Saving Money and Reducing Climate Change

2022 Facility Masters Conference

Presented by:

Actively Building
Competency, Character, Culture & Community
OREGON SCHOOL DISTRICT

Agenda

Forest Edge Elementary

Agenda

- The OSD story
- Net Zero Strategies
- $aving Money
- Teaching & Learning
- A Carbon Neutral Future?
- Lessons Learned

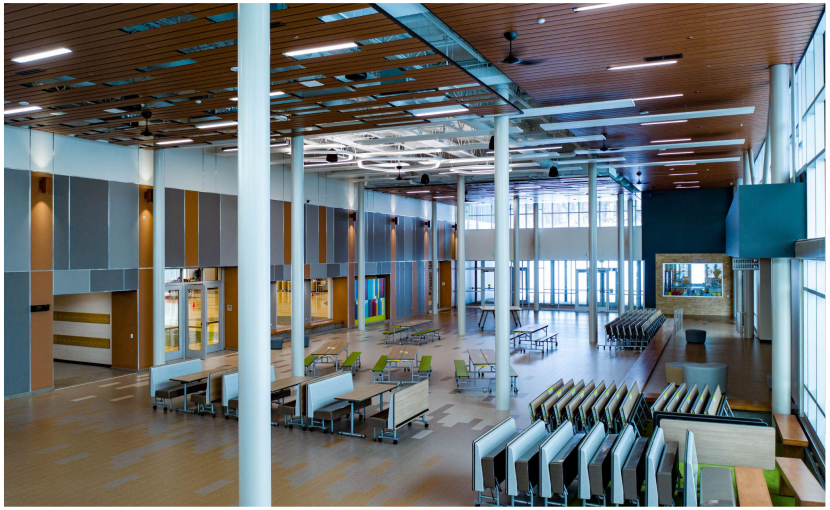
Q&A

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*



The OSD Story

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*

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

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

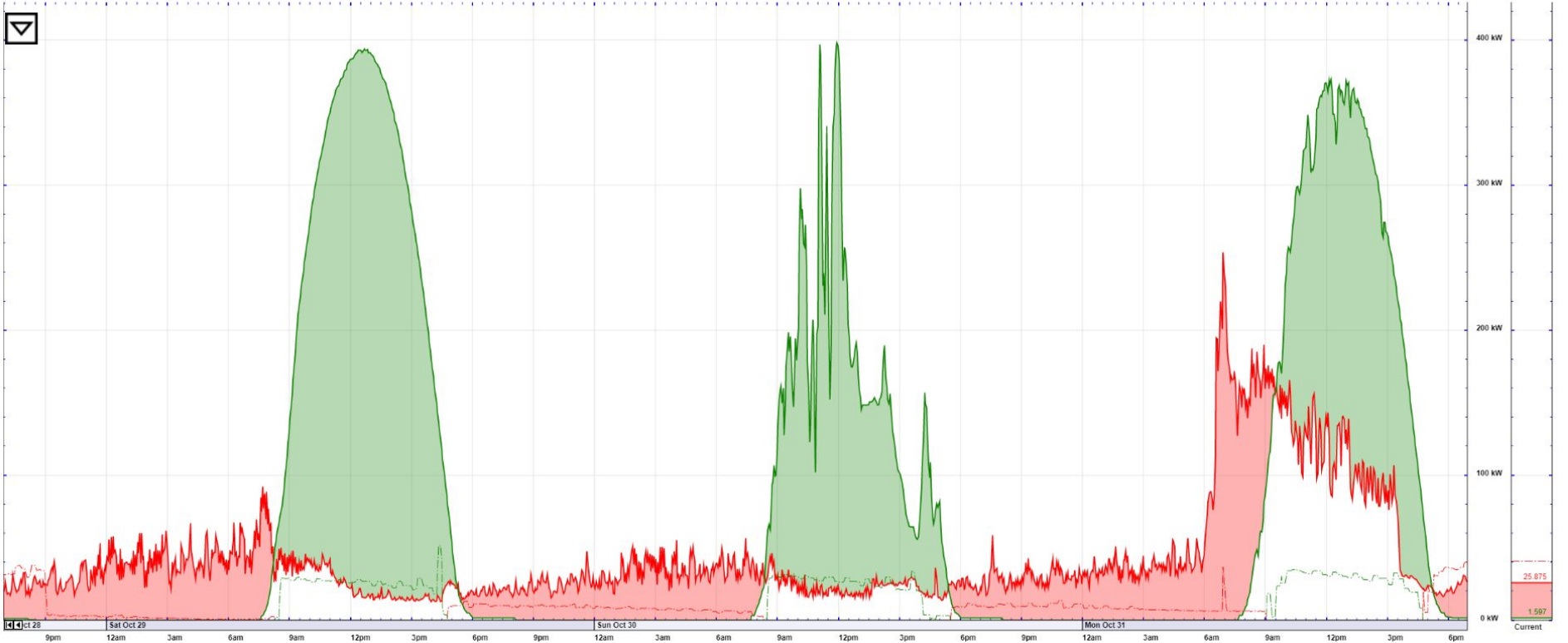
Energy Used	3.12 MWh	(approx. $405.49 used)
Energy Generated	6.07 MWh	(approx. $789.58 saved)
Net	2.95 MWh sold	(approx. $384.09 earned)

Summary over last 30 days

Energy Used	39.5 MWh	(approx. $5,131.42 used)
Energy Generated	62.6 MWh	(approx. $8,136.27 saved)
Net	23.1 MWh sold	(approx. $3,004.84 earned)

All | 1y | 6M | 3M | 1M | 3w | 1w | 3d | 1d | 12h | 6h | 3h | 1h | 10m

Auto | 500kW | 100kW | 50kW | 10kW | 5kW | 1kW | 500W | 100W | 50W




NET ZERO
STRATEGIES

5th **LARGEST VERIFIED**
NET ZERO K-12 SCHOOL IN THE U.S.

