Appendix -A: Mahadiscom Data for roof top solar

SNO	UNITS	Rooftop Area	Corrected area	Area/Consumption	Daily Consumption	Daily consumption/ Area
1	1	1145	1030.5	1030.5	0.04	3.88161E-05
2	1	1056	950.4	950.4	0.04	4.20875E-05
3	1	600	540	540	0.04	7.40741E-05
4	77	9804	8823.6	114.592208	3.08	0.000349064
5	15	600	540	36	0.6	0.001111111
6	61	1200	1080	17.704918	2.44	0.002259259
7	30	500	450	15	1.2	0.002666667
8	150	2250	2025	13.5	6	0.002962963
9	74	1036	932.4	12.6	2.96	0.003174603
10	82	1000	900	10.9756098	3.28	0.003644444
11	248	2250	2025	8.16532258	9.92	0.004898765
12	139	1000	900	6.47482014	5.56	0.006177778
13	170	1000	900	5.29411765	6.8	0.007555556
14	196	1000	900	4.59183673	7.84	0.008711111
15	184	750	675	3.66847826	7.36	0.010903704
16	252	1000	900	3.57142857	10.08	0.0112
17	273	1000	900	3.2967033	10.92	0.012133333
18	286	1000	900	3.14685315	11.44	0.012711111
19	665	2200	1980	2.97744361	26.6	0.013434343
20	238	600	540	2.26890756	9.52	0.01762963
21	216	500	450	2.08333333	8.64	0.0192
22	268	600	540	2.01492537	10.72	0.019851852
23	308	600	540	1.75324675	12.32	0.022814815
24	514	1000	900	1.75097276	20.56	0.022844444
25	1744	2800	2520	1.44495413	69.76	0.02768254
26	702	1000	900	1.28205128	28.08	0.0312
27	1555	2200	1980	1.2733119	62.2	0.031414141
28	737	1000	900	1.22116689	29.48	0.032755556
29	842	1056	950.4	1.12874109	33.68	0.03543771
30	1174	1188	1069.2	0.91073254	46.96	0.043920688
31	680	600	540	0.79411765	27.2	0.05037037
32	709	600	540	0.76163611	28.36	0.052518519
33	2501	2109	1898.1	0.75893643	100.04	0.052705337
34	904	750	675	0.74668142	36.16	0.05357037
35	1207	1000	900	0.74565037	48.28	0.053644444
36	2084	1500	1350	0.64779271	83.36	0.061748148
37	2839	2043	1838.7	0.64765763	113.56	0.061761027
38	2824	2000	1800	0.63739377	112.96	0.062755556
39	1484	1000	900	0.606469	59.36	0.065955556
40	1622	1000	900	0.55487053	64.88	0.072088889
41	17376	9804	8823.6	0.50780387	695.04	0.07877057
42	1130	600	540	0.47787611	45.2	0.083703704
43	951	455	409.5	0.43059937	38.04	0.092893773
44	2094	1000	900	0.42979943	83.76	0.093066667
45	2105	1000	900	0.42755344	84.2	0.093555556

46	3223	1500	1350	0.41886441	128.92	0.095496296
47	2311	1000	900	0.3894418	92.44	0.102711111
48	1399	605	544.5	0.38920658	55.96	0.102773186
49	1424	600	540	0.37921348	56.96	0.105481481
50	3708	1553	1397.7	0.37694175	148.32	0.106117193
51	2408	1000	900	0.37375415	96.32	0.107022222
52	2645	1000	900	0.34026465	105.8	0.117555556
53	1894	700	630	0.33262936	75.76	0.120253968
54	7161	2644	2379.6	0.33229996	286.44	0.120373172
55	4066	1500	1350	0.33202164	162.64	0.120474074
56	4366	1475	1327.5	0.30405405	174.64	0.131555556
57	3145	1000	900	0.28616852	125.8	0.139777778
58	3754	1187	1068.3	0.28457645	150.16	0.140559768
59	4033	1250	1125	0.27894867	161.32	0.143395556
60	1993	600	540	0.27094832	79.72	0.14762963
61	2222	600	540	0.2430243	88.88	0.164592593
62	3797	1000	900	0.23702923	151.88	0.168755556
63	5116	1331	1197.9	0.23414777	204.64	0.17083229
64	8932	2250	2025	0.22671294	357.28	0.176434568
65	8756	2200	1980	0.22613065	350.24	0.176888889
66	2411	600	540	0.22397345	96.44	0.178592593
67	9080	2200	1980	0.21806167	363.2	0.183434343
68	4181	1000	900	0.21525951	167.24	0.185822222
69	4840	1000	900	0.18595041	193.6	0.215111111
70	4852	1000	900	0.18549052	194.08	0.215644444
71	5458	1080	972	0.17808721	218.32	0.224609053
72	6330	1236	1112.4	0.1757346	253.2	0.227615965
73	5585	1056	950.4	0.1701701	223.4	0.235058923
74	5649	1000	900	0.15932023	225.96	0.251066667
75	7214	1155	1039.5	0.14409482	288.56	0.277594998
76	3911	600	540	0.1380721	156.44	0.289703704
77	7953	1200	1080	0.13579781	318.12	0.294555556
78	4000	600	540	0.135	160	0.296296296
79	9746	1461	1314.9	0.13491689	389.84	0.29647882
80	4254	600	540	0.12693935	170.16	0.315111111
81	4258	600	540	0.1268201	170.32	0.315407407
82	11650	1500	1350	0.11587983	466	0.345185185
83	16756	2080	1872	0.11172117	670.24	0.358034188
84	5037	600	540	0.10720667	201.48	0.373111111
85	10852	1250	1125	0.10366753	434.08	0.385848889
86	10133	1165	1048.5	0.1034738	405.32	0.386571292
87	12718	1410	1269	0.09977984	508.72	0.400882585
88	11472	1224	1101.6	0.0960251	458.88	0.416557734
89	22701	2400	2160	0.09514999	908.04	0.420388889
90	5610	560	504	0.08983957	224.4	0.445238095
91	10437	1040	936	0.08968094	417.48	0.446025641
92	7112	700	630	0.08858268	284.48	0.451555556
93	12301	1200	1080	0.08779774	492.04	0.455592593

94	15600	1500	1350	0.08653846	624	0.462222222
95	12686	1200	1080	0.08513322	507.44	0.469851852
96	10770	1000	900	0.08356546	430.8	0.478666667
97	13918	1265	1138.5	0.08180055	556.72	0.488994291
98	8978	800	720	0.08019603	359.12	0.498777778
99	18396	1598	1438.2	0.07818004	735.84	0.511639549
100	17097	1398	1258.2	0.07359186	683.88	0.543538388
101	7505	600	540	0.07195203	300.2	0.555925926
102	12626	1000	900	0.07128148	505.04	0.561155556
103	13422	1000	900	0.06705409	536.88	0.596533333
104	13635	1000	900	0.0660066	545.4	0.606
105	14821	1083	974.7	0.06576479	592.84	0.608228173
106	20824	1464	1317.6	0.06327315	832.96	0.632179721
107	14360	1000	900	0.06267409	574.4	0.638222222
108	14423	1000	900	0.06240033	576.92	0.641022222
109	20436	1380	1242	0.0607751	817.44	0.658164251
110	9270	600	540	0.05825243	370.8	0.686666667
111	43680	2800	2520	0.05769231	1747.2	0.693333333
112	21872	1400	1260	0.0576079	874.88	0.694349206
113	9493	600	540	0.05688402	379.72	0.703185185
114	22384	1380	1242	0.05548606	895.36	0.720901771
115	9886	600	540	0.0546227	395.44	0.732296296
116	20396	1215	1093.5	0.05361345	815.84	0.74608139
117	16867	1000	900	0.05335863	674.68	0.749644444
118	9973	560	504	0.05053645	398.92	0.791507937
119	20048	1094	984.6	0.04911213	801.92	0.814462726
120	11128	600	540	0.04852624	445.12	0.824296296
121	11408	600	540	0.0473352	456.32	0.845037037
122	19857	1000	900	0.04532407	794.28	0.882533333
123	20523	1000	900	0.04385324	820.92	0.912133333
124	21927	1000	900	0.04104529	877.08	0.974533333
125	22455	1000	900	0.04008016	898.2	0.998
126	15778	700	630	0.03992902	631.12	1.001777778
127	27336	1200	1080	0.03950834	1093.44	1.012444444
128	20432	870	783	0.03832224	817.28	1.043780332
129	24130	1000	900	0.03729797	965.2	1.072444444
130	24238	1000	900	0.03713178	969.52	1.077244444
131	13811	557.5	501.75	0.03632974	552.44	1.101026408
132	12569	500	450	0.03580237	502.76	1.117244444
133	32337	1277	1149.3	0.03554133	1293.48	1.125450274
134	15272	600	540	0.03535883	610.88	1.131259259
135	25748	1000	900	0.03495417	1029.92	1.144355556
136	57245	2200	1980	0.03458817	2289.8	1.156464646
137	26590	1000	900	0.03384731	1063.6	1.181777778
138	26880	1000	900	0.03348214	1075.2	1.194666667
139	27762	1000	900	0.03241841	1110.48	1.233866667
140	31495	1125	1012.5	0.03214796	1259.8	1.244246914
141	21059	700	630	0.02991595	842.36	1.337079365

