

*Courtesy of DOE/NREL*

## **Building Solar into Commercial Buildings**

- 
- 
- 
- **Give back more than you take**
- 

**Gov. Phil Bredesen**

**Speech to University of TN Graduates,  
December 2004**

## Building-Integrated Photovoltaics



*Courtesy of DOE/NREL*

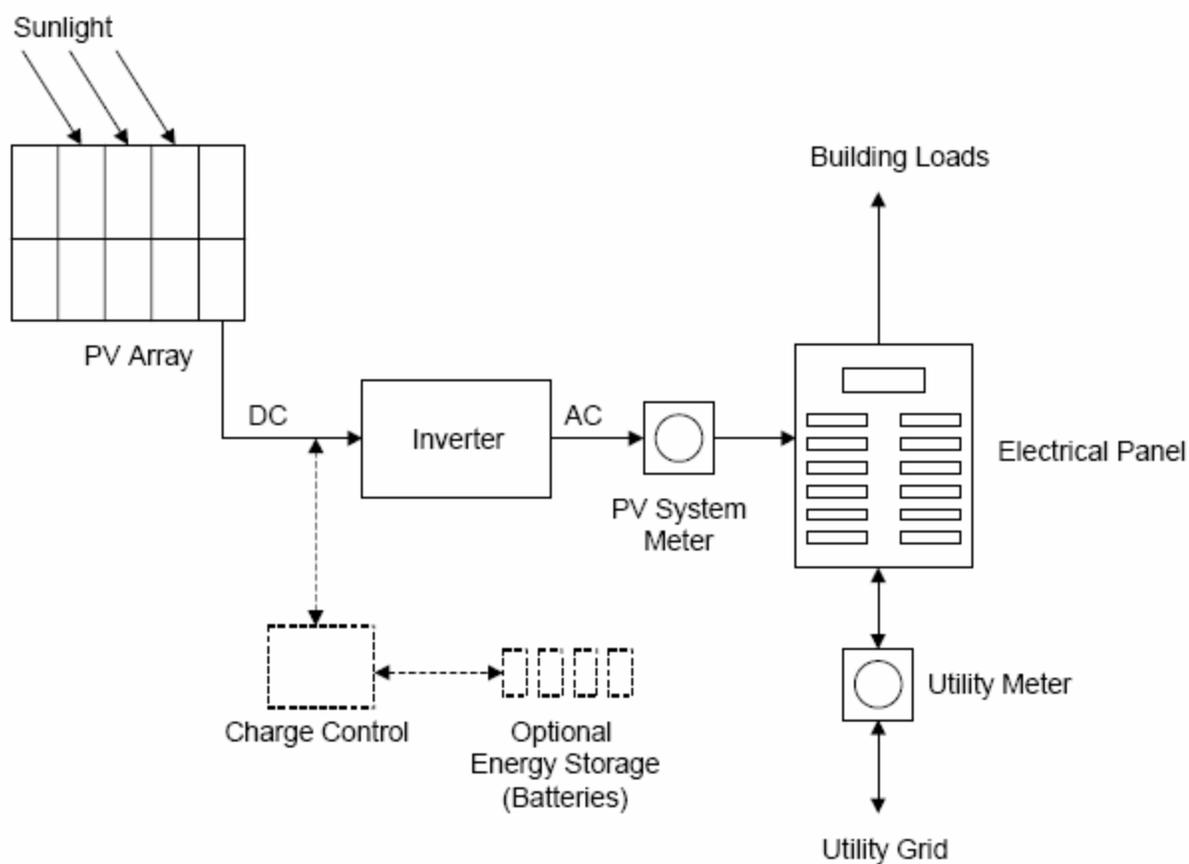
The main thing...  
Is to keep the main thing,  
The main thing.

Joe Whitefield

## Energy Management Motivation Evaluation Form

Motive Statement	Primary Issues Behind the Motive	Rating Scale
Reduce Energy Consumption	Environmental, Pollution, Political, Natural Resource Issues	0 1 2 3 4 5
Reduce Energy/Energy-related Costs	Financial	0 1 2 3 4 5
Reduce Peak Energy Demand	Utility Infrastructure Capacity/Reliability	0 1 2 3 4 5
Reduce Deferred Maintenance/Augment Capital Maintenance	Facilities Maintenance (O&M and Capital Maintenance) Issues	0 1 2 3 4 5
Demonstrate Technologies/Processes	Innovation, Research and Development	0 1 2 3 4 5
Other	Other	0 1 2 3 4 5

