

THE  
SUN IS OUR FUTURE NOW

## TALMAGE ENGINEERING

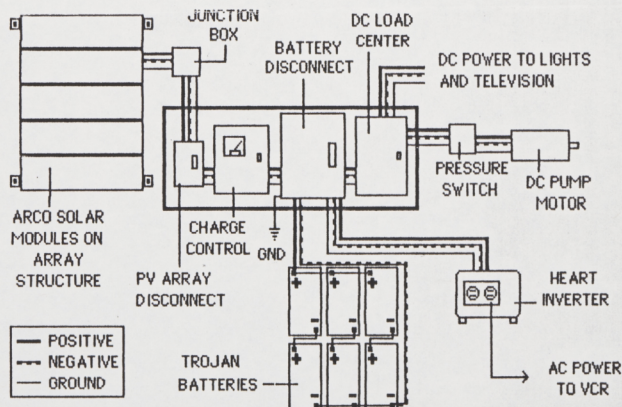
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August 8, 1987

Stephen Porter  
Great Spruce Head Island  
Sunset, Maine 04663

Dear Stephen,

Enclosed is the estimate for the cost of the Farmhouse solar electric power system. As you can see I have included a few additional items, some which we discussed and some that You will be needing for use with other systems in the future. The IFO toilet, as we discussed, will save a great deal of water and thus electricity and is a necessary item in the system. The lights that are included are permanent ceiling fixtures and are high efficiency fluorescents. The Heart inverter is recommended as the cost of it is less than the cost of supplying photovoltaic modules and batteries that would allow the use of the Eaton's inefficient inverter. Finally the battery charger I recommend is one that can charge 12 as well as 24 volt battery banks. This will be important in the not to distant future as a back up battery charging power source for the other island systems that will be both 12 and 24 volts. Below is a diagram of the system for the farmhouse.



## PORTER SYSTEM

### FARMHOUSE POWER CONSUMPTION IN WINTER

ITEM	CURRENT DRAW	HRS/DAY USAGE	TOTAL POWER AMP-HR/DAY
Lights (3 on)	.75 amp @ 12 VDC	6	13.5
Television	1.2 AMP @ 12 VDC	6	7.2
VCR	39 watts AC or 3.7 amp @ 12 VDC on Heart Inverter	2	7.4
Water Pump	25 amp @ 12 VDC	1/6 (using IFD)	4.0
TOTAL AMP-HR			32.1

Total daily amp-hr consumption = 32.1

Assuming a battery efficiency of 85%, then the pv array must have a daily output of:

$$32.1 \div .85 = \underline{37.8} \text{ amp-hours}$$

Average solar potential in winter: 2.5 hours of full sun per day

Photovoltaic array output required:  $37.8 \div 2.5 = \underline{15.1}$  amps

ARRAY SIZE:  $15.1 \times 2.94 = \underline{5.1}$

Array will consist of 5 ARCO modules on one array structure.

BATTERY BANK SIZE:  $15.1 \times 50 = \underline{755}$  amp-hr @ 12vdc  
 $755 \div 300 = \underline{2.51}$

Battery bank will consist of 6 Trojan TBL-16 batteries in a 2 X 3 series-parallel arrangement.



# PORTER - FARMHOUSE SYSTEM COST ESTIMATE

QUANTITY	ITEM	UNIT COST	TOTAL
5	ARCO Solar M75 photovoltaic modules	\$342.00	\$1710.00
1	SSS-4-AA array structures		\$220.00
1	QD260NATS array disconnect		\$39.50
1	Talmage Engineering model TECC-12-B charge controller		\$177.00
1	Remote reading voltmeter		\$41.00
1	SD322N Battery disconnect		\$92.80
1	QO12L100DSN 12 VDC load center with 12 circuits		\$106.50
1	Heart HF12-300X Inverter		\$440.00
1	Mounting panel for controls and inverter with interconnecting wire		\$60.00
6	Trojan TLB-16 batteries	\$155.00	\$930.00
7	Battery interconnect cables	\$3.50	\$24.50
1	Model 8266 Silver Beauty portable battery charger 6/12/24 volts @ 60/60/40 amps		\$295.00
1	1/3 hp 12 vdc water pump motor including heavy duty dc pressure switch		\$244.50
1	Model 3180-17 IF0 toilet with seat and gasket		\$178.00
2	TL-193-12-CW lights for kitchen and bath	\$22.50	\$45.00
2	9WL-12 lights for dinning and living rooms	\$39.50	\$79.90
2	7WL-12 lights for bedrooms	\$39.50	\$79.90
1	OL-20L light for battery-controller room		\$21.00
6	15 watt incandescent bulbs	\$2.20	\$13.20
	System components interconnect wiring (estimate)		<u>\$150.00</u>
	TOTAL		\$4947.80
	Sales Tax		\$ 247.39
Installation cost estimate (24 hrs labor @ \$25/hr, 10 hrs travel at \$12/hr, and 348 miles @ 22¢/ mile)			\$796.56
	<u>TOTAL ESTIMATED COST</u>		<u>\$ 5991.75</u>