142	30740	1000	900	0.02927781	1229.6	1.366222222
143	19739	600	540	0.02735701	789.56	1.462148148
144	19901	600	540	0.02713431	796.04	1.474148148
145	18521	550	495	0.02672642	740.84	1.496646465
146	26648	750	675	0.02533023	1065.92	1.579140741
147	36260	1000	900	0.02482074	1450.4	1.611555556
148	55194	1500	1350	0.02445918	2207.76	1.635377778
149	38838	1000	900	0.02317318	1553.52	1.726133333
150	40445	1000	900	0.02225244	1617.8	1.797555556
151	44236	1000	900	0.02034542	1769.44	1.966044444
152	26641	600	540	0.02026951	1065.64	1.973407407
153	46548	1000	900	0.01933488	1861.92	2.0688
154	28613	600	540	0.01887254	1144.52	2.119481481
155	23846	500	450	0.01887109	953.84	2.119644444
156	26572	500	450	0.01693512	1062.88	2.361955556
157	54663	1000	900	0.01646452	2186.52	2.429466667

Appendix -B : PM KUSUM Scheme

S.No	District	Targeted Quantity (3/5/7.5HP Pumps)				Cost Incurred				
		General	SC/ST			By Central Government	By Famers	By Each Famer	Electricity rate for irrigation	Average Pump Running Time
1	Ajmer	534	100	116.0275	417.7749	₹ 30,688,587	₹ 40,918,116	₹ 97,943	(Per unit)	(Hours)
2	Alwar	500	100	108.64	391.175	₹ 28,734,632	₹ 38,312,843	₹ 97,943		
3	Banswada	8	0	1.73824	6.2588	₹ 459,754	₹ 613,005	₹ 97,943		
4	Bara	30	50	6.5184	23.4705	₹ 1,724,078	₹ 2,298,771	₹ 97,943		
5	Bardmer	500	55	109	390	₹ 28,661,175	₹ 38,214,900	₹ 97,943		
6	Bharatpur	180	50	39.1104	140.823	₹ 10,344,468	₹ 13,792,623	₹ 97,943		
7	Bheelwada	500	125	108.64	391.175	₹ 28,734,632	₹ 38,312,843	₹ 97,943		
8	Bikaner	2253	375	489.5318	1762.6346	₹ 129,478,252	₹ 172,637,669	₹ 97,943		
9	Boondi	500	80	108.64	391.175	₹ 28,734,632	₹ 38,312,843	₹ 97,943		
10	Chittaudgarg	500	50	108.64	391.175	₹ 28,734,632	₹ 38,312,843	₹ 97,943		
11	Churu	934	525	202.9395	730.7149	₹ 53,676,292	₹ 71,568,390	₹ 97,943		
12	Dausa	183	40	39.76224	143.17005	₹ 10,516,875	₹ 14,022,500	₹ 97,943		
13	Dhaulpur	0	20	0	0	₹ -	₹ -			
14	Doongerpur	4	0	0.86912	3.1294	₹ 229,877	₹ 306,503	₹ 97,943		
15	Hanumangarg	775	175	168.392	606.32125	₹ 44,538,680	₹ 59,384,906	₹ 97,943		
16	Jaipur	2027	478	440.4266	1585.8235	₹ 116,490,198	₹ 155,320,264	₹ 97,943		
17	Jaisalmer	658	250	143	514	₹ 37,741,318	₹ 50,321,758	₹ 97,943		
18	Jaalaur	1182	450	256.825	924.7377	₹ 67,928,670	₹ 90,571,560	₹ 97,943	₹ 0.90	8
19	Jhaalwada	63	15	2447	2525	₹ 185,502,354	₹ 247,336,472	₹ 97,943		
20	Jhunjhunu	500	100	8	608	₹ 44,661,996	₹ 59,549,328	₹ 97,943		
21	Jodhpur	228	75	1	304	₹ 22,330,998	₹ 29,774,664	₹ 97,943		
22	Karauli	20	10	18	48	₹ 3,525,947	₹ 4,701,263	₹ 97,943		
23	Kota	112	40	17	169	₹ 12,414,272	₹ 16,552,362	₹ 97,943		
24	Nagaur	200	50	0	250	₹ 18,364,308	₹ 24,485,743	₹ 97,943		
25	Pali	217	30	5	252	₹ 18,511,222	₹ 24,681,629	₹ 97,943		
26	Pratapgarg	233	30	17	280	₹ 20,568,024	₹ 27,424,033	₹ 97,943		
27	Rajasmand	285	30	5	320	₹ 23,506,314	₹ 31,341,751	₹ 97,943		
28	Sawai Madhopur	500	100	420	1020	₹ 74,926,375	₹ 99,901,833	₹ 97,943		
29	Sikar	500	150	9	659	₹ 48,408,315	₹ 64,544,419	₹ 97,943		
30	Sirohi	500	150	104	754	₹ 55,386,751	₹ 73,849,002	₹ 97,943		
31	Sri Ganganagar	1556	350	2	1908	₹ 140,156,395	₹ 186,875,193	₹ 97,943		
32	Tonk	903	375	921	2199	₹ 161,532,449	₹ 215,376,598	₹ 97,943		
33	Udaipur	87	30	14	131	₹ 9,622,897	₹ 12,830,530	97,943		

Cost Recovered by Farmers

Cost of running a normal pump per day	Time taken by farmer to recover the investment cost		
	Days	Months	Years
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	3529	118	9.80
	0	0	0.00
	3529	118	9.80
	3529	118	9.80
₹ 27.75	3529	118	9.80
	3529	118	9.80
	3529	117.64	9.80
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	9.8
	3529	118	

Appendix -C : Air conditioners 3 Star, 4 star, 5 star rated

Name of electrical appliance	House 1 - 2BHK, 2 Adults +2 kids				House 2 - 2BHK, 2 Adults				House 3 - 3BHK, 4 Adults			
	Count	usage	Rating (W)	Consumpti	Count	usage	Rating	Consumpti	Count	usage	Rating	Consumpti
Fan	6	10	45	2700	5	12	53	3180	9	10	50	4500
Tubelight	8	5	55	2200	5	6	20	600	9	8	20	1440
Computer	1	8	80	640	1	1	70	70	3	8	100	2400
Air Conditioner	1	7	840	5880	1	4			1	3	840	2520
									1	7	840	5880
	1	1	840	840					1	-	-	0
Electric Geysers	2	0.25	2000	1000	1	0.16	840	134.4	2	-	2000	0
Television	1	6	80	480	1	14	80	1120	1	3	50	150
									1	1	80	80
Mobile Charging	3	5	5	75	2	2	5	20	3	5	5	75
Microwave Oven	-	-	-	0	-	-	-	0	1	0.5	1200	600
Washing Machine	1	1	350	350	1	1	500	500	1	1	350	350
Juicer/Mixer	1	0.08	750	60	1	0.16	750	120	1	0.08	750	60
Wet Grinder	1	0.25	150	37.5	1	0.16	150	24	1	0.16	240	38.4
Table Fan	-	-	0	0	1	0.5	55	27.5	-	-	0	0
Wifi Router	1	16	6	96	1	14	12	168	1	16	12	192
CCTV Camera	-	-	0	0	-	-	0	0	1	24	12	288
Refrigerator	1	24	400	9600	1	24	250	6000	1	24	250	6000
Invertor	0	0	0	0	-	-	0	0	1	4	800	3200
Exhaust fan	1	0.08	80	6.4	1	0.08	80	6.4	4	0.08	60	19.2
Electric Iron	1	0.16	750	120	1	0.16	1000	160	1	0.33	750	247.5
Printer	1	0.08	400	32	-	-	0	0	1	0.08	300	24
Total				24116.9				15490.3				28064.1
kWh				24.1169				15.4903				28.0641
In Mega Joules (MJ)				86.8208				55.7651				101.031
Total energy consumed during summer (MJ)				20837				13383.6				24247.4

