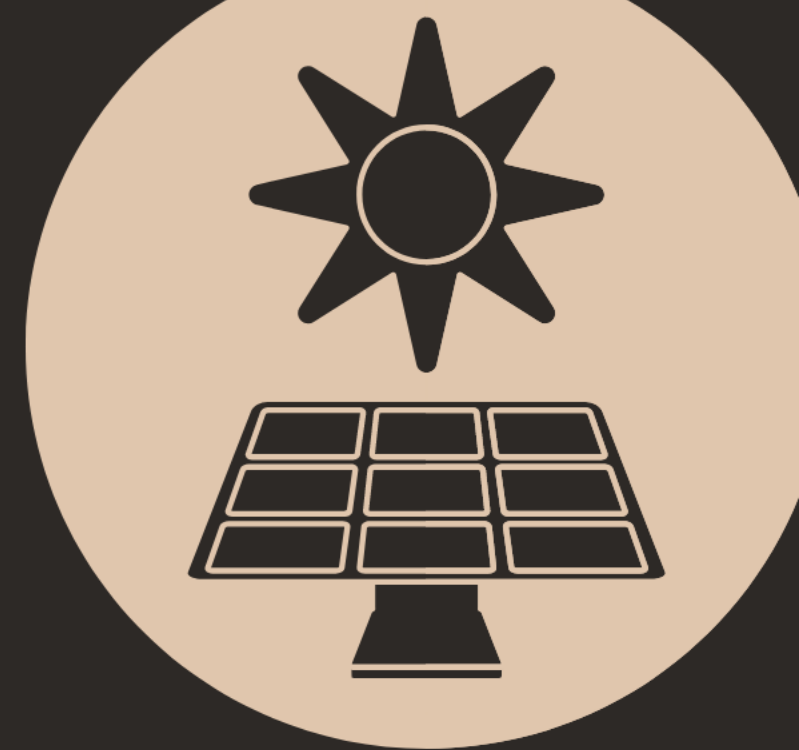
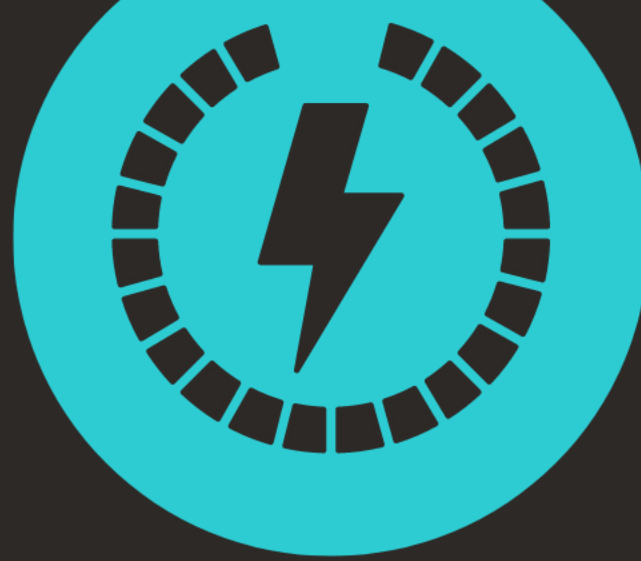


FEFPA SUMMER CONFERENCE 2021  
WEDNESDAY, JULY 14



# A NET ZERO REALITY

LESSONS LEARNED FROM THE FIRST TWO YEARS OF  
OPERATIONS AT NEOCITY ACADEMY, FLORIDA'S FIRST  
ZERO ENERGY PUBLIC SCHOOL

SCHOOL DISTRICT OF OSCEOLA COUNTY | LITTLE | CMTA



# WHO WE ARE



**MARC CLINCH**  
CHIEF FACILITIES OFFICER  
*School District of Osceola County*



**TRACY STEWARD**  
PRINCIPAL  
*CMTA Engineers*



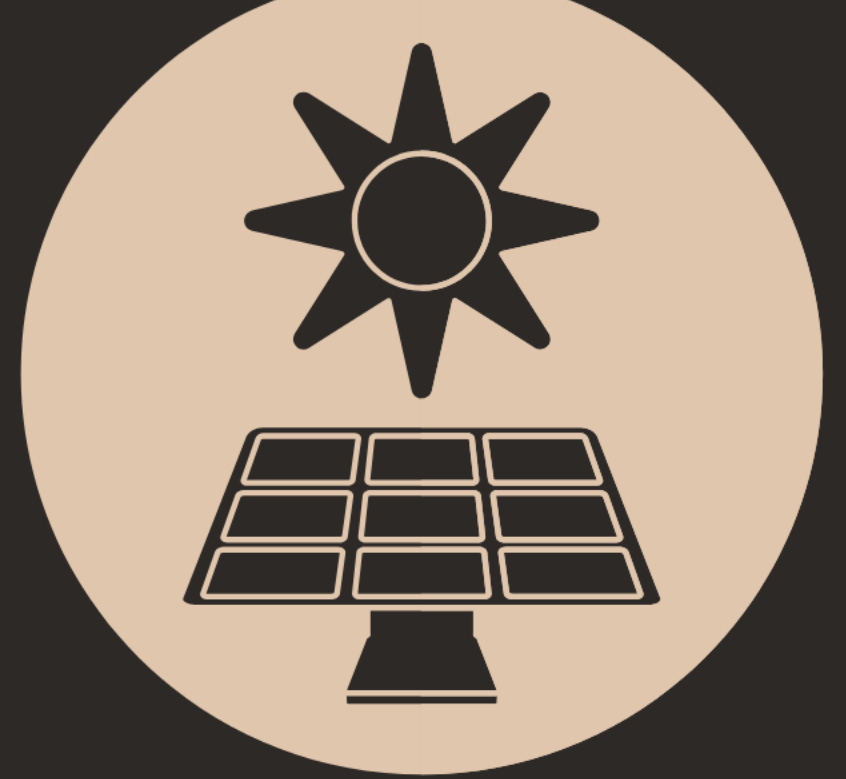
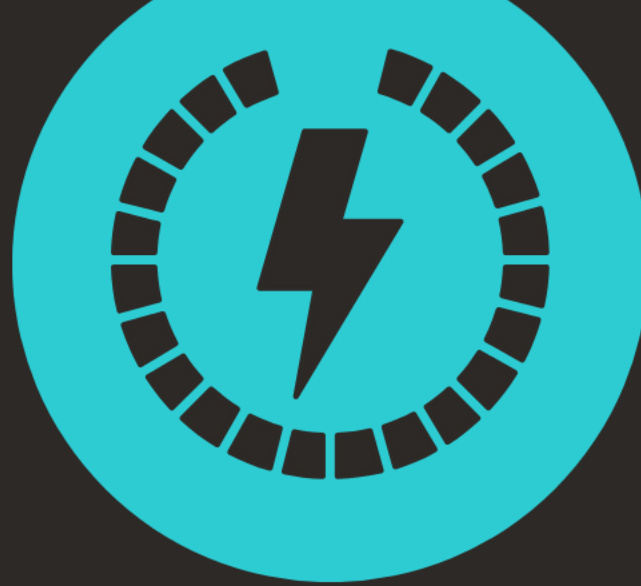
**PHILIP DONOVAN**  
PRINCIPAL  
*Little Diversified Architectural Consulting*

# WHAT WE'LL TALK ABOUT

- 1) **A Brief Rewind**
- 2) **What Has Happened Since We Opened the Doors**
- 3) **Working Out the Bugs**
- 4) **Dollars and Cents**
- 5) **The Future**
- 6) **Q&A**



**WHAT'S YOUR EUI?**



*A Brief Rewind*

**WHEN WE LAST  
LEFT OUR STORY...**





## NeoCity Academy

School District of Osceola County

45,000 gsf

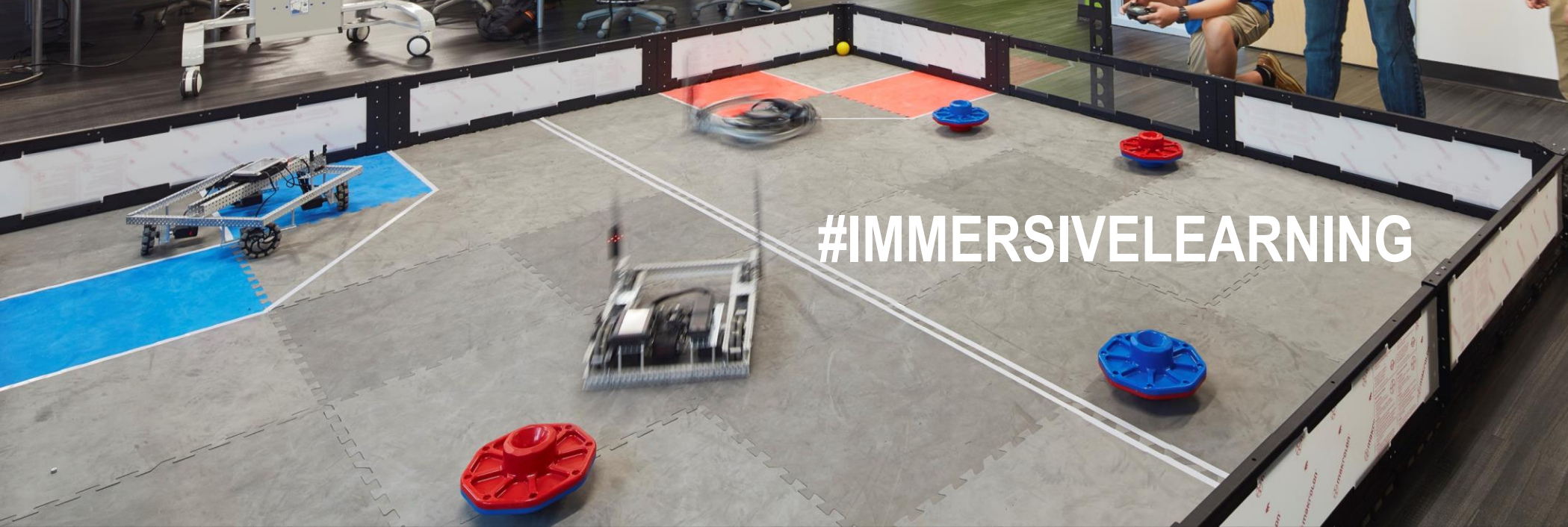
625 student stations

EUI Req. = 20 or less

Air Leakage = .15 cfm or less



**#IMMERSIVELEARNING**



#IMMERSIVELEARNING





#IMMERSIVELEARNING



#IMMERSIVELEARNING



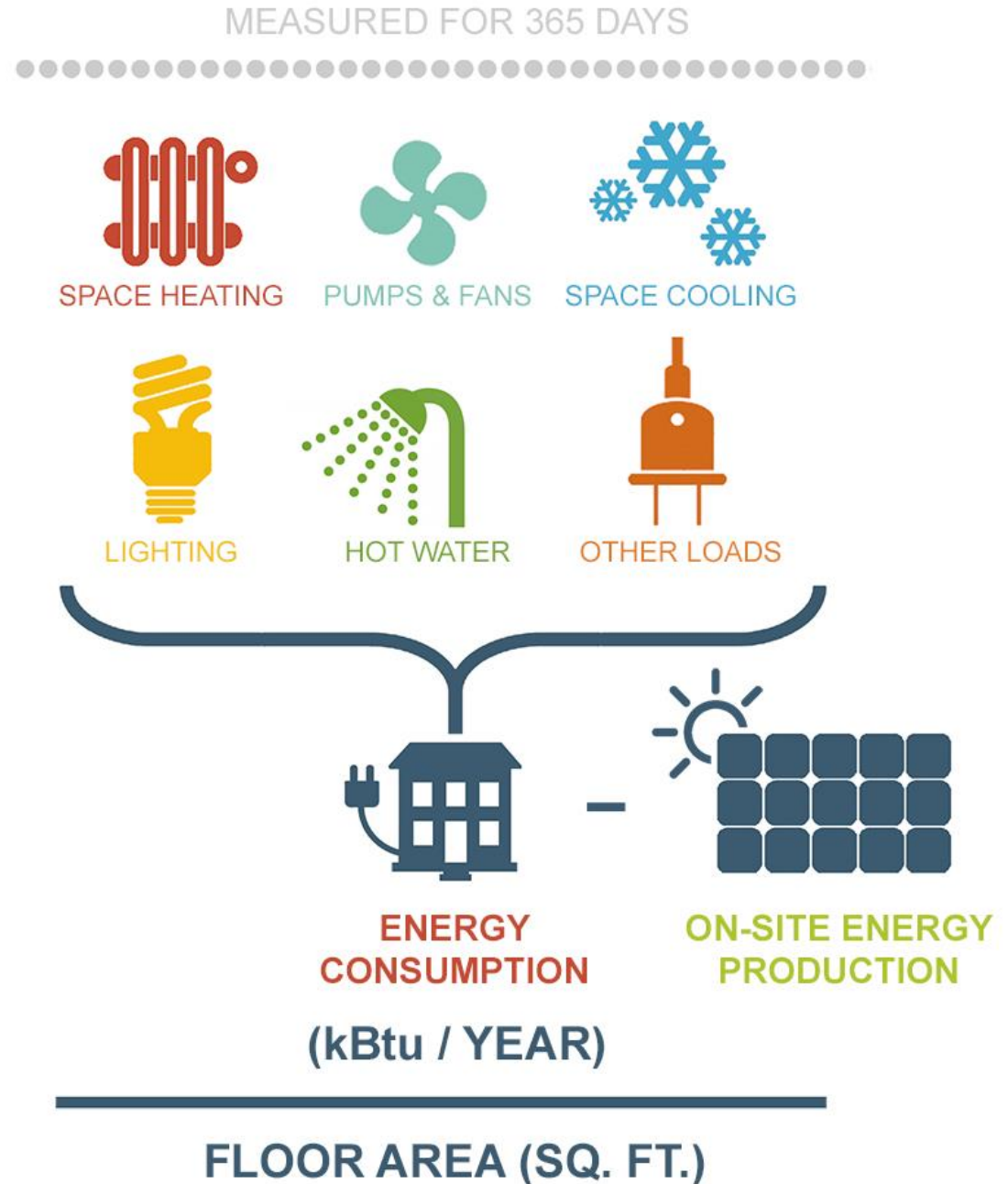
## WHAT IS EUI?

