

MITIGATION

The nation's 98,000 K-12 public schools have a significant environmental impact.¹ In order to serve over 50 million students in every community across the country, schools have a variety of resource needs that impact the environment, including energy, buildings, land, food, water, and transportation.² In fact, schools are one of the largest public sector energy consumers, operate the largest mass transit fleet in the country, occupy 2 million acres of land, and serve over 7 billion meals annually with related food waste.³ Energy, transportation, food, and other school operations all contribute to the sector's carbon emissions, and as public entities, our schools require the support of the public to decarbonize.

In addition to benefiting the environment, improving sustainability in schools can protect the health and safety of students and educators, improve learning outcomes, and build resilience for communities.⁴ Poor indoor air quality, contaminated drinking water, environmental hazards, and diesel pollution have significant impacts on student health and learning.⁵ Efforts such as transitioning to electric school buses and electrifying buildings can help reduce air pollution. Ensuring schools have clean water, green schoolyards, and modern HVAC systems are three examples of how sustainable infrastructure supports students' health by reducing the risks of asthma in children and improving attendance.⁶ Supporting schools in serving healthy food, including locally-grown sustainable food, can promote better child nutrition and healthy eating habits.⁷

Helping our schools mitigate their environmental impact enables schools to create healthy sustainable learning environments for children and communities. Providing these learning environments which improve health and learning outcomes can reduce longer-term healthcare costs and improve participation in the economy.⁸ Sustainability efforts also reduce costs for schools and districts on maintenance and operations, allowing schools to repurpose funding previously spent on operational costs to teaching and learning.

As schools transition to more sustainable practices in their buildings, grounds, and transportation, they create hands-on learning opportunities for students.⁹ Actively engaging in sustainable practices and climate mitigation at school can help students understand how they can take climate action, which creates a sense of agency. Educators can use school infrastructure and sustainability improvements to teach students about clean energy, composting, electric vehicles, and more, enabling them to be better prepared to support our larger societal efforts for decarbonization.



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

School Buildings and Energy

Buildings account for almost 40% of carbon dioxide emissions in the U.S., and with over 98,000 school buildings across the country, schools have the collective potential to help lower greenhouse gas emissions.¹⁰ Energy costs are the second-largest costs for school districts, second only to salaries.¹¹ Reducing schools' environmental impacts through energy efficiency, clean energy, energy education, and sustainable infrastructure has environmental, financial, and health benefits.



WHAT WE'VE HEARD

During our listening session on mitigation, energy education specialist Gilbert Rosas of Stockton Unified School District in California spoke about helping students promote energy efficiency within their schools through the student energy patrol program.¹² Gilbert shared that the school district is on track to save \$22 million in ten years through energy conservation, solar panels, and solar battery storage at schools.

Using solar energy is one way schools can lower their environmental footprints and contribute to reducing greenhouse gas emissions. Solar-powered schools are becoming more popular each year. As of 2019, there were 6,839 solar public K-12 schools in the U.S., with a 144% growth rate in the last five years.¹³ Yet, there is still a significant gap — only 7% of public schools currently use solar energy. This creates huge potential to support the expansion of solar panels on school campuses. Schools can make use of solar energy, other renewable energy sources, and energy-efficiency improvements through either new construction or retrofitting existing buildings. Renewable energy for schools with battery storage can also have the added benefit of building community resilience by creating microgrid energy systems for the community. Direct ownership of solar can maximize annual cost-saving benefits for schools, or, currently, about half of all states allow power purchase agreements which enable third-party ownership and minimize upfront costs.¹⁵

Other infrastructure improvements such as geothermal heating and cooling, LED lighting, and green roofs can help schools decrease their reliance on fossil fuels and support decarbonization. Berkeley County Schools in West Virginia installed geothermal heating and cooling systems in seven schools and made additional energy efficiency upgrades, resulting in a 75% decrease in energy use in those schools.¹⁵ In Virginia, the Manassas Park Elementary School building design uses a variety of innovative strategies for lighting, ventilation, and insulation. Together, the sustainability measures are expected to reduce carbon emissions by 37% and use nearly half as much energy as the average K-12 school building.¹⁷ As schools begin to incorporate more sustainable facilities improvements, they can consider pursuing sustainability-related certificates from existing programs, such as Leadership in Energy and Environmental Design (LEED) and the Collaborative for High Performance Schools.



BRIGHT SPOTS

In Arkansas, Batesville School District worked with teachers to

reduce energy consumption and installed solar panels on two schools.¹⁶ The combined 1,483 solar panels generate half of the district's energy needs and save the district \$100,000 per year in energy costs. The district is on track to save \$4 million over 20 years from a combination of solar power generation, energy conservation, and improved water efficiency, with a portion of the savings already being used to raise teacher salaries. Teachers also received training on how to incorporate solar technology into STEM classes.