House 4 - 3BHK, 3Adults				House 5 - 3BHK, 4 Adults + 1 kid				House 6 - 1BHK, 2 Adults				House 7 - 3BHK,	
Count	usage	Rating	Consumpti	Count	usage	Rating	Consumpti	Count	usage	Rating	Consumpti	Count	usage
6	4	45	1080	7	7	53	2597	4	4.5	45	810	6	3.5
9	2	20	360	7	3	55	1155	4	3	40	480	8	3
1	9	180	1620	3	8	130	3120	1	1	180	180	2	4
			4200	1	7	840	5880	1	3	840	2520	1	7
1	6	840	5040	1	6	840	5040					1	2
2	0.5	2000	2000	2	0.5	2000	2000	1	0.5	2000	1000	2	0.25
1	10	100	1000									1	1
1	2	50	100									1	3
2	1	5	10	3	5	5	75	2	1	4	8	2	2
-	-	-	0	-	-	-	0	-	-	-	0	-	-
1	0.75	500	375	1	1.5	570	855	1	0.5	410	205	1	0.5
1	0.16	750	120	1	0.16	750	120	1	-	-	0	1	0.5
-	0.25	0	0	1	0.25	240	60	-	-	0	0	1	0.4
1	0.5	55	27.5	-	-	0	0	-	-	0	0	1	1
1	16	10	160	1	15	10	150	1	10	12	120	1	12
-	-	0	0	-	-	0	0	-	-	0	0	-	-
1	24	400	9600	1	24	500	12000	1	24	250	6000	1	24
-	-	-	0	1	4	800	3200	-	-	0	0	-	-
-	-	0	0	1	0.5	80	40	-	-	0	0	3	0.027
-	-	0	0	-	-	0	0	-	-	0	0	1	0.16
1	0.25	300	75	1	10	500	5000	-	-	0	0	1	0.016
			25767.5				42092				12283		
			25.7675				42.092				12.283		
			92.763				151.531				44.2188		
			22263.1				36367.5				10612.5		

2 Adults + 1 kid		House 8 - 2BHK, 2 Adults				House 9 - 3BHK, 4 Adults + 2 kids				House 10 - 3BHK, 6 Adults			
Rating	Consumpti	Count	usage	Rating	Consumpti	Count	usage	Rating	Consumpti	Count	usage	Rating	Consumpti
53	1113	5	9	50	2250	12	5	53	3180	6	9	70	3780
55	1320	5	3	40	600	7	3	55	1155	5	3	55	825
90	720	2	9	90	1620	2	8	100	1600	3	8	80	1920
840	5880					1	7	840	5880	1	5	840	4200
										1	7	840	5880
840	1680					1	7	840	5880	1	2	840	1680
2000	1000	1	0.16	2000	320	1	0.5	2000	1000	2	1	2000	4000
50	50					1	6	100	600	1	8	100	800
50	150					1	6	80	480	1	6	100	600
5	20	2	1	5	10	4	1	5	20	6	0.5	5	15
-	0	-	-	-	0	-	-	-	0	-	-	-	0
350	175	1	0.5	410	205	1	2	2150	4300	1	1	2150	2150
750	375	-	-	-	0	1	0.16	750	120	1	0.25	750	187.5
150	60	-	-	0	0	-	-	0	0	-	-	0	0
50	50	-	-	0	0	-	-	0	0	-	-	0	0
10	120	-	-	0	0	1	14	10	140	1	16	10	160
0	0	-	-	0	0	-	-	0	0	-	-	0	0
400	9600	1	24	250	6000	1	24	778	18672	1	24	778	18672
-	0	-	-	0	0	1	4	800	3200	1	4	800	3200
60	4.86	-	-	0	0	1	0.16	80	12.8	1	0.16	80	12.8
1000	160	-	-	0	0	-	-	0	0	1	0.33	750	247.5
400	6.4	-	-	0	0	-	-	0	0	1	0.16	500	80
	22484.26				15365				46239.8				48409.8
	22.48426				15.365				46.2398				48.4098
	80.9433				55.314				166.463				174.275
	19426.4				13275.4				39951.2				41826.1

Grid-Connected System: Simulation parameters

Project : **New Project**

Geographical Site	**Ahmedabad_1_GJ**		Country	**India**
Situation	Latitude	22.93° N	Longitude	72.66° E
Time defined as	Legal Time	Time zone UT+5.5	Altitude	58 m
	Albedo	0.20		
Meteo data:	**Ahmedabad_1_GJ**	Meteonorm 7.3 (1981-2010) - Synthetic		

Simulation variant : **New simulation variant**

	Simulation date	03/10/20 19h10		
Simulation parameters	System type	**No 3D scene defined, no shadings**		
Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse Circumsolar	Perez, Meteonorm separate
Horizon	Free Horizon			
Near Shadings	No Shadings			
User's needs :	Unlimited load (grid)			

PV Array Characteristics

PV module	Si-poly	Model	**Eldora VSP.60.260.05_U**		
Original PVsyst database		Manufacturer	Vikram Solar		
Number of PV modules		In series	8 modules	In parallel	1 strings
Total number of PV modules		nb. modules	8	Unit Nom. Power	260 Wp
Array global power		Nominal (STC)	**2080 Wp**	At operating cond.	1880 Wp (50°C)
Array operating characteristics (50°C)		U mpp	222 V	I mpp	8.5 A
Total area		Module area	**13.0 m²**		

Inverter		Model	**Growatt 2000TL-US**		
Original PVsyst database		Manufacturer	Growatt New Energy		
Characteristics		Unit Nom. Power	**2.00 kWac**	Oper. Voltage	120-450 V
Inverter pack		Total power	**2.0 kWac**	Pnom ratio	1.04
		Nb. of inverters	1 units		
Total		Total power	**2 kWac**	Pnom ratio	1.04

PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Global array res.	441 mΩ	Loss Fraction	1.5 % at STC
Module Quality Loss			Loss Fraction	-0.8 %
Module mismatch losses			Loss Fraction	2.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.403	0.000

Grid-Connected System: Main results

Project : **New Project**

Simulation variant : **New simulation variant**

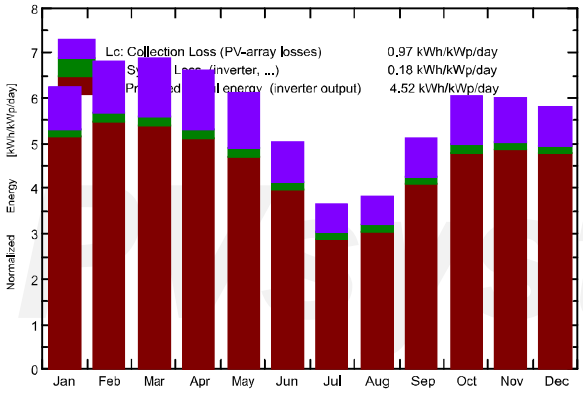
Main system parameters	System type	**No 3D scene defined, no shadings**			
PV Field Orientation	tilt	30°	azimuth	0°	
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp	
PV Array	Nb. of modules	8	Pnom total	**2080 Wp**	
Inverter	Model	Growatt 2000TL-US	Pnom	2000 W ac	
User's needs	Unlimited load (grid)				

Main simulation results

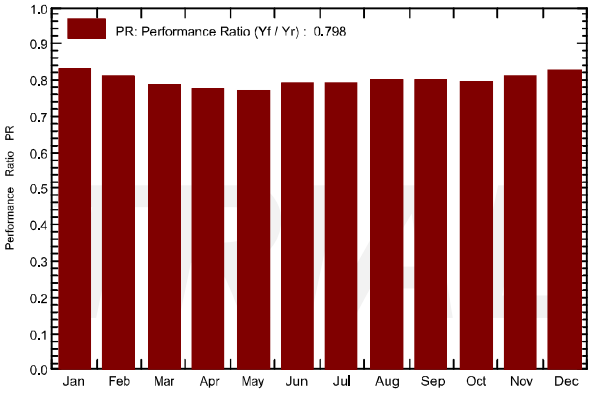
System Production — **Produced Energy** **3433 kWh/year** Specific prod. 1650 kWh/kWp/year

Performance Ratio PR 79.84 %

Normalized productions (per installed kWp): Nominal power 2080 Wp



Performance Ratio PR



New simulation variant

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	E_Grid kWh	PR ratio
January	139.2	41.1	19.37	193.4	189.9	343.5	333.2	0.829
February	151.1	41.9	22.48	190.2	187.0	329.9	320.0	0.809
March	192.1	64.1	28.07	213.2	208.7	360.1	348.4	0.786
April	202.0	76.4	31.64	198.8	193.7	331.8	320.2	0.774
May	212.0	91.6	33.47	189.6	183.8	316.7	304.3	0.771
June	172.4	105.2	31.64	150.8	145.8	259.3	247.3	0.788
July	126.7	89.0	29.30	112.8	108.8	197.5	185.8	0.792
August	125.4	88.0	28.21	118.1	114.3	207.6	196.1	0.798
September	149.2	80.0	28.97	153.6	149.4	265.8	255.1	0.799
October	159.6	69.0	28.45	187.1	183.0	321.0	310.0	0.797
November	136.1	49.4	24.11	179.5	176.5	313.4	303.1	0.812
December	128.5	42.6	20.77	180.3	177.6	319.5	309.5	0.825
Year	1894.4	838.3	27.23	2067.4	2018.5	3566.2	3433.0	0.798

Legends:
- GlobHor — Global horizontal irradiation
- DiffHor — Horizontal diffuse irradiation
- T_Amb — T amb.
- GlobInc — Global incident in coll. plane
- GlobEff — Effective Global, corr. for IAM and shadings
- EArray — Effective energy at the output of the array
- E_Grid — Energy injected into grid
- PR — Performance Ratio

