

Backup Power Fuel Cell Systems For Data Networks

Introduction

Reliable power for data communications networks such as high-speed data and fiber optics backbones is crucial worldwide. Information carried through these networks includes critical data for corporations such as banks, airlines and medical centers. Power loss on these networks not only poses a threat to the information carried, but typically results in major revenue loss. IdaTech's reliable backup power fuel cell systems provide the dependability required to ensure consistency of power.

Historical solutions such as diesel generators and battery-strings have inherent reliability and maintenance challenges. Both generator and battery options provide limited backup run time. IdaTech's systems, operating on a liquid fuel mixture of methanol and water called HydroPlus, provide extended run power for up to several days of reliable backup power. Additionally, IdaTech's systems have significantly reduced maintenance requirements when compared to generators and batteries, with only one maintenance visit required annually.

- **RELIABLE** – Few moving parts and no discharge in standby mode
- **QUIET** – Low noise signature
- **ROBUST** – Operating range from -40°C to +50°C
- **FLEXIBLE** – Indoor (container/shelter) or outdoor installations
- **POWERFUL** – Up to 15 kW
- **LOW MAINTENANCE** – Minimal annual maintenance
- **COST EFFECTIVE** – Attractive total cost of ownership
- **CLEAN ENERGY** – Low emissions and low environmental impact

Additionally, fuel cell systems do not discharge or degrade on standby mode, enhancing the site's reliability, and they do not require "recharging time," enhancing site availability.

How Does It Work?

The system continuously senses the direct current (dc) bus voltage and 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 from HydroPlus, a liquid fuel using the 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 converts the unregulated dc electricity from the fuel cell stack into high-quality regulated dc electricity to serve the required loads. IdaTech fuel cell systems can provide multiple days of backup power, since run time is limited only by the amount of HydroPlus stored onsite.

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 currently used in common applications such as windshield washer fluid, engine additives, molded seat cushions, latex paints, clear plastic bottles and silicone sealants, among others. Methanol is easily transported, water miscible, quickly biodegradable and is sulphur-free. Methanol is less flammable than gasoline and burns with a cool, low-particulate flame. It has a low freezing point (-50°C) and does not degrade when stored for a long time.



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Benefits of Fuel Cells Compared to Traditional Backup Power 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 valve-regulated lead acid (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 wide variety of factors including charge level, temperature, cycles, age, and other variables. The energy provided will vary based on these factors and is not easily predicted. 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 cited as an important advantage in switching to fuel cells for critical backup power applications. Fuel cells generate energy only when fuel is applied, like a combustion generator, but 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. In rooftop sites where it is often impossible to install diesel generators, fuel cell systems present an alternative quiet and eco-friendly solution.

Typical site profile for ElectraGen™ and iGen™ applications:

- Sites with power requirements between 100 W and 15 kW
- Sites with autonomy requirements > 4 hours
- Fiber optics (SDH, high-speed Internet, VoIP...) repeater sites
- High-speed data network nodes
- WiMax transmission nodes

Conclusions

For critical data network infrastructures, fuel cell backup power systems offer numerous advantages compared to traditional stand-alone battery strings or diesel generators to improve site availability.

- 1. Liquid fuel technology solves hydrogen siting challenges and provides virtually unlimited backup power operation.**
- 2. Due to the quiet operation, light weight, temperature robustness and virtually vibration-free operation, fuel-cells can be installed outdoors, in technical shelters/containers or on rooftops.**
- 3. System site preparation is quick and economical, and operating cost is low.**
- 4. Fuel is biodegradable and provides a pollution-free solution for urban environments.**

The IdaTech ElectraGen™ and iGen™ field-proven fuel cell systems are commercially available today for backup of critical communications network infrastructures.

For more information, please visit www.idatech.com