1,704
SOLAR PANELS

FIRST NET ZERO SCHOOL
IN WISCONSIN

99
GEOTHERMAL WELLS THAT ARE 406 FEET DEEP

PROJECT TEAM

bray architects

Findorff
BUILDING & BEYOND

HGA

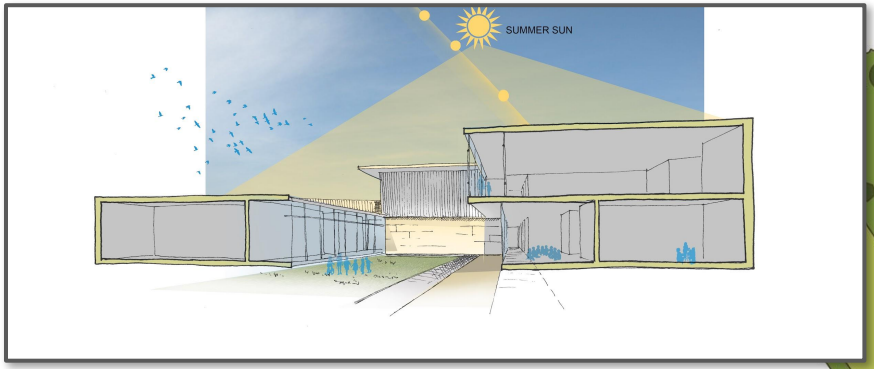
PMA™

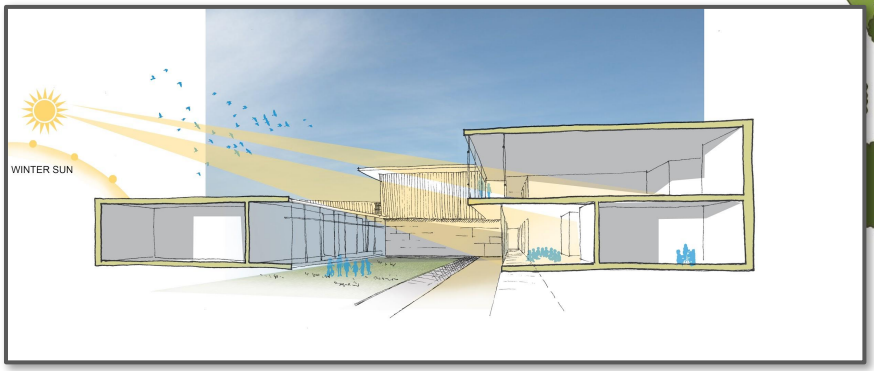
ABOUT FOREST EDGE

PROJECT GOALS

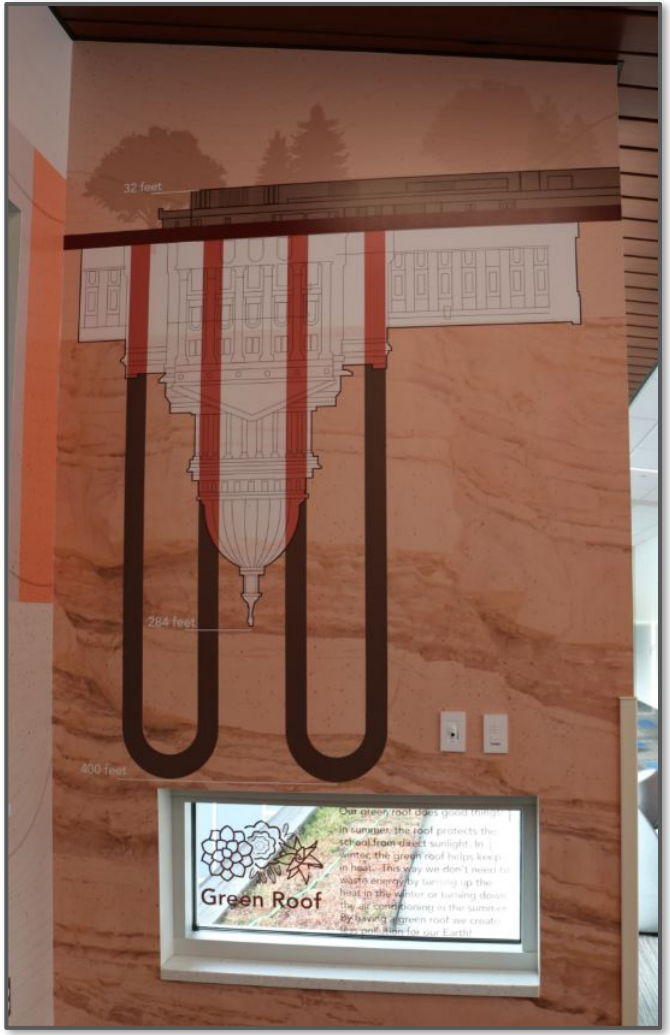
- Address enrollment growth
- Exceptional learning spaces
- An abundance of Natural Light
- Safety and security
- Sustainable elements

