Solar Energy

Southern Style

Joshua Tickell
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The Magee family's lakefront getaway cabin near Bogalusa, Louisana, has all the comforts of home and is powered by the sun. So far, the sapling doesn't shade the array.

Crawfish boils emit a pungent aroma that triggers your sweat glands before you've pinched your first spicy tail or sucked your first head. The smell hit me full force as I opened the car door. The fragrance was wafting from the "camp"—an elegant blue cabin perched on the side of a big pond. Aside from its octagonal shape, rich wood interior, and expansive deck, only one thing is out of the ordinary about this little getaway—the twelve solar-electric panels that bask in the sun on its south-facing roof.

As seen from the cupola, the small but modern kitchen uses solar electricity and a propane range to feed a family of six between vacation adventures.

This solar powered oasis is the brainchild of attorney Bill Magee, age 49, born and raised in the tiny town of Bogalusa, Louisiana. After we chowed down on steaming crawfish, corn, potatoes, and enough boiled garlic to keep the mosquitoes away indefinitely, Bill and I sat down to talk turkey.

"I was an environmentalist in college," says Magee. "I was anti-nuke and pro-clean. I went to law school at LSU [Louisiana State University] and founded the first environmental law society there. I thought solar energy was the biggest no-brainer ever. But I also knew that since the big multibillion dollar corporations have their investments in fossil fuel and nuclear, [solar] wasn't going to happen anytime soon. After all, how are they going to make money if they can't send you a monthly bill?"

The open floor plan makes the small cabin feel cozy and spacious at the same time.

Magee didn't give up his dream of solar energy, though. According to him, it was just a matter of time. "I put it on the back burner for 24 years," says Magee. "I've reached the point in my career where I can do solar. It was going to cost $4,000 to run [grid] power to the camp." Additional expenses would have pushed the total bill for running grid electricity to the camp to more than US$6,000.

Faced with this high expense, Magee decided, "I'll use that money to offset the cost of the solar-electric system and let the sun provide the electricity for the camp." He hired Louis Martin, a local contractor who specializes in solar installations.

Critical Loads

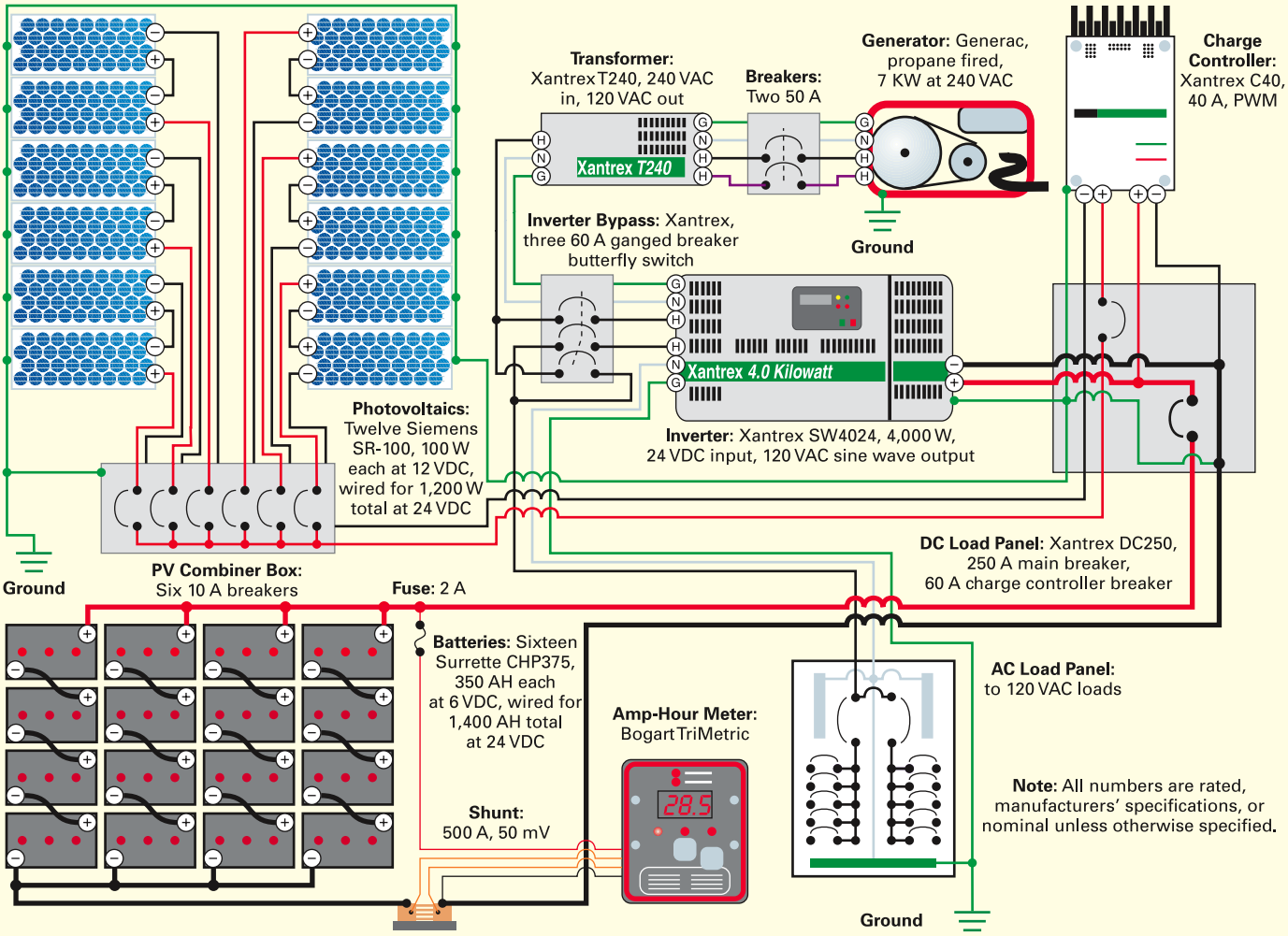
Item	Watts	Avg. Hrs. / Day	Avg. KWH / Day
GE refrigerator	120	10.00	1.20
TV	150	5.00	0.75
Surround amp	60	5.00	0.30
DVD	25	0.50	0.01
VHS	40	0.50	0.02
Laptop computer	50	10.00	0.50
Printer/fax machine	10	10.00	0.10
Microwave	1,200	0.10	0.12
Toaster	1,000	0.10	0.10
Fluorescent lights	30	6.00	0.18
Incandescent lights	60	3.00	0.18
		Total	3.46
		Total Weekly	24.24

