



Are High Efficiency Panels Worth the Higher Price?

Many customers are sold on the idea of buying the most efficient panel they can find. An efficient panel doesn't produce any more power over a less efficient panel. What a high efficient panel produces is a smaller footprint which could be an advantage on a roof with limited area.

This is an example of a roof area using High Efficiency Panels, 19% vs a Standard Mono Crystalline Panel 15%.

The criteria is for a 10 KW system

The roof area will allow for 36 panels on a southeast facing roof (160 degrees). The remaining panels will have to be mounted on the southwest roof (250 degrees). The roof pitch is a 4/12 slope.

High Efficiency Panels allows for 8560 watts of panels to be mounted on the southeast roof. With is configuration the best option requires two inverters. This would leave the southwest roof with 6 panels. There is a problem because the inverter will not work with 6 panels on the string so 10 panels would have to be utilized of the second roof area. In order to accommodate 4 panels would have to be removed from the southeast roof. In other words the maximum size of the panels on the southeast roof is now 7600 watts. The good news is that one inverter can be used for the southeast arrays and one on the southwest array.



Higher Efficiency Panels:

The power production for this system is 10,549 KWH for the southeast array and 2890 KWH for the southwest array for a total of 13,439KWH for the year.

The price of this system \$25,600

		Building Cost Effective Solar PV Systems Residential ROI Calculations						
System size 9.99 kW Energy Cost \$0.11 kWh Inflation Rate 3% Degradation 1% System Cost \$25600								
Year	kW Cost \$	Yearly System Output kWh	Energy Production \$	System Cost (Payback Period)	System Cost (Payback Period) With a 6% Loan	Money Earned Per Year	Total Profit With a 6% Loan	Total Profit No Loan
1	\$0.11	13439	\$1478	\$-24122	\$-25658	\$-58	\$-58	\$1478
2	\$0.113	13305	\$1503	\$-22619	\$-25694	\$-36	\$-94	\$2981
3	\$0.117	13172	\$1541	\$-21078	\$-25695	\$-1	\$-95	\$4522
4	\$0.12	13040	\$1565	\$-19513	\$-25672	\$23	\$-72	\$6087
5	\$0.124	12909	\$1601	\$-17912	\$-25611	\$61	\$-11	\$7688
6	\$0.128	12780	\$1636	\$-16276	\$-25512	\$99	\$88	\$9324
7	\$0.131	12653	\$1658	\$-14618	\$-25385	\$127	\$215	\$10982
8	\$0.135	12526	\$1691	\$-12927	\$-25217	\$168	\$383	\$12673
9	\$0.139	12401	\$1724	\$-11203	\$-25006	\$211	\$594	\$14397
10	\$0.144	12277	\$1768	\$-9435	\$-24738	\$268	\$862	\$16165
11	\$0.148	12154	\$1799	\$-7636	\$-24423	\$315	\$1177	\$17964
12	\$0.152	12032	\$1829	\$-5807	\$-24059	\$364	\$1541	\$19793
13	\$0.157	11912	\$1870	\$-3937	\$-23633	\$426	\$1967	\$21663
14	\$0.162	11793	\$1910	\$-2027	\$-23141	\$492	\$2459	\$23573
15	\$0.166	11675	\$1938	\$-89	\$-22591	\$550	\$3009	\$25511
16	\$0.171	11558	\$1976	\$1887	\$-21970	\$621	\$3630	\$27487
17	\$0.177	11443	\$2025	\$3912	\$-21263	\$707	\$4337	\$29512
18	\$0.182	11328	\$2062	\$5974	\$-20477	\$786	\$5123	\$31574
19	\$0.187	11215	\$2097	\$8071	\$-19609	\$868	\$5991	\$33671
20	\$0.193	11103	\$2143	\$10214	\$-18643	\$966	\$6957	\$35814
21	\$0.199	10992	\$2187	\$12401	\$-17575	\$1068	\$8025	\$38001
22	\$0.205	10882	\$2231	\$14632	\$-16399	\$1176	\$9201	\$40232
23	\$0.211	10773	\$2273	\$16905	\$-15110	\$1289	\$10490	\$42505
24	\$0.217	10665	\$2314	\$19219	\$-13703	\$1407	\$11897	\$44819
25	\$0.224	10559	\$2365	\$21584	\$-12160	\$1543	\$13440	\$47184
26	\$0.23	10453	\$2404	\$23988	\$-10486	\$1674	\$15114	\$49588
27	\$0.237	10349	\$2453	\$26441	\$-8662	\$1824	\$16938	\$52041
28	\$0.244	10245	\$2500	\$28941	\$-6682	\$1980	\$18918	\$54541
29	\$0.252	10143	\$2556	\$31497	\$-4527	\$2155	\$21073	\$57097
30	\$0.259	10041	\$2601	\$34098	\$-2198	\$2329	\$23402	\$59698

Lower Efficiency Panels:

36 panels = 6840 watts for the southeast array and 16 panels = 3,040 watts for the southwest array. The power production for this system is 9,494 KWH for the southeast array and 3,691 KWH for the southwest array for a total of 13,185 KWH for the year. The price of this system \$19,800.