BUILDING ORIENTATION
SITE & SECTION





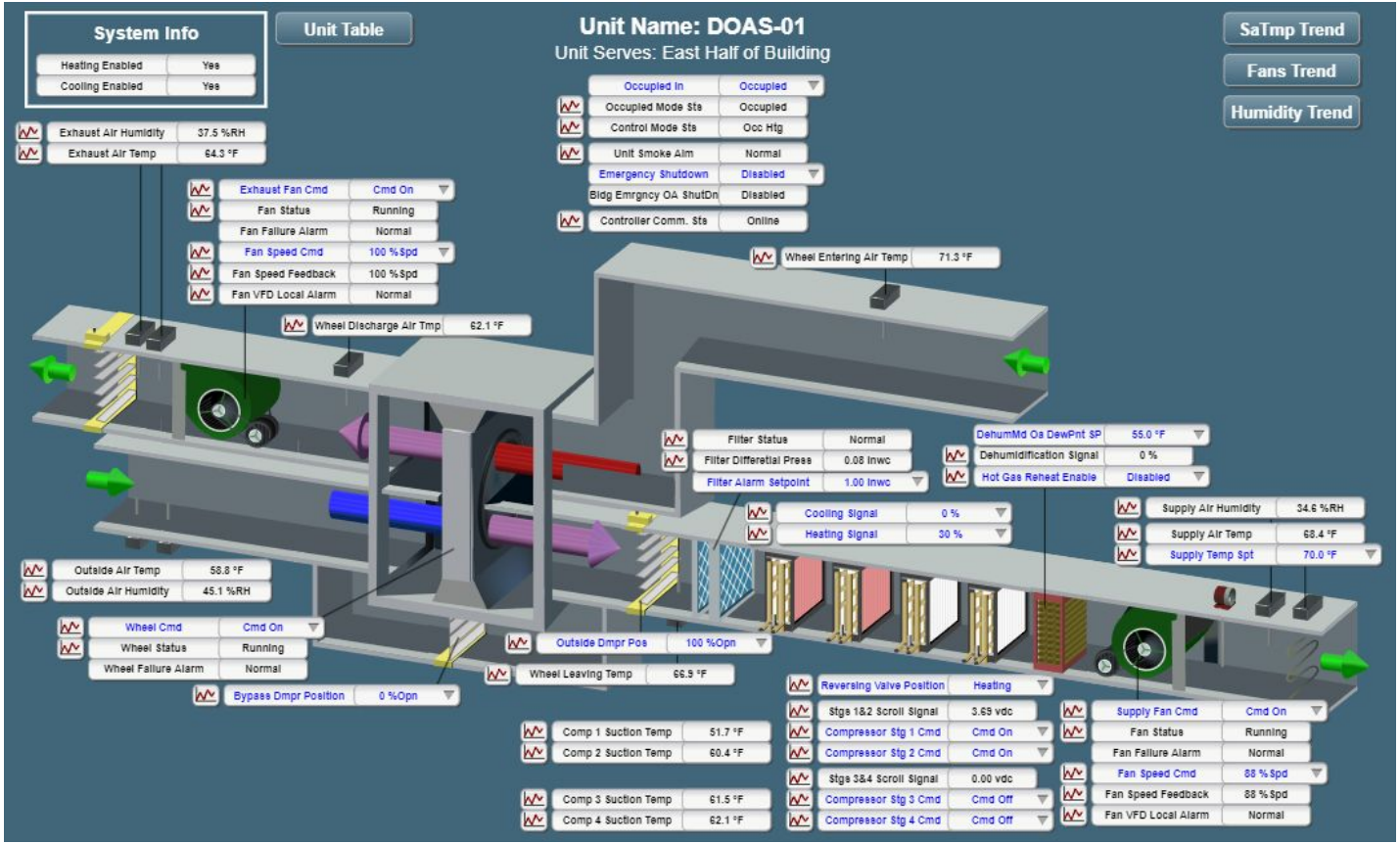
GEOTHERMAL HEATING/COOLING



ROOFTOP
SOLAR PHOTOVOLTAICS

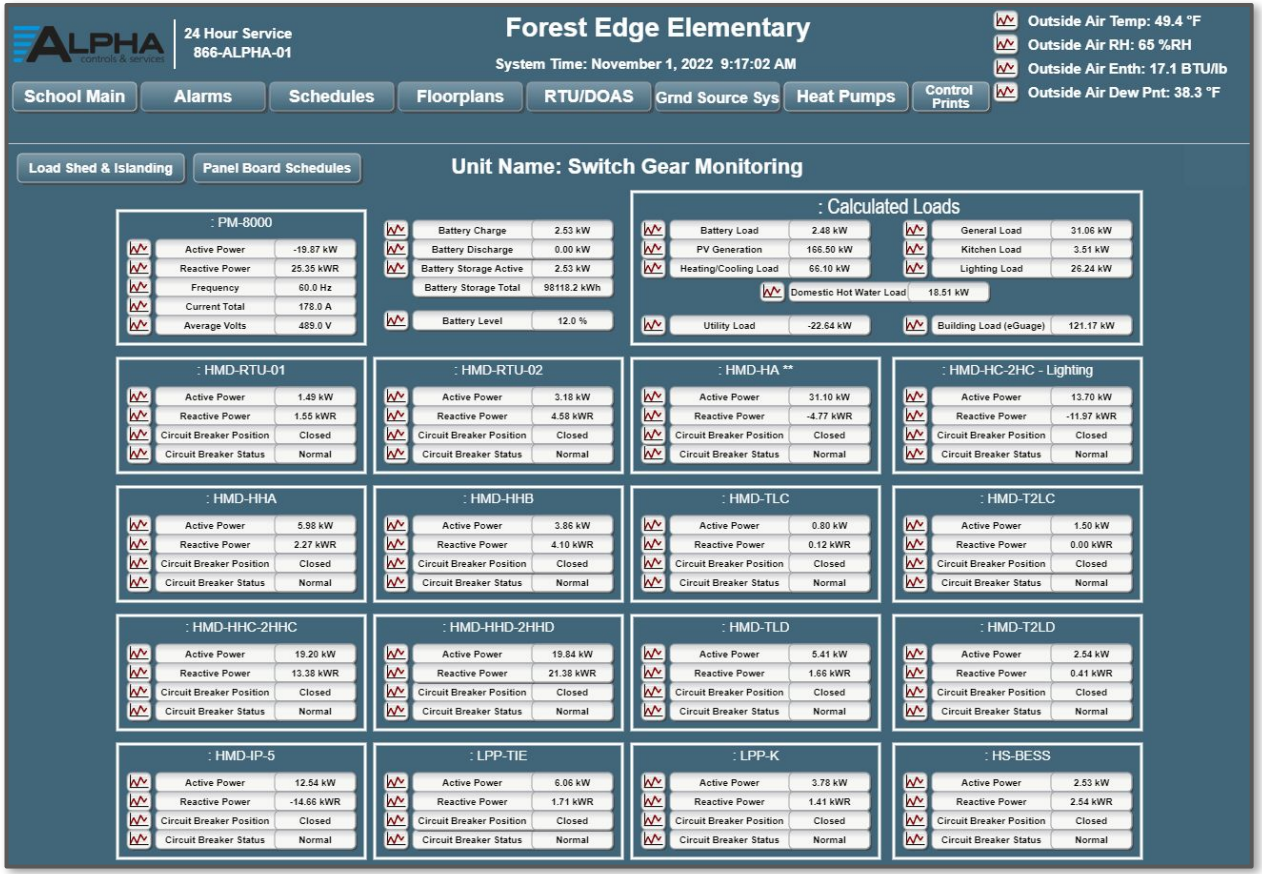
N

DOAS Units
