



# LEED at Wetland Studies and Solutions, Inc.

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# Wetland Studies and Solutions, Inc.

Natural & Cultural Resource  
consulting firm

75 Staff:

- ☞ Archeology;
- ☞ Engineering;
- ☞ Environmental Science & Ecology;
- ☞ Environmental Technology;
- ☞ Compliance;
- ☞ GIS;
- ☞ Regulatory;
- ☞ Surveying;
- ☞ Wildlife Biology



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# What is LEED?

- ☞ LEED stands for “Leadership in Energy and Environmental Design”
- ☞ LEED is a voluntary certification system created by the U.S. Green Building Council.
- ☞ The system is consensus-based, meaning that all aspects of the building industry have a voice in the criteria.
- ☞ The system has four levels of certification –
  - ☞ *Certified* for achieving 40-50% of the possible credits;
  - ☞ *Silver* for achieving 50-60% of the possible credits;
  - ☞ *Gold* for achieving 60-80% of the possible credits; and
  - ☞ *Platinum* for achieving more than 80% of the possible credits.
- ☞ WSSI’s facility is certified *Gold*.
- ☞ WSSI’s facility was the eighth LEED-Certified project in Virginia and the first to rise above the *Silver* rating, as of March 2, 2006.

# Why Did WSSI Become LEED Certified?

- ☞ To determine what is involved with building and certifying an environmentally-advanced (“green”) building
- ☞ To tangibly validate the achievement of creating a green building
- ☞ But... Why create a green building in the first place?
  - ☞ Because green buildings are efficient and economical to operate
  - ☞ Because green buildings are healthy to work in
  - ☞ Because green buildings are healthy for the environment without sacrificing human comfort or needs.
  - ☞ Because it's the right thing to do.

# What Types of Projects Does LEED Certify?

- ❧ LEED covers different types of projects through different rating systems:
  - ❧ LEED-NC is for new construction
  - ❧ LEED-CI is for commercial interiors
  - ❧ LEED-EB is for existing buildings
  - ❧ LEED-CS is for core and shell buildings
  - ❧ LEED-H is for residential homes
  - ❧ LEED-ND is for new development
  
- ❧ WSSI's building is certified under the LEED-CI rating system. Why?

# Why Did WSSI Certify Under LEED-CI?

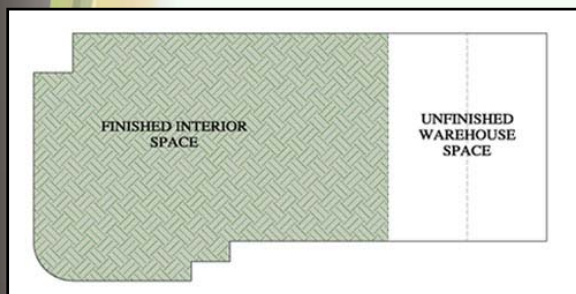
## Why not certify under:

☞ **LEED-NC?** Even though WSSI built the entire building, so it is “new construction,” only a portion of the interior is finished for occupancy. The rest is unfinished shell space (without plumbing, HVAC, or electrical systems) which LEED has no mechanism to certify. This would have made certifying the entire building nearly impossible.

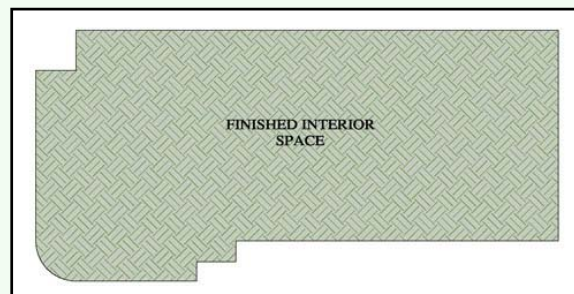
☞ **LEED-CS?** Our base building is a typical speculative office/warehouse design that only provides a “cold, dark shell.” No elevator/HVAC/restroom core is included in the base building plan, which is the type of product the CS rating system was created to certify.

