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We've been tracking 14 of our customers PV systems in Western Mass since 2003, a representative sample of roof and ground mounts with varying tilt angles and orientations.

Their average changes each year and as you can see is significantly lower than the predicted output of a PV system based on 20 year meteorological data for Albany and Boston and for a true south oriented 1 kW PV system tilted at 42 degrees.

Our sincere thanks to all our customers who report their solar kWh readings. The data has been used by many students of solar and helps us accurately estimate benefits.

### AC Production Range 1 kW PV Capacity

Month	kWh		
	Based on 20 yr avg*		Based on 12 yr avg
	Boston	Albany	BPVS Sample**
Jan	88	83	51.73
Feb	99	95	65.39
Mar	120	108	104.21
Apr	118	119	124.42
May	126	128	125.49
Jun	120	117	122.71
Jul	128	127	138.49
Aug	129	124	128.33
Sep	116	111	116.24
Oct	112	96	80.69
Nov	77	59	63.50
Dec	76	60	46.68
Total annual	1309	1226	1167.89

\*AC Watts Generated from PV Watts Grid Data Calculator (Ver. 2) with a 0.833 derate factor at a 42 degree fixed tilt

\*\*Courtesy of detailed data collected on BPVS W. Mass systems from 2003-2015. © BPVS 2016

### Environmental Benefits per 1 kW of Capacity Based on Western Mass Generation Mix Year 2015

		Daily	Yearly	System Life 30 Years
kWh	high	3.36	1,226.40	36,792.00
	low	3.20	1,168.00	35,040.00
CO2 (lbs)	high	5.66	2,065.90	61,977.00
	low	5.39	1,967.35	59,020.50
SO2 (lbs)	high	0.028	10.22	306.60
	low	0.027	9.86	295.65
NOx (lbs)	high	0.007	2.56	76.65
	low	0.0067	2.45	73.37
Hg (g)	high	0.00038	1.38	41.61
	low	0.00036	1.31	39.42

High= (Albany Weather Data, 20 yr avg.) Low= (BPVS Sample, past 12 yr avg.)

(CO2-Carbon Dioxide, SO2-Sulfer Dioxide, NOx- Nitrogen oxide, HG-Mercury)

Emissions were calculated using data from ISO- New England, EPA, EIA, and McClatchy.

Massachusetts continues to diversify how its electricity is produced, yet fossil fuels continue to account for 72.8% of the state's electrical generation fuel mix (Natural gas, petroleum, and coal). 27.2% comes from renewable energy sources (Solar, wind, biomass, hydroelectric, nuclear, and wood). Solar thermal and photovoltaic energy accounted for 2.1% of the state's energy mix in 2015. The largest contributor was Natural Gas at 63.3%, despite it having a CO2 emissions rating of 1.14 lbs/kWh. These figures correspond with total electricity produced found from the EIA along with each fuel's percentage taken from ISO-New England.

Not shown are trace amounts of cadmium and arsenates, a host of toxins and radioactive elements which result from conventional electricity generation supplied to Berkshire, Franklin, Hampden and Hampshire counties of Massachusetts.

This table was first created by Abby Krich in 2004 when she was at Cornell University. BPVS interns have refined this table over the years- this year our intern from MCLA, Joshua Reynolds, updated Evan Hess's 2014 research.

Rebecca Martin of our office did the research when she interned in 2007 from MCLA and now guides new summer interns on keeping it updated.