Dedicated Outside Air Systems



N

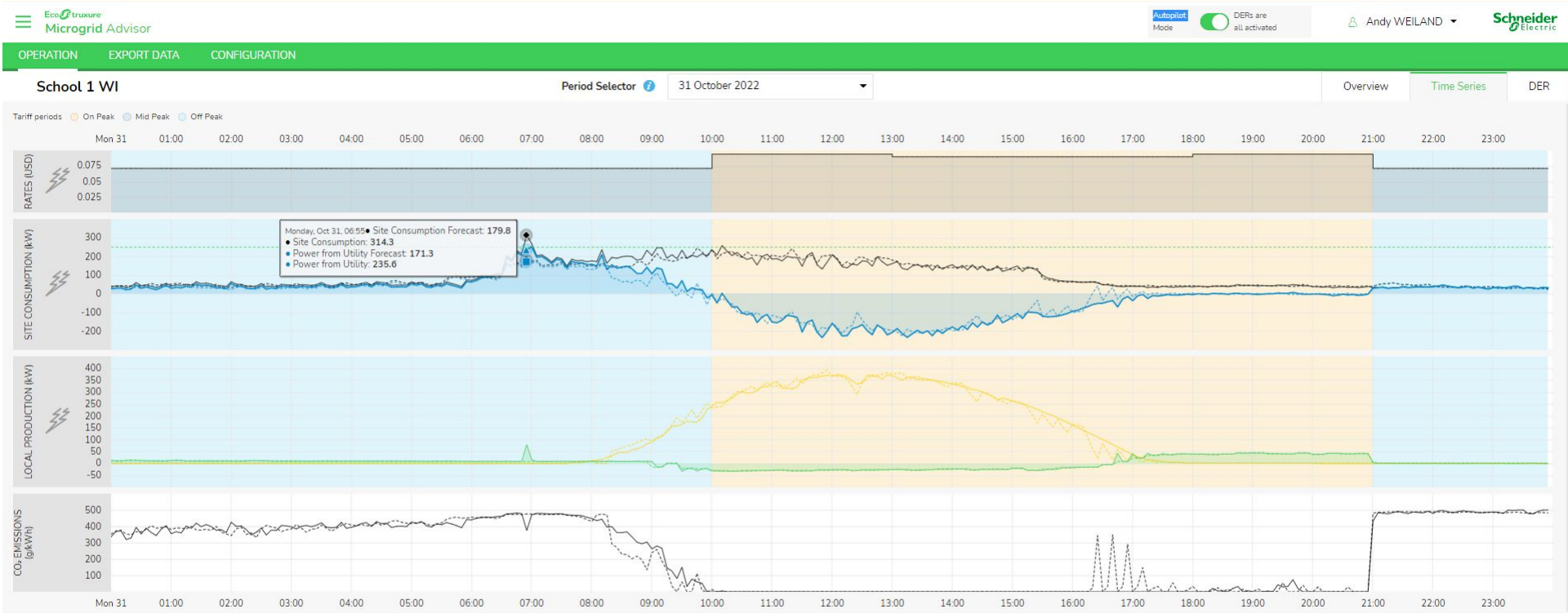
Monitoring
At the Switchgear Level



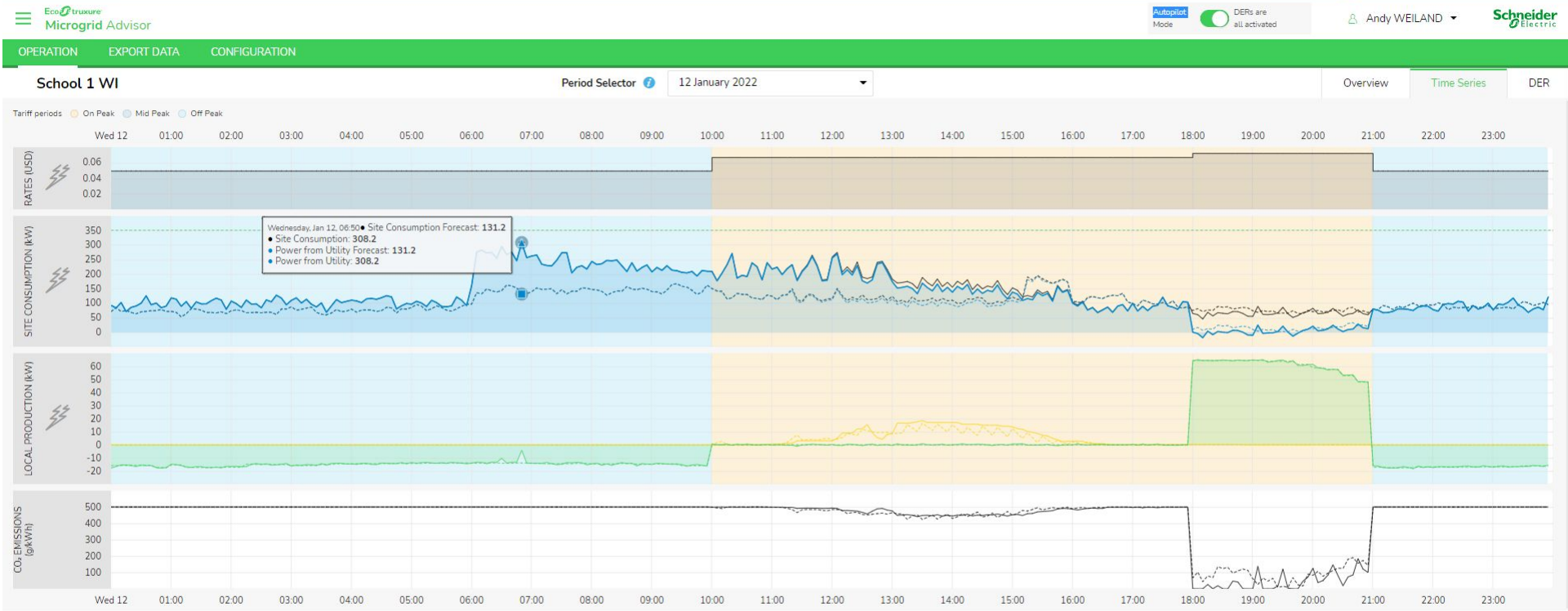
N

BATTERY
STORAGE SYSTEM

MicroGrid Advisor Dashboard