## Why certify under **LEED-CI**?

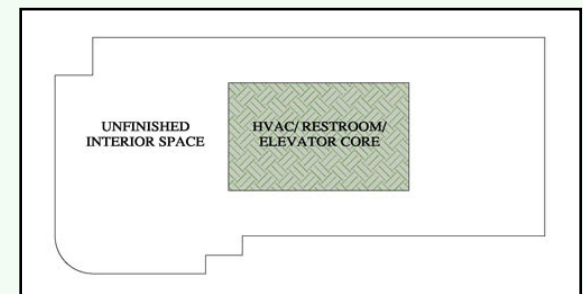
☞ WSSI chose to certify under the Commercial Interiors rating system because it most fits our project scope and properly reflects the depth of innovation that went into the finished portion of the building.



The WSSI building layout



A typical NC building layout



A typical CS building layout

# What Are the LEED-CI Categories?

- ☞ **Category 1 – Sustainable Sites**  
Focuses on site selection and design
- ☞ **Category 2 – Water Efficiency**  
Focuses on reducing potable water needs
- ☞ **Category 3 – Energy and Atmosphere**  
Focuses on HVAC, lighting, and appliance efficiency and controllability
- ☞ **Category 4 – Materials and Resources**  
Focuses on building with recycled, rapidly renewable, and regional materials, as well as waste recycling and reuse
- ☞ **Category 5 – Indoor Environmental Quality**  
Focuses on human comfort, daylighting, and the use of low-emitting building materials
- ☞ **Category 6 – Innovation and Design Process**  
Gives credit for items not specifically covered in the rating system

# Sustainable Sites and Water Efficiency

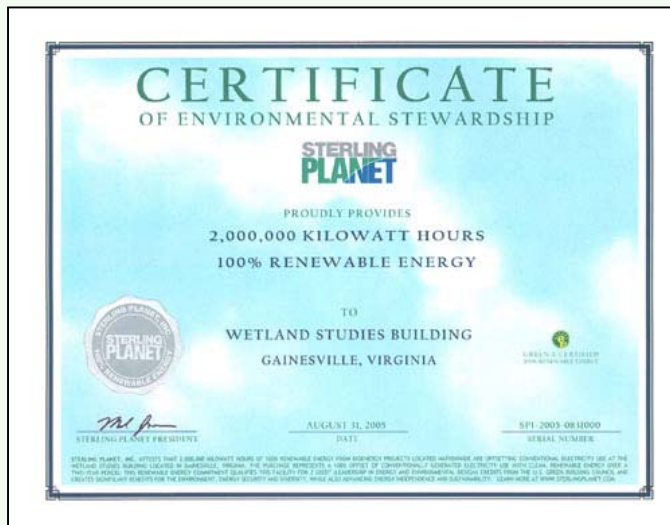
- ☞ Heat island and light pollution reduction
- ☞ Low-impact development
- ☞ Native landscaping and water-efficient irrigation
- ☞ Bicycle storage and changing rooms
- ☞ Low-flow sinks, toilets, and showers
- ☞ Motion-based faucet controls
- ☞ Waterless urinals
- ☞ 72% reduction in potable water use