# Energy Use Intensity (EUI)

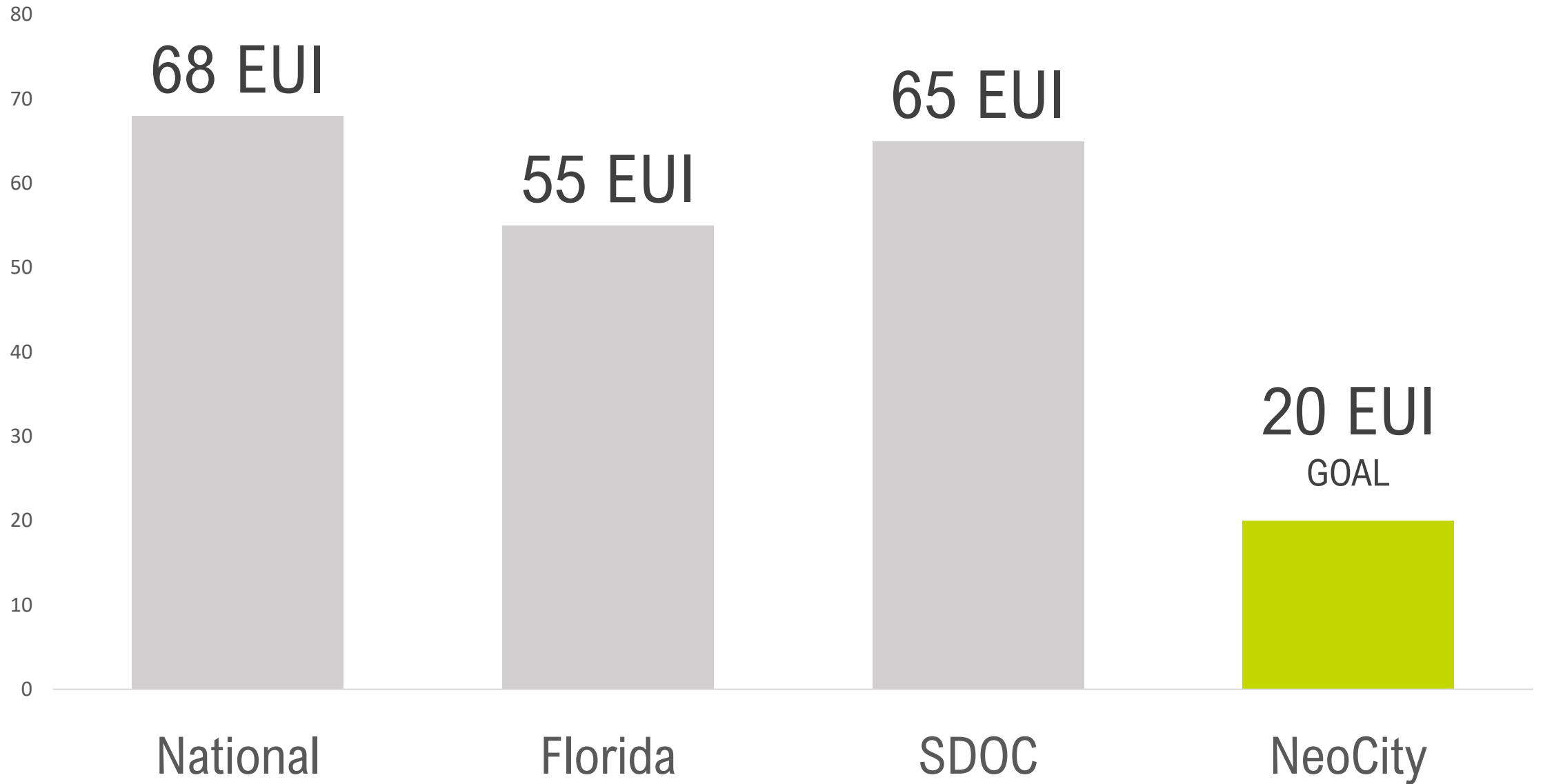
...the lower the number

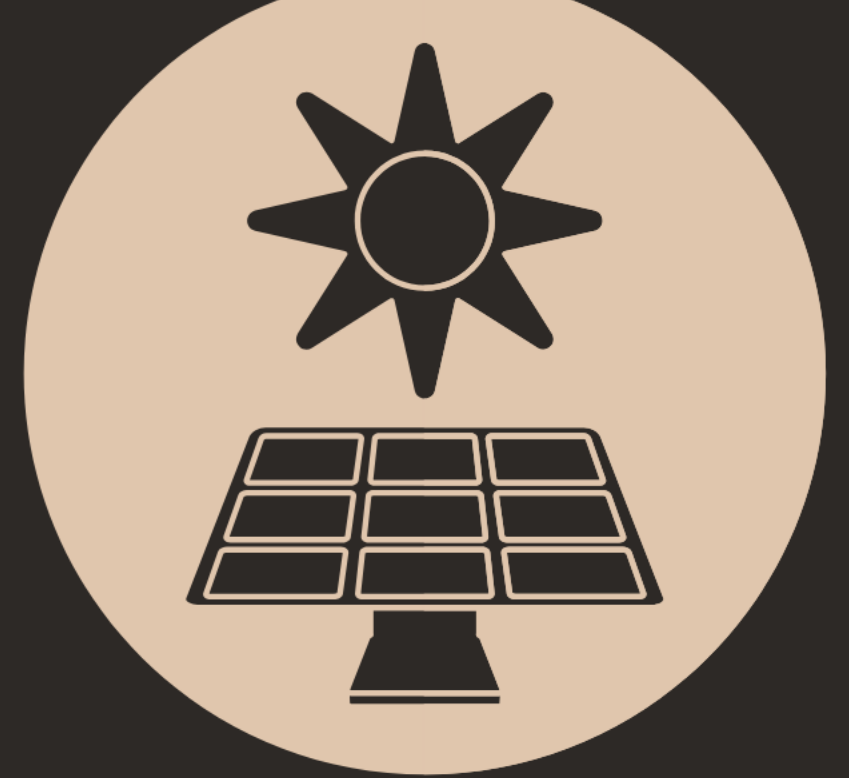
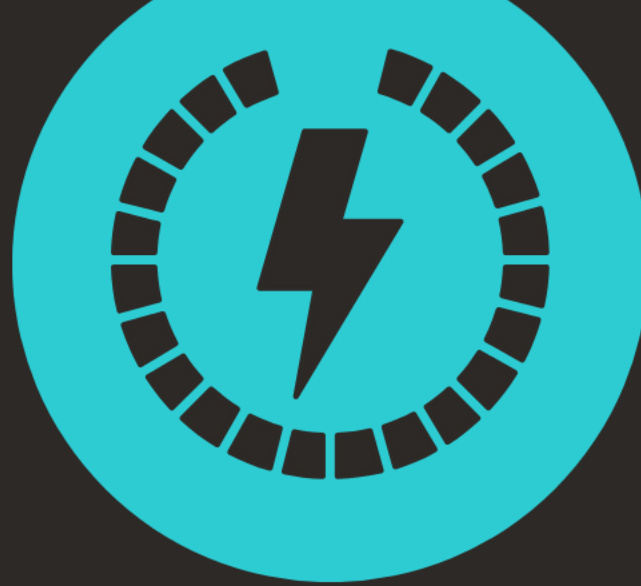
...the lower the energy use

A net-zero energy building returns as much energy to the power grid as it uses in a year



