

# PoE Works with LEED and Well



Top design professionals and subject matter experts with experience in designing and constructing Power Over Ethernet intelligent buildings share their best practices and lessons learned. The session will cover how Power Over Ethernet Lighting and Automation work within LEED and WELL to optimize your designs.

**Designing for PoE Lighting and  
Automation**





# Agenda



## **Intro**

Tyler



## **How Does LEED work**

Danna



## **How Does WELL work**

Andy



## **Benefits of Automation, Lighting, and PoE as a System**

Joe



## **Benefits of PoE in relation to Blinds and Shades**

Andy



## **What are next steps**

Danna



# What are LEED and WELL?





# Why LEED and WELL?



## **Economic Benefits**

- Gain a competitive edge
- Attract tenants
- Meet ESG goals (Environmental, Social, and Corporate Governance)
- Realize operational savings (energy, water, maintenance, waste)



## **Health Benefits**

- Happier occupants, increased productivity, higher retention
- Healthier occupants, better indoor environmental quality



## **Environmental Benefits**

- Reduced energy use and carbon emissions
- Water and waste conservation
- Sustainable operation



# Costs, Benefits, and ROI

**“The general link between high performance buildings and benefits for energy, environment, health and productivity has been proven, and a conceivable return on investment (ROI) on their construction has been noted as well.”**

- **LEED**

- LEED Costs, Benefits and ROI: Energy, Water, CapEx, Health and Productivity (2017, Alpin Limited)
- <https://media.alpinme.com/pws/LEED-Costs-Benefits-ROI1.pdf>

- **WELL**

- Buildings emerge as drivers of health and profits (2017, Scott Muldavin, Chris R. Miers and Ken McMackin)
- [https://static1.squarespace.com/static/5a00a5ad90bade3bd62dbaa1/t/5aff64bf758d46bedbd90862/1526686912747/Buildings+Emerge+as+Drivers+of+Health+%26+Profits\\_Corp+RE+Journal\\_Dec+2017.pdf](https://static1.squarespace.com/static/5a00a5ad90bade3bd62dbaa1/t/5aff64bf758d46bedbd90862/1526686912747/Buildings+Emerge+as+Drivers+of+Health+%26+Profits_Corp+RE+Journal_Dec+2017.pdf).



**PROJECT RATING SYSTEMS**



**Building Design and Construction**



**Interior Design and Construction**



**Building Operations and Maintenance**



**Neighborhood Development**



**Homes**

**CREDIT CATEGORIES**



**Integrative Process**



**Location and Transportation**



**Materials and Resources**



**Water Efficiency**



**Energy and Atmosphere**



**Sustainable Sites**



**Innovation**



**Indoor Environmental Quality**



**Regional Priority Credits**

# LEED<sup>®</sup>



## LEED v4 and LEED v4.1

- LEED v4 projects can utilize LEED v4.1 pathways
- Biggest differences:
  - ASHRAE 90.1-2016 baseline
  - Materials and Resources credits



## Prerequisites and credits

- Lighting/daylighting design and controls, flexible power distribution, DC power system, energy metering, energy performance, thermal comfort controls



## Innovation (up to 5 points)

- Pilot Credits
- Exemplary Performance
- Innovation



# WELL

## v1 and v2

Comprehensive approach to well-being

Spanning 108 features and 10 concepts, WELL is a roadmap for improving the quality of these elements with inspired design decisions that not only keep us connected but facilitate a good night's sleep, support our mental health and help us do our best work everyday



AIR



WATER



NOURISHMENT



LIGHT



MOVEMENT



THERMAL COMFORT



SOUND



MATERIALS



MIND



COMMUNITY

WELL Focuses on the Health and Wellness of the occupants in the Built Environment and addresses the multiple health benefits of natural light such as our naturally occurring circadian rhythms



# The WELL v2 Process



Projects pursuing WELL Certification can earn points based on performance outcomes for various policy, design and operational strategies and can achieve one of four certification levels: Bronze, Silver, Gold or Platinum