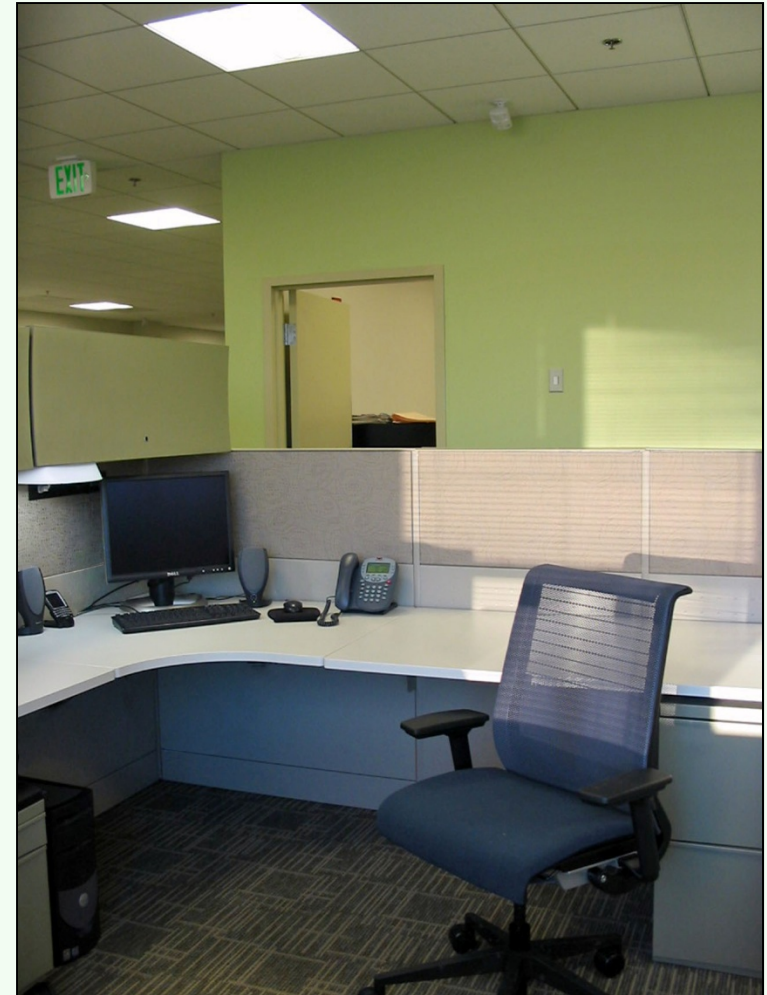
# Energy and Atmosphere

- ☞ Daylight- and motion-responsive lighting
- ☞ Light density of 0.9 Watts/square foot
- ☞ Energy Star appliances
- ☞ Green power credits for 100% of electricity used
- ☞ 35% lower energy usage than a typical building of WSSI's size
- ☞ No CFC's used in HVAC or refrigeration



# Materials, Resources, and Indoor Air Quality

- ☞ 26% recycled content throughout building
- ☞ 35% regional materials throughout building
- ☞ 11% rapidly-renewable materials throughout building
- ☞ Low-VOC paints, coatings, carpeting, and furniture
- ☞ 62 thermal zones
- ☞ Access to direct daylight and views
- ☞ Carbon dioxide sensors to deliver fresh air
- ☞ 3 times more ventilation than required by code



# Innovation and Design Process

- ☞ WSSI uses the building as a laboratory for the study of LID practices
  - ☞ Staff frequently provide building and site tours
  - ☞ Seminars are held for various organizations (regulatory officials, builders, etc.)
  - ☞ Staff create case studies and brochures to promote “green” design



# LEED Features at WSSI

Compact fluorescent lights

Regionally-manufactured drywall

50% recycled content in steel doors and frames

Waterless urinals and low-flow toilets

35% recycled content in plastic and metal-shaving countertop

34% recycled content in ceramic tile



Low-VOC paints

30% recycled content in partitions

Solar powered, sensor controlled low-flow faucets

THE REST ROOMS

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# LEED Features at WSSI

Rapidly-renewable,  
95% recycled  
wheatboard cabinets

35% recycled content in  
metal-shaving countertop

Low-VOC paint

11% recycled content  
in carpeting



Compact fluorescent lights

High-efficiency  
appliances

Rapidly renewable  
linoleum flooring  
(made with linseed oil  
and wood flour/cork dust)