# WHAT IS EUI?





*What has happened since we opened the doors?*

**IT WAS A HELLUVA  
TWO YEARS**



RFP GOAL = 20

PROJECT EUI

DESIGN MODEL = 16

ADJUSTMENTS DURING LATE DESIGN/CONSTRUCTION = 18.8



CURRENT

23.9

**TYPICAL SDOC FACILITY UTILITY COSTS 2020-2021 = \$131,102**

**NEOCITY UTILITY COSTS 2020-2021 = \$18,828**



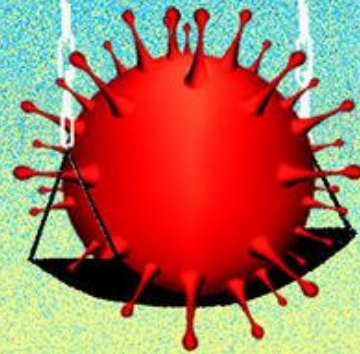


**NET-POSITIVE ENERGY SINCE DECEMBER 2020**

**AIR LEAKAGE = .027cfm**



**A pandemic no one anticipated...**



# MIKE MEECHIN NAMED HIGH SCHOOL PRINCIPAL OF THE YEAR



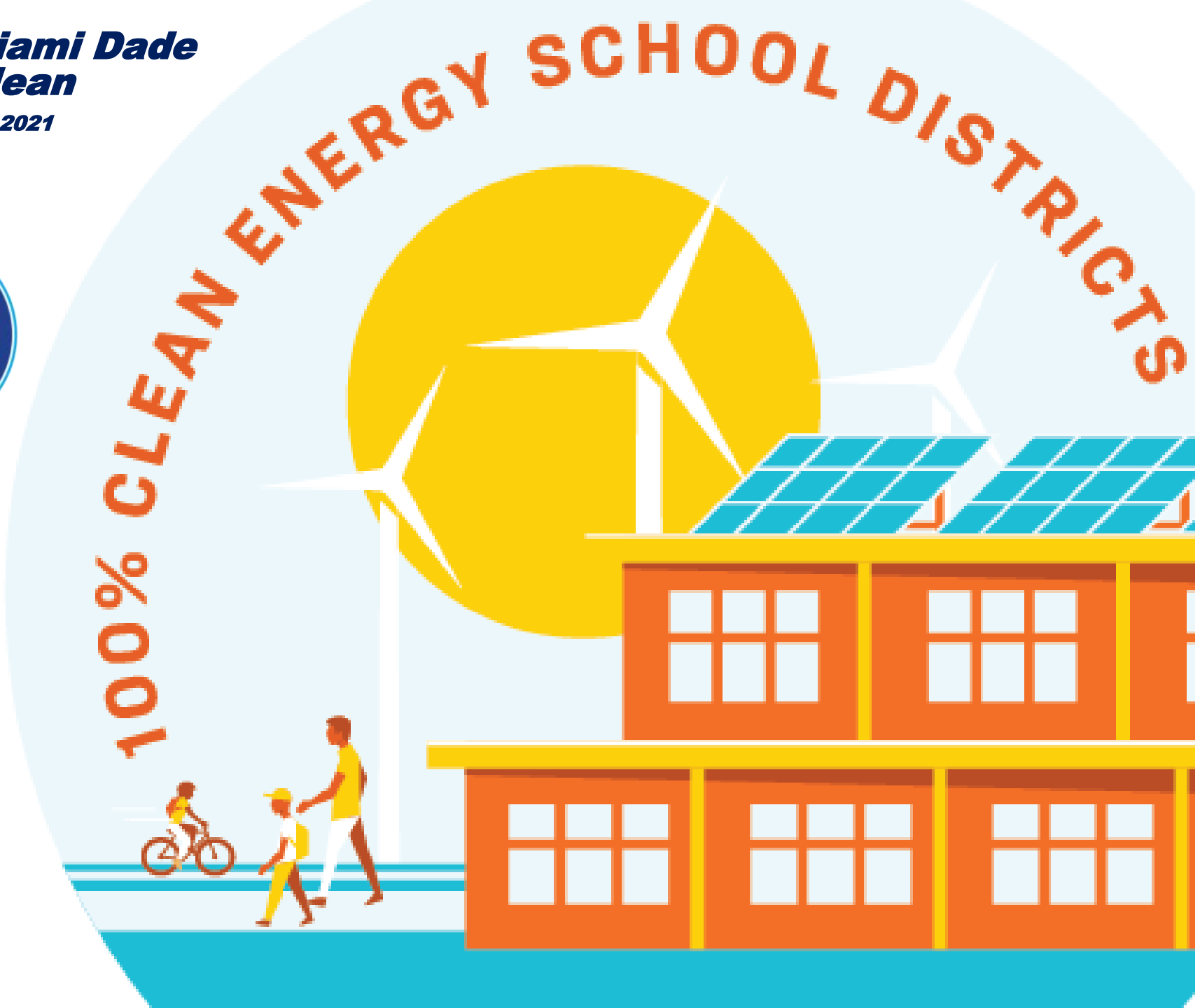
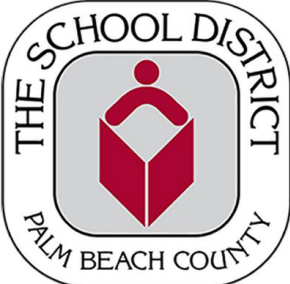
# SDOC HIGH PERFORMANCE CRITERIA FOR ALL NEW PROJECTS



**EUI = 25 OR LESS**

**AIR LEAKAGE OF .20 CFM OR LESS**

**'For our children's sake': Miami Dade schools commit to 100% clean energy by 2030** -Miami Herald April 2021




On average, high-performance schools can use between **65%–80% less energy** than conventionally constructed schools, and the remaining energy required is supplied by renewable energy.



Any building  
can be zero-  
energy...



An aerial photograph of a vast solar farm. The solar panels are arranged in neat, parallel rows that stretch across a large area of land. The surrounding landscape includes green fields, a road, and some industrial buildings in the distance. A large black circle is overlaid on the left side of the image, containing white text.

If you have  
a solar array  
big enough

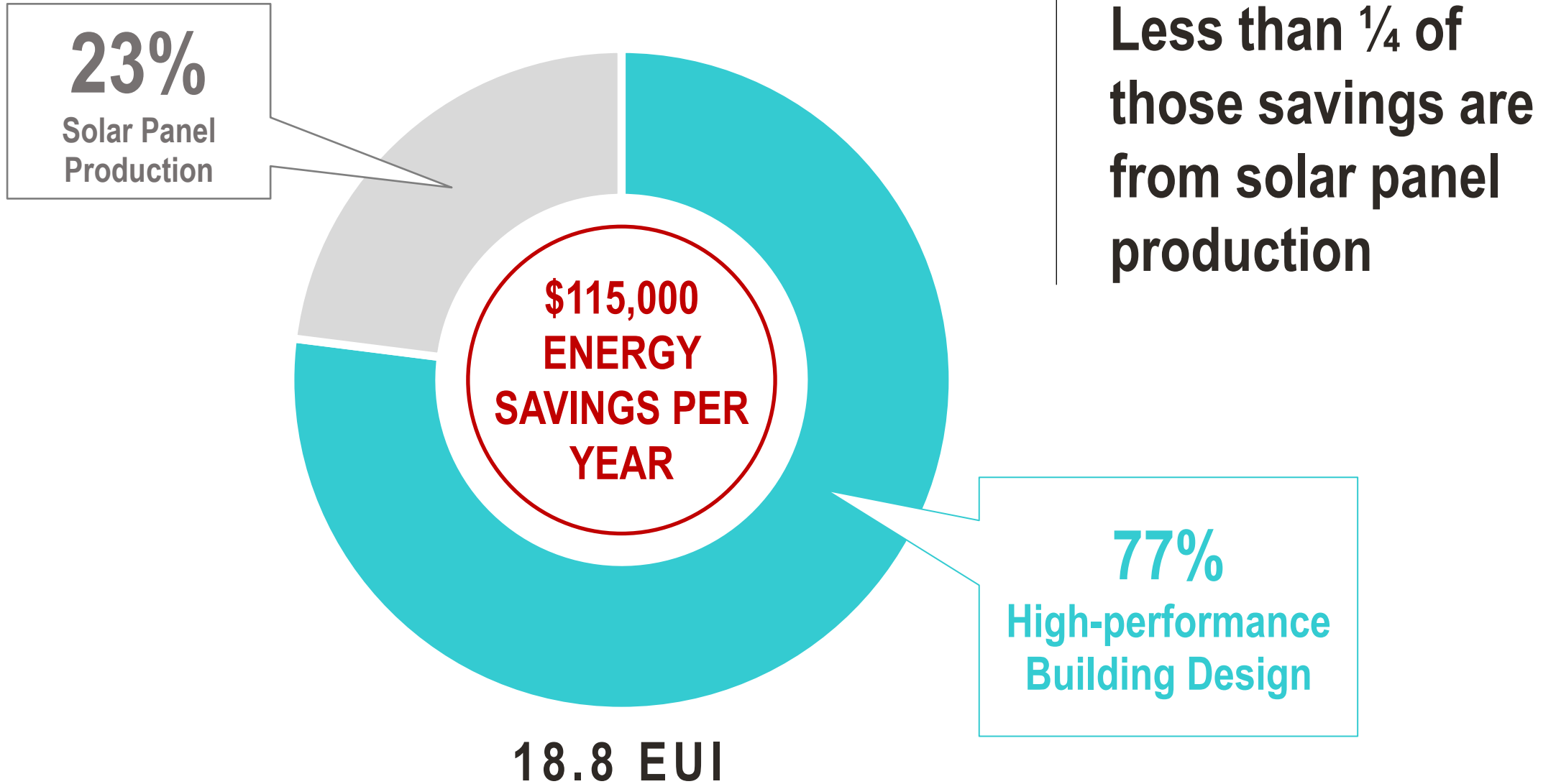
A close-up photograph of Tom Cruise, looking intensely at the camera with his mouth wide open in a shout. He is holding a black mobile phone to his ear with his right hand. The background is blurred, showing what appears to be an airport or travel setting with people and structures.

