

# SUSTAINABILITY TO NET ZERO

2022 WASBO Spring Conference

Presented by:

**alb** Actively  
**cb** Building  
Competency, Character,  
Culture & Community

OREGON SCHOOL DISTRICT

**Findorff**



# Agenda

## Forest Edge Elementary

### Key Topics

- The “Why”
- Net Zero Strategies
- Operational Impact
- Teaching & Learning Impact
- Lessons Learned
- What you can do

### Q&A

# There is something in the Room

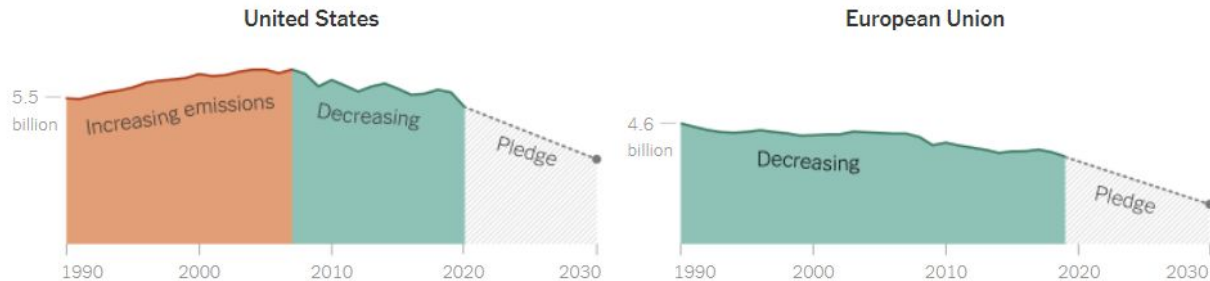
- It is past time to start talking about it
- There are things everyone can do
- It is not all or nothing...
- Our kids want us to lead



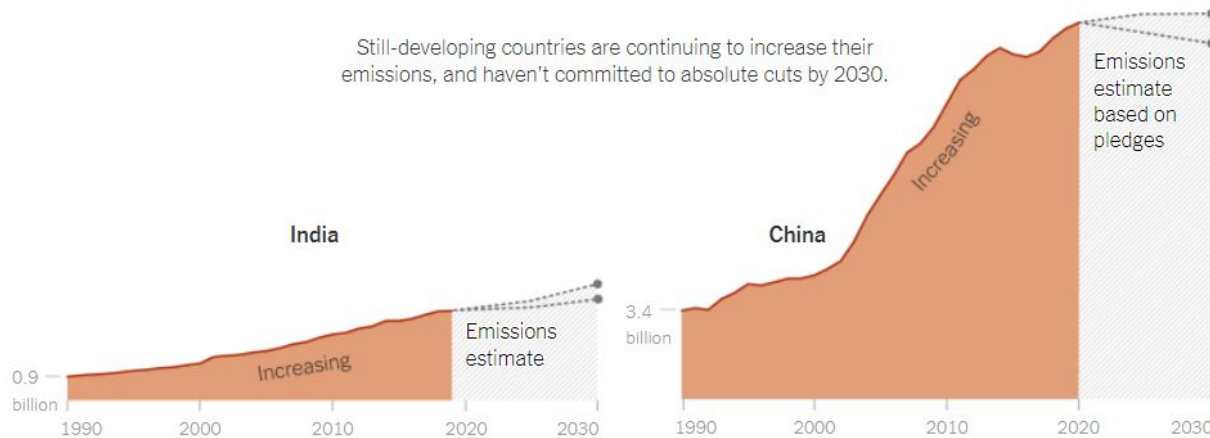
## Trajectories for the World's Largest Emitters

The United States was still increasing emissions until the mid-2000s, while Europe took earlier action.

In metric tons CO<sub>2</sub>



Still-developing countries are continuing to increase their emissions, and haven't committed to absolute cuts by 2030.



New York Times, April 22, 2022

Source: Rhodium Group

## The U.S. Still Had the Highest Per-person Emissions in 2019



Sources: Rhodium Group, World Bank

The U.S. Has a New Climate Goal. How Does It Stack Up Globally?

