



# The Compound Benefits of Greening School Infrastructure

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# Introduction and summary

Across the country, more and more students are returning to their classrooms after what has been, for some, nearly a year of online learning. The school closures brought on by COVID-19 have underscored how critical the physical environment is to student well-being and educational success. And yet, for large populations of students—particularly those in communities with fewer resources and in Black, Latino, and other communities of color<sup>1</sup>—going back to school means going back to broken-down facilities with poor insulation and outdated ventilation systems.<sup>2</sup>

The deficiencies of school infrastructure have been exposed by the compounding crises of the COVID-19 pandemic and the record-breaking extreme weather events exacerbated by climate change. Last year, schools in Oregon burned in the worst wildfire season to date,<sup>3</sup> and schools in Florida flooded after Tropical Storm Eta.<sup>4</sup> In February, an extreme cold snap caused schools in Texas to freeze.<sup>5</sup> According to a 2020 report by the Government Accountability Office (GAO), 54 percent of U.S. school districts—a bulk of which primarily serve students of color—need to update or completely replace multiple building systems in their schools.<sup>6</sup> Without the funds to do so, these districts are increasingly vulnerable to the impacts of climate change and the exorbitant costs of rebuilding after it is too late. In 2016, for example, floods in West Virginia caused an estimated \$130 million in damages to regional schools.<sup>7</sup> In 2020, Hurricane Laura caused \$300 million in damages to the Lake Charles public school system in Louisiana, with 74 of 76 schools in disrepair and more than half of the district’s 350 school buses inoperable.<sup>8</sup>

The urgency of investing in school infrastructure has never been greater, but, arguably, neither has the opportunity. The recent enactment of the American Rescue Plan by Congress—both through education funds and state and local fiscal recovery funds—will provide schools with an important down payment on the capital upgrades needed to address COVID-19.<sup>9</sup> With this relief funding en route, Congress should shift to providing long-term funding to adequately and equitably update school infrastructure, equipping schools to withstand the disasters ahead and to participate in the clean energy transition.

In his American Jobs Plan, President Joe Biden called for the investment of \$100 billion to upgrade and build new public schools.<sup>10</sup> The prioritization of climate change throughout the plan underscores that this transformation of the public school system can and should work in tandem with the country's transformation to a 100 percent clean future. By increasing spending on local school infrastructure needs, Congress would not only stimulate the economy but also advance climate change solutions and reduce the number of instructional days missed by students due to public health and environmental factors. Finally, federal school funds could begin to redress the deep infrastructure inequities that plague public school districts.

This report will review the need for federal school infrastructure funding, the benefits of both immediate and long-term school infrastructure upgrades, and the ways in which these upgrades can spur greater climate action. All students, regardless of their background, deserve access to a safe and healthy learning environment that will foster their growth and set them up for long-term success. Strong and targeted federal investment will enable the education sector to lead the country in its transition to a more equitable and just 100 percent clean future, including—and perhaps especially—for the country's youngest generations.

# The need for federal investment in school infrastructure

Despite representing the nation's second-largest infrastructure sector,<sup>11</sup> public schools have historically been excluded from federal infrastructure legislation.<sup>12</sup> A 2016 report found that national spending for K-12 school buildings falls short by an estimated \$46 billion annually.<sup>13</sup> Public schools receive the vast majority of their funding from state and local government sources. Many states have avoided the worst of their projected budget losses during the pandemic, but the same cannot be said at the local level.<sup>14</sup> For school districts with already meager tax bases, the coronavirus-induced recession further reduced the local governmental revenues needed to cover the facilities upgrades required to safely return students to the classroom.

Budget shortfalls are particularly serious for school districts in communities with fewer resources, which often primarily serve students of color. Majority nonwhite districts generate less funding from local property taxes, the primary source of local education funding and the main funding mechanism to upgrade school facilities.<sup>15</sup> As a result, they must rely more heavily on state education funding to cover both day-to-day operations—including teacher salaries, student services, and classroom materials—and infrastructure upgrades.