**NEOCITY ACADEMY WILL SAVE  
SDOC OVER \$115,000 A YEAR**

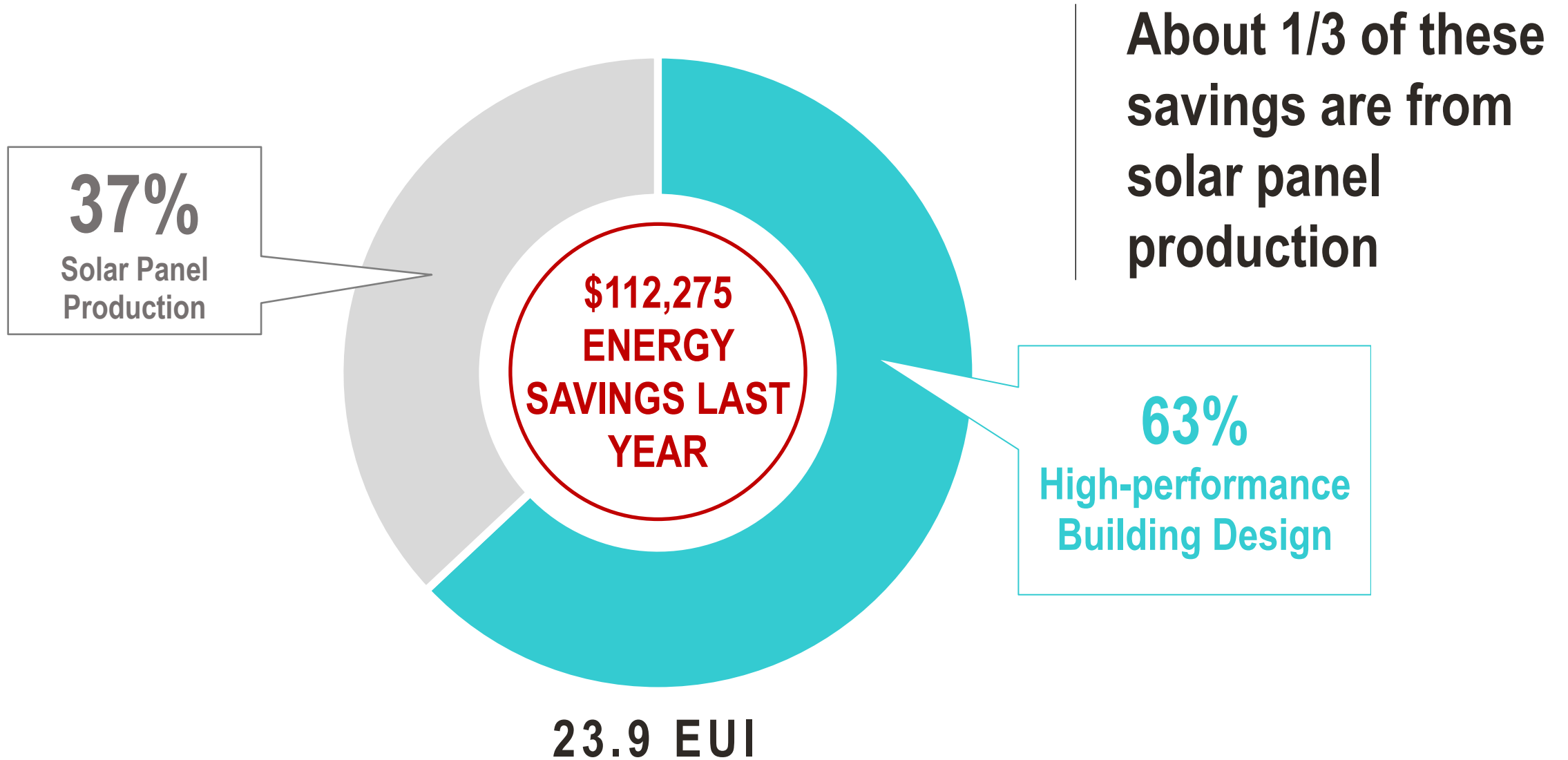
**#showmethemoney**



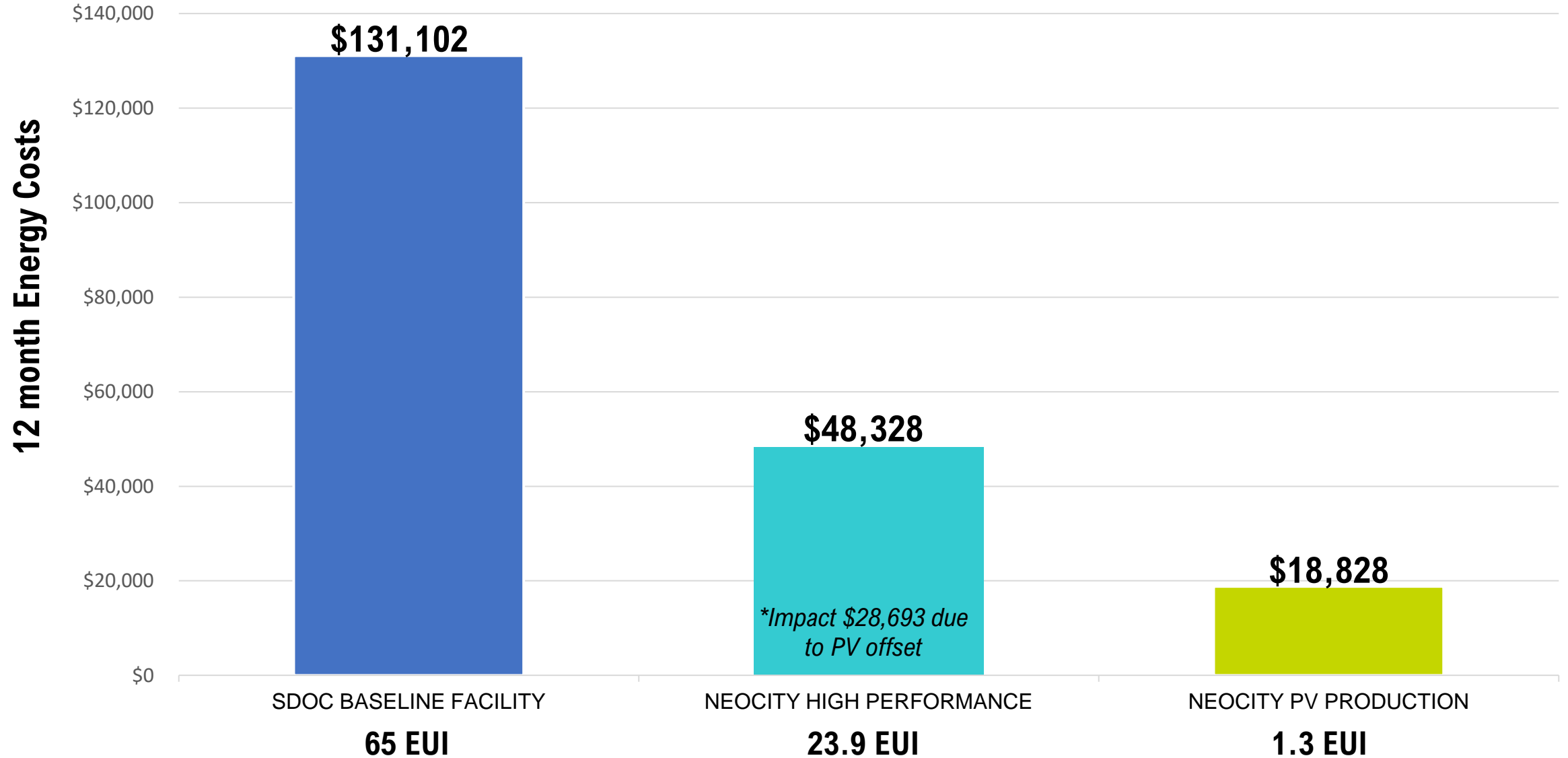
NEOCITY ACADEMY - ANTICIPATED



NEOCITY ACADEMY – LAST 12 MONTHS



# High Performance Design & PV Production Energy Savings





**Electric Rate Initially = \$0.130/kWh**

**Current Electric Rate = \$0.153/kWh**

**Net Meter Credit = \$0.07/kWh**

**MAY THE ODDS BE EVER IN YOUR FAVOR**

12 MONTH ENERGY SAVINGS

**\$112,275**

## SOLAR PANEL ROI



**\$34,320 Annually**

**ROI = 12 YEARS**



# ZERO ENERGY FILTERS

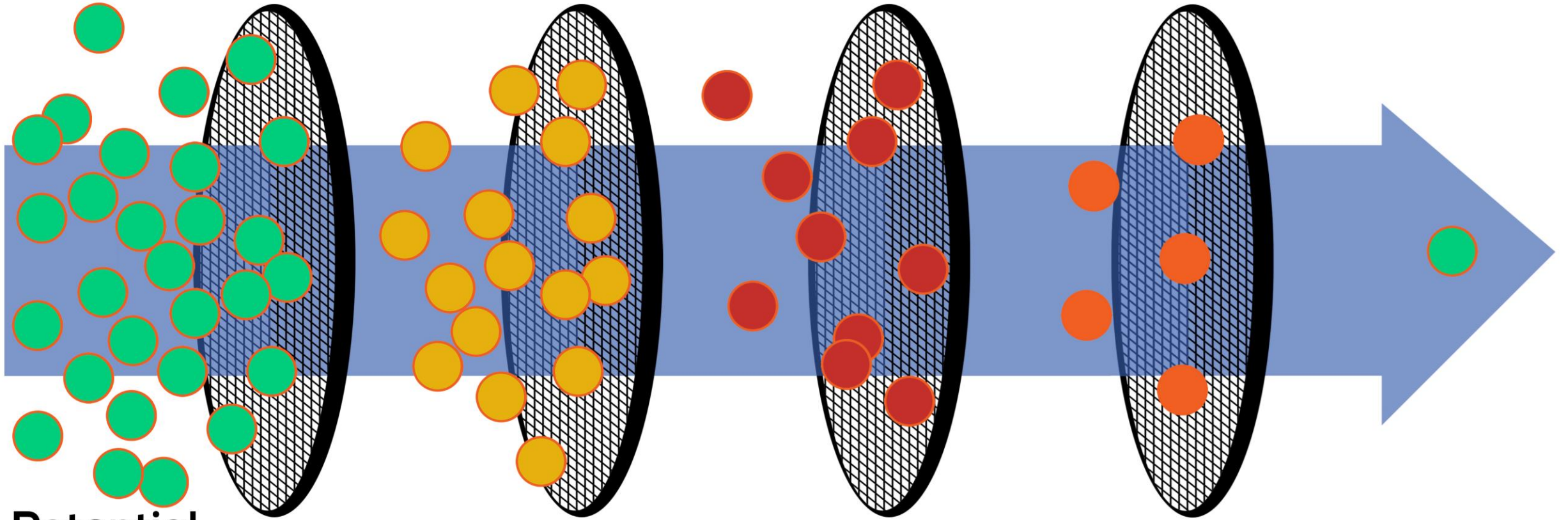
Owner Project  
Requirements / RFQ

Estimating  
/ VE

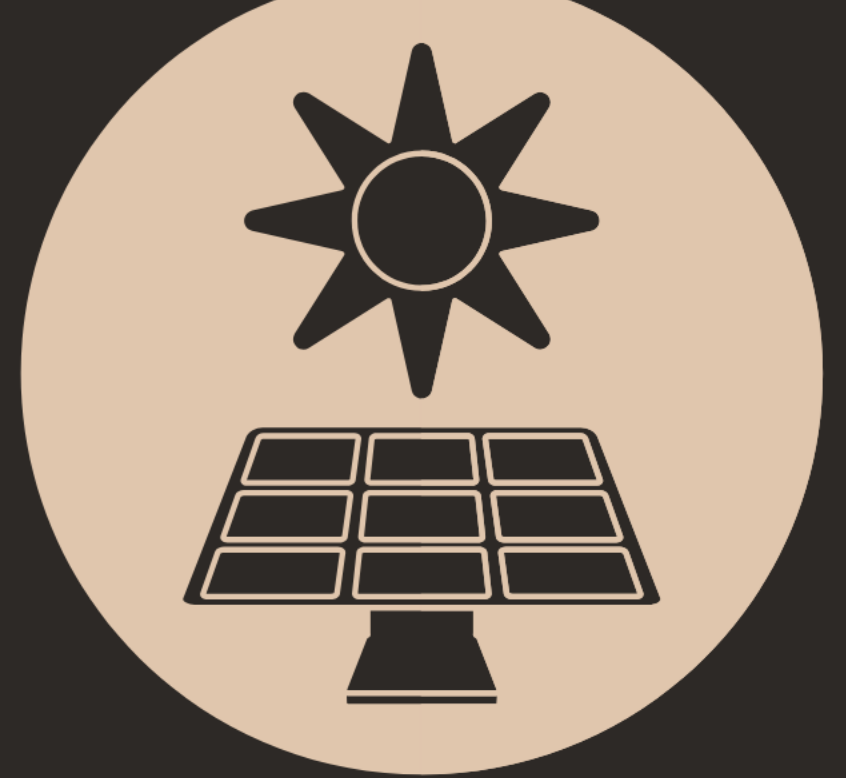
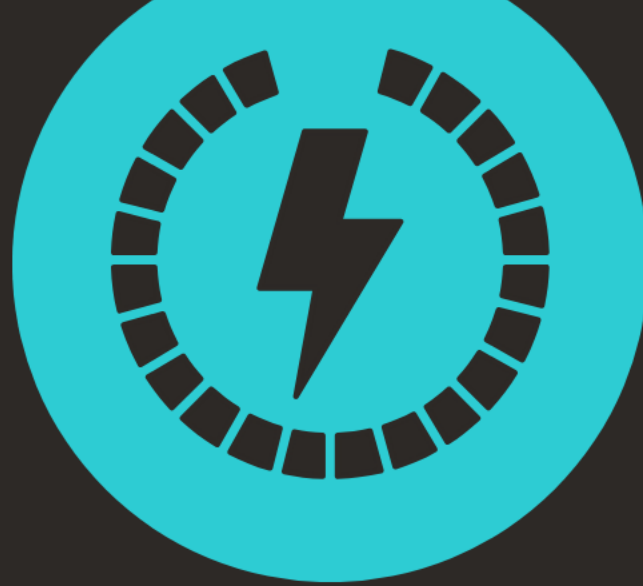
Construction