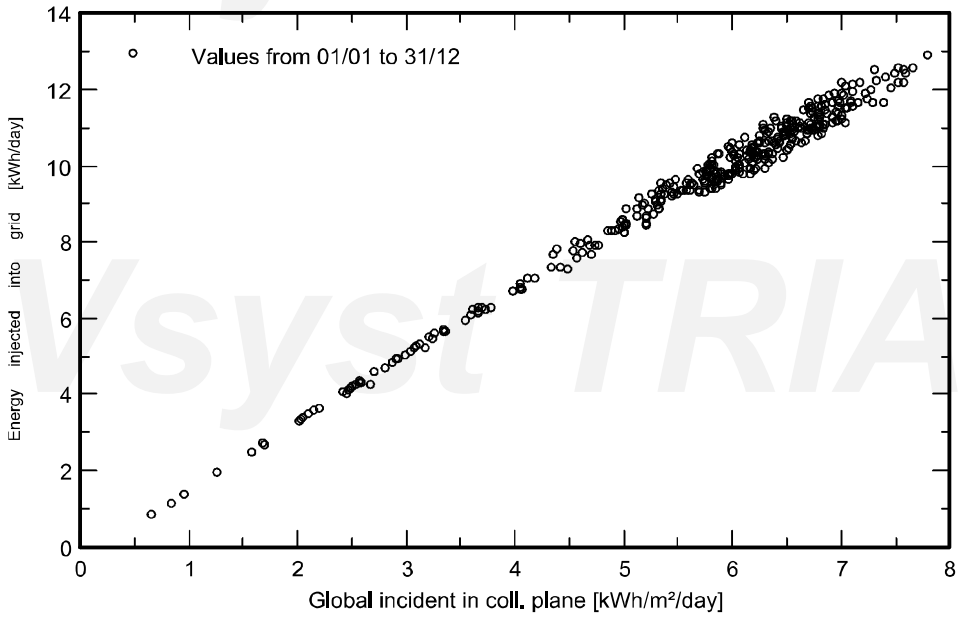
Grid-Connected System: Special graphs

Project : **New Project**

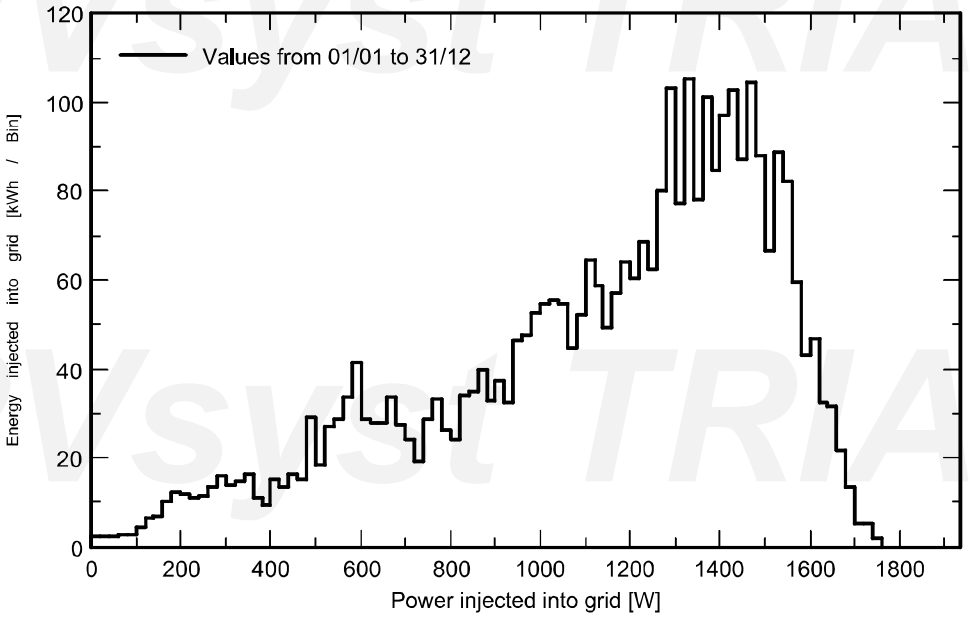
Simulation variant : **New simulation variant**

Main system parameters					
System type	**No 3D scene defined, no shadings**				
PV Field Orientation	tilt	30°	azimuth	0°	
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp	
PV Array	Nb. of modules	8	Pnom total	**2080 Wp**	
Inverter	Model	Growatt 2000TL-US	Pnom	2000 W ac	
User's needs	Unlimited load (grid)				

Daily Input/Output diagram



System Output Power Distribution



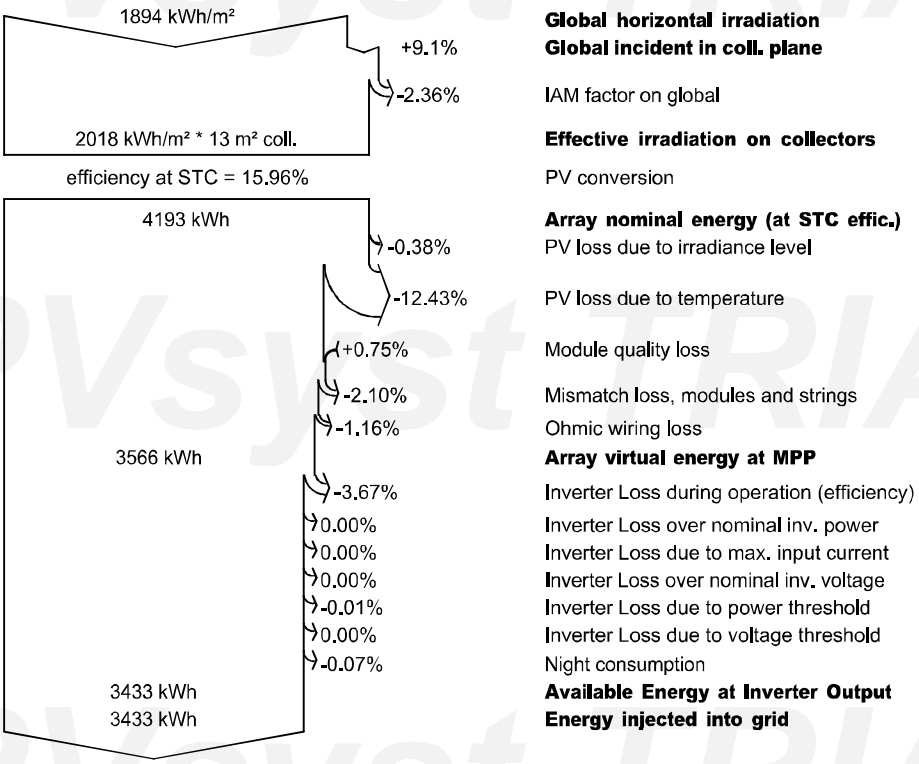
Grid-Connected System: Loss diagram

Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	8	Pnom total	**2080 Wp**
Inverter	Model	Growatt 2000TL-US	Pnom	2000 W ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year



Global horizontal irradiation
Global incident in coll. plane
IAM factor on global
Effective irradiation on collectors
PV conversion
Array nominal energy (at STC effic.)
PV loss due to irradiance level
PV loss due to temperature
Module quality loss
Mismatch loss, modules and strings
Ohmic wiring loss
Array virtual energy at MPP
Inverter Loss during operation (efficiency)
Inverter Loss over nominal inv. power
Inverter Loss due to max. input current
Inverter Loss over nominal inv. voltage
Inverter Loss due to power threshold
Inverter Loss due to voltage threshold
Night consumption
Available Energy at Inverter Output
Energy injected into grid

Grid-Connected System: Simulation parameters

Project : **New Project**

Geographical Site	**Ahmedabad_1_GJ**		Country	**India**
Situation	Latitude	22.93° N	Longitude	72.66° E
Time defined as	Legal Time	Time zone UT+5.5	Altitude	58 m
	Albedo	0.20		
Meteo data:	**Ahmedabad_1_GJ**	Meteonorm 7.3 (1981-2010) - Synthetic		

Simulation variant : **New simulation variant**

Simulation date 03/10/20 19h11

Simulation parameters	System type	**No 3D scene defined, no shadings**		
Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse Circumsolar	Perez, Meteonorm separate
Horizon	Free Horizon			
Near Shadings	No Shadings			
User's needs :	Unlimited load (grid)			

PV Array Characteristics

PV module	Si-poly	Model	**Eldora VSP.60.260.05_U**		
Original PVsyst database		Manufacturer	Vikram Solar		
Number of PV modules		In series	12 modules	In parallel	1 strings
Total number of PV modules		nb. modules	12	Unit Nom. Power	260 Wp
Array global power		Nominal (STC)	**3120 Wp**	At operating cond.	2819 Wp (50°C)
Array operating characteristics (50°C)		U mpp	334 V	I mpp	8.5 A
Total area		Module area	**19.5 m²**		

Inverter	Model	**Growatt 3000HF**		
Original PVsyst database	Manufacturer	Growatt New Energy		
Characteristics	Unit Nom. Power	**3.00 kWac**	Oper. Voltage	120-600 V
Inverter pack	Total power	**3.0 kWac**	Pnom ratio	1.04
	Nb. of inverters	1 units		
Total	Total power	**3 kWac**	Pnom ratio	1.04

PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Global array res.	662 mΩ	Loss Fraction	1.5 % at STC
Module Quality Loss			Loss Fraction	-0.8 %
Module mismatch losses			Loss Fraction	2.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.403	0.000

Grid-Connected System: Main results

Project : **New Project**

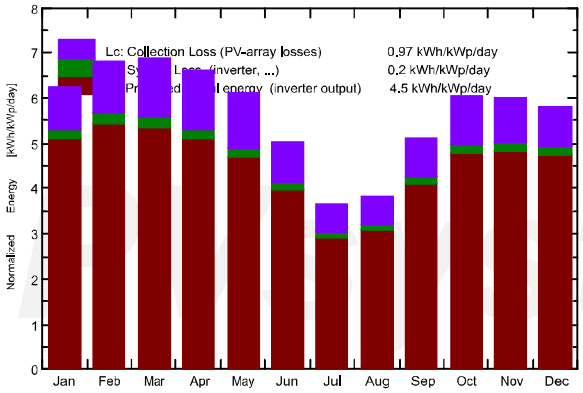
Simulation variant : **New simulation variant**

Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	12	Pnom total	**3120 Wp**
Inverter	Model	Growatt 3000HF	Pnom	3000 W ac
User's needs	Unlimited load (grid)			

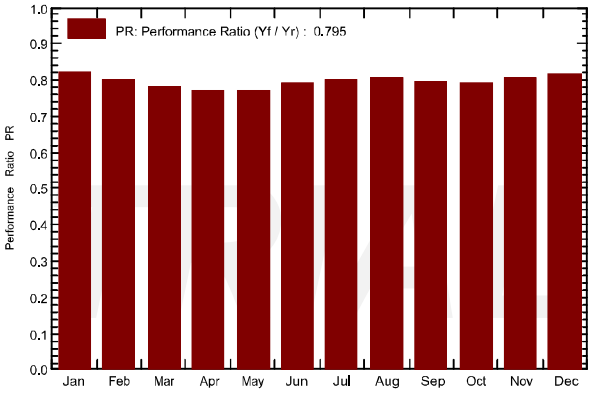
Main simulation results

System Production	**Produced Energy**	**5.13 MWh/year**	Specific prod.	1643 kWh/kWp/year
	Performance Ratio PR	79.47 %		

Normalized productions (per installed kWp): Nominal power 3120 Wp



Performance Ratio PR



New simulation variant

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR ratio
January	139.2	41.1	19.37	193.4	189.9	0.515	0.495	0.820
February	151.1	41.9	22.48	190.2	187.0	0.495	0.475	0.800
March	192.1	64.1	28.07	213.2	208.7	0.540	0.518	0.779
April	202.0	76.4	31.64	198.8	193.7	0.498	0.477	0.769
May	212.0	91.6	33.47	189.6	183.8	0.475	0.455	0.769
June	172.4	105.2	31.64	150.8	145.8	0.389	0.372	0.791
July	126.7	89.0	29.30	112.8	108.8	0.296	0.282	0.802
August	125.4	88.0	28.21	118.1	114.3	0.311	0.297	0.806
September	149.2	80.0	28.97	153.6	149.4	0.399	0.382	0.797
October	159.6	69.0	28.45	187.1	183.0	0.481	0.462	0.791
November	136.1	49.4	24.11	179.5	176.5	0.470	0.451	0.805
December	128.5	42.6	20.77	180.3	177.6	0.479	0.460	0.817
Year	1894.4	838.3	27.23	2067.4	2018.5	5.349	5.126	0.795

Legends:
GlobHor Global horizontal irradiation
DiffHor Horizontal diffuse irradiation
T_Amb T amb.
GlobInc Global incident in coll. plane
GlobEff Effective Global, corr. for IAM and shadings
EArray Effective energy at the output of the array
E_Grid Energy injected into grid
PR Performance Ratio

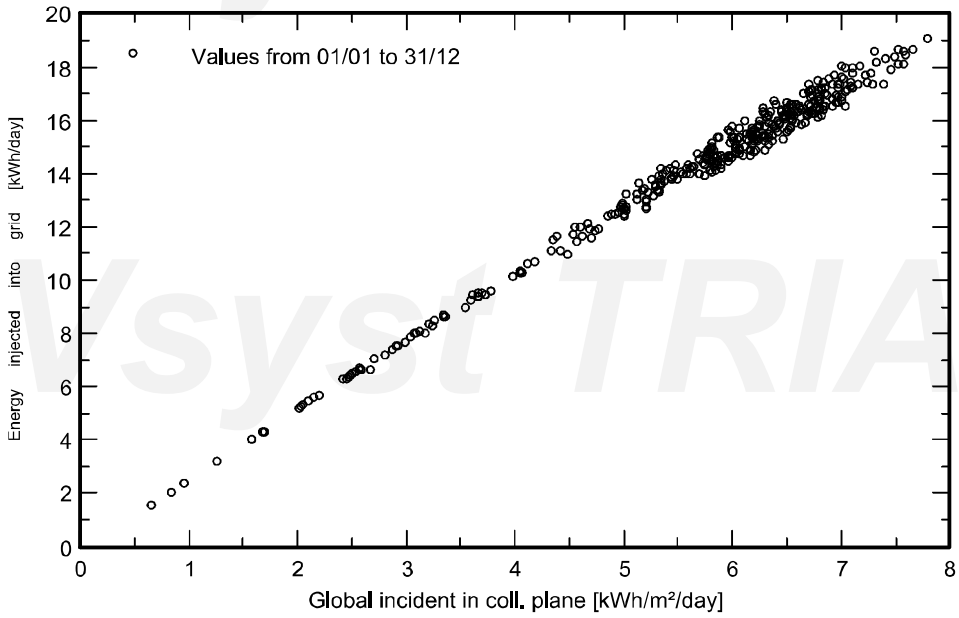
Grid-Connected System: Special graphs

Project : **New Project**

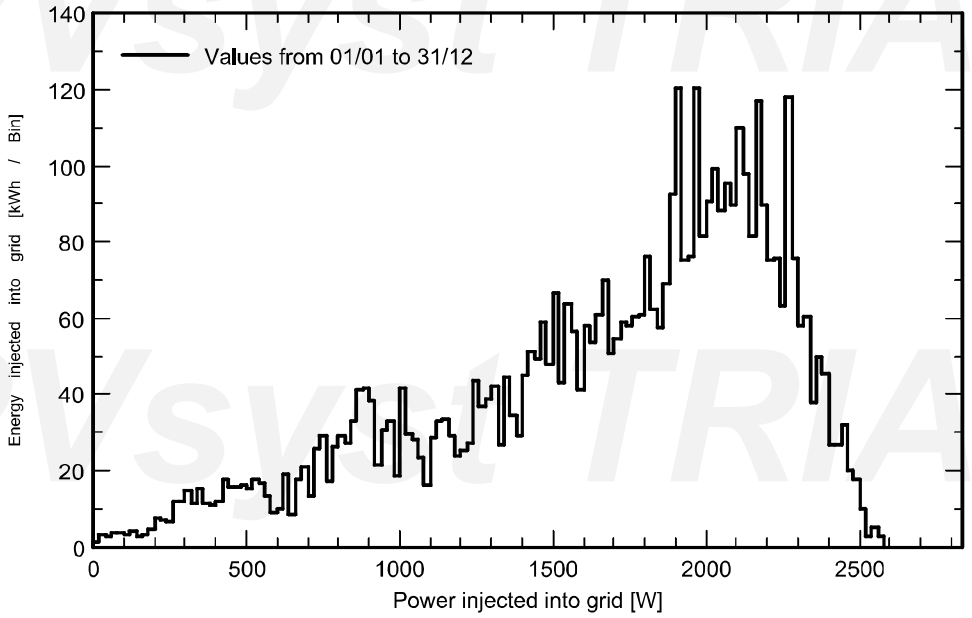
Simulation variant : **New simulation variant**

Main system parameters					
System type		**No 3D scene defined, no shadings**			
PV Field Orientation	tilt	30°	azimuth	0°	
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp	
PV Array	Nb. of modules	12	Pnom total	**3120 Wp**	
Inverter	Model	Growatt 3000HF	Pnom	3000 W ac	
User's needs	Unlimited load (grid)				