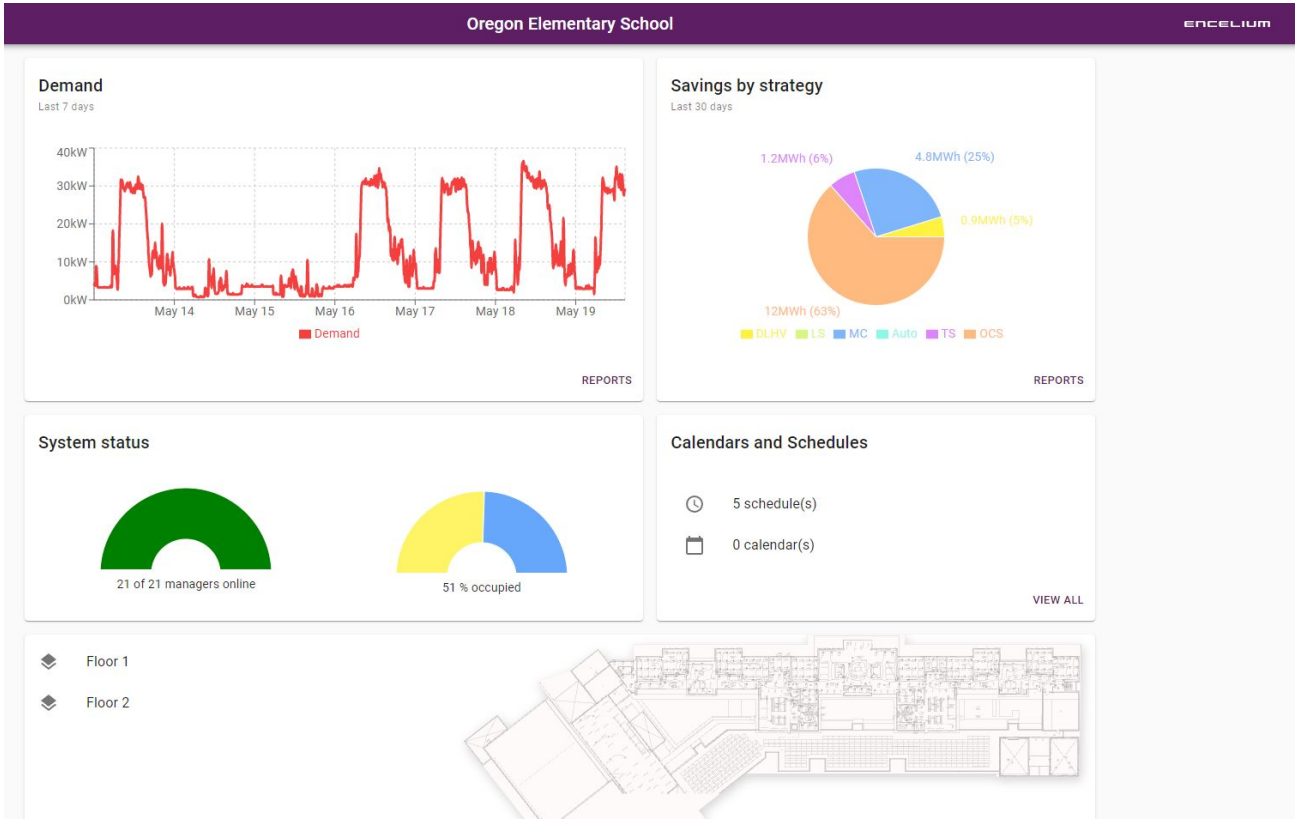


MicroGrid Advisor Dashboard



MINIMIZE ELECTRIC USE
ELECTROCHROMIC GLASS

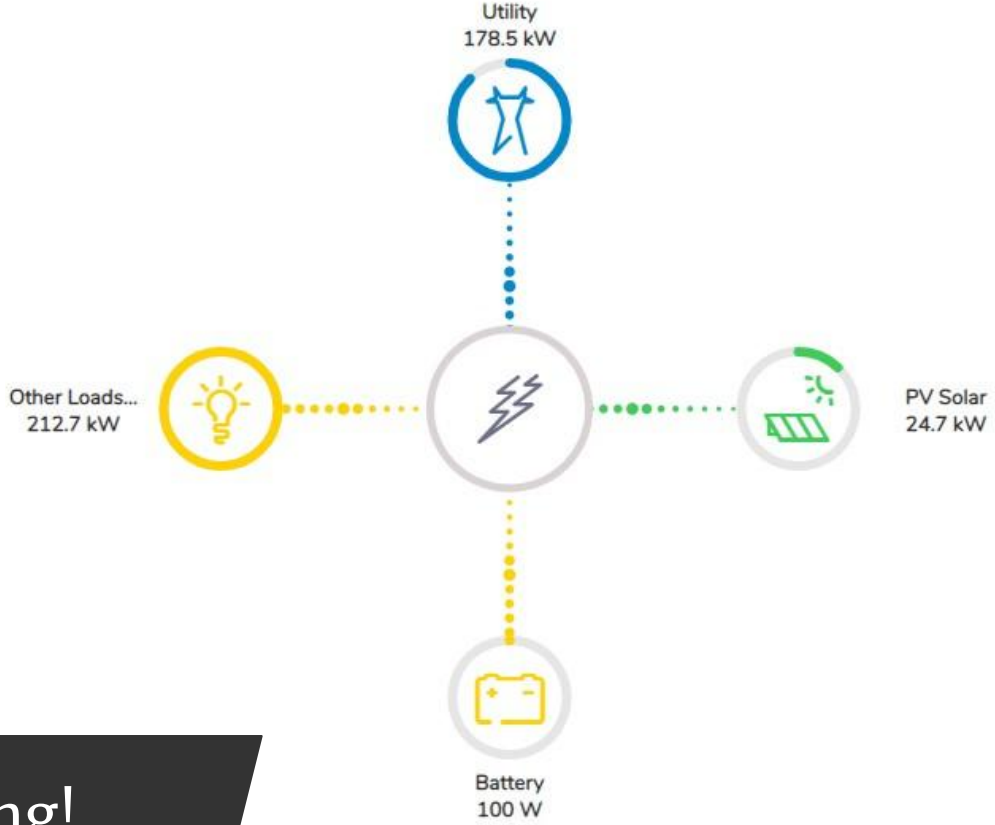
MINIMIZE ELECTRIC USE
NETWORKED LIGHTING SYSTEM



