

Utah Solar Incentive Program

2008 Annual Report

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Executive Summary

This report provides information on 2008 program participation for the pilot program available through Schedule 107. Background information on the pilot, funding levels, pilot duration, and regulatory background were provided in the 2007 report. 2008 program requirements for equipment, maximum size of system eligible for incentives, contactor licensing requirements, etc. remain the same as for the 2007 program.

Goals of the program

The goals of the program were provided in the 2007 report and are provided here for reference.

- Assessment of the benefits
- Assessment of costs
- Program administration logistics
- Rate of consumer installation of photovoltaic systems in Utah.
- Provide experience in working collaboratively with the solar community.

Key dates, data and activities for 2008 program

- Application acceptance date (the first day applications could be submitted) was January 6, 2008.
- 2008 installation completion date (the day projects had to be complete) was January 31, 2009.
- 2.945 kW for residential applications and 46.695 kW for non-residential applications were carried over from 2007 to the 2008 program.
- Including the carry over from 2007, a total of 59.945kW for residential and 96.695 kW for non-residential projects were available and allocated to customers during the 2008 program.
- A waiting list for the 2008 program was started. Applicants on this list could be eligible to receive 2008 incentives if an approved 2008 applicant withdrew or cancelled their

project. The current year waiting list does not function as a pre-reservation for the next program year allocation.

- Eleven customers notified the program administrator during 2008 they were not able to complete their projects and would re-apply later. When projects were dropped early in 2008, replacement projects from the waiting list were added. When projects dropped later in the year, replacement projects could not be completed in time. The project with the largest impact on the 2008 program was a 15kW non-residential project which lost both funding and key personnel in late winter and there was no readily available replacement project. As a result of project cancellations, 7.015 kW for residential and 24.245 kW non-residential were carried over from 2008 to the 2009 program allocation.

Summary of 2008 results

Information in the tables below summarizes expenditures by cost category, installed capacity by customer type and application data for the 2008 program. Additional information on individual 2008 projects is available in the Appendix.

Table 1. 2008 Installed Capacity and Expenditures

	kW	Incentives	Administration	Expenditures
Residential	52.930	\$105,864		\$105,864
Non-residential	72.450	\$144,903		\$144,903
Third party - total			\$88,634 ¹	\$86,634
Utility - total			\$3,080 ²	\$3,080
Total	125.380 ³	\$250,767 ⁴	\$91,714	\$342,481

¹ Includes \$33,103 of third party administration for 2007 program

² Includes direct labor costs for program management, marketing and analysis. In 2008, Company did not perform additional site inspections beyond those performed by the program administrator. As a result utility labor does not include any site inspection costs. Costs for net meters and associated metering department time is not allocated to the program or reflected in these costs. For the 24 residential installations in 2008, the cost to upgrade the meter was \$125/site or \$3,000 total. The nine non-residential installations required a programming upgrade only with no additional incremental costs.

³ Ten customers (seven residential and three non-residential) installed systems larger than the maximum size eligible for program incentives. Installed capacity beyond the program is an additional 27.807 kW. Total installed capacity for systems receiving program incentives is 153.187 kW.

⁴ Incentives based on \$2/watt differs from total incentives displayed here by \$7 based on rounding of watts and incentives. Incentives represent those paid or to be paid to customers installed projects in the 2008 program. Actual incentives paid in 2008 are \$180,561. The balance of the 2008 incentives will be paid in 2009.

Table 2. 2008 Applications

Received	48
Completed	33
Denied	0
Dropped/re-apply later	11
Incomplete/not approved	2
Added to 2008 waiting list	2

Key findings from 2008

The section below outlines key findings from the 2008 program and is designed to compare activity and results in relation to stated program goals provided in the 2007 report. These findings help inform the recommendations for the next program year.

1. Installed system costs (assessment of costs goal)
 - a. Total reported customer costs were \$1,489,795 for 153.187 kW(ac) of installed capacity. This includes 27.807 kW beyond the amounts eligible for program incentives listed in Table 1.
 - b. Average cost (based on total installed capacity) was \$9.73 /W(ac). Removing the highest cost and all costs below \$6/W results in an average cost of \$10.46/W
 - c. Highest system cost was \$20.83 /W(ac)
 - d. Lowest system cost was \$2.07/W(ac)⁵
 - e. 2008 average system costs was approximately 94%% of 2007
 - f. 2008 highest system cost was 94% of highest system cost in 2007
 - g. 2008 lowest system cost was 38% of lowest system cost in 2007. See footnote 5 below.