Daily Input/Output diagram



System Output Power Distribution



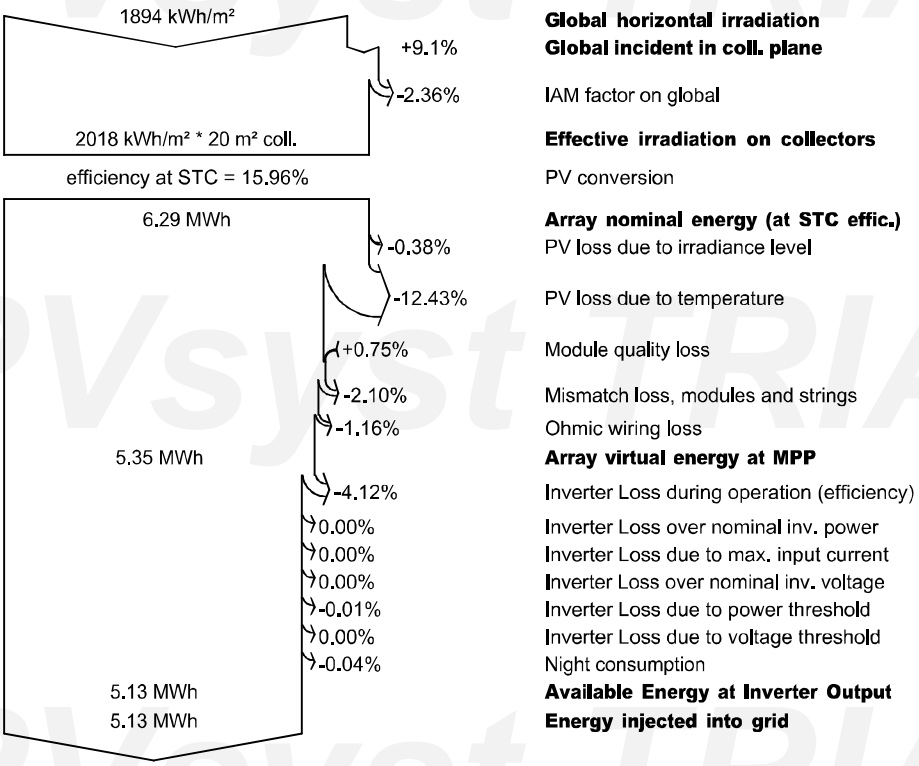
Grid-Connected System: Loss diagram

Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	12	Pnom total	**3120 Wp**
Inverter	Model	Growatt 3000HF	Pnom	3000 W ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year



Grid-Connected System: Simulation parameters

Project : **New Project**

Geographical Site	**Ahmedabad_1_GJ**		Country	**India**
Situation	Latitude	22.93° N	Longitude	72.66° E
Time defined as	Legal Time	Time zone UT+5.5	Altitude	58 m
	Albedo	0.20		
Meteo data:	**Ahmedabad_1_GJ**	Meteonorm 7.3 (1981-2010) - Synthetic		

Simulation variant : **New simulation variant**

	Simulation date	03/10/20 19h12		
Simulation parameters	System type	**No 3D scene defined, no shadings**		
Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse Circumsolar	Perez, Meteonorm separate
Horizon	Free Horizon			
Near Shadings	No Shadings			
User's needs :	Unlimited load (grid)			

PV Array Characteristics

PV module	Si-poly	Model	**Eldora VSP.60.260.05_U**		
Original PVsyst database		Manufacturer	Vikram Solar		
Number of PV modules		In series	15 modules	In parallel	1 strings
Total number of PV modules		nb. modules	15	Unit Nom. Power	260 Wp
Array global power		Nominal (STC)	**3900 Wp**	At operating cond.	3524 Wp (50°C)
Array operating characteristics (50°C)		U mpp	417 V	I mpp	8.5 A
Total area		Module area	**24.4 m²**		

Inverter		Model	**Growatt 4000UE**		
Original PVsyst database		Manufacturer	Growatt New Energy		
Characteristics		Unit Nom. Power	**4.00 kWac**	Oper. Voltage	200-800 V
Inverter pack		Total power	**4.0 kWac**	Pnom ratio	0.98
		Nb. of inverters	1 units		
Total		Total power	**4 kWac**	Pnom ratio	0.98

PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Global array res.	827 mΩ	Loss Fraction	1.5 % at STC
Module Quality Loss			Loss Fraction	-0.8 %
Module mismatch losses			Loss Fraction	2.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.403	0.000

Grid-Connected System: Main results

Project : **New Project**

Simulation variant : **New simulation variant**

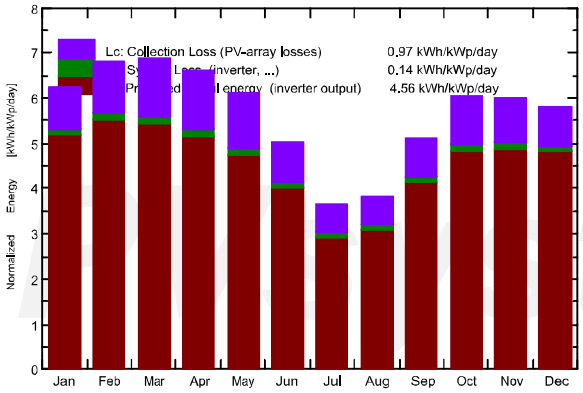
Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	15	Pnom total	**3900 Wp**
Inverter	Model	Growatt 4000UE	Pnom	4000 W ac
User's needs	Unlimited load (grid)			

Main simulation results

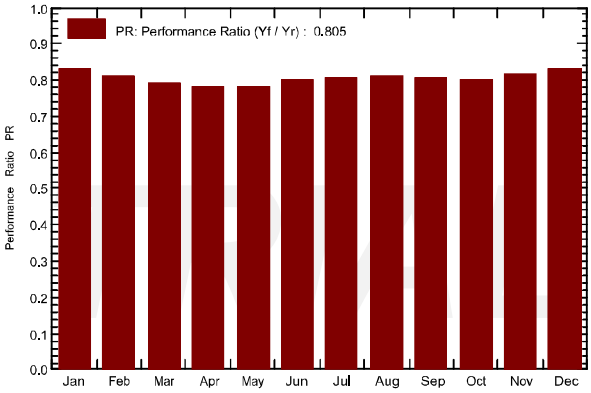
System Production — **Produced Energy** **6.49 MWh/year** — Specific prod. 1665 kWh/kWp/year

Performance Ratio PR 80.52 %

Normalized productions (per installed kWp): Nominal power 3900 Wp



Performance Ratio PR



New simulation variant

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR ratio
January	139.2	41.1	19.37	193.4	189.9	0.644	0.628	0.832
February	151.1	41.9	22.48	190.2	187.0	0.619	0.602	0.812
March	192.1	64.1	28.07	213.2	208.7	0.675	0.657	0.790
April	202.0	76.4	31.64	198.8	193.7	0.622	0.605	0.780
May	212.0	91.6	33.47	189.6	183.8	0.594	0.576	0.779
June	172.4	105.2	31.64	150.8	145.8	0.486	0.470	0.800
July	126.7	89.0	29.30	112.8	108.8	0.370	0.355	0.808
August	125.4	88.0	28.21	118.1	114.3	0.389	0.374	0.813
September	149.2	80.0	28.97	153.6	149.4	0.498	0.483	0.807
October	159.6	69.0	28.45	187.1	183.0	0.602	0.586	0.803
November	136.1	49.4	24.11	179.5	176.5	0.588	0.572	0.817
December	128.5	42.6	20.77	180.3	177.6	0.599	0.583	0.830
Year	1894.4	838.3	27.23	2067.4	2018.5	6.687	6.492	0.805

Legends:
- GlobHor — Global horizontal irradiation
- DiffHor — Horizontal diffuse irradiation
- T_Amb — T amb.
- GlobInc — Global incident in coll. plane
- GlobEff — Effective Global, corr. for IAM and shadings
- EArray — Effective energy at the output of the array
- E_Grid — Energy injected into grid
- PR — Performance Ratio

