

## Benefits of Fuel Cell Solutions for Backup Power Needs in Telecom

For telecom service providers occasional, prolonged power outages can be devastating. Telecom backup power solutions based on Ballard's proprietary fuel cell technology offer improved network reliability, tangible durability, environmental and economic improvements over incumbent technology.

### SITUATION

Recent natural disasters, have increased focus on availability and reliability of telecommunication services. A key differentiator of telecom systems, whether wireless or wireline, is the ability to provide continuous, reliable service to customers at all times, and in particular during extended power outages. The choice of backup power technology has a direct impact on the availability of services to end-users and contributes significantly to a telecommunication company's market success.

Traditional battery solutions are challenged to meet extended-duration backup power needs. Limitations of battery technology include:

- Unpredictability of life expectancy, even in moderately harsh climates (hot or cold),
- Battery health status is difficult to predict and monitor,
- When handled improperly, battery overheating can occur, sometimes resulting in explosion. Environmental and financial consequences of even a single incident could be severe,
- Batteries are bulky and heavy in large-scale backup installations, making them potentially expensive to site.

Diesel generators are sometimes used to extend backup times, but are often not suitable for urban locations, where associated noise, fuel storage and pollution are unwelcome. In some jurisdictions, such as the state of California, the use of diesel generators for backup power purposes is subject to strict air quality regulations.

### SOLUTION

Fuel cell backup power solutions offer numerous compelling advantages over conventional battery and diesel-powered systems in emergency backup power situations.

#### A. Improved Durability and Reliability

Fuel cell solutions are reliable with minimal servicing requirements (annual air filter change), and durability is minimally compromised by operation at extreme temperatures.

#### B. Scalability

Backup power run time is directly proportional to the amount of fuel available for a fuel cell system, so the required backup time can be provisioned by ensuring adequate on-site fuel storage. The fuel cell system itself occupies the same amount of space within existing enclosures whether eight, twelve, or seventy-two hours of backup time is required - again, limited only by on-site fuel storage capacity.

#### C. Lifecycle Cost Savings

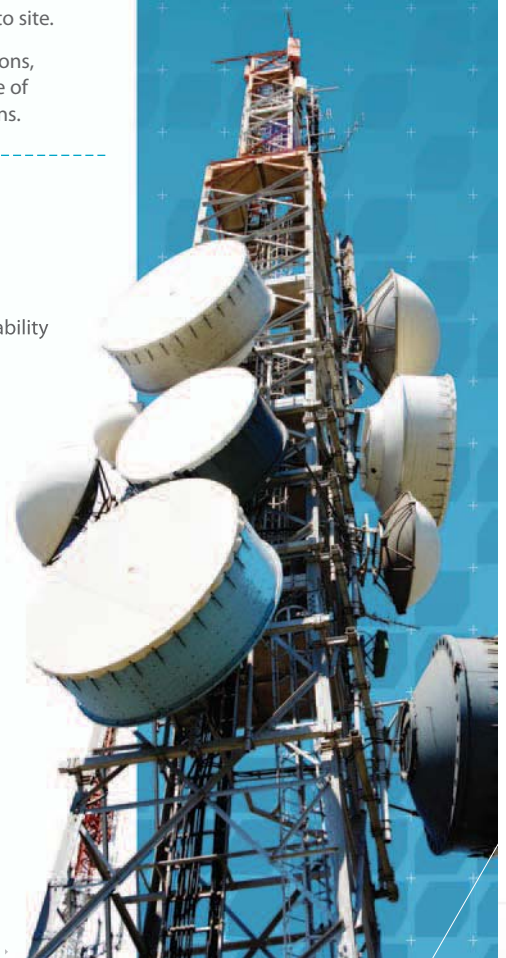
Fuel cell systems offer lifecycle cost savings for backup power distributed at telecom nodes, particularly at sites requiring relatively low power (<5kW) over a long duration (>8 hours). Fuel cell-based backup power systems are designed to operate for approximately ten years