

BUY FROM UTILITY				PV SYSTEM; 3 kW System; cost 15000					FINANCING PV SYSTEM				FINANCING INVERTER REPLACEMENT						
Year	Usage	Rate	Cost	Panel Aging Rate	Power Prod'd	Power Bought	Cost of Power Bought	O&M Cost	Mortgage 15000	@ 5%/yr		Mortgage 2200	@ 5%/yr						
	kWh/yr	\$/kWh	\$/yr		kWh/yr	kWh/yr	\$/yr	\$/yr	Princ'l Remain'g	Princ'l Paym't \$/yr	Int Paym't \$/yr	Total Paym't \$/yr	Princ'l Remain'g	Princ'l Paym't \$/yr	Int Paym't \$/yr	Total Paym't \$/yr	Total Cost \$/yr		
2010	6000	0.130	780	0.003	3782	2218	288	75	15000	14685	315	750	1065				1428		
2011	6000	0.136	815	0.003	3771	2229	303	78	14355	14355	330	734	1065				1445		
2012	6000	0.142	852	0.003	3759	2241	318	80	14008	14008	347	718	1065				1463		
2013	6000	0.148	890	0.003	3748	2252	334	83	13644	13644	364	700	1065				1482		
2014	6000	0.155	930	0.003	3737	2263	351	86	13262	13262	382	682	1065				1502		
2015	6000	0.162	972	0.003	3726	2274	368	89	12860	12860	401	663	1065				1522		
2016	6000	0.169	1016	0.003	3714	2286	387	92	12439	12439	422	643	1065				1544		
2017	6000	0.177	1061	0.003	3703	2297	406	95	11996	11996	443	622	1065				1566		
2018	6000	0.185	1109	0.003	3692	2308	427	99	11531	11531	465	600	1065				1590		
2019	6000	0.193	1159	0.003	3681	2319	448	102	11043	11043	488	577	1065				1615		
2020	6000	0.202	1211	0.003	3670	2330	470	106	10531	10531	512	552	1065				1641		
2021	6000	0.211	1266	0.003	3659	2341	494	109	9993	9993	538	527	1065				1668		
2022	6000	0.220	1323	0.003	3648	2352	519	113	9428	9428	565	500	1065	2200			1696		
2023	6000	0.230	1382	0.003	3637	2363	544	117	8835	8835	593	471	1065	2062	138	110	248	1726	
2024	6000	0.241	1445	0.003	3626	2374	571	121	8212	8212	623	442	1065	1917	145	103	248	1757	
2025	6000	0.252	1510	0.003	3615	2385	600	126	7558	7558	654	411	1065	1764	152	96	248	1790	
2026	6000	0.263	1577	0.003	3604	2396	630	130	6871	6871	687	378	1065	1604	160	88	248	1824	
2027	6000	0.275	1648	0.003	3594	2406	661	135	6150	6150	721	344	1065	1436	168	80	248	1860	
2028	6000	0.287	1723	0.003	3583	2417	694	139	5393	5393	757	307	1065	1260	176	72	248	1898	
2029	6000	0.300	1800	0.003	3572	2428	728	144	4598	4598	795	270	1065	1075	185	63	248	1937	
2030	6000	0.314	1881	0.003	3561	2439	765	149	3763	3763	835	230	1065	880	194	54	248	1978	
2031	6000	0.328	1966	0.003	3551	2449	802	154	2887	2887	876	188	1065	676	204	44	248	2021	
2032	6000	0.342	2054	0.003	3540	2460	842	160	1967	1967	920	144	1065	461	214	34	248	2067	
2033	6000	0.358	2147	0.003	3529	2471	884	165	1000	1000	966	98	1065	236	225	23	248	2114	
2034	6000	0.374	2243	0.003	3519	2481	928	171	0	0	1000	50	1050	0	236	12	248	2149	
Total	150000		34761		91223	58777	13763	2921		15000	11600	26600		2200	779	2979	46263		
								Total Cost		Levelized cost \$/kWh			14630					PV system, 55% of capital cost as a tax credit	
Utility only								34761		0.232			15000					PV system cost	
PV system, no subsidy, no deductions								46263		0.308			2250					less state tax credit	
PV system, 55% of capital cost as a tax credit								34293		0.229			4500					less fed tax credit	
PV system; state tax credit 75c/W, fed tax credit 30%								34293		0.229			8250					to be financed, 5%/yr for 25 yrs	14630

GENERAL NOTES:

Electricity use is assumed at 6,000 kWh/yr
 Electricity use could decline as existing equipment and systems of the house are replaced with more efficient ones in future years.
 Electricity rates are assumed to increase at 4.5% per year.

Residential PV system: roof-mounted; capacity 3 kW of crystalline silicon panels; installed cost \$15,000, or \$5,000/kW
 PV system life is assumed at 25 years, after which PV panels may be replaced and other items, such as inverters, are upgraded/refurbished/replaced.
 Recycling and disposal costs of panels and other items were not included in this analysis.

Production = 3 kW x 4.3 avg peak sun hrs/d x 365 d/yr x 0.825 avg eff = 3,782 kWh/yr; production declines because of aging of PV panels and increased outages of the system as it ages.
 Production will be reduced by dust, snow, shadows, higher summer temperatures, not true-south-facing, not correctly-angled
 PV panel aging is assumed at 0.3% per year.

Operation and maintenance, O&M, costs are assumed at 0.005% of installed cost, inflating at 3.5% per year. The O&M percentage may increase as the system ages.

The inverter, such as by SMA, converts DC to AC; cost about 20% of the PV system, depending on design, component quality, sine wave quality and features
 The inverter is warranted for 10 years, may need to be replaced after about 12 years, or it may need to be refurbished at that time
 Assume the present cost of a 3 kW SMA inverter is \$3,500, then, at 3% inflation, it will be \$5,140 at the end of year 13 (2022); refurbishing will be less costly
 Assume, for this analysis, the inverter is refurbished for \$2,200 at the end of year 13 and the cost is amortized at 5%/yr for 12 years, the yearly payments will be

248.2

Interest rate is assumed at 5%; loan amortized over 25 years; loan starts Jan.1, 2010; amortization factor $\{1-1/(1+0.05)^{25}\}/0.05$ 14.09 12 years 8.863
 Financing and other fees were not included in this analysis. Renewable energy systems are exempt from sales taxes, not exempt from property taxes in Vermont.