\$ 12,935	\$ 13,331	\$ 13,537	\$ 883	\$ 907	\$ 886	\$ 251	\$ 257	\$ 231
Mississippi	\$ 8,954	\$ 9,300	\$ 9,666	\$ 930	\$ 960	\$ 985	\$ 254	\$ 255	\$ 232
Missouri	\$ 10,941	\$ 11,229	\$ 11,281	\$ 1,091	\$ 1,125	\$ 1,133	\$ 287	\$ 293	\$ 259
Montana	\$ 11,675	\$ 11,955	\$ 12,096	\$ 1,146	\$ 1,181	\$ 1,233	\$ 193	\$ 186	\$ 184
Nebraska	\$ 12,801	\$ 12,736	\$ 12,924	\$ 1,128	\$ 1,147	\$ 1,200	\$ 254	\$ 242	\$ 236
Nevada	\$ 9,075	\$ 9,158	\$ 9,554	\$ 862	\$ 872	\$ 868	\$ 229	\$ 225	\$ 209
New Hampshire	\$ 16,159	\$ 16,660	\$ 17,053	\$ 1,330	\$ 1,382	\$ 1,394	\$ 254	\$ 256	\$ 232
New Jersey	\$ 19,407	\$ 20,371	\$ 20,549	\$ 1,945	\$ 2,037	\$ 2,010	\$ 254	\$ 256	\$ 232
New Mexico	\$ 9,557	\$ 10,173	\$ 11,289	\$ 979	\$ 1,068	\$ 1,135	\$ 237	\$ 255	\$ 232
New York	\$ 22,845	\$ 23,806	\$ 25,132	\$ 1,896	\$ 1,943	\$ 2,019	\$ 254	\$ 257	\$ 232
North Carolina	\$ 9,285	\$ 9,746	\$ 9,847	\$ 748	\$ 805	\$ 781	\$ 224	\$ 229	\$ 209
North Dakota	\$ 13,753	\$ 13,999	\$ 14,235	\$ 1,195	\$ 1,205	\$ 1,205	\$ 254	\$ 251	\$ 232
Ohio	\$ 12,752	\$ 13,294	\$ 13,547	\$ 1,106	\$ 1,150	\$ 1,145	\$ 233	\$ 235	\$ 212
Oklahoma	\$ 8,158	\$ 9,160	\$ 9,360	\$ 878	\$ 956	\$ 981	\$ 181	\$ 184	\$ 167
Oregon	\$ 11,878	\$ 12,432	\$ 12,810	\$ 927	\$ 964	\$ 999	\$ 177	\$ 182	\$ 170
Pennsylvania	\$ 16,174	\$ 16,638	\$ 16,935	\$ 1,492	\$ 1,555	\$ 1,558	\$ 258	\$ 262	\$ 231
Rhode Island	\$ 16,266	\$ 17,056	\$ 16,843	\$ 1,322	\$ 1,361	\$ 1,339	\$ 272	\$ 288	\$ 245
South Carolina	\$ 11,080	\$ 11,390	\$ 11,764	\$ 1,054	\$ 1,093	\$ 1,131	\$ 255	\$ 242	\$ 227
South Dakota	\$ 10,072	\$ 10,137	\$ 10,206	\$ 1,037	\$ 1,038	\$ 1,044	\$ 250	\$ 244	\$ 227
Tennessee	\$ 9,536	\$ 9,862	\$ 9,894	\$ 773	\$ 793	\$ 786	\$ 252	\$ 254	\$ 234
Texas	\$ 9,560	\$ 9,782	\$ 10,302	\$ 1,043	\$ 1,038	\$ 1,083	\$ 290	\$ 282	\$ 260
Utah	\$ 7,525	\$ 7,885	\$ 8,246	\$ 731	\$ 707	\$ 718	\$ 169	\$ 166	\$ 159
Vermont	\$ 19,471	\$ 20,019	\$ 20,906	\$ 1,574	\$ 1,642	\$ 1,590	\$ 254	\$ 252	\$ 232
Virginia	\$ 12,214	\$ 12,639	\$ 12,903	\$ 1,090	\$ 1,130	\$ 1,129	\$ 431	\$ 444	\$ 426
Washington	\$ 12,986	\$ 14,255	\$ 14,535	\$ 1,093	\$ 1,111	\$ 1,099	\$ 254	\$ 252	\$ 136
West Virginia	\$ 11,442	\$ 12,129	\$ 12,492	\$ 1,193	\$ 1,273	\$ 1,260	\$ 291	\$ 288	\$ 272
Wisconsin	\$ 12,159	\$ 12,487	\$ 12,624	\$ 1,319	\$ 1,296	\$ 1,237	\$ 227	\$ 230	\$ 206
Wyoming	\$ 16,131	\$ 16,221	\$ 16,631	\$ 1,623	\$ 1,633	\$ 1,684	\$ 372	\$ 373	\$ 352
Grand Total/ Average	\$ 12,485	\$ 13,037	\$ 13,393	\$ 1,152	\$ 1,198	\$ 1,216	\$ 252	\$ 253	\$ 231