⁵ Three systems were installed utilizing some combination of donated materials and/or labor. The lowest cost system was \$2.07/W. Two other system costs were \$5.89/W and \$5.90/W. These systems were all removed from the revised average cost calculation.

- h. Net meters required for 2008 installation cost \$125/residential installation or \$3,000 for 24 installations. The per-meter cost for 2008 is the same as 2007. The nine non-residential applications did not generate any additional net metering costs, the same as 2007. Net metering costs are not included in customer or utility costs in Table 1.
2. Trade allies (experience working with solar community goal)
- a. Eighteen contractors performed the 2008 installations, an increase of six compared to 2007.
 - b. Eleven contractors performed one installation each.
 - c. Two contractors performed two installations each.
 - d. One contractor performed three installations.
 - e. One contractor performed four installations.
 - f. One contractor performed five installations.
 - g. One contractor performed six installations.
 - h. The 2008 contractor with the highest installation count doubled their installations compared to 2007. The 2008 contractors with the second and third highest installation count performed the same number of installations in 2007.
3. Customers (rate of consumer installations goal)
- a. Participants were from nineteen unique cities, an increase of six from 2007.
 - b. Participant count in the top three cities are: Salt Lake City (6), Moab (5), Ivins (3). Salt Lake City and Moab also had high participant counts in 2007.
 - c. Three cities had two participants. Twelve cities had one participant.
 - d. Customers were slow to return Attestation certificates for all projects including those completed in 2007. This finding is similar to 2007.
 - e. Customers did not submit applications for completed projects. This represents a change from 2007.
 - f. The most commonly cited reason for dropped projects was changes in available funding for both the overall project and in some cases for upgrades such as solar equipment.

4. Marketing (program administration logistics & solar community goals)
 - a. Similar to the first year of the program, proactive trade allies are using personal selling to market the customer to end use customers.
 - b. Applications are being completed and submitted by the trade allies. This is being done as service for customers and is similar to the first year of the program.
 - c. The program funded a sponsorship for the 2008 Utah Solar Tour. This sponsorship included a print ad in the tour magazine.

5. Equipment availability (program administration logistics & solar community goals)
 - a. Customers or trade allies did not report equipment shortages or schedule delays related to equipment availability in 2008.

6. Allocation of program incentives (program administration goal)
 - a. Even with a full year for approved projects to be constructed, changes in customer's available funding throughout the year precluded all of the available capacity and incentives from being fully utilized in the prescribed time frames.
 - b. Annual program allocations pose an on-going administrative burden such as communications, chronological processing requirements, etc.
 - c. Development of a waiting list was a good idea to help maximize yearly installation and compensate for project cancellations, but lead times on waiting list projects and timing of canceled projects both pose challenges to fully allocating annual program incentives.
 - d. The 2008 waiting list added communication challenges, i.e., applicants on the waiting list should not begin a project until the program administrator has provided notification of application acceptance; a spot on the waiting list does not pre-reserve funds for the next year, etc.
 - e. The shortfall in allocated incentives for 2008 was largest in the non-residential customer group which is similar to 2007

In summary, findings from 2008 indicate costs per installed watt were comparable to 2007 when outliers are removed. In 2008 costs per installed watt are skewed by three projects utilizing donated equipment and/or labor. 2008 installed costs are comparable to original estimates of \$10/watt. The number of contractors has increased but a few contractors still account for most of the installations. Marketing continues to be done with contractors utilizing personal selling and including the program application process as part of their sales process. The annual program allocation process driven by limited funding poses administration challenges when approved projects encounter funding or schedule delays and there is not a “good fit” (ready to begin construction and approximately the same size) replacement project with an approved application waiting in the wings. Neither the program administrator nor the Company expected there would be a carry-over from 2008 into 2009 and we certainly didn’t expect the magnitude of the non-residential carry-over.

Recommendations for the next year

1. Carry over the “unused 2008 kW allocation” (7.015 kW for residential installations and 24.245 kW for non-residential applications) to the 2009 program. To ensure consistent marketing messages surrounding annual kW allocations, the addition will occur as part of the 2009 tracking by the program administrator and will not be included as a specific roll-over amount⁶. This is consistent with the way the 2007 program was handled.
2. Add some quantification of “lead time” to waiting list applicants, so replacement projects are a better fit for cancelled projects.
3. Continue the informal program administrator reminder to customers with installed projects to provide completed Attestation Forms. Implement Company branded communication to follow-up.
4. Continue informal communication to solar trade ally community on importance of generation data from actual installations and that missing, incomplete or inaccurate

⁶ Since pilot program revenue requirements were established based on five full years of program operation, the re-allocation decision was made to compensate for the short falls in projects completion from 2007 that rolled into 2008 and short falls from 2008 that are carried over into 2009. In other words, the intent is to deploy five years of funding to acquire the five year program targets even if each year is not exactly twenty percent of the total.

