Getting to Net Zero: Project Goals & Approach

Chris McEntee

About AGU

Promoting discovery in Earth and space science for the benefit of humanity.
Project Goals

- Destination Attraction for Earth and Space Science
- Advance the Adoption of Science-based Solutions
- Enhanced Visibility for Earth and Space Science
- State-of-the-Art Meeting and Conference Space
- Increased Productivity and Collaboration across Programs

Integrated Project Delivery & Planning: AGU’s Approach

The Project Team:

- AGU
- Hickok Cole Architects
- Interface Engineering
- MGAC
- Skanska
- Stratacomm
Community Engagement Timeline

July 14-15, 2015: Project Charrette Session and Building Renovation Kick-Off

March 11, 2016: AGU-Community/HPRB/DC officials debrief meeting

March 16, 2016: First ANC2B Community Meeting

May 26, 2016: Historic Preservation Review Board Meeting

July 10, 2016: ZA Approval

July 13, 2016: ANC Meeting

July 7 2016: AGU tours ULI’s new open, unassigned office concept

June 16, 2016: DC Water Meeting on Wastewater Thermal Energy Concept

August 5, 2016: DOE Meeting on Net Zero Energy Concepts and Grant Opportunities

August 5, 2016: ZA Approval Celebration with Vendors

October 5, 2016: Meeting with DC Water on Wastewater Thermal Energy Installation

October 16, 2016: Dupont Circle Citizens Association Tour

November 2016: ANC2B/Dupont Community Meeting

December 2016: Final Board Approval

March 8, 2017: ANC2B Meeting Update

January 24, 2017: Building Renovation Celebration: community comes together ANC, DOE, DC Water, Events DC, Destination DC

Dec 2016: Final Board Approval

Getting to Net Zero: Energy Conservation Measures and Renewable Generation

Holly Lennihan
A + E

WORKPLACE

1. Transparency and Openness – Open Work Plan
2. Radiant Ceiling Grid & DC lights – Limited Energy “Budget”
3. Wellness and Active Design – Circulation through the Space
4. The Hy-Phy Wall and Biophilia – Air filtration + Visual Delight
5. PV Array as Amenity on the Roof and ENERGY SOURCE
A NEW WAY OF WORKING
EMBODY THE MISSION

- Typical Open Office

- Shared Spaces
  - Pre-Function Space at Executive Conferencing
  - Semi-Private Meeting Spaces for Open Teaming

- Quiet Spaces
  - For Focused Work or Private Meetings

- Improved Circulation
  - Perimeter & Vertical Connection at All AGU Work Floors

- Formal Conferencing
  - At Prow

- Arrival Lobby
  - Featuring 'Cross Section Through Member Science' Wall

- Open Office
  - Personal Workspace for Increased Collaboration
THINKING ABOUT THE OCCUPANTS - WELLNESS

EMBODY THE MISSION

Connecting Stair

Hy-Phy Wall

A NEW WAY OF WORKING

EMBODY THE MISSION

Common Roof Deck
Getting to Net Zero: Energy Conservation Measures and Renewable Generation

Roger Frechette PE

Research + Strategy Analysis
High Performance Strategies

BUNDLED STRATEGIES
- Geothermal System
- Rooftop Solar Concentrators
- Municipal Heat Extraction
- Solar PV Array
- Exhibit Space / Building Tour
- Vertical L pk
- DC Power Distribution
- Integrated Wind Turbines
- ECODISTRICT
- CEB System
- Hydroponics in Hydroponics
- Shared Social Space
- Radiant Columns
- Modular Layout
- Building Energy Dashboard
- Daylight Optimization
- Phase Change Material Walls
- High Efficiency Lighting
- Solar Hot Water System
- Progressive Occupancy
- Enhanced Glazing
- Grey Water Reclamation

Solar Photovoltaics (PV)

Photovoltaic (PV) system generates electricity that powers LED lights, cooling grid, computer monitors and workstations.
Photovoltaic (PV) Solar Array

- 719 PV Panels
- @ 360 Watts per Panel

DC Power Workstations
DC Powered Workstations

Sewer Heat Transfer System
Sewer Heat Transfer System

Radiant Ceiling Cooling System
Radiant Ceiling Cooling System

Storm Water Reclamation
Hydrophonic Phytoremediation (HY-PHY)
Dynamic Triple Pane Glass

Pathway to Positive Energy

Site Energy Consumption and Production

Electricity Produced [kWh]
Gas Consumption [kWh]
Electricity Consumption [kWh]
Thank You.

Soup to Nuts PACE-Funded Campus Deep Energy Retrofit
Starting with planning, through development, design, financing, and execution.

Getting to Zero National Forum | April 17, 2018

Presented By:
Blair Madden Bui, CEO John Madden Company
Phillip Saieg, Regional Director McKinstry

John Madden Company  McKinstry
Colorado’s Integrated Commercial Developer

- Building Colorado Since 1960
- Developing & Managing High-End Commercial Space
- Setting the Standard for Innovative Commercial Master Planning

Project Background and History

- Executive Summary
- Project Scope
- Building Design
- Asset Management
- Construction
- Utility Data Analysis
- Operations
- Approvals

Capital Renewal Inflection Point

2012
- Retro-commissioning Study 2012
- RCx Improvements 2013
- LEED EBOM 2014
- Condition Assessment 2016
- Audit and Design 2017
- PACE Financing 2018
- Construction 2018
- 3 year Performance Tail 2018-21

2021
Project Implementation

Project Implementation Scope:
- High Efficiency AHUs with Evaporative Cooling
- Building Automation Systems
- LED lighting (common space and exterior)
- Irrigation water savings
- Domestic water savings
- Advanced sub-metering
- Active Energy Management

Project Outcomes

Project Outcomes – 31% Energy Savings
No Capital required from owner, tenants save on utility costs
New, required, mechanical and controls equipment
Savings pay for amortized capital costs

BUILDING END USE MODEL

![Graph showing energy usage by different categories]
Project Outcomes

- Future Scope:
  - Solar PV
  - Envelope upgrades
  - Outsourced I.T. for tenants or Thin Client options
  - Tenant space lighting strategies (daylight, task, LED)
  - Tenant space ZNE guidelines and space design guidelines

Active Energy Management
PACE Financing

- Property Assessed Clean Energy (PACE)
  - First PACE program was established in 2008 in Berkeley, California
  - Upfront costs & long-term savings are spread over time to current and future owners
  - Over 33 States have PACE financing enabling legislation
- Colorado PACE
  - Power to levy special assessments as part of property tax
  - 2017 – Final enabling legislation
  - New Energy improvement District (NEID)
  - Allows for new construction

PACE Financing

- Project Cost: $7.1M (hard and soft costs)
- 20 year finance term, 14 year break-even point
Historic Preservation Review Board Approval

Board of Zoning Adjustment – Special Exception for Penthouse Setback Requirements
OPENING UP
THE NEW BUILDING