

Zero Energy Buildings – Tales from Those Who Have Built Them

Better Buildings Summit

May 11, 2016

3:45PM - 5:00PM





- Jason Hartke Intro, 3:45 3:50
- Philip Riggs Presentation # 1, 3:50 4:05
- John Chadwick Presentation # 2, 4:10 4:25
- Bakari Kennedy Presentation # 3, 4:30 4:45
- Jason Hartke Q & A, 4:45pm 5:00pm





Zero Energy Now

Forty percent of American energy use today comes from building operations. We have the technology today to reduce this number to zero.



It's Simple!





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DOE - Zero Energy Now



Mission

Accelerate the development of zero energy commercial buildings in the U.S. by expanding both demand for ZEBs and the ability of the building design, construction, and operation industry to deliver extremely high-performing buildings.

Each Program to include:

- Partnerships sign agreements
- Allies support partners
- ZE Design Strategies Book
- Technical resources
- Case studies





ZEB K-12 Schools Program

Market **Outreach &** Engagement Market engagement through campaigns and Support & outreach to achieve Resources zero energy schools Market facing products that will create a strong foundation for deployment channels **Feasibility** Technical design strategies, case studies **Why ZEB K-12 schools? Technical feasibility study for viability of - Strong stakeholder involvement Definition zero energy schools - good replication potential - pillars of the community - market transformation through new **Create Common** generation education Definition - \$14billion in new construction



Better Buildings



Today's Presenters

- Philip Riggs Erie County Industrial Development Agency
- John Chadwick Discovery Elementary School (Speaker)
- Bakari Kennedy Suncoast Credit Union (Speaker)





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State of the Art Manufacturing Facility with Commercial Office Space for Emerging Companies

Philip Riggs



Zero Net Energy Building

STATE OF THE ART MANUFACTURING FACILITY WITH COMMERCIAL OFFICE SPACE FOR EMERGING COMPANIES

What is a ZNE Facility for Manufacturing ?

- Zero Net energy is created by producing as much or more energy on site as you require for annual operations, (preferably more than you need).
- To obtain this high performance building we begin with a geothermal system that recycles energy from within the ground, then build an extremely tight, well insulated facility with robust building controls and systems and then we add solar and wind components to produce energy and storage units to make use of additional power at key opportunities.
- The energy storage provides the opportunity to share on to a micro grid or sell back to the Grid to balance the books.
- > Natural gas is added for generating power if needed for resilience.

Zne: What Would it Look Like?





The nexus of new era manufacturing is right here, in Western New York. Each manufacturing module shown above is 70,000sf.

C&S Rendering

Upscale design to peak interest in the facility with covered parking and heated sidewalks.

C&S Rendering

Rain water and grey water reuse with thermal chimney and clerestory daylighting.

Rendering

Industrial Park approach with micro grid and walkability features and storm water reuse.

ZNE: Why Here in WNY?

- With rich industrial roots WNY has continued to be a strong manufacturing hub now poised to roll in to the energy manufacturing arena.
- We have infrastructure, water, energy & workers.
- Available brownfield sites at key locations.
- This is the center of the world's 5th largest mega region!
- International deep sea port and airport, all mainline rail suppliers and quick highway access.
- Buffalo has momentum building now.
- Why not here?



ZNE: Why E C I D A?

- IDA's were originally created to encourage the development of manufacturing firms/jobs.
- Western New York has a great opportunity to lead the country with a new type of green manufacturing space.
- ECIDA has staff expertise in construction, design, facility management/operations and in collaborative funding projects.
- ECIDA has relationships with the world leaders in their perspective fields of design and energy components.



ZNE: Why Now?



- Market assessment studies reveal a critical deficit in available manufacturing space.
- New York State is attempting to keep pace with the leaders, Calif.
 And Mass. Who are on pace for Zne residential by 2020 and commercial by 2030.
- Interested Canadian parties, tenants and partners.
- Excitement towards cleaning up the environment and diversifying the economy.

ZNE: Projected Cost

- Proposed 80,000 sf facility with movable walls in the 50,000 sf of light manufacturing space and 30,000 sf of commercial space for tenants and related firms including a class A meeting room on top for viewing the natural settings and Cityscape along with selective manufacturing viewing.
- The projected cost for design, construction and parcel purchase is \$17 million range.
- The Budget and business plan is complete.
- Keep in mind the original goal of creating competitive manufacturing firms that will multiply.



ZNE: Where do the Funds Come From ?

Funding Options:

- ECIDA (over 5 years) \$1.5 million
- NY State (multi source) \$4 million
- > City \$500,000
- Foundation Grants \$3 million
- > Universities \$2 million
- > Utilities BD Funds \$2 million
- Federal Funding \$4 million
- Corporate Sponsors
- Investment Groups
- > Financing



ZNE: What are the Benefits?

