



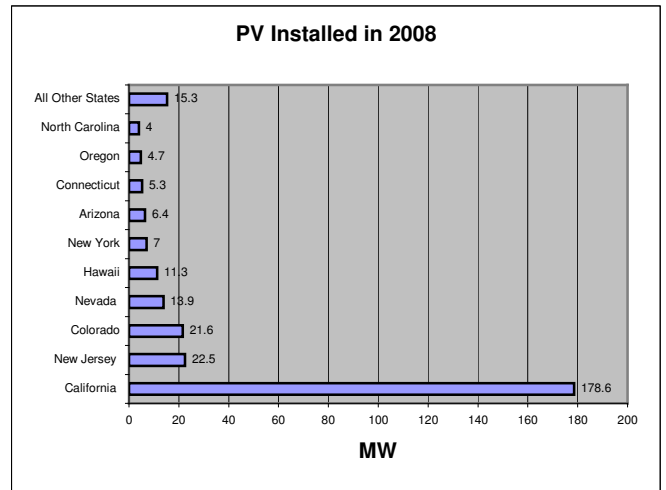
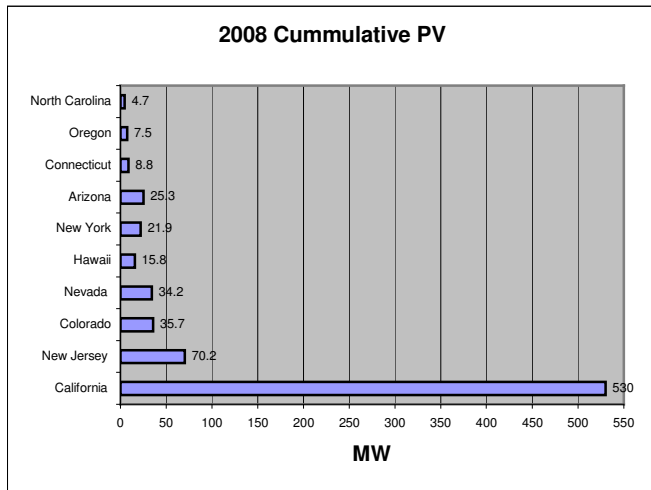
Comparing Simple Payback of Solar Systems in California and the Mid-Atlantic States

Kerinia Cusick
Syn-Dex Consulting, April 2009

Where can a PhotoVoltaic (PV) system generate a quicker payback? Is it in California, the state that currently holds 68% of the solar market share, or is it in the Mid-Atlantic States, an area of the country that until recently has generally not been on the solar map? Here's a hint -- the answer might surprise you. Indeed, the answer is the Mid-Atlantic.

When it comes to the PV marketplace in the United States, everyone recognizes that CA is the largest market. However, as CA's incentives ratchet down and other states develop their markets, emerging states are starting to look more favorable. Included below is a quick comparison of payback for solar projects in the Mid-Atlantic (defined in this case as New Jersey, Delaware, Maryland, Pennsylvania, and the District of Columbia) versus CA.

Let's start by acknowledging the strength of CA's marketplace. As one can see in the graph, with 530 MW of cumulative PV installed at the end of 2008, CA held nearly 68% of the US market share for PV, up from 58% in 2008. Both NJ and Colorado installed approximately 22 MW of PV in 2008, which was only about a 50% increase for NJ but nearly a 150% increase for CO ¹.



