

# POWER UP

FUEL CELLS ARE RELIABLE WAY TO PROVIDE CRITICAL BACKUP DURING EMERGENCIES

By **Kathy** Fosberg  
IdaTech

**W**ith an increasing need for reliable backup power at cellular sites, major telecoms carriers in Latin America and the Caribbean are choosing fuel cells for backup power over diesel generators and large battery banks.

The rapid expansion of wireless communication systems worldwide and the increasing socioeconomic benefits of mobile phone technology have made the need

for dependable and economical backup power critical. Electric grid loss throughout the year, whether from severe weather, natural disasters or limited grid capacity, is an ongoing challenge for network operators.

Traditional telecoms backup power solutions include valve-regulated lead acid batteries for short duration backup and diesel and propane generators for longer periods of time.

Batteries are relatively inexpensive for supplying one to two hours of backup power. However, they are not ideal for longer duration backup power applications because they can be expensive to maintain, unreliable after aging, temperature sensitive and hazardous to the environment after disposal.

Diesel and propane generators are capable of longer durations, but they can be unreliable, maintenance intensive, and they emit high levels of pollution and greenhouse gases into the atmosphere.

Fortunately, clean fuel cell technology has been developed to solve the limitations of traditional backup power solutions.

Fuel cells are reliable and quiet, with fewer moving parts than a generator and a wider operating temperature range, -40°C to +50°C, than a battery.

## Liquid Fuel vs. Hydrogen Cylinders

50 hours of operation at 5 kW requires one of the following:



In addition, a fuel cell system has a lower lifetime cost than a generator. The lower costs are the result of only one maintenance visit per year and significantly higher system efficiency.

Finally, the fuel cell is the clean technology solution with minimal environmental impact.

One company making a splash in the fuel cell industry is IdaTech LLC of Bend, Oregon, which manufactures and sells systems that provide backup power to critical communications network infrastructures in wireless, fixed

and broadband telecoms applications ranging from 1 to 15 kW. The fuel cell system offers these systems:

- Reliable – Few moving parts and no discharge in standby mode
- Quiet – Low noise signature
- Robust – Operating range from -40°C to +50°C
- Flexible – Outdoor or indoor (container/shelter) installations
- Powerful – Up to 15 kW
- Low maintenance – Minimal annual maintenance
- Cost-effective – Attractive total cost of ownership
- Environmentally friendly – Low emissions with minimal environmental impact

### HOW THE FUEL CELL WORKS

The system continuously senses the direct current (dc) bus voltage and

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seamlessly takes over critical loads if the dc bus falls below a customer determined set point. The system is fueled by hydrogen, which is delivered to the fuel cell stack in one of two ways: from a commercial-grade hydrogen supply or HydroPlus; or methanol and water liquid fuel, using an integrated reformer system.

Electricity is generated by the fuel cell stack as direct current. The dc energy is passed to a dc/dc converter, which changes the unregulated dc electricity from the fuel cell stack into high-quality regulated dc electricity to serve the required loads.

The fuel cell systems can provide multiple days of backup power, since run time is limited only by the amount of hydrogen or methanol/water fuel stored on site, making them a perfect backup solution for such catastrophes as the earthquakes in Haiti or Chile.

## FUEL CELLS VS. CURRENT SOLUTIONS

Fuel cells offer improved system reliability, more predictable performance in a broad range of climates, and a reliable service life when compared to the industry standard VRLA battery strings.

Life cycle costs are also reduced because of greatly decreased maintenance and replacements needs. Fuel cells offer environmental advantages to end users because disposal costs and liability risks related to lead acid batteries are an increasing concern.

Battery performance can be affected by a variety of factors including charge level, temperature, cycles, age and other variables.

The energy provided from batteries will vary based on these factors and is not easily predicted. However,

Proton Exchange Membrane (PEM) fuel cell performance is relatively unaffected by these factors and will provide critical power as long as there is fuel available.

Increased predictability is an important advantage for switching to fuel cells for critical backup power applications.

Fuel cells generate energy only when fuel is applied, like a combustion generator, but they have no moving parts in the generating region. Therefore, unlike a generator, they are not prone to rapid wear or frequent maintenance and lubrication requirements.

## EXTENDED RUN SOLUTIONS

The Oregon company has developed a fuel cell system with a fuel reformer technology that is capable of generating hydrogen on site using HydroPlus methanol/water liquid fuel. This allows the fuel cell to support backup power requirements of days versus hours.

It takes one 55-gallon fuel tank of methanol/water fuel with a fuel reformer to produce 50 hours of 5 kW

output power vs. 30 T-cylinders of hydrogen to produce the same amount of output power.

Bottled hydrogen is appropriate and cost-effective for many backup power applications, but when critical backup power systems need to operate for more than eight hours, or hydrogen storage is not practical or in remote locations where hydrogen delivery is not feasible, a compact liquid fuel system is a more practical solution.

## METHANOL FUEL

The fuel used to operate the extended run fuel reformer is a fuel mixture of methanol and water. Methanol is a readily available, commercially produced fuel that is used in common applications such as windshield washer fluid, plastic bottles, engine additives, and latex paints, among others.

Methanol is easily transported, water miscible, easily biodegradable and sulphur-free. It has a low freezing point (-71°C) and does not degrade when stored for a long time.

Telecoms carriers in Latin America and the Caribbean have installed fuel



An IdaTech fuel cell sits idle and ready on the island of Trinidad in the Caribbean. But when hurricanes move through the area, it keeps people connected more efficiently and effectively than batteries or diesel-fuel generators.

cells with fuel reformers as a reliable source of extended run backup power for their remote cell towers.

Fuel Cell Systems are used to back up critical communication network infrastructures in wireless fixed and broadband telecoms applications throughout the world. 

## About the Author:

Kathy Fosberg is Marketing Communications Manager of IdaTech LLC.

	Fuel Cells	Batteries	Generators
Reliable	+++	++	+
Low Maintenance	+++	++	+
Extended Run Time	+++	+	+++
Scalable	+++	+++	+
Environmentally Friendly	+++	+	+
Remote Monitoring & Control	+++	+	++

+++ Strong  
++ Moderate  
+ Weak