Operations

Zero Energy  
Success



Potential  
Zero Energy  
Projects



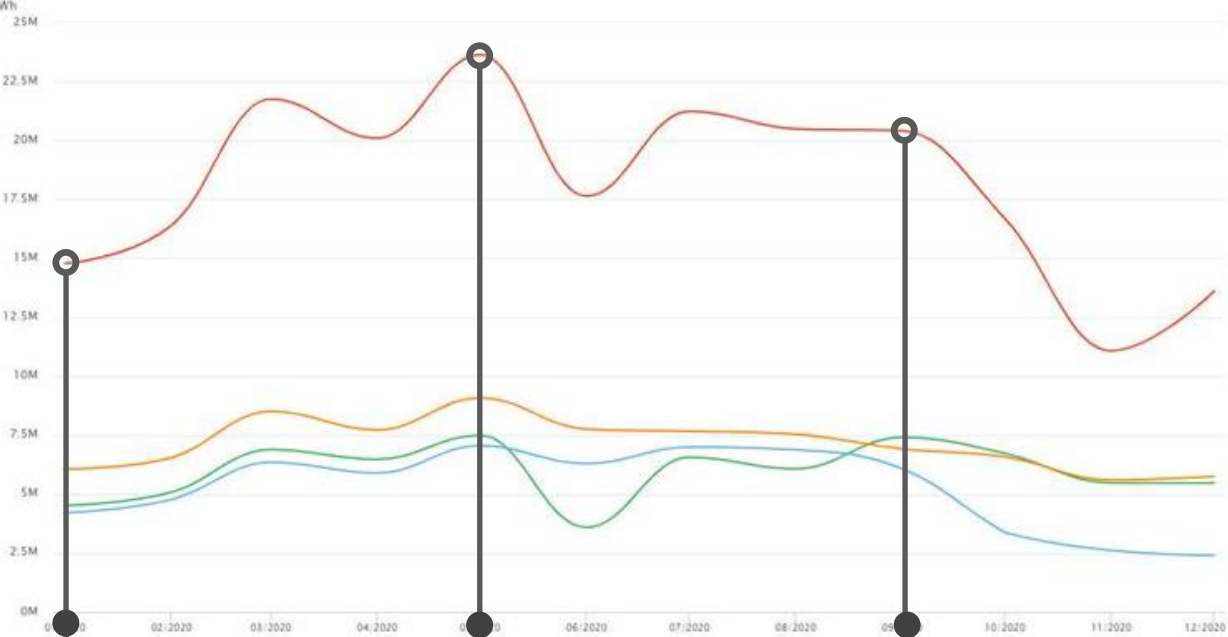
*Working out the Bugs*

**MAKING IT WORK  
TAKES GUTS**





# SOLAR PRODUCTION ISSUES



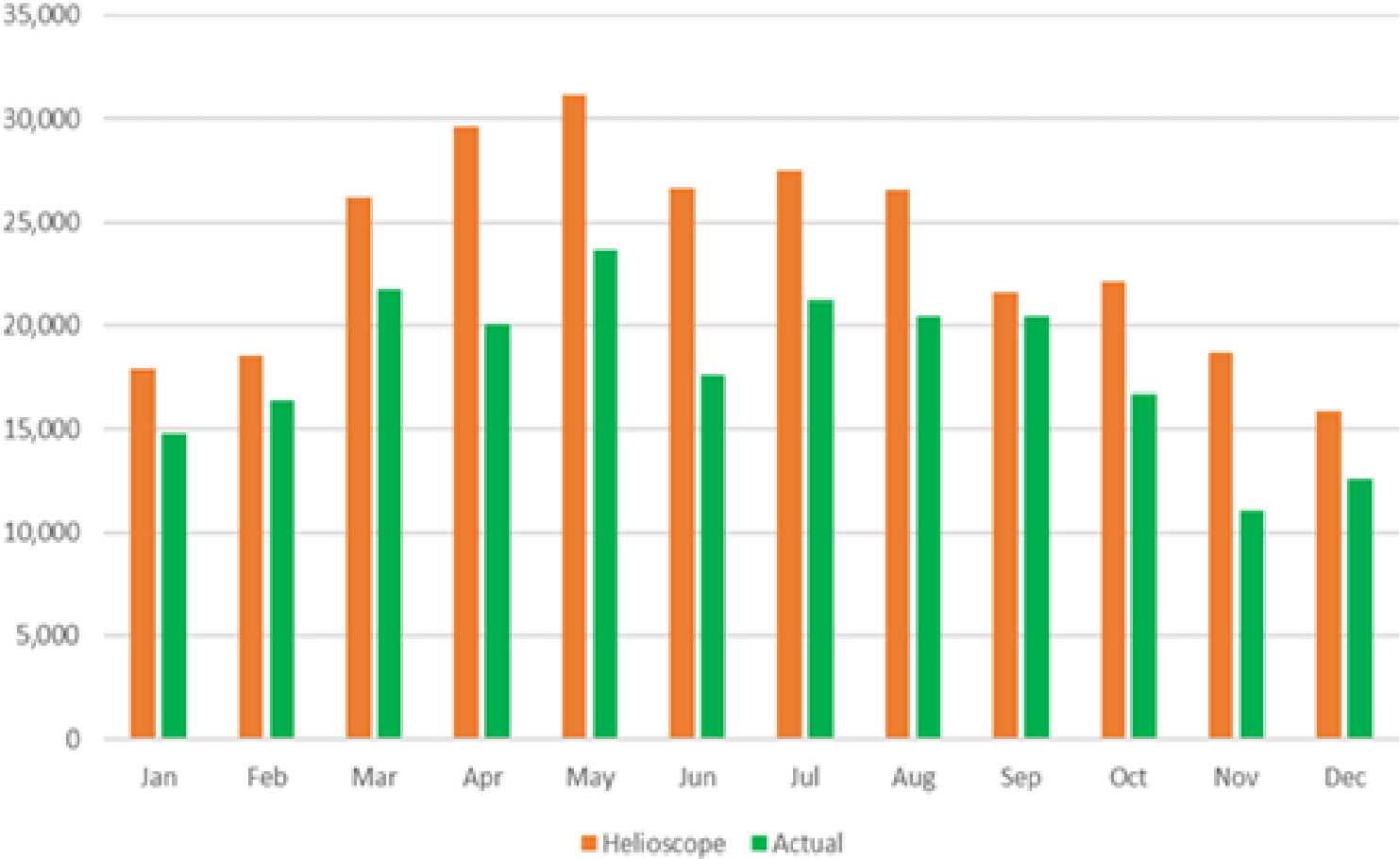
**LOW  
PRODUCTION  
NOTICED**

**INVERTER  
PROBLEM**

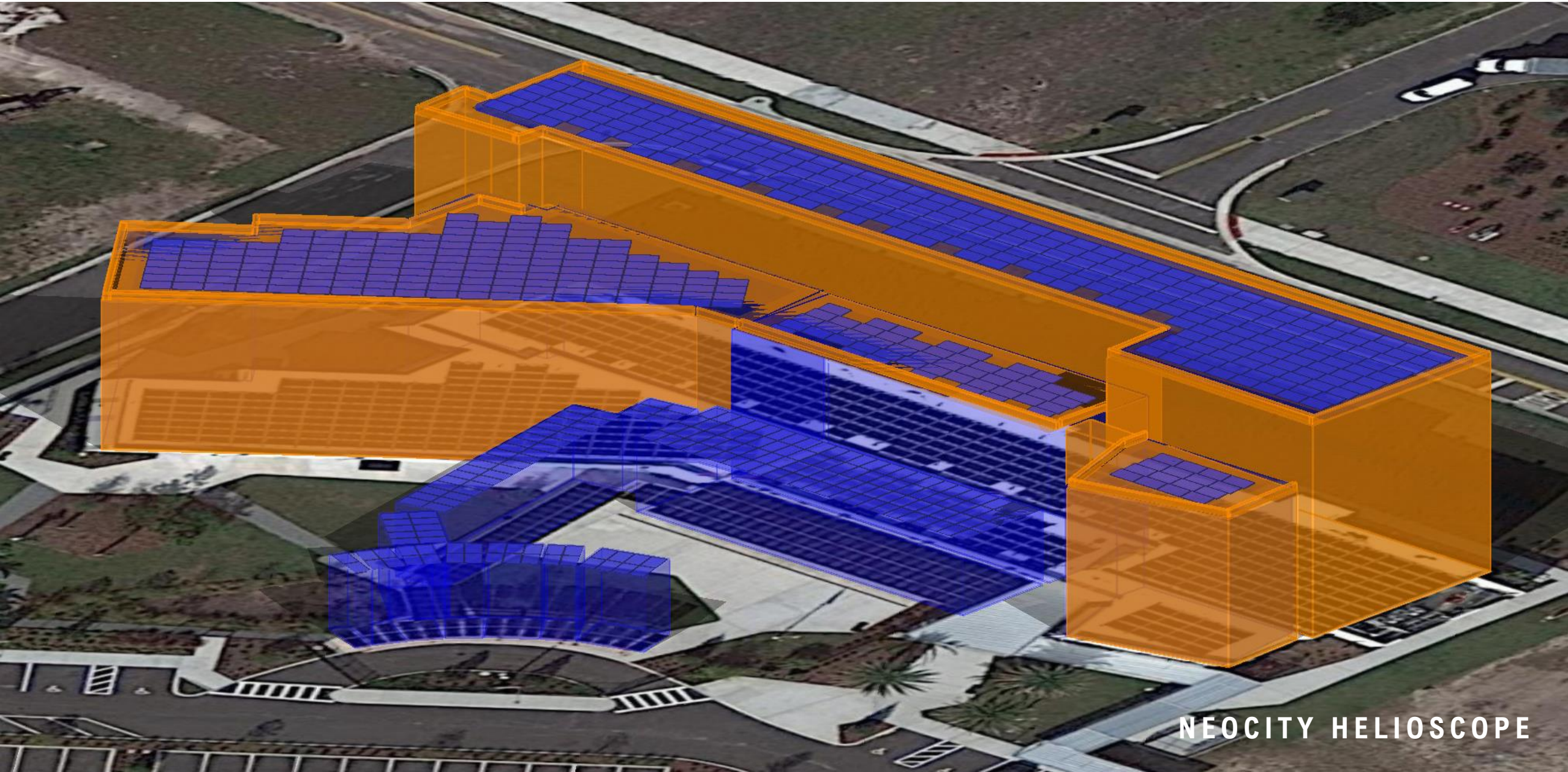
**INVERTER  
REPAIRED**



# PREDICTED OUTPUT vs. ACTUAL OUTPUT



# WAS SHADING THE ISSUE?



# CONTROLS / COMMISSIONING

- Completed the controls after occupancy
- Identified a missing blank-off from the energy recovery wheel
- Running extra reheat to dehumidify until the building was under control
- No summer schedule for building conditioning- Conditioning 75% of the building for the office space