Take a Load Off

Together, Bill and Louis made a list of the loads in the house. Loads are all of the electrical appliances, such as the refrigerator, the fans, and the air conditioner. They also listed how many hours per day each appliance would be used. Once the list was complete, they added it all up to see how much total electricity per day the house would use, and how much the solar-electric system would have to produce.

Bill faxed his load list as well as a diagram of his available roof space to renewable energy equipment suppliers around the country. He chose Sierra Solar in Grass Valley, California, because of their helpful phone support and competitive pricing. They planned a package consisting of twelve Siemens, 100 watt, photovoltaic (PV) panels; sixteen Surrette, deep-cycle batteries; and a Xantrex power panel. The power panel combines the major system components into one unit, and with the TriMetric meter shows how much energy is being used by the household, how much is being generated by the solar-electric array, and how much is stored in the batteries.

Even though the camp is a getaway for Bill, his wife Karen, and their four children, Bill still wanted it to have all of the conveniences of a normal home. Bill researched energy efficient appliances and found that by installing items like the AquaStar on-demand water heater and a propane stove and heater, the house's electrical energy consumption would be greatly reduced. Bill and Louis figured that the peak electrical load of the house would be around 800 watts without the air conditioner. With the air conditioner, the peak load jumped to 2,000 watts (2 KW). For times when the air conditioner is in use, they decided on a propane-fired, 7 KW Generac brand generator.



Bill Magee shows off the Xantrex power panel.

The Way Everyone Should Live

Bill says that, overall, the response to his solar-electric house from friends and colleagues has been very positive. But not everybody has been supportive of Magee's desire to be off-grid. "You know what?" he asks, "They don't give you any tax credit for using solar. And there's no benefit in Louisiana for selling electricity back to the grid. They want you to pay a monthly minimum amount whether you use their electricity or not."

Cost Estimate

Item	Cost (US$)
12 Siemens 100 W modules	$6,000
Xantrex Power Panel	4,000
16 Surrette CHP375 batteries	3,200
Additional wiring & hardware	1,000
PV mount	600
Battery box	500
TriMetric meter	235
Total	$15,535

Magee sees his solar-electric house as a solution to the energy problems of society. "When you live in a solar house," explains Magee, "you're aware of how much energy you're using and you pace yourself. That teaches you efficiency. But the energy policy of this country does not encourage efficiency—it encourages waste. You're not paying for the actual cost of energy, so you don't care how much you use."

Magee says his children now understand how the PV panels work, and they are able to gauge how much energy is produced and how much they consume in a day. "For my kids," he says, "it's a great behavior modification system. You leave the lights on and go play, and you run out of energy and that's it—there is no more."

And for the adults? Bill's wife Karen has no complaints about their solar abode. "I don't really have to think about it. The kitchen, the lights—everything functions just like a normal home."

The Magee clan loves to escape to their lakeside retreat, especially with the independence and comfort provided by solar power.

Standing on his deck looking out over the calm lake and the setting sun, Bill mused, "This is the way it should be. This is the way everybody should live."

Tech Specs

System Overview

System type: Off-grid PV
Location: Talasheek, Louisiana
Solar resource: 3 average daily peak sun hours
Production: 75 AC KWH average per month

Photovoltaics

Modules: 12 Siemens, SR100, 100 W STC, 12 VDC
Array: 1,200 W STC, 24 VDC
Array combiner box: Six-circuit load center with 10 A, DC-rated breakers
Array disconnect: 60 A breakers mounted in a Xantrex DC250 enclosure.
Array installation: Custom aluminum frame, SSW orientation, about 35 degrees tilt

Balance of System

Inverter: Xantrex SW4024, 24 VDC input, 120 VAC output, 4,000 W
Charge controller: Xantrex C40, PWM
System performance metering: Bogart Engineering TriMetric AH meter
Engine Generator: Generac 7 KW, 240 VAC, with balancing transformer for 120 VAC output; average annual run time approximately 150–200 hours

Energy Storage

Batteries: Sixteen Surrette CHP375 flooded lead-acid, 6 VDC, 350 AH at C20
Battery pack: 24 VDC, 1,400 AH total
Battery/inverter disconnect: Xantrex DC250, 250 A breaker

Access

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