



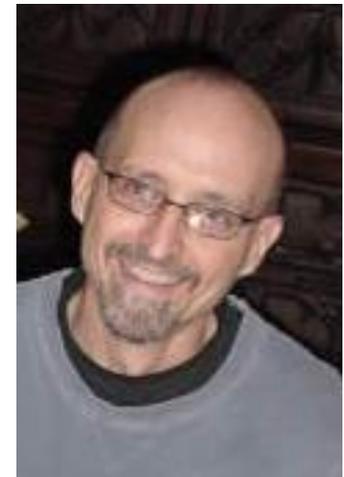
Carroll County Solar Considerations

Douglas Hinrichs • Solar Program Manager

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Who is this Guy?

- ✘ Illinois farm boy
- ✘ Undergrad studies
 - + Biology/Psychology
- ✘ Graduate studies
 - + Environmental Studies/Alternative Energy
- ✘ International Society for Ecological Economics
- ✘ Clean energy consultant
 - + USDOE, USDOD, USEPA, utils, mans.
- ✘ MEA Program Manager
 - + Solar/Geothermal/Clean Energy Grants/Game Changers



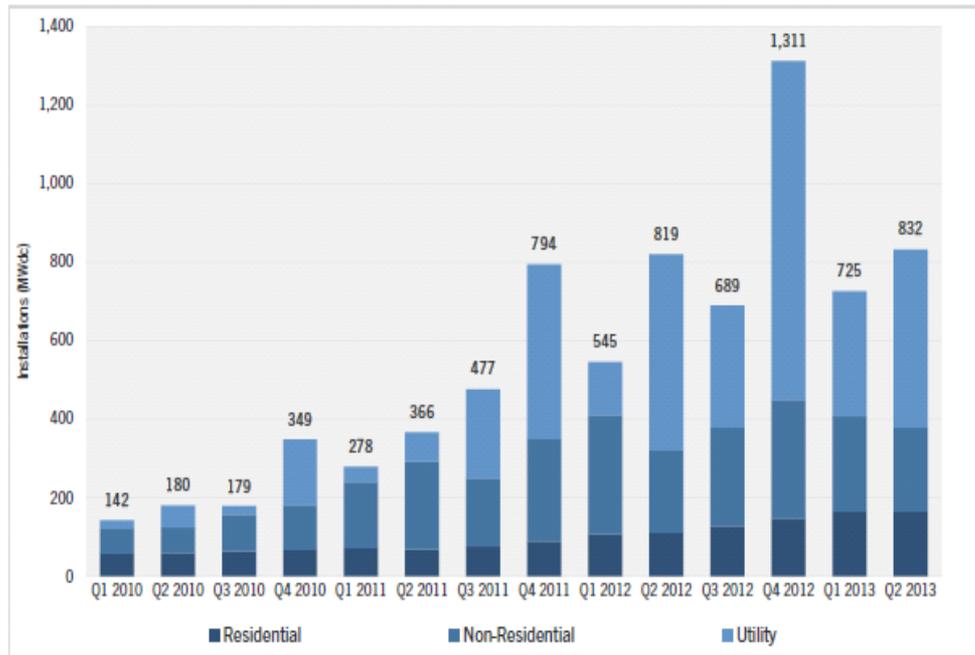
Maryland Solar Goals & SREC Schedule

Calendar Year	Solar RPS Goals (%)	Solar RPS Goal Capacity (Cumulative, in MW)
2007	0.000%	0.0
2008	0.005%	2.9
2009	0.010%	5.7
2010	0.025%	14.4
2011	0.05%	28.7
2012	0.10%	57.5
2013	0.25%	143.6
2014	0.35%	201.1
2015	0.50%	287.3
2016	0.70%	402.2
2017	0.95%	545.8
2018	1.40%	804.3
2019	1.75%	1,005.4
2020	2.00%	1,149.0