Attestation forms are a barrier to complete assessment of program effectiveness.
 Implement formal program administrator or Company communication to follow-up.

The company recognizes that accurate assessment of installation output is essential to assessing performance of both equipment and the program as a whole. In addition to the information from the Attestation certificates which has been slow to come back to the program administrator, the Company has retained a third party consultant to estimate hourly output of the systems using the National Renewable Energy Laboratory (NREL) PV Watts calculator available at http://rredc.nrel.gov/solar/codes_algs/PVWATTS/version1/ and the information about each system in the 2008 program provided in detail in Appendix One. This is similar to the approach utilized for the 2007 program. Results are provided below.

Table 3. Levelized cost of Energy⁷

Customer Cost	\$1,489,795
Incentives	\$250,767
Administration	\$91,714
Meters (24 installations * \$125/meter)	\$3,000
Total Annual Generation (MWh)	251,667
Levelized Total Cost (\$/MWh)	\$545.14
Levelized Utility Cost (\$/MWh)	\$118.86
2007 IRP 49% Load Factor Decrement Levelized Cost (\$/MWh)	\$81.57

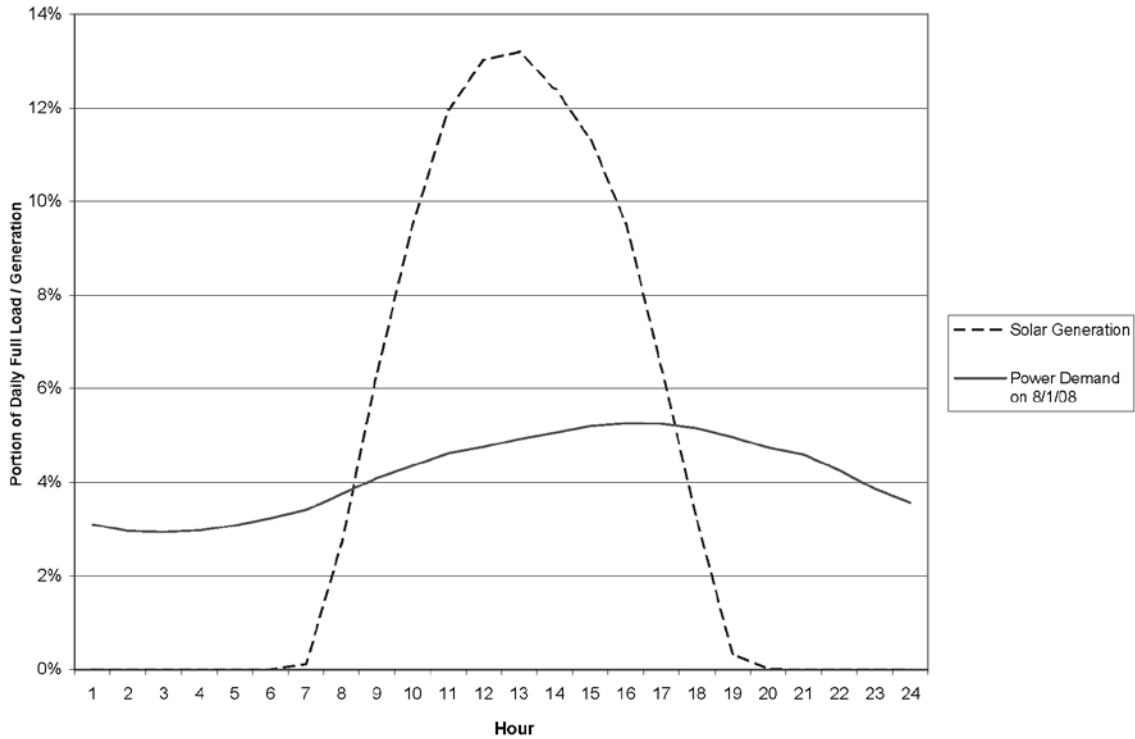
⁷ Levelized at 7.1% discount rate over 25 year estimated life.

