Education Sector Meet-Up

June 8, 2020
1-2:30pm
Welcome, Introductions, & Session Housekeeping

Nate Allen
U.S. Department of Energy
Weatherization & Intergovernmental Programs Office (WIP)
Welcome, Introductions, & Session Housekeeping

Sector Overview: Priorities, Activities, & Key Resources

Hearing From Experts: EE Perspectives & Updates for the Education Sector

Q&A Session
Follow along with Better Buildings, Better Plants

#BBSummit2020

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Webinar Housekeeping

- Please note, today’s session will be recorded and archived on the Better Buildings Solution Center. We will follow up when today’s recording and slides are made available.

- If you experience any audio or visual issues anytime throughout today’s session, please send a message in your “chat” window located on the bottom of your Zoom panel.
Welcome, Introductions, & Session Housekeeping

Slido will be used as our platform for Q&A throughout the webinar.

1. Please go to www.slido.com
2. Enter the event code - #BBSummit
3. From the list of sessions provided, select “Education Meet-Up”
Poll #1: Slido test – word cloud

Where are you joining us from today?  
(City name only is acceptable)
Poll: Multiple Choice

What best describes the focus of your role?
Sector Overview: Priorities, Activities, & Key Resources
Sector Overview: Priorities, Activities, & Key Resources

Better Buildings Education Sector

K-12 Schools
- 29 partners
- 253 Million Sq. Ft.
- 2300 buildings
- 7 goal achievers (3 in 2020)
- Completed solutions:
  - Showcase projects: 21
  - Implementation Models: 6
  - Solutions at a Glance: 11

Higher Education
- 23 Challenge partners
- 155 Million Sq. Ft.
- 5 goal achievers (2 in 2020)
- Completed solutions:
  - Showcase projects: 16
  - Implementation models: 10
  - Solutions at a Glance: 2
Sector Overview: Priorities, Activities, & Key Resources

Current Sector Priorities

K-12 Schools
- Technical assistance for utilizing energy data and financing EE
- Retaining & training staff
- Communicating the value of energy efficiency to leadership
- Support for rural school districts
- Enhancing resilience

Higher Education
- Laboratory efficiency
- Energy efficiency student career training
- Advanced energy goals
POLL: Informing Future Sector Priorities

Please briefly list your challenges & goals relating to energy efficiency for the upcoming year.

This may be in the form of barriers you seek to overcome, specific challenges to which you need solutions, or general topic areas where additional information would open new opportunities in your pursuit of energy efficiency.
Welcome New Partners!

K-12 Education
- Forth Worth ISD
- Pasadena ISD

Higher Education
- Catholic University of America
- Morehouse College
- Pace University
- University of Tulsa
Congratulations New Goal Achievers!
Sector Overview: Priorities, Activities, & Key Resources

2020 Green Schools Conference + Expo
Presentation: Energy Efficiency & Renewable Energy Resources for Rural K-12 Schools
Sector Overview: Priorities, Activities, & Key Resources

2019-2020 Site Visits
Recently published K-12 Resources

**Energy Efficiency and Renewable Energy Resources for Rural K-12 School Energy Managers and Educators**

- High-level solutions and strategies for reducing energy use through efficiency measures
- Examples from existing Better Buildings Solutions
- Resources for exploring specific technologies and financial mechanisms

**Rural K-12 School Facility Workforce Development and Training**

- Collection of materials, trainings, and certification courses from nationally-recognized building science organizations to expand operator expertise
Recently published Higher Ed Resources

Smart Labs Toolkit

- Learn how to plan, assess, optimize and manage for high-performing, energy-efficient and safe laboratories
- Includes roadmap, upgrades SOW for existing labs, building management plan and performance reports
- Integration with HVAC Resource Map

Review of Campus Energy Plans

- Reviewed 45 plans to glean priorities and best practices
- Discussion of both technical and outreach & engagement features
Sector Overview: Priorities, Activities, & Key Resources

HVAC Resource Map

What is this resource?

The HVAC Resource Map is an intuitive graphical interface that provides quick access to a broad array of quality information on operations and maintenance best practices and energy and water efficiency measures.

The resources cover the central plant, distribution systems, and zone systems. The primary audiences for this resource are facility managers, operations staff, and design engineers who want to improve central plant and distribution efficiency but don’t have time to search for these resources.

This Resource Map does not duplicate guidance provided in codes and standards, and it should not be used in lieu of professional engineering services.

General HVAC Resources

Building Re-Tuning Training: two free interactive e-learning courses

Explore HVAC Resources

Use the navigation on the right or the interactive diagram on the left to dive into resources on different HVAC components.

