



Renewable Energy Financing

Maryland Smart Energy Communities



Doug Hinrichs, MEA Solar &
Geothermal Program Manager



Preliminary Assessment of PV



Click on the site where you want to use PVWATTS to calculate the electrical energy produced. Choose the site nearest to your location that has similar topography. If near a state border, you may wish to review site locations in the adjacent state.

Maryland



Preliminary Assessment of PV



Click on **Calculate** if default values are acceptable, or after selecting your system specifications. Click on **Help** for information about system specifications. To use a DC to AC derate factor other than the default, click on **Derate Factor Help** for information.



AC Energy
&
Cost Savings



(type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification:

WBAN Number: 93721
City: Baltimore
State: Maryland

PV System Specifications:

DC Rating (kW): 500.0
DC to AC Derate Factor: 0.785

Array Type: Fixed Tilt

Fixed Tilt or 1-Axis Tracking System:

Array Tilt (degrees): 39.2 (Default = Latitude)
Array Azimuth (degrees): 180.0 (Default = South)

Energy Data:

Cost of Electricity (cents/kWh): Default = State Average

Station Identification	
City:	Baltimore
State:	Maryland
Latitude:	39.18° N
Longitude:	76.67° W
Elevation:	47 m
PV System Specifications	
DC Rating:	500.0 kW
DC to AC Derate Factor:	0.785
AC Rating:	392.5 kW
Array Type:	Fixed Tilt
Array Tilt:	39.2°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	7.8 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	3.47	43222	3371.32
2	4.40	49234	3840.25
3	4.79	56973	4443.89
4	5.12	57625	4494.75
5	5.28	59049	4605.82
6	5.70	59278	4623.68
7	5.61	60128	4689.98
8	5.28	56587	4413.79
9	4.95	52224	4073.47
10	4.90	56095	4375.41
11	3.58	41344	3224.83
12	2.85	34497	2690.77
Year	4.66	626255	48847.89

Space Required for PV - Rooftop

In My Backyard Reshape Rotate Delete Center Help

ALL NREL SOLAR TOOLS SHARE

Address: 60 West Street, Annapolis, MD 21 Find

System Type

4kw 10kw 50kw 100kw

System Inputs

Modify the inputs below to run the simulation

Size (kW): 10.00

System Type: Commercial

Derating: 0.77

Tilt angle (°): 39

Azimuth angle (°): 180

Data year: 2004

Electric Rate (\$/kWh): 0.09

Run

Give Feedback

West Washington St Calvert St West St West St Cathedral St

Energy Administration Chesapeake Bay Commission Discover Annapolis Tours Annapolis & Anne Arundel County Conference and Visitors Bureau

West Street Medical Anne Arundel County Adult Services

Imagery ©2013 Map data ©2013 Terms of Use 76.4657 76.9780

Space Required for PV - Rooftop

Solar Simulation Results

Summary PV Generation Profile

System Inputs
Modify the inputs below to run another simulation

Size (kW):

System Type:

Derating:

Tilt angle (°):

Azimuth angle (°):

Data year:

Electric Rate (\$/kWh):

Payback
The form below shows the values used to estimate the payback for this system. [help](#)

Initial Cost (\$/Wdc):

Initial Cost (\$):

Rebates (\$):

Tax Credits (\$):

After Incentives (\$):

Payback (years):

System Outputs
This table shows the amount of electricity (kWh) generated by this system each month and the dollar amount that those values translate into.

Month	Output (kWh)	Value* (\$)
January	751	67.59
February	1103	99.27
March	1114	100.26
April	1052	94.68
May	1276	114.84
June	1061	95.49
July	1119	100.71
August	1108	99.72
September	912	82.08
October	871	78.39
November	831	74.79
December	799	71.91
Annual	11997	1079.73

*Value based on a electric rate of **\$0.09/kWh**

To save these results, choose the Export Results button at the bottom right corner of this window.

Load
Now compare your estimated solar electricity production with your electricity consumption.
Step 1. Select a load profile.

You may select a residential sample profile or upload your own custom load profile. The residential load profile is based on a 4kW system.

(A) Use a residential load profile.
Choose a city from the drop-down box below.

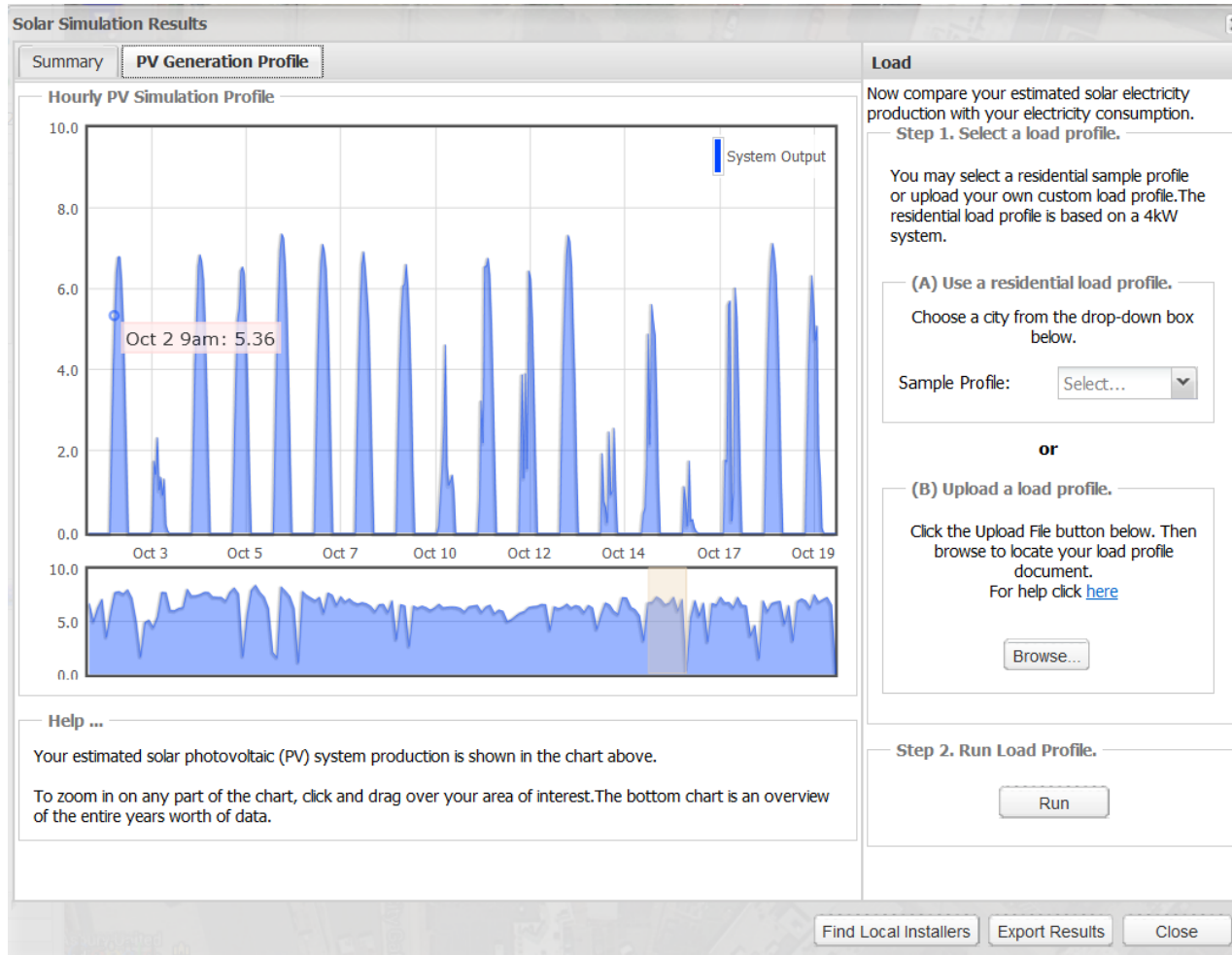
Sample Profile:

or

(B) Upload a load profile.
Click the Upload File button below. Then browse to locate your load profile document.
For help click [here](#)

Step 2. Run Load Profile.

Space Required for PV - Rooftop



Space Required for PV - Open Land



ABOUT NREL

ENERGY ANALYSIS

SCIENCE & TECHNOLOGY

TECHNOLOGY TRANSFER

APPLYING TECHNOLOGIES

Energy Analysis

Power Technologies Energy Data Book

◀ Data Book Home

Table of Contents

Browse by Technology

Calculators

Renewable Energy Conversion

Photovoltaic Land Area

Wind Power Land Area

Energy Growth Estimator

Archives

Contact Us

PV Area Calculator

This calculator uses assumptions about land area requirements for photovoltaic systems to estimate total land area requirements for a system of a given size after subtracting the portion of PV that may be placed on rooftops of buildings.

Capacity	<input type="text" value="1000"/>	(kW)
Area per kW	<input type="text" value="0.004"/>	(acres)
Rooftop density	<input type="text" value="0.2"/>	(Fraction of PV panels that are placed on rooftops)
Land density	<input type="text" value="0.5"/>	(Fraction of surface that can be covered by PV panels)

submit

Result: **1,000 kW** of photovoltaics is estimated to require **6.4 acres**.

This calculation assumes a generating capacity of **1,000 kW**, where each kW requires an average of **0.004 acres per kW**, and that the first **20%** of this capacity is placed on rooftops, and further that the remaining capacity is placed on land where the photovoltaic panels can cover **50%** of the land area.

Net Metering

Your bi-directional meter will continue to be read once each month. The meter measures the energy generated by your solar system and the energy consumed by you over a month's time, and will display the net difference. Over a year, your energy usage totals may look something like the example below.

Relevant Period: August to July

Month 1 (Aug)	Month 2 (Sept)	Month 3 (Oct)	Month 4 (Nov)	Month 5 (Dec)	Month 6 (Jan)	Month 7 (Feb)	Month 8 (Mar)	Month 9 (Apr)	Month 10 (May)	Month 11 (June)	Month 12 (July)
<i>Generated</i> 550 kWh	<i>Generated</i> 520 kWh	<i>Generated</i> 420 kWh	<i>Generated</i> 200 kWh	<i>Generated</i> 155 kWh	<i>Generated</i> 190 kWh	<i>Generated</i> 185 kWh	<i>Generated</i> 215 kWh	<i>Generated</i> 395 kWh	<i>Generated</i> 410 kWh	<i>Generated</i> 465 kWh	<i>Generated</i> 550 kWh
<i>Consumed</i> 500 kWh	<i>Consumed</i> 510 kWh	<i>Consumed</i> 500 kWh	<i>Consumed</i> 400 kWh	<i>Consumed</i> 475 kWh	<i>Consumed</i> 415 kWh	<i>Consumed</i> 395 kWh	<i>Consumed</i> 405 kWh	<i>Consumed</i> 420 kWh	<i>Consumed</i> 405 kWh	<i>Consumed</i> 410 kWh	<i>Consumed</i> 525 kWh
Energy Charges = -50 kWh (energy usage credit)	Energy Charges = -10 kWh (energy usage credit)	Energy Charges = 80 kWh (energy usage charge)	Energy Charges = 200 kWh (energy usage charge)	Energy Charges = 320 kWh (energy usage charge)	Energy Charges = 225 kWh (energy usage charge)	Energy Charges = 210 kWh (energy usage charge)	Energy Charges = 190 kWh (energy usage charge)	Energy Charges = 25 kWh (energy usage charge)	Energy Charges = -5 kWh (energy usage credit)	Energy Charges = -55 kWh (energy usage credit)	Energy Charges = -25 kWh (energy usage credit)

This customer's **annual energy bill** will be tallied as follows= (50) + (10) + 80 + 200 + 320 + 225 + 210 + 190 + 25 + (5) + (55) + (25) x Domestic Energy Rate per kWh

- 2 MW cap for PV system
- PV energy offsets grid power, at full retail electricity rates
- In some months, a PV generator may produce more electricity than building can use, creating "net excess generation" (NEG)
- Compensation for NEG remaining in a customer's account after a 12-month period ending in April of each year is paid to the customer at the commodity energy supply rate, which is perhaps 1/3rd lower than retail rates

Costs, Incentives, Revenues

■ Costs

- ❑ \$2,200-2,600/kW (total installed cost)
- ❑ 250 kW x \$2,400/kW (avg.) = \$600,000
- ❑ Land/rooftop lease?