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

Net-zero energy schools, which produce as much clean energy as they consume, have especially high benefits for both the environment and school budgets.¹⁸ As of 2019, 11 states had at least one public K-12 school that was net-zero energy certified or verified by the New Buildings Institute, and 17 states had at least one public K-12 school which was considered net-zero energy emerging.¹⁹ To achieve net-zero emissions, schools often use solar panels as well as building designs and other elements that support energy efficiency. While many net-zero energy schools are built new, schools can also retrofit existing buildings to achieve net-zero or close to net-zero energy status. Importantly, designing new buildings to target net-zero energy can often be done in the same budget as other new buildings.

Many schools around the country, however, have aging infrastructure, which has negative implications for energy efficiency, health, and learning. A recent GAO report found that 54% of districts need to replace at least two building systems in many of their schools.²⁰ In total, the country underinvests in school facilities by \$46 billion annually.²¹ Communities of color and low-income communities are more likely to have aging infrastructure and higher maintenance costs due to inequitable school funding structures and historic underinvestment.²² These additional costs often prevent these communities from being able to afford the upfront costs needed to improve school infrastructure. Sustainability focused school infrastructure investments will be critical to help the education sector transition schools to clean energy.



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School Transportation

Students use a variety of transportation methods to get to school, including biking, walking, public transportation, school buses, and private cars. These options represent a range of environmental impacts, and each transportation option comes with different safety concerns and feasibility across communities. School buses are one of the most common ways students get to and from school — during the 2018-19 school year, 57% of public school students took school buses to get to school.²³ Students from low-income families are more likely to ride school buses to get to school than students from higher-income families who may have more transportation options.²⁴



BRIGHT SPOTS

In Maryland, Montgomery County Public Schools (MCPS) recently announced a plan to transition its entire bus fleet* to electric through a partnership with Highland Electric Transportation.³⁰ Highland Electric will lease the buses to MCPS and take care of maintenance and operations for the same price the district would typically pay to purchase and maintain a diesel bus, reducing the challenge of higher upfront costs.



BRIGHT SPOTS

Stockton Unified School District (SUSD) has also partnered with private companies to transition to electric school buses through grants from the California Air Resources Board, the California Energy Commission, and rebates from the local utility company.³¹ Less than a year after submitting the first grant proposal, the district has built charging stations and acquired its first set of electric buses. Supporting more districts in making plans, accessing funding, and building needed charging infrastructure can help schools transition their school bus fleet to electric.

The nation's 480,000 school buses are the largest mass transit fleet in the country.²⁵ During the 2017-2018 school year, school buses drove nearly 23.3 million students about 3.45 billion miles. Currently, 94% of school buses are diesel powered.²⁶ Diesel engines create air pollution, which contributes to climate change, harms students' health, and impacts academic performance and absenteeism.²⁷ Students of color are disproportionately exposed to air pollution, contributing to higher rates of asthma and other health issues.²⁸

Transitioning to electric school buses has substantial environmental, economic, and health benefits. Electric school buses eliminate tailpipe emissions, meaning that schools utilizing these buses will have students breathing cleaner air. Electric school buses save an estimated \$2,000 in fuel costs and \$4,400 in maintenance costs annually.²⁹ Over the lifetime of the bus, an electric school bus is projected to save a district \$170,000 in maintenance and fuel costs.

Though the upfront costs are currently higher than diesel buses, grants, public-private partnerships, and other financing mechanisms are substantially reducing costs for districts. Importantly, transitioning to electric buses also requires building the needed charging infrastructure and supporting workforce training to help maintain and operate electric buses. Policymakers can also help ensure that diesel buses are decommissioned to prevent them from further contributing to pollution and emissions in another community.

In addition to electric school buses, communities can also take other steps to reduce transportation emissions associated with students' commutes to school. City-led efforts to increase safe routes to school for walking and biking can support alternative, emission-free methods of transportation. Many students also take public transportation to school, and city efforts to electrify public transit can reduce emissions from students' commutes to school.



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

*The transition will occur in phases, beginning with 25 buses in fall 2021, with a goal of completing the transition of all 1,422 buses by 2035.

School Food

Schools are critical food providers, serving over 7 billion meals annually.³² The process of purchasing, using, and disposing of food contributes to schools' environmental footprints. Sourcing food that is grown locally and sustainably is better for the environment and local economies. Working with local food vendors can also help schools incorporate more fresh produce, which is important for child nutrition. Schools and districts with kitchen equipment that supports cooking from scratch — rather than solely refrigerating and heating pre-packaged food — can more easily serve meals that use fresh local produce.

Currently, 34 states and DC have at least one policy — for instance incentives for local procurement or farm-to-school programs — to encourage the use of local-sourced food in schools.³³ School gardens, supported by 18 states, coupled with food education have helped students understand the benefits of healthy eating, and research has found that students in schools with school gardens and garden education eat more fruits and vegetables.³⁴ With 88% of school breakfasts and 77% of school lunches served to low-income students, serving more sustainable and nutritious food in schools can also help improve health for these students.³⁵

Schools also contribute to the country's challenges with food waste. Schools produce an estimated 530,000 tons of food waste annually.³⁶ As food sits in landfills, it emits methane, a potent greenhouse gas that contributes to climate change. Food waste in schools has a financial cost as well – an estimated \$1.24 billion each year.³⁷ Importantly, research suggests that healthier school food does not impact food waste.³⁸ Efforts to reduce food waste can consider how to divert or repurpose the waste.

