



Efficient and Healthy Schools Recognition Program

Energy Efficiency + Health

January 10, 2023

EE+Health Recognition Webinar 1:

Making the Case to Save Energy and Improve Indoor Environmental Quality in Schools

Today's Presenters



Reilly Loveland

Senior Project Manager
New Buildings Institute



Wanyu Rengie Chan

Indoor Environment
Lawrence Berkeley National
Laboratory

Today's Agenda

- Introductions and Level Setting
- Overview of Recognition Process
- Making the Case for Efficiency and Health
- Planning for Efficient and Healthy Schools
- Office hours

Let us know who is here!

Introduce yourselves in the chat with your **name**, **title**,
and **school district**

What to Expect from this Series

- Learn about tools for achieving energy efficient and healthy schools
- Find peer to peer connections
- Access regional and national technical experts
- Real time guidance to develop climate-appropriate goals and plans
- Gain national recognition!



Overview of the Recognition Process

The campaign will recognize exemplary implemented solutions and planning efforts by K-12 schools and districts in the following categories:



Energy Efficiency Plus Health

To recognize schools and districts that have implemented retrofits improving energy efficiency and indoor environmental quality (IEQ: indoor air quality, lighting, thermal comfort, and/or acoustics), or have performed building assessments and planning in preparation for retrofits with the goal to provide an energy efficient and healthy learning environment.



Emissions Reduction and Resilience

To recognize schools and districts that have implemented strategies to reduce carbon emissions and taken actions to improve resilience or have identified pathways and planned activities with the goal of reducing carbon emissions and improving resilience.

<https://efficienthealthyschools.lbl.gov/20222023-recognition>

Planning Track – Webinar Series

	Energy Efficiency Plus Health 	Emissions Reduction and Resilience 
Webinar 1 Jan 2023	Making the Case to Save Energy and Improve Indoor Environmental Quality in Schools Jan 10	Making the Case for Carbon Reduction and Electrification Readiness for School Districts Jan 24
Webinar 2 Feb 2023	Understanding Your Building Stock: Energy Benchmarking and Ventilation Assessments for Schools Feb 14	Understanding Greenhouse Gas Tracking and Reporting in School Districts Feb 21 – updated date!
Webinar 3 Mar 2023	Building Assessment Tools for School Energy Retrofits Mar 14	Take Action on Climate! Planning for Climate Vulnerability and Resiliency in Schools Mar 28

Registration Links for the Planning Track Webinar Series!

Energy Efficiency Plus Health



<https://bit.ly/EHScEEHealth>

Emissions Reduction and Resilience



<https://bit.ly/EHScERR>

Webinar Series

Interested schools and districts will participate in a webinar series between January and March 2023.

Final Submission

Schools and districts will complete a final submission by **May 1, 2023** to summarize key learnings and describe how tools or approaches can be applied in their school facilities.

Winter 2023

Spring 2023

May 2023

June 2023

Preparation

Schools and districts will prepare their materials for the final submission.

Announcement

Schools and districts receiving recognition will be invited to attend an in-person celebration in June 2023.

Submitting for Planning Recognition

Plans will be tailored to school district needs and may evolve over the course of this series.

Goal: an actionable plan that is not extra busywork for your district.

Plans can be:

- Focused on a particular topic (energy, IAQ, IEQ, etc.)
- Focused on a particular action (ex. building assessment)
- Be part of an existing plan or a larger plan focused on whole district sustainability
- In any format! PPT, word doc, one pager, infographic, etc.

If you're applying for the Implementation Track too....

Preparation

Interested schools and districts will fill out a recognition application and request assistance from the Campaign if needed.

Winter 2022-2023

March 2023

June 2023

Announcement

Schools and districts receiving recognition will be invited to attend an in-person celebration in June 2023.

Final Submission

Schools and districts will complete and send application together with supporting materials by March 1, 2023.

<https://efficienthealthyschools.lbl.gov/20222023-recognition>

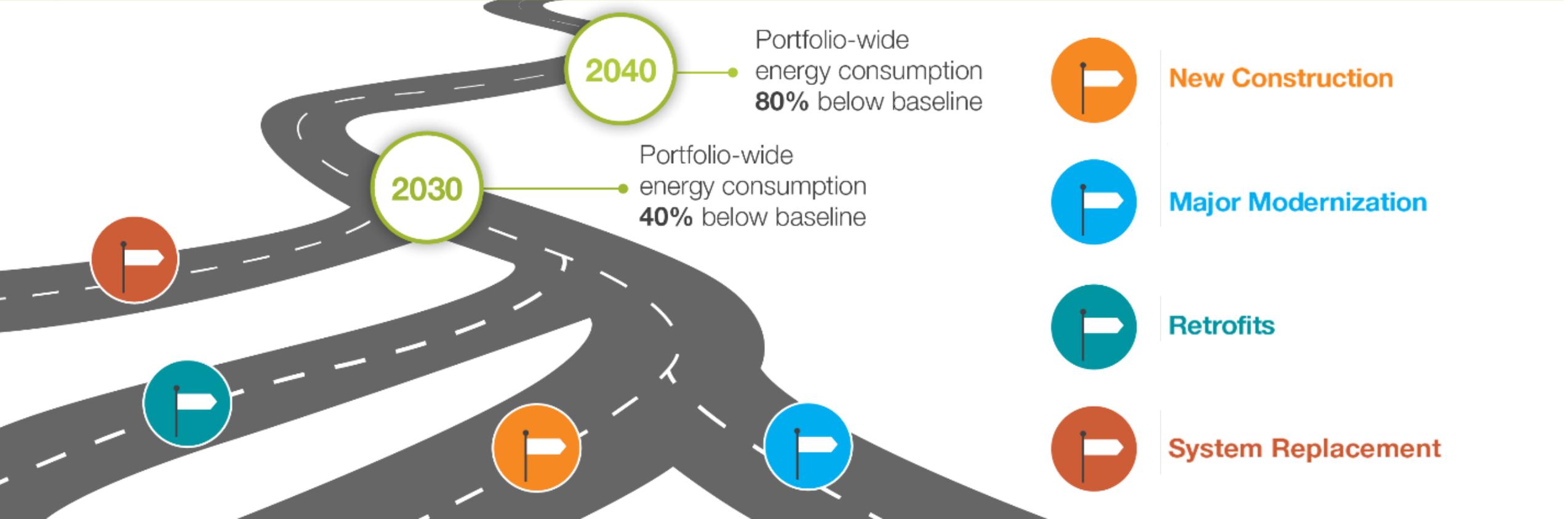
Questions?



Planning for Efficiency and Health



2045 Carbon Neutral School Building Portfolio



Key Approaches and Outcomes in Achieving Efficient and Healthy Schools





Making the Case for Energy Efficiency and Health

Benefits of Efficient and Healthy Schools

- Lower operating cost
- Increased student and staff health and productivity
- Educational benefits
- Resilient communities



Stakeholder Engagement and Visioning



- Identify the champion
- Who are the decision makers?
- Who would be a great candidate for the energy and health team?
- What messaging do you need to communicate?
- What are the stakeholder(s) goals and drivers?

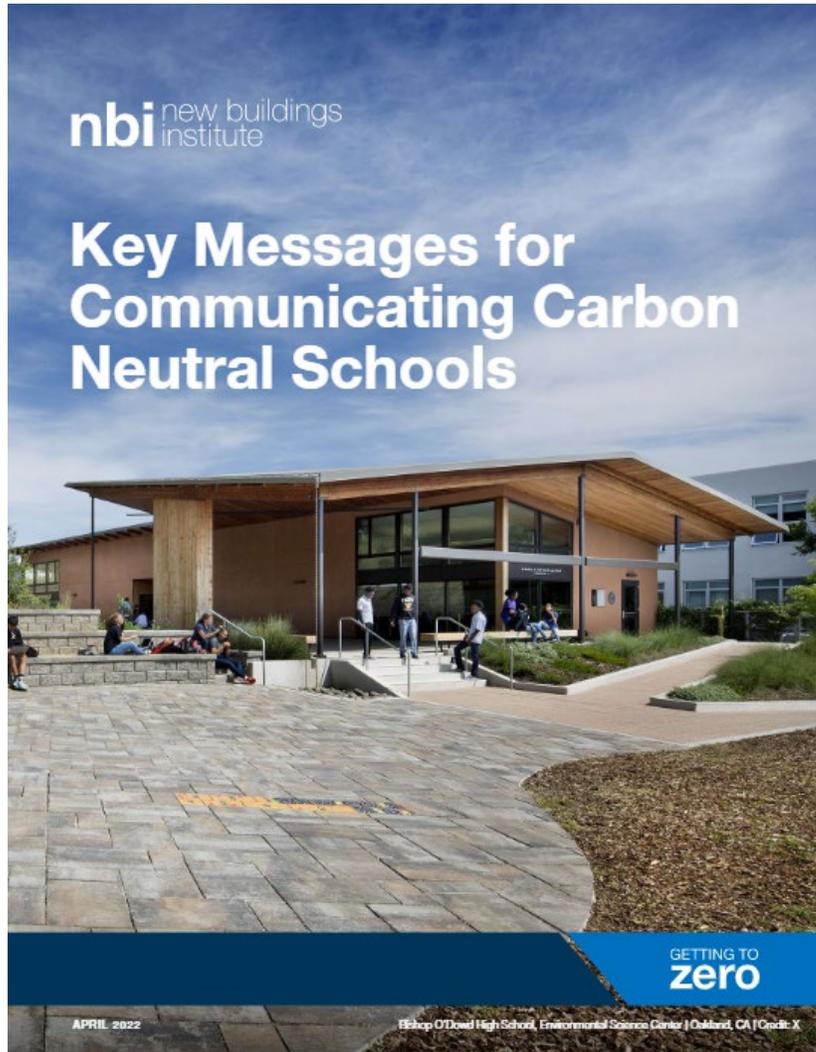
Visioning and Goals

- Use storytelling to showcase success (tell yours and listen to others)
- Discuss efficient and healthy goals and desired actions with stakeholders
- Identify synergies and similar goals
- Visioning sessions: What does your “perfect” efficient and healthy school or portfolio look like?