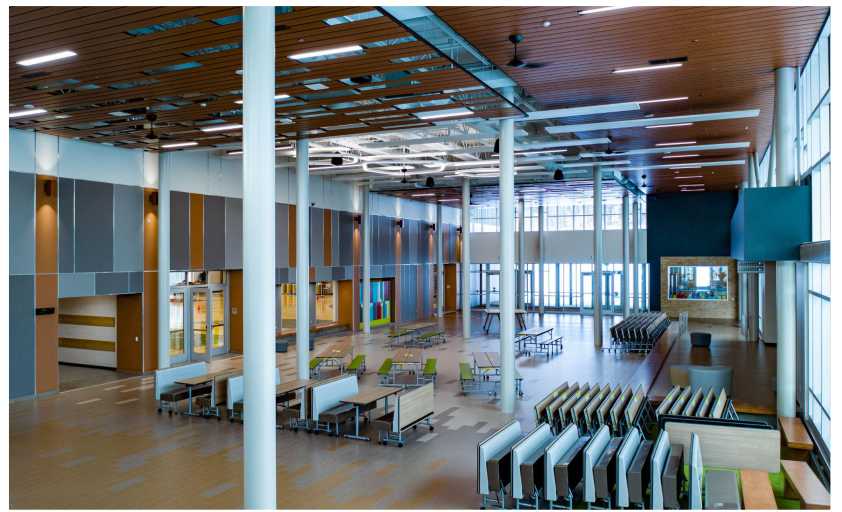
New York Times, April 22, 2022

# NET ZERO

Net zero or zero-energy buildings produce at least as much energy as they consume on an annual basis.

They do this by incorporating state-of-the-art energy efficiency and renewable energy technologies.

- *The National Renewable Energy Laboratory*



# LARGEST VERIFIED

NET ZERO K-12 SCHOOL  
IN THE U.S.

# 1,704

SOLAR PANELS

## PROJECT TEAM



HGA



# FIRST NET ZERO SCHOOL

IN WISCONSIN

# 99

GEOHERMAL WELLS  
THAT ARE  
406 FEET DEEP

**ABOUT FOREST EDGE**

A photograph of a mechanical room with white cinder block walls and a grey tiled floor. Large yellow pipes run horizontally across the room, with a vertical yellow pipe on the right labeled "GEO LOOP RETURN". Grey pipes and equipment are visible on the left. A central orange text box with a white border contains the text "DISTRICT BACKGROUND".

**DISTRICT  
BACKGROUND**



# BOARD POLICY

- Community and staff committee drafted a paper on sustainability in the OSD
- Paper became policy and provided direction
- The policy provides a platform for staff-led environmental initiatives



"The Oregon School District believes it is critical for the future of our planet to **develop learners who are ecologically literate and environmentally responsible citizens and stewards**. We believe it is important to model the District's commitment by establishing these values and developing practices consistent with them:

The District will **continue to develop building and operational practices and procedures** that reflect a commitment to environmental sustainability; and

The District will have an **aligned K-12 curriculum that integrates ecological and environmental sciences and issues into the curriculum**, including socio-economic aspects. This may include, but is not limited to, experiences outside the classroom, project-based learning, and environmental services projects."

**OREGON'S VALUE STATEMENT**

# THE BEGINNING: ENERGY MANAGEMENT

## eGauge Pro

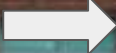
- Cost effective (\$800)
- Easy to use and implement
- Helps to make data driven decisions





**OREGON MIDDLE SCHOOL** 2014



Original Solar Panel 

**OREGON MIDDLE SCHOOL** *Solar | 62 KWp*



**BROOKLYN ELEMENTARY SCHOOL** *Solar* | 36 kWp



**OREGON HIGH SCHOOL** *Solar* | 136 kWp

# SOLAR PANEL

2014



Oregon Middle School

# SOLAR ARRAYS *and* GEOTHERMAL

2014 Referendum

Oregon  
High  
School



Oregon  
Middle  
School



Brooklyn  
Elementary



# NET ZERO

2018 Referendum



Forest Edge Elementary

**OREGON'S** *Journey*



# THE BEGINNING: ENERGY MANAGEMENT

## eGauge Pro

- Cost effective (\$800)
- Easy to use and implement
- Helps to make data driven decisions