■ Incentives

- ❑ Federal Investment Tax Credit (30%)
- ❑ Federal MACRS (advanced depreciation)
- ❑ MEA Clean Energy Grant of \$30/kW (cap of 200 kW)
- ❑ MEA Clean Energy Production Tax Credit of 0.85 cents/kWh
- ❑ County? Utility?
 - (Check <http://www.dsireusa.org/incentives/index.cfm?state=md>)

■ Revenues

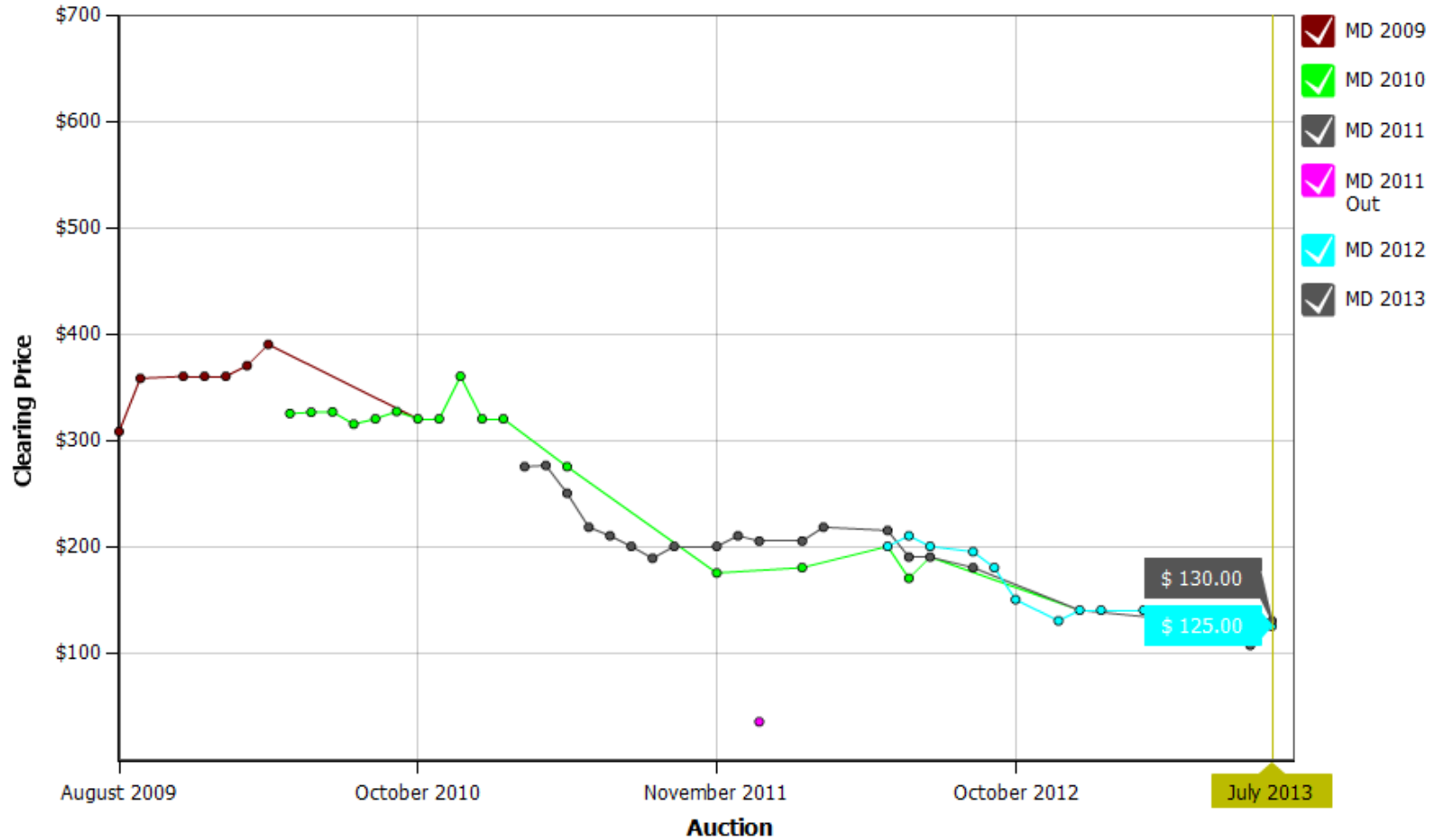
- ❑ Sale of solar energy
 - If net metered, full retail offset of, e.g., 8-12 cents/kWh
 - ❑ MD SRECs
 - Currently, 34% of SACP
-

Costs, Incentives, Revenues

Energy Year	RPS Solar Requirement	Projected SRECs Required (MWh)	Projected Capacity Required (MW)	SACP
2009	0.01%	6,259	5.2	\$400
2010	0.025%	16,334	13.6	\$400
2011	0.05%	31,800	26.5	\$400
2012	0.10%	64,554	53.8	\$400
2013	0.25%	163,805	136.5	\$400
2014	0.35%	232,767	194.0	\$400
2015	0.50%	337,512	281.3	\$350
2016	0.70%	479,605	399.7	\$350
2017	0.95%	660,655	550.5	\$200
2018	1.40%	988,201	823.5	\$200
2019	1.75%	1,253,781	1,044.8	\$150
2020	2.00%	1,454,385	1,212.0	\$150
2021	2.00%	1,476,201	1,230.2	\$100
2022	2.00%	1,498,344	1,248.6	\$100
2023	2.00%	1,520,819	1,267.3	\$50