## 10 Concepts

WELL v2 operates on 10 concepts, and 108 features with 110 possible points



## Performance Verified Features

Every WELL project is verified through on-site testing of building performance



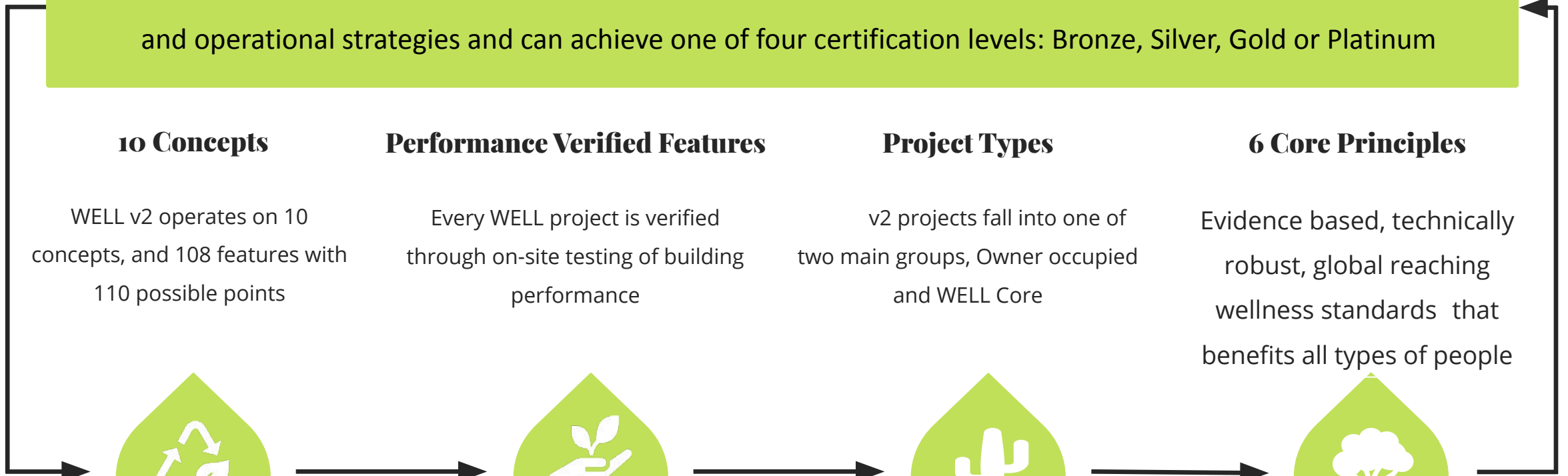
## Project Types

v2 projects fall into one of two main groups, Owner occupied and WELL Core



## 6 Core Principles

Evidence based, technically robust, global reaching wellness standards that benefits all types of people





# Power over Ethernet (PoE)

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Benefits of Automation, Lighting, and PoE as a System

# What is Power over Ethernet?

- **Intrinsically Safe Power**

*Power that keeps humans and facilities safe*

- **Digital Age Amenities that Drive Value**

*Individual environments can now be controlled cost effectively*

- **Information collection**

*Change from how it was → to how you want it TO BE*

- **Lower Natural Resource cost**

*PoE uses 60% less copper (wire) and 100% less steel (conduit) over traditional high voltage designs*

High Voltage

Power Over Ethernet





# THE GATEWAY TO DIGITAL AMENITIES

The Complete Solution for Automation and Lighting  
For Commercial, A/V, Hospitality, Residential and Industrial