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

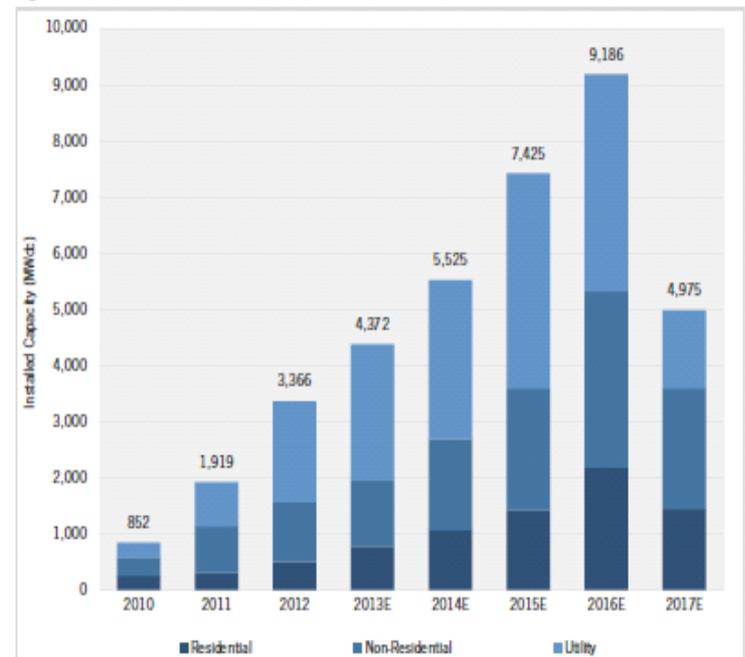
National Solar PV Market Status

Figure 2.1 U.S. PV Installations by Market Segment, Q1 2010-Q2 2013



	Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013	Q2 2013
Residential	56	60	63	67	72	68	75	88	107	111	126	146	164	164
Non-Residential	63	64	94	115	168	224	175	261	304	212	245	307	243	216
Utility	22	55	22	167	38	50	227	445	134	498	310	861	318	452
Total	142	180	179	349	278	342	477	794	544	821	682	1315	725	832

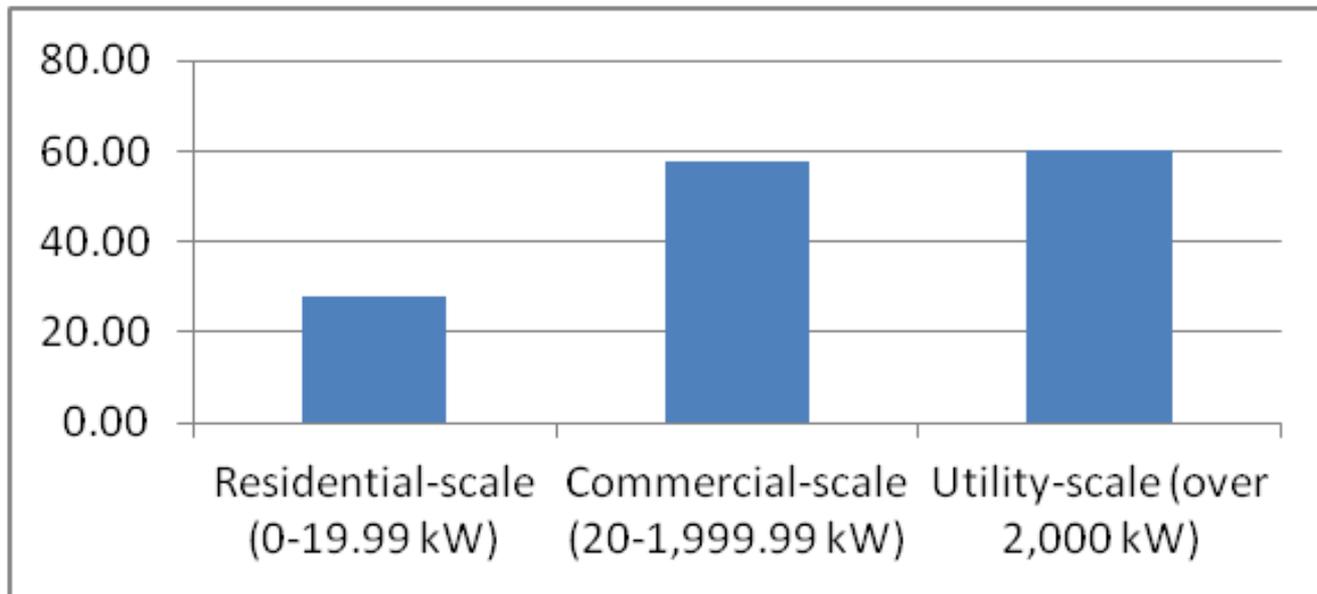
Figure 2.22 U.S. PV Installation Forecast, 2010-2017E



	2010	2011	2012	2013E	2014E	2015E	2016E	2017E
Total	852	1,919	3,366	4,372	5,525	7,425	9,186	4,975
Residential	246	304	494	776	1,069	1,424	2,175	1,446
Non-Residential	339	831	1,069	1,178	1,613	2,165	3,147	2,143
Utility	267	784	1,803	2,418	2,843	3,836	3,864	1,386

