

WHO'S WHO IN FUEL CELLS

Gaia Power Takes Plug to the Home

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FCTN: Gaia has been running its modular battery-based backup power system for several months at a home with a Plug Power PEM fuel cell. Is this the first application that couples the Gaia system with a fuel cell?

Olsen: Yes, although we will soon have another system being tested at a large commercial building.

FCTN: Is the home running completely off grid?

Olsen: It is still grid-connected, but for all intents and purposes it runs without power from the grid.

FCTN: What is the output capacity of the system?

Olsen: It is nominally a 10 kW system. The combination of the Gaia system and the fuel cell can produce peak power of over 20 kW.

FCTN: Does Gaia produce the control electronics for the system?

Olsen: As much as possible, we use off-the-shelf components, provide the control logic and package the entire system in a UL-certified unit.

FCTN: What is the control strategy for the system?

Olsen: The Gaia PowerTower provides the large majority of the electricity consumed in the house. It is recharged by the fuel cell, which is consuming propane. During peak usage, it is possible for the fuel cell to contribute electricity to meet the load.

FCTN: Is the fuel cell durability sufficient for the purpose?

Olsen: The manner in which the fuel cell is being used has a significant impact on its lifetime. Since it is being mostly used to recharge the batteries in the PowerTower, the fuel cell isn't required to do load following, which reduces stress on the system. It will last much longer than it would if it were required to supply all the household power. This is a limitation on the membrane, which will improve in the future.

FCTN: So it functions like a hybrid vehicle.

Olsen: Yes, that is what it is, a hybrid.

FCTN: Has the unit been configured with, or has consideration been given to, coupling the fuel cell with a heat exchanger?

Olsen: That is something that is being looked at. It would improve the economics of such systems.

FCTN: Are you using VRLA (valve-regulated lead acid) batteries in the PowerTower.

Olsen: Yes. They are a proven technology with low maintenance and a satisfactory lifetime. We are also looking at Li-ion and supercapacitors.

FCTN: Have super- and ultracapacitors reached a price point at which they can begin to replace lead-acid batteries?

Olsen: Not yet, but they are getting close.

FCTN: Does the fuel cell have redundant propane bottles?

Olsen: The current test system does. The bottles and the propane are owned by the local supply company. If it was running on a single bottle, there is a reservoir in the fuel cell that is sufficiently large so that a bottle could be changed out without disrupting power output.