Costs, Incentives, Revenues

MD Auction Price



PV Cash Flow & Payback

Solar Project Assumptions

Total System Size:	100	kW DC
Installation Type:	Ground Mount	See costs at right
Total Project Cost:	\$3.00	\$/Watt
Estimated System Production:	132,000	kWh/Year
Federal Tax Rate:	35.0%	
State Tax Rate:	5.5%	
Land Cost:	\$0	
Land Lease Cost:	\$0	\$/ Year
O&M, Asset Management, Insurance Cost	\$24	\$/ kW DC / Year
O&M, Asset Management, Insurance Escalator	3.0%	
Inverter Reserve / Soft Cost Contingency	\$12	\$/ kW DC / Year
System Degredation Factor	0.5%	
System Installation Year	2013	
Electricity Offset Rate / PPA Rate	\$0.095	\$/kWh
Electricity Escalator	1.0%	
SREC % ACP	30.0%	
Investment Tax Credit:	30.0%	
Total Project Basis for Depreciation:	\$255,000	
Total Cash Benefit From Depeciation:	\$103,275	

kW Installed	100	2,000	Final Cost
Ground Mount	\$3.00	\$2.55	\$3.00
Roof Mount	\$3.10	\$2.65	\$3.10
Parking Canopy	\$3.50	\$3.00	\$3.50

PV Cash Flow & Payback

Electric Rate with Escalator	Year	Annual Electricity Generation (kWh)
\$0.0950	2013	122,000
\$0.0960	2014	121,500
\$0.0963	2015	120,687
\$0.0979	2016	120,000
\$0.0983	2017	119,500
\$0.0998	2018	118,750
\$0.1008	2019	118,000
\$0.1019	2020	117,449
\$0.1029	2021	116,891
\$0.1039	2022	116,337
\$0.1049	2023	115,787
\$0.1060	2024	114,939
\$0.1070	2025	114,294
\$0.1081	2026	113,653
\$0.1092	2027	113,054
\$0.1103	2028	112,459
\$0.1114	2029	111,827
\$0.1125	2030	111,208
\$0.1136	2031	110,622
\$0.1148	2032	110,069
\$0.1159	2033	109,469
\$0.1171	2034	108,812
\$0.1182	2035	108,215
\$0.1194	2036	107,626
\$0.1206	2037	107,038
\$0.1218	2038	106,453

Annual Cash Flow												
System Revenues								System Costs				
Electricity Revenue	SACP Schedule	SACP %	SRECS Revenues	MEA Clean Energy	MEA Production Tax Credit	Federal ITC Cash Benefit	Federal MACRS Depreciation	O&M, Asset Mgt, Insurance	Inverter Reserve, Soft Costs	Land / Lease Expense	Total Annual Cash Flow	
\$12,540	\$400	30.0%	\$15,840	\$13,500	\$1122	\$90,000	\$36,146	(\$2,400)	(\$1,200)	\$0	\$165,949	
\$12,602	\$400	30.0%	\$15,761		\$1,111		\$26,852	(\$2,472)	(\$1,200)	\$0	\$53,059	
\$12,664	\$350	30.0%	\$13,722		\$1,111		\$16,111	(\$2,546)	(\$1,200)	\$0	\$40,212	
\$12,727	\$350	30.0%	\$13,653		\$1,105		\$11,371	(\$2,623)	(\$1,200)	\$0	\$35,384	
\$12,790	\$200	30.0%	\$7,763		\$1,100		\$11,371	(\$2,701)	(\$1,200)	\$0	\$29,322	
\$12,853	\$200	30.0%	\$7,724					(\$2,782)	(\$1,200)	\$0	\$18,221	
\$12,917	\$150	30.0%	\$5,764					(\$2,866)	(\$1,200)	\$0	\$14,766	
\$12,981	\$150	30.0%	\$5,735					(\$2,952)	(\$1,200)	\$0	\$14,715	
\$13,045	\$100	30.0%	\$3,804					(\$3,040)	(\$1,200)	\$0	\$12,710	
\$13,110	\$100	30.0%	\$3,795					(\$3,131)	(\$1,200)	\$0	\$12,664	
\$13,175	\$50	30.0%	\$1,883					(\$3,225)	(\$1,200)	\$0	\$10,683	
\$13,240	\$50	30.0%	\$1,874					(\$3,322)	(\$1,200)	\$0	\$10,642	
\$13,305	\$50	30.0%	\$1,864					(\$3,422)	(\$1,200)	\$0	\$10,598	
\$13,371	\$50	30.0%	\$1,855					(\$3,524)	(\$1,200)	\$0	\$10,552	
\$13,438	\$50	30.0%	\$1,846					(\$3,630)	(\$1,200)	\$0	\$10,503	
\$13,504	\$50	30.0%	\$1,837					(\$3,739)	(\$1,200)	\$0	\$10,452	
\$13,571	\$50	30.0%	\$1,827					(\$3,851)	(\$1,200)	\$0	\$10,397	
\$13,638	\$50	30.0%	\$1,818					(\$3,967)	(\$1,200)	\$0	\$10,340	
\$13,706	\$50	30.0%	\$1,809					(\$4,086)	(\$1,200)	\$0	\$10,279	
\$13,773	\$50	30.0%	\$1,800					(\$4,208)	(\$1,200)	\$0	\$10,215	
\$13,842	\$50	30.0%	\$1,791					(\$4,335)	(\$1,200)	\$0	\$10,148	
\$13,910	\$50	30.0%	\$1,782					(\$4,465)	(\$1,200)	\$0	\$10,078	
\$13,979	\$50	30.0%	\$1,773					(\$4,599)	(\$1,200)	\$0	\$10,004	
\$14,048	\$50	30.0%	\$1,764					(\$4,737)	(\$1,200)	\$0	\$9,926	
\$14,118	\$50	30.0%	\$1,756					(\$4,879)	(\$1,200)	\$0	\$9,845	
\$14,188	\$50	30.0%	\$1,747					(\$5,025)	(\$1,200)	\$0	\$9,760	