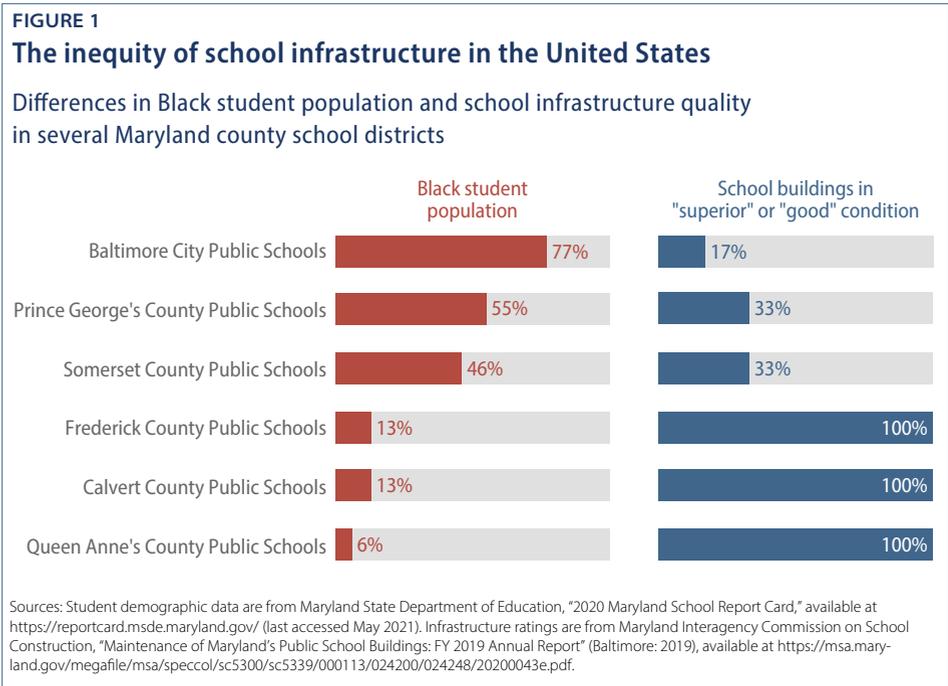
The funding gap between school districts serving primarily students of color and school districts serving primarily white students stems from a history of discriminatory housing policies, or redlining, in the United States.<sup>16</sup> The refusal by the federal government to insure mortgages in communities of color has resulted in depreciating home values and, ultimately, less funding for school districts in those communities. The impacts of redlining are still felt by students today: Majority nonwhite districts receive \$23 billion less in funding every year compared with majority-white districts.<sup>17</sup>

Falling state and local tax revenues will amplify the historical disparities in quality of school infrastructure that predate the pandemic. For example, Baltimore City Public Schools in Maryland serves a student population that is almost 77 percent Black and 7.5 percent white,<sup>18</sup> and in a 2019 state report, only 17 percent of Baltimore city school buildings were rated as being in “superior” or “good” condition.<sup>19</sup> Meanwhile,

Frederick County Public Schools, also in Maryland, serves a student population that is nearly 13 percent Black and more than 57 percent white;<sup>20</sup> in contrast, 100 percent of the county’s school buildings were rated as being in “superior” or “good” condition.<sup>21</sup> Without access to the kinds of property tax revenues available to many majority-white districts, districts serving students of color will be even less capable of repairing and maintaining school facilities in the wake of COVID-19. In this way, federal school infrastructure investment is about not only upgrading school buildings but also addressing the long-standing, ongoing need for racial justice and educational equity.

Any money that is spent on schools in the next few years is likely to go toward operational changes and air quality improvements tied to COVID-19 protocols. These investments are crucial, but they are only half the story. Without additional funding from the federal government, schools will be unable to make the large-scale capital expenditures necessary to provide every student with a safe, healthy, and supportive learning environment or address the threats posed by climate change. Federal school infrastructure funds should therefore focus on two phases of school improvements: 1) capital improvements intended to meet COVID-19 health protocols and 2) long-term repair, reconstruction, and expansion projects designed to improve student learning and achieve climate sustainability goals.

