

Momich's MicroHydro System (built over 3 years)

BASIC needs for 48 volt system:

	SUPPLIER	COST
Turbine Harris, 2-nozzle & fan kit (3 extra nozzles)	LoPower Engineering, David Ledbetter, 707-986-7771, CO	\$2,025 (\$29)
6 Batteries , 48 Volts	Gene's Reconditioning, Greeneville, TN 423-639-3939	\$ 575.00
	Trojan Batteries 800-423-6569 (3045)	
#6 & #10 wire , 40' to batteries	Wms electric, Lowes	\$ 171.90
250A Breaker & cable	Sundance, 828-645-2080, Weaverville, NC	\$ 152.85
60A Disconnect by meter		\$ 19.99
Outback Grid-Tie FX 3048 Inverter , lightning arrester, Mate system controller by Outback	Northern Arizona Wind & Sun 800-383-0195 , Flagstaff, AZ Outback: 360-435-6030 , Arlington, WA	\$ 2,124
Lightning rod & wire	Lowes	\$ 23.15
30A Fuse holder, bar connector	Backwoods Solar Electric , Sandpoint, ID 208-263-4290	\$ 38.00
Xantrek C40 Charge Controller , 48VDC, 40A Charge Diversion	Northern Arizona Wind & Sun 800-383-0195	\$ 149.89
Heater Diversion HL-75	Sundance, 828-645-2080 , Weaverville, NC	\$ 220
Lugs to hookup batteries	Airgas, 423-638-1281 Greeneville, TN	\$ 9.52
Conduit, AC wire for hookup	Lowes	\$ 57.00
New breaker box, breakers, PVC	Lowes	\$ 194.19

POWERHOUSE basics

PVC couplings	Lowes	\$ 49.32
Conduit powerhouse to batteries	Lowes	74.05
Conduit turbine to batteries	Lowes	15.18
Protection for turbine (ours matched the house & cost about \$630)		
Digital Ammeter	Backwoods, 208-263-4290 , Sandpoint, ID	\$ 62.00

INTAKE ours is maintenance-free, but could do something simple for < **\$100**

Hydroscreen	Robert Weir, 303-333-6071 , CO	\$700
3" PVC, schedule 40 for 700 feet	Ferguson, Greeneville	\$ 1336.67
Buried underground	Ditch witch, jackhammer, backhoe	\$330.36
Attachment of intake box	Al support, jackhammers, Fastenal glue	\$260.71

Our Hydro cost: \$9,406.59

Simpler hydro system:~ \$7,335

Required cost

Need enough pipe to reach from intake to turbine

2006 – Pipe purchased & installed, intake box	\$1,694.61
2007 – Turbine, batteries, powerhouse, installed intake	\$4,018.90
2008 – Inverter, Mate, charge controller, charge diversion, new breaker box	<u>\$3,693.08</u>
	\$9,406.59

To contact us:

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Microhydro Resources:

www.attra.ncat.org/dea

“Micro-Hydro Power: A Beginners’ Guide to Design and Installation” is available from

www.attra.ncat.org/attra-pub/summaries/summary.php?pub=352

microhydro listservers, like the one via www.microhydro.net

Home Power magazine: www.homepower.com

Homepower.com/basics/hydro is especially good

Energy Systems and Design, Paul Cunningham, CEO

PO Box 4557, Sussex, NB E4E 5L7

Phone +1 506-433-3151

Email hydropow@nbnet.nb.ca

Web www.microhydropower.com

Backwoods Solar (can help with microhydro systems):

<http://www.backwoodssolar.com/>

Jan/Feb 2013 issue of Backwoods has a nice article on microhydro site evaluation.

Flow in gallons per minute

	1	1.25	1.5	2	2.5	3	4	5	8	10
3	0.14	0.04	0.02							
4	0.23	0.07	0.04	0.01						
5	0.35	0.11	0.05	0.02						
6	0.49	0.15	0.08	0.03	0.01					
7	0.66	0.20	0.10	0.03	0.01					
8	0.84	0.25	0.13	0.04	0.02					
9	1.05	0.31	0.16	0.05	0.02					
10	1.27	0.38	0.20	0.07	0.03	0.01				
11	1.52	0.45	0.23	0.08	0.03	0.01				
12	1.78	0.53	0.28	0.09	0.04	0.01				
14	2.37	0.71	0.37	0.12	0.05	0.02				
16	3.04	0.91	0.47	0.16	0.06	0.02				
18	3.78	1.13	0.58	0.20	0.08	0.03				
20	4.59	1.37	0.71	0.24	0.09	0.04	0.01			
22	5.48	1.64	0.85	0.29	0.11	0.04	0.01			
24	6.44	1.92	1.00	0.34	0.13	0.05	0.02			
26	7.47	2.23	1.15	0.39	0.15	0.06	0.02			
28	8.57	2.56	1.32	0.45	0.18	0.07	0.02			
30	9.74	2.91	1.50	0.51	0.20	0.08	0.02			
35		3.87	2.00	0.68	0.27	0.10	0.03			
40		4.95	2.56	0.86	0.34	0.13	0.04	0.01		
45		6.16	3.19	1.08	0.42	0.16	0.05	0.02		
50		7.49	3.88	1.31	0.52	0.20	0.06	0.02		
55		8.93	4.62	1.56	0.62	0.24	0.07	0.02		
60		10.49	5.43	1.83	0.72	0.28	0.08	0.03	0.01	
65			6.30	2.12	0.84	0.32	0.09	0.03	0.01	
70			7.23	2.44	0.96	0.37	0.11	0.04	0.02	
75			8.21	2.77	1.09	0.42	0.12	0.04	0.02	
80			9.25	3.12	1.23	0.47	0.14	0.05	0.02	
85			10.35	3.49	1.38	0.53	0.16	0.06	0.02	
90				3.88	1.53	0.59	0.17	0.06	0.03	
95				4.29	1.69	0.65	0.19	0.07	0.03	
100				4.72	1.86	0.72	0.21	0.08	0.03	0.01
150				10.00	3.94	1.52	0.45	0.16	0.07	0.02
200					6.72	2.59	0.76	0.27	0.12	0.03
250					10.16	3.91	1.15	0.41	0.18	0.05
300						5.49	1.61	0.58	0.25	0.07
350						7.30	2.15	0.77	0.33	0.09
400						9.35	2.75	0.98	0.42	0.12
450							3.42	1.22	0.52	0.14
500							4.15	1.48	0.63	0.18
550							4.96	1.77	0.76	0.21
600							5.82	2.08	0.89	0.25
650							6.75	2.41	1.03	0.29
700							7.75	2.77	1.18	0.33
750							8.80	3.14	1.34	0.37

Bold Numbers indicate
5 Feet per Second Velocity

Pipe Friction Loss for Microhydro

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