

PV PLATFORM
TRACKER
BOOSTER MIRROR

"An innovative technology"

PV PLATFORM + TRACKER + BOOSTER MIRROR SYSTEMS (ON GRID & OFF GRID)

US Clean Energy's "SOLAR PV PLATFORM" (Patented in USA and Worldwide) is invented, designed and developed in the USA by US Clean Energy's Khurram Khan Nawab. US Clean Energy's "SPVP" is an innovative tracking system for photo voltaic installations which is fully automatic and controlled by sensors and GPS which tracks the sun movements and ensures maximum power yield from photo voltaic installation worldwide. SPVP, with it's efficient mechanical system and most reliable installation concept design guarantees the highest energy yields from photo voltaic all year round which results in outstanding price-performance ratio, high return on investment and thereby making it one of the most unique and cost effective tracking system available today.



ABTI USA PV Tracking System



Performance Boost Yield

- Over 50% more power output in summer
- Over 70% more power in winter

Temperature Effect on the PV Panel

- Only 5% increase in the panel temperature
- Over 70% more power in winter

Wind Effect on the PV Platform

- Operational winds 30 miles per hour
- Platform Design for 100 miles per hour

Applications

- On grid utility scale power plants
- Off grid power plants

SPVP Advantages:

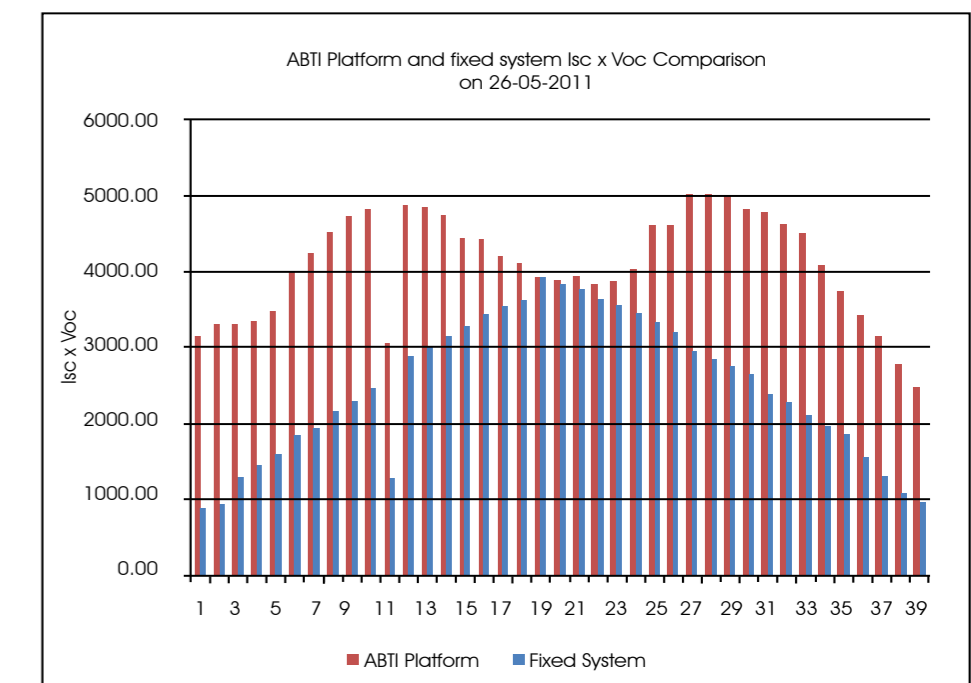
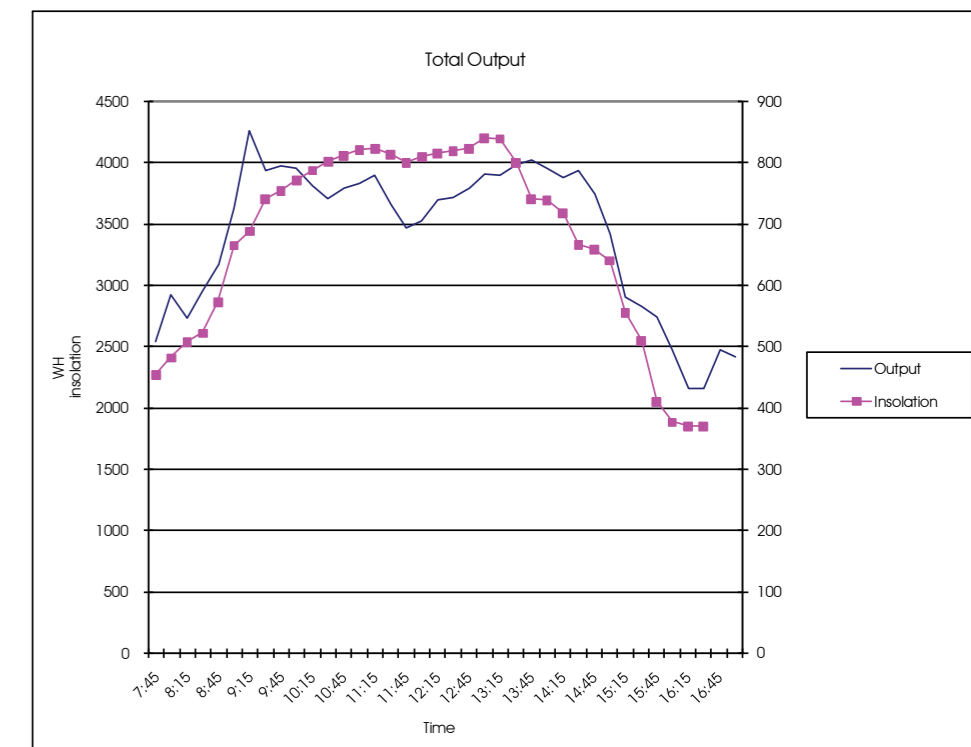
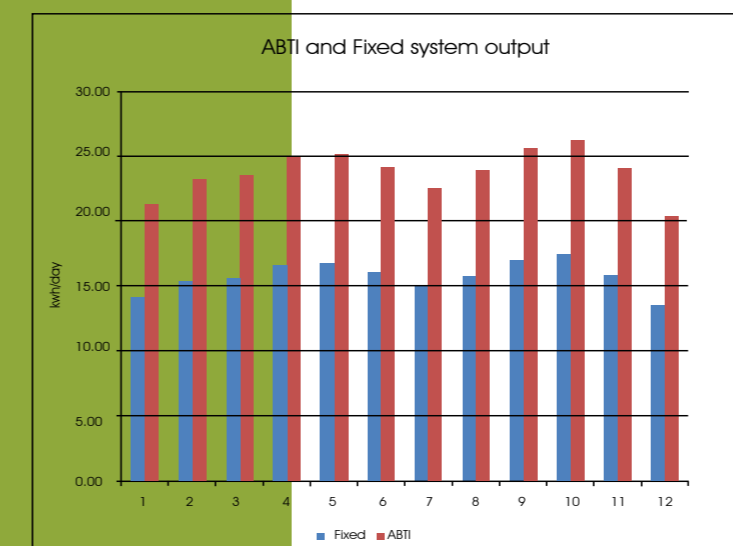
- Less cost
- High energy yield
- Simple and easy installation design
- Accurate tracking using precise sensors
- Reduced land requirements for the overall project installations
- No maintenance required
- Fully automatic

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PV SYSTEM DATA COLLECTION

TEST PV PLATFORM IN FIXED POSITION FACING SOUTH LOCATION: SHARJAH, Latitude: +25.37 (25°22'12"N), Longitude: +55.41 (55°24'36"E). DATE: 05-6-2011