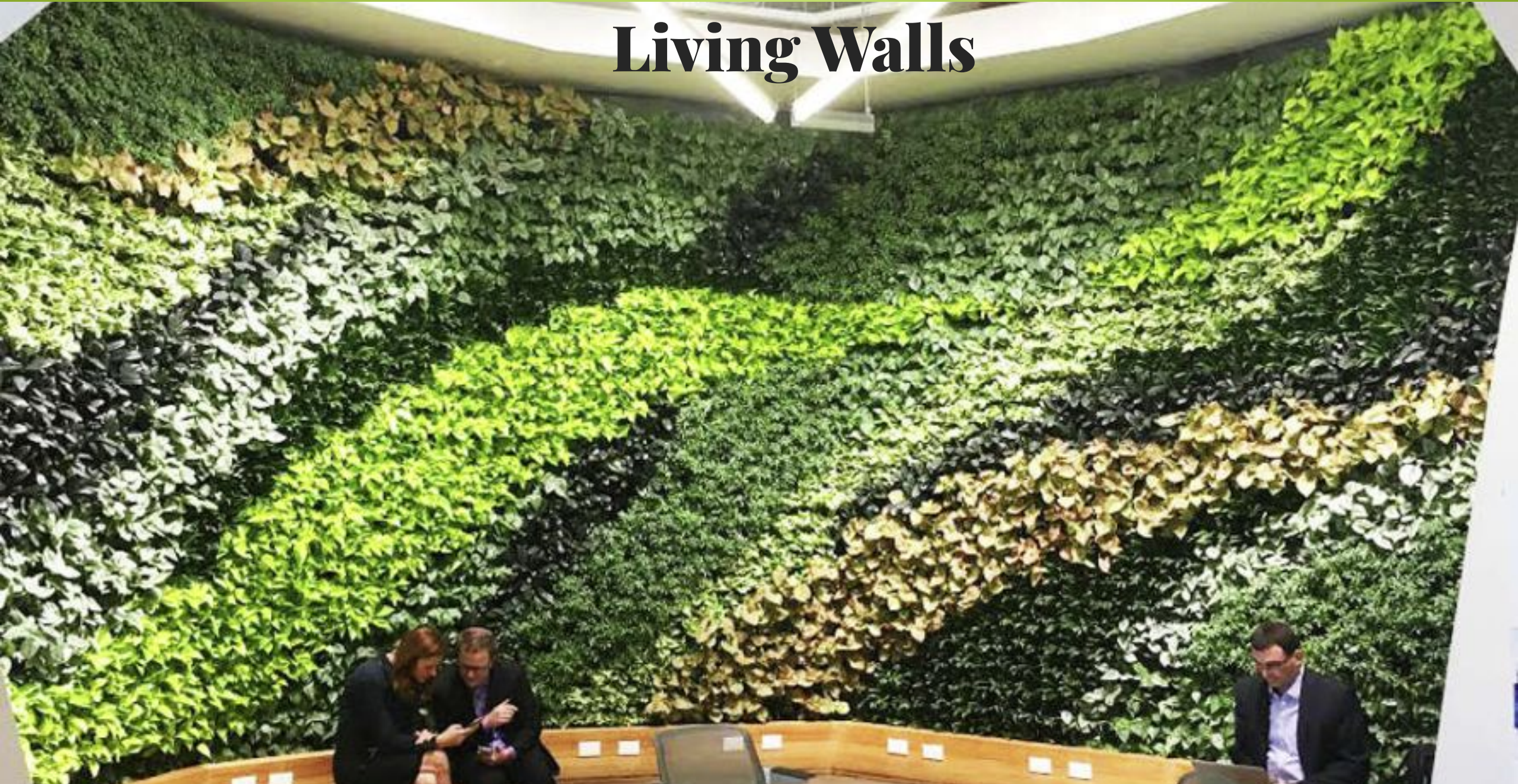
An aerial photograph of a modern skyscraper, the Vertical Forest in Milan, Italy. The building is characterized by its cantilevered balconies, each densely planted with a variety of trees and shrubs, creating a lush green facade. The building stands out against a clear blue sky and a dense urban landscape of traditional European-style buildings with red-tiled roofs. The text 'Examples of what PoE enables in a building' is overlaid in a large, white, serif font across the center of the image, with a white horizontal line underneath it.