Total Investment			\$300,000
Federal Tax Paid	State Tax Paid	Total Annual Cash Flow	Cumulative Cash Flow (Post)
(\$13,791)	(\$1,363)	\$150,795	\$150,795
(\$9,033)	(\$1,358)	\$42,669	\$193,463
(\$8,313)	(\$1,245)	\$30,654	\$224,118
(\$8,282)	(\$1,241)	\$25,861	\$249,979
(\$6,213)	(\$916)	\$22,193	\$272,172
(\$5,808)	(\$913)	\$11,500	\$283,672
(\$5,115)	(\$804)	\$8,846	\$292,518
(\$5,098)	(\$801)	\$8,816	\$301,334
(\$4,413)	(\$694)	\$7,603	\$308,937
(\$4,397)	(\$691)	\$7,576	\$316,513
(\$3,721)	(\$585)	\$6,377	\$322,890
(\$3,707)	(\$583)	\$6,352	\$329,242
(\$3,692)	(\$580)	\$6,326	\$335,568
(\$3,676)	(\$578)	\$6,299	\$341,867
(\$3,659)	(\$575)	\$6,270	\$348,137
(\$3,641)	(\$572)	\$6,239	\$354,376
(\$3,621)	(\$569)	\$6,207	\$360,583
(\$3,601)	(\$566)	\$6,173	\$366,756
(\$3,580)	(\$563)	\$6,137	\$372,892
(\$3,558)	(\$559)	\$6,099	\$378,991
(\$3,534)	(\$555)	\$6,059	\$385,049
(\$3,510)	(\$552)	\$6,017	\$391,066
(\$3,484)	(\$547)	\$5,973	\$397,039
(\$3,457)	(\$543)	\$5,926	\$402,965
(\$3,428)	(\$539)	\$5,878	\$408,843
(\$3,398)	(\$534)	\$5,827	\$414,671

NOTES:

Variables are noted with blue text and highlighted

Costs do not include cost of capital.

SRECS prices are only estimates.

Model does not include cost for decommissioning at end of life

Federal Tax is paid on Electricity, SREC, State Grants/Incentives, State Tax is paid on Electricity, SREC

This entire spreadsheet is for educational purposes only. MEA cannot be held responsible for any assumptions, calculations, or estimates.

Power Purchase Agreements

■ Purpose

- Allows local governments (which don't pay taxes) to partner with solar developers to take advantage of tax credits, reduce risk, etc.

■ Benefits

- Can take advantage of Federal ITC (30%)
 - No upfront capital cost
 - No system performance or operating risk
 - Predictable energy pricing
 - Net metering allowed if PV serves local load
 - If net metered, full retail electric rate offset
 - Some demand charges (in kW) will remain under T&D chargers
 - Ideally at lower costs than conventional grid power
 - Solar developer or building owners can sell SRECs
-

MEA's Work with PPAs



- Sunburst I Program
 - Incentives offered (no longer offered)
 - Mainstreamed PPAs
 - 16 State and local government partners
 - Brought 8.9 MW of PV online

MEA's Work with PPAs



NMWDA – Installation of Racks for Ballasted Rooftop Mounts



George Carver Washington ES - Pole Mount



Talbot County Community Center – Ground Mount



Coppin State University – Ballasted Rooftop Mount



Back River WWTP – Screw-type Ground Mount

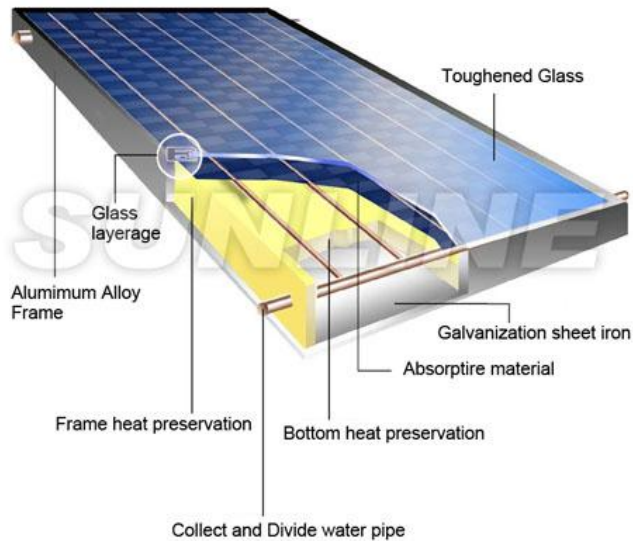


Frederick County Oakdale High School – Ballasted Rooftop Mount

MEA's Work with PPAs

Sunburst I Project	PV Capacity (kW)	Procurement Vehicle
1. MPA Shed 10 + Cruise Terminal, Baltimore	750 kW	Energy performance contract
2. Back River Wastewater Treatment Plant, Baltimore	900 kW	Energy performance contract
3. MTA Bus Facility, Baltimore	500 kW	Energy performance contract
4. MAA, BWI's Daily Parking Garage Roof	500 kW	PPA
5. Town of Hancock Facility	104 kW	PPA
6. Prince George County Facility	384 kW	PPA
7. NE MD Waste Disposal Authority - Howard Co.	462 kW	PPA
8. NE MD Waste Disposal Authority - Montgomery Co.	281 kW	PPA
9. AAC Combined Support Services Complex, Millersville	750 kW	PPA
10. George Washington Carver Elem. School, Lexington Park	500 kW	PPA
11. Frederick County Oakdale High School, Ijamsville	499 kW	PPA
12. Talbot County Community Center, Easton	550 kW	PPA
13. Anne Arundel Community College	750 kW	PPA
14. Coppin State University, Baltimore	500 kW	PPA
15. Harford County Public School, Bel Air	752 kW	PPA
16. University MD at College Park Severn Building, Beltsville	630 kW	PPA

Solar Water Heating



www.sunline.com.cn

Flat plate collectors



Evacuated tube collectors

Solar Water Heating

- Game Changer Award

- Glazed polymeric collectors
 - “1/2 the cost, 3/4 the performance” of flat plates
 - Low per square foot weight load
 - Rapid un-installation and re-installation
 - Seemingly ideal for multi-family housing



- Awardee will test performance of flat plates, evacuated tubes, and glazed polymeric

