

PHOTON Lab's outdoor module tests: Results of 2012 yield measurements

Rank	Manufacturer	Model	Production dates*1	Installed in	Yield in kWh/m ²	Performance ratio	Yield in kWh/kW	Deviation from test winner (%)
1	SunPower	SPR-327NE-WHT-D	-	2012	228.7	95.2%	1,144.1	-
2	SunPower	SPR-320NE-WHT-D	-	2012	227.6	94.9%	1,140.1	0.35%
3	SunPower	SPR-245NE-WHT-D	-	2012	225.3	94.8%	1,139.4	0.42%
4	Seraphim Solar System	SRP-220-6PB	-	2011	156.1	93.6%	1,125.5	1.63%
5	Yingli Green Energy	YL240P-29b	-	2012	169.2	93.1%	1,118.7	2.22%
6	ET Solar	ET-P660240	-	2011	161.6	92.8%	1,115.3	2.51%
7	Sunerg Solar	XP 60/156-230	-	2011	154.6	92.8%	1,115.0	2.55%
8	Siliken	SLK60P6L 230Wp	-	2009	158.0	92.7%	1,114.2	2.61%
9	Jinko Solar	JKM190M-72	2010	2011	166.1	92.5%	1,112.2	2.79%
10	Huanghe	HH230(30)P	-	2012	157.1	92.5%	1,112.1	2.80%
11	Jinko Solar	JKM235P-60	-	2012	156.8	92.5%	1,111.4	2.86%
12	Apollo Solar	235G6M	2011	2012	163.9	92.3%	1,109.0	3.07%
13	CSG PV Tech	CSG180S1-35/36*6	2008	2010	159.1	92.0%	1,106.1	3.32%
14	NexPower Technology	NT-125AX*2	2009-2010	2010	87.7	92.0%	1,105.9	3.34%
15	Linsun Renewable	SK60P6	-	2011	155.8	92.0%	1,105.6	3.36%
16	Huanghe	HH190(36)M	-	2012	164.7	91.9%	1,104.5	3.47%
17	Nelumbo	NEI 230-3VA	-	2011	153.8	91.8%	1,103.7	3.53%
18	Schott Solar*15	SCHOTT PERFORM Poly 235	Since 2011	2012	139.7	91.8%	1,103.4	3.56%
19	Conergy	Conergy PowerPlus 235P	-	2012	162.2	91.7%	1,101.8	3.70%
20	SolarWorld	Sunmodule Plus SW 225 mono	2009	2010	153.8	91.6%	1,100.4	3.82%
21	Upsolar	UP-M220P	2010-2011	2011	147.8	91.5%	1,099.3	3.92%
22	Aleo Solar	Aleo S_18 225	2005	2010	154.5	91.5%	1,099.3	3.92%
23	ZN Shine PV-Tech	ZX250(48)MS	-	2011	163.1	91.5%	1,099.1	3.93%
24	CNPV Solar	CNPV-240P	2006	2011	162.9	91.4%	1,099.0	3.94%
25	Himin Clean Energy	HG-190S/Ba	-	2012	167.0	91.4%	1,098.9	3.95%
26	REC	Premium 210	Until 2008	2011	141.2	91.4%	1,098.0	4.03%
27	REC	REC230AE*2	2007-2010	2010	152.1	91.4%	1,097.9	4.04%
28	Win Win Precision	Winaico WSP-250P6	-	2012	164.9	91.3%	1,097.6	4.06%
29	Chint Solar / Astronergy	CHSM5612M-185	-	2012	160.6	91.3%	1,097.1	4.11%
30	V-Energy	VE260PV	-	2012	155.1	91.3%	1,097.1	4.11%
31	Hareon Solar	HR-230P-18/Bb	-	2011	156.1	91.3%	1,096.9	4.13%
32	Solar Modules Nederland	TC245-MO	2010-2011	2011	165.0	91.3%	1,096.7	4.14%
33	Kinmac Solar*13	KSS-6P6A-230	2010	2011	156.5	91.3%	1,096.7	4.14%
34	Kioto Photovoltaics	KPV 210 PE*2	2008-2010	2009	152.0	91.2%	1,095.9	4.21%
35	BP Solar	BP 3220 T	Until 2011	2011	152.4	91.1%	1,094.5	4.34%
36	Solon	SOLO Blue 230/07(225)	2008	2011	151.4	91.1%	1,094.3	4.36%
37	ITS Innotech Solar	EcoPlus ITS220ECU5*10	2011	2012	160.6	90.9%	1,092.2	4.53%
38	SolarWorld	Sunmodule Plus SW 245 poly	-	2012	160.4	90.9%	1,092.1	4.54%
39	Amerisolar	AS-5M-190W	-	2012	166.4	90.9%	1,092.1	4.54%
40	Win Win Precision	Winaico WSP-235P6	-	2010	157.9	90.8%	1,091.7	4.58%
41	REC	REC230PE	2010	2011	157.1	90.8%	1,091.0	4.64%
42	Eurener	PEPV230	-	2012	153.7	90.8%	1,090.8	4.66%
43	CNPV Solar	CNPV-220P	2006	2011	150.0	90.8%	1,090.7	4.66%
44	Sunlink PV	SL220-20M230	-	2011	157.2	90.7%	1,090.6	4.68%
45	CH Solar	CH Solar 180 mono*2	Until 2010	2010	157.1	90.7%	1,090.2	4.71%
46	China Sunergy	CSUN260-60M	-	2012	170.9	90.7%	1,090.1	4.72%
47	Amerisolar	AS-6P30-230W	-	2012	157.3	90.6%	1,089.2	4.80%
48	CNPV Solar	CNPV-185M	2006	2010	164.9	90.6%	1,089.0	4.82%
49	Upsolar	UP-M180M	2010-2011	2010	154.3	90.5%	1,087.9	4.91%
50	M-Prime	M 235P	-	2012	162.6	90.5%	1,087.4	4.95%
51	Sunflower Light	SF125x125-72-M(180)	-	2011	150.0	90.5%	1,087.3	4.96%
52	Risen Energy	SY185S-M	-	2011	162.8	90.5%	1,087.3	4.97%
53	PV Power Technologies	PVQ3 220	2008	2009	150.0	90.4%	1,087.0	4.99%
54	SWAT-International	SWAT-240-PS	-	2011	162.3	90.4%	1,086.2	5.06%
55	Bisol	BMU-215-2/233	2009	2011	156.0	90.4%	1,086.0	5.08%
56	Conergy	Conergy PowerPlus 220P	2009	2010	149.4	90.3%	1,085.8	5.09%
57	CEEG Solar*5	SST 240-60M	2005	2011	160.2	90.3%	1,085.6	5.12%
58	China Sunergy	CSUN250-60M	-	2012	166.4	90.3%	1,085.4	5.13%
59	Linuo	LN180(36)M-185	2003	2011	162.6	90.3%	1,085.2	5.15%
60	JCS Solar*11	JCSM290M-72*12	-	2012	166.1	90.3%	1,085.2	5.15%
61	Galaxy Energy	GS260m-96	-	2011	164.3	90.3%	1,085.0	5.17%
62	Mage Solar	Mage Powertec Plus 225/6PJ	Until 2011	2009	153.4	90.2%	1,084.4	5.22%

