

EXISTING CONDITIONS: RESIDENTIAL - WITHOUT PV SYSTEM																										
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Usage	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Rate \$/kWh	0.130	0.136	0.143	0.149	0.156	0.164	0.171	0.179	0.188	0.197	0.206	0.215	0.226	0.236	0.247	0.259	0.271	0.284	0.297	0.311	0.326	0.341	0.357	0.374	0.391	0.410
Inflation rate	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
Cost \$	780	817	855	895	937	981	1027	1076	1126	1179	1235	1293	1353	1417	1484	1553	1626	1703	1783	1867	1954	2046	2143	2243	2349	2459
ALTERNATIVE CONDITIONS: RESIDENTIAL - WITH PV SYSTEM																										
Aging rate		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
PV Produced	3767	3759	3752	3744	3737	3729	3722	3715	3707	3700	3692.3	3685	3678	3670	3663	3656	3648	3641	3634	3626	3619	3612	3605	3597	3590	3583
Purchased	2233	2241	2248	2256	2263	2271	2278	2285	2293	2300	2307.7	2315	2322	2330	2337	2344	2352	2359	2366	2374	2381	2388	2395	2403	2410	2417
Rate \$/kWh	0.130	0.136	0.143	0.149	0.156	0.164	0.171	0.179	0.188	0.197	0.206	0.215	0.226	0.236	0.247	0.259	0.271	0.284	0.297	0.311	0.326	0.341	0.357	0.374	0.391	0.410
Cost \$	290	305	320	337	354	371	390	410	430	452	475	499	524	550	578	607	638	670	703	738	776	814	855	898	943	991
O & M rate	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Inflation rate	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
O & M cost \$	105	109	112	116	120	125	129	134	138	143	148	153	159	164	170	176	182	188	195	202	209	216	224	232	240	248
FINANCING: NO INCENTIVES; 100% OF INSTALLED COST IS BORROWED AT 6%/YR, INTEREST NOT DEDUCTABLE, NO DEPRECIATION, NO TAX CREDITS.																										
Principal	19500	19144	18767	18367	17943	17493	17017	16512	15977	15409	14808	14170	13494	12778	12019	11214	10361	9456	8498	7481	6404	5263	4052	2769	1410	0
Int. Paym		1170	1149	1126	1102	1077	1050	1021	991	959	925	888	850	810	767	721	673	622	567	510	449	384	316	243	166	85
Princ Paym		356	377	400	424	449	476	505	535	567	601	638	676	716	759	805	853	904	959	1016	1077	1142	1210	1283	1360	1410
Total Paym		1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526	1526
Tax Saving																										
FINANCING: 60% OF INSTALLED COST IS A TAXABLE GRANT; 0.35 x 0.6 x 19,500 + 0.4 x \$19,500 = \$11,895 IS BORROWED AT 6%/YR, INTEREST NOT DEDUCTABLE, NO DEPRECIATION																										
Principal	11895	11678	11447	11203	10944	10670	10379	10071	9744	9398	9031	8642	8229	7792	7328	6837	6316	5764	5179	4559	3901	3205	2466	1683	853	0
Int. Paym		714	701	687	672	657	640	623	604	585	564	542	518	494	468	440	410	379	346	311	274	234	192	148	101	51
Princ Paym		217	230	244	259	274	291	308	327	346	367	389	413	437	463	491	521	552	585	620	657	697	739	783	830	853
Total Paym		931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931
Tax Saving																										
FINANCING: CURRENT INCENTIVES; 100% OF INSTALLED COST IS BORROWED AT 6%/YR, INTEREST NOT DEDUCTABLE, NO DEPRECIATION																										
Principal	11900	11683	11453	11209	10951	10677	10386	10079	9752	9406	9040	8651	8239	7803	7340	6849	6329	5778	5193	4574	3918	3222	2484	1702	873	0
Int. Paym		714	701	687	673	657	641	623	605	585	564	542	519	494	468	440	411	380	347	312	274	235	193	149	102	52
Princ Paym		217	230	244	258	274	290	308	326	346	367	389	412	437	463	491	520	551	584	619	657	696	738	782	829	873
Total Paym		931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931
Tax Saving																										
EXISTING CONDITIONS: WITHOUT PV SYSTEM																										
Purchased electricity over 25 years	6,000 kW/yr x 25 yrs = 150,000 kWh																									
Levelized electricity over 25 years	\$38,183/150,000 kWh = 0.255 \$/kWh See note.																									
Purchased electricity cost over 25 years	\$ 38183																									
Note:	Past loan guarantees, low interest rate financing, grants, federal and state tax credits, tax effects of deductions from taxable income and not accounting for environmental, health, military (to protect resources), nuclear plant decommissioning and nuclear waste storage costs, have artificially reduced levelized costs of fossil and nuclear power. Proposed carbon and/or CO2 taxes, coal gasification and CO2 sequestration, etc., will increase future levelized costs of fossil power.																									
ALTERNATIVE CONDITIONS: WITH PV SYSTEM																										
PV electricity produced over 25 years	No Incentives				60% of Installed Cost is a Grant				Current Incentives:				\$ 19500 installed cost													
O & M costs over 25 years	\$ 4338				\$ 4338				\$ 4338				less \$ 5850 30% federal tax credit													
Financing cost, interest and principal over 25 years	\$ 38150				\$ 23275				\$ 23275				\$ 11900 to be financed													
Gain from tax saving over 25 years	\$ 0				\$ 0				\$ 0																	
Total cost of PV system over 25 years	\$ 42488				\$ 27613				\$ 27613				Cap'l													
Purchased electricity cost over 25 years	\$ 14918				\$ 14918				\$ 14918				Amort													
Total cost of ALTERNATIVE CONDITIONS	\$ 57406				\$ 42531				\$ 42531				Annual Loan													
Excess cost of ALTERNATIVE CONDITIONS	\$ 19223				\$ 4348				\$ 4348				Cost													
Levelized cost of PV system power over 25 years	\$ 0.445 \$/kWh				\$ 0.289 \$/kWh				\$ 0.289 \$/kWh				Factor													
													Payment													
													\$													
													No incentives													
													60% of capital cost													
													Current incentives													
													19500													
													11895													
													11900													
													12.78													
													12.78													
													931													
													931													
													35%													
Note:	A taxable grant of 60%, reduces the 25-yr levelized cost from \$0.445/kWh to \$0.289/kWh The current Federal and State incentives are equivalent to a taxable capital grant of about 60% of the installed cost If the loan was added to the house mortgage, then the interest would be deductible which would be more valuable to high income households than to average income households.																									
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 4.7% per year.																										
Residential PV system: roof-mounted; capacity 3 kW of crystalline silicon panels; installed cost \$19,500, or \$6,500/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 0.80 avg eff = 3,767 kWh/yr; production could decline because of aging of PV panels and increased outages of the system as it ages.																										
PV panel efficiency is affected by dust, snow, shadows, higher summer temperatures.																										
PV panel aging is assumed at 0.2% per year. Source: Planning and Installing PV Systems, by Gesellschaft fur Sonnenenergie.																										
Operation and maintenance, O & M, costs are assumed at 0.05% of installed cost, inflating at 3.5% per year. The O & M percentage may increase as the system ages.																										
The inverter converts DC to AC, costs 10% - 15% of the PV system, depending on design, component quality, sine wave quality and features; needs to be replaced every 10 - 15 years.																										
Interest rate is assumed at 6%; loan amortized over 25 years; loan starts on Jan.1, 2009.																										
Financing and other fees were not included in this analysis. Renewable energy systems are exempt from sales and property taxes in Vermont.																										