

Comparison report : electric panel+ thermal panel

	PHOTOVOLTAIC PANEL mono-crystalline PERC High efficiency (335 W) [a]	THERMAL COLLECTOR VACUUM TUBES HEAT PIPE 20 tubes High performance [b]	TOTAL [a] + [b]	SOLARAYS MODULE
Peak power (W) per panel (STC)	335			496 W elec + 722 W therm
Efficiency at 25 ° C	19,90 %			0,3341
P max temperature coefficient	0,37%/K			0,106%/K
Efficiency at 60°C	17,21 %			32,19 %
Efficiency at 90°C	15,20 %			31,18 %
Deterioration performance at 25 years	82,60 %			100,00 %
Half life deterioration	8,70 %			0,00 %
Kwh/m ² /year GHI (fixed flat panel) vs DNI (solar tracking ... data in Madrid) (depending on location)	1.760	1.760		2.060
Kwh produced per year in Madrid (half life) by each panel/collector/module	473 electric	915 thermal		832 electric + 1.211 thermal
Optical efficiency	80 %	70 %		82 %
Linear coefficient of thermal losses (W/m ² °C)		1,506		1,399
m ² solar collector opening / (panel/collector/ module)	1,69	1,87	3,56	1,485
m ² / (panel/collector/module)	1,69	3,25	4,94	2,72
Kg / (panel/collector/module)	18,70	70,00	88,70	25,00
N° panels/collectors to produce the same annual kwh	1,76	1,32	3,08	1,00
m ² used to produce the same kwh	2,97	4,29	7,26	2,72
Weight (kg) to produce the same kwh	32,91 (Structure not included)	92,40 (Structure not included)	125,31 (Structure not included)	25,00 (Structure not included)