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# Immediate upgrades to secure student health

The importance of healthy air quality in classrooms has gained renewed attention because of COVID-19, which spreads more rapidly in poorly ventilated areas.<sup>22</sup> As of June 2020, however, one-third of schools still needed to update or replace their heating, ventilation, and air conditioning (HVAC) systems. And this estimate is low, given that the GAO research underlying this number was conducted before the pandemic and therefore does not factor in the additional system modernization requirements necessary to achieve new public health standards for air quality and ventilation.<sup>23</sup> When HVAC systems break down, they stop properly filtering and circulating the air in a classroom.<sup>24</sup> This poor air quality can then contribute to and worsen respiratory illnesses among children,<sup>25</sup> including asthma—one of the leading causes of school absenteeism.<sup>26</sup> In 2013, the Centers for Disease Control and Prevention found that children, ages 5 to 17, with asthma collectively missed almost 14 million days of school, or 2.6 days per child.<sup>27</sup> While upgrades to HVAC systems are one of the most well-documented ways that schools can promote student health, especially during the transition back to in-person learning,<sup>28</sup> they can cost schools millions of dollars; and many schools will need additional financial resources to afford them.<sup>29</sup>

# Long-term upgrades to support student learning and school resilience

Investments in HVAC systems must be accompanied by long-term infrastructure improvements, including school bus electrification and clean energy and energy efficiency retrofits, to ensure that schools can protect student health and advance student learning for years to come.

School buses currently make up about 90 percent of the U.S. bus fleet, but less than 1 percent of them—about 475,000 buses—are electric.<sup>30</sup> Most other school buses are powered by diesel and often leak dangerous fumes into the cabin, subjecting children to harmful pollutants. In 2001, a study by the Natural Resource Defense Council found that children riding inside diesel school buses are exposed to as much as four times the diesel exhaust as those standing or riding in cars alongside the bus.<sup>31</sup> In addition to increasing children's susceptibility to respiratory illnesses, exposure to localized traffic pollution such as diesel exhaust has been found to impair student achievement.<sup>32</sup> By electrifying their school bus fleets, school districts would improve local air quality and realize the associated health and learning benefits for their students.

Studies have also linked student performance to the design quality and condition of school buildings, including their thermal comfort, quietness, and abundance of natural light.<sup>33</sup> In one study of heat exposure in New York City, high schools students were found to be 12.3 percent more likely to fail an exam on a 90-degree day than on a 72-degree day.<sup>34</sup> Yet test-taking in extreme heat is not uncommon, as more than one-third of school districts in the United States do not have adequate air conditioning in at least half of their schools.<sup>35</sup> Making matters worse, the number of plus-90-degree days is projected to at least double by midcentury due to climate change—one of many ways in which climate change will continue to jeopardize school learning environments in the absence of adaptation.<sup>36</sup>

In the face of intensifying temperature extremes and disaster events, long-term investments in school infrastructure will be central to maintaining the health and educational success of students. School districts will need the support of federal funds to

increase school resilience, not only by weatherizing their buildings through energy efficiency and other improvements but also by installing clean energy technologies such as solar power, battery storage, and microgrids, which enable schools to independently generate and sustain electricity during grid outages.<sup>37</sup>

### **Resilience in Apollo Elementary School, Florida**

When Hurricane Irene struck Florida in September 2017, more than 5 million homes and businesses were left without power.<sup>38</sup> In the coastal town of Titusville, Florida, however, residents could access heat and electricity by sheltering in Apollo Elementary School,<sup>39</sup> one of 115 schools in the state that was retrofitted with solar power and energy storage systems through the SunSmart E-Shelter Schools program, which was funded by the American Recovery and Reinvestment Act—the economic recovery package passed under President Barack Obama in 2009.<sup>40</sup>

More than one-third of school districts in the United States do not have adequate air conditioning in at least half of their schools.