Time	Solar Array 1 Angle: Panel 29°, Mirror: 32°				Solar Array 2 Angle: Panel 29°, Mirror: 32°				Total Watt 1+2	Insolation	
	Mirror ✓		Tracker ✓		Mirror ✓		Tracker ✓				
	Voc 1	Isc 1	W 1	T 1 Average	Voc 2	Isc 2	W 2	T 2 Average			
7:30	65.5	19.2	1257.6	44.8	65.9	18.7	1232.33	44.2	2490	443	
7:45	65.2	19	1238.8		65.7	19.7	1294.29		2533	454	
8:00	65.3	20.4	1332.12	45.7	65.8	24.1	1585.78	45.4	2918	482	
8:15	64.4	21.3	1371.72		64.9	20.9	1356.41		2728	508	
8:30	63.9	22.8	1456.92	50.2	64.4	23.1	1487.64	51.3	2945	522	
8:45	64.1	24.1	1544.81		64.7	25.1	1623.97		3169	573	
9:00	63.3	28.9	1829.37	53.1	63.8	28.2	1799.16	54.5	3629	665	
9:15	64.3	31.2	2006.16		68	33.1	2250.8		4257	688	
9:30	63.5	31.1	1974.85	55.0	63.7	30.7	1955.59	56.3	3930	740	
9:45	63.2	31.6	1997.12		63.4	31.2	1978.08		3975	754	
10:00	63.6	30.9	1965.24	55.4	63.8	31.1	1984.18	55.4	3949	771	
10:15	63.7	29.8	1898.26		63.8	30	1914		3812	787	
10:30	63.7	28.6	1821.82	59.7	63.9	29.4	1878.66	59.2	3700	801	
10:45	64.2	29.2	1874.64		64.1	29.9	1916.59		3791	811	
11:00	64.1	29.6	1897.36	58.0	64.2	30	1926	59.1	3823	820	
11:15	64.4	30.1	1938.44		64.4	30.4	1957.76		3896	822	
11:30	64.3	28	1800.4	55.5	63.9	29	1853.1	55.3	3654	813	
11:45	63.9	26.9	1718.91		63.6	27.4	1742.64		3462	800	
12:00	63.9	27.3	1744.47	56.4	63.7	27.9	1777.23	55.4	3522	809	
12:15	64.1	29.3	1878.13		64.2	28.3	1816.86		3695	815	
12:30	62.1	29.2	1813.32	56.6	64.1	29.6	1897.36	53.9	3711	819	
12:45	63.9	29.3	1872.27		64	29.9	1913.6		3786	822	
13:00	63.6	30.6	1946.16	57.8	63.9	30.6	1955.34	55.4	3902	840	
13:15	63.4	30.4	1927.36		63.6	30.9	1965.24		3893	839	
13:30	62.9	31.6	1987.64	58.6	63.4	31.4	1990.76	56.8	3978	800	
13:45	62.4	32.4	2021.76		63.3	31.6	2000.28		4022	740	
14:00	62.2	32.1	1996.62	60.6	62.9	31.1	1956.19	59.9	3953	739	
14:15	62.1	31.4	1949.94		62.4	30.9	1928.16		3878	717	
14:30	63.3	31.6	2000.28	61.0	63.4	30.4	1927.36	60.8	3928	666	
14:45	63.2	30.1	1902.32		63.4	29	1838.6		3741	659	
15:00	63.3	27	1709.1	63.1	63.2	27	1706.4	62.7	3416	640	
15:15	63.2	23.3	1472.56		63.2	22.6	1428.32		2901	556	
15:30	64.3	22.4	1440.32	60.1	64.2	21.6	1386.72	60.1	2827	509	
15:45	64.2	21.3	1367.46		64.2	21.4	1373.88		2741	410	
16:00	64.4	17.4	1120.56	60.5	64.1	21.1	1352.51	60.7	2473	377	
16:15	64.4	17.2	1107.68		64.3	16.3	1048.09		2156	370	
16:30	64.4	17.2	1107.68	49.1	64.3	16.3	1048.09	49.9	2156	370	
16:45	64.3	17.3	1112.39		64.2	21.1	1354.62		2467	360	
17:00	64.2	21.4	1373.88		64.1	16.2	1038.42		2412	350	
Total Watt (Voc*Isc)									63144.96	Total Watt (Voc*Isc)	64170.3
WH									15786.24	WH	16042.6
Equivalent Energy output									11839.68	Energy output daily	12031.9
Total Energy yield (KWH)									23.872	PV system with ALUBOND booster mirror and ABTI tracker to traditional	152%
Traditional 3600W system Energy yield (KWH)									15.75		