# Examples of what PoE enables in a building

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Well Points - Biophilia, sound reduction and air quality credits

# Living Walls



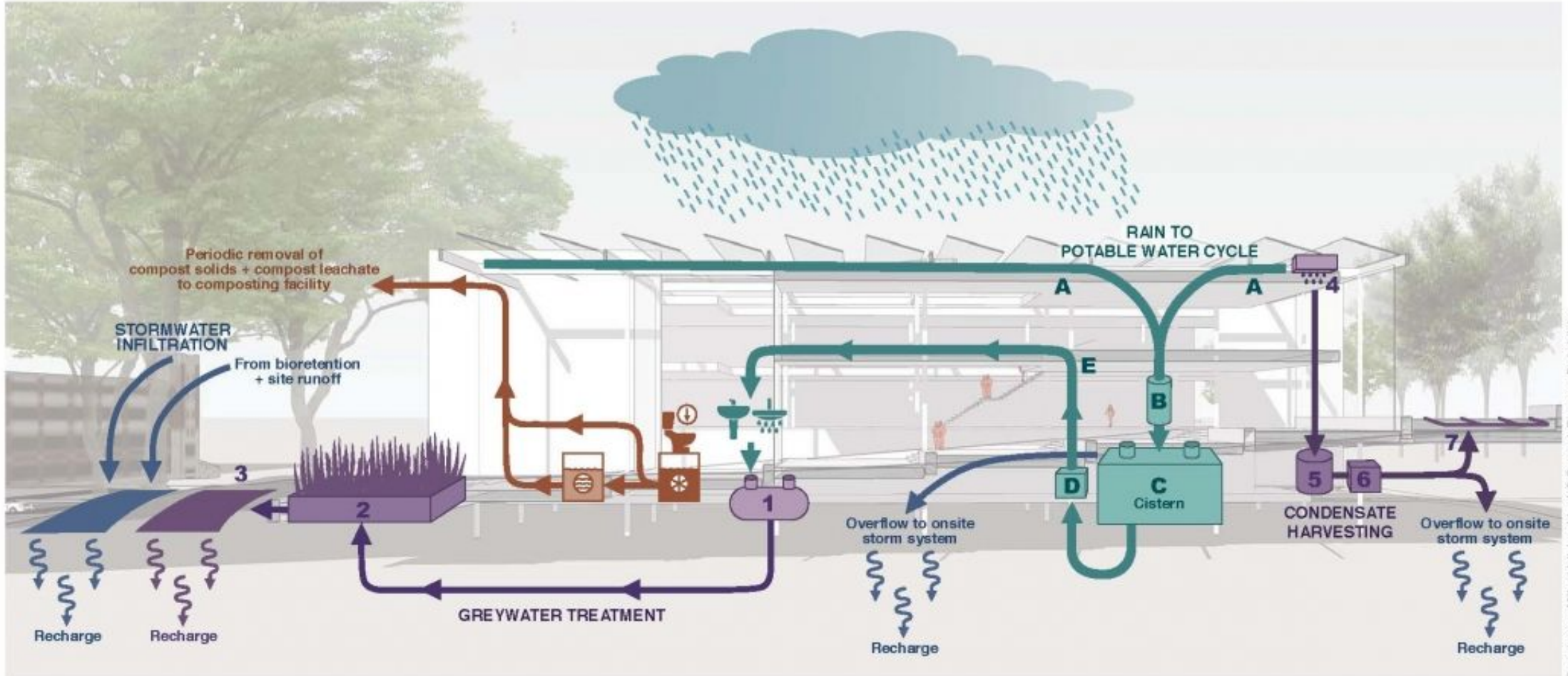
# NET POSITIVE WATER CYCLE – LIVING BUILDING CHALLENGE STRATEGY

Kendeda Building for Innovative Sustainable Design  
Georgia Institute of Technology, Atlanta, GA

# LEED Points - Water Use Reduction Credit

# Water Collection and Reuse

Miller Hull  
Lord Aeck Sargent  
Newcomb & Boyd  
Engineering  
Associates  
PAE



Base image: Miller Hull, Lord Aeck & Sargent, Diagram: Biohabitats

### GREYWATER TREATMENT

- 1 Primary treatment tank—collects, settles\*, digests
- 2 Constructed wetlands—passive ecological polishing
- 3 Subsurface infiltration—recharges groundwater

### RAIN TO POTABLE WATER CYCLE

- A Rainwater collection—piping
- B Inlet Filtration from roof
- C Basement cistern
- D Potable water filtration + UV disinfection skid
- E Distribution to potable fixtures

