WORKSHEET 2 · CHAPTERS 6 AND 9

Array Sizing Worksheet

This follows Worksheet 9.1 in the book. Fill the sample column is already done from Chapter 9. Write your own figures next to it, and check each result backward.

Your name / address: _____

Line	Sample house	Your house	Checked backward
Yearly usage, kWh	10,800 (Ch 4)		
Target share	About 90%		
Target, kWh a year	10,800 x 0.90 = 9,720		
PVWatts, best plane, kWh per kW per year	South: 1,350 (sample; run your own)		
PVWatts, second plane, kWh per kW per year	West: 1,100 (sample, afternoon shade)		
kW needed if all on the best plane	9,720 / 1,350 = 7.2 kW		
Panel watts (STC)	400 W		
Panels needed if all on the best plane	7,200 / 400 = 18		
Panels that fit, best plane	16 south, after setbacks, pathway, and vents		
Panels that fit, second plane	6 west		
Panels you place, best plane	16 south		
Panels you place, second plane	4 west, 2 spots left for later		
Chosen panel count and kW DC	20 panels, 8.0 kW		
Expected yearly kWh (plane mix)	16 x 0.4 x 1,350 = 8,640; 4 x 0.4 x 1,100 = 1,760; total 10,400		
Share of yearly usage	10,400 / 10,800 = 96%		
Utility cap, and whether the design is under it	Write your utility's cap, and the basis it uses (AC, DC, or kWh)		

Inverter path, sample figures from Chapter 9

Path	Book sample	Your house
Microinverters	20 panels, 8.0 kW, 20 micros at 290 VA each, about 10,400 kWh a year. 16 south, 4 west, 2 west spots left for later.	
String inverter	20 panels, 8.0 kW, one 7.6 kW string inverter, about 10,200 kWh a year. Two strings of 7 south, one string of 6 west, 2 south spots empty.	
Hybrid inverter	Same 20 panels and strings as the string build, on a hybrid inverter (Ch 34). Chapter 35 checks those strings against a real hybrid's limits.	

String builds only: the voltage window (Ch 9)

On the sample panels, by the book's table method: 12 panels is the most (12 x 47.2 V = 566.4 V, under 600 V) and 5 is the fewest (5 x 28.4 V = 142 V, above 120 V). Use your own datasheet numbers.

	Sample house	Your house
Cold Voc per panel, V	47.2	
Hot Vmp per panel, V	28.4	
Most panels per string	12	
Fewest panels per string	5	

Chosen strings per input	Two of 7 south, one of 6 west	

The PVWatts figures in the book are samples made up for the example. Run PVWatts on your own address. Chapter 11 still has to accept the array at the main panel. Use this worksheet with the book, not in place of it.