AN ELECTRIC FUTURE

All Electrical Energy

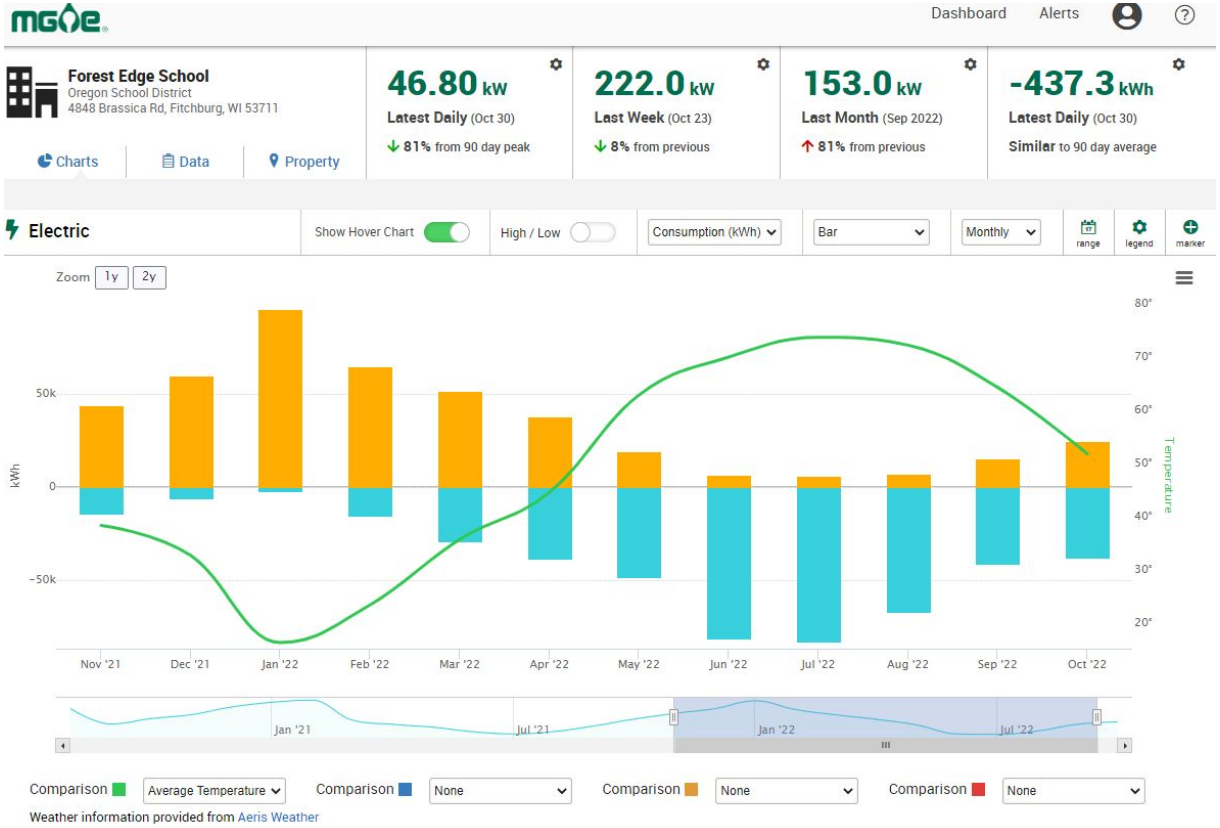
- Heating / cooling
- Hot water
- Renewable energy
- Battery storage



Zero natural gas to the building!

OPERATIONAL IMPACT

NET ZERO TRACKING
MONTH-BY-MONTH



ENERGY USAGE
COMPARISON - 9/2020 to 8/2021

Building	Square Footage	Utility	Total by Utility	Total Energy Cost by Building	Cost sq/ft
Rome Corners Intermediate	110,000	Gas	$24,930	114,547	$1.04
		Electric	$89,617		
Forest Edge Elementary	126,000	Gas	N/A	$56,873	$0.45
		Electric	$56,873		
Oregon Middle School*	132,000	Gas	$32,063	$122,131	$0.93
		Electric	$89,617		

*Oregon Middle School has a 22,000 sqft geothermal wing

ENERGY USAGE
COMPARISON - 9/2021 to 8/2022

Building	Square Footage	Utility	Total by Utility	Total Energy Cost by Building	Cost sq/ft
Rome Corners Intermediate	110,000	Gas	$24,417	$145,692	$1.15
		Electric	$102,190		
Forest Edge Elementary	126,000	Gas	N/A	$60,974**	$0.48
		Electric	$60,974		
Oregon Middle School*	132,000	Gas	$31,047	$131,132	$1.04
		Electric	$105,698		

*Oregon Middle School has a geothermal wing
** 69% of this cost was related to demand charges….not energy or transmission costs.

ENERGY USAGE
COMPARISON - 2020-21 to 2021-22

Building	20-21 Cost Sq/Ft	21-22 Cost Sq/Ft	% Chg
Rome Corners Intermediate	$1.04	$1.15	10.53%
Forest Edge Elementary	$0.45	$0.48	7.21%
Oregon Middle School*	$0.93	$1.04	11.97%

- 4% to 5% less of an increase than the other two buildings in one year
- What do you think happens for 22-23?