### COMPOSTING TOILET CYCLE

- Ⓜ Foam flush toilet fixtures (compatible with composting unit)
- Ⓜ Composter units (serve multiple toilets)
- Ⓜ Compost leachate storage tank

### CONDENSATE HARVESTING

- 4 Condensate from building cooling system
- 5 Condensate storage tank
- 6 Filtration + irrigation pump
- 7 Site irrigation system

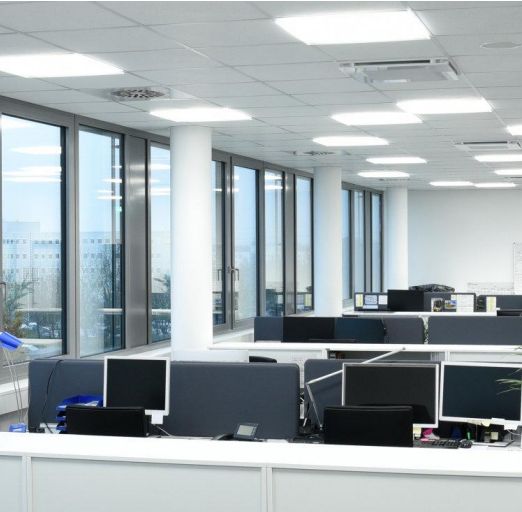
LEED Points - Optimize Energy Performance credit

# Geothermal Heating and Cooling





# PoE benefits germane to LEED!



## DC Power Distribution

LED lighting is a DC technology. Converting AC to DC at each fixture wastes power at each fixture from conversion losses



## Lighting Controls

With PoE – EVERY light fixture is now controllable!!

## Advanced Energy Metering

At the edge of a PoE network is a power meter that gives insight to where energy flows and for how long

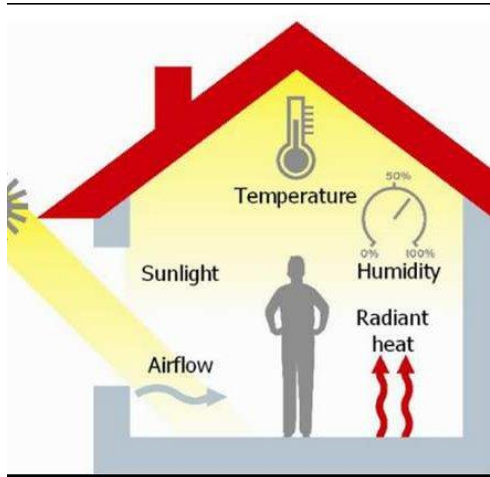


## Life Cycle Impact Reduction: Design for Flexibility

Flexibility is the most compelling virtue of a PoE system and the key to reuse of existing resources by simply reprogramming new behavior

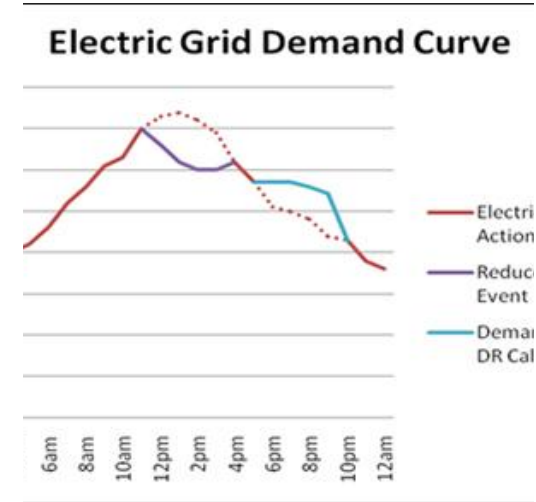


# PoE benefits germane to LEED!



## Thermal Comfort

By integrating more sensors, the distribution of thermal energy is delivered to the places it is needed most



## Demand Response

At the touch of a button or a web call from a utility, a PoE system can respond to cut peak load requirements