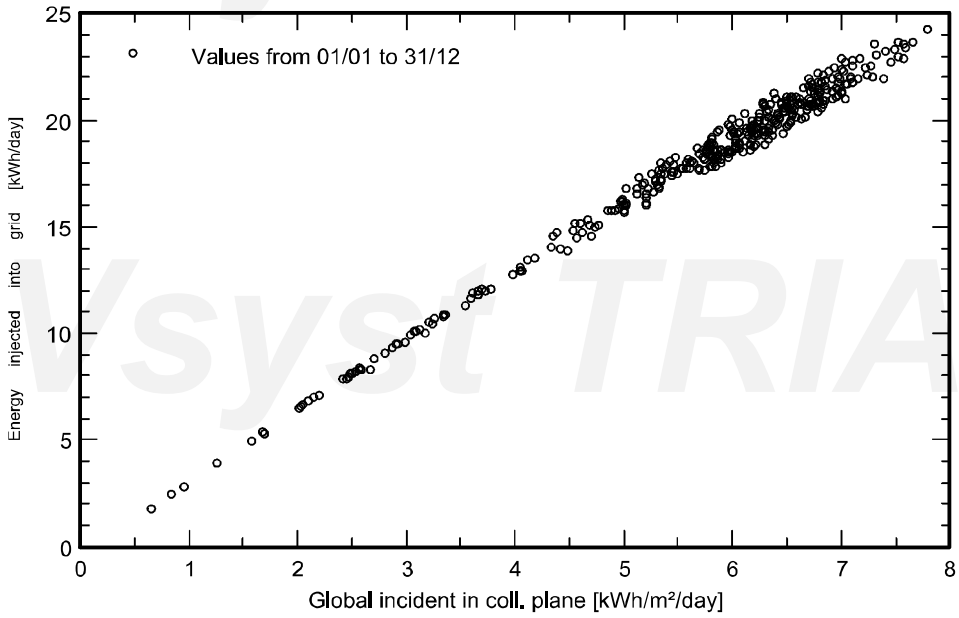
Grid-Connected System: Special graphs

Project : **New Project**

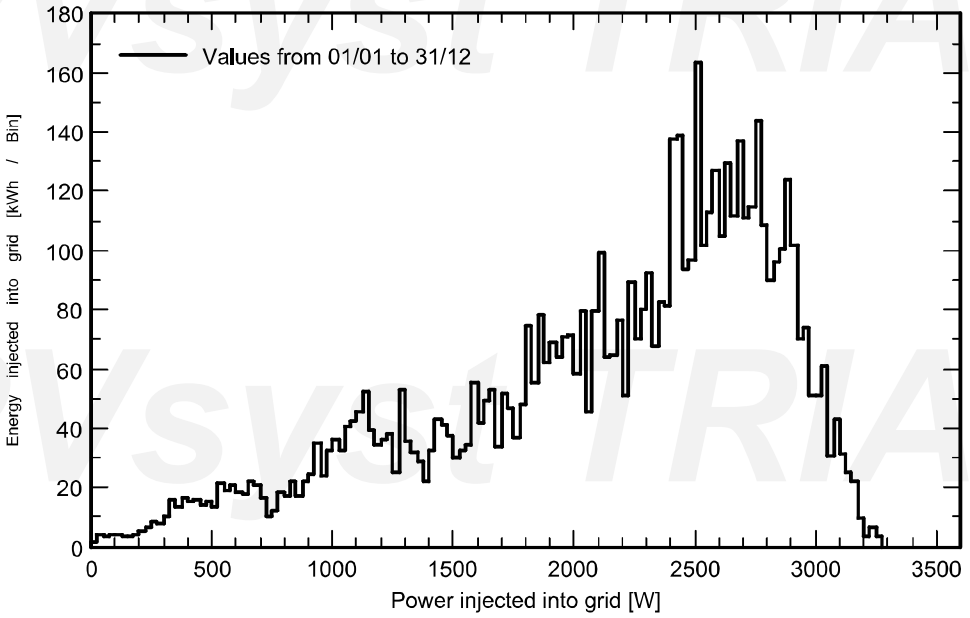
Simulation variant : **New simulation variant**

Main system parameters					
System type	**No 3D scene defined, no shadings**				
PV Field Orientation	tilt	30°	azimuth	0°	
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp	
PV Array	Nb. of modules	15	Pnom total	**3900 Wp**	
Inverter	Model	Growatt 4000UE	Pnom	4000 W ac	
User's needs	Unlimited load (grid)				

Daily Input/Output diagram



System Output Power Distribution



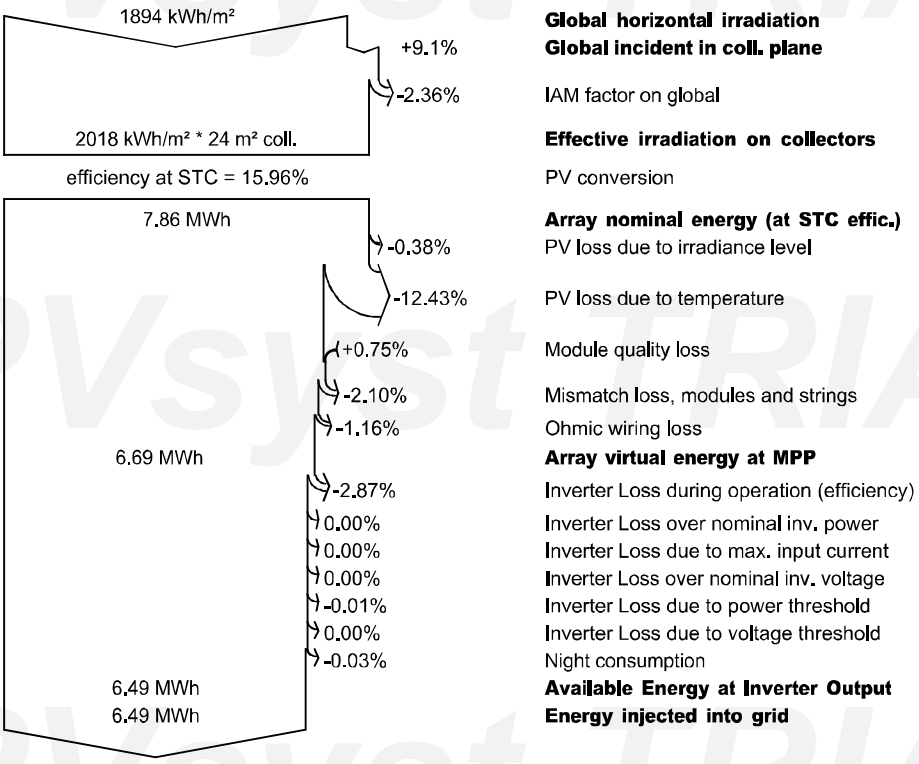
Grid-Connected System: Loss diagram

Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	15	Pnom total	**3900 Wp**
Inverter	Model	Growatt 4000UE	Pnom	4000 W ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year



Global horizontal irradiation
Global incident in coll. plane
IAM factor on global
Effective irradiation on collectors
PV conversion
Array nominal energy (at STC effic.)
PV loss due to irradiance level
PV loss due to temperature
Module quality loss
Mismatch loss, modules and strings
Ohmic wiring loss
Array virtual energy at MPP
Inverter Loss during operation (efficiency)
Inverter Loss over nominal inv. power
Inverter Loss due to max. input current
Inverter Loss over nominal inv. voltage
Inverter Loss due to power threshold
Inverter Loss due to voltage threshold
Night consumption
Available Energy at Inverter Output
Energy injected into grid

Grid-Connected System: Simulation parameters

Project : **New Project**

Geographical Site	**Ahmedabad_1_GJ**		Country	**India**
Situation	Latitude	22.93° N	Longitude	72.66° E
Time defined as	Legal Time	Time zone UT+5.5	Altitude	58 m
	Albedo	0.20		
Meteo data:	**Ahmedabad_1_GJ**	Meteonorm 7.3 (1981-2010) - Synthetic		

Simulation variant : **New simulation variant**

Simulation date 03/10/20 19h10

Simulation parameters	System type	**No 3D scene defined, no shadings**		
Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse Circumsolar	Perez, Meteonorm separate
Horizon	Free Horizon			
Near Shadings	No Shadings			
User's needs :	Unlimited load (grid)			

PV Array Characteristics

PV module	Si-poly	Model	**Eldora VSP.60.260.05_U**		
Original PVsyst database		Manufacturer	Vikram Solar		
Number of PV modules		In series	8 modules	In parallel	1 strings
Total number of PV modules		nb. modules	8	Unit Nom. Power	260 Wp
Array global power		Nominal (STC)	**2080 Wp**	At operating cond.	1880 Wp (50°C)
Array operating characteristics (50°C)		U mpp	222 V	I mpp	8.5 A
Total area		Module area	**13.0 m²**		

Inverter		Model	**Growatt 2000TL-US**		
Original PVsyst database		Manufacturer	Growatt New Energy		
Characteristics		Unit Nom. Power	**2.00 kWac**	Oper. Voltage	120-450 V
Inverter pack		Total power	**2.0 kWac**	Pnom ratio	1.04
		Nb. of inverters	1 units		
Total		Total power	**2 kWac**	Pnom ratio	1.04

PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Global array res.	441 mΩ	Loss Fraction	1.5 % at STC
Module Quality Loss			Loss Fraction	-0.8 %
Module mismatch losses			Loss Fraction	2.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.403	0.000

Grid-Connected System: Main results

Project : **New Project**

Simulation variant : **New simulation variant**

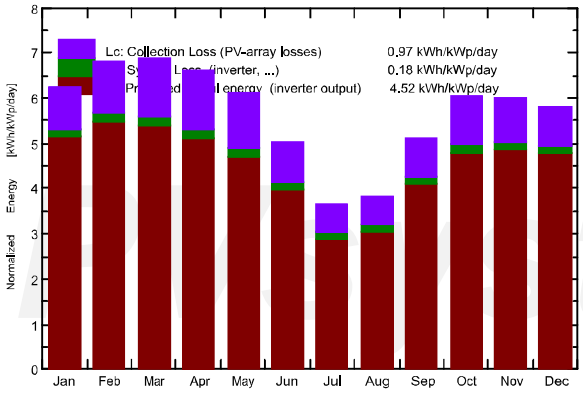
Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	8	Pnom total	**2080 Wp**
Inverter	Model	Growatt 2000TL-US	Pnom	2000 W ac
User's needs	Unlimited load (grid)			

Main simulation results

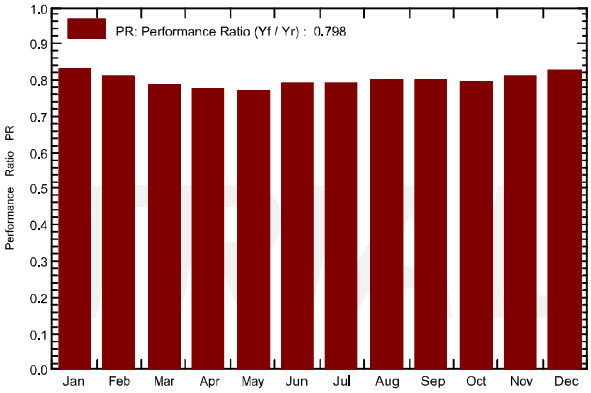
System Production — **Produced Energy** **3433 kWh/year** Specific prod. 1650 kWh/kWp/year