Cal Poly Collins College of Hospitality Goal Setting Meeting
Credit: HMC Architects

Data for supporting efficient and healthy goals

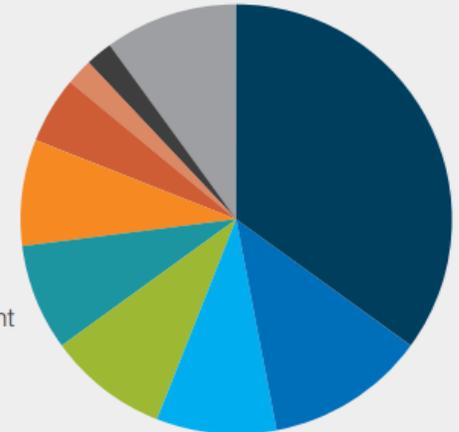


Fast Facts About Schools, Energy, and Emissions

- Public K-12 school buildings represent 7.8 billion square feet of building space, or 85% of all K-12 building space [\[source\]](#).
- 17% of the population in the United States is a student or school staff and spend their day connected to a school (sources [\[1\]](#), [\[2\]](#), [\[3\]](#)).
- America's K-12 schools currently spend \$12.5 billion PER YEAR on energy [\[source\]](#).
- Schools in the United States produce emissions equivalent to 18 coal-fired power plants each year (sources [\[1\]](#), [\[2\]](#)).
- The educational sector consumes over 2,000 trillion BTUs of energy for all types per year, savings across a district could mean hundreds of thousands of dollars that can go back into the classroom or building itself [\[source\]](#).
- With public school square footage equating to **7,837 million SF**, and **130,930** public schools in the U.S., the average school is approximately 60,000 square feet. The average school produces about 320 MTCO₂e of emissions and may spend \$100,000 or more on electricity and gas costs each year.
- According to the 2012 Energy Information Agency's Commercial Building Energy Consumption Survey (CBECS), a typical school uses energy for space heating (35%), cooling (12%), computing and office equipment (9%), ventilation (8%), lighting (9%), water heating (8%), kitchen (7%), and other (10%) loads. [\[source\]](#)
- Educational buildings primarily use gas combustion for space heating, hot water heating and cooking.
- Current emissions associated with the operation of public K-12 buildings is estimated to be approximately 42 MMTCO₂e [\[source\]](#).
- School buses represent the largest fleet of public transportation with about 480,000, largely diesel, buses in need of electrification [\[source\]](#).

EDUCATION BUILDING ENERGY USE
(2012 CBECS Data)

35%	Space heating
12%	Cooling
9%	Computing
9%	Lighting
8%	Ventilation
8%	Water heating
5%	Refrigeration
2%	Cooking
2%	Office Equipment
10%	Other



USC Price

Sol Price School of Public Policy



Environment Now

Action. Results. Change.

An Analysis of The California Clean Energy Jobs Act K-12 Program (Prop 39)



Prepared by Danielle Barr, Yilin Li
Hannah Maryanski, and Bryce Merryman

USC – Environment Now MPA Capstone Project | August 2020

California's Prop 39's K-12 Program Overview

- FY 2013/14 to 2018/19 (5 years)
- Distributed about \$1.5 billion in grants to more than 7,000 school sites
- About 80% of eligible LEAs participated

Table 5: EEM categories implemented (final project completion reports)

EEM Category Type	Number of EEM Project Types Within Each EEM Category	Frequency of EEM Category Type in Dataset (Outliers Removed)
Lighting (Controls/Retrofits/LED/Exit Signs)	7	1,484
HVAC (Smart Thermostats/Air Handlers/Boilers/Furnace)	14	561
Plug Load (Power Management/Vending Machine Misers)	2	50
Building Envelope (Insulation/Windows/Shades/Roofs)	4	34
Pumps, Motors, Drives (Variable Frequency Drives)	1	15
Domestic Hot Water System (Heaters/Pipe Insulation)	2	12
Kitchen (High Efficiency Appliances)	3	6
Energy Storage-On Site Energy Storage	1	2
Electrical-High Efficiency Transformer	1	2
Swimming Pool Cover Installation	1	2

Source: CEC, n.d.

Prop. 39 K-12 Program Site Annual Cost Savings Distribution

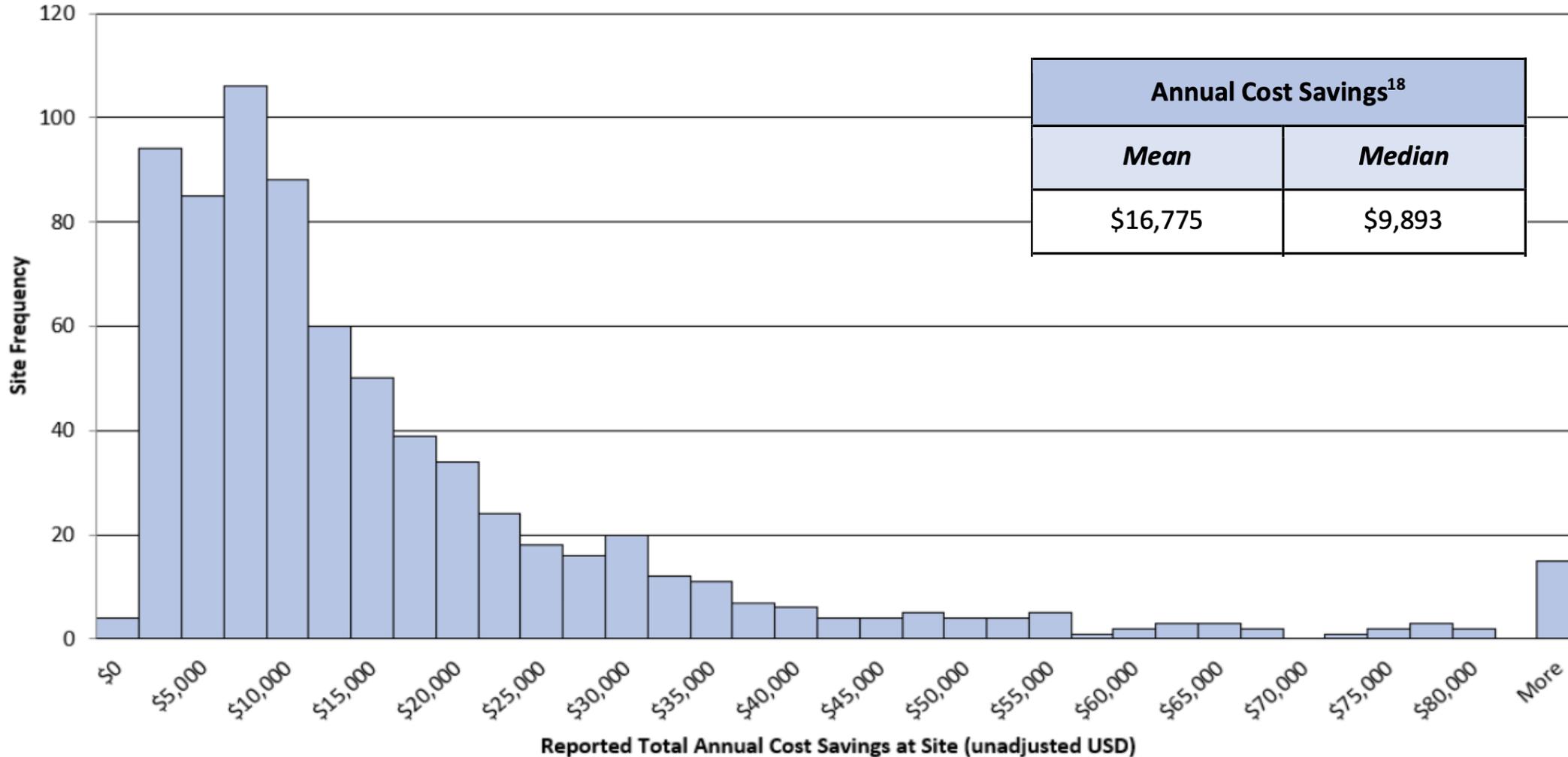


Figure 1: Distribution of site cost savings (as of June 30, 2018).¹⁹ Source: CEC, n.d.

Energy Efficiency Measures (EEMs)

- HVAC projects dominated the top EEM project types for reducing annual cost savings.
- Note that reported total annual cost savings are calculated estimates based on the difference in post-implementation use and baseline use.

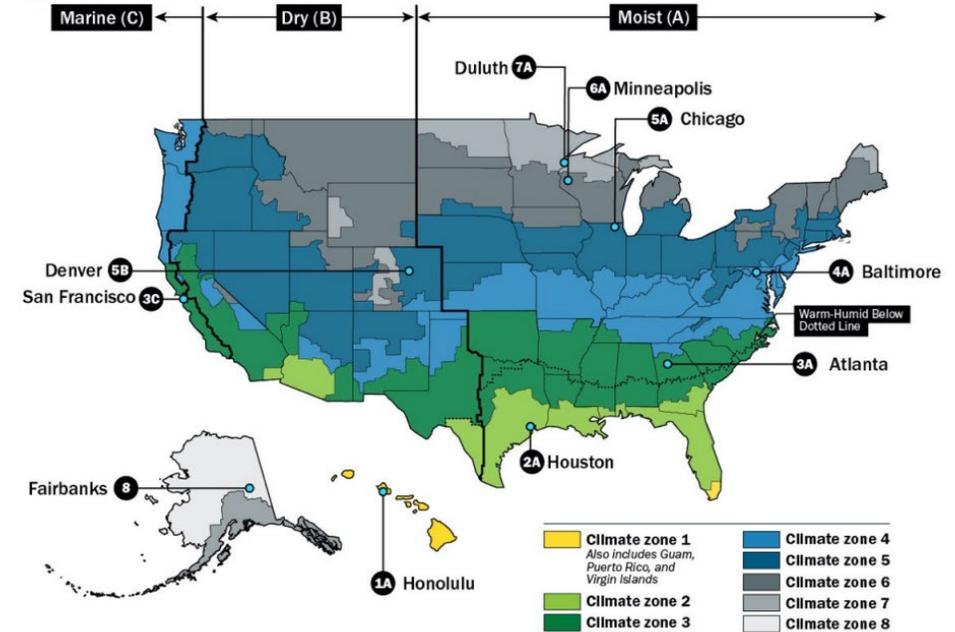
Appendix H: EEM Projects Ranked from Most to Least Effective based on Total Annual Cost Savings Mean