Appendix G: Utility Expenditures as Percentages of Total Maintenance and Operations Expenditures and Total General Operating Expenditures for FY2018-FY2020, by State

STATES	FY18 % Utilities of M&O	FY19 % Utilities of M&O	FY20 % Utilities of M&O	FY18 % Utilities of Total Expenditures	FY19 % Utilities of Total Expenditures	FY20 % Utilities of Total Expenditures
Alabama	32%	31%	28%	3%	3%	3%
Alaska	31%	30%	30%	4%	4%	4%
Arizona	26%	25%	23%	3%	3%	3%
Arkansas	21%	20%	19%	2%	2%	2%
California	22%	20%	18%	2%	2%	2%
Colorado	19%	18%	16%	2%	2%	1%
Connecticut	14%	14%	13%	1%	1%	1%
Delaware	10%	9%	12%	1%	1%	1%
District of Columbia	20%	21%	18%	2%	2%	2%
Florida	25%	24%	21%	2%	2%	2%
Georgia	29%	28%	26%	2%	2%	2%
Hawaii	21%	20%	19%	2%	2%	2%
Idaho	36%	35%	31%	3%	3%	3%
Illinois	20%	19%	17%	2%	2%	1%
Indiana	27%	27%	24%	3%	3%	3%
Iowa	23%	23%	21%	2%	2%	2%
Kansas	26%	25%	23%	2%	2%	2%
Kentucky	27%	25%	24%	2%	2%	2%
Louisiana	19%	19%	17%	2%	2%	2%
Maine	19%	20%	17%	2%	2%	2%
Maryland	13%	13%	11%	1%	1%	1%
Massachusetts	13%	13%	11%	1%	1%	1%
Michigan	19%	18%	17%	2%	2%	1%
Minnesota	28%	28%	26%	2%	2%	2%
Mississippi	27%	27%	24%	3%	3%	2%
Missouri	26%	26%	23%	3%	3%	2%
Montana	17%	16%	15%	2%	2%	2%
Nebraska	23%	21%	20%	2%	2%	2%
Nevada	27%	26%	24%	3%	2%	2%
New Hampshire	19%	19%	17%	2%	2%	1%
New Jersey	13%	13%	12%	1%	1%	1%
New Mexico	24%	24%	20%	2%	3%	2%
New York	13%	13%	11%	1%	1%	1%
North Carolina	30%	28%	27%	2%	2%	2%
North Dakota	21%	21%	19%	2%	2%	2%
Ohio	21%	20%	18%	2%	2%	2%
Oklahoma	21%	19%	17%	2%	2%	2%
Oregon	19%	19%	17%	1%	1%	1%
Pennsylvania	17%	17%	15%	2%	2%	1%
Rhode Island	21%	21%	18%	2%	2%	1%
South Carolina	24%	22%	20%	2%	2%	2%
South Dakota	24%	23%	22%	2%	2%	2%
Tennessee	33%	32%	30%	3%	3%	2%
Texas	28%	27%	24%	3%	3%	3%
Utah	23%	24%	22%	2%	2%	2%
Vermont	16%	15%	15%	1%	1%	1%
Virginia	40%	39%	38%	4%	4%	3%
Washington	23%	23%	12%	2%	2%	1%
West Virginia	24%	23%	22%	3%	2%	2%
Wisconsin	17%	18%	17%	2%	2%	2%
Wyoming	23%	23%	21%	2%	2%	2%
Grand Total/Average	21.9%	21.1%	19.0%	2.0%	1.9%	1.7%



Image: istockphoto/CynthiaAnnF



*National Association of
State Energy Officials*