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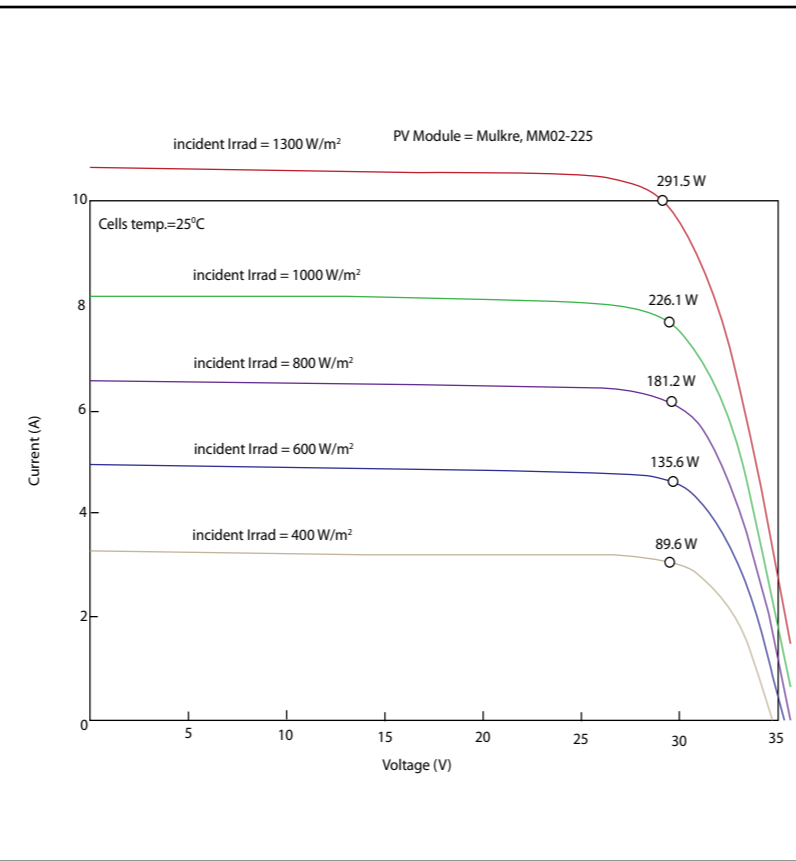
PV MODULE CHARACTERISTICS

PV Module Characteristics (US Clean Energy 225Wp, Mono Crystalline)

This performance will achieve with PV booster mirror (irradiation 1300w/m²)

At STC module maximum output 225Wp and at Real condition with PV booster mirror same Module maximum output 291Wp.

Characteristics of a PV module				
Manufacturer, Model	: UCE , MM02-225			
Availability	: prod. from 2010 to 2011			
Data source	: own output			
STC Power (manufacturer)	Pnom	225 Wp	Technology	Si-mono
Module size (W x L)	0.990 x 1.660	m ²	Rough module area	A module 1.64 m ²
Tile. apparent sizes	0.990 x 1.660	m ²	Apparents module area	Apparent 1.64 m ²
No. of cells	1.60		Sensitive area (cells)	A cells N/A m ²
Specifications for the model sizes (manufacturer or measurement data)				
Reference temperature	TRef 25 °C		Reference irradiance	GRef 1000 W/m ²
Open circuit voltage	Voc 35.9 V		Short-circuit current	ISC 8.18 A
Max. power point voltage	Vmpp 30.1 V		Max. power point current	Impp 7.47 A
=> maximum power	Pmpp 225.0 W		Isc temperature coefficient	mulsc 4.1 mA/°C
one-diode model parameters				
shunt resistances	Rshunt 190 ohm		Diode saturatiub current	I0Ref 0 nA
Serie resistance	Rserie 0.31 ohm		Voc. temp. coefficient	MuVoc -117 mV/°C
			Diode Quality factor	Gamma 0.85
Specified Pmax temper. coeff.	muPMaxR -0.43 %/°C		Diode factor temper. coeff.	muGamma -0.000 1/°C
Model results for standard conditions (STC: T=250C, G=1000 W/m2, AM=1.5)				
Max. power point voltage	Vmpp 29.4 V		Max.power point current	Impp 7.68 A
Maximum power	Pmpp 226.1 Wc		Power temper. Coefficient	muPmpp 0.43 %/°C
Efficiency (/module area)	Eff_mod 13.8%		Fill factor	FF 0.769
Efficiency (/Cells area)	Eff-Cells NA %			