EEM Project	Number of LEAs	Total CO2e Reduction	Total Annual Cost Savings at Site Mean	EEM Project SIR Mean
Energy Storage- On Site Energy Storage	3	0.00	\$20,837.00	24.86
HVAC- Cooling Towers	1	17.31	\$16,330.68	5.21
Pumps, Motors, Drives- Variable Frequency Drives	15	29.89	\$15,407.17	6.13
HVAC- VAV System	4	42.46	\$14,095.17	1.24
HVAC Controls- Energy Management System	86	27.26	\$10,546.94	2.26
HVAC-Retro commissioning (Continuous)	7	8.92	\$9,513.21	3.52
Pool- Swimming Pool Cover	2	16.28	\$7,774.50	7.35
HVAC- New Economizer	5	23.61	\$7,620.60	1.25
HVAC Controls- Chiller Controls Upgrade	1	14.55	\$7,567.28	2.10
HVAC- Packaged/Split System AC/Heat Pump/VRF	253	11.45	\$6,754.77	1.03
Lighting- Interior Fixture Retrofit	501	9.85	\$6,318.73	1.84
Electrical- High Efficiency Transformer	2	8.79	\$5,886.35	1.55
HVAC- Chiller/Boiler Replacement	20	17.45	\$5,857.23	1.19
Lighting- Exterior Fixture Retrofit	514	8.57	\$3,978.37	1.95

Energy efficiency retrofit saving estimates

- Quick Building Assessment Tool / Asset Score report / Energy Conservation Measure Cost Estimations (March 14 webinar)
- Modeled retrofit package performance for prototype schools provides a lookup tables of modeled savings and performance metrics ([link](#))

Figure 1. Modeled Climate Zones and Cities





MANAGING AIR QUALITY DURING THE PANDEMIC:

How K-12 Schools Addressed Air Quality in the Second Year of COVID-19

P. Jacob Bueno de Mesquita, Ph.D.
Lawrence Berkeley National Laboratory

Wanyu Rengjie Chan, Ph.D.
Lawrence Berkeley National Laboratory

Anisa Heming
Center for Green Schools at the U.S. Green Building Council

Caroline Shannon, AIA
Center for Green Schools, MPH candidate at Harvard T.H. Chan School of Public Health

**THE CENTER
FOR GREEN SCHOOLS**



Center for Green Schools (April 2021)



Preparation in the Pandemic:
How Schools Implemented Air Quality Measures to Protect Occupants from COVID-19

ANNIE HOANG
Research Associate, The Center for Green Schools
MPH Candidate, Harvard TH Chan School of Public Health
MD Candidate, University of California – San Francisco School of Medicine (UCSF)

ANISA HEMING
Director, The Center for Green Schools



Profile of the K-12 School District Respondents

The survey was completed by 47 school districts, independent schools, and charter schools in 24 states. Increase fresh air through mechanical ventilation.

1. Increase outdoor air supply through the building's heating, ventilation, and air conditioning (HVAC) system.
2. Implement a flushing process between occupancy periods where the HVAC system runs for a pre-specified duration or until a target of clean air changes has been reached.

Increase outdoor air through the use of operable windows.

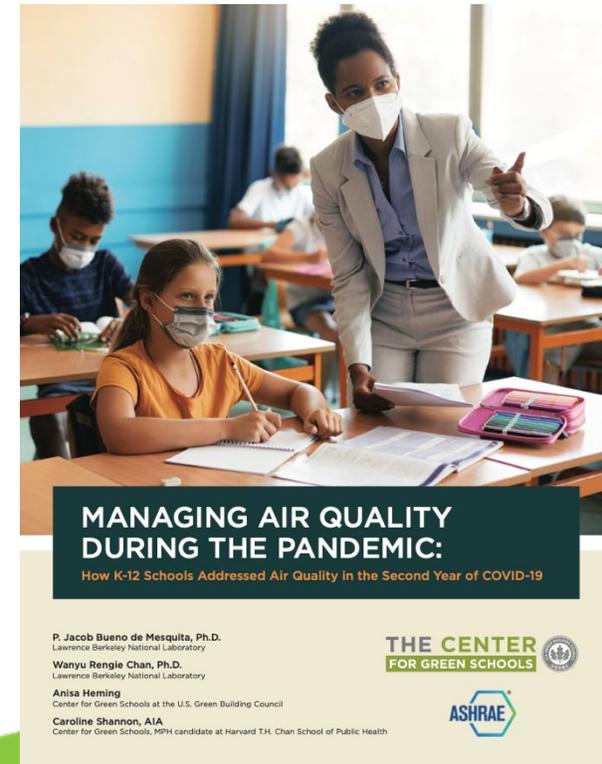
3. Open windows to increase the outdoor flow.
4. Place fans in windows to exhaust room air to the outdoors.

Remove airborne contaminants through filtration.

5. Upgrade to filters with higher minimum efficiency reporting values (MERV) ratings, with MERV 13 or better as a target for removing airborne viral particles in recirculating systems (MERV ratings range from 1-16, with 16 being the most efficient filtration).
6. Install air cleaners with high-efficiency particulate air (HEPA) filters (HEPA filters are no less than 99.97% efficient at capturing human-generated viral particles).

Survey (Oct-Dec 2021) of 88 School Districts

- The survey addressed:
 - **Implementation** of engineering, behavioral, and administrative controls, and indoor air quality monitoring in schools across districts
 - **Technical information and funding resources** used and challenges faced regarding indoor air quality implementation
 - **Measured or perceived costs and benefits** of indoor air quality implementation measures
 - **Plans for promoting healthy indoor environments** beyond the pandemic and perceptions of associated pandemic- and non-pandemic-related benefits.



Q: What are the overall costs/savings from changes related to ventilation, filtration, and other building controls, compared with the same period during a typical school year prior to the pandemic? Costs/savings may include energy, materials, and staffing.

	Responses: N = 88
Cost a lot more	31 (35%)
Cost moderately more	36 (41%)
No impact on overall costs	3 (3%)
Moderate savings	3 (3%)
Not sure	12 (14%)
NA / no changes	3 (3%)

FOCUS GROUP INSIGHTS

“

I had a conversation with our administration about the impact to our budget that we are going to have this year and next year because we get paid per student per day in the classroom. If all of a sudden we are short a bunch of students our budget shrinks. So if we have healthier kids because we have better ventilation, I don't know what the numbers are and I don't know that we can say what the numbers are, but we can certainly say they are linked. Ventilation keeps kids in the seats, which keeps the budget happy.

”

— Focus Group Participant



Clean Air in Buildings Challenge

U.S. ENVIRONMENTAL PROTECTION AGENCY

MARCH 2022



1. **CREATE AN ACTION PLAN FOR CLEAN INDOOR AIR IN YOUR BUILDING(S)** that assesses IAQ, plans for upgrades and improvements, and includes HVAC inspections and maintenance.



2. **OPTIMIZE FRESH AIR VENTILATION** by bringing in and circulating clean outdoor air indoors.



3. **ENHANCE AIR FILTRATION AND CLEANING** using the central HVAC system and in-room air cleaning devices.



4. **GET YOUR COMMUNITY ENGAGED IN YOUR ACTION PLAN** by communicating with building occupants to increase awareness, commitment, and participation in improving indoor air quality and health outcomes.



1. CREATE AN ACTION PLAN FOR CLEAN INDOOR AIR IN YOUR BUILDING(S) that assesses IAQ, plans for upgrades and improvements, and includes HVAC inspections and maintenance.

- Assess IAQ
 - HVAC and building information: e.g., [School Energy Assessment \(SEA\) form](#)
 - Ventilation assessment, TAB (Feb 14 webinar)
 - Other approaches: occupant survey, monitoring CO2 and other parameters

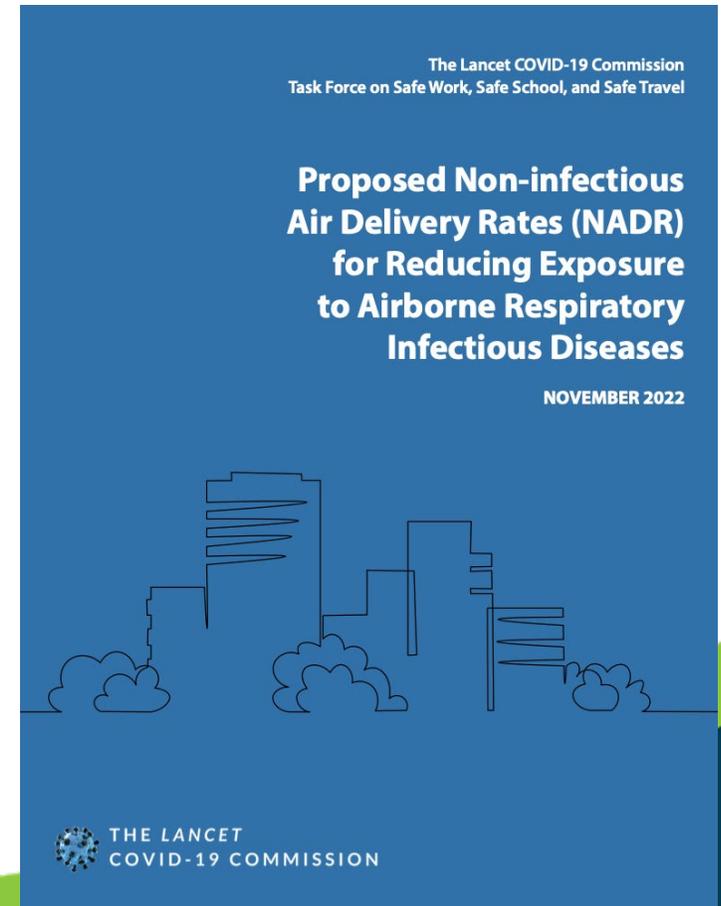
- Plan for upgrades and improvements
 - Enhance air filtration, HVAC control upgrade, fan/motor retrofit
 - HVAC air economizer, demand control ventilation, energy recovery, low carbon technologies, ...