# Building Integrated Photovoltaics



**Figure 1: Grid-Tied Photovoltaic System Schematic**

**Graphic Courtesy of Architectural Energy Cooperation**

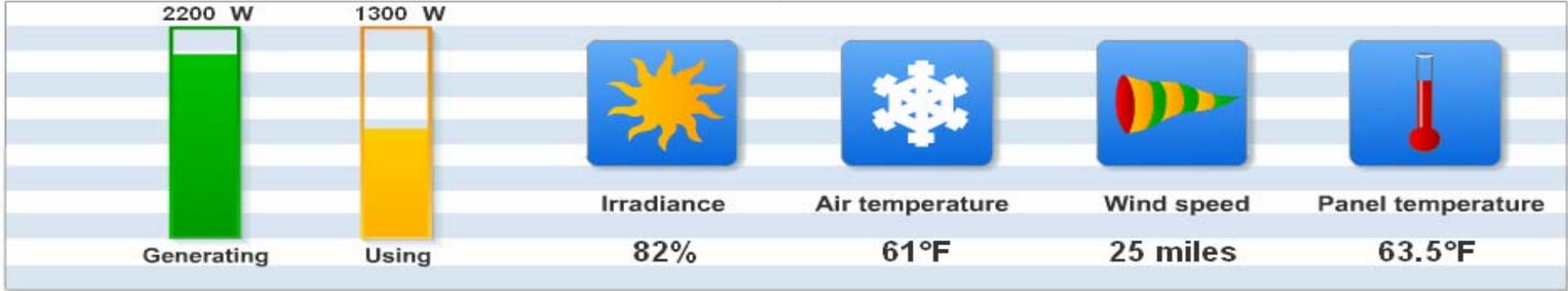


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888 Main Street  
New York, NY 10044

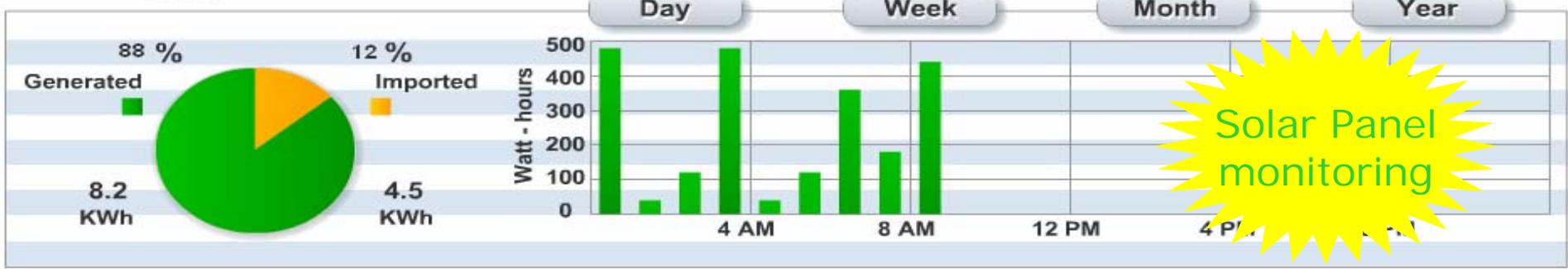
NYSERDA  
-funded NYC  
property



Last Reading : 12 September 2006 12 : 4



History



I EAT MY PEAS WITH HONEY  
I'VE DONE SO ALL MY LIFE  
IT MAKES THE PEAS TASTE FUNNY  
BUT IT KEEPS THEM ON THE KNIFE

-Wallace Chapel

- Hardware – PV power to building
- Mounting Hardware
- Grid – Metered Connections
- Fault Protection
- Inverter
- (Electrical Storage)

**Balance Of System**

- Façade Systems
- Atrium Systems
- Roofing Systems
- Awning and Shading Systems

Up to 25 Year warranty at 80% rated  
minimum power output

- Electrical Energy Savings  
1400 – 2000 kWh/KW installed capacity
- Decreased Peak Demand
- LEED Credits

% Renewable Energy	Points
<b>2.5%</b>	<b>1</b>
<b>7.5%</b>	<b>2</b>
<b>12.5%</b>	<b>3</b>

## **Benefits and Costs**

# SDP

- First Cost - \$90,000
- 10 KW
- 1460 eFLH
- 14,600 kWh/yr

**UCRHO**

# DDP

- First Cost - \$120,000 – 140,000
  - 12 KW
  - 1460 eFLH
  - 17,520 kWh/yr
  - Less Shading System - \$40,000
- 
- \$80,000 – 100,000