Source: GTM Research

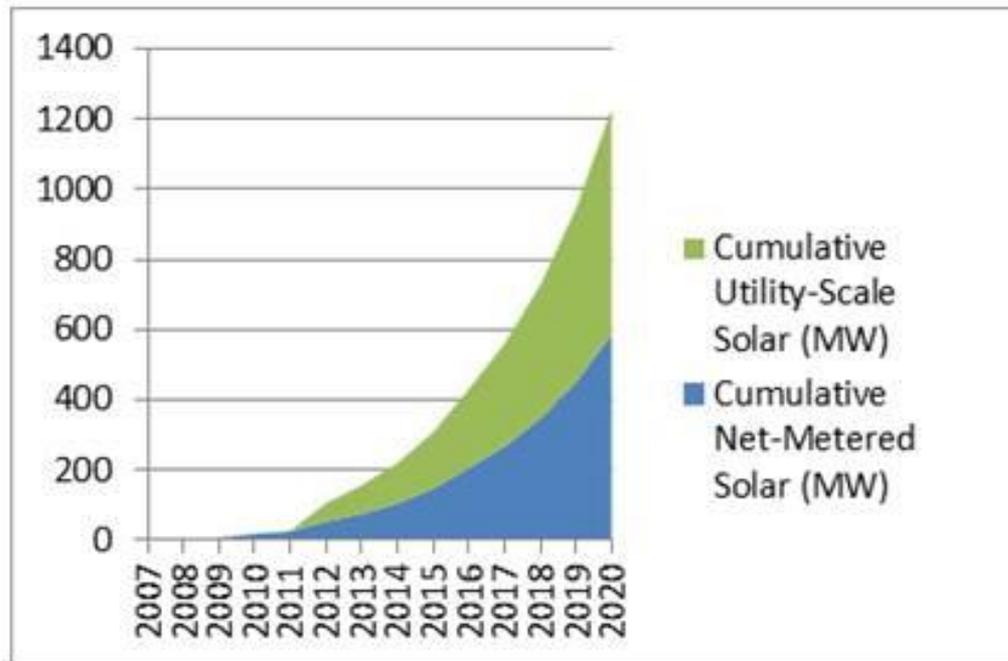
Maryland Solar Market Status (as of July)



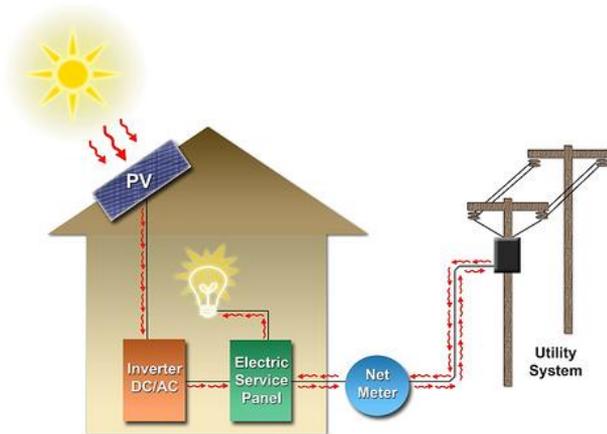
Maryland's total installed capacity of 145.5 MW of solar PV capacity accounts for 12% of the RPS goal of 1,200 MW.

Data courtesy: [GATS Renewable Generator Report](#).

Maryland Projected Solar Market



Business Model 1: Net Metering



- ✘ “Single load” net metering
 - + 1 meter measures both solar and grid electricity for 1 customer, 1 load
 - + Full electricity retail rate offsets
 - + 2 MW cap

- ✘ “Aggregate” (load) net metering
 - + 1 meter measures both solar and grid electricity for up to 20 loads, e.g. homes and buildings on one farm
 - + Loads can be physically or virtually tied together
 - + For agricultural, non-profit and government entities
 - + Full retail rates
 - + 2 MW cap

Business Model 1: 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 is paid to the customer at the commodity energy supply rate

Business Model 1: Net Metering

- ✘ Salisbury
- ✘ 1.2 MW
- ✘ Meets 90% of Perdue HQ load
- ✘ Ideal sizing



Business Model 1: Net Metering

Address: 60 West Street, Annapolis, MD 21

System Type: Commercial

System Inputs:

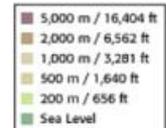
- Size (kW): 10.00
- System Type: Commercial
- Derating: 0.77
- Tilt angle (°): 39
- Azimuth angle (°): 180
- Data year: 2004
- Electric Rate (\$/kWh): 0.09

Run



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



Business Model 2: Wholesale

- ✘ Two high-profile utility-scale solar installations
 - + Mount St. Mary's 16 MW
 - + Hagerstown 29 MW
- + Different business model than net metered PV
 - + Sells into market at wholesale rates (~2/3rd of retail)
 - + Interconnects at transmission (PJM) level



Land Requirements



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)
<input type="button" value="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.

Land Requirements

- ✘ Rule of thumb: 5-7 acres for 1 MW of solar PV



Responsible Solar Siting/Ag

- ✘ Diversified revenue streams
 - ✘ If arrays are raised or separated, could allow for:
 - ✘ Cover crops
 - ✘ Grain?
 - ✘ Community supported ag?
 - ✘ Poultry?