DATA TABLE- 225 WP WITH MIRROR & WITHOUT MIRROR (BOTH OPTIONS WITH TRACKING)

Time	Insolation vs Time	225 WP MODULE / WITH MIRROR / WITH TRACKING		225 WP MODULE / WITH OUT MIRROR / WITH TRACKING		Power Without Mirror(W)	
		Vo ltage (V)	Current With Mirror(Amp)	Power With Mirror(W)	Voltage (V)		Current Without Mirror(Amp)
10:30 Am	802	30.8	11.5	354.2	31.85	8.5	70.725
10:45 Am	809	31.6	12.2	385.52	31.85	9	286.65
11:00 Am	810	31.3	12.5	391.25	31.5	9	283.5
11:15 Am	830	30.95	12.5	386.875	31.95	9	287.55
11:30 Am	843	30.53	13	396.89	31.8	9	286.2
11:45 Am	851	30.25	13	393.25	31.8	9	286.2
12:30 Pm	851	31.5	13	409.5	32.05	9.5	304.475
12:45 Pm	852	31.35	13	407.55	32.1	9.5	304.95
1:00 Pm	830	31.5	13	409.5	31.6	9.5	300.2

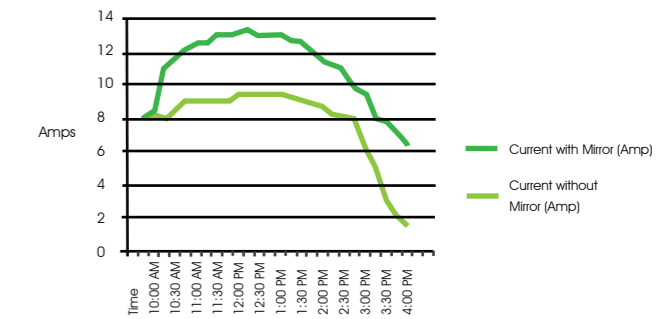


Figure 1: PERFORMANCE GRAPH

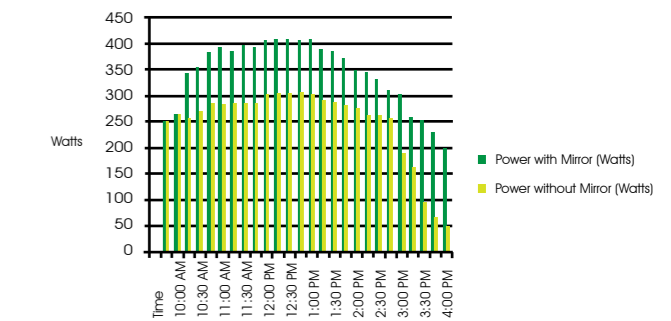
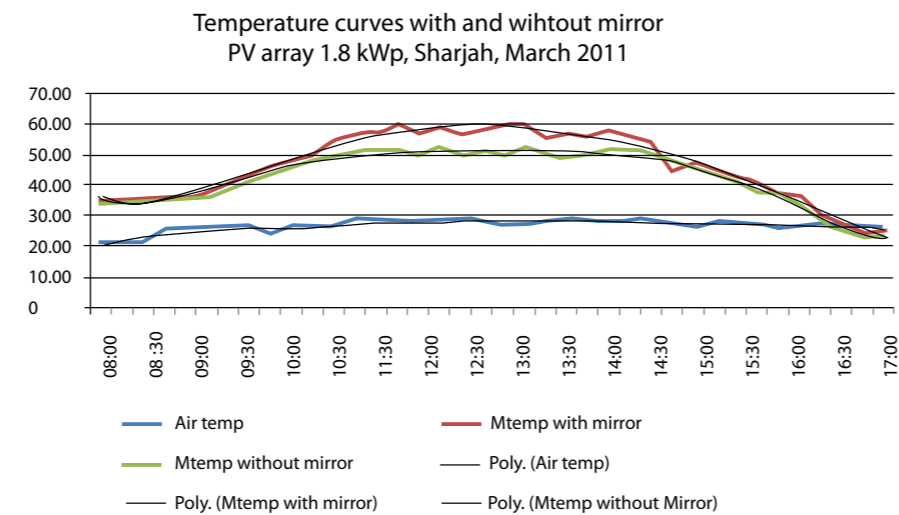
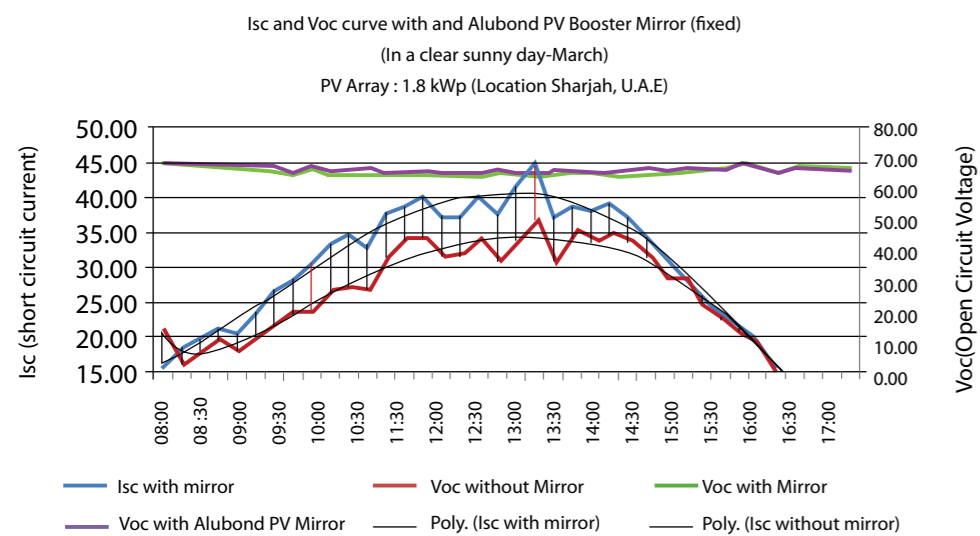
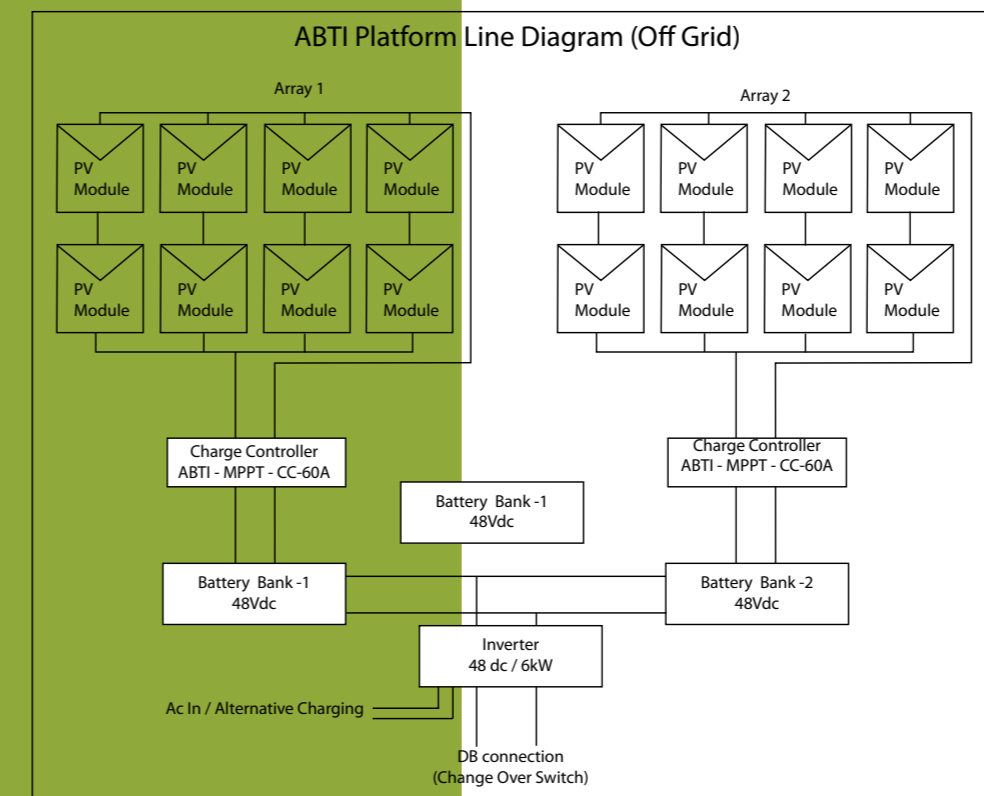