Performance Ratio PR 79.84 %

Normalized productions (per installed kWp): Nominal power 2080 Wp



Performance Ratio PR



New simulation variant

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	E_Grid kWh	PR ratio
January	139.2	41.1	19.37	193.4	189.9	343.5	333.2	0.829
February	151.1	41.9	22.48	190.2	187.0	329.9	320.0	0.809
March	192.1	64.1	28.07	213.2	208.7	360.1	348.4	0.786
April	202.0	76.4	31.64	198.8	193.7	331.8	320.2	0.774
May	212.0	91.6	33.47	189.6	183.8	316.7	304.3	0.771
June	172.4	105.2	31.64	150.8	145.8	259.3	247.3	0.788
July	126.7	89.0	29.30	112.8	108.8	197.5	185.8	0.792
August	125.4	88.0	28.21	118.1	114.3	207.6	196.1	0.798
September	149.2	80.0	28.97	153.6	149.4	265.8	255.1	0.799
October	159.6	69.0	28.45	187.1	183.0	321.0	310.0	0.797
November	136.1	49.4	24.11	179.5	176.5	313.4	303.1	0.812
December	128.5	42.6	20.77	180.3	177.6	319.5	309.5	0.825
Year	1894.4	838.3	27.23	2067.4	2018.5	3566.2	3433.0	0.798

Legends:
- GlobHor — Global horizontal irradiation
- DiffHor — Horizontal diffuse irradiation
- T_Amb — T amb.
- GlobInc — Global incident in coll. plane
- GlobEff — Effective Global, corr. for IAM and shadings
- EArray — Effective energy at the output of the array
- E_Grid — Energy injected into grid
- PR — Performance Ratio

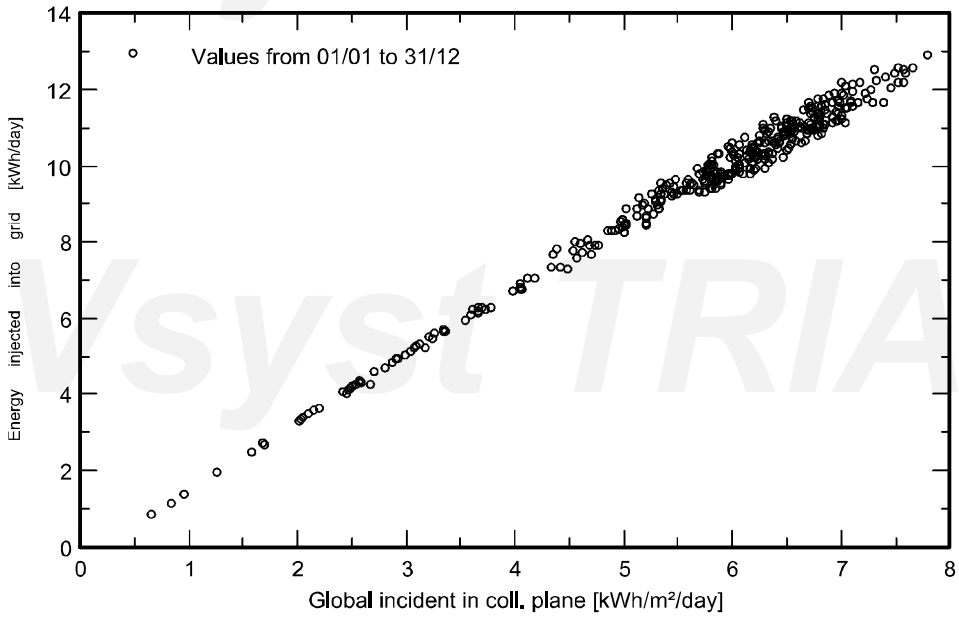
Grid-Connected System: Special graphs

Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters					
PV Field Orientation	System type	**No 3D scene defined, no shadings**			
	tilt	30°	azimuth	0°	
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp	
PV Array	Nb. of modules	8	Pnom total	**2080 Wp**	
Inverter	Model	Growatt 2000TL-US	Pnom	2000 W ac	
User's needs	Unlimited load (grid)				

Daily Input/Output diagram



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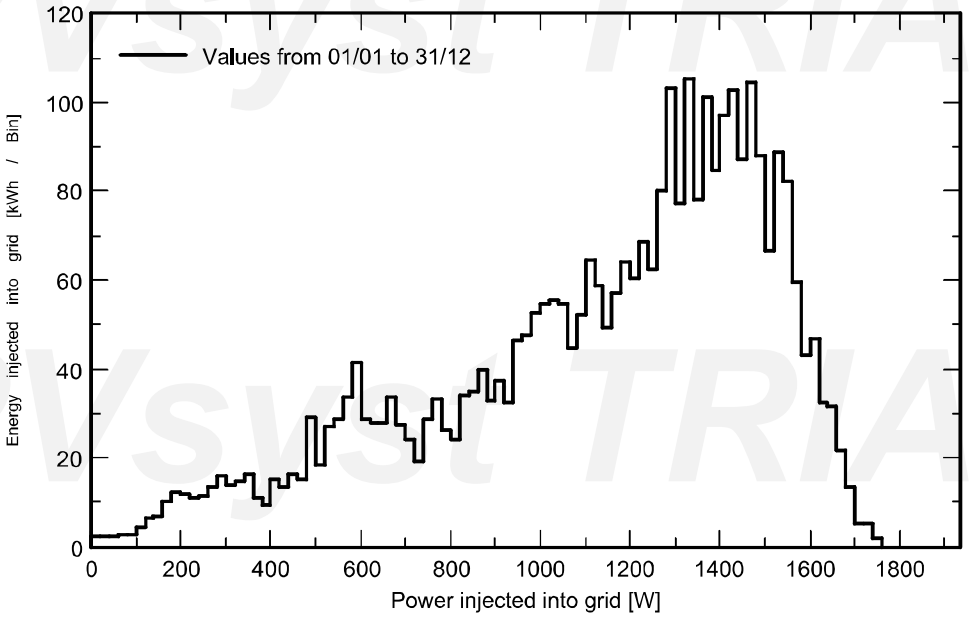


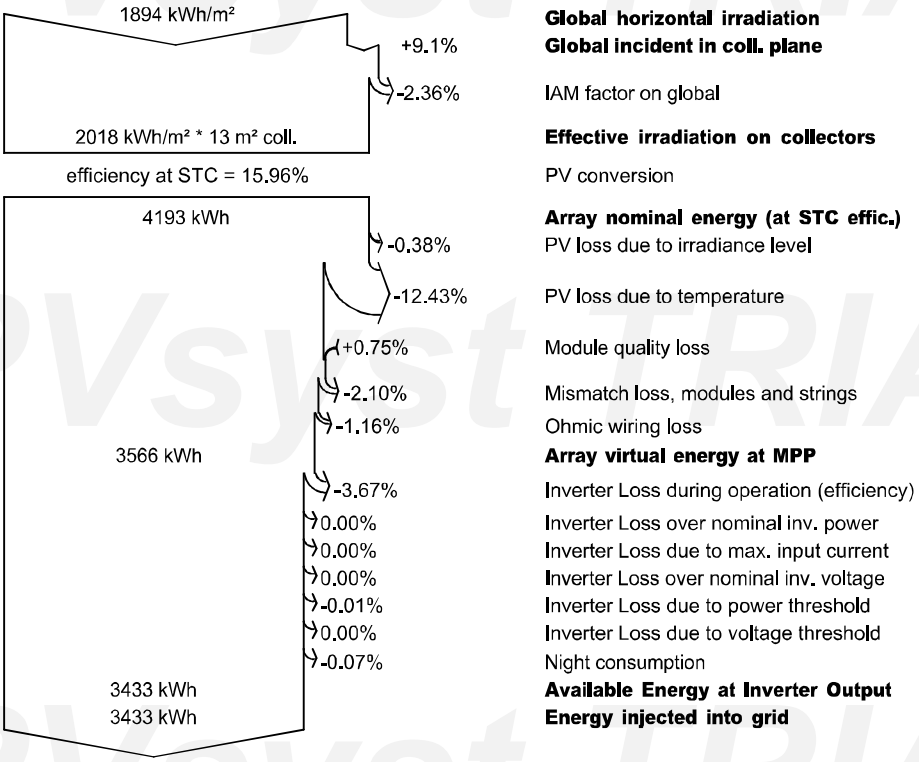
Grid-Connected System: Loss diagram

Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	Eldora VSP.60.260.05_U	Pnom	260 Wp
PV Array	Nb. of modules	8	Pnom total	**2080 Wp**
Inverter	Model	Growatt 2000TL-US	Pnom	2000 W ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year



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