- Include HVAC inspections and maintenance

A call to develop health-based ventilation targets

“... There is urgency in setting new minimum standards that can help reduce respiratory disease risk indoors and promote better health overall ... The important scientific debates about metrics and targets must continue. However, while there is debate about the “best” metric to use, and there is debate about the specific targets for each, there is no debate that the current targets are too low.”

<https://static1.squarespace.com/static/5ef3652ab722df11fcb2ba5d/t/637740d40f35a9699a7fb05f/1668759764821/Lancet+Covid+Commission+TF+Report+Nov+2022.pdf>







Review Paper

Can green schools influence academic performance?

D. Vakalis^a, C. Lepine^a, H. L. MacLean^{a,b}, and J. A. Siegel^{a,c} 

^aDepartment of Civil and Mineral Engineering, University of Toronto, Toronto, Ontario, Canada;

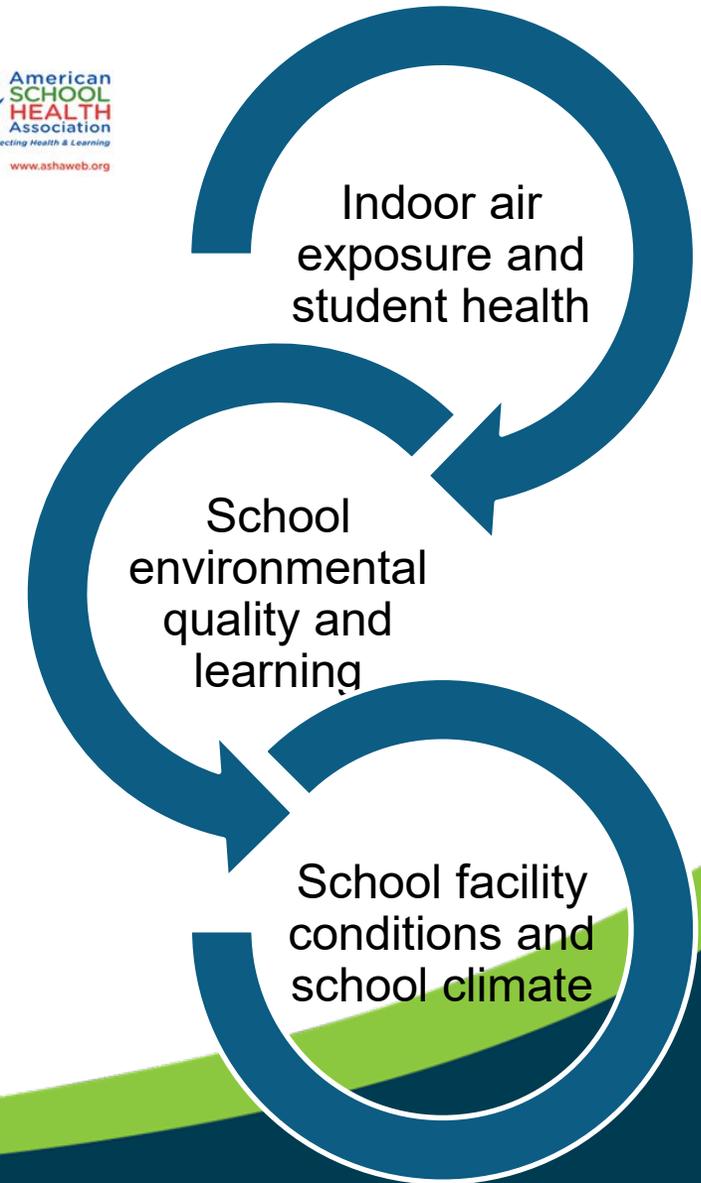
^bDepartment of Chemical Engineering and Applied Chemistry, University of Toronto, Toronto, Ontario, Canada; ^cDalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

“... This review synthesizes current research from 28 new studies and 101 other studies that were previously included in 15 reviews of associations between LEED-specified building factors and these performance outcomes in schools. ... this review finds that building features common to 100% of LEED-certified schools also have the strongest research supporting associations with academic outcomes, and largely come under the purview of **indoor air quality** (e.g., minimum ventilation rate, filtration or air cleaning) and **acoustic** performance.”

A Multidisciplinary Research Framework on Green Schools: Infrastructure, Social Environment, Occupant Health, and Performance

SHERYL MAGZAMEN, PhD, MPH^a ADAM P. MAYER, PhD^b STEPHANIE BARR, MS^c LENORA BOHREN, PhD^d BRIAN DUNBAR, MArch^e
DALE MANNING, PhD^f STEPHEN J. REYNOLDS, PhD^g JOSHUA W. SCHAEFFER, PhD^h JORDAN SUTER, PhDⁱ JENNIFER E. CROSS, PhD^j

Journal of School Health • May 2017, Vol. 87, No. 5 • © 2017, American School Health Association



Relationships between social climate and indoor environmental quality and frequently reported health symptoms among teachers and staff in a suburban school district

Sheena E. Martenies^{a,b} , Jennifer Schill^c, Matthew Klimm^c, Jennifer E. Cross^{d,e} , Shannon Oliver^f, and Sheryl Magzamen^{b,g} 

^aDepartment of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, Champaign, Illinois; ^bDepartment of Environmental and Radiological Health Sciences, Colorado State University, Fort Collins, Colorado; ^cInstitute for the Built Environment, Colorado State University, Fort Collins, Colorado; ^dInstitute for Research in the Social Sciences, Colorado State University, Fort Collins, Colorado; ^eDepartment of Sociology, Colorado State University, Fort Collins, Colorado; ^fManager, Energy and Sustainability, Metropolitan Denver, Colorado; ^gDepartment of Epidemiology, Colorado School of Public Health, Aurora, Colorado

- Survey of 134 staff from 11 schools in a Colorado district, of which 62% were teachers
- Increase in school climate score (e.g. workplace culture) was associated with fewer health symptoms reported
- For participants with a school climate score below the mean, an increase in IAQ score was associated with a decrease in the number of frequently reported symptoms



Identifying and evaluating school environmental health indicators

Shao Lin^{1,2} · Yi Lu¹ · Ziqiang Lin¹ · Xiaobo Xue Romeiko¹ · Tia Marks¹ · Wangjian Zhang¹ · Haider A. Khwaja^{1,3} · Guanghui Dong⁴ · George Thurston⁵

- Study considered school indoor environmental indicators, outdoor indicators, children’s health and performance indicators, and demographic and community characteristic indicators in **4579 schools in New York State (NYS)**.

Association with asthma among children (risk ratio)

Mold/moisture problems	2.55
Classroom too dry	2.03
Classroom too hot	1.72
Ventilation problems	1.23
Classroom air intake not free of blockage	1.13

Association with teachers work-related symptoms

Excessive noise	2.46
Too dim lighting in classroom	2.23



Contents lists available at ScienceDirect

International Journal of Hygiene and Environmental Health

journal homepage: www.elsevier.com/locate/ijheh



School environmental conditions and links to academic performance and absenteeism in urban, mid-Atlantic public schools



J.D. Berman^{a,*,1}, M.C. McCormack^b, K.A. Koehler^c, F. Connolly^d, D. Clemons-Erby^c, M.F. Davis^c, C. Gummerson^b, P.J. Leaf^e, T.D. Jones^f, F.C. Curriero^a

- 158 Baltimore City public schools
- 3rd to 8th grade students school performance data (reading and math, 2013-14); chronic absences (20 or more days)
- School facility conditions, density of nearby roads and/or industrial air pollution
- Neighborhood factors: demographics, crime, poverty

“... Each 10-unit change in **facility condition index**, denoting worse quality buildings, was associated with a decrease in **reading** (1.0% (95% CI: 0.1–1.9%) and **math scores** (0.21% (95% CI: 0.20-0.40), while **chronic absences** increased by 0.75% (95% CI: 0.30–1.39).”

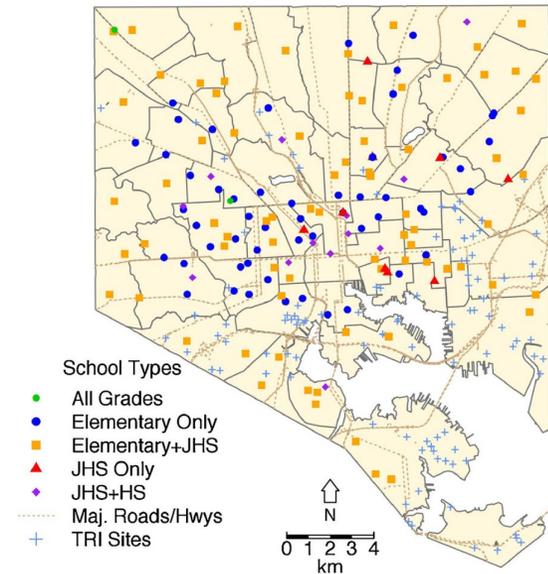
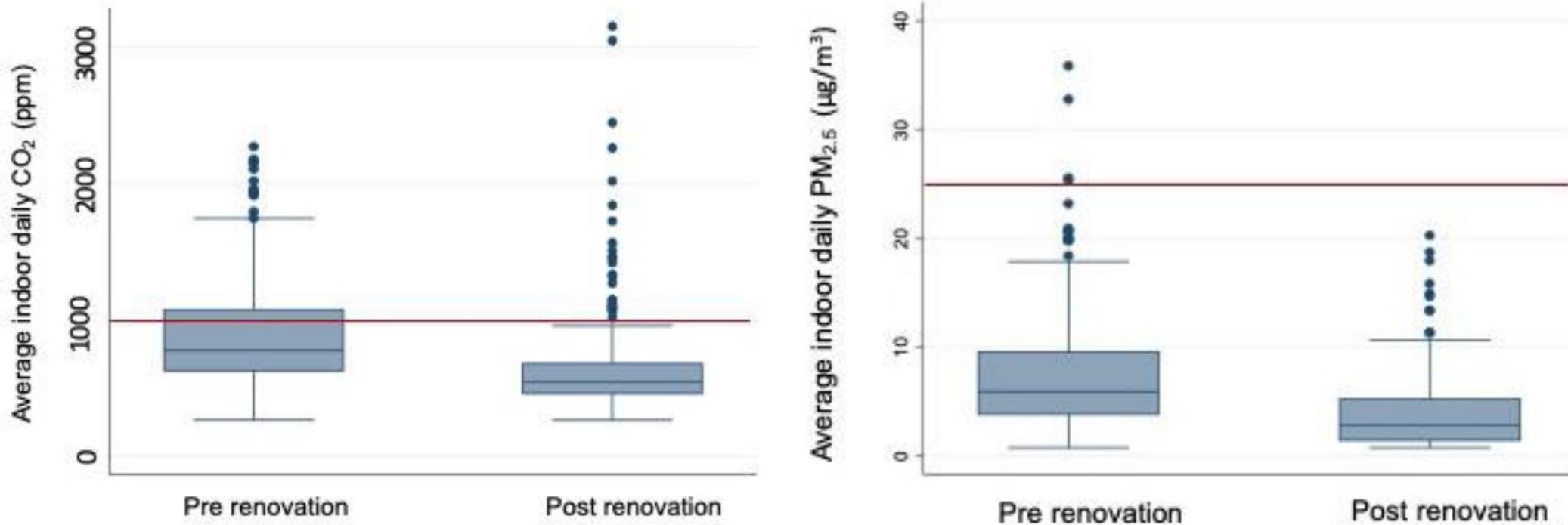


Fig. 1. Distribution of Baltimore City schools (N = 158) representing grades 3 through 8. Mapped background includes community statistical area (CSA) boundaries, major roads and highways, toxic release inventory (TRI) sites.