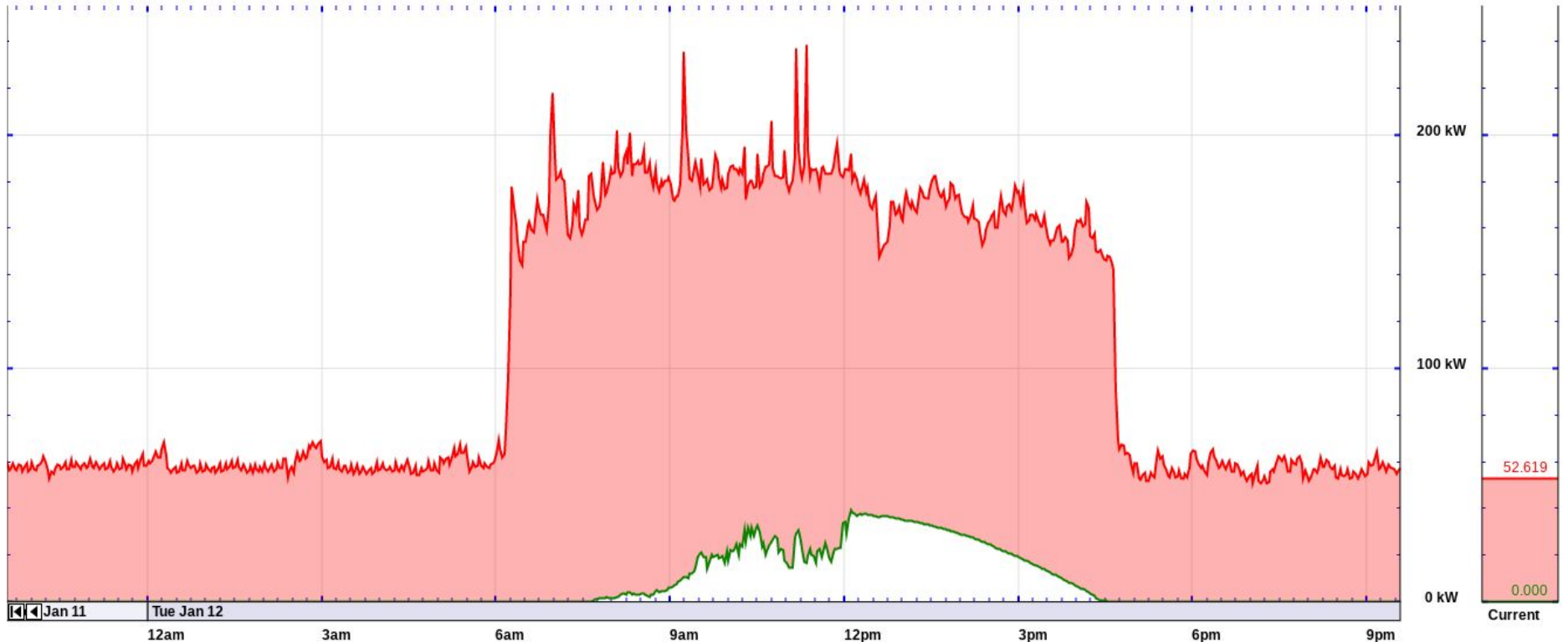
### Summary for time-period shown in graph

Energy Used	2.61 MWh	(approx. \$312.73 used)
Energy Generated	174 kWh	(approx. \$20.83 saved)
Net	2.43 MWh bought	(approx. \$291.91 spent)

### Summary over last 30 days

Energy Used	59.6 MWh	(approx. \$7,155.46 used)
Energy Generated	1.42 MWh	(approx. \$170.49 saved)
Net	58.2 MWh bought	(approx. \$6,984.97 spent)

All 1y 6M 3M 1M 3w 1w 3d 1d 12h 6h 3h 1h 10m Auto 500kW 100kW 50kW 10kW 5kW 1kW 500W 100W 50W