Solar Water Heating

■ Target Markets

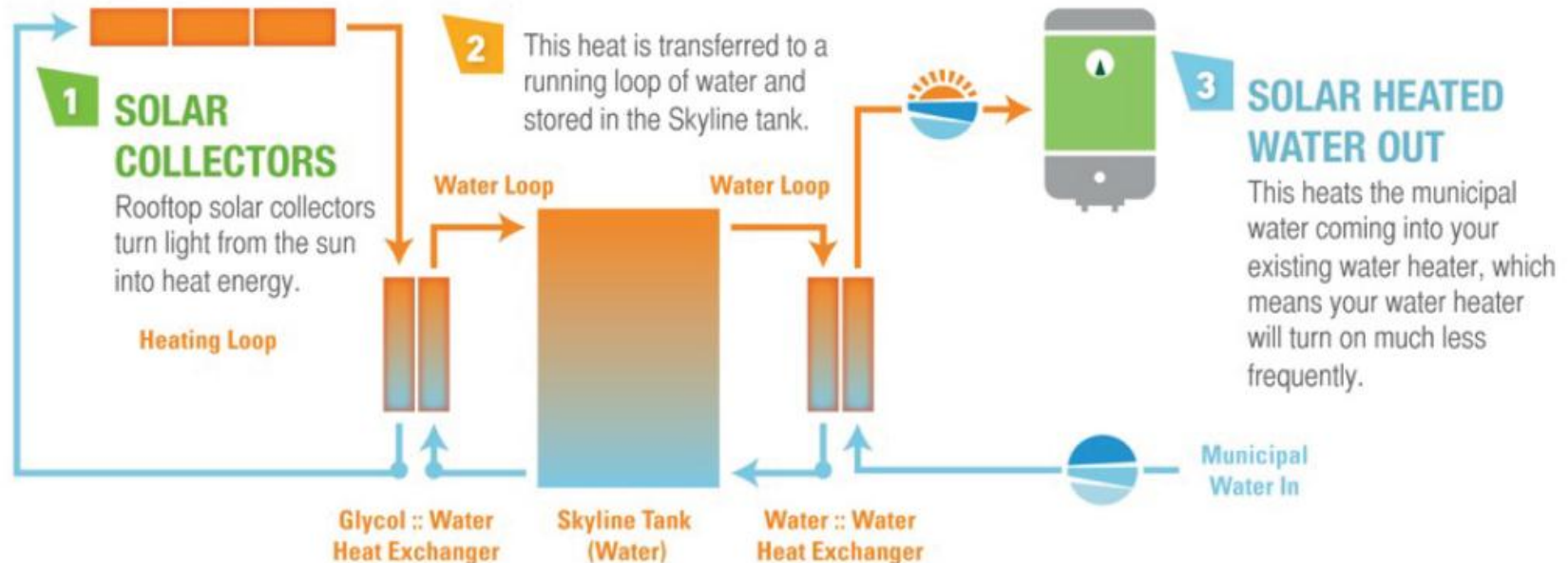
□ Attributes

- High population density
- High hot water use
- Year-round hot water use

□ Markets

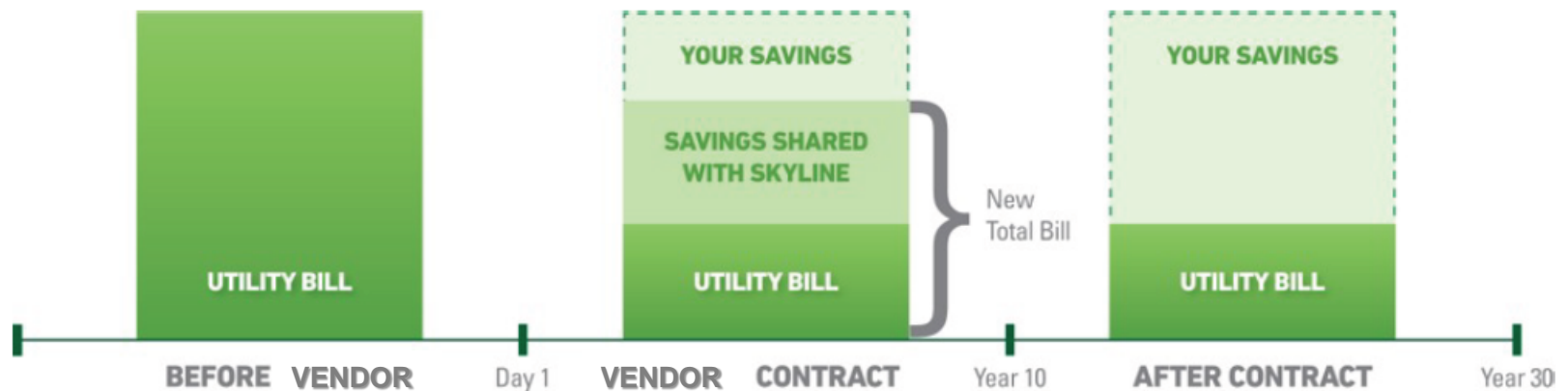
- Detention centers
 - Multifamily
 - Hospitals
 - Laundry, e.g. with elderly housing, assisted living
 - Facilities that can use HW + solar thermal absorption cooling
 - (Schools are not ideal unless they operate in summer)
-

Solar Water Heating



- Solar thermal system equipment configuration based on proven technology (OG-100 certified and SRCC-rated equipment) with utility-grade metering and monitoring points across the system
- Ongoing measurement, reporting and optimization of energy savings delivery
- Internal billing software for delivery of price-indexed energy

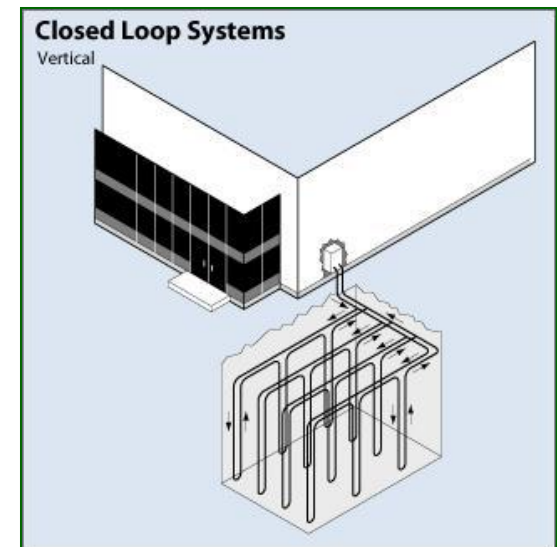
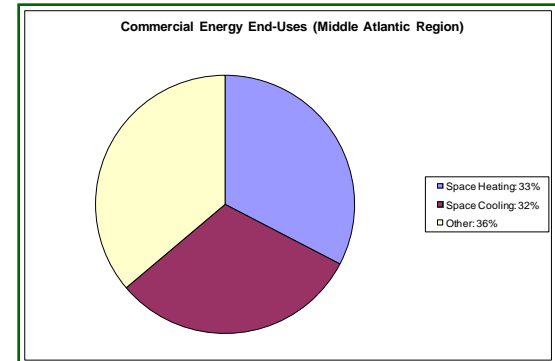
Solar Water Heating



