Estimating System Demands

In order to select an appropriate power system for your requirements, it is necessary to calculate your average daily energy consumption in KILOWATT HOURS.
The example giving below is of a typical low energy home using highly energy efficient lighting and appliances.

Step One
Obtain the energy rating (in watts) of each light and appliance that you wish to use and record in column 2. This is normally found on the nameplate. If an appliance is rated in amps, multiply amps by operating voltage (240) to find the watts.

Step Two
Multiply column 2 wattage by the actually number of appliances, e.g. 2 x lights.

Step Three
Carefully estimate the approximate running time of each light and appliance in hours or parts thereof and record in column 3. Be realistic, remember this is the bottom line as far as the overall price of the power system is concerned. Waste costs money!

Step Four
Multiply the figures in columns 2 and 3 together and record the resulting watt hours in column 4

Step Five
Total all the figures from column 4 to give the total watt hours of electricity required daily to supply your lighting and appliances in your household.

Lighting & Appliances	Wattage	X	Hours Run	=	Watt Hours
Bedroom 1 Light x 2	15 (x 2)		2		60
Bedroom 2 Light	15		2		30
Bathroom 1 Light	15		1		15
Laundry Light	15		1		15
Kitchen Lights x 2	20 (x 2)		3		120
Lounge Lights x 2	20 (x 2)		4		160
Exterior Light	20		1		20
Refrigerator	150		9*		1350
Freezer	170		9*		1530
Microwave Oven	1200		0.5		600
Toaster	1200		0.1		120
Blender	150		0.02		3
Mixer	450		0.02		9
Steam Iron	1200		0.2		240
Washing Machine	500		0.5		250
Sewing Machine	80		0.1		8
Vacuum Cleaner	1000		0.2		200
TV (older CCT type) & Video	150		3		450
Stereo System	100		2		200
Radio	10		5		50
Power Tools	1000		0.5		500
TOTAL WATT HOURS					**5930**

*Note: Actual compressor's running time.

The above calculations are based on the use of high efficiency lighting which has the effect of reducing the lighting load by 80%. Most of the cooking would be done on a gas stove and water heating is solar with backup provided by a slow combustion wood heater coupled into the system.

Solar Array Sizing

WATTS REQUIRED **(volts x amps)**	
X	**X**
HOURS OF USE **(per day)**	
÷	**÷**
PEAK SUNLIGHT HOURS **(Check with Niwa for your local sunlight hours)**	
=	**=**
WATTAGE OF SOLAR ARRAY REQUIRED	

Battery Bank Sizing

WATT HOURS X 1.3 FOR LOSSES	
X	**X**
NUMBER OF DAYS STORAGE REQUIRED **(standby power)**	
÷	**÷**
0.5 **(depth of discharge)**	
÷	**÷**
VOLTAGE OF BATTERIES	
=	**=**
AMP HOURS REQUIRED @ ___ VOLTS	