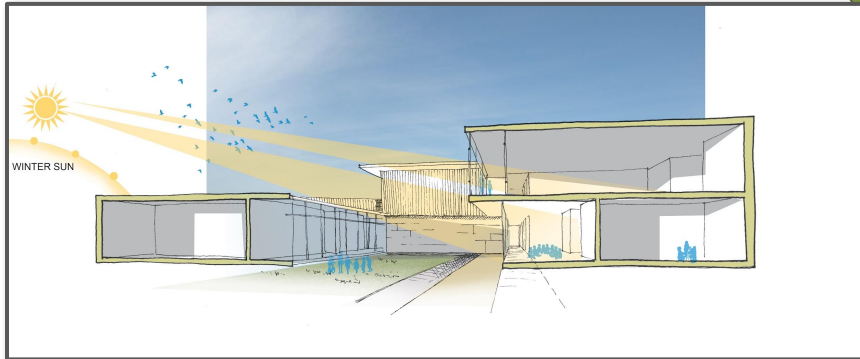
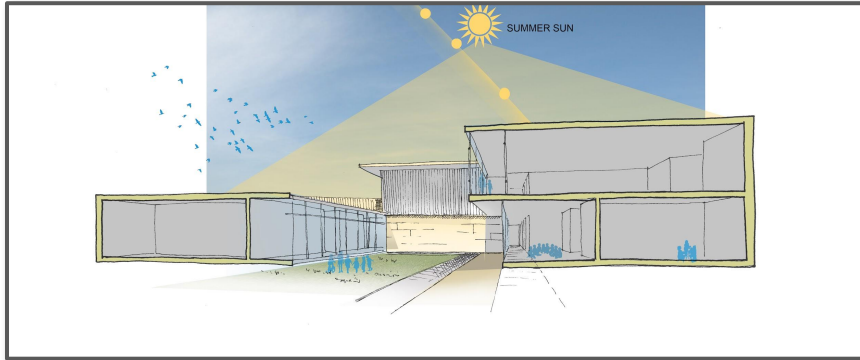


An aerial photograph of a large, multi-story building with a flat roof. The roof is covered with numerous solar panels, arranged in a grid pattern. The building is surrounded by a paved area and a parking lot with yellow markings. In the foreground, there is a road with a white crosswalk and a yellow arrow pointing right. The background shows a grassy area and a concrete path.

# **NET ZERO STRATEGIES**

# BUILDING ORIENTATION

## SITE & SECTION



# PROJECT GOALS

- Address enrollment growth
- Exceptional learning spaces
- Safety and security
- Sustainable elements
  - Net Zero