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63	CEEG Solar*5	SST 265-72P	2005	2011	157.0	90.2%	1,084.1	5.24%
64	Axitec	AC 236P/156-60S	Until 2011	2011	152.1	90.2%	1,084.0	5.25%
65	SolarWorld	Sunmodule Plus SW 225 poly	2004-2011	2011	147.5	90.2%	1,084.0	5.25%
66	Solaria Energia	S6P2G2Z5	2010	2011	154.8	90.2%	1,083.8	5.27%
67	CSG PV Tech	CSG230M2-30*7	2008	2010	151.7	90.1%	1,083.3	5.31%
68	Trina Solar	TSM-180DC01	2007	2009	149.1	90.1%	1,083.2	5.33%
69	Trina Solar	TSM-225PC05	-	2010	153.9	90.1%	1,083.1	5.33%
70	Ningbo Solar	Sun Earth TDB125x125-72-P 180W*2	Until 2010	2011	151.6	90.1%	1,083.0	5.34%
71	Vikram Solar	ELDORA 220	-	2011	156.8	90.0%	1,082.2	5.41%
72	Mage Solar	Mage Powertec Plus 230/6PH-US	-	2011	154.7	90.0%	1,081.5	5.47%
73	Daqo New Energy	DQ235PSCa	-	2012	157.8	89.9%	1,080.5	5.56%
74	Magi Solar	MGSM-295-D	2011	2011	163.7	89.9%	1,079.9	5.61%
75	Eging Photovoltaic Technology	EGM-185	2010	2011	159.0	89.9%	1,079.9	5.61%
76	Linuo	LN240(30)P-225	2003	2011	155.6	89.8%	1,079.0	5.69%
77	S-Energy	SM-220PA8	-	2009	152.0	89.6%	1,076.9	5.87%
78	Bosch Solar	Bosch c-Si M 60 230	2009-2010	2011	153.0	89.6%	1,076.5	5.91%
79	Frankfurt Solar	FS215W-POLY	-	2009	147.9	89.5%	1,075.7	5.98%
80	Zentralsolar Deutschland	Genius SDM 185-10004-185	-	2011	160.2	89.5%	1,075.6	5.99%
81	Hanwha SolarOne*9	SF160-24-1M175 (scac)	-	2010	153.8	89.5%	1,075.6	5.99%
82	Topray Solar	TPS105T-180W	-	2011	155.3	89.5%	1,075.6	5.99%
83	BP Solar	BP 3280 T	Until 2011	2011	155.3	89.5%	1,075.4	6.00%
84	Bisol	BMU-215-2/221	2007	2010	150.2	89.5%	1,075.3	6.01%
85	Talesun Solar	TP572M-195	2011	2012	164.7	89.5%	1,075.1	6.03%
86	Solarwatt	M220-60 GET AK (230)	2005	2011	149.9	89.4%	1,075.0	6.04%
87	Solarbest Energy-Tech	ZSB M190	-	2011	156.2	89.4%	1,074.6	6.08%
88	Jinko Solar	ZJM255M-96	-	2011	164.1	89.4%	1,074.3	6.10%
89	Kenmec Mechanical	TKSA-23001	-	2011	153.9	89.4%	1,074.3	6.10%
90	Fluitemec	FTS-220 P	-	2011	153.7	89.4%	1,074.1	6.11%
91	Runda PV	RS230P-60	-	2012	155.7	89.3%	1,073.8	6.15%
92	Suntech Power	STP205-18/Ud	-	2011	156.2	89.3%	1,073.7	6.15%
93	Magi Solar	MGSM-240D-60	-	2011	162.0	89.3%	1,073.1	6.20%
94	Sunrise Solartech	SRM 180D72-GE	-	2009	152.2	89.3%	1,072.9	6.22%
95	Yingli Green Energy	YL210P-29b	2009	2011	141.0	89.3%	1,072.8	6.23%
96	Lilie Energie	Lilie SPL 185	-	2011	155.3	89.3%	1,072.8	6.23%
97	SolarWorld	Sunmodule Plus SW 210 poly*16	2004	2006	135.5	89.2%	1,072.5	6.26%
98	Zytech Engineering	ZT 230P	-	2011	150.9	89.2%	1,072.5	6.26%
99	Solargate	SG-2350	-	2012	163.0	89.2%	1,071.9	6.31%
100	Topsolar Green	TSM72-125M-190W	-	2011	155.6	89.2%	1,071.6	6.33%
101	Upsolar	UP-M185M	2010-2011	2011	158.3	89.1%	1,071.3	6.37%
102	CNPV Solar	CNPV-240M	2006	2011	163.1	89.1%	1,071.2	6.37%
103	Sonalis*14	SL-180CE-36M	-	2010	154.7	89.0%	1,070.0	6.48%
104	Scheuten Solar	Multisol P6-60	-	2011	153.4	89.0%	1,069.7	6.50%
105	China Sunergy	CSUN240-60P	-	2012	160.9	89.0%	1,069.5	6.52%
106	Sunage	SAM 96/5	-	2011	154.1	88.9%	1,068.8	6.58%
107	Ningbo Solar	Sun Earth TDB125x125-72-P 160W*2	-	2011	134.8	88.8%	1,067.8	6.67%
108	Chint Solar / Astronergy	CHSM-6610P-230	-	2012	152.5	88.8%	1,067.7	6.68%
109	Ferrania Solis	AP 60-230	2010	2011	210.5	88.8%	1,067.3	6.71%
110	Hanwha SolarOne*9	SF160-24-1M180	-	2011	148.8	88.7%	1,066.4	6.79%
111	Sunpeak / Alpexsolar*4	ALP235W*2	2009-2010	2010	154.3	88.7%	1,066.3	6.80%
112	Jetion Solar	JT230(30)P1655x992	2005	2011	151.1	88.7%	1,066.0	6.83%
113	Alex Solar	ALM-190D-24	2009	2011	157.6	88.7%	1,065.8	6.84%
114	CNPV Solar	CNPV-190M	2006	2011	164.3	88.7%	1,065.6	6.86%
115	Aide Solar	AD195M5-Aa	-	2011	164.7	88.6%	1,065.0	6.91%
116	Helios Technology	H3A230P	-	2012	151.5	88.5%	1,063.5	7.04%
117	Luxor Solar	LX-185M/125-72+	2007	2011	156.4	88.4%	1,062.7	7.12%
118	Axitec	AC-250M/156-60S	-	2012	162.1	88.4%	1,061.9	7.19%
119	Lilie Energie	Lilie SPL 185-I	-	2011	155.2	88.3%	1,061.6	7.21%
120	Evergreen Solar	ES-E-210-fc3	-	2011	136.3	88.1%	1,058.8	7.45%
121	Win Win Precision	Winaico WSP-230P6	2009	2009	149.4	88.0%	1,057.9	7.53%
122	Shell Solar (now with SolarWorld)	Shell SQ 150-C*2	Until 2005	2006	124.5	87.8%	1,054.9	7.79%
123	Solar-Fabrik	Premium L poly (225)	-	2011	142.0	87.7%	1,054.3	7.85%
124	Day4 Energy	Day4 48MC 185	2006	2011	152.3	87.6%	1,053.3	7.93%