Schools can reduce food waste by diverting surplus food through share tables or food donation programs. Currently, 14 states have policies or programs that allow or encourage these efforts.³⁹ Food that is not suitable to be donated can be composted instead of thrown away. Currently, five states and DC have composting policies, and two states allow or encourage composting as part of school garden or recycling programs. Schools have also been working to add kitchen dishwashing capability to reduce an over-reliance on single use plastic with school meals.⁴⁰

Ensuring schools and policymakers consider the full process of food in schools (procurement, menu, and waste) can help schools mitigate their impact. Schools have also been working to add dishwashing capability to reduce an over-reliance on single use plastic with school meals.⁴¹



BRIGHT SPOTS

In California, Oakland Unified School District has a sustainability manager who focuses on reducing food waste, creating a Food Share program at every school and increasing compost programs.⁴² San Diego Unified School District's Love Food Not Waste program takes food that has been prepared but not taken by students and makes it available for local hunger relief organizations.⁴³ Between 2016-2019, the program rescued 530,900 pounds of food from schools and eliminated 275,200 pounds of greenhouse gas emissions.⁴⁴



Water Use, Other Consumption, and Waste

Water, paper, and other resources are essential to meet the needs of students and staff, but can also contribute to high levels of unnecessary waste. Using water efficiently is better for the environment and can save schools money.⁴⁴ Conserving water is particularly important as climate change increases the length and severity of droughts in many parts of the country.⁴⁶ Reducing water use also saves energy which reduces greenhouse gas emissions. Efforts to conserve water in schools can include using water-efficient appliances and irrigation systems, repairing leaks, and managing water runoff.⁴⁷

Materials that are thrown away end up in landfills, which are the third-largest source of human-related methane emissions in the country.⁴⁸ Schools can work to lower the amount of waste they produce by minimizing the use of single-use plastics and other materials, implementing effective recycling programs*, and using supplies made from recycled products, among other efforts.⁴⁹ As discussed above, schools can also work to limit food-related waste by using and composting sustainable food packaging.

Whether reducing water use or increasing recycling programs, creating a culture of conservation among students, teachers, and other school staff is crucial to success. Educators can also incorporate resource conservation into their lessons through hands-on activities and school-wide sustainability practices such as rainwater harvesting and upcycling.

*Some materials, such as paper and aluminum, are easier to recycle than others. According to EPA data, less than 9% of plastics were recycled in 2018.



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

District Efforts to Move Schools Toward Sustainability & Clean Energy

Over the last few years, school districts across the country have been developing sustainability plans and committing to use clean energy. Students are often key leaders in these efforts, working with communities and school board members to push for climate action in schools.

The School District of Philadelphia launched its GreenFutures five-year sustainability plan in 2016 with a goal of improving sustainability education and operations in every school.⁵⁰ GreenFutures spans five areas of sustainability, from consumption and waste to school greenscapes, with targets and specific actions for each area. The plan also emphasizes community engagement, equity, and educational opportunities.

In response to collaborative campaigns from students, parents, and climate-focused organizers, a growing number of school boards have passed clean energy resolutions, including:

- In July 2015, **San Diego Unified School District** passed a resolution calling for an action plan to help the district transition to 100% clean energy by 2035 and pursue other sustainability goals.
- In December 2019, **Los Angeles Unified School District** passed a resolution committing to transition to 100% clean, renewable electricity by 2030 and to electrify buildings and buses by 2040.
- In June 2020, **Salt Lake City School District** passed a resolution committing to 100% clean energy for electricity by 2030 and 100% carbon neutral energy for all operations by 2040.
- In February 2021, **Seattle Public Schools** passed a resolution committing to 100% clean and renewable energy by 2040 or earlier.
- In April 2021, **Miami-Dade County Public Schools** passed a resolution to transition the district to 100% clean energy by 2030.



WHAT WE'VE HEARD

As we heard from Salt Lake City students Mahider Tadesse and Andie Madsen, intergenerational collaboration was critical to passing the resolution and students are actively involved in implementation plans. Since the resolution passed unanimously in June 2020, Andie shared that she has already seen similar student-led efforts begin in other districts in Utah:

“One of our selling points for the campaign was that this is a nationwide movement that’s happening, but already the effects of our climate leadership in Salt Lake City are being realized in parts of Utah, which is a fossil-fuel heavy state.”

Many districts around the country have already worked to prioritize sustainability and take climate action. Building on these existing efforts, supporting their implementation, and sharing their success can help create momentum to reduce the environmental footprint of the education sector. Policymakers, educators, parents, caregivers, and students can mitigate climate change in schools by collaborating across generations and emphasizing how taking climate action now can create a healthier and more stable future for today’s students.



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