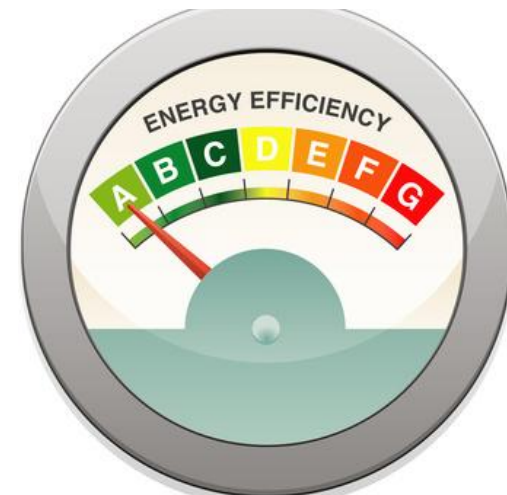
## Daylight Harvesting

Every fixture in a daylight zone can be adjusted in response to a light meter that helps comfort and reduces energy load.



## Energy Performance

PoE provides energy metering down at each fixture or device allowing for precise insight to where and how energy is being used



# PoE benefits germane to WELL!



## Occupant Light Control

PoE can connect any app or wall switch to a fixture or group of fixtures



## Electric Light Quality

AC systems have a notorious flicker – all that is removed utilizing a DC based system that does not flicker.

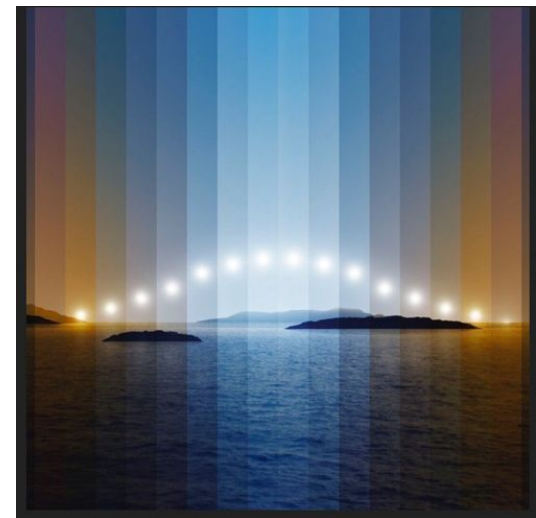
## Daylight Design Strategies

Utilizing integration with shades, a PoE based system can optimize shade position and light levels at any time of the day, any day of the year.



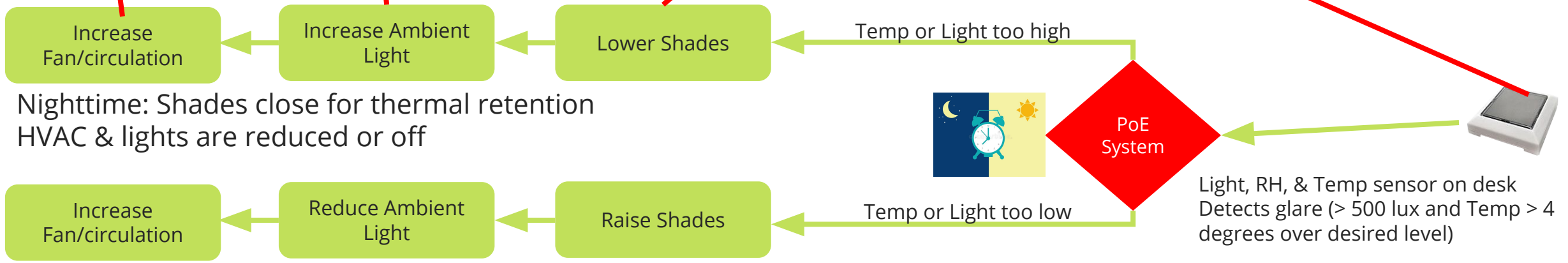
## Circadian Rhythms

PoE systems can dynamically adjust CCT and brightness on a minute-by-minute basis providing a full spectrum of warm-cool lighting



**Example of how PoE integrates 3  
separate technologies  
(HVAC, Shades, Lighting)  
to bring a much greater value**

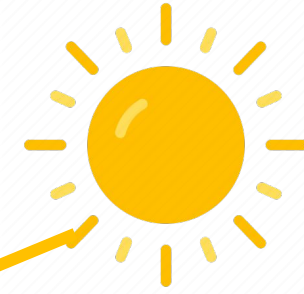
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Closed Loop Model (using sensor feedback)