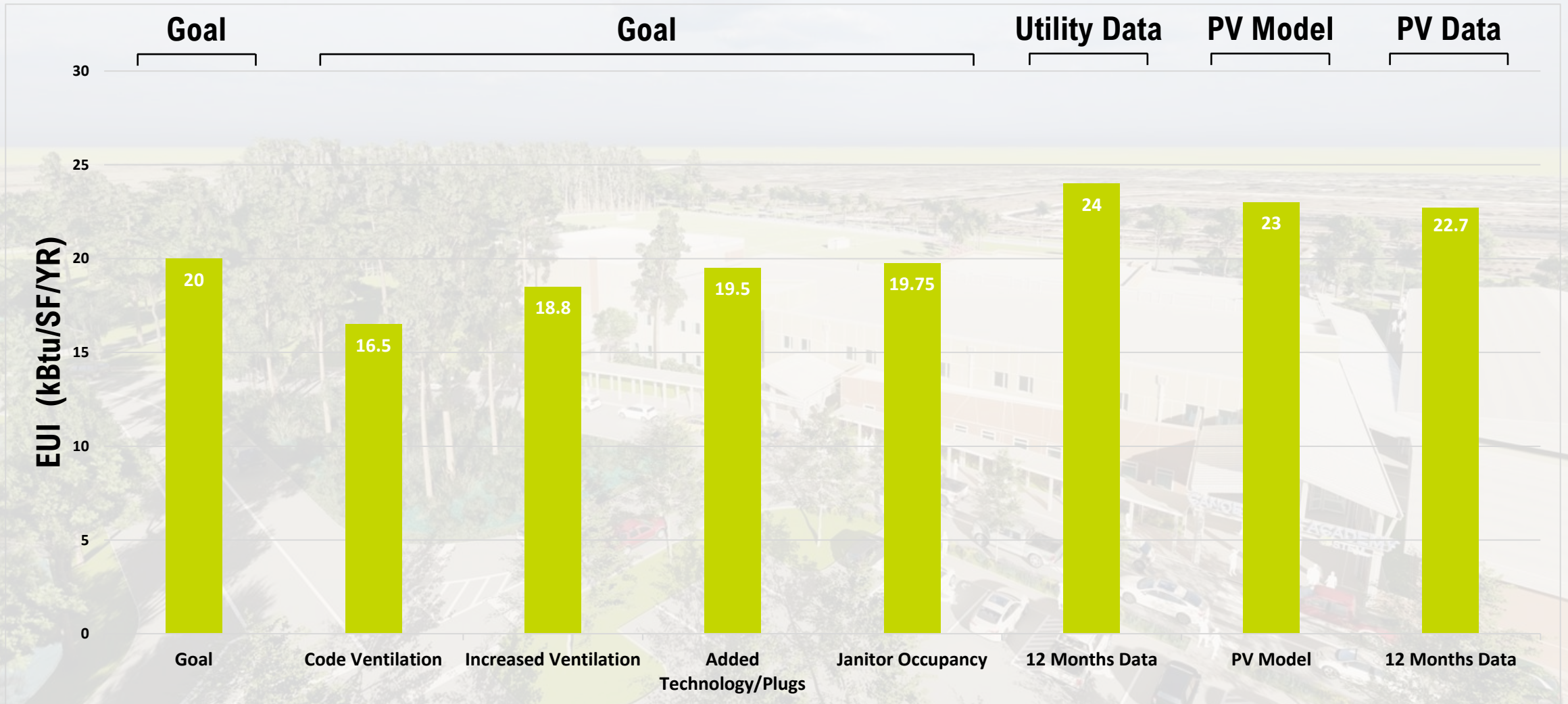


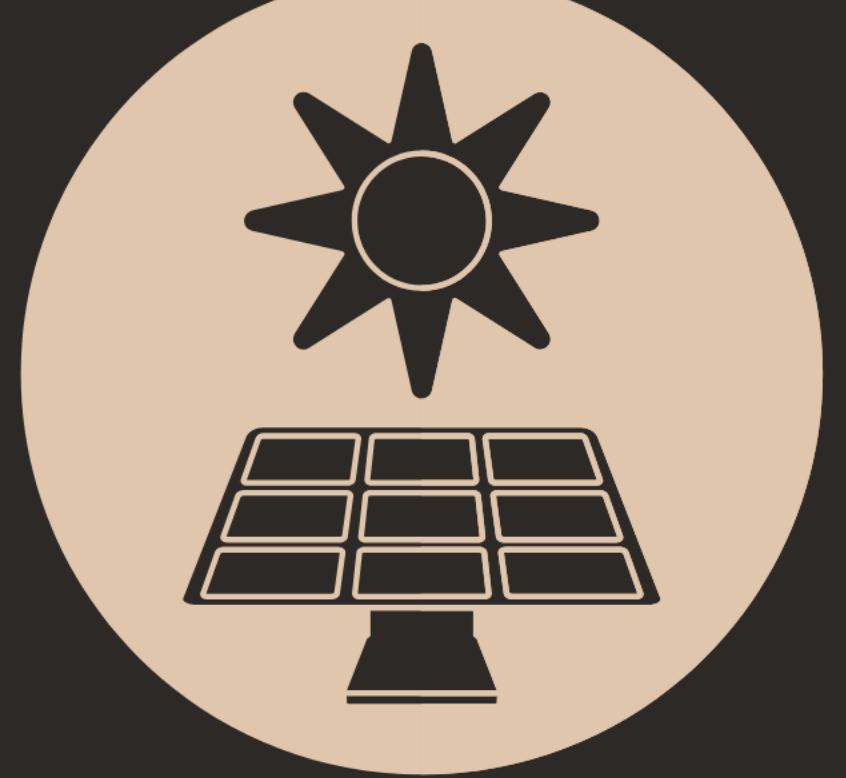
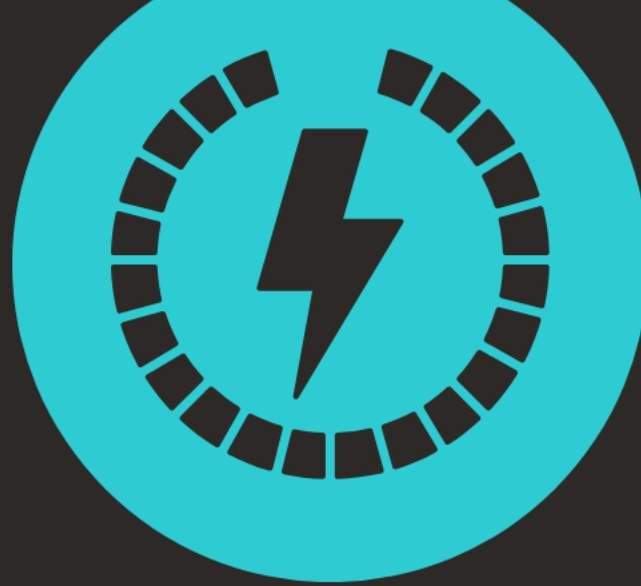
# OCCUPANCY / OPERATIONS SURPRISES

- Janitor hours added after design and reduced impact to a floor-by-floor cleaning to un-occupy
- HVLV fans operating 24-7
- Added a hydroponics lab
- Monitors not turned off when the building is unoccupied
- 2020 Extended ventilation schedules (COVID Related)



# OCCUPANCY / OPERATIONS SURPRISES



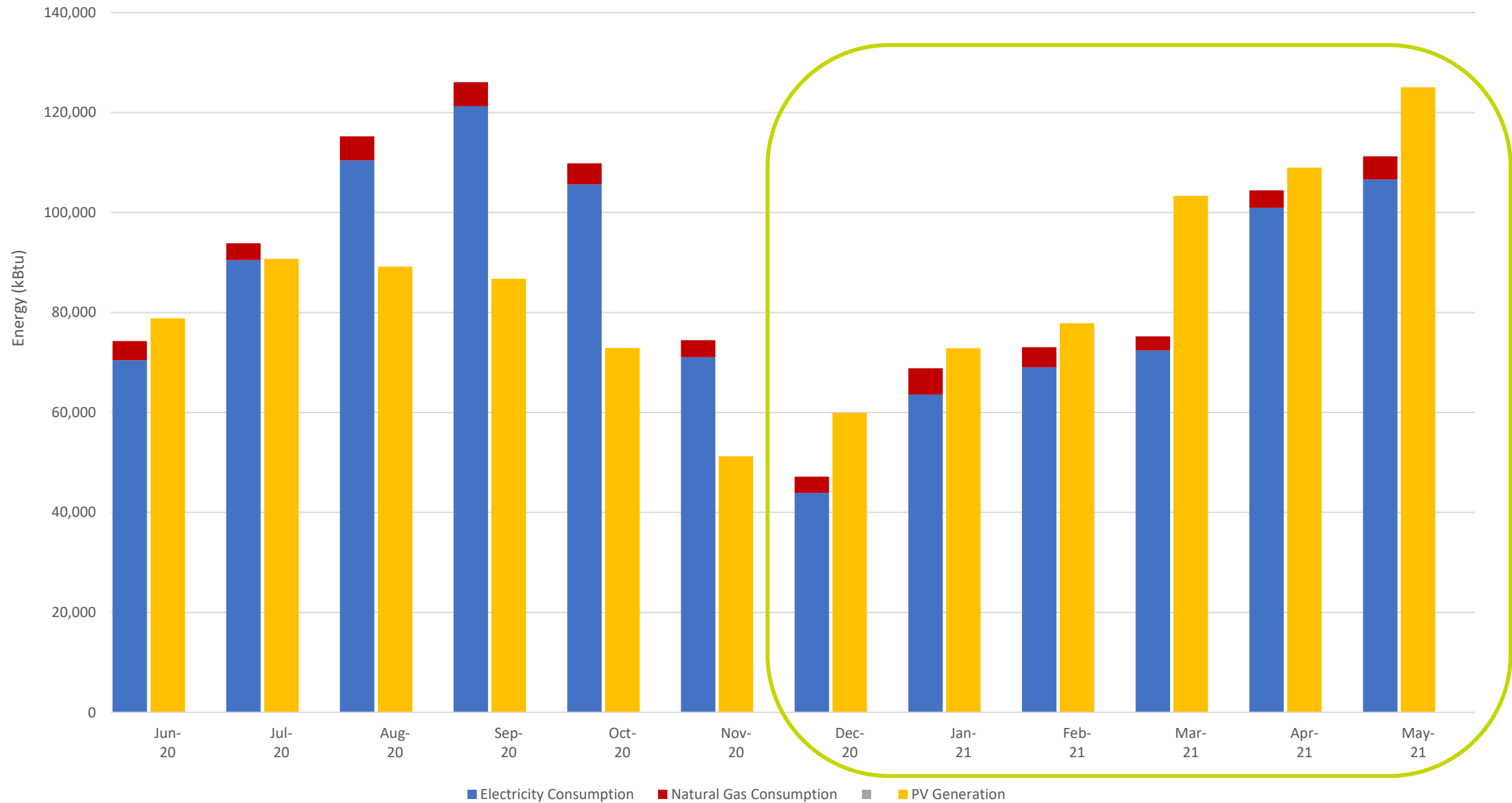


*Dollars and Cents*

**REAL DATA DON'T LIE**



# Monthly Building Consumption vs PV Generation





# MONTHLY TRACKING TO ZERO

|        |      |
|--------|------|
| Aug-20 | 1.75 |
| Sep-20 | 1.61 |
| Oct-20 | 1.70 |
| Nov-20 | 2.06 |
| Dec-20 | 1.40 |
| Jan-21 | 1.29 |
| Feb-21 | 1.17 |
| Mar-21 | 1.11 |
| Apr-21 | 1.56 |
| May-21 | 1.25 |





neocityacademy  
NeoCity Academy

...



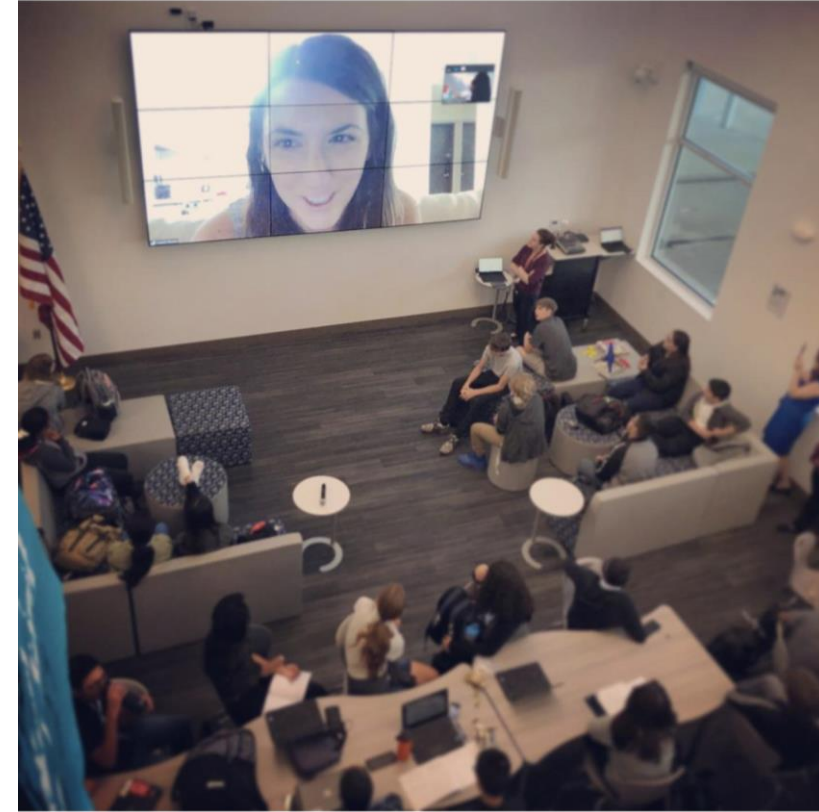
neocityacademy

...



neocityacademy

...



***Learning Happens Everywhere***  
***89% re-attendance rate – Highest in the district***  
***Collaborative Opportunities Emerging***



umec



*NeoCity Academy was included to fly two student experiments into suborbital flight aboard a Blue Origin launch in the spring or fall 2021.*

# COST PER STUDENT STATION 2019

Florida Public Schools



**Elementary School**

**\$22,760**

/ STUDENT STATION



**Middle School**

**\$24,578**

/ STUDENT STATION



**High School**

**\$31,925**

/ STUDENT STATION

# COST PER STUDENT STATION 2019

Florida Public Schools



**Elementary School**

**\$22,760**

/ STUDENT STATION



**Middle School**

**\$24,578**

/ STUDENT STATION

**NEOCITY TARGET**



**High School**

**\$31,925**

/ STUDENT STATION

# COST PER STUDENT STATION 2019

Florida Public Schools

## NEOCITY ACTUAL



Elementary School

**\$22,760**

/ STUDENT STATION



NeoCity

**\$23,833**

/ STUDENT STATION

-\$8,092

/ STUDENT STATION

-\$5,057,500

PROJECT SAVINGS



Middle School

**\$24,578**

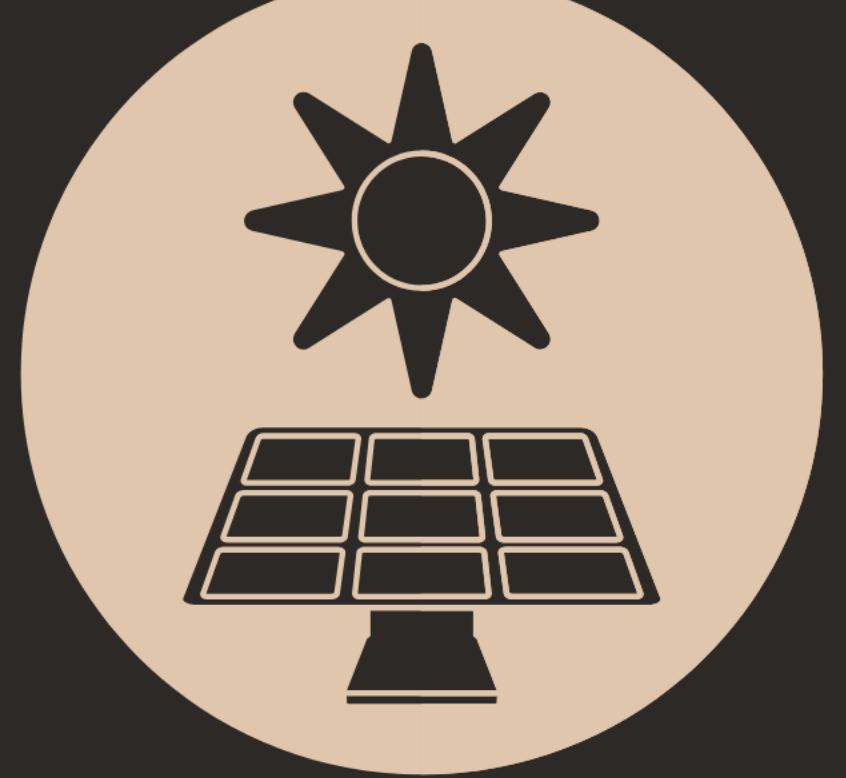
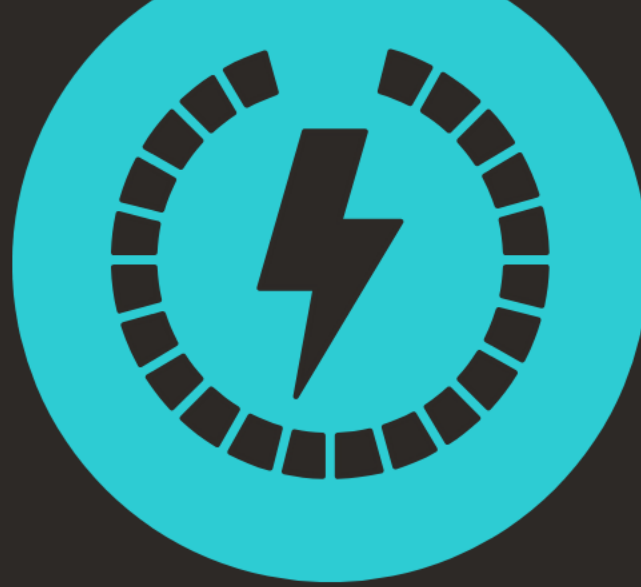
/ STUDENT STATION



High School

**\$31,925**

/ STUDENT STATION



*The Future*

# FORGING AHEAD







# OUR COMMITMENT TO HP/ZER/ZE

## The “WHY” To Reduce Operational Costs – The Cost of Ownership

Cost to Build = \$11.3M

VS.