THE KITCHEN

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# LEED Features at WSSI

Parabolic, reflective  
light fixtures

Low-VOC paint

Motion sensor  
light control

Rapidly-renewable,  
95% recycled  
wheatboard



Daylight-responsive  
lighting control

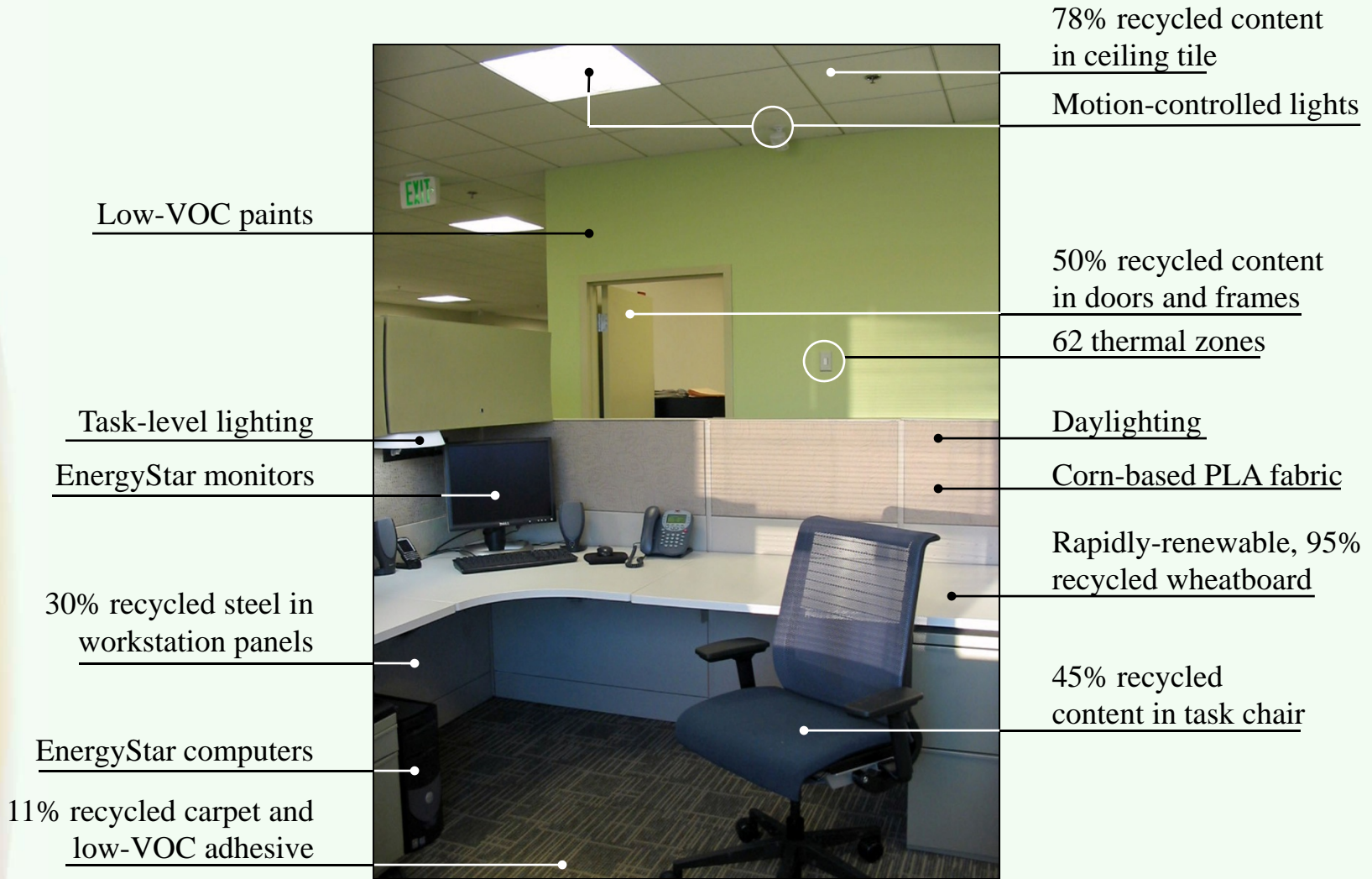
Low U-value glass

Operable windows

11% recycled carpeting  
with low-VOC adhesive

THE CONFERENCE ROOMS

# LEED Features at WSSI



THE WORKSTATION

# What is the Cost Breakdown?

<b>Hard Cost</b>	<b>Credits</b>	<b>Premium</b>	<b>\$ / Credit</b>
Sustainable Sites	4	\$312,080	\$78,020
Water Efficiency	3	\$6,100	\$2,033
Energy and Atmosphere	8	\$92,085	\$11,511
Materials and Resources	6	\$43,895	\$7,135
Indoor Environmental Quality	11	\$127,750	\$11,614
Innovation and Design Process	2	\$3,250	\$1,625
“Hard Costs” Subtotal	34	\$585,160	\$17,210
Total Building Cost	\$5,696,100 – (10.3% Premium)		
<b>Soft Cost</b>			
Documentation, Paperwork, and Consulting Fees	34	\$111,900	\$3,290
Total Non-LEED Design Cost (Civil = \$141,754; Architecture = \$96,544; Interior Design = \$134,663)	\$372,960 – (30.0% Premium)		
<b>Total LEED Premium (Hard Cost + Soft Cost)</b>	<b>34</b>	<b>\$697,060</b>	<b>\$20,050</b>