Figure 2: POWER OUTPUT BAR GRAPH

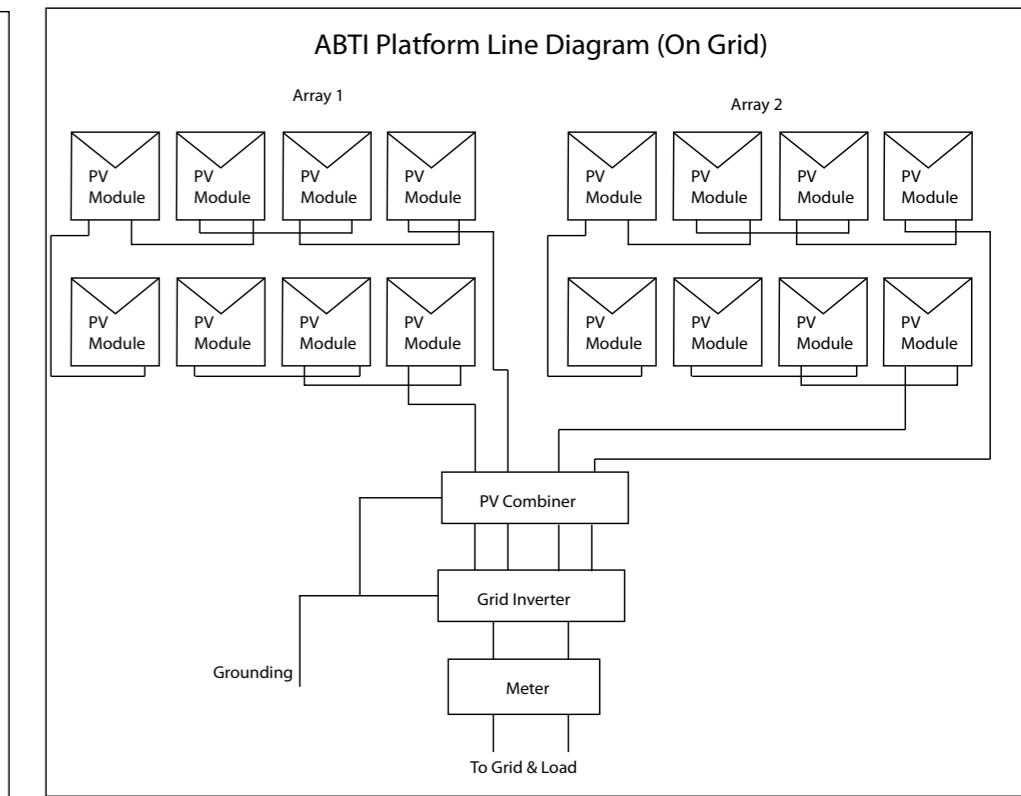
Table 1: At 12.15 pm a Max current of 13.3 Amp is achieved with using mirror giving a Max power of 410.97 Watts