Article

Indoor Air Quality Prior to and Following School Building Renovation in a Mid-Atlantic School District

Sandra E. Zaeh ^{1,2}, Kirsten Koehler ³, Michelle N. Eakin ², Christopher Wohn ⁴, Ike Diibor ⁴, Thomas Eckmann ², Tianshi David Wu ^{5,6}, Dorothy Clemons-Erby ³, Christine E. Gummerson ⁷, Timothy Green ³, Megan Wood ³, Ehsan Majd ⁸, Marc L. Stein ^{9,10}, Ana Rule ³, Meghan F. Davis ^{3,11} and Meredith C. McCormack ^{2,*}



Making the Case for Energy Efficiency and Health

- Energy savings
- Indoor air quality
- Student health and learning





Planning for Energy Efficiency and Health

What could my plan look like?

Key pieces of a plan:

- Audience
- Team
- Assessment data
- Timelines
- Goals



Table of Contents

Executive Summary 08

Cross Cutting Theme 1: CLIMATE 10

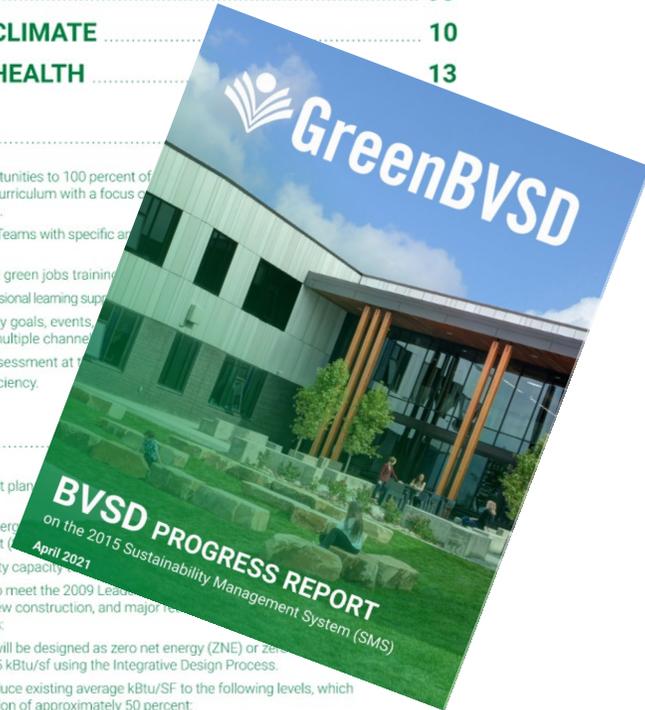
Cross Cutting Theme 2: HEALTH 13

Focus Area 1: Education

- GOAL 1** Provide professional learning opportunities to 100 percent of teachers and integrate sustainability across the curriculum with a focus on social studies and science teachers.
- GOAL 2** Create active and formalized Green Teams with specific and measurable goals at 100 percent of schools.
- GOAL 3** Develop an interdisciplinary, formal green jobs training program.
- GOAL 4** Provide orientation and ongoing professional learning support for all staff.
- GOAL 5** Leverage all of BVSD's sustainability goals, events, and programs internally and externally, that use multiple channels of communication.
- GOAL 6** Develop a sustainability literacy assessment at the student level to assess student sustainability proficiency.

Focus Area 2: Buildings

- GOAL 1** With a balanced water management plan, reduce water consumption by 10 percent in existing buildings.
- GOAL 2** Reduce fiscal year 2008 baseline energy consumption by 10 percent (Thermal Units (kBtu)/per square foot (SF) per year).
- GOAL 3** Increase BVSD's renewable electricity capacity by 20 percent by April 2021.
- GOAL 4** Design new buildings or additions to meet the 2009 Leadership in Energy and Environmental Design (LEED) gold standard for schools, new construction, and major renovation projects. Major renovation waste performance goals as follows:
 - New buildings or additions will be designed as zero net energy (ZNE) or zero net energy capable (ZNEC), targeting 25 kBtu/sf using the Integrative Design Process.
 - Deep energy retrofits will reduce existing average kBtu/SF to the following levels, which represent an average reduction of approximately 50 percent.
 - High Schools: 40 kBtu/SF
 - Middle Schools: 35 kBtu/SF
 - Elementary Schools: 35 kBtu/SF
 - New buildings or additions will achieve a 75 percent construction waste material diversion rate.



Guiding Standards for Lake Tahoe Unified School Construction Projects

SCOPE <i>See further details below</i>	MODERNIZATION	
	Mandatory	Case-by-case
Envelope air sealing, insulating walls and openings	✓	
Roofs insulation, rainwater collection		✓
Glazing & Shading heat minimization, high performance windows		✓
Lighting LED lighting & controls	✓	
Electrical energy monitoring	✓	
Metering submetering		✓
Kitchen electrification & Energy Star energy-efficient equipment	✓	
Heating electrification & maintainability		✓
Ventilation heat recovery & filtration		✓
Controls set points & operating hours	✓	
Domestic Hot Water recirculation pumps & pipe insulation	✓	
Plug Loads are measured & controlled	✓	
Water backflow device & high-efficiency fixtures	✓	
Schoolyard green schoolyards, stormwater mgmt. & rainwater collection		✓
Materials CalGreen, CA Section 01350 & CA Buy Clean	✓	
Renewables Onsite solar PV, storage		✓
Zero Net Energy Capable roof solar readiness	✓	

Templates in the toolbox

Carbon Neutral Schools Resolution Template



School District logo – click to place

Enter School District Name

Enter Resolution Number #

RESOLUTION TO ESTABLISH GOALS FOR ENERGY EFFICIENCY, CLEAN ENERGY AND CARBON NEUTRALITY

Instructions: Fill in any of the sections underlined in green. You may add any other local information or aligned initiatives into this release. Be sure to include your logo, photos, and secure quotes from involved board members, your Superintendent, or anyone else in support of your work. There are several examples of language for quotes and other sections you can use in the blue boxes below certain sections. Feel free to use this language or develop your own. This sample language is noted and in italics and can be easily deleted by clicking on the blue box and deleting.

WHEREAS, the insert School District name community is experiencing the detrimental effects of climate change through increased temperatures, extreme weather events, changes in the forms and timing of precipitation and runoff, any regionally specific effects, and other environmental disruptions; and

*(Example for text above):
... increased wildfires and associated poor air quality, more frequent and intense storms, major flooding events*

WHEREAS, any local or jurisdictional adopted and aligned resolutions; and

*(Example for text above):
WHEREAS, City Council formally adopted a resolution to achieve 100% renewable energy by 2032; and*

WHEREAS, the School District Board is committed to making positive, tangible changes to mitigate climate change, and to ensure that every effort is made to conserve energy and natural resources while exercising sound financial management; and

WHEREAS, School District students and staff are entitled to safe and healthy working and learning environments that reflect recommendations of reliable scientific studies indicating that student achievement and attendance and teacher and staff retention are improved when their

Contents

- School District Commitment to Healthy, Energy Efficient, and Carbon Neutral Schools
- District Overview and Goals
- DISTRICT ENERGY AND CARBON EMISSIONS GOALS
- Energy and Carbon
 - Current Capital Funding Projects
 - Facilities Efficiency Initiatives
 - Other Initiatives
 - Data Trends
- Other Sections to Consider
 - Waste and Recycling
 - Water
 - Materials and Healthy School Buildings
 - Transportation
 - Gardens and Grounds
 - Food and Nutrition
- Resources

District Overview and Goals

This section includes brief boilerplate language about the district that may already be in other district documents. An example is provided below.

School District serves number of students across grade levels building space across # of cities, counties, acres, etc. Facilities

- # of facilities, preschools or early childhood centers
- # of elementary schools
- # of middle schools
- # of high schools and secondary schools
- # of K-8 schools
- # of administrative and maintenance buildings
- # of any other facility types

Roadmap Planner Table 10

Trajectory Graphs for Carbon Neutral Schools can be used to track this information graphically. A visual representation of your goals can be a useful tool for communicating with stakeholders.