# Schools as models for decarbonization

While K-12 schools are not themselves a major contributor to climate change, they are uniquely positioned to function as models for the deployment of clean energy technology. School buildings, for example, only account for about 7.7 percent of the total primary energy use of commercial buildings.<sup>41</sup> Yet they present a critical opportunity to demonstrate approaches to reducing greenhouse gas emissions and other harmful pollution and could lead the way for decarbonizing all nonresidential buildings, including through achieving higher levels of efficiency and accelerating the switch to all-electric building systems. Over time, these energy upgrades would result in long-term savings that schools could put toward other priorities.<sup>42</sup> The Batesville School District in Arkansas, for example, is projected to save at least \$2.4 million over the next 20 years after retrofitting its facilities and installing solar power; the district will use a portion of these savings to increase teacher salaries by an average of \$2,000 to \$3,000 a year.<sup>43</sup>

The same holds true for school buses. President Biden has committed to making all American-made buses zero-emission by 2030, starting with the transition of the school bus fleet over the next five years.<sup>44</sup> School buses are one small part of the mobile source emissions of greenhouse gases, but they can lead the effort to decarbonize medium- and heavy-duty vehicles while reducing local air pollution in the process.

These kinds of climate-forward infrastructure investments would also generate construction, maintenance, and other clean energy jobs in local communities. An analysis from the Economic Policy Institute estimated that every \$1 billion of public funding spent on construction generates 17,785 jobs.<sup>45</sup> Building maintenance staff also play an important role in ensuring ongoing sustainability efforts.<sup>46</sup> Policymakers are increasingly working to ensure that green jobs are good, well-paying jobs,<sup>47</sup> and research shows that supporting high-quality jobs can boost wages, reduce inequality, and increase hiring equity without a significant impact on overall project costs.<sup>48</sup> Schools across the country have helped introduce students to these professional opportunities by adopting clean energy curriculum and career and technical education (CTE) programs in tandem with infrastructure upgrades.<sup>49</sup>

The installation of clean energy technology in schools is closely tied to the increase in favorable clean energy utility incentives, the enactment of clean energy government policies, and the availability of third-party financing options.<sup>50</sup> In other words, as the conditions for adopting clean energy become more accessible and economically advantageous nationwide, schools are increasingly well-positioned to integrate clean energy into their building systems and bus fleets.

Meanwhile, federal funding for school infrastructure would help school districts to capitalize on the country's clean energy momentum and, in regions of the United States where favorable conditions are less prevalent, enable schools to overcome the initial capital investments that often make major infrastructure upgrades less feasible. Demonstrating successful zero-emission approaches in schools would then accelerate the deployment of similar solutions throughout the economy while ensuring that children are the first to benefit.

### **Solar installations in Stockton Unified School District, California**

In Northern California, the Stockton Unified School District (SUSD) has made big strides to incorporate clean energy into its schools over the past five years. SUSD comprises 54 schools and about 40,000 students, 82 percent of whom live in high-poverty or disadvantaged communities. Using power purchase agreements, SUSD installed solar power at more than 60 percent of its schools from 2015 to 2019. In January 2020, the district was also awarded \$4.9 million from the California Air Resources Board, which SUSD partially directed toward electrifying school buses. Now, SUSD has the infrastructure to charge 24 electric school buses, and two of its largest high schools have battery storage systems. SUSD expects to save \$22 million in the first 10 years of its climate and clean energy initiatives.<sup>51</sup>

At an event hosted by the K12 Climate Action Initiative, energy education specialist Gilbert Rosas said that actualizing SUSD's vision was made possible by California's unique funding sources, including state grant programs.<sup>52</sup> By increasing the availability of federal funds for school infrastructure, Congress would provide more schools across the country with the opportunity to pursue and implement similar projects.

# Recommendations

In alignment with President Biden’s Build Back Better agenda, Congress should direct long-term federal funding toward the advancement of healthy, resilient, and energy-efficient schools that can truly support student learning. This federal funding for K-12 schools should supplement, not replace, state education funding, and Congress should center its provision around the same principles established in the American Jobs Plan:

- **Equity and justice:** Policymakers should distribute federal funding in a way that promotes equity and justice for disadvantaged communities. This includes prioritizing funding for the schools most in need of extensive infrastructure repairs.
- **Good job creation:** Policymakers should ensure that green school infrastructure investments support high-quality, domestic jobs that are accessible to Americans from all walks of life.<sup>53</sup> Jobs receiving government support should pay family-supporting wages and benefits, including prevailing wages; respect workers’ right to join a union; prohibit discrimination and expand access through paid training and apprenticeship opportunities; and create jobs in the United States.<sup>54</sup>