The interactive diagram will not be available on Internet Explorer. Please use Edge, Chrome, Safari, or Firefox for a better experience.

The resources listed on this site have been carefully selected to help narrow your search for helpful information.
There are many ways to finance energy efficiency and renewable energy projects in buildings that you own or occupy. The Navigator helps you cut through this complexity to secure financing that works for you.

What would you like to do?
Hearing From Experts:
Energy Efficiency Perspectives & Updates for the Education Sector
Today’s Presenters

Christos Chrysiliou  
Los Angeles Unified School District

Brendan Hall  
U.S. EPA

Paul Torcellini  
NREL

Rachel Romero  
NREL
Christos Chrysiliou
Los Angeles Unified School District

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Facilities Services Division
Maintenance and Operations
A/E Services – Sustainability Initiatives Unit

2020 Summit Leadership Symposium – Resilience

Christos Chrysiliou, AIA, CCM, LEED AP BD+C

Director of Architecture and Engineering Services

May 28, 2020
Overview

**Goals**
- 100% clean, renewable electricity by 2030, and all other energy usages, including boilers, HVAC, and transportation by 2040
- 20% Energy Intensity Reduction by 2024
- 20% Water Consumption Reduction by 2024

**Mission**
LAUSD’s Sustainability Initiatives mission is to be the most sustainable school district in the nation.

**Motivation**
- 660,000+ students (K-12)
- 60,000 employees
- 710 square miles of site boundaries
- 6,657 acres of land
- 13,500 buildings
- 1,200 schools and educational facilities

**Preparing for the unknown**
- Sustainability Initiatives focus areas
- LAUSD Business Continuity Plan
- First step: understand your facility
- Covid-19 and other emergencies

**Focusing on Resiliency**
- Design: ZNE Ready and Energy Star Portfolio Manager
- Technology: solar, battery storage, controls
- SIU Program highlights

**Looking ahead**
- LAUSD Target Goals
- The Bottom Line
Preparing for the unknown

Global Pandemics
- Colorado Hail Storms
  - July 4–5
- California and Alaskan Wildfires
  - Summer–Fall 2019

Earthquakes
- Texas Hail Storm
  - March 22–24
- Texas Tomatoes and Central Severe Weather
  - October 20

Wind Storms
- Missouri River and North Central Flooding
  - March 14–31
- Central Severe Weather
  - May 16–18
- Southeast, Ohio Valley and Northeast Severe Weather
  - February 23–25
- Rockies, Central and Northeast Tornadoes and Severe Weather
  - May 26–29
- Hurricane Dorian
  - August 28–September 6
- Mississippi River, Midwest and Southern Flooding
  - March 15–July 31
- Southern and Eastern Tornadoes and Severe Weather
  - April 13–14

U.S. 2019 Billion-Dollar Weather and Climate Disasters

This map denotes the approximate location for each of the 14 separate billion-dollar weather and climate disasters that impacted the United States during 2019.

Each threat is different, but the themes are the same.
Preparing for the unknown

Sustainability Initiatives Unit

Focus Areas

- Water Conservation
- Energy Conservation
- Campus Ecology
- Emerging Technologies
- High Performance Schools
- Awareness & Outreach
Resiliency and why it matters

Resilience: The capacity to survive and thrive in the face of stressors and shocks.

✓ Stressors could be aging infrastructure, poor performing buildings, environmental pollution, poverty and income inequality, chronic public health challenges; all problems in their own right that may render a society’s unable to bounce back from shocks.

✓ Shocks are the headline-grabbers—the earthquakes, fires, floods, terrorist attacks, pandemics, and other events that can jolt us from the status quo and force us to take action.
Question:

What is Resiliency to you? Select the two most important items to you:

a. Business continuity
b. Building/classroom recovery plan
c. Ability to function remotely
d. Natural resource depletion
e. Ability to continue working with minimal or no interruption
Create a collaborated resiliency plan

Facilities Services, Architecture & Engineering

Focusing on Resiliency

- Energy
- Sustainability
- Education
- Users

Resiliency Plan

Logistics
- EOC Center

Space Layout
- Planning
- Designing

Business Continuity Plan
- Site Relocation
- Business Impact Analysis
- Essential Functions Recovery Strategy

Design Guidelines
- ZNE Ready Policy
- 2030 100% Renewables Policy
- 2040 Carbon-free Policy
- Energy Star rating 75+
LAUSD Business Continuity Plan

Ensures the recovery and performance of essential business functions in the event of a disruption or disaster.

Site Relocation Plan - in the event the primary facility is inaccessible.

Business Impact Analysis - identifies and prioritizes the essential functions that will have the greatest impact should they not be available in the event of a disruption or disaster.