*Oregon Middle School has a geothermal wing

ENERGY USAGE
COMPARISON - 2020-21 to 2022-23

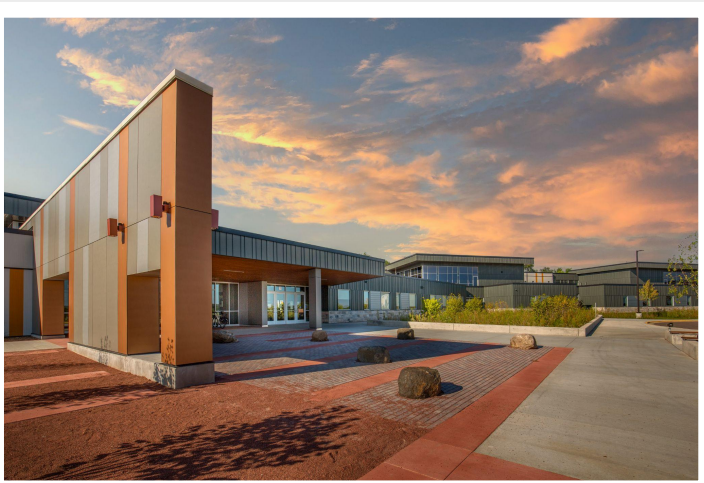
Building	20-21 Cost Sq/Ft	22-23 Cost Sq/Ft	% Chg
Rome Corners Intermediate	$1.04	$1.16	11.5%
Forest Edge Elementary	$0.45	$0.35	-22.2%
Oregon Middle School*	$0.93	$1.10	18.2%

- Probably not sustainable….influenced by higher solar buy back rates/war in Ukraine
- Electricity has been a more stable energy source as compared to Natural Gas - Why?

*Oregon Middle School has a geothermal wing

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
- Need a watchful eye - Share & Recruit?

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!

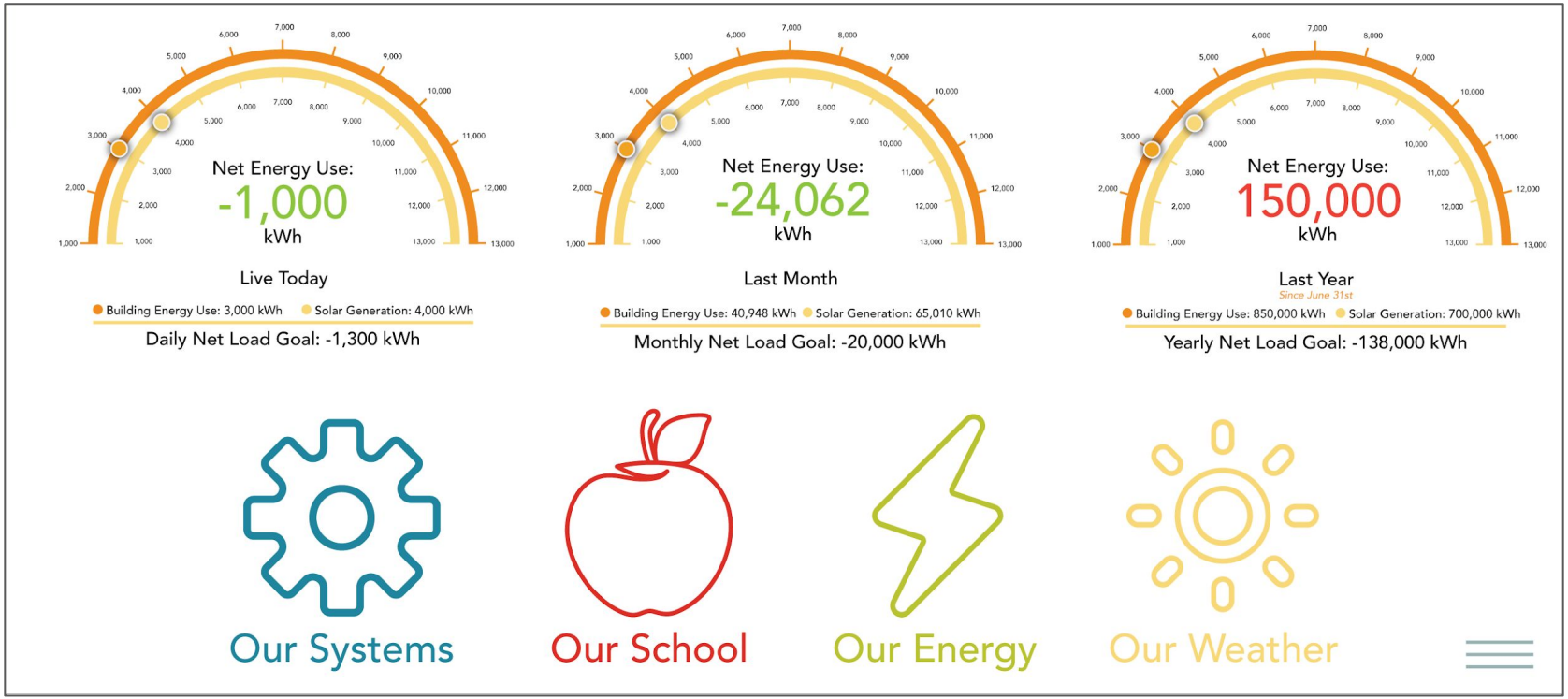
Now - The Inflation Reduction Act - 30% rebates until 2032


TEACHING &
LEARNING

Oregon's Next Steps
Retrofit LEDs & More Solar

- Our 5th Solar Installation
- At the Oregon Pool
- 120 KWp Solar Panels
- 91 KWp Inverter
- Est Prod 156,000 KWh/year
- Approx 50% Building Use