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125	Sharp	NU-185E1	2005	2011	148.3	87.5%	1,052.1	8.04%
126	Evergreen Solar	ES-A-210-fa2	2008	2011	140.7	87.5%	1,052.0	8.05%
127	Perfectenergy	PEM-180/185-72M-SCC	2008	2010	157.0	87.4%	1,050.8	8.15%
128	Hanwha SolarOne*3	SF160 M5-24 (175 W)*2	-	2007	143.2	87.4%	1,050.0	8.22%
129	Kyocera	KD210GH-2PU	2009	2011	149.3	87.2%	1,049.5	8.35%
130	Sonalis*14	SL-190CE-36M	-	2012	154.7	87.2%	1,047.8	8.42%
131	First Solar	FS-265	2006-2011	2007	94.8	86.9%	1,043.9	8.76%
132	Emvee Photovoltaics	ES-230P60*8	2008-2011	2010	144.0	86.5%	1,039.9	9.11%
133	Schott Solar*15	SCHOTT POLY TM 220	2008-2009	2011	157.9	86.4%	1,038.1	9.27%
134	IBC Solar	IBC MonoSol 240 TT	Until 2011	2011	153.7	86.3%	1,036.9	9.37%
135	Suntech Power	STP190-18/Ub*2	2005	2011	128.8	86.1%	1,034.8	9.55%
136	Sovello	SV-X-205-fa1	-	2011	135.3	85.8%	1,030.7	9.91%
137	Calrays	CPM 250-A-96	-	2011	149.7	85.3%	1,024.7	10.43%
138	Solar-Fabrik	SF 130/4-130*2	2006-2010	2010	133.8	85.2%	1,023.7	10.52%
139	Evergreen Solar	EC-120*2	2004-2006	2006	120.1	85.1%	1,022.7	10.61%
140	Sovello	SV-X-200-fa*13	2009-2011	2011	132.3	84.9%	1,019.8	10.87%
141	Canadian Solar	CS6A-170P	2007 (purchased)	2007	135.9	84.3%	1,013.4	11.43%
142	Sunways	MHH plus 190 (190 Wp)*2	2003-2005	2005	141.2	83.6%	1,005.0	12.16%
143	Solar-Fabrik	SF 145A*2	2003-2004	2005	118.8	83.4%	1,002.4	12.38%
144	Isofoton	IS-170/24*2	2007	2009	137.5	83.4%	1,002.4	12.39%
145	Isofoton	I-110/24*2	Until 2005	2006	119.4	83.3%	1,001.7	12.45%
146	Kyocera	KC170GT-2*2	Until 2006	2006	140.1	83.0%	997.1	12.85%
147	ASE (now with Schott Solar)	ASE-300-DG-FT (300 W)*2	1997-2006	2007	126.3	82.5%	992.0	13.29%
148	BP Solar	BP 7185 S*2	-	2005	145.2	81.6%	980.6	14.29%
149	Photowatt International	PW 1650-175W	2005 (purchased)	2006	125.1	81.4%	978.1	14.51%
150	Evergreen Solar	ES-180-RL*2	2006-2008	2007	119.0	80.1%	962.6	15.86%
151	Sharp	NT-R5E3E*2	2003	2005	137.2	79.0%	949.2	17.04%