# What About Utility Savings?

Utility Type	Annual Use	Rate / Total Cost	Savings
<b>Irrigation water</b>		<b>\$2.90 / 1,000 gal<sup>1</sup></b>	\$7,540 / year
Estimated typical use	2,600,000 gal	\$7,540	
Estimated WSSI use	200,000 gal	\$0	
Total premium for cistern, drip irrigation, and native landscape			\$45,864
Capitalized value of savings ( at 6%)			\$125,667
<b>Payback</b>			<b>6.1 years</b>
<b>Potable water (with toilet cistern)</b>		<b>\$8.45 / 1,000 gal<sup>1</sup></b>	\$1,497 / year
Estimated typical use	245,214 gal	\$2,072	
Estimated WSSI use	68,084 gal	\$575	
Total premium for low-flow and waterless fixtures, cistern, and pump equipment (excl. installation)			\$55,954
Capitalized value of savings ( at 6%)			\$24,950
<b>Payback (with toilet cistern)</b>			<b>37 years</b>
<b>Potable water (without toilet cistern)</b>		<b>\$8.45 / 1,000 gal<sup>1</sup></b>	\$1,049
Estimated typical use	245,214	\$2,072	
Estimated WSSI use (before cistern)	121,095	\$1,023	
Total premium for flow-flow and waterless fixtures (excl. installation)			\$6,100
Capitalized value of savings (at 6%)			\$17,483
<b>Payback (without toilet cistern)</b>			<b>5.8 years</b>

1. Water costs per PWC Service Authority, 9/1/08-9/1/09



# What About Utility Savings?

Utility Type	Annual Use	Rate / Total Cost	Savings
<b>Electricity</b>		\$0.13 / kWh <sup>1</sup>	\$50,291 / year
Typical Estimated Annual Electric Use	968,100 kWh	\$125,853	
WSSI Annual Electric Use	581,243 kWh	\$75,562	
<b>Gas</b>		\$1.30 / therm	\$17,703 / year
Typical Estimated Annual Gas Use	15,600 therms	\$20,280	
WSSI Annual Gas Use	1982 therms	\$2,577	
<b>Total Energy Savings</b>			\$67,994 / year
Total Cost of LEED-Related Items (Green power certificate, metering equipment, reflective roof, HVAC equipment, operable windows, lighting equipment, insulation, Energy Star appliances, and task lighting)			\$114,735
<b>Capitalized Value of Savings</b>			\$1,133,240
<b>Payback</b>			1.7 years

1. Estimated energy cost per NOVEC 3R LP (for large power service)



# What Else Has WSSI Done?

# Employee Health and Happiness

- ☞ Gym for employee use
- ☞ Trainer-led workouts five times per week
- ☞ Cardio and weight machines and volleyball net
- ☞ Weight Watchers weekly meetings
- ☞ 6-room kennel and outdoor dog run for employee dog care
- ☞ Community garden
- ☞ Boardwalk and Nature Trail



# Additional Green Upgrades

- ☞ Solar hot water
- ☞ Full-spectrum fluorescent lighting
- ☞ Living wall
- ☞ Dog waste composter