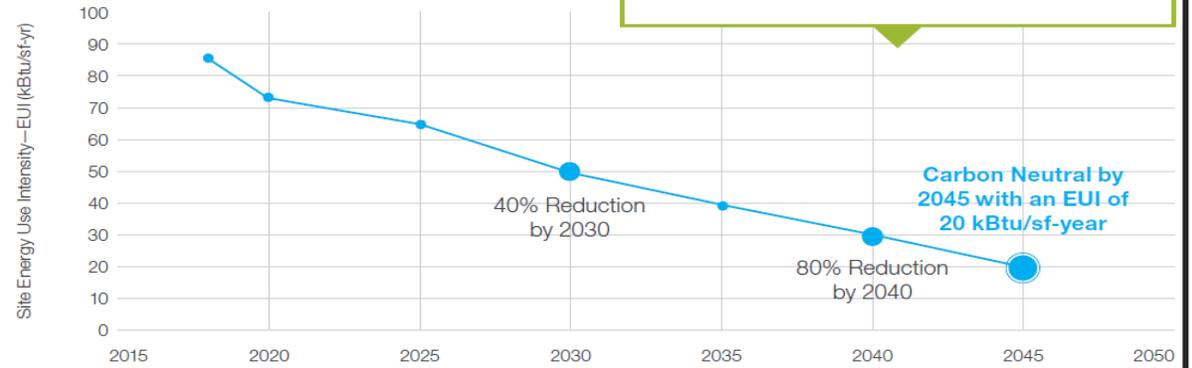


Table 9: School District Portfolio Roadmap Goals

Using your baseline benchmarking data, customize the table below to note the district's portfolio goals and how they change over time. Table 14 in this workbook also includes a template track this graphically as a useful tool for communicating with stakeholders. Additional rows are included in this table for additional portfolio goals as appropriate for your portfolio.

GOAL: All buildings in the district will be carbon neutral by [target year] and the average portfolio site EUJ will adhere to the following targets over time:

	Baseline [YEAR]	2025	2030	2035	2040	2045
Average Portfolio Site EUJ	[2019] EUJ: 60	52	44	36	28	20
Average Portfolio Site EUJ (kBTU/ft2/year)	80	68	56	44	32	20
Total Portfolio Greenhouse Gas Emissions (Metric Tons CO2e/year)						
Total Portfolio Greenhouse Gas Emissions (kgCO2e/ft2/year)						

What could be in my plan?

Plans might include:

- Key messaging and stakeholder documentation
- List of relevant goals and plans
- List of documents to be developed (resolutions, tech specs, etc.)
- Benchmarking and assessment data – Energy and IEQ
- Project and portfolio level goals
- Planning timelines and project list

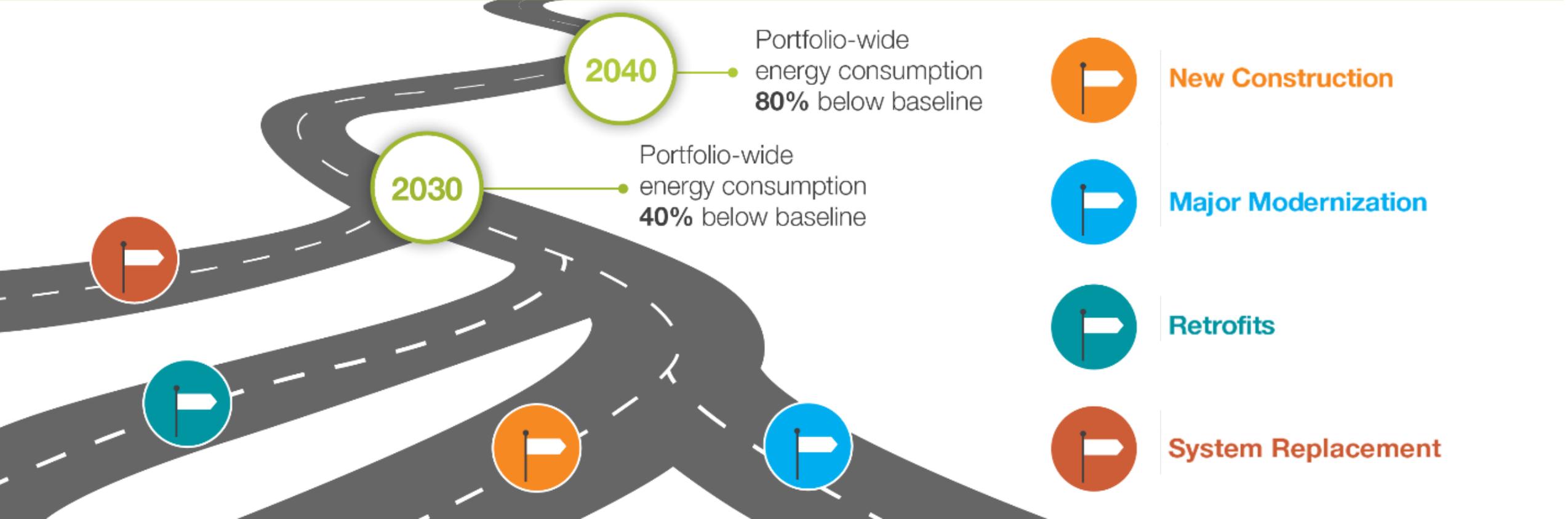
Consider throughout the series: What Will Your Plan Cover?

Topics may include:

- IEQ and health
- Energy efficiency
- Emissions
- Resilience
- Climate Action Plan
- Other Sustainability
- Whatever is a priority for your district



2045 Carbon Neutral School Building Portfolio



Key Approaches and Outcomes in Achieving Efficient and Healthy Schools





Next Steps

What has been done so far in your district?

- What goals do you have in place?
- What is in process?
- What is being planned?



Collect “stock take” information, including:

- District sustainability goals
- Formal district resolutions
- Technical specifications for district facilities
- Procurement requirements
- Owners Project Requirements (OPR) for new construction or major renovation projects
- Energy or carbon report to school board
- School district org chart
- Benchmarking data
- Facilities, characteristics, and equipment lists
- Facility master plans and assessments
- Capital project plans, including bond planning documents
- Operations and maintenance (O&M) requirements
- Fleet vehicle fuel use information
- IAQ goals and plans



Discussion

1. What topic(s) do you think your plan will focus on?

- a. Energy efficiency/energy reduction
- b. IAQ or IEQ
- c. Emissions reduction
- d. Resiliency
- e. Other (let us know in chat)

2. What kind of plan is realistic for your district?

Tell us about what you envision developing for this recognition.

3. What data or information delivered during the session supports your goals?

- a. Stakeholder engagement process and visioning
- b. Health and IAQ messaging (be specific in the chat if you can)
- c. Efficient schools messaging (be specific in the chat if you can)
- d. Visual roadmap
- e. Stock take
- f. Other

4. Of this list of documents which does your district have?

Which do you think will be important to develop as part of this plan?

- District sustainability goals
- Formal district resolutions
- Benchmarking data
- Facilities, characteristics, and equipment lists
- Technical specifications for district facilities
- Procurement requirements
- Owners Project Requirements (OPR) for new construction or major renovation projects
- Energy or IEQ report to school board
- Facility master plans and assessments
- Capital project plans, including bond planning documents
- Operations and maintenance (O&M) requirements
- Fleet vehicle fuel use information
- IAQ goals and plans



Resources

For more information, please email EHSC@lbl.gov

Overview of Federal Funding Mechanisms

Elementary and Secondary School Emergency Relief Fund (ESSER)

ESSER I – Coronavirus Aid Relief, and Economic Security (CARES Act) – \$13.2B

ESSER II – Coronavirus Response and Relief Supplemental Appropriations Act (CRRSA) – \$54.3B

ESSER III – American Rescue Plan Act (ARP) – \$122.7B

ARP State and Local Recovery Funds – allocated through other state agencies (not SEA's) but can support school construction efforts - \$350B

Infrastructure, Investment, and Jobs Act (IIJA) – \$1.2 trillion

Funding Breakdown: \$550M for school building efficiency, \$5B for electric school buses, \$550M for energy efficiency block grants, \$200M for lead in school drinking water, \$1B for FEMA Building Resilient Infrastructure & Communities (BRIC) grants, \$216M for Tribal Climate Resilience.

Inflation Reduction Act (IRA) – \$369 billion

Funding Breakdown: \$37.5M for monitoring and reduction of air pollution and greenhouse gases, \$12.5M to address school environmental quality.

Overview of Federal Funding Mechanisms

State Energy Program through Department of Energy (DOE) – FY22 \$56.5M

- Grants provided to State Energy Offices for use in efficiency, renewable, and alternative energy demonstration activities.
- *Note: not all of the \$56.5M went to schools.*

Secure Rural Schools Act (SRS) – FY21 payments totaled \$213.4M

A portion of Forest Service funds generated through multi-use activities, such as grazing, timber production, etc. are distributed from the USDA Forest Service to eligible rural counties to help maintain local roads and schools.

