

Project

Contact

Person in charge

Date

**SPREADSHEET 1
WATER PUMPING**

CALCULATE THE WATER PUMPING LOAD

Values in green shaded cells are necessary to complete all calculations.
Water volume is in liters. Head and distances are in meters.

1	Water required per day (l/day)	2	Peak sun (h/day)	3	Pumping rate (l/h)
	/			=	

4	Static level (m)	5	Drawdown lift (m)	6	Static lift (m)	7	Discharge head (m)	8	Static Head (m)	9	Allowance for friction (decimal)	10	Friction head (m)	11	Static head (m)	12	Total dynamic head (m)
+		+		+		+		=		X		=		8	+		=

Before you fill cell 14 find the water pump appropriate for your project. Consult manufacturer's pump literature to determine pumping efficiency. If pumping efficiency cannot be determined from the manufacturer's literature use the following guide:

TDH	Pump type	Efficiency
5 m	Surface centrifugal	25%
20 m	Surface centrifugal	15%
20 m	Submersible centrifugal single step	25%
20 to 100 m	Submersible centrifugal multiple step	35%
50 to 100 m	Positive displacement	35%
100 or more	Positive displacement. Jack.	45%

WATER PUMP AND MOTOR INFORMATION	
Make	
Model	
Pump type	
Motor type	
Input voltage (ac/dc)	
Pumping efficiency	

13	Water required per day (l/day)	14	Total dynamic head (m)	15	Energy conversion factor (constant)	16	Hydraulic energy (Wh/day)	17	Pumping efficiency (decimal)	18	Array energy (Wh/day)	19	Nominal system voltage (V)	20	Amp-hour load (Ah/day)
1		X		/	367	=		/		=		/		=	

21	Amp-hour load (Ah/day)	22	Wire loss factor (decimal)	23	Adjusted amp-hour load (Ah/day)	24	Peak sun (h/day)	25	Preliminary project current (A)
20		/	0.95	=		/		=	

**SPREADSHEET 2
WATER PUMPING**

SYSTEM PHOTOVOLTAIC ARRAY SIZE

Before you fill cell 27 select your desired PV module.

You might have to repeat this step with another module selection to match your needs.

PHOTOVOLTAIC MODULE INFORMATION	
Make and Model	
Type	
Vmp	Voc
Imp	Isc

26	Project current (A)	27	Module loss factor (decimal)	28	Derated project current (A)	29	Rated PV module current Imp (A)	30	Number of PV modules in parallel (int. num.)
25									
	/			=		/		=	

31	Nominal system voltage (V)	32	Rated PV module voltage Vmp (V)	33	Number of PV modules in series	34	Number of PV modules in parallel	35	Total number of PV modules	36	Rated PV module current Imp (A)	37	Rated PV module voltage Vmp (V)	38	PV array wattage (W)
19						30				29		32			
	/			=		X		=		X		X		=	

**SPREADSHEET 3
WATER PUMPING**

PUMPED WATER AND PUMPING RATE

39	Number of PV modules in parallel	40	Rated PV module current Imp (A)	41	Nominal system voltage (V)	42	Pumping efficiency (decimal)	43	Energy conversion factor (constant)	44	Peak sun (h/day)	45	Module loss factor (decimal)	46	Total dynamic head (m)	47	Actual pumped water (l/day)
30		29		19		17		15	367	2		27		12			
	X			X		X		X		X		X		/		=	

Compare the pumping rate value of cell 51 with the capacity of your water source. Do not exceed the capacity of the water source.

48	Pumped water (l/day)	49	Peak sun (h/day)	50	Actual pumping rate (l/h)
47		2			
	/			=	