Table 4. Results for standard economic tests

All Measures				AC: IRP 49% LF Decrement	
	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	0.5451	\$1,584,509	\$319,577	(\$1,264,932)	0.202
Total Resource Cost Test (TRC) No Adder	0.5451	\$1,584,509	\$290,525	(\$1,293,985)	0.183
Utility Cost Test (UCT)	0.1189	\$345,481	\$290,525	(\$54,956)	0.841
Rate Impact Test (RIM)		\$366,369	\$290,525	(\$75,844)	0.793
Participant Cost Test (PCT)		\$1,239,029	\$324,045	(\$914,984)	0.262
Lifecycle Revenue Imp (\$/kWh)				\$0.0000000989	

The ability of solar resources to meet peak demand in Utah is illustrated in the following table. The shape of the generation output is derived from actual installation data entered into the NREL calculator. The peak day from 2008 company sales data was utilized to determine the peak day and the output for the systems for that day is displayed in the graph below.

Figure 1. Peak Day Generation and Load Profile (August 1, 2008)



This analysis indicates the solar generation resources deliver peak output between 1-2 PM and the company system peaks approximately two hours later. Solar resources, while not strictly one hundred percent coincident with system peaks do contribute energy during the high load and high energy cost hours of summer days. Hourly information used in providing this illustration as well as for each hour of the year is being stored electronically as supporting documentation for the 2008 program.

Appendix- 2008 project detail

Project ID	Status	City	Incentive Amount	Total System size (kW)	Applied Residential Installation (kW) 57 - 59.945	Applied Commercial Installation (kW) 50 - 96.695	Total System Cost (\$)	\$/kW (system)	\$/watt
801061920	Completed	Moab	\$2,620.00	1.310	1.310		\$9,399.24	\$7,174.99	\$7.17
801061939	Completed	Castle Valley	\$6,000.00	4.446	3.000		\$43,217.52	\$9,720.54	\$9.72
801062305	Completed	Moab	\$2,620.00	1.310	1.310		\$13,858.05	\$10,578.66	\$10.58
801062309	Completed	Highland	\$5,580.00	2.790	2.790		\$26,948.82	\$9,659.08	\$9.66
801062312	Completed	Dammeron Valley	\$6,000.00	3.587	3.000		\$37,500.00	\$10,454.42	\$10.45
801062313	Completed	SLC	\$5,158.52	2.579	2.579		\$27,899.59	\$10,816.90	\$10.82
801062314	Completed	Virgin	\$3,780.00	1.890	1.890		\$19,413.27	\$10,271.57	\$10.27
801062316	Completed	Ivins	\$3,504.00	1.752	1.752		\$20,463.72	\$11,680.21	\$11.68
801062317	Completed	Ivins	\$8,570.00	4.285		4.285	\$41,685.62	\$9,728.27	\$9.73
801062321	Completed	Moab	\$6,000.00	3.760	3.000		\$38,385.89	\$10,209.01	\$10.21
801070702	Completed	SLC	\$3,808.00	1.904	1.904		\$19,708.00	\$10,350.84	\$10.35
801080949	Dropped/re-apply later			0.000					
801081214	Completed	La Sal	\$6,000.00	4.470	3.000		\$26,374.90	\$5,900.43	\$5.90
801090938	Completed	Ivins	\$6,000.00	6.650	3.000		\$64,000.00	\$9,624.06	\$9.62
801141526	Completed	West Valley City	\$30,000.00	19.699		15.000	\$202,727.17	\$10,291.24	\$10.29
801151420	Completed	Morgan	\$5,564.80	2.782	2.782		\$23,598.00	\$8,482.39	\$8.48
801161451	Completed	SLC	\$3,174.00	1.587	1.587		\$13,355.23	\$8,415.39	\$8.42
801181226	Dropped/re-apply later	Morgan			0.000				
801181442	Dropped/re-apply later	Park City		0.000					
801190914	Dropped/re-apply later	Brookside		0.000					
801211002	Completed	Mountain Green	\$4,174.00	2.087	2.087		\$27,532.00	\$13,192.14	\$13.19
801211052	Completed	South Jordan	\$3,864.00	1.932	1.932		\$4,000.00	\$2,070.39	\$2.07
801220730	Completed	Cedar City	\$5,282.00	2.641		2.641	\$25,021.38	\$9,474.21	\$9.47
801221040	Dropped/re-apply later	Leeds		0.000					
801231604	Completed	Moab	\$6,000.00	4.140	3.000		\$25,545.58	\$6,170.43	\$6.17
801240729	Completed	La Verkin	\$5,280.00	2.640	2.640		\$42,923.26	\$16,258.81	\$16.26
801240950	Completed	St George	\$6,000.00	5.357	3.000		\$45,004.19	\$8,401.01	\$8.40