TEACHING TOOLS
INTERACTIVE INTERFACE



TEACHING TOOLS
WALL/WINDOW GRAPHICS

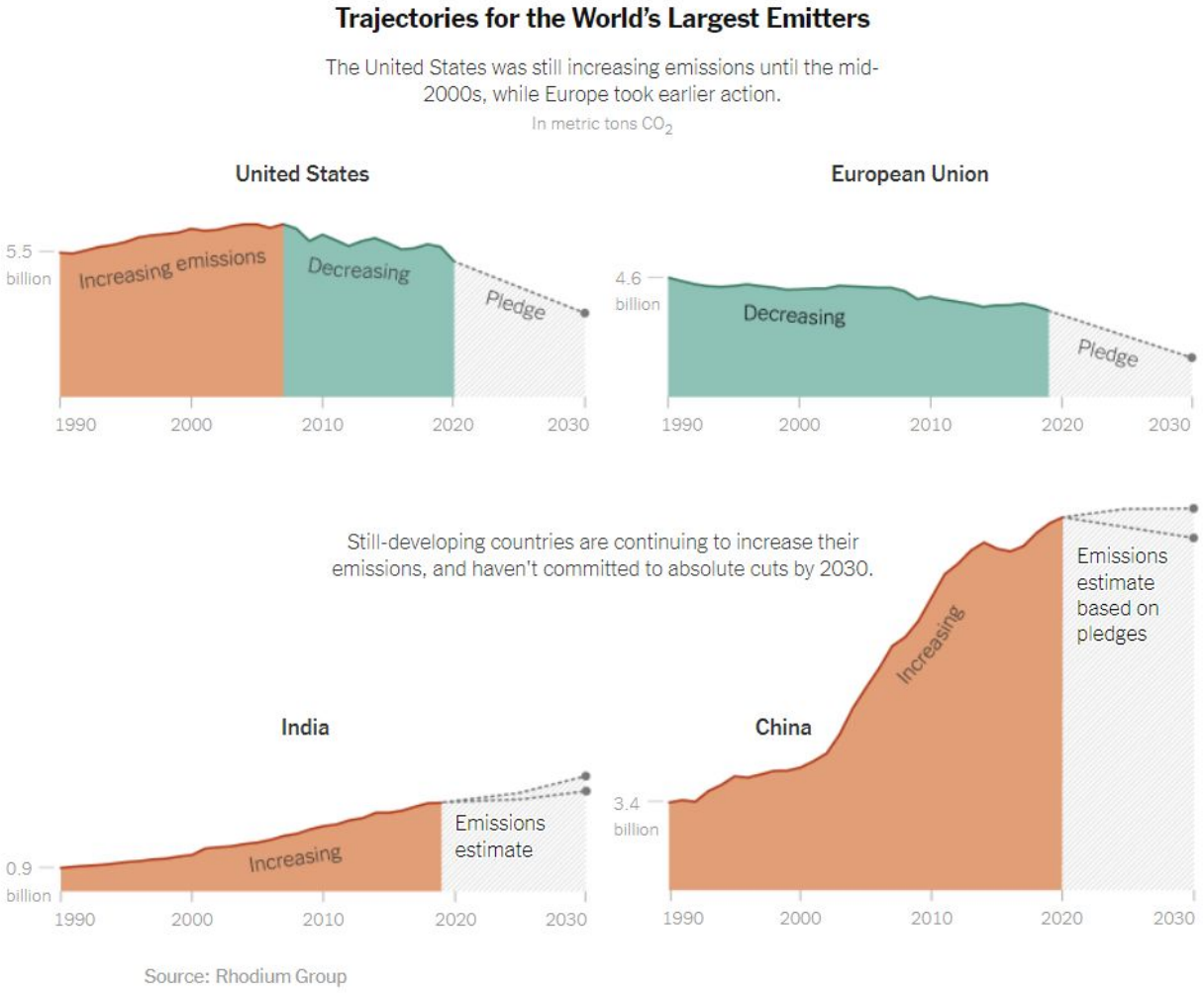
TEACHING TOOLS
LEARNING OPPORTUNITIES

EDUCATIONAL ENVIRONMENT
NATURAL LIGHT

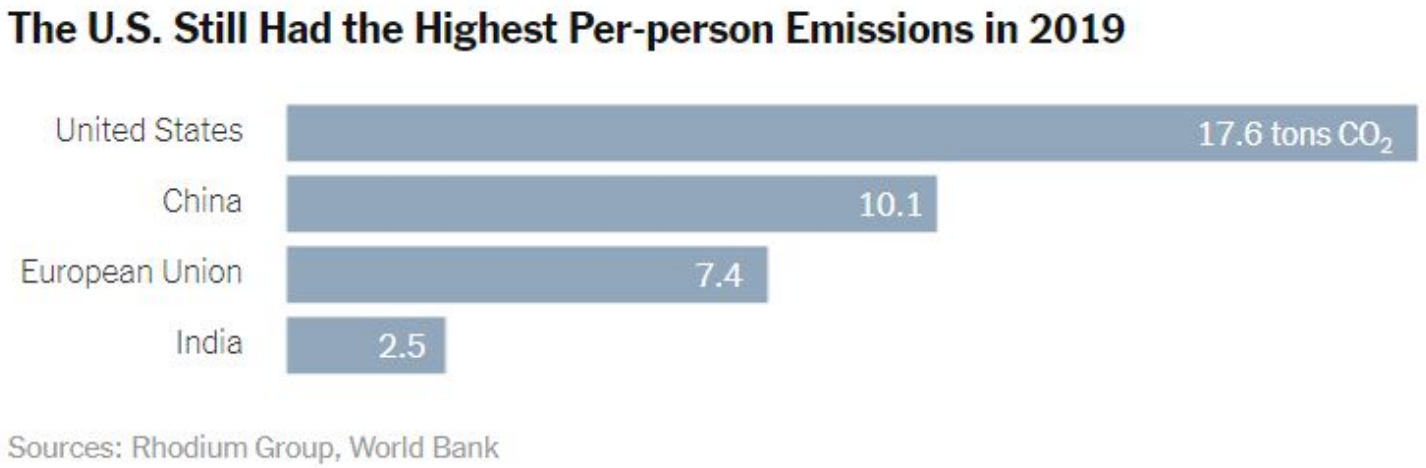
EDUCATIONAL ENVIRONMENT
OUTDOOR CLASSROOMS

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 in this area
- What is the cost of doing nothing?



New York Times, April 22, 2022



The U.S. Has a New Climate Goal. How Does It Stack Up Globally? New York Times, April 22, 2022

The “Plan”

- What is the 2030 climate target?
- To keep global warming to **no more than 1.5°C** – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050.
- Buildings are responsible for 40% of global energy consumption and 33% of greenhouse gas emissions.
- 2030 is only 6.9 years away
- 2050 only 26.9 years away…..how long do schools last?

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 & What is the cost of doing nothing?
- Net Zero is great but…..the journey is as important as the goal and….
- Electrification is most important!

WHAT CAN WE DO?

- Measure Energy Usage
- New School/Additions - Assess Geothermal Possibilities at beginning
- Investigate Heat Pump Technologies
- Electrification & Stop Burning
- Purchase electric vehicles & charging infrastructure
- Empower future sustainability champions

THANK *You!*

ANDY WEILAND
atw@oregonsd.net
608.835.4012