Essential Functions Recovery Strategy - will be utilized to provide timely and efficient restoration of essential business functions in the event of a disruption or disaster.

LAUSD Facilities Continuity Plan

Focusing on Resiliency
COVID-19 and other emergencies

- Ensure safe school maintenance and operations plan in place
- Update or develop school emergency and contingency plans.
- Education continuity through computers/software/technology
- Adapt school policies where appropriate
- Maintain facility resilience
Design: LAUSD planning for ZNE Ready

Approved ZNE Ready Policy:

✓ ZNE Site Assessment
✓ Stakeholder Engagement
✓ Integrated Design
✓ Energy Modeling
✓ Commissioning
✓ Training and Stewardship
✓ Measurement & Verification

Utilize Energy Star Portfolio Manager to new construction and modernization projects
Emerging Technologies

Supported by other District teams and industry innovators. Sustainability Initiatives Unit evaluates emerging and innovative technologies for feasibility and cost effectiveness.

Solar, Battery Storage, Emergency Generators, Controls
Focusing on Resiliency

**Question:**

Do you have a resiliency plan? If not, what is holding you back?

a. Yes, we have a plan
b. No, where do I start?
c. No, resource constraints
d. No, plan development
e. No, cost
f. No, stakeholder involvement
Program Highlights

Increasing campus green space, school gardens and outdoor learning spaces:

- SEEDS
- Nature Explorer Gardens
- Learning Gardens
- Community Initiated Greening Projects

Piloting Several Emerging Technologies

- Battery Storage
- Plug Load
- LED lights
- HVAC Controls
- EV charging stations
- Leak detection

Adapted and integrated CHPS into LAUSD Design Standards:

- 132 CHPS recognized projects
- 1 LEED Platinum certified
- 5 LEED Gold certified
- 1 LEED Silver Certified

We are reaching all our schools:

- Heroes for Zero contest
- Empowered
- Save the Drop
- SEAT Program
- LearningGreen website

- Recycled water system on 7 school sites
- Developed storm water technical manual
- All schools comply with LID: 122 sites completed LID program with GPS for maintenance, 31 projects ongoing

- Installing solar arrays at 59 campuses and 5 administrative sites, totaling 21 MW of solar capacity, enough to power 3,300 homes for a year.
Looking ahead while delivering the bottom line

**LAUSD FUTURE TARGET GOALS:**

- **100% Renewable Energy**
- **20% Energy Intensity**
- **20% Water Consumption**
- **100% Carbon Free**
- **2024**
- **2030**
- **2040**

**THE BOTTOM LINE:** to deliver facilities and educational spaces that meet their purpose and intent, are healthy, conducive to learning, cost effective, and have an excellent life cycle.

2018 Savings: $5.8M Electricity Cost, 19,275,714 kWh
$342k Natural Gas Cost, 495,141 Therms
GHG reduction equivalent to carbon sequestered yearly by 19,132 acres of forests

2018 Savings: $3M Water Cost, 65,882,431 gallons
Equivalent to filling up 99 Olympic-sized swimming pools

**PV Solar Initiative**

- 157,279M kWh generated to date
- 117,050 metric tons of CO₂ avoided
- Equals work of 137,868 acres of forest
THANK YOU!

Questions?
Website: learninggreen.laschools.org
Contact us by email: learninggreen@lausd.net
Telephone: (213) 241-1000
Zero Energy Schools

Paul Torcellini, Ph.D., P.E.
Principal Engineer, National Renewable Energy Laboratory

Submit Questions
www.slido.com event code #BBSummit
Advanced Energy Design Guides

- K-12 Schools—Direct Application for School Systems
  - Classrooms
  - Gyms, cafetorium, etc.
  - Offices
  - Kitchens
- Offices
  - Open office plans
  - Conference rooms
  - Closed offices
- Multifamily
  - 1-3 bedroom apartment units
  - Common spaces
  - Tenant laundry
  - Hot water a key energy user

Indirect Application for Higher Education
Advanced Energy Design Guides Background

Six 30% Guides Published  
(2004-2008)  
Highway Lodging, K-12 Schools, Small Hospitals and Healthcare Facilities, Small Office Buildings, Small Retail Buildings, Small Warehouses and Self Storage

Five 50% Guides Published  
(2009-2013)  
Grocery Stores, K-12 Schools, Large Hospitals, Small to Medium Office Buildings, Medium to Big Box Retail Buildings

Two Zero Energy Guides Published  
(2018-current)  
K-12 Schools  
Small/Medium Offices  
Multifamily (expected Fall 2020)

As of May 4, 2020
All versions (13 total)  
652,205 downloaded  
26,582 distributed in print  
678,787 total  
169,726 registrants account for free AEDG downloads