FEMA Hazard Mitigation & Disaster Relief Programs

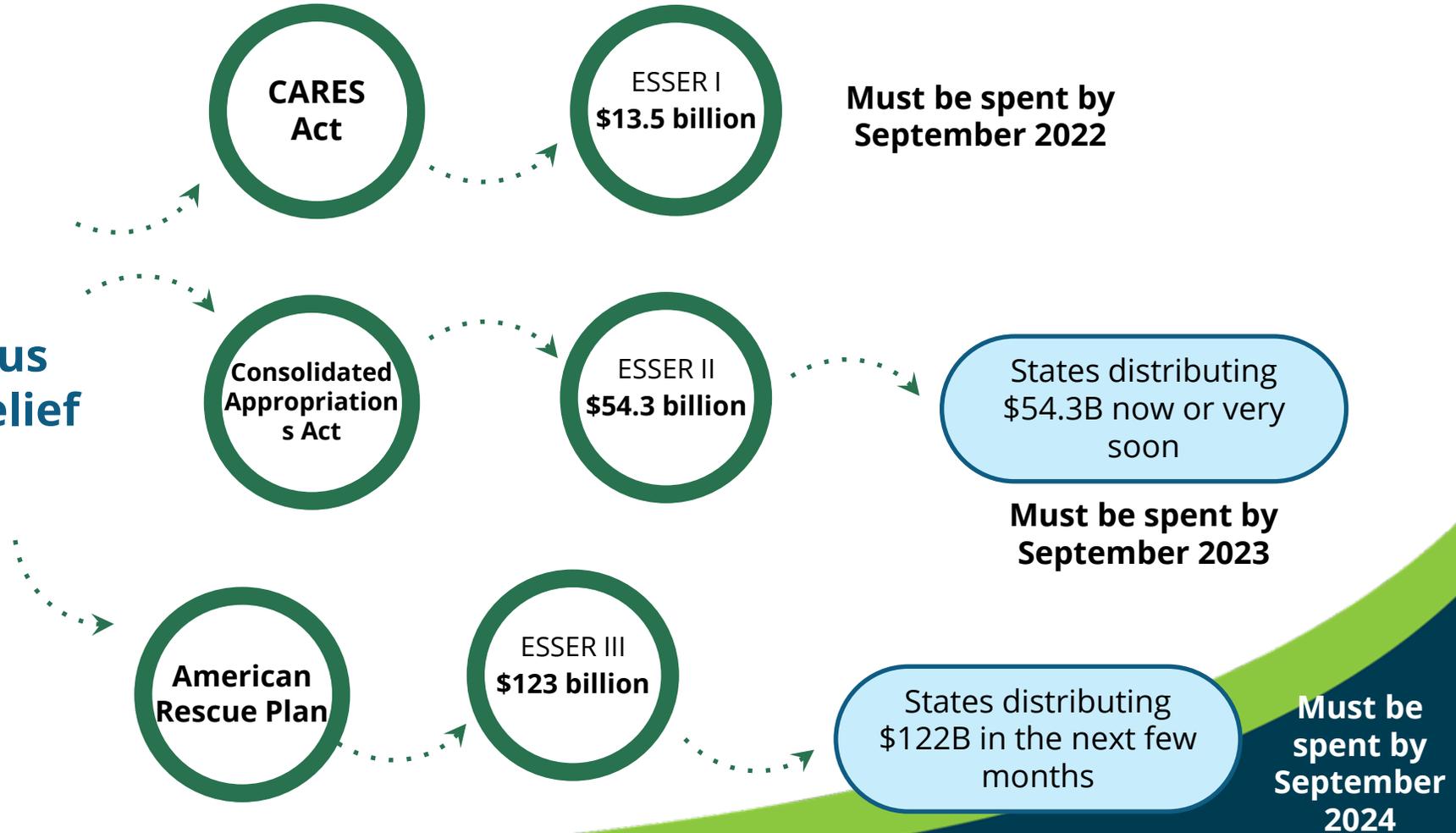
- Eligible projects are cost shared between FEMA (75%) and non-federal sources (25%)
- **Public Assistance Grant Program:** emergency or permanent work to support protective measures and/or replacement of damaged facilities.
- **Hazard Mitigation Grant Program:** implement long-term hazard mitigation measures after a major disaster declaration.

Elementary and Secondary School Emergency Relief (ESSER I, II, III)

K-12 School Districts, aka Local Education Agencies (LEAs)

**PLANNING TO
LEVERAGE EVERY
OPPORTUNITY!**

**Current
Coronavirus
Stimulus Relief
Efforts**



**Must be spent by
September 2022**

States distributing
\$54.3B now or very
soon

**Must be spent by
September 2023**

States distributing
\$122B in the next few
months

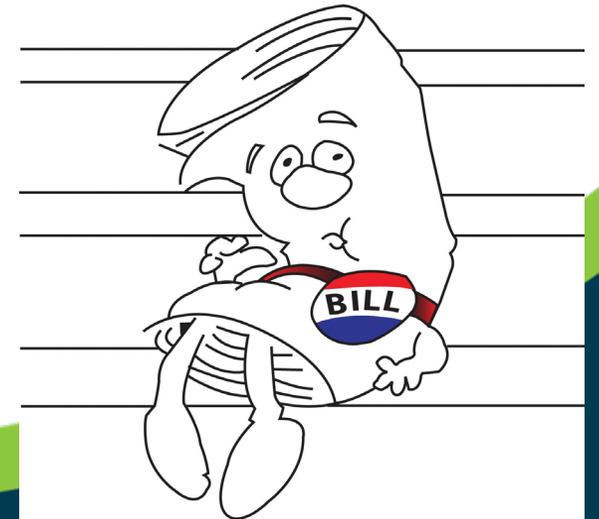
**Must be
spent by
September
2024**

\$800M set aside for Homeless Education
(drops the ESSER III Funding to SEAs
down to \$122 Billion)

Meet our Funding Friends – BIL and IRA!

BIL: Bipartisan Infrastructure Law
(Infrastructure Investment and Jobs Act – IIJA)

IRA: Inflation Reduction Act



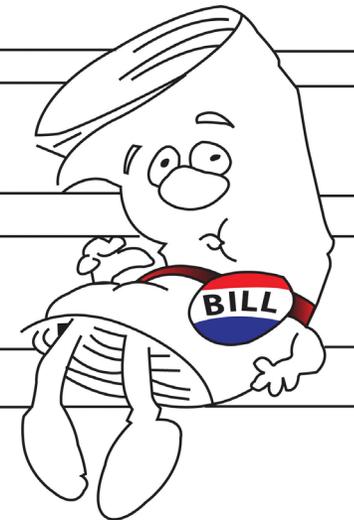
Renew America's Schools - BIL

Invest in More Efficient, Energy-Saving School Buildings: The Department of Energy (DOE) is launching a \$500 million grant program spread across FY22-26 through President Biden's Bipartisan Infrastructure Law (BIL) to make public schools more energy efficient.

The U.S. Department of Energy recently announced more than **\$80M**, the first tranche of funding in a \$500M investment, to make clean energy improvements in K-12 public schools. Funds will empower school districts to make upgrades that will lower facilities' energy costs and improve student learning environments.

Application released SOON!

Sign-up for updates for about the Grants for Energy Improvements at Public School Facilities Program: <https://www.energy.gov/bil/grants-energy-improvements-public-school-facilities>



Renew America's Schools

Invest in More Efficient, Energy-Saving School Buildings: The Department of Energy (DOE) is launching a \$500 million grant program spread across FY22-26 through President Biden's Bipartisan Infrastructure Law (BIL) to make public schools more energy efficient.



<https://eere-exchange.energy.gov/>

Renew America's Schools – Grants Overview



Funding

\$500M (over FY22-26),
competitive grant



Qualifying Energy

- Improvements, repairs, or renovations that:
- reduce energy costs or lead to improved teacher and student health and achieve energy savings;
 - installation of renewable energy;
 - installation of alternative fueled vehicle (AFV) infrastructure; and
 - purchases or leases of AFV.



Eligible Entities

Consortium of (a) one LEA and (b) one or more schools; nonprofit organizations that have the knowledge and capacity to partner and assist with energy improvements; for-profit organizations that have the knowledge and capacity to partner and assist with energy improvements; or community partners that have the knowledge and capacity to partner and assist with energy improvements.



Prioritization

- Schools that:
- Demonstrate funding needs;
 - Serve a high percentage of students who are eligible for a free or reduced-price lunch;
 - Located in a locale code of 41, 42, or 43 as determined by NCES; and
 - Proposal leverages private sector investment through energy-related performance contracting.

Renew America's Schools – Goals



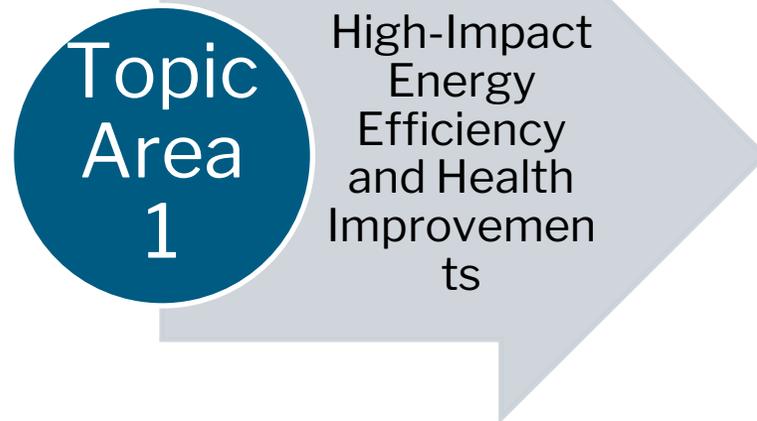
Facilitate
substantial
additional
investment

Prioritize
schools with
high needs

Minimize
administrative
burden

Build operating
capacity in
LEAs to
maximize
impact

Renew America's Schools – Topic Areas





The graphic features a blue background with a white border. At the top left is the 'AMERICAN MADE U.S. DEPARTMENT OF ENERGY' logo. To its right is the title 'Energy CLASS Prize TIMELINE'. On the top right, it says '\$2.5 Million in Awards'. The timeline is divided into two phases. Phase 1, 'Application', is marked with a large '1' in a green circle and includes details about the submission period (November 2022 to February 2023) and prizes. Phase 2, 'Skills Development and Coaching', is marked with a large '2' in a green circle and includes details about the duration (May 2023 to May 2024) and support. At the bottom, there is an illustration of a school building with solar panels, trees, and people walking and riding bicycles.

AMERICAN MADE
U.S. DEPARTMENT OF ENERGY

Energy CLASS Prize
TIMELINE

\$2.5 Million
in Awards

PHASE 1

Application

Opens in November 2022, submissions due by February 2023

- Up to 25 local educational agencies (LEAs) selected
- \$100,000 in cash prizes to each selected LEA to support energy management professionals-in-training in Phase 2