Cost to Operate/Maintain = \$12.3M  
(\* \$5.50/SF x 50 Years)

**Utility Costs over 50 years = \$941,400**

\*Data Source: 2019-2020 District Financial Reports – Annual Plant Maintenance and Operations Cost Information

### Strategic Plan – Fiscal Responsibility

- Three (3) Successful HP, ZER or ZE projects
- Another Three (3) HP or ZER projects in Design  
Incorporating HP strategies in Renovations

**Strategic Plan 2019-2022** Year 2 GOALS, STRATEGIES, METRICS, AND ACTIVITIES

**STRATEGIC PLAN GOALS**

- ACADEMIC SUCCESS
- TALENT MANAGEMENT
- FISCAL RESPONSIBILITY
- COMMUNITY ENGAGEMENT & GOVERNANCE
- SCHOOL SAFETY & SECURITY

OSCEOLA COUNTY SCHOOL BOARD MEMBERS:  
Terry Castillo - District 1 | Julius Melendez - District 2 | Jon Arguello - District 3  
Clarence Thacker - District 4 | Robert Bass - District 5  
Dr. Debra P. Pace - Superintendent

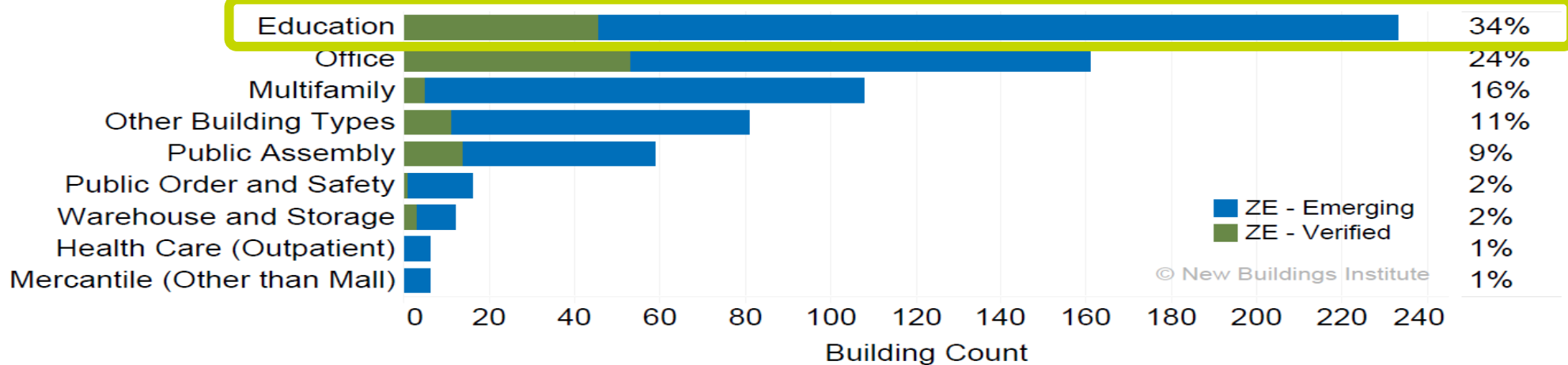
*Every Child, Every Chance, Every Day!*

THE SCHOOL DISTRICT OF OSCEOLA COUNTY, FL  
817 BILL BECK BLVD. KISSIMMEE, FL 34744 | 407-870-4600 | WWW.OSCEOLASCHOOLS.NET

Osceola County SCHOOL DISTRICT

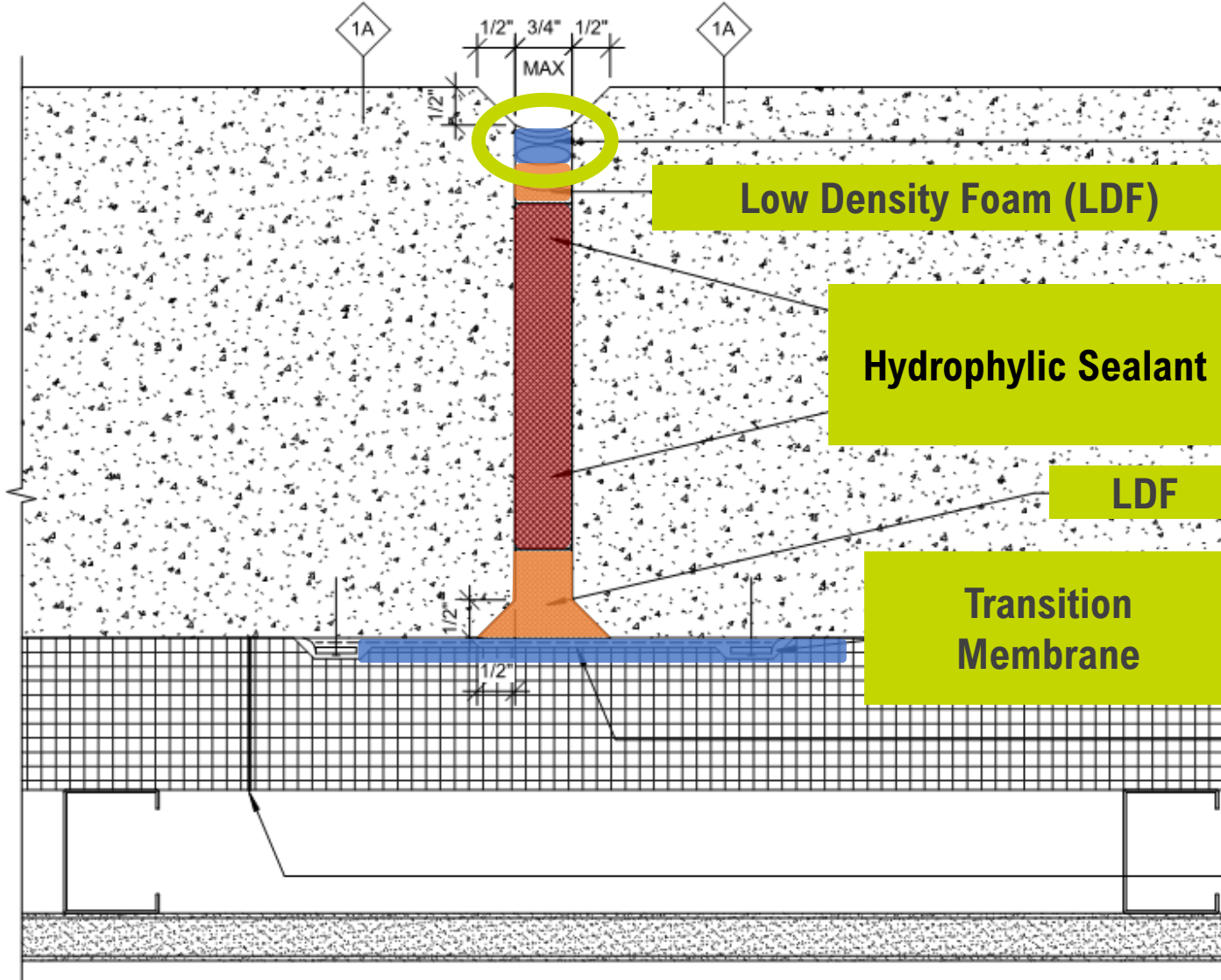
# THE HP/ZER/ZE TREND IS BUILDING MOMENTUM

Building Type Breakdown



- Several school district and governmental agencies are moving forward with such project
- Many designers and construction managers are now providing these services
- Many organization have made commitments to ZE including the AIA (i.e., 2030 Challenge)
- Included in Sustainable Rating Systems (i.e., CHPS, LEED, Green Globes, FGBC, etc.)
- Certification pathways (i.e., WELL, ILFA, LEED ZE, etc.)
- Taking Green Construction to the next level – “Less bad to More Good”
- Recognized improvements to the Built Environment