Responsible Solar Siting/Ag

- ✘ Innovative grounds maintenance
 - ✘ Reduced grass mowing costs
 - ✘ Potential sheep revenues
 - ✘ Lambs
 - ✘ Wool
 - ✘ Milk/cheese



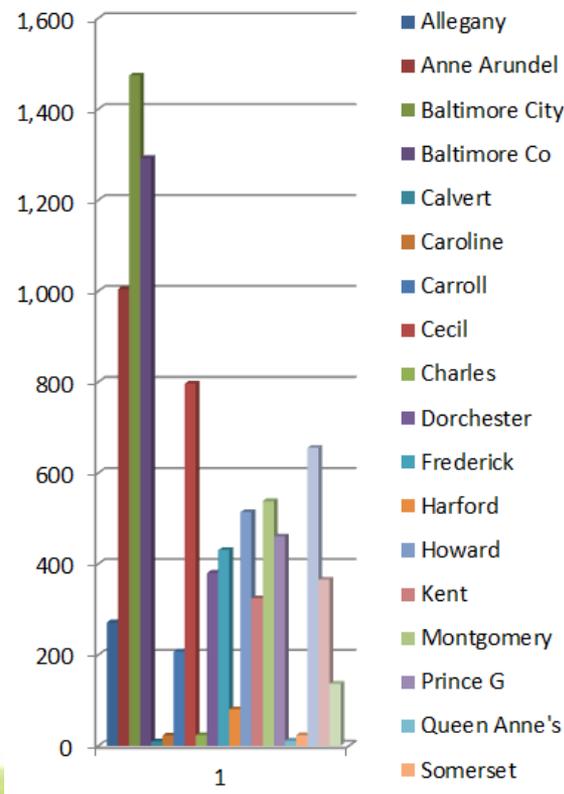
Responsible Solar Siting/Ag

- ✘ Reversion to agricultural land use
 - ✘ Ballasted ground mounts
 - ✘ Ground screw mounts



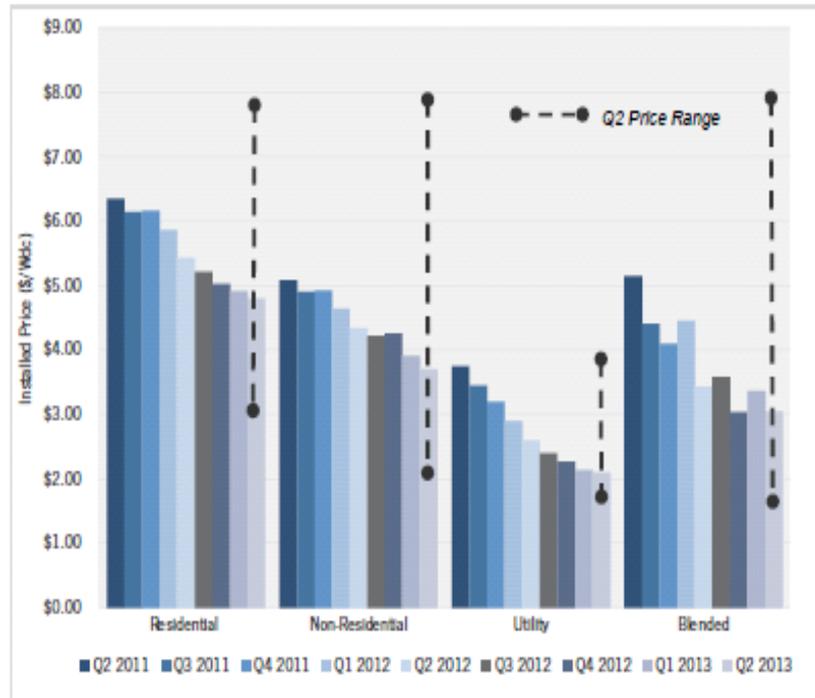
Responsible Solar Siting/"Less Productive" Land

- ✘ Parking lots
 - ✘ 1,000+ acres
 - ✘ New grants
- ✘ Brownfields
- ✘ Wastewater treatment plants
- ✘ Abandoned mine land



Cost Overview (National, State)

Figure 2.30 Average Installed Price by Market Segment, Q2 2011-Q2 2013



Installed Price (\$/Wdc)	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013	Q2 2013
Residential	\$6.35	\$6.15	\$6.16	\$5.86	\$5.43	\$5.22	\$5.03	\$4.92	\$4.81
Non-Residential	\$5.09	\$4.90	\$4.92	\$4.64	\$4.35	\$4.22	\$4.26	\$3.92	\$3.71
Utility	\$3.75	\$3.45	\$3.20	\$2.90	\$2.60	\$2.40	\$2.27	\$2.14	\$2.10
Total	\$5.15	\$4.41	\$4.10	\$4.45	\$3.43	\$3.59	\$3.04	\$3.36	\$3.05