- Solar hot water priced at fixed discount (indexed) to utility rate
- No upfront cost to customer
- 10 year contract term
- Monitoring and maintenance included
- Opportunity to take ownership of system at end of contract and keep 100% of savings

Geothermal Heating & Cooling

- In the RPS, counts for MSEC
- Eco-friendly heating and cooling
 - 2/3rd of a building's energy consumption
- Energy savings of 25-50%
- Vertical fields act as efficient heat exchanger with earth
- Heat pump uses 55°F thermal energy to:
 - Cool during summer
 - Heat during winter
 - Heat water year-round



Geothermal Heating & Cooling

- Proven technology
- ~14,000 tons installed in MD
 - Aberdeen Proving Ground (APG)
 - 634 wells/heat pumps
 - 2,853 tons
 - ESCO model = no upfront \$ from APG
 - \$600k/yr savings
 - Allegany College
 - McDaniels College
 - Annapolis Market House



Geothermal Heating & Cooling

2012 GHC	Sector	Number of Grants	Award Amount	Total Project Cost	Tons	\$/Ton
<input checked="" type="checkbox"/>	Commercial	4	\$17,000.00	\$204,501.00	37.25	\$5,489.96
<input type="checkbox"/>	Residential	630	\$1,064,250.00	\$21,237,894.25	3,110.70	\$6,827.37
Grand Totals		634	\$1,081,250.00	\$21,442,395.25	3,147.95	\$6,811.54
2011 GHC	Sector	Number of Grants	Award Amount	Total Project Cost	Capacity	\$/Ton
<input checked="" type="checkbox"/>	Commercial	5	\$23,500.00	\$321,066.00	101	\$3,178.87
<input type="checkbox"/>	Residential	600	\$1,117,250.00	\$19,281,499.38	2,836.60	\$6,797.40
Grand Totals		605	\$1,140,750.00	\$19,602,565.38	2,937.60	\$6,672.99
2010 GHC	Sector	Number of Grants	Award Amount	Total Project Cost	Capacity	\$/Ton
<input checked="" type="checkbox"/>	Commercial	2	\$3,500.00	\$31,417.35	7	\$4,488.19
<input type="checkbox"/>	Residential	634	\$1,413,875.00	\$19,569,010.94	3,055.25	\$6,405.04
Grand Totals		636	\$1,417,375.00	\$19,600,428.29	3,062.25	\$6,400.66

Geothermal Heating & Cooling

The screenshot shows a web browser window displaying the ClimateMaster Savings Calculator. The browser's address bar shows the URL www.climatemaster.com/residential/svcalc/sc01.php. The page features the ClimateMaster logo and navigation tabs for 'Tell us about your home' and 'View Details'. The 'Tell us about your home' section includes dropdown menus for Country, State, City, Home Type, Insulation and Air Leakage, HVAC Equipment Age, HVAC Equipment Efficiency, Heating Type, and Water Heating Type. It also has input fields for Conditioned Space (sq ft) and buttons for 'Energy Efficiency Improvements' such as 'with Hot Water Generator', 'Insulation and Air Leakage Level Upgrade', 'Appliance Type Upgrade', and 'Lighting Type Upgrade'. The 'View Details' section has a 'Start Here' button and tabs for 'Energy Consumption', 'Carbon Footprint', and 'Help'. The main content area is titled 'Savings Calculator' and contains text explaining the benefits of geothermal technology and providing instructions on how to use the calculator. The Windows taskbar at the bottom shows the system time as 8:10 AM on 5/6/2013.

CLIMATEMASTER
Geothermal Heat Pump Systems
An USB Industries, Inc. Company (NYSE : UXU)

Tell us about your home

Country -----
State -----
City -----
Home Type -----
Conditioned Space sq ft
Insulation and Air Leakage Poor
HVAC Equipment Age <3 years old
HVAC Equipment Efficiency Standard
Heating Type Natural Gas
Water Heating Type Natural Gas

Energy Efficiency Improvements

Geothermal Heating and Cooling System
with Hot Water Generator
Insulation and Air Leakage Level Upgrade
Poor
Appliance Type Upgrade
None
Lighting Type Upgrade