Project ID	% of Sunshine	System Orientation	System Tilt Angle (Degree,°)	Module Manufacturer	Module Model	Module Quantity	Module CEC Rated Watts Output	Inverter Manufacturer	Inverter Model	Inverter CEC Weighted Efficiency %
801061920	100%	S	39	Evergreen	180	8	180.0	KACO	1501xi	94.0%
801061939	100%	S	39	Evergreen	190	26	180.0	SMA	5000 US	95.5%
801062305	100%	S	39	Evergreen	180	8	180.0	SMA	1800 U	91.5%
801062309	100%	S	40	Schott	ASE-270-DFG/50v	12	300.0	Outback	GVFX3648	91.0%
801062312	100%	S-SW	37	Mitsubishi	PV-MF180UD4	12	159.0	Fronius	IG 4000	94.0%
801062313	95%	S-SW	20	Evergreen	ES 190 SL	16	168.8	Xantrex	GT 3.3	94.5%
801062314	100%	S	summer 25, winter 55-60	Evergreen	ES 200	10	200.0	Xantrex	SW 4048	90.5%
801062316	100%	SW	Adjustable	Conergy/SunTec	S 175MU	12	154.5	Fronius	IG 3000	94.0%
801062317	100%	S	30	Sharp	NE-170U1	30	149.9	Fronius	IG 5100	94.5%
801062321	100%	S	39	Evergreen	ES 180	22	180.0	SMA	3000 SU	95.5%
801070702	90%	S	Adjustable 34-52	Evergreen	ES 190	12	168.8	Fronius	IG 3000	94.0%
801080949		S	35	Evergreen	Spruce 190W	18	168.8	SMA	SB3300US	94.5%
801081214	100%	S	22	Evergreen	180 SL or RL	26	180.0	SMA	SB5000US	95.5%
801090938	100%	S	20	Kyocera	KC 175 GT	40	175.0	SMA	SB 6000 US	95.5%
801141526	100%	S	45	Evergreen	ES 190 RL	108	190.0	SMA	SB 6000 US	95.5%
801151420	100%	S	20	Uni-Solar	PVL-136	21	136.0	Fronius	IG 3000	94.0%
801161451	100%	S	42	Evergreen	ES 190	10	168.8	Xantrex	GT 2.8	94.0%
801181226	100%	S	45	Evergreen	ES A 205	16	185.2	Xantrex	XW 4024	91.0%
801181442			40	Evergreen	Spruce 190W	6	168.8	SMA	SB 1100U	91.0%
801190914		S-SW	37	Sharp	NE 170 U1	7	149.9	Fronius	IG 2000	95.2%
801211002	100%	S	45	Mitsubishi	PV-MF185UD4	12	185.0	Fronius	IG 3000	94.0%
801211052	100%	W-SW	30	Sharp	142 Watt	16	125.0	Aurora	PVI 3600	94.5%
801220730	100%	S	30	Conergy	S 175MU	18	154.5	Fronius	IG 4000	94.0%
801221040		S	28	Day 4	48MC170	12	151.4	Fronius	IG 3000	95.0%
801231604	100%	S	39	Evergreen 9/22: REC	180 215	24	180.0	SMA 9/22: SMA	4000 US 9/22: 5000 US	95.5%
801240729	100%	S	28	Webel	W1600	18	143.9	SMA Sunnyboy	SB6000U	94.5%
801240950	100%	S	30	Sharp	NE 170 UI	33	142.9	SMA	5000 U	95.5%