OFF GRID DIAGRAM



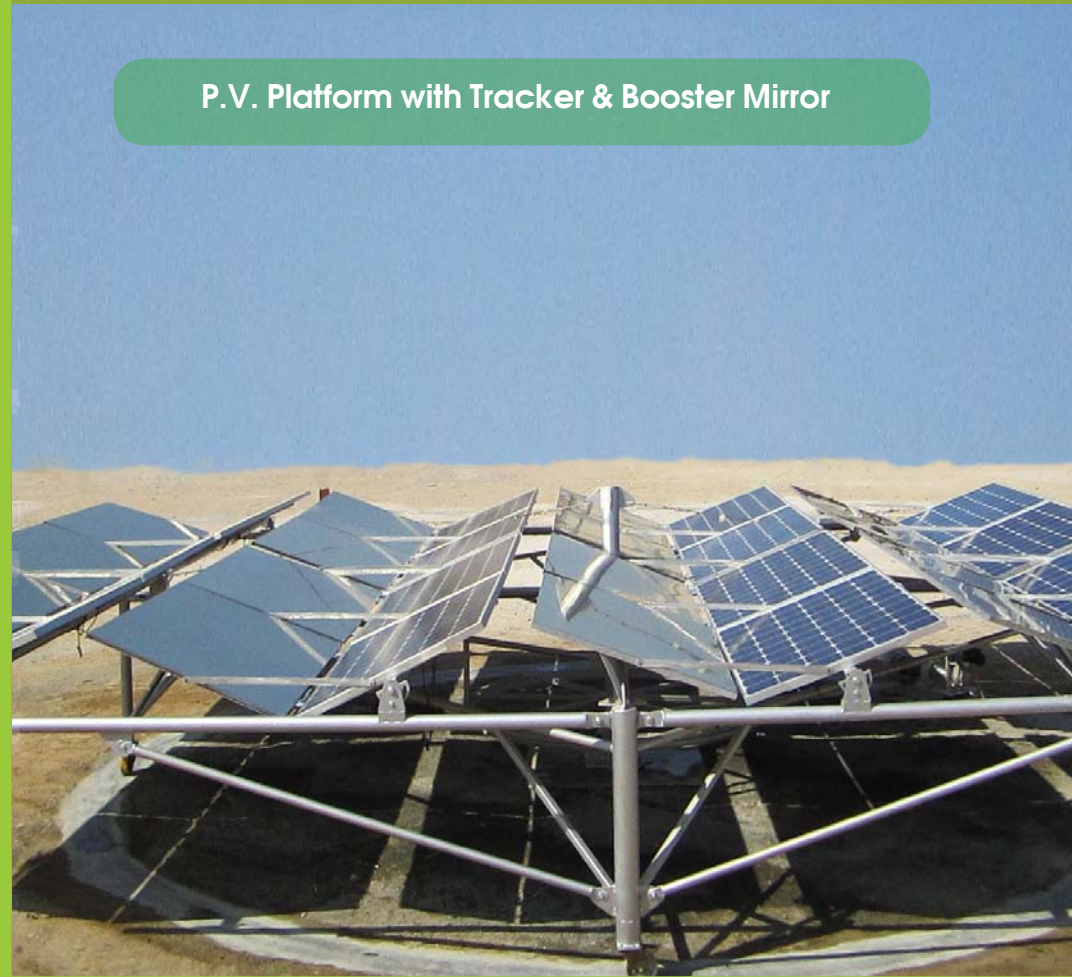
ON GRID DIAGRAM



Glass Free Parabolic Trough



P.V. Platform with Tracker & Booster Mirror



www.cleanenergy.com



CLEANENERGY
Technologies

760 Village Center Drive, Suite 220
Burr Ridge, IL 60527
USA
Tel : (630) 242-6644
Fax : (630) 504-7471

info@cleanenergy.com