View Details

Start Here Energy Consumption Carbon Footprint Help

Savings Calculator

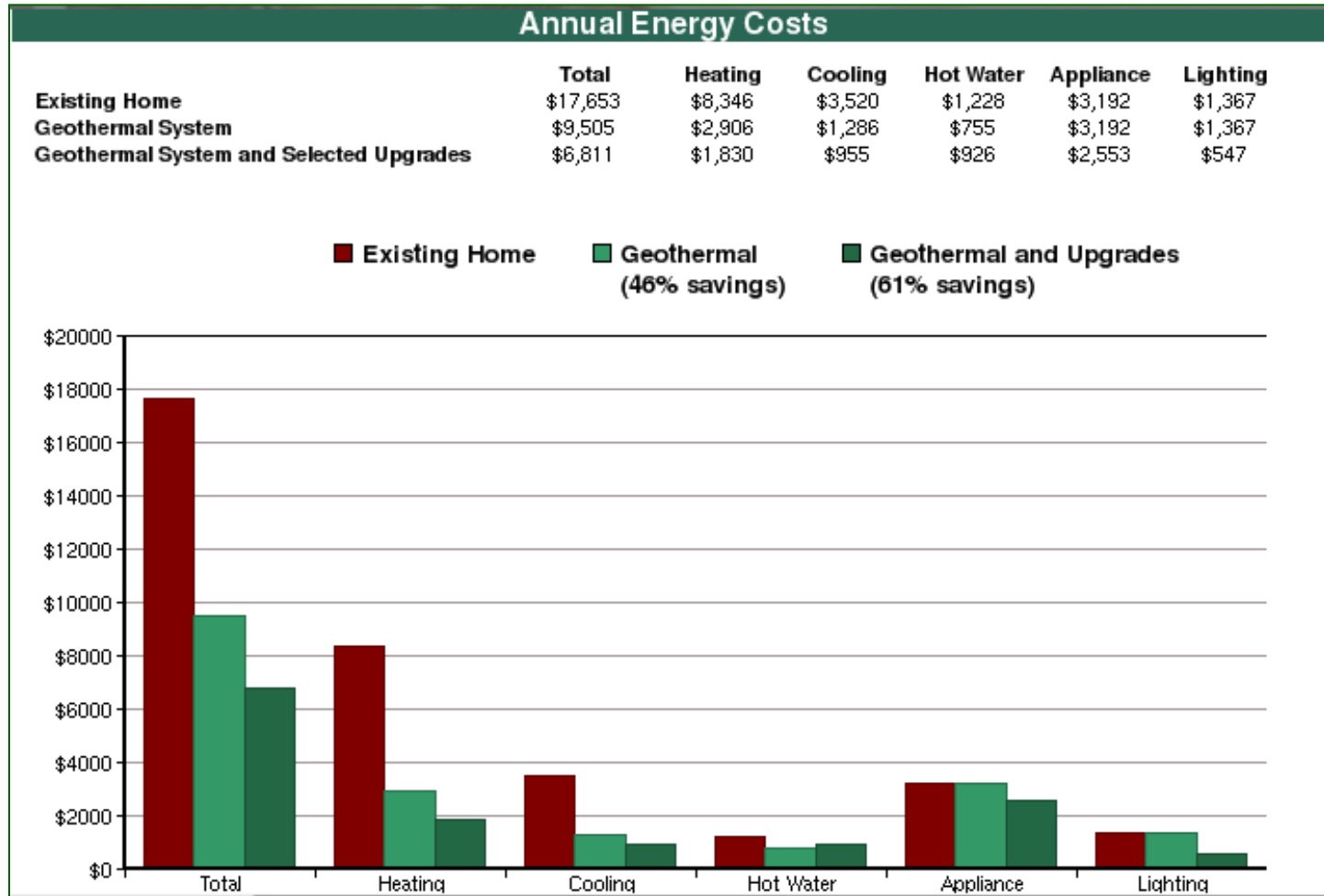
Geothermal technology saves you money each and every day. By using the constant temperature below the earth's surface, your geothermal system doesn't need to work as hard to heat and cool your home. It runs more efficiently, so it saves you money - up to 80% savings over your existing heating and cooling system!

We have designed a savings calculator that can help you determine just how much you can save. You will need to answer just a few simple questions about your home and your existing heating and cooling system and hot water needs and the calculator will do the rest.

Remember that this is just a demonstration of the potential savings and is not an implied promise of actual savings. To get a more accurate assessment, get in touch with a ClimateMaster dealer today. Each home is different and your experienced and knowledgeable ClimateMaster dealer can help you pick the right system and give you a better understanding of just how much you can expect to lower your heating and cooling costs.

<http://www.climatemaster.com/residential/svcalc/sc01.php>

Geothermal Heating & Cooling

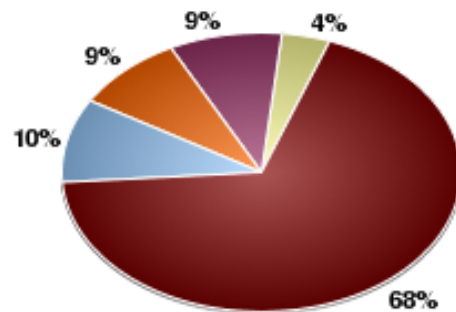


Geothermal Heating & Cooling

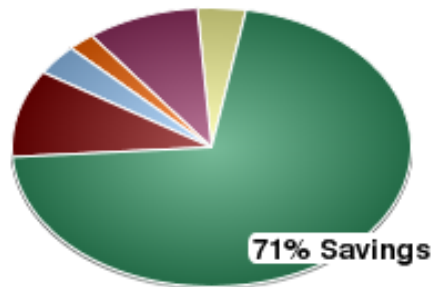
Annual Energy Consumption (Million Btu)

	Total	Heating	Cooling	Hot Water	Appliance	Lighting
Existing Home	836	571	81	75	76	33
Geothermal System	242	85	30	18	76	33
Geothermal System and Selected Upgrades	172	53	22	22	61	13

Existing Home



Geothermal



Geothermal and Upgrades



■ Savings
 ■ Heating
 ■ Cooling
 ■ Hot Water
 ■ Appliance
 ■ Lighting

Solar + Geothermal

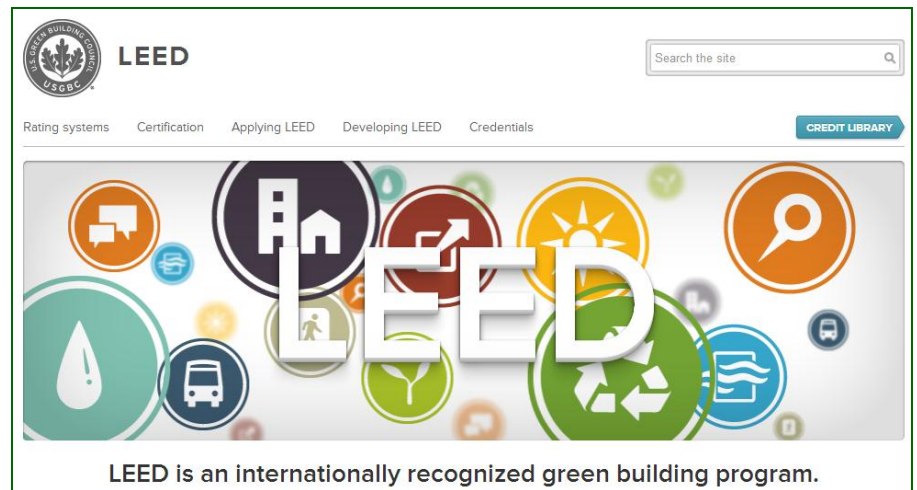
The Nation's First Net Zero Energy School!



- Richardsville (KY) Elementary
 - Nation's first Net Zero Energy School
 - Used green design, solar PV, geothermal heating & cooling
 - Exports excess electricity to the grid on annual basis



Solar + Geothermal



LEED

Search the site

Rating systems Certification Applying LEED Developing LEED Credentials

CREDIT LIBRARY

LEED

LEED is an internationally recognized green building program.