Project ID	Status	City	Incentive Amount	Total System size (kW)	Applied Residential Installation (kW) 57 - 59.945	Applied Commercial Installation (kW) 50 - 96.695	Total System Cost (\$)	\$/kW (system)	\$/watt
801241200	Completed	SLC	\$3,680.00	1.840	1.840		\$19,488.00	\$10,591.30	\$10.59
801291606	Dropped/re-apply later	SLC		0.000					
801310813	Dropped/re-apply later	Cedar City		0.000					
802051414	Completed	Holladay	\$4,129.00	2.064	2.064		\$21,287.46	\$10,313.69	\$10.31
802112225	Completed	West Valley City	\$2,922.00	1.461	1.461		\$17,595.00	\$12,043.12	\$12.04
802140946	Completed	Cedar City	\$5,153.56	2.577		2.576	\$37,768.53	\$14,657.26	\$14.66
802141428	Completed	Circleville	\$1,699.74	0.850	0.849		\$12,692.00	\$14,934.05	\$14.93
802191510	Completed	Moab	\$9,570.96	4.785		4.785	\$66,684.51	\$13,934.76	\$13.93
803031454	Completed	Kearns	\$2,306.00	1.358	1.153		\$8,000.00	\$5,891.02	\$5.89
802261411	Completed	Wanship	\$6,346.00	3.173		3.173	\$66,100.66	\$20,832.23	\$20.83
804010846	Dropped/re-apply later	West Valley		0.000					
804070924	Completed	South Jordan	\$30,000.00	17.960		15.000	\$191,500.00	\$10,662.58	\$10.66
804211043	Completed	SLC	\$30,000.00	23.531		15.000	\$169,849.68	\$1,659.00	\$1.66
805020751	Dropped/re-apply later	Park City		0.000					
805021527	Completed	SLC	\$19,980.00	9.990		9.990	\$80,268.00	\$8,034.83	\$8.03
805061056	Dropped/re-apply later	SLC		0.000					
805090917	Dropped/re-apply later	Diamond Valley		0.000					
806091305	added to waiting list	West Valley City		0.000					
NA	incomplete/not approved	SLC		0.000					
807151330	added to waiting list	SLC							
NA	incomplete/not approved	Syracuse							
Totals			\$ 250,767	153.187	52.930	72.450	\$1,489,795	\$9,725.31	\$9.73
								min	\$2.07
								max	\$20.83
							without max and below \$6		\$10.46

Project ID	% of Sunshine	System Orientation	System Tilt Angle (Degree,°)	Module Manufacturer	Module Model	Module Quantity	Module CEC Rated Watts Output	Inverter Manufacturer	Inverter Model	Inverter CEC Weighted Efficiency %
801241200	100%	S	30	Evergreen	Spruce 190W	14	168.8	Power One	Aurora PVI-3600	95.0%
801291606		S	22.5	Solar Fun	200 watt panel	84	187.0	Xantrex	GT 5.0	95.0%
801310813		S	25	Sharp	NE 170 UI	18	149.9	Fronius	3000	95.0%
802051414	95%	SW	45	Mitsubishi	PV-MF185UD4	12	185.0	Outback	GVFX3648	93.0%
802112225	100%	S	40	Solar World	SW 165	6	147.3	Sunny Boy	700 U	91.5%
802140946	100%	S	37	Sharp	NE 170 UI	18	149.9	SMA	3000 U	95.5%
802141428	100%	S	18	Solar World	SW 165	6	149.1	Fronius	IG 3000	94.0%
802191510	100%	S	39	Evergreen	ES 190	30	168.8	Fronius	IG 5100	94.5%
803031454	100%	S	45	Evergreen	ES 180	7	180.0	SMA American (Sunny Boy)	SB 1800 V	91.5%
802261411	100%	S	26.5	Evergreen	ES 180	20	168.8	Fronius	IG-4000	94.0%
804010846		S	30	Sanyo	HIP 200 BA 3	56	200.0	SMA	SB7000, SB4000	97.0%
804070924	100%	S-SW	41	Evergreen	ES 190	112	168.6	Xantrex	GT5.0 NA-208	95.5%
804211043	100%	S	10	Sharp	224 W ND 224U1F	110	197.8	SMA	SB7000US	96.0%
805020751		S	41	Solar Fun	SF-190-27-M200	112	176.2	Xantrex	GT5.0 NA-240/208	95.5%
805021527	100%	S	54	Evergreen	190 Watt Panels	54	185.0	Xantrex	GT 2800	94.0%
805061056		SW	40	Evergreen	ES 190	33	167.2	SMA	4000 US	95.5%
805090917		S	25	Sharp	NE 170 U1	10	149.9	Fronius	IG 4000	95.2%
806091305		S	19	Sol Gen/BP Solar	UT 2050 P	14	175.0	PV Powered	PVP2500	95.5%
NA		S	40	Evergreen	Spruce 190W	12	168.8	Xantrex	GT 3.3	95.0%
807151330										
NA										