# GEOHERMAL HEATING/COOLING



# ROOFTOP SOLAR PHOTOVOLTAICS



# BATTERY STORAGE SYSTEM

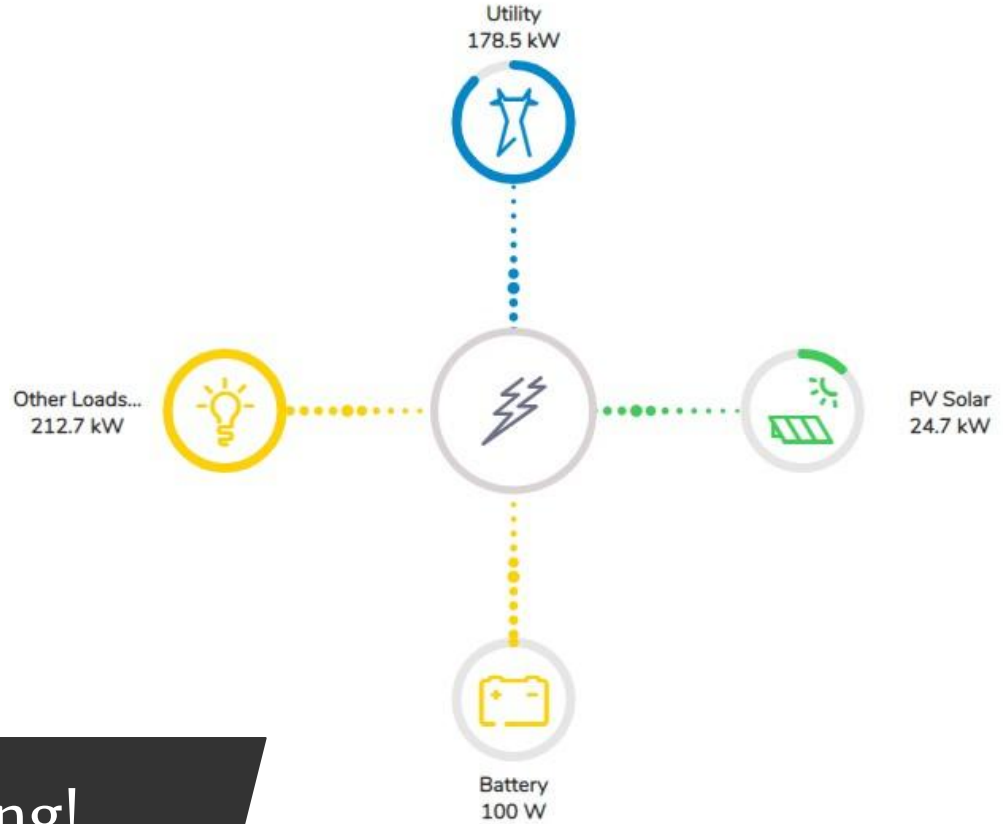




# AN ELECTRIC FUTURE

## All Electrical Energy

- Heating / cooling
- Hot water
- Renewable energy
- Battery storage



*Zero* natural gas to the building!

...ain source of light is  
...res and even fireflies  
...in the sun and use it  
...ynthesis. Almost all  
...ergy needs.

LIGHT



# OPERATIONAL IMPACT



# NET ZERO TRACKING

## MONTH-BY-MONTH



# ENERGY USAGE COMPARISON

Building	Square Footage	Utility	Total by Utility	Total Energy Costs by Building
Rome Corners Intermediate School	110,000	Gas	\$ 24,930	\$114,547
		Electric	\$ 89,617	
Oregon Middle School	132,000	Gas	\$ 32,063	\$122,131
		Electric	\$ 90,060	
Forest Edge Elementary School	126,000	Gas	<i>does not apply</i>	\$56,873
		Electric	\$ 56,873	

*Energy costs reflect data from September 2020 – August 2021.*

*Forest Edge energy costs per square foot is nearly 50% less than Rome Corners and the Middle School.*

**\$57,674** difference in energy costs between Forest Edge & Rome Corners

**\$65,258** difference in energy costs between Forest Edge & the Middle School

# MAINTAINING A NET ZERO BUILDING

- Needs a willing advocate with some passion for sustainability
- Requires time to learn and trust the technology
- Include internal, building-level staff who have passion for sustainability



# MAINTAINING A NET ZERO BUILDING

- Needs minimal systems maintenance
  - Have not needed to add FTE
- Positions district as an educational and sustainability leader
- Provides value in recruiting and adds pride to district



# SUSTAINABILITY GRANTS & INCENTIVES

- Focus on Energy Design Assistance - \$69,619.81
- Focus on Energy Prescriptive Solar Incentive - \$60,000
- Couillard Solar Foundation Solar for Schools - \$20,000