## Open Loop Model (No Sensors)

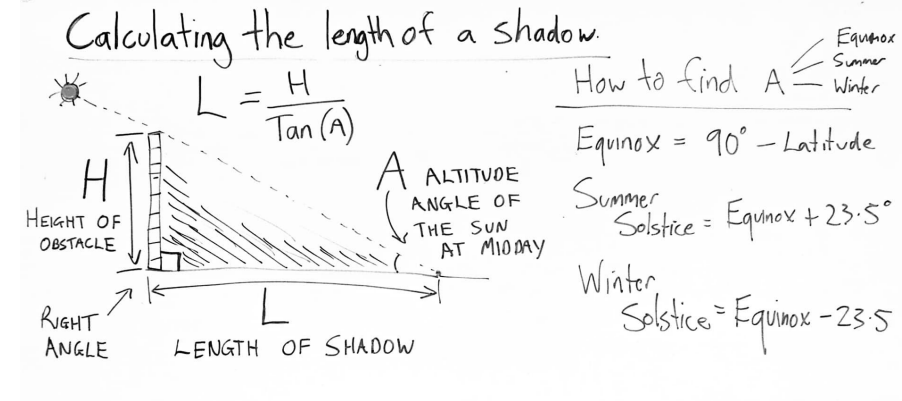
Using GPS, window direction, DOY azimuth calculations(H), and maximum encroachment from window (L), we determine shade level dynamically.



June 21 noon  
73 deg



Dec 21 noon  
41 deg



Height of the shade adjusted every 10-120 minutes in addition to light levels

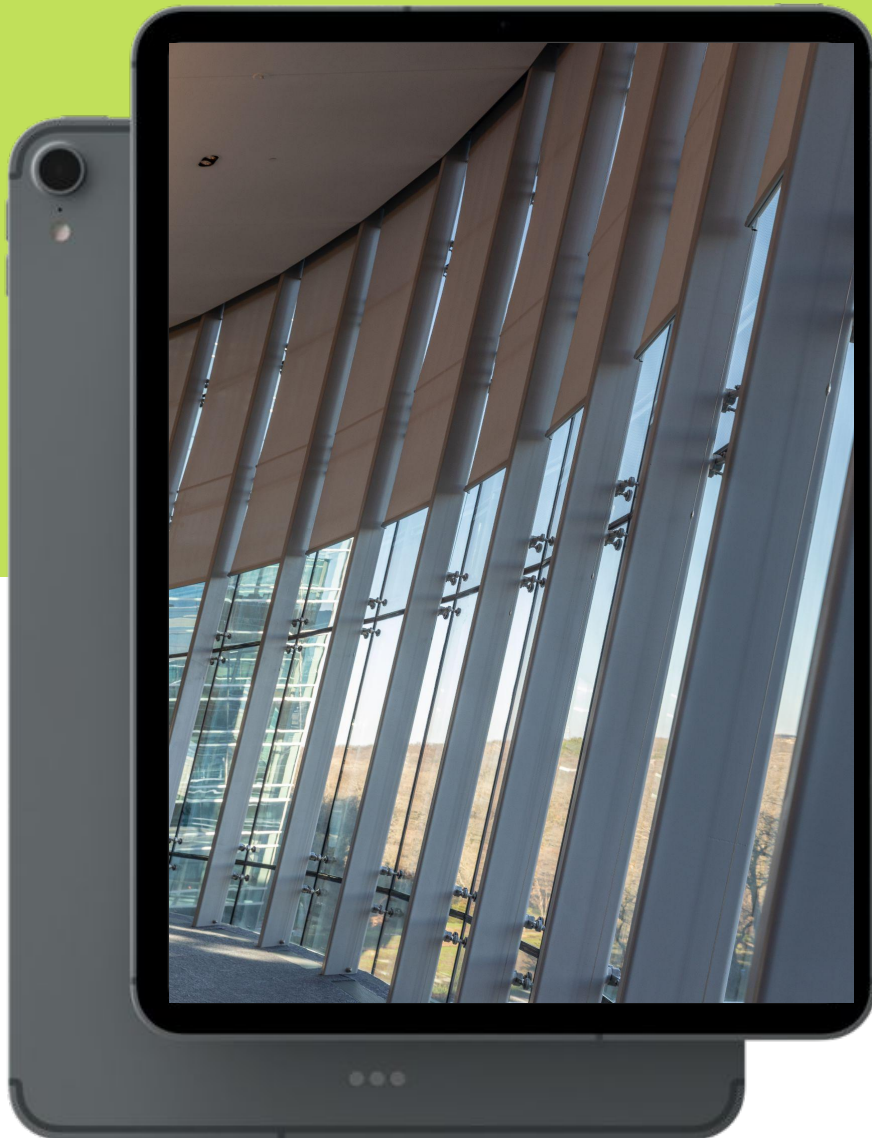
Astro Time clock ensures shades stay closed after sunset.