ZE  
K-12: 10,395 copies (January 2018)  
SMO: 4,627 copies (June 2019)
Advanced Energy Design Guides

• Developed by technical experts with National Laboratory Simulation Analysis
• Development of Energy Use Targets by Climate Zone
• Examples of actual buildings that achieved EUI targets
• Over 650,000 in electronic or hard copy distribution
Step by Step Guidance for Owners

• Result of working closely with school decision makers

• Addresses key barriers to zero energy from the owner’s perspective

• Provides questions for owners to ask design teams

• Many parallels to other building types (similar barriers)

https://www.nrel.gov/docs/fy19osti/72847.pdf
Key Barriers for Adoption

• Knowledge—how to ask the right questions
• Cost—“It will cost too much”
• Hard to be first

• Collecting the following data—please share:
  • School name/location
  • Cost of the project
  • EUI (measured and/or projected)

• Showing others that ZE/R can be done without increasing the cost.
Results to Date

- Design teams are gaining experience with time and more project
- We are building ZE/R schools
Cost of Zero Energy Ready

- Collected data on costs and energy performance for over 150 schools
- Many schools operating better than ZE/R (AEDG Targets)
- Newer schools tend to have lower energy use
- Little evidence ZE/R costs more
Zero Energy K–12 Schools

A zero energy school is so energy-efficient that the output of an on-site renewable energy installation can meet or exceed its annual energy needs.

The emphasis on energy efficiency reduces the amount of purchased energy the school requires and can free up funds for educational purposes. In addition, zero energy schools provide experiential learning opportunities for students and strengthen community resilience. The resources in this section provide information about benefits and best practices as well as detailed implementation strategies for achieving zero energy in K–12 schools.

DOE developed this content with technical support from the National Renewable Energy Laboratory and insights from school districts, states, and non-governmental organizations that participated in the Zero Energy Schools Accelerator.

Available through this website are case studies, fact sheets, advanced energy design guidance, and other helpful resources.

Click here to download the Advanced Energy Design Guide for K–12 School Buildings.
Learn more about the Zero Energy Schools Accelerator program.
Brendan Hall
U.S. EPA

Submit Questions
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Poll: Multiple Choice

What challenges does your campus face related to efficiency?
Our shared goal
Reducing energy use and GHG emissions at colleges and universities.

US HIGHER ED GHG EMISSIONS

ENERGY STAR

• ENERGY STAR is a U.S. EPA voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency.

• Leadership commitment (ENERGY STAR partnership)
• Tools & resources to understand and act on energy use
  • Portfolio Manager (1-100 ENERGY STAR scores, partial coverage in higher ed)
• Recognition for top performance
  • ENERGY STAR certification for buildings (partial coverage in higher ed)
  • ENERGY STAR Awards for organizations
Higher ed efficiency hurdles

**Operational**
- Limited staff
- Budget shortfalls
- Competing priorities
- Deferred maintenance backlogs

**Data and benchmarking**
- Lack of building-level metering and granular data
- Incomplete coverage of 1-100 ENERGY STAR scores
- How to set an accurate peer group?
Higher ed tools and resources

COMPLETED
  • Step Away from the Spreadsheet guide – SIMAP, USGBC LEED, Second Nature, AASHE STARS, GRITS, Portfolio Manager

IN DEVELOPMENT
  • Northwestern University case study
  • “Executive report” based on AASHE STARS data
  • Peer comparison opportunity

POSSIBLE
  • Networking for institutions subject to state & local ordinances?
  • Survey for score(s) and certification?
Peer comparison

- ENERGY STAR is launching a peer comparison opportunity for higher ed
- Participating schools will receive a scorecard comparing their campus energy use to other participating campuses, cutting performance against key institutional characteristics**
- Springboard for future efforts
  - Best practice sharing
  - Multiple rounds of scorecards, with increasing participation (hopefully!)
  - Survey effort?

*Carnegie Classification, campus size, IECC climate zone, floor area of energy intensive space, FTE or student population, percent residential
Stay in the loop

- (Optional, but encouraged!) Email us to express interest: sdieck@retechadvisors.com
- (Optional, but encouraged!) Register for webinar on July 15
- Benchmark campus in Portfolio Manager
- Submit 2019 energy use data via Portfolio Manager -- data request to come (July-August 2020)
- Provide supplementary information for peer grouping – simple survey to come (July-August 2020)
- EPA will share back the results in fall of 2020
Rachel Romero
NREL

Submit Questions
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Poll: Multiple Choice

How familiar are you with Smart Labs?
Q & A

Submit Questions

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Additional Questions?

Please Contact Us

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