***\$149,619.81*** in grants & incentives!

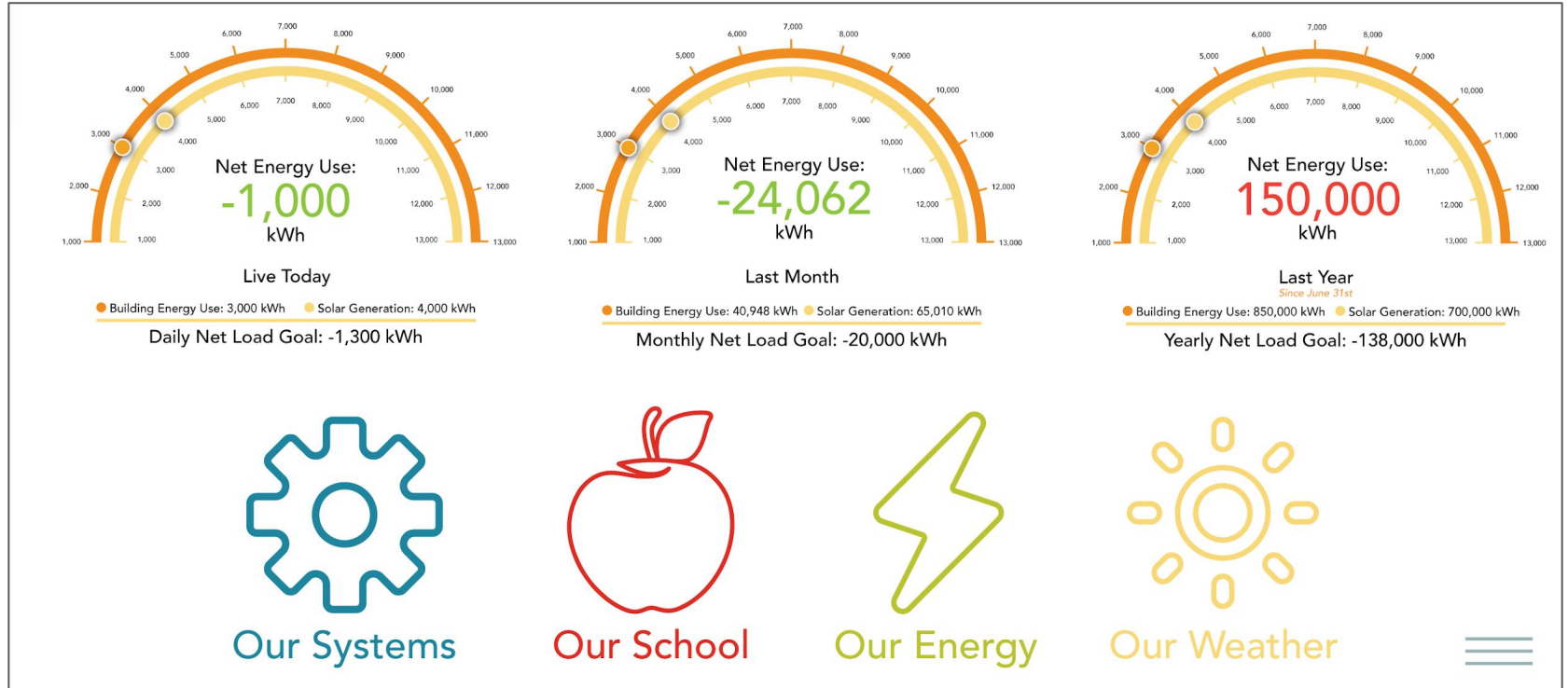
A modern office lounge area with large windows, a ceiling fan, and contemporary furniture. A central orange text box with a white border contains the text 'TEACHING & LEARNING IMPACT'. The background shows a bright, open-plan office space with glass walls and a green accent wall.

**TEACHING &  
LEARNING IMPACT**



# TEACHING TOOLS

## INTERACTIVE INTERFACE



# TEACHING TOOLS

## WALL/WINDOW GRAPHICS



# TEACHING TOOLS LEARNING OPPORTUNITIES



# EDUCATIONAL ENVIRONMENT

## NATURAL LIGHT



# MINIMIZE ELECTRIC USE **ELECTROCHROMIC GLASS**



# EDUCATIONAL ENVIRONMENT

## OUTDOOR CLASSROOMS





# Some Lessons Learned

- Be intentional about this work. Everyone on the team needs to know the importance of your sustainability goals upfront.
- Take steps to get familiar with these technologies
- There are people there to help if you ask
- There is more support in your community than you may think
- Some ROI is better than none!
- Net Zero is great but.....the journey is as important as the goal and....
- Electrification is most important!

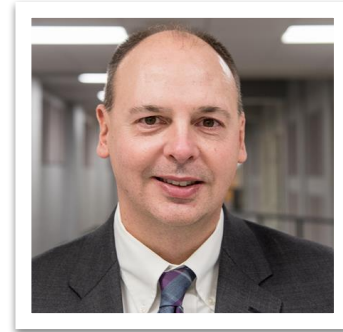
# WHAT'S CAN YOU DO?

- Install a CT Meters
- New School/Additions - Assess Geothermal Possibilities at beginning
- Investigate Heat Pump Technologies
- Electrification & Microgrids
- Purchase electric vehicles & charging infrastructure
- Empower future sustainability champions





**THANK**  
*You!*



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