Manual override always available.

Monitor weather.com to proactively anticipate shade, lighting and HVAC requirements

# Division 12 PoE Roller Shades

**Both WELL v2 and LEED 4.1 have significant changes relating to Roller shades in Division 12**



## **WELL v2**

Simplified Credit requirements: Integrate solar Shade L05 Part 1 and 2



## **LEED v4.1**

Direct Current Power Pilot Credit



## **Integrative Process**

PoE integrates people, systems, business structures and practice.

# WELL v2



## Materials Optimization

X08 -2 points  
Multiple options relating to  
EPD and HPD



## Integrate Solar Shading

L05 -2 points  
Option 2 Automated Shades



## Enhanced Material Restrictions

X05.2- 1 Point  
Option 1 RoHs Compliant



## Contact Reduction

x12- 1 Point  
Option 2 Surface Touch  
Management

Through Innovation we can look at strategies with PoE and management software to help bridge some of these concepts and features that still may stand alone from one feature to another or better validate thru good real time data the performance of the integrated systems so that we truly have a single ecosystem within our build environment.



# LEED V4/v4.1



## Indoor Environmental Quality

Daylight - 3 points



## Building Product Disclosure

Environmental Product Disclosure - 2 Points



## Indoor Environmental Quality

Interior Lighting- 1 Point  
Patient Bedside control



## Direct Current Power

Pilot Credit- 18 points  
Possible Options 2 whole building model

LEED v4 is driven by sustainable and environmentally conscious strategies. Though we can achieve all of these through traditional or stand alone strategies, PoE systems will aid in achieving these criteria more efficiently, while contributing to sustainable and environmentally friendly solutions as we work towards our Net Zero and Embodied Carbon reporting and reductions strategies.

# Next Steps<sup>3</sup>



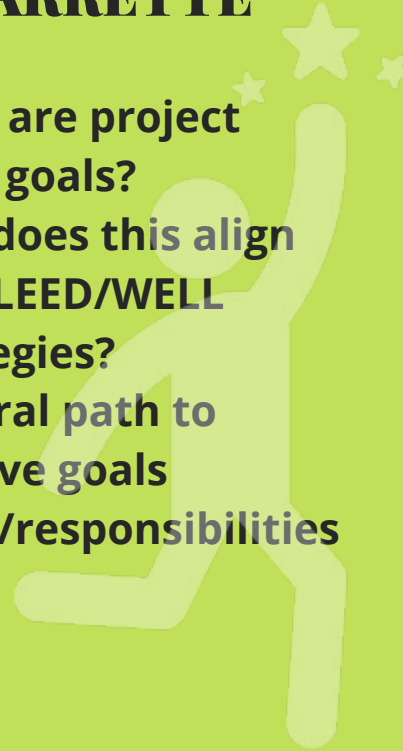
## ESTABLISH TEAM

- LEED/WELL consultant
- Owner
- PoE specialist
- MEP designers



## CHARRETTE

- What are project team goals?
- How does this align with LEED/WELL strategies?
- General path to achieve goals
- Roles/responsibilities



## DESIGN

- Integrated process
- As design progresses, verify alignment with goals and credit requirements



# Contact Us



If you'd like to speak to any of the panelist, you can use the contact information below.



## **E-mail**

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