

U.S. DEPARTMENT OF EDUCATION INFRASTRUCTURE AND SUSTAINABILITY NOTES



How School Operations Affect the Environment

As our nation looks to reduce carbon emissions to slow climate change, school administrators must not overlook the environmental impact of school operations. Schools are uniquely situated to shift mindsets as they drive innovation and workforce preparation. They are also fundamental to equitable and resilient community development.

The country's 99,000 K-12 public schools account for a large portion of public sector buildings.¹ Nearly 50 million students are enrolled in, and 3.2 million full-time equivalent teachers work at, these schools.² K-12 public schools alone spent about \$79 billion in capital expenditures in 2020-21,³ making these school facilities the second largest area of public spending on capital outlay, after highways, by state and local governments.³ In general, the education sector, across both non- and public schools and at various levels, presents opportunities for the United States to reduce environmental impacts and costs.

School Environmental Impact by the Numbers

While there is no national database on school facilities and grounds conditions, independent researchers and public agencies have studied different types of schools to better understand the sector's environmental impacts. These data points, while still providing an incomplete picture, can offer a sense of the scope of schools' environmental impact, and the possible ways that the education sector can collectively reduce its environmental footprint:

- The U.S. Energy Information Administration reports that the education sector at large, including both postsecondary institutions and K-12 schools, annually spends \$8 billion on energy,⁴ and emits an estimated 72 million metric tons of carbon dioxide, equivalent to 18 coal-fired power plants.⁵ While K-12 school buildings' energy use intensity is not itself high when compared with other sectors, there are interesting trends, such as education being the largest consumer of natural gas.⁶
- Nationwide, K-12 schools are estimated to manage 2 million acres of land, an area roughly twice the size of the state of Rhode Island,⁷ and 8.1 billion gross square feet of buildings, equivalent to nearly half the area of all U.S. commercial office space.⁸

¹ Number of public school districts and public and private elementary and secondary schools: Selected school years, 1869-70 through 2021-22, https://nces.ed.gov/programs/digest/d22/tables/dt22_214.10.asp?current=yes.

² National Center for Education Statistics. "The NCES Fast Facts Tool Provides Quick Answers to Many Education Questions". Ed.gov. National Center for Education Statistics. 2018. <https://nces.ed.gov/fastfacts/>.

³ National Center for Education Statistics. "Revenues and Expenditures for Public Elementary and Secondary Education: FY 21 FINANCE TABLES." National Center for Education Statistics. 2023. <https://nces.ed.gov/pubs2023/2023301.pdf>.

⁴ Better Buildings Initiative. "K-12 School Districts". U.S. Department of Energy. 2023. <https://betterbuildingssolutioncenter.energy.gov/sectors/k-12-school-districts>.

⁵ Sierra Club. "100% Clean Energy School District Organizing Toolkit". Sierra Club. April 2019. <https://drive.google.com/file/d/1z8JPlamVfey-XiqO-MPY-zcIijTxiUk/view?usp=sharing>.

⁶ U.S. Energy Information Administration. "2018 Commercial Buildings Energy Consumption Survey – Consumption and Expenditures Highlights". U.S. Energy Information Administration: 17, <https://www.eia.gov/consumption/commercial/data/2018/pdf/CBECs%202018%20CE%20Release%20%20Flipbook.pdf>.

⁷ "K12 CLIMATE ACTION PLAN." 2021: 6, <https://www.thisisplaneted.org/img/K12-ClimateActionPlan-Complete-Screen.pdf>.

⁸ Filardo, Mary. 2021. Review of "2021 State of Our Schools: America's PK-12 Public School Facilities". Washington, D.C.: 21st Century School Fund. 27, <https://www.wellcertified.com/state-of-our-schools>.

- The K-12 public school fleet is the largest mass transit system in the United States. As of 2023, less than 2 percent of the country's estimated 480,000 school buses are electric, although even this seemingly small number represents a tremendous increase from past years.⁹
- In 2022, K-12 public schools served an estimated 4.9 billion school lunches.¹⁰ A 2019 study estimated that public school districts waste 530,000 tons of food a year, accounting for nearly 2 million metric tons of carbon dioxide, which are emissions equivalent to nearly half a million gas-powered vehicles driven for one year.¹¹

Challenges and Opportunities

Schools - especially those located in areas of high poverty and traditionally under-resourced communities - face significant challenges in maintaining and improving their facilities. The 2021 State of Our Schools Report found that, considering both maintenance and operations and capital investment, school facilities are underfunded by \$85 billion each year.¹² In addition, the U.S. Government Accountability Office found that, in 2020, half of districts needed to replace or update multiple building systems such as heating, ventilation and air conditioning or plumbing.¹³ Natural disasters also present a challenge to the physical environment of schools, and these adverse effects are felt disproportionately by schools serving socially vulnerable groups.¹⁴



CLEMENT AVENUE SCHOOL IN MILWAUKEE, WI, REDESIGNED SCHOOL GROUNDS TO PROVIDE ADDITIONAL OPPORTUNITIES FOR PHYSICAL ACTIVITY, LEARNING, AND REDUCE STORMWATER RUNOFF.

Schools can access both funding opportunities and tax incentives to support reducing their environmental impacts, especially by adopting energy efficient and renewable energy technologies.¹⁵ Schools can access resources to learn how they can reduce their environmental impact on the [Green Strides School Sustainability Resource Hub](#). The [U.S. Department of Education Green Ribbon Schools \(ED-GRS\) criteria](#) offer many ways to reduce environmental impacts and costs as the first pillar of this recognition award, including greenhouse gas emissions reductions, energy efficiency, water conservation, waste reduction, and clean transportation.

⁹ Lazer, Leah, and Lydia Freehafer. 2021. "The State of Electric School Bus Adoption in the US." World Resources Institute. <https://www.wri.org/insights/where-electric-school-buses-us>.

¹⁰ United States Department of Agriculture Economic Research Service. "National School Lunch Program". United States Department of Agriculture. <https://www.ers.usda.gov/topics/food-nutrition-assistance/child-nutrition-programs/national-school-lunch-program/#:~:text=In%20FY%202022%2C%20the%20program,or%20at%20a%20reduced%20price>.

¹¹ "Food Waste Warriors: A Deep Dive into Food Waste in US Schools." 2019. World Wildlife Fund: 3, <https://www.worldwildlife.org/stories/food-waste-warriors>.

¹² Filardo, Mary. 2021. Review of "2021 State of Our Schools: America's PK-12 Public School Facilities". Washington, D.C.: 21st Century School Fund. 29, <https://www.wellcertified.com/state-of-our-schools>.

¹³ U. S. Government Accountability Office. "K-12 Education: School Districts Frequently Identified Multiple Building Systems Needing Updates or Replacement." www.gao.gov. June 4, 2020. <https://www.gao.gov/products/gao-20-494>.

¹⁴ U. S. Government Accountability Office. "Disaster Recovery: School Districts in Socially Vulnerable Communities Faced Heightened Challenges after Recent Natural Disasters" www.gao.gov. January 18, 2022. <https://www.gao.gov/products/gao-22-104606>.

¹⁵ Internal Revenue Service. "Elective Pay and Transferability". www.irs.gov. December 22, 2023. <https://www.irs.gov/credits-deductions/elective-pay-and-transferability>.