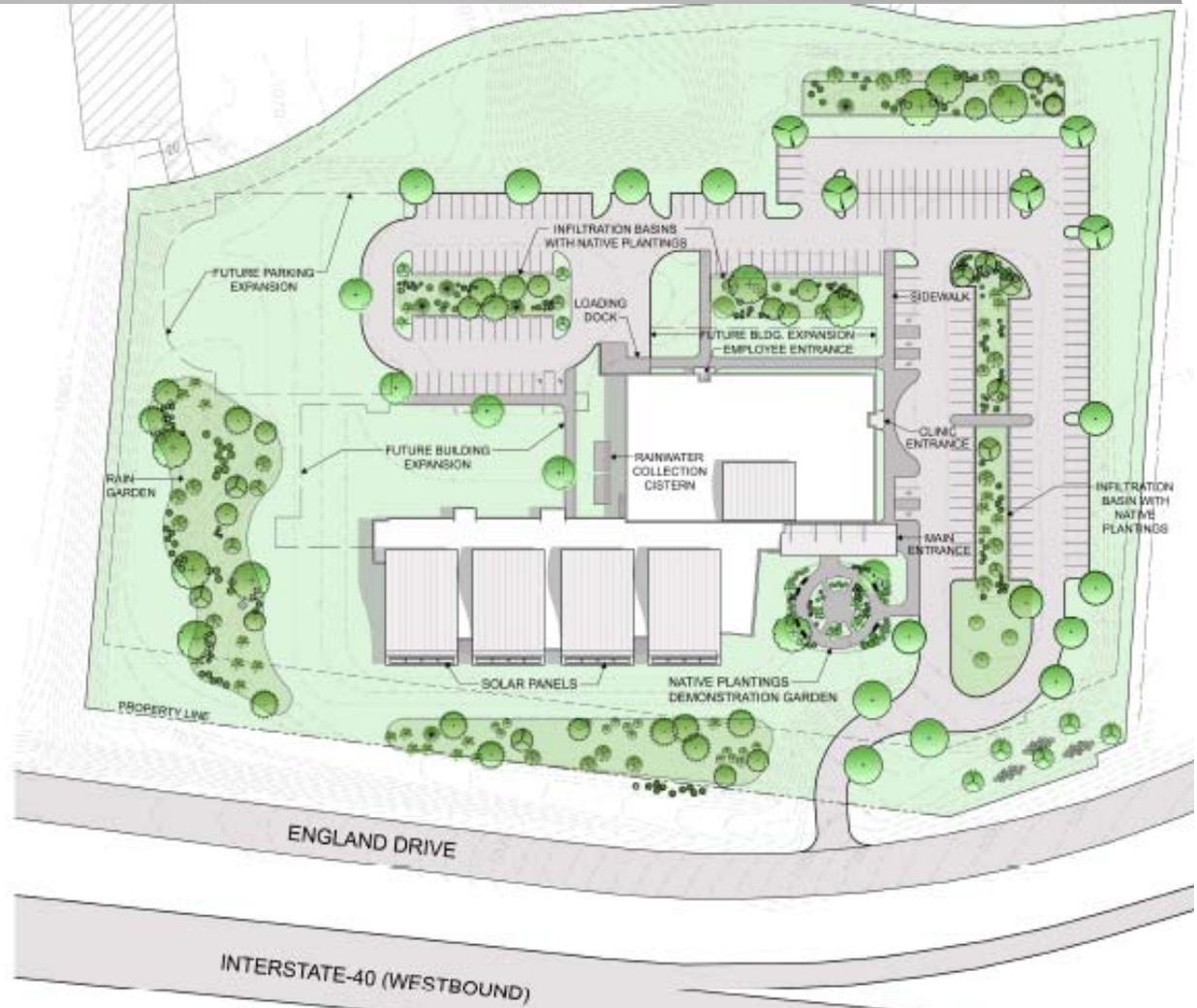
**UCRHO**

**DESIGN GOALS:**

- 1. HEALTHY AND PRODUCTIVE INDOOR ENVIRONMENT
- 2. LOW-MAINTENANCE FACILITY
- 3. LOW ENVIRONMENTAL IMPACT FROM BUILDING DESIGN & CONSTRUCTION



KEY PLAN



SITE PLAN



UPPER CUMBERLAND REGIONAL HEALTH FACILITY

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Courtesy to Thomas, Miller + Partners, LLC