- Tenants receive LEED and ZNE certification as well as "Made in USA"
- Tenants produce their products without utility charges.
- Tenants enjoy a state of the art manufacturing facility.
- ECIDA gains an economic engine for WNY that provides an alternative funding source.
- New York catches up in the race for sustainability.

- Micro Grids develop supporting municipal and community support facilities.
- Grid gets to downsize their demand pipeline.
- Carbon footprints are monumentally reduced.
- A resilient building is created that operates through the storms that cripple others.
- WNY leads the country in to the new design for sustainable manufacturing facilities.

Discovery Elementary

John Chadwick









ARLINGTON PUBLIC SCHOOLS DISCOVERY ELEMENTARY EXPLORERS



VMDO ARCHITECTS



Arlington Public Schools: Vision/Goals

To create a learning environment inside, outside and beyond the school, in which learning, design, sustainability and environmental stewardship are integrated to a new level.

- VMDO's elementary school in Manassas Park, VA, completed in 2009, comes close to achieving this vision/goal.
- APS challenged VMDO to go to the next level at Discovery.
- VMDO proposed zero-net energy as the next level, along with a team of consultants that could achieve it.









Discovery: The Zero-Net Energy Team

Arlington Public Schools, Arlington, VA www.apsva.us

VMDO Architects, Charlottesville, VA www.vmdo.com

CMTA Consulting Engineers, Louisville, KY <u>www.cmta.com</u>

2rw Consultants, Charlottesville, VA <u>www.2rw.com</u>













Discovery: Learning and Zero-Net Energy

Erin Russo, Ed.D., Principal

- Close collaboration with design team from outset
- Graphics, signage, wayfinding and colors integrated with Standards of Learning by grade
- Solar laboratory, bioretention gardens and solar calendar
- National Wildlife Federation's Eco-Schools USA program: student-led project to reduce lunch waste; uneaten food saved and donated each Friday; students weigh total school lunch trash
- Paper*light* school with fewer copiers and printers and more digital work
- Students track transportation modes and give building tours















Discovery: Energy Performance to Date

Discovery Pre-Solar

- 50% less energy consumed per square foot compared to average Arlington elementary school (72 kBTU/sf)
- 33% less energy consumed per square foot compared to our next most efficient elementary school (43 kBTU/sf)
- Commissioning not yet complete

Discovery With Solar

- Solar array operational since January 4, 2016
- Returned over 25,000 kWh back to the grid since January 4 in less than 3 months of operation
- School zero-net over 24 hour period for 14 days
- 2 school days/12 non-school days

















Discovery: Challenges



Utility and Regulatory Hurdles

- No incentives for solar energy in Virginia
- Net metering maximum of 500 kW system
- Contract minimum utility charge for standby service: \$1060.00/month
- No one's ever done this before in Virginia!







Zero-Net Energy: Lessons Learned

The owner **must** understand and accept that:

- The vision and goals must be established **before** the design team is selected.
- The owner must select a design team that shares its vision and goals and has the expertise and tenacity to achieve them.
- An efficient zero-net energy building must be an integrated system in which almost every component contributes to reduce energy consumption to a minimum.
- Reducing utility costs should not be the prime reason for seeking zero-net energy.
- Maintaining zero-net energy is a commitment for the life of the building.













Erin Russo, Ed.D, Principal, Discovery Elementary School erin.russo@apsva.us



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Suncoast Zero Energy

Bakari Kennedy



Suncoast Zero Energy

Bushnell Service Center

2016 Better Buildings Summit | Zero Energy Buildings



Suncoast Mission Statement

To improve the quality of our member's lives by maintaining a strong, secure and innovative credit union that builds trust, shows respect and maximizes efficiency.





Sustainability: Making responsible decisions that will reduce the negative environmental impact of Suncoast operations.

100% Green EnergyCarbon Neutrality



Suncoast Helping Hands

























Choosing Smart Technologies







Suncoast Energy Efficiency



Choosing Smart Technologies

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Choosing Smart Technologies

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BANK, SUNCOAST CREDIT UNION 6801 E HILLSBOROUGH AVE TAMPA, FL 33680

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Introduction

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The KACM LED combines the latest in LED technology with the familiar secthetic of the Contour⁴ Series for stylch, high-performance illumination that lasts. It is ideal for replacing: 105-250// metal halide in surface/canopy lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

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LITHONIA LIGHTING

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replacing 400-1000W metal halide in ana lighting applications with energy savings of up to 80%. and expected service life of over 100:000 hours. EXAMPLE: D5X2 LED 80C 1000 40K T4M WVOLT SPA DD5XD

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2015 Monthly Utility kWh - Bushnell vs SW Cape Coral







Coming Soon!!





The Suncoast Sustainability Story

"Corporate social responsibility can't be authentic if you don't have responsible business practices."









ZERO ENERGY IS OUR GOAL Suncoast Credit Union

Suncoast Zero Energy

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Discussion



Thank you!