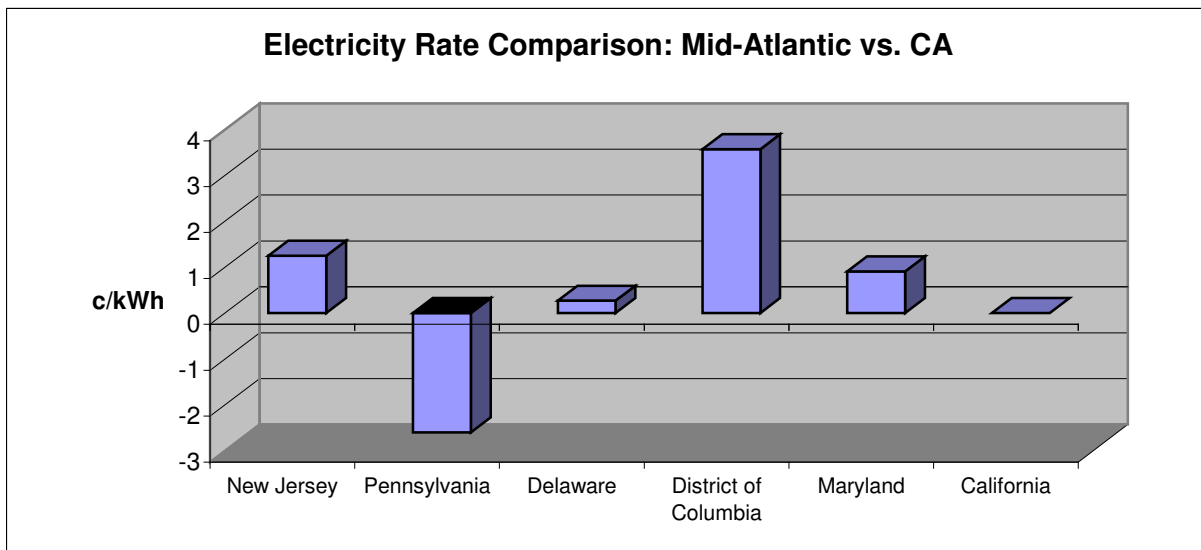
Obviously, with the exception of NJ, there isn't a single Mid-Atlantic state on the list of leading states – either in the category of 2008 Cumulative PV or 2008 Installed PV. With this data, how can one imagine that the Mid-Atlantic States are an emerging market?

DE, MD, DC, PA and NJ have all taken a different approach for incentivizing PV than CA, choosing to fund solar by creating a financial marketplace for Solar Renewable Energy Credits (SRECs). The SREC market is still in its infancy, and as a financing vehicle it is much more difficult to understand than CA's comparatively straightforward incentive program. Instead of a clear performance based incentive for



commercial projects, solar generators and their financiers need to understand and account for the factors that are going to cause SREC pricing to vary – including the Alternative Compliance Payment (ACP) and the state’s progress towards meeting the solar RPS.

Before we jump to comparing the simple payback on PV systems, lets first look at the other factors impacting payback, including the cost of electricity and installation costs. The chart below shows the price of electricity in the Mid-Atlantic as compared to CA. With the exception of PA, all of the Mid-Atlantic states have higher electricity rates than CA². CA industrial rates are approximately 9.4 c/kWh, while D C is as high as 12.97 c/kWh.



How do the installation costs compare? A report from Lawrence Berkeley National Labs analyzed installation costs³, and the table below is an excerpt from their report.

