



Berkshire Photovoltaic Services

www.bpvs.com

We have been tracking 12 of our customers PV systems in Western Mass since 2003, a representative sample of roof and ground mounts with varying tilt angles and orientations.

This original group of sample systems is now 15 years old. Equipment efficiencies have improved significantly. We are now conducting sensitivity analysis of a wider group of sample customer systems. Our goal is to provide you with the most accurate statistics. While our 2016 statistics represent our original sample, we want to let you know that we are in the process of replacing this report with one more up to date and detailed for recent years as well as for very efficient solar equipment such as Panasonic HIT modules.

Consider the BPVS sample yearly average of 1172.29 kWh per kilowatt conservative. We noted in our emissions table below the average of our higher producers at 1259.98 kWh per kilowatt. This is typical of our new system installations for a yearly average.

Environmental Benefits per 1 kW System

Based on Massachusetts Generation Mix Year 2016

High= BPVS Sample Average of Highest Producers

Low = BPVS Sample Average of ~1172 kWh per kW

AC Production for a 1 kW DC Photovoltaic System

Month	kWh		
	Based on 20 yr avg		Based on past 10 yr avg
	Albany*	Boston*	BPVS Sample**
Jan	71	83	54.26
Feb	81	95	62.32
Mar	111	107	90.08
Apr	122	123	110.87
May	140	135	128.41
Jun	146	139	134.00
Jul	150	149	142.35
Aug	137	143	136.77
Sep	136	127	110.79
Oct	119	109	95.75
Nov	75	67	60.67
Dec	66	56	46.02
Total annual	1354	1302	1172.29

*AC production generated from PVWatts Grid Data Calculator (Ver.2) with a 0.833 derate factor at a 42° fixed tilt

**Courtesy of detailed data collected from 12 BPVS W. Mass systems from 2003-2016. © BPVS 2017

Emissions		Daily	Yearly	System Life 30 Years
kWh	high	3.452	1259.98	37799.40
	low	3.061	1172.29	33518.7
CO2 (lbs) Carbon Dioxide	high	3.097	1130.65	33919.70
	low	2.747	1002.65	30079.5
SO2 (lbs) Sulfur Dioxide	high	0.00313	1.14	34.32
	low	0.002779	1.014	30.42
NOx (lbs) Nitrogen Oxide	high	0.00519	1.89	56.78
	low	0.0045985	1.678	50.34
Hg (mg) Mercury	high	0.00039	0.143	4.286
	low	0.0003471	0.127	3.81

Emissions were calculated using data from Independent System operator- New England (ISO-NE), the Federal Environmental Protection Agency(EPA), and the Energy Information Administration (EIA).

Massachusetts continues to diversify how its electricity is produced, yet fossil fuels still make up nearly 2/3 of the generation fuel mix. These figures correspond with average emissions for electricity produced found at EIA along with regional producers taken from ISO-NE.

Not shown are trace amounts of cadmium and arsenates, as well as a host of toxins and radioactive elements which result from conventional electricity generation.

This table was first created by Abby Krich in 2004 when she was an intern from Cornell University. BPVS interns have refined this table over the years- this year Walker Phillips, our intern from MCLA, updated Josh Reynolds' 2015 research.

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