*1 when date of production was unavailable, the date when PHOTON Lab bought the module was used (if possible)

*2 no longer manufactured

*3 referred to as Pure Power SV-X-200 (LV) in previous issues

*4 manufactured by Alpexsolar; available through Sunpeak-Vertrieb Unternehmensgruppe Ratio-Data

*5 CEEG is the manufacturing company of license holder China Sunergy

*6 previous model designation: CSG180S1-35/1589x807

*7 previous model designation: CSG230M2-30/1640x992

*8 previous model designation: ES-200-P60(230)

*9 previously manufactured by Solarfun Power Holdings Co. Ltd.

*10 previous model designation: Economy New ITS220ECU5

*11 previous manufacturer designation: JZ Solar


*12 previous model designation: JZM 290M-72

*13 company has changed its name to Inventec Energy

*14 manufactured by Ningbo Qixin Solar Electrical Appliance Co. Ltd.

*15 company has withdrawn from crystalline silicon PV manufacturing

*16 previous model designation: SW 210 poly




KLNE Sunteams

- Proven in operation all over the world
- Highest CEC (California Energy Commission) Efficiency rating
- Photon inverter test "A" grade

The KLNE Sunteams range has shown itself to be one of the popular 'value for money' ranges in the inverter world. Sturdy design, simple operation and easy installation make this range of inverters a favourite with installers all over the world.



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