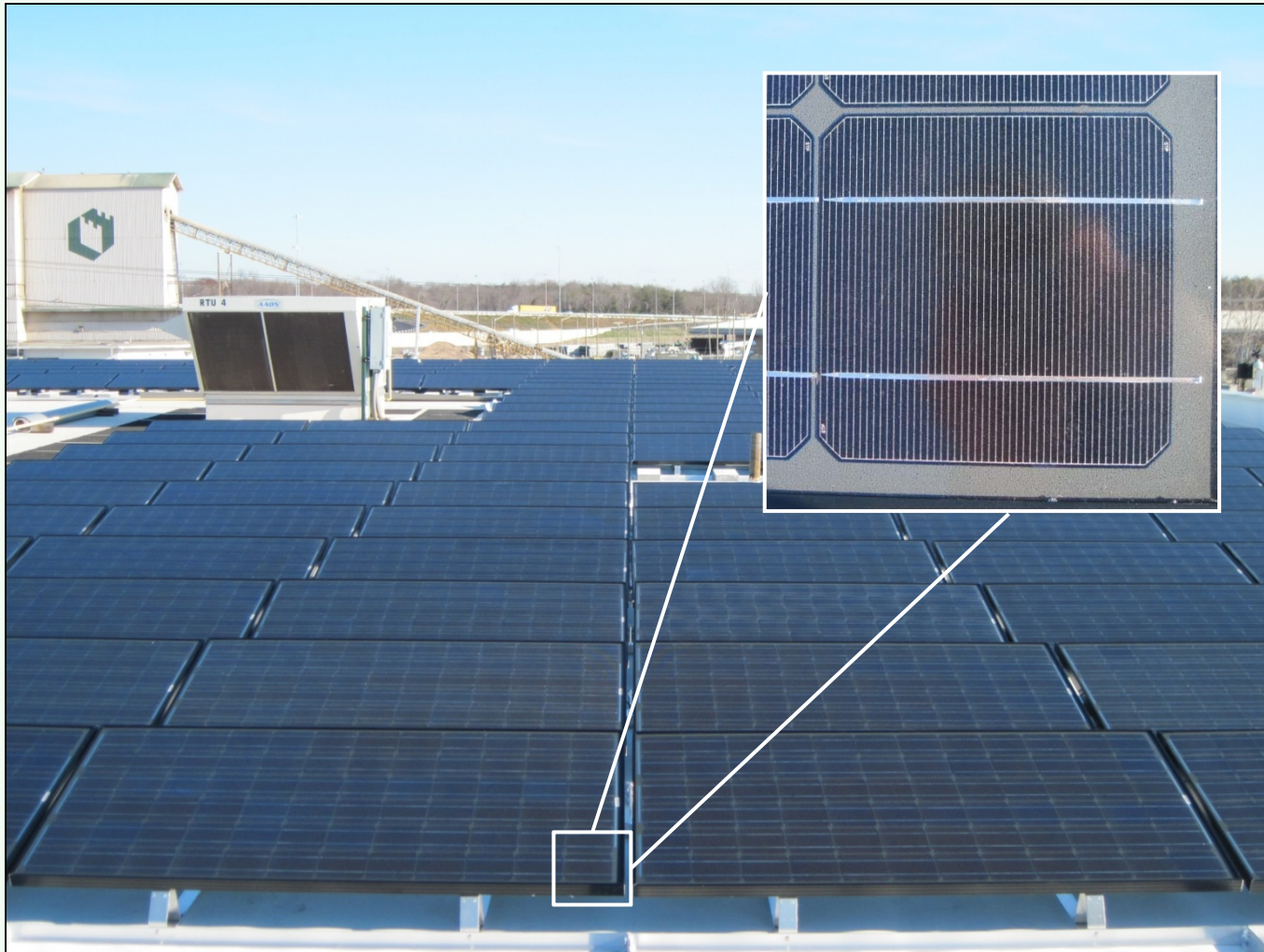


# Additional Green Upgrades – Solar Electricity

- ☞ **Virginia's largest solar photovoltaic system**
- ☞ **Power production began January 19, 201**
- ☞ **System Size:** 105.82 kW
- ☞ **Components:** 572 Suntech 185-Watt Black Label™ panels  
572 TIGO® Energy Module Maximizer™ panel optimizers  
Aluminum mounting racks and concrete block ballast  
Satcon® PowerGate Plus 135 kW inverter
- ☞ **Warranty:** 25 years
- ☞ **Expected Life:** 30-50 years
- ☞ **Estimated Annual Production:** 123,627 kWh
- ☞ **Annual Building Demand:** 580,000 kWh
- ☞ **Percent Supplied by Solar:** 21%

# Additional Green Upgrades – Solar Electricity

72 solar cells per panel. (Panels are 62.2" x 31.8" and weigh 34.1 lbs each.)



# Additional Green Upgrades – Solar Electricity

January 23, 2011: Aerial view of completed installation



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# Thanks to the WSSI Project Team

- ☞ **User** – Wetland Studies and Solutions, Inc.
- ☞ **Project Management** – The Peterson Companies
- ☞ **LID Concept Plan** – Wetland Studies and Solutions, Inc.
- ☞ **Civil Engineering** – Urban Engineering and Associates, Inc.
- ☞ **Architecture** – W.A. Brown & Associates, P.C.
- ☞ **Mechanical, Electrical, Plumbing** – Potomac Energy Group, Inc.
- ☞ **Interior Design** – Bartzen + Ball
- ☞ **Building Commissioning** – Advanced Building Performance, Inc.
- ☞ **General Contracting** – EEReed Construction, LP
- ☞ **Site Work** – S.W. Rodgers
- ☞ **Green Roof Installation** – The Furbish Company
- ☞ **Pervious Concrete** – Virginia Ready-Mixed Concrete Association
- ☞ **Toilet Cistern Design** – E.K. Fox & Associates, Ltd.
- ☞ **Photos** – Ron O. Blunt Photography

Questions?



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