FLOOR PLAN

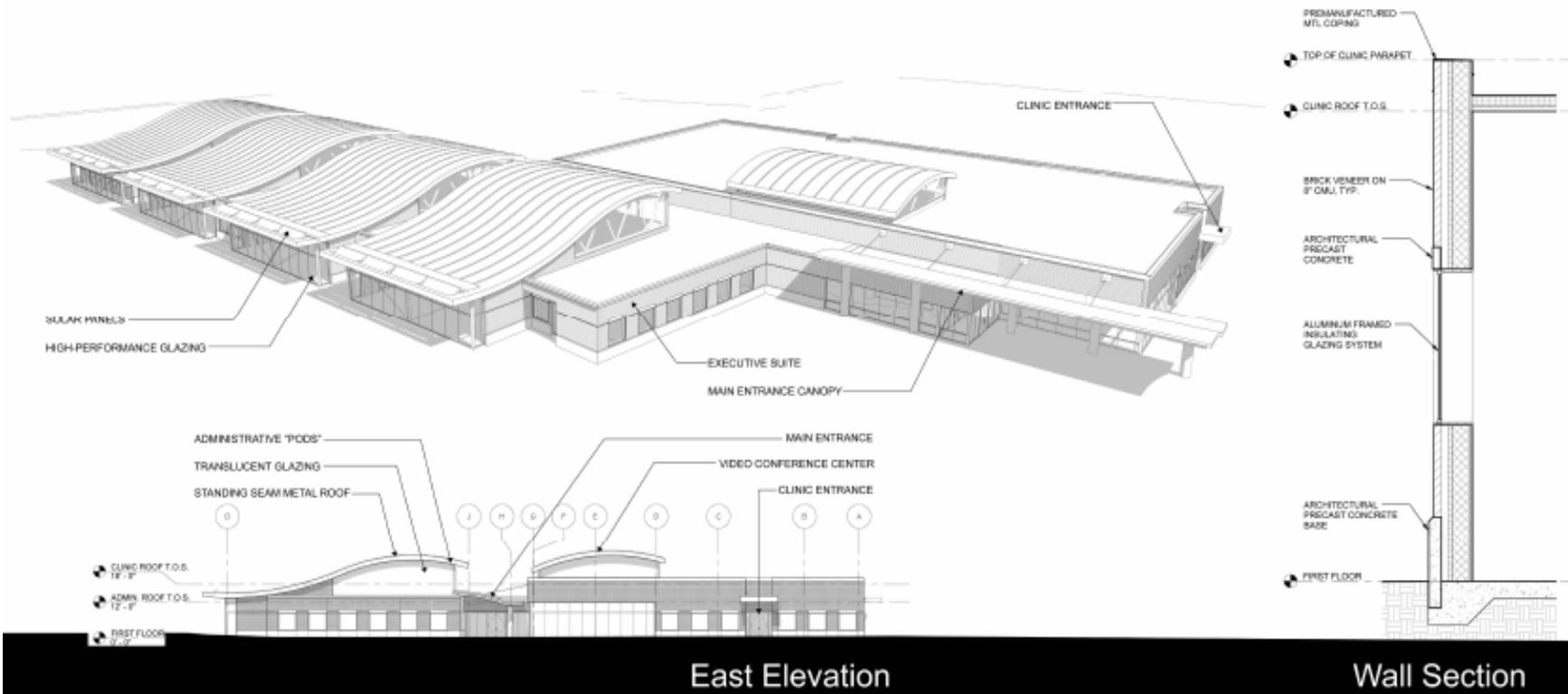


UPPER CUMBERLAND REGIONAL HEALTH FACILITY

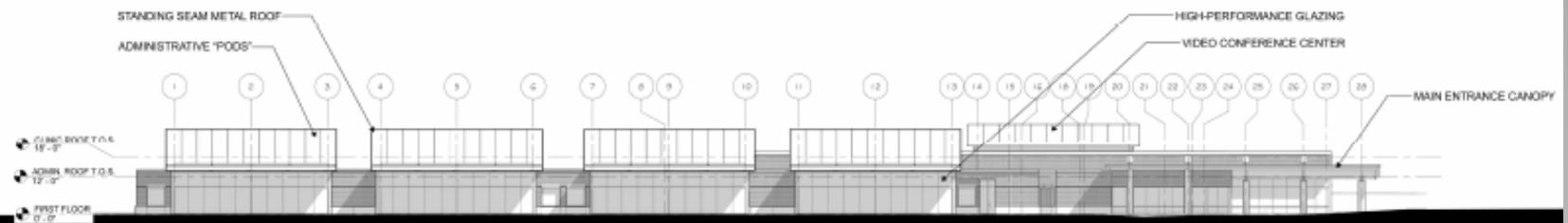
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Courtesy to Thomas, Miller + Partners, LLC



South Elevation

UPPER CUMBERLAND REGIONAL HEALTH FACILITY

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Courtesy to Thomas, Miller +  
Partners, LLC

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