PHASE 2

Skills Development and Coaching

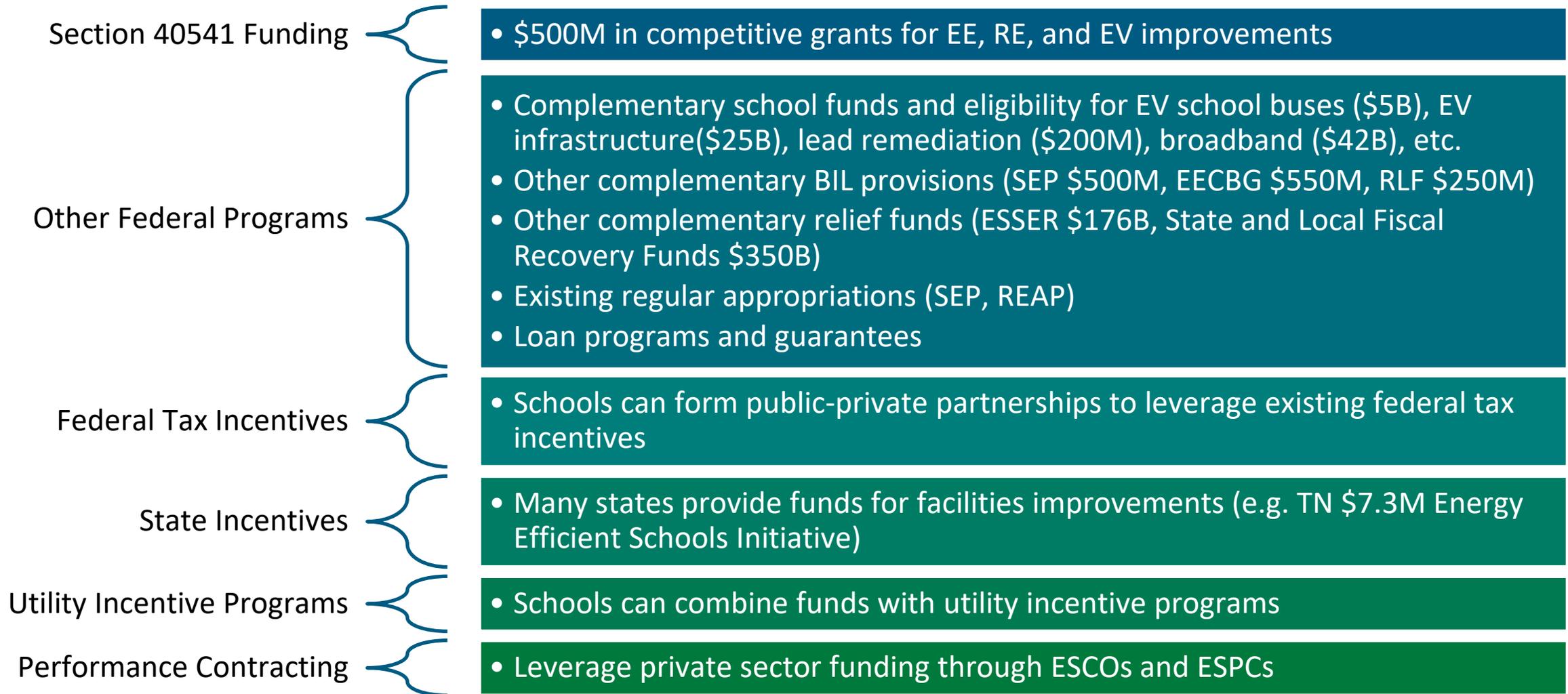
May 2023 – May 2024

- Courses and 1:1 support over a 12-month period
- Chance to win a \$50,000 bonus prize upon completion

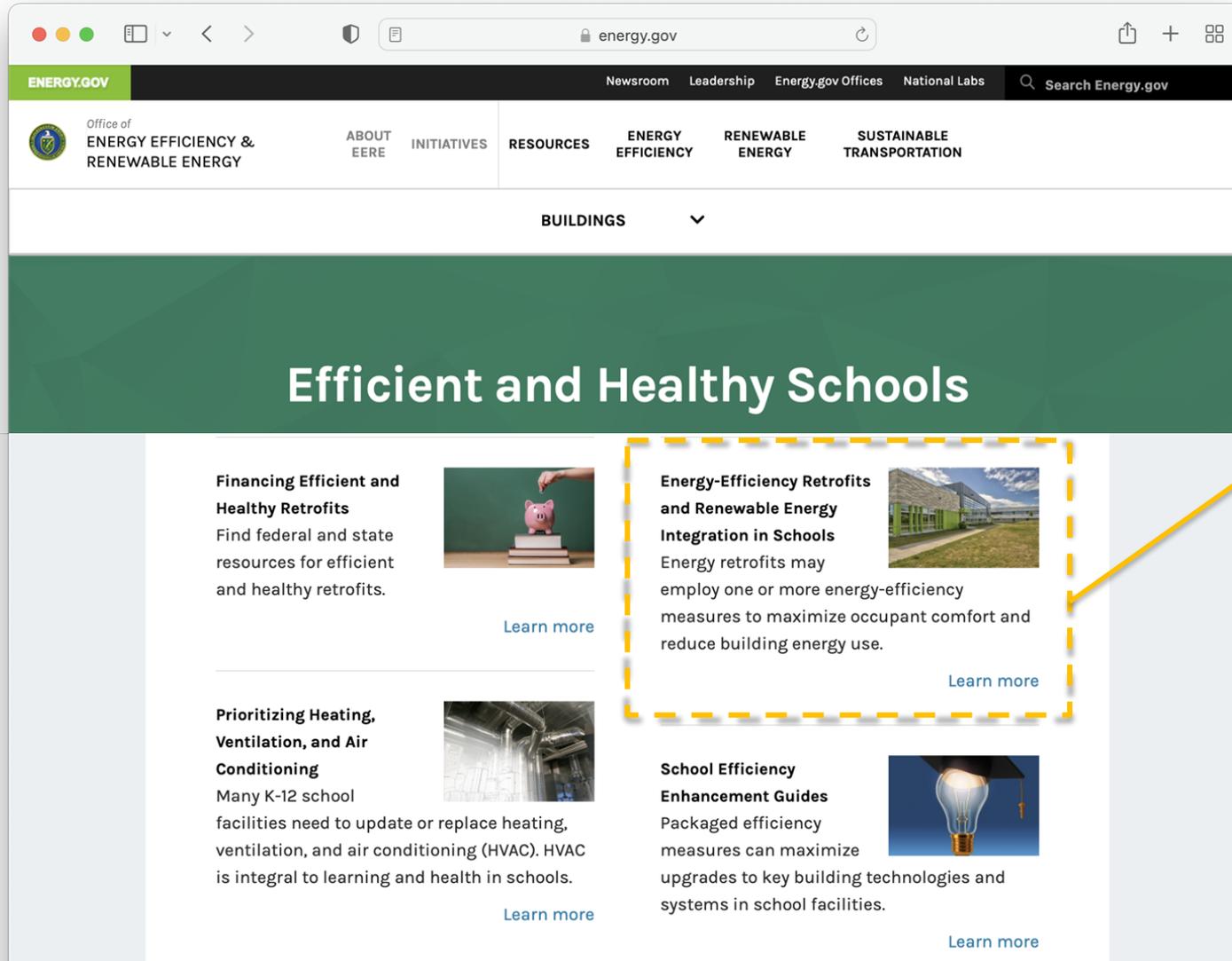


www.herox.com/energy-class

Renew America's Schools – Maximizing Impact



Applicants should thoroughly review cost share types and allowability if an applicant plans to combine federal funding from multiple programs and agencies.



The screenshot shows the Energy.gov website with the following navigation and content:

- Header: ENERGY.GOV, Newsroom, Leadership, Energy.gov Offices, National Labs, Search Energy.gov
- Secondary Navigation: ABOUT EERE, INITIATIVES, RESOURCES, ENERGY EFFICIENCY, RENEWABLE ENERGY, SUSTAINABLE TRANSPORTATION
- Section Header: BUILDINGS
- Main Title: Efficient and Healthy Schools
- Four content cards are visible:
 - Financing Efficient and Healthy Retrofits**: Find federal and state resources for efficient and healthy retrofits.  [Learn more](#)
 - Energy-Efficiency Retrofits and Renewable Energy Integration in Schools**: Energy retrofits may employ one or more energy-efficiency measures to maximize occupant comfort and reduce building energy use.  [Learn more](#)
 - Prioritizing Heating, Ventilation, and Air Conditioning**: Many K-12 school facilities need to update or replace heating, ventilation, and air conditioning (HVAC). HVAC is integral to learning and health in schools.  [Learn more](#)
 - School Efficiency Enhancement Guides**: Packaged efficiency measures can maximize upgrades to key building technologies and systems in school facilities.  [Learn more](#)

Energy-Efficiency Retrofits and Renewable Energy Integration in Schools

Buildings

Buildings » Energy-Efficiency Retrofits and Renewable Energy Integration in Schools

Energy Efficiency

Energy retrofits may employ one or more energy-efficiency measures (EEMs) to maximize occupant comfort and reduce building energy use. EEMs that are frequently implemented in schools include: improving insulation; upgrading heating, ventilation, air conditioning, and water heating systems; reducing air leakage through air-sealing; installing energy-efficient windows (e.g., insulated glazing units); upgrading to energy-efficient lighting; adding occupancy- or daylight-sensing lighting controls; installing advanced controls and fault diagnostic systems; or changing building operation protocols (e.g., coordinating the use of HVAC systems for maximum comfort only during occupied hours). Below are links to helpful Better Buildings Resources on EEMs.

- [Energy Efficiency and Renewable Energy Resources for Rural K-12 School Energy Managers and Educators](#)
- [Better Buildings K-12 Lighting Tool Kit](#)
- [Better Buildings K-12 Solutions for Buildings Energy Excellence](#)
- [Better Buildings Decision Guides for Plug and Process Load Controls](#)
- [Better Buildings Webinar: Back to School: Including Energy Efficiency in K-12 Classrooms](#)
- [Better Buildings Webinar on Fault Detection and Diagnostics in the Age of COVID-19](#)
- [Better Buildings Toolkit on Incentivizing Advanced RTU Control Retrofits](#)
- [Energy Case Study: Henderson County Public Schools](#)
- [Low Carbon Technology Strategies for Primary Schools](#)
- [Low Carbon Technology Strategies for Secondary Schools](#)

<https://www.energy.gov/eere/buildings/efficient-and-healthy-schools>

Getting to Zero Resources HUB

SCHOOLS RESOURCES

Here you can find resources for those interested in getting on the path to zero in schools. These resources include technical strategies, district approaches, state policies, and national programs that aim for getting to zero energy and zero carbon over time. Case studies highlight successful projects from across the country. Technical tools include assessment strategies for school retrofits and technical best practices in both new construction and existing buildings. You will also find policy guidance documents, examples of district goals, and strategies to achieve them.



DESIGN & PROCESS

PATHS TO SUCCESSFUL SCHOOLS



EXISTING BUILDINGS

TOOLS AND ANALYSIS FOR RETROFITS



SCHOOLS & DISTRICTS

LEADERSHIP AND LESSONS LEARNED FROM
IMPLEMENTATION



STATE & NATIONAL

PROGRAMS MAKING THE CASE FOR HEALTHY AND
SUSTAINABLE SCHOOLS

<https://gettingtozeroforum.org/zero-energy-schools-resources/>



Office Hours