Specifically, Congress should aim to enhance school infrastructure in the following ways, while also including the equity, job quality, and state protections profiled above:

Increase the electrification and proliferation of zero-emission school buses

One of the most significant barriers to electrifying school bus fleets is the up-front capital cost. To minimize this financial barrier, Congress should increase grant funding for diesel bus replacement and electric charging infrastructure.

Accelerate K-12 school retrofits to ensure a safe and healthy learning environment

Congress should provide sufficient funding to retrofit all K-12 public schools to make them healthy, highly efficient, and all-electric. Outside of clean energy and energy efficiency improvements, additional funding should be provided to remediate environmental hazards such as lead pipes, lead paint, and polychlorinated biphenyls in light ballasts—all of which can have serious and long-term health effects.

## Build climate-resilient K-12 schools

To be adequately prepared for the climate crisis, K-12 schools will need the support of federal funding to invest in buildings, playgrounds, and sports facilities that can withstand increasingly extreme temperatures and weather events. This funding should assist schools with disaster recovery, the construction of climate-ready infrastructure, and the installation of clean energy storage and microgrid systems. These investments will create a safer school environment while reducing the cost and number of school days missed because of post-disaster repairs.

In addition to targeted school infrastructure funding, Congress should invest in complementary education and clean energy policies that will facilitate the advancement of green, pollution-free schools. For example, the enactment of long-term clean electricity tax credits would incentivize increased renewable energy generation, making school upgrades such as solar installations more affordable.<sup>55</sup> Together, these policies can revolutionize the future of school infrastructure and, by extension, the future of student learning, health, and well-being.

# Conclusion

The need for federal investment in school infrastructure has never been greater. The COVID-19 pandemic, backdropped by the climate crisis, has made clear that the deteriorating state of school infrastructure in the United States is compromising the ability of students to thrive. This is especially true for Black, Indigenous, and non-Black people of color, who disproportionately experience the disruption and impacts caused by these crises and are more likely to live in underfunded school districts.

President Biden has called for \$100 billion to upgrade school infrastructure in his American Jobs Plan. Now, Congress has the responsibility—and a once-in-a-generation opportunity—to prioritize long-term investments in school infrastructure that advance climate resilience, energy efficiency, and healthy, productive learning environments. These investments would deliver critical, compound benefits to students while creating high-quality jobs and addressing systemic racial injustices inside the classroom.

Building back better must begin with equitably and justly repairing the institutions most critical to the fabric and future of the United States. Providing schools with the infrastructure and clean energy technology they need is an investment in the health and safety of not only today's students but the many generations of students to come.

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## Acknowledgements

The authors would like to thank Bill Shiebler from the American Federation of Teachers as well as Mia Korinke, Lee Smith, and Larry Engelstein from the Climate Jobs National Resource Center for their contributions to this report. The authors would also like to thank Laura Jimenez, Trevor Higgins, Malkie Wall, Khalilah Harris, Christian Rodriguez, Thomas Waldrop, Andres Vinelli, and Cathleen Kelly from the Center for American Progress for their feedback throughout the drafting process.

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## Our Mission

The Center for American Progress is an independent, nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.

## Our Values

As progressives, we believe America should be a land of boundless opportunity, where people can climb the ladder of economic mobility. We believe we owe it to future generations to protect the planet and promote peace and shared global prosperity.

And we believe an effective government can earn the trust of the American people, champion the common good over narrow self-interest, and harness the strength of our diversity.

## Our Approach

We develop new policy ideas, challenge the media to cover the issues that truly matter, and shape the national debate. With policy teams in major issue areas, American Progress can think creatively at the cross-section of traditional boundaries to develop ideas for policymakers that lead to real change. By employing an extensive communications and outreach effort that we adapt to a rapidly changing media landscape, we move our ideas aggressively in the national policy debate.