Figure 2.31 Installed PV Pricing by State, Q1 2013-Q2 2013

Average Installed Price (\$/Wdc)	Q1 2013			Q2 2013		
	Residential	Non-Residential	Utility	Residential	Non-Residential	Utility
Arizona	\$4.64	\$5.03		\$4.59	\$5.25	
California	\$5.08	\$4.02		\$5.03	\$4.27	
Colorado	\$4.30	\$3.48		\$3.80	\$3.68	
Connecticut	\$4.65	-		\$4.50	-	
Delaware	\$4.16	\$3.93		\$4.04	\$3.13	
Florida	\$4.07	\$3.31		\$3.15	\$2.85	
Georgia	\$4.67	\$4.17		\$4.45	\$4.00	
Hawaii	\$5.33	\$4.81		\$4.75	\$4.60	
Illinois	\$4.82	\$4.05		\$4.86	\$3.68	
Maryland	\$4.79	\$3.57		\$4.81	\$4.05	
Massachusetts	\$5.03	\$3.46		\$5.70	\$3.61	
Minnesota	\$6.17	\$6.36		\$6.10	\$6.00	
Missouri	\$4.65	\$4.55		\$4.45	\$4.10	
Nevada	\$4.19	\$4.64		\$4.77	\$3.45	
New Hampshire	\$5.56	\$4.95	\$2.14	\$5.40	\$4.75	\$2.10
New Jersey	\$4.21	\$3.11		\$4.05	\$2.60	
New Mexico	\$4.24	\$4.42		\$5.41	\$4.40	
New York	\$4.91	\$5.05		\$4.97	\$5.04	
North Carolina	\$4.92	\$4.31		\$4.70	\$4.05	
Ohio	\$4.72	\$3.42		\$4.55	\$3.45	
Oregon	\$4.87	\$4.97		\$4.80	\$4.89	
Pennsylvania	\$4.46	\$4.02		\$4.38	\$3.45	
Tennessee	\$5.01	\$4.96		\$4.80	\$4.65	
Texas	\$3.55	\$3.23		\$3.54	\$3.40	
Utah	\$5.10	\$4.92		\$5.10	\$4.92	
Vermont	\$4.63	\$4.50		\$4.46	\$2.95	
Washington	\$5.80	\$5.22		\$5.65	\$5.02	
Washington, D.C.	\$4.91	\$2.96		\$4.50	\$3.44	
Wisconsin	\$5.02	\$4.54		\$4.80	\$6.25	
Other	\$5.46	\$4.84		\$5.25	\$4.43	

Property Taxes

CHAPTER 574

(Senate Bill 621)

AN ACT concerning

Sales and Use and Property Tax - Exemptions - Solar Energy Equipment and Property

FOR the purpose of altering the definition of "solar energy equipment" for purposes of an exemption under the sales and use tax for certain solar energy equipment; altering the definition of "solar energy equipment" for purposes of a property tax exemption for certain solar energy equipment; and generally relating to certain tax exemptions for certain solar energy equipment, § 7-242.

Article - Tax - Property

(a) In this section, "solar energy property" means equipment that is installed to use solar energy to generate electricity ~~to be used in a structure~~ OR SUPPLIED TO THE ELECTRIC GRID, or provide hot water for use in a structure.

(b) Except as provided in § 8-240 of this article, solar energy property is not subject to real property tax.

SECTION 2. AND BE IT FURTHER ENACTED, That this Act shall take effect July 1, 2009.

Approved by the Governor, May 19, 2009.

Financing with PPAs

- ✘ Power Purchase Agreements (PPAs)
 - + Allows local governments (which don't pay taxes) to partner with solar developers to take advantage of Federal tax credits, reduce risk, etc.
 - + No upfront capital cost to local government
 - + No system performance risk or operating risk for local government
 - + Developer can take advantage of Federal ITC (30%) and MACRS (20%)
 - + Predictable energy pricing for 20+ years

Financing with PPAs



NMWDA



George Carver Washington



Talbot County Community Center



Coppin State University



Back River WWTP



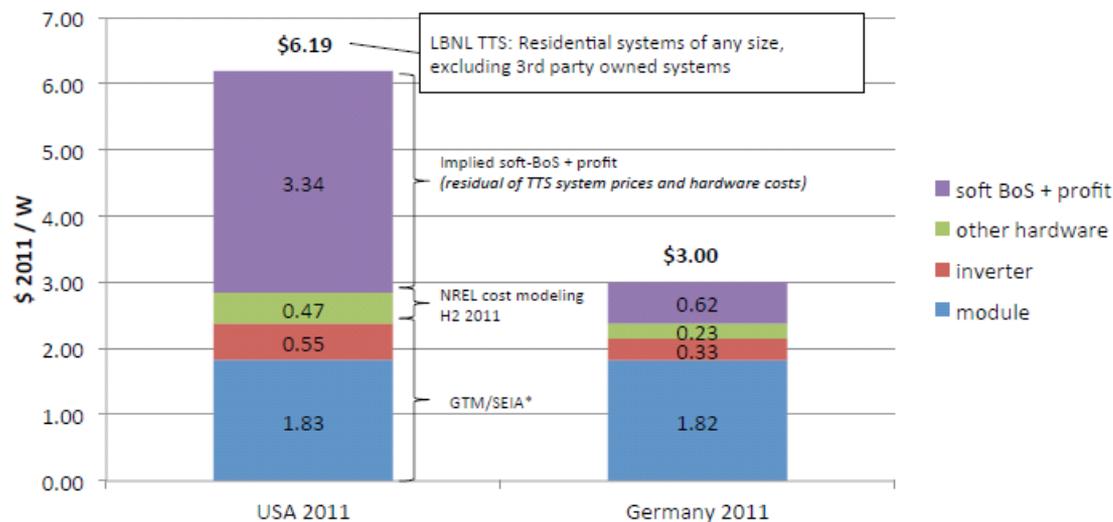
Frederick County Oakdale High

Driving Down Soft Costs

Soft Costs for Residential PV in Germany Are ~\$2.7/W Lower Than in the U.S.