State	Total Sample Capacity-Weighted Average Cost	2006-2007 Systems				
		All Sizes Capacity-Weighted Average Cost	Simple Average Cost			
			0 - 10 kW	10 - 100 kW	100 - 500 kW	>500 kW
AZ	\$7.8 (n=540)	\$7.6 (n=413)	\$7.6 (n=391)	\$8.1 (n=20)	\$9.1 (n=2)	n/a (n=0)
CA	\$7.7 (n=30963)	\$7.5 (n=14614)	\$8.1 (n=12850)	\$7.6 (n=1607)	\$7.3 (n=136)	\$6.7 (n=33)
CT	\$8.4 (n=311)	\$8.3 (n=274)	\$8.8 (n=252)	\$8.1 (n=19)	\$7.9 (n=3)	n/a (n=0)
IL	\$12.4 (n=166)	\$8.5 (n=118)	\$9.8 (n=116)	\$3.3 (n=2)	n/a (n=0)	n/a (n=0)
MA	\$9.7 (n=702)	\$9.6 (n=415)	\$9.1 (n=389)	\$10.1 (n=24)	\$8.8 (n=5)	n/a (n=0)
MD	\$9.8 (n=78)	\$9.7 (n=71)	\$10.6 (n=69)	\$8.5 (n=2)	n/a (n=0)	n/a (n=0)
MN	\$8.4 (n=105)	\$8.5 (n=60)	\$8.8 (n=59)	\$8.7 (n=3)	n/a (n=0)	n/a (n=0)
NJ	\$7.7 (n=2395)	\$7.5 (n=1588)	\$8.4 (n=1301)	\$8.4 (n=272)	\$7.6 (n=50)	\$6.7 (n=15)
NY	\$8.8 (n=755)	\$8.8 (n=519)	\$8.8 (n=472)	\$8.9 (n=52)	n/a (n=0)	n/a (n=0)
OR	\$8.0 (n=600)	\$8.4 (n=324)	\$8.4 (n=305)	\$8.4 (n=19)	n/a (n=0)	n/a (n=0)
PA	\$9.0 (n=137)	\$8.7 (n=67)	\$8.7 (n=66)	\$8.4 (n=1)	n/a (n=0)	n/a (n=0)
WI	\$8.4 (n=240)	\$8.3 (n=162)	\$8.7 (n=149)	\$7.9 (n=16)	n/a (n=0)	n/a (n=0)

Source: Lawrence Berkeley National Labs³



Not all Mid-Atlantic states are listed, but one can see that costs in CA and NJ are nearly equivalent. MD and PA are significantly more expensive than CA, and no data is listed for DE or DC. It is worth noting that installed costs dropped by at least 20% in the 4th quarter of 2008, mostly due to a dramatic decrease in module price driven by world-wide oversupply. Two factors kept module prices high in 2008: (1) Spain installed over 2 GW of solar in 2008, and (2) the continued shortage of silicon feedstock. However, Spain's goals have contracted, with installation of only 500 MW anticipated in 2009. Module price is approximately 50% of the total installed price.

Finally, how do the incentives compare? California's Solar Initiative (CSI) provides a performance-based incentive (PBI) for power generated. The incentives are designed to ratchet down as more solar is installed in the state, starting high at 39 c/kWh in Step 2 (the lowest step available for commercial systems) and decreasing all the way to 3 c/kWh in Step 9. The Mid-Atlantic SREC marketplace has been varying between 22 c/kWh and 65 c/kWh depending upon the state, size of system, and contractual terms (spot market versus long term contract).

When one puts these numbers all together, and accounting for differences in solar radiance, it is clear that Mid-Atlantic PV systems have a quicker payback and higher rate of return. The table below summarizes the results using a 1 MW system for comparison purposes.

State	Simple Payback for 1 MW Solar PV (years)	Comments
CA (CSI Step 5)	~8.25	CCSE and SCE at Step 5. Step 3 & 4 incentives only available for residential systems
CA (CSI Step 6)	~9.75	PGE commercial systems at Step 6, only 45 MW left at Step 6
CA (CSI Step 7)	~11	
CA (CSI Step 8)	~11.75	
CA (CSI Step 9)	~12.15	
DC	~7	30 c/kWh for SRECs
DE	~8.75	25 c/kWh for SRECs
MD	~8.25	28 c/kWh for SRECs
NJ	~6	35 c/kwh for SRECs
PA	~10	22 c/kWh for SRECs

Of course, the key factor in achieving a rapid payback in the Mid-Atlantic is an understanding of the SREC marketplace and obtaining a favorable SREC contract. This will largely be driven by the number of solar projects being built in the state, and the overall progress towards achieving the solar RPS goals. For more information on factors impacting the SREC marketplace and profitability of PV projects, please contact Syn-Dex Consulting.

¹ Solar Energy Industry Association, 2008 US Solar Industry Year in Review, March 2009

² EIA Electric Power Monthly report with data for December 2008, published March 24, 2009

³ Barbose, G., Peterman, C., Wiser, R., Tracking the Sun: The Installed Cost of Photovoltaics in the US from 1998 – 2007, February 2009