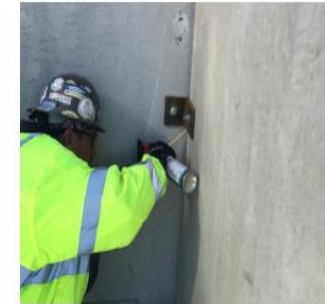
# TIGHT BUILDING ENVELOPE



## Backer Rod & Sealant



STEP 1: INSTALL BACKER ROD IN JOINT



STEP 2: INSTALL SPRAY FOAM INSULATION IN JOINT



STEP 3: TRIM SPRAY FOAM FLUSH WITH WALL



STEP 4: APPLY TRANSITION PRIMER TO BOTH SIDES OF JOINT

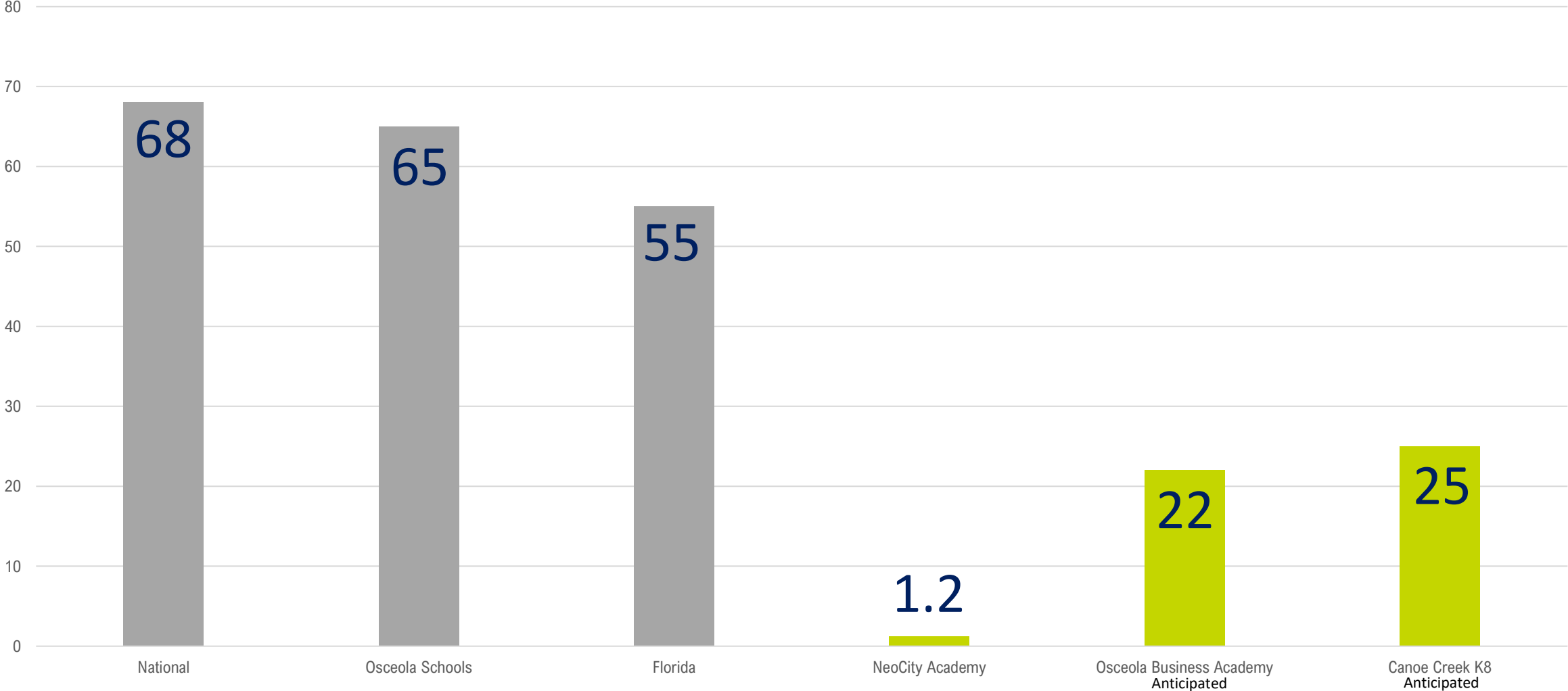


STEP 5: APPLY TRANSITION MEMBRANE AND ADHERE WITH WEIGHTED ROLLER



STEP 6: SEAL EDGES OF MEMBRANE WITH BUTYL SEALANT

# COMPARABLE EUI'S



# TESTING

**“TRUST, BUT VERIFY”**

- Ronald Reagan



**NeoCity Academy Mock-up**



**Osceola Business Academy Mock-up**



**ASTM E779 “Air Leakage Testing by Fan Pressurization”**

# RFP PROCESS



Date Issued: October 13, 2017

|   |  |
|---|--|
| <b>Submittal Due Date:</b><br>November 15, 2017   | <b>Submittal Due Time:</b><br>2:00 P.M.  |
| <b>Submit Responses To:</b><br>School District of Osceola County, Florida<br>Purchasing Department<br>817 Bill Beck Boulevard, Building 2000<br>Kissimmee, FL 34744 | <b>Purchasing Representative:</b><br>Cheryl Jessee, Supervisor of Purchasing<br>(407) 870-4627 Office • Fax (407) 870-4616<br>E-mail: <a href="mailto:jesseec@osceola.k12.fl.us">jesseec@osceola.k12.fl.us</a><br><a href="http://www.osceola.k12.fl.us/depts/purchasing">www.osceola.k12.fl.us/depts/purchasing</a> |

**RFQ # SDOC-18-Q-050-CJ-FPC**  
**Architect and Engineering Services for the**  
**Demonstration STEM High School Project**

The purpose of this Request for Qualifications (RFQ) is to select the most highly qualified Firm to provide the requested services. Submittals will be reviewed and evaluated as to qualifications to perform the services required by a Selection Committee consisting of School District staff; the selection committee will make a recommendation and present it to the School Board for approval.

It is anticipated that one firm shall be selected to provide the necessary services for the project outlined in the Scope of Services in accordance with Florida Statutes 287.055.

Expressions of interest and qualification data will be received at the School District of Osceola County's Purchasing Department located at 817 Bill Beck Blvd., Bldg. 2000, Kissimmee, FL 34744, **until 2:00 PM on November 15, 2017**. Submittals received after this deadline **will not** be considered for award.

Cut out the Label below and attach it to your envelope/package

**\* DO NOT OPEN \* SEALED PROPOSAL \* DO NOT OPEN \***

RFQ NUMBER: SDOC-18-Q-050-CJ-FPC

RFQ TITLE: Architect & Engineering Services for the Demonstration STEM High School Project

SUBMITTAL DUE ON November, 15 2017 AT 2:00 P.M.

SUBMITTAL ENCLOSED  "NO SUBMITTAL LETTER" ENCLOSED

The School District of Osceola County, Florida  
PURCHASING DEPARTMENT  
817 Bill Beck Blvd., Building 2000  
Kissimmee, FL 34744-4492

Deliver To:

## PROJECT REQUIREMENTS / HIGH PERFORMANCE CRITERIA

The following list of High Performance Criteria shall be considered the District's Project Requirements, though the list is by no means to be considered exhaustive. The firm awarded a Contract as a result of this RFQ, at a minimum, must have sufficient organization, personnel and management to provide the Scope of Services required and meet the Project Requirements and High Performance Criteria listed below. The design shall:

Page 2 of 34

1. Integrate learning, design, sustainable design, and environmental stewardship so that it supports and enhances student learning and student success;
2. Deliver a balanced design that achieves Zero Energy status as defined by the United States Department of Energy.
3. Meet these measurable High Performance Criteria:
  - a. **Maximum Energy Use Intensity (EUI): 20. EUI Goal is 20 or less.**
  - b. On-site renewable energy generation that exceeds the EUI via a solar photovoltaic array. Solar to be provided via a Solar Partner. Designer shall coordinate design with the Solar Partner.
  - c. Overall minimum insulation R-values: 30-roof, 25-wall, 10-under-slab.
  - d. Passive solar design solutions
  - e. Thermally broken windows with insulated glass.
  - f. Glazing percentage: 35-40%.
  - g. **Airtightness: 0.15 cfm/sf per ASTM E779 and E1827.**
  - h. HVAC System: ground source heat pump with dedicated outdoor air system.
  - i. Lighting System: primarily LED.
  - j. Consideration for sub-metering of building systems including plug loads, lighting, etc. and incorporate metered data into a comprehensive Building Automation System
  - k. Provide building systems that are durable, straightforward to operate/control, and are easily maintained.
  - l. Consider Indoor Air Quality, Thermal/Acoustic/Visual Comfort, and Universal Design standards beyond the minimums required by building code.
  - m. Consideration for geothermal, co-generation and other proven emerging technologies.



INTERNATIONAL  
**LIVING FUTURE**  
INSTITUTE<sup>SM</sup>



***MARC CLINCH, LFA***

**LIVING FUTURES ACCREDITATION**

# CURRICULUM SUPPORT – BUILDING DASHBOARD



TUESDAY JULY, 6  
09:07:50 AM



DATA

360° View





# CURRICULUM SUPPORT – BUILDING DASHBOARD



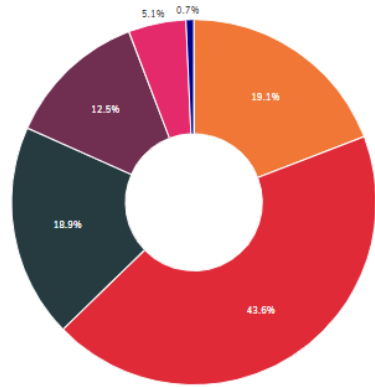
NEOCITY ACADEMY  
OSCEOLA COUNTY SCHOOLS

TUESDAY JULY 13, 2021

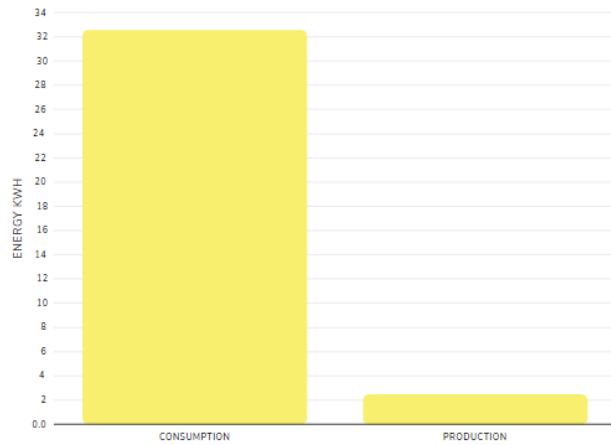
5:07:11 PM

DAY ▼ BUILDING ▼ EXPORT

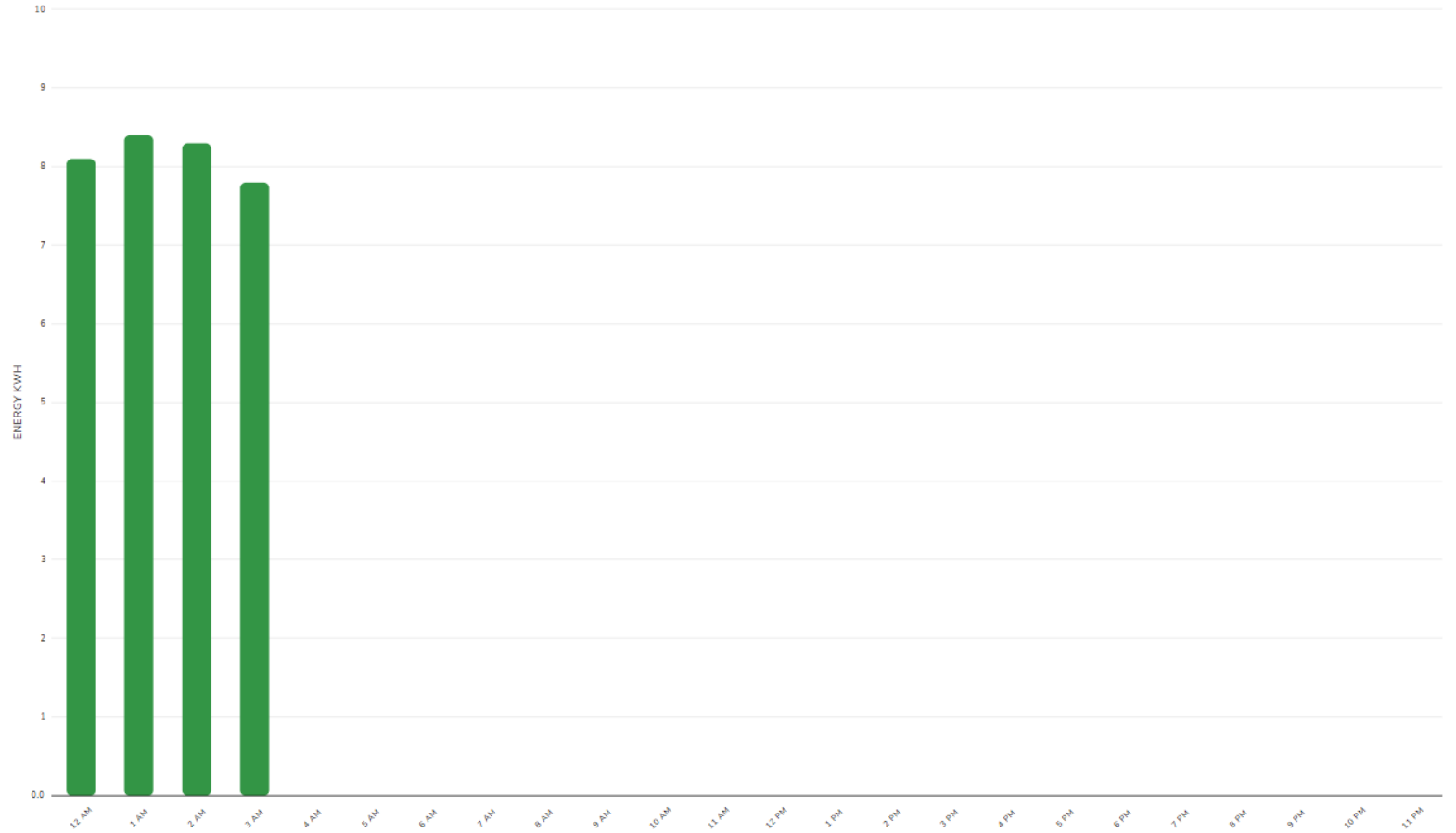
< TUE 07/13/2021 >



- LIGHTING 19.1%
- HVAC 43.6%
- IT 18.9%
- PLUGLOAD 12.5%
- KITCHEN 5.1%
- ELEVATOR 0.7%



**BUILDING DEMAND**  
9.8 KW 22.2 KW 28.6 KW  
LOW CURRENT HIGH



What does this data mean?

This shows the total amount of energy used to operate NeoCity Academy today. This means all energy required to heat, cool, and light the building, store and prepare food, operate technology, and power everything plugged into outlets.



1. **Florida Educational Planners Association (FEFPA)** 2019 Award of Merit
2. **Florida Educational Planners Association (FEFPA)** 2020 Award of Merit
3. **ABC 2020** Project of the Year
4. **ABC 2020** Eagle Awards
5. **American Society of Civil Engineers(ASCE)** East Central Florida Branch 2020 Project of the Year
6. **American Society of Civil Engineers(ASCE)** Florida Section Branch 2020 Project of the Year
7. **American Society Heating and Refrigeration (ASHRAE)** 2020 National Technology Award
8. **USGBC Florida** 2020 Climate Champion Award
9. **AIA Orlando** 2020 Sustainability Award
10. **American School & University**, Interiors Showcase, Silver Citation (2020)
11. **Learning By Design**, Citation of Excellence (2021)



## **AWARDS & RECOGNITION**

# Q&A