Total soft costs for residential PV in Germany, including margin, are just 19% of the implied soft costs for U.S. residential PV (\$0.62/W vs. \$3.34/W)



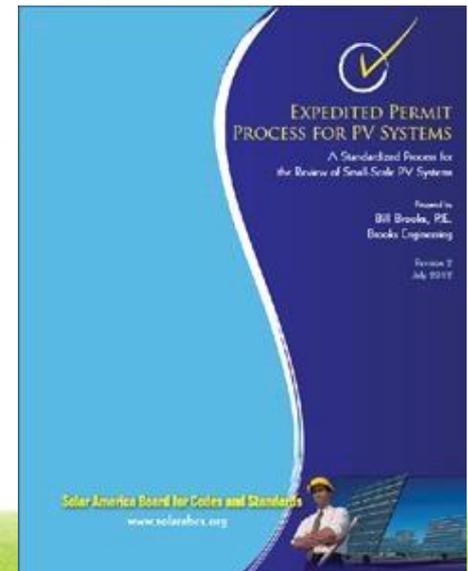
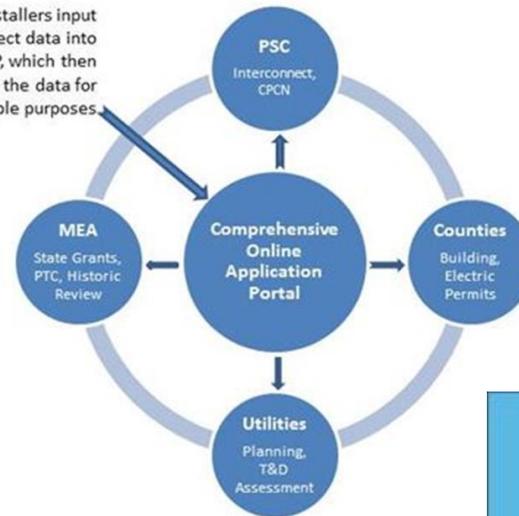
* Note: US module and inverter prices are based on average factory gate prices for Q4 2010-Q3 2011 as reported by GTM/SEIA with an adder of 10% to account for supply chain costs. Inverter efficiency assumed to be 85%.

Driving Down Soft Costs

For Electrical permits, a Diamond symbol (◆) indicates permits are only needed if new wiring is required.
 Talbot County (●) does not require a Plumbing permit for Solar Water Heating, but does require a Zoning Certificate
 Baltimore County (■) requires a Building Permit for PV projects over 10 kW

County	Geothermal Heat Pump			Solar Photovoltaic		Solar Water Heating		
	HVAC/Mech.	Electrical	Well	Building	Electrical	Building	Electrical	Plumbing
Allegany	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anne Arundel	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>
Baltimore City	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>
Baltimore County	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	■	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>
Calvert	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Caroline	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Carroll	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>					
Cecil	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>					
Charles	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dorchester	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Frederick	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Garrett	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harford	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>
Howard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
Kent	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Montgomery	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>					
Prince George's	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>
Queen Anne's	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Somerset	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
St. Mary's	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Talbot	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	●
Washington	<input checked="" type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wicomico	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Worcester	<input type="checkbox"/>	◆	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Solar PV installers input all project data into COAP, which then customizes the data for multiple purposes:



Incentives and Revenue Streams

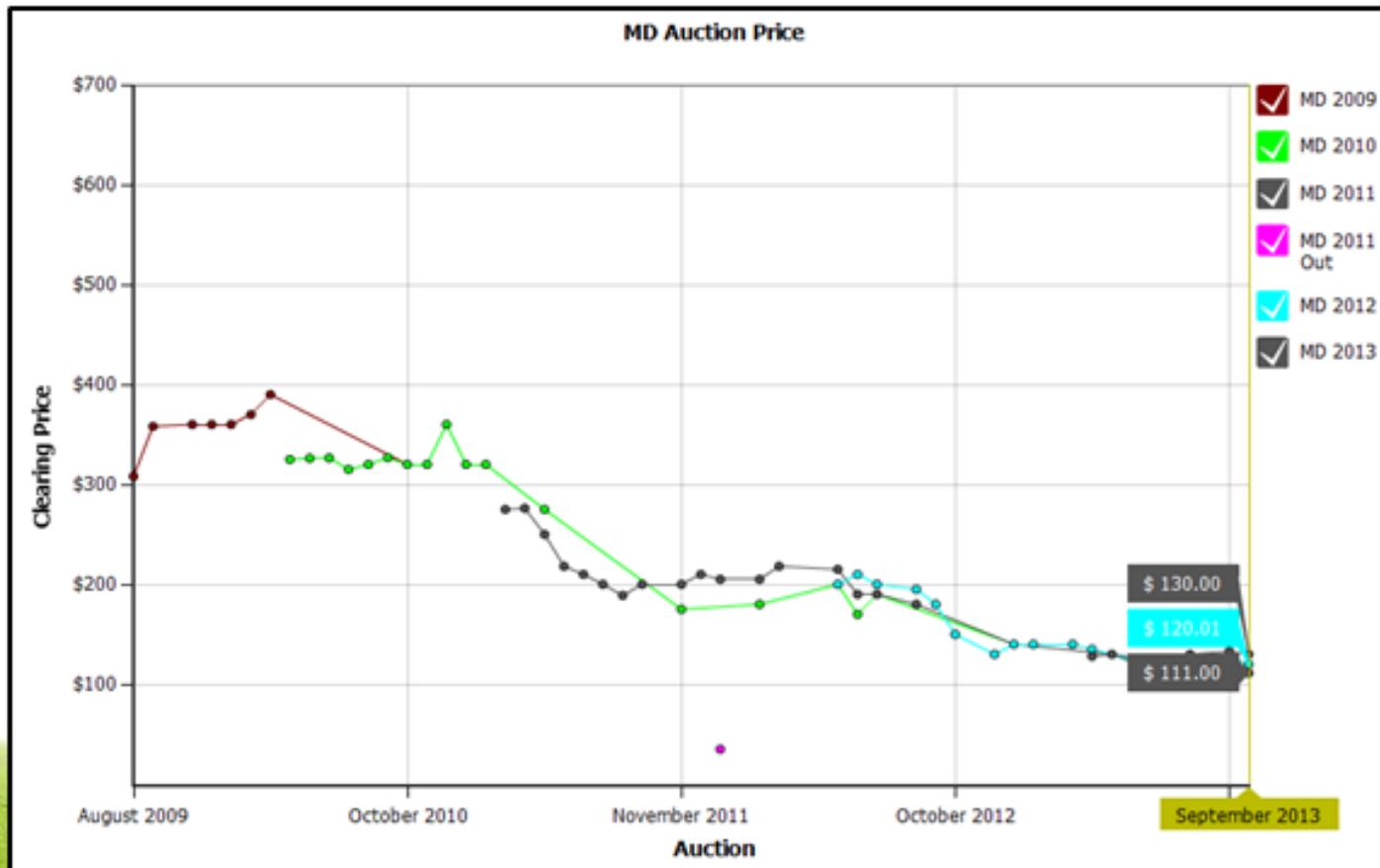
✘ Incentives

- + 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>)

✘ Revenue Streams

- + Sale of solar energy (electricity)
 - ✘ Full retail offset (net metered) or wholesale
- + SRECs
 - ✘ Trading at \$111 in mid-September