		Building Cost Effective Solar PV Systems Residential ROI Calculations							
System size 9.88 kW Energy Cost \$0.11 kWh Inflation Rate 3% Degradation 1% System Cost \$19800									
Year	kW Cost \$	Yearly System Output kWh	Energy Production \$	System Cost (Payback Period)	System Cost (Payback Period) With a 6% Loan	Money Earned Per Year	Total Profit With a 6% Loan	Total Profit No Loan	
1	\$0.11	13185	\$1450	\$-18350	\$-19538	\$262	\$262	\$1450	
2	\$0.113	13053	\$1475	\$-16875	\$-19235	\$303	\$565	\$2925	
3	\$0.117	12923	\$1512	\$-15363	\$-18877	\$358	\$923	\$4437	
4	\$0.12	12793	\$1535	\$-13828	\$-18475	\$402	\$1325	\$5972	
5	\$0.124	12665	\$1570	\$-12258	\$-18014	\$461	\$1786	\$7542	
6	\$0.128	12539	\$1605	\$-10653	\$-17490	\$524	\$2310	\$9147	
7	\$0.131	12413	\$1626	\$-9027	\$-16913	\$577	\$2887	\$10773	
8	\$0.135	12289	\$1659	\$-7368	\$-16269	\$644	\$3531	\$12432	
9	\$0.139	12166	\$1691	\$-5677	\$-15554	\$715	\$4246	\$14123	
10	\$0.144	12045	\$1734	\$-3943	\$-14753	\$801	\$5047	\$15857	
11	\$0.148	11924	\$1765	\$-2178	\$-13873	\$880	\$5927	\$17622	
12	\$0.152	11805	\$1794	\$-384	\$-12911	\$962	\$6889	\$19416	
13	\$0.157	11687	\$1835	\$1451	\$-11851	\$1060	\$7949	\$21251	
14	\$0.162	11570	\$1874	\$3325	\$-10688	\$1163	\$9112	\$23125	
15	\$0.166	11454	\$1901	\$5226	\$-9428	\$1260	\$10372	\$25026	
16	\$0.171	11340	\$1939	\$7165	\$-8055	\$1373	\$11745	\$26965	
17	\$0.177	11226	\$1987	\$9152	\$-6551	\$1504	\$13249	\$28952	
18	\$0.182	11114	\$2023	\$11175	\$-4921	\$1630	\$14879	\$30975	
19	\$0.187	11003	\$2058	\$13233	\$-3158	\$1763	\$16642	\$33033	
20	\$0.193	10893	\$2102	\$15335	\$-1245	\$1913	\$18555	\$35135	
21	\$0.199	10784	\$2146	\$17481	\$826	\$2071	\$20626	\$37281	
22	\$0.205	10676	\$2189	\$19670	\$3015	\$2189	\$22815	\$39470	
23	\$0.211	10569	\$2230	\$21900	\$5245	\$2230	\$25045	\$41700	
24	\$0.217	10464	\$2271	\$24171	\$7516	\$2271	\$27316	\$43971	
25	\$0.224	10359	\$2320	\$26491	\$9836	\$2320	\$29636	\$46291	
26	\$0.23	10256	\$2359	\$28850	\$12195	\$2359	\$31995	\$48650	
27	\$0.237	10153	\$2406	\$31256	\$14601	\$2406	\$34401	\$51056	
28	\$0.244	10051	\$2452	\$33708	\$17053	\$2452	\$36853	\$53508	
29	\$0.252	9951	\$2508	\$36216	\$19561	\$2508	\$39361	\$56016	
30	\$0.259	9851	\$2551	\$38767	\$22112	\$2551	\$41912	\$58567	

Summary

High Efficiency Panels Cost \$25,600
Payback 15 years 30 + years with 6% loan
Output slightly higher

Lower Efficiency Panels

Lower Efficiency Panels Cost \$19,800
Payback 12 years 20 + years with 6% loan
Output slightly lower

The lower output panels are rated with an up to +5 watts per panel and carry a 30 year power output warrantee.

If money isn't an issue then high efficiency panels are fine. The best investment is with a lower cost per watt panel.

What about thin film? Thin-film is better yet if they will fit on your roof. Thin-film costs more to mount - more wire, more racking and more labor. The savings using Thin-film is not significant enough versus Si-PV.