Incentives and Revenue Streams



Solar Cost and Cashflow Calculator

Electric Rate with Escalator	Year	Annual Electricity Generation (kWh)	Annual Cash Flow											Total Investment				
			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	Federal Tax Paid	State Tax Paid	Total Annual Cash Flow	Cumulative Cash Flow (Post)
\$0.0950	2013	102,000	\$12,540	\$400	30.0%	\$15,840	\$13,500	\$1,122	\$90,000	\$36,146	(\$2,400)	(\$1,200)	\$0	\$165,949	(\$13,791)	(\$1,363)	\$150,795	\$150,795
\$0.0960	2014	101,340	\$12,602	\$400	30.0%	\$15,761		\$1,116		\$26,852	(\$2,472)	(\$1,200)	\$0	\$53,059	(\$9,033)	(\$1,358)	\$42,669	\$193,463
\$0.0969	2015	100,683	\$12,664	\$350	30.0%	\$13,722		\$1,111		\$16,111	(\$2,546)	(\$1,200)	\$0	\$40,212	(\$8,313)	(\$1,245)	\$30,654	\$224,118
\$0.0979	2016	100,030	\$12,727	\$350	30.0%	\$13,653		\$1,105		\$11,371	(\$2,623)	(\$1,200)	\$0	\$35,384	(\$8,282)	(\$1,241)	\$25,861	\$249,979
\$0.0989	2017	99,380	\$12,790	\$300	30.0%	\$7,763		\$1,100		\$11,371	(\$2,701)	(\$1,200)	\$0	\$29,322	(\$8,213)	(\$916)	\$22,193	\$272,172
\$0.0998	2018	98,733	\$12,853	\$250	30.0%	\$7,724				\$1,425	(\$2,782)	(\$1,200)	\$0	\$18,221	(\$5,808)	(\$913)	\$11,500	\$283,672
\$0.1008	2019	98,089	\$12,917	\$200	30.0%	\$5,764					(\$2,866)	(\$1,200)	\$0	\$14,766	(\$5,115)	(\$804)	\$8,846	\$292,518
\$0.1019	2020	97,449	\$12,981	\$150	30.0%	\$5,735					(\$2,952)	(\$1,200)	\$0	\$14,715	(\$5,098)	(\$801)	\$8,816	\$301,334
\$0.1029	2021	96,811	\$13,045	\$100	30.0%	\$3,804					(\$3,040)	(\$1,200)	\$0	\$12,710	(\$4,413)	(\$694)	\$7,603	\$308,937
\$0.1039	2022	96,177	\$13,110	\$100	30.0%	\$3,785					(\$3,131)	(\$1,200)	\$0	\$12,664	(\$4,397)	(\$691)	\$7,576	\$316,513
\$0.1049	2023	95,547	\$13,175	\$50	30.0%	\$1,883					(\$3,225)	(\$1,200)	\$0	\$10,683	(\$3,721)	(\$585)	\$6,377	\$322,890
\$0.1060	2024	94,919	\$13,240	\$50	30.0%	\$1,874					(\$3,322)	(\$1,200)	\$0	\$10,642	(\$3,707)	(\$583)	\$6,352	\$329,242
\$0.1070	2025	94,294	\$13,305	\$50	30.0%	\$1,864					(\$3,422)	(\$1,200)	\$0	\$10,598	(\$3,692)	(\$580)	\$6,326	\$335,568
\$0.1081	2026	93,673	\$13,371	\$50	30.0%	\$1,855					(\$3,524)	(\$1,200)	\$0	\$10,552	(\$3,676)	(\$578)	\$6,299	\$341,867
\$0.1092	2027	93,054	\$13,438	\$50	30.0%	\$1,846					(\$3,630)	(\$1,200)	\$0	\$10,503	(\$3,659)	(\$575)	\$6,270	\$348,137
\$0.1103	2028	92,439	\$13,504	\$50	30.0%	\$1,837					(\$3,739)	(\$1,200)	\$0	\$10,452	(\$3,641)	(\$572)	\$6,239	\$354,376
\$0.1114	2029	91,827	\$13,571	\$50	30.0%	\$1,827					(\$3,851)	(\$1,200)	\$0	\$10,397	(\$3,621)	(\$569)	\$6,207	\$360,583
\$0.1125	2030	91,218	\$13,638	\$50	30.0%	\$1,818					(\$3,967)	(\$1,200)	\$0	\$10,340	(\$3,601)	(\$566)	\$6,173	\$366,756
\$0.1136	2031	90,612	\$13,706	\$50	30.0%	\$1,809					(\$4,086)	(\$1,200)	\$0	\$10,279	(\$3,580)	(\$563)	\$6,137	\$372,892
\$0.1148	2032	90,009	\$13,773	\$50	30.0%	\$1,800					(\$4,208)	(\$1,200)	\$0	\$10,215	(\$3,558)	(\$559)	\$6,099	\$378,991
\$0.1159	2033	89,409	\$13,842	\$50	30.0%	\$1,791					(\$4,335)	(\$1,200)	\$0	\$10,148	(\$3,534)	(\$555)	\$6,059	\$385,049
\$0.1171	2034	88,812	\$13,910	\$50	30.0%	\$1,782					(\$4,465)	(\$1,200)	\$0	\$10,078	(\$3,510)	(\$552)	\$6,017	\$391,066
\$0.1182	2035	88,217	\$13,979	\$50	30.0%	\$1,773					(\$4,599)	(\$1,200)	\$0	\$10,004	(\$3,484)	(\$547)	\$5,973	\$397,039
\$0.1194	2036	87,626	\$14,048	\$50	30.0%	\$1,764					(\$4,737)	(\$1,200)	\$0	\$9,926	(\$3,457)	(\$543)	\$5,926	\$402,965
\$0.1206	2037	87,038	\$14,118	\$50	30.0%	\$1,756					(\$4,879)	(\$1,200)	\$0	\$9,845	(\$3,428)	(\$539)	\$5,878	\$408,843
\$0.1218	2038	86,453	\$14,188	\$50	30.0%	\$1,747					(\$5,025)	(\$1,200)	\$0	\$9,760	(\$3,398)	(\$534)	\$5,827	\$414,671

NOTES:

Variables are noted with blue text and highlighted
 Costs do not include cost of capital.
 SREC 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.

Helpful Documents and Websites

- ✘ [Homeowners Guide to Financing a Grid-Connected Solar Electric System](#)
- ✘ [Solar Powering Your Community: A Guide for Local Governments](#)
- ✘ [Net Metering and Aggregate Net Metering](#)
- ✘ [2012 Report on the Status of Net Metering in the State of Maryland](#)
- ✘ [Power Purchase Agreement Checklist for State and Local Governments](#)
- ✘ [Tracking the Sun: An Historical Summary of the Installed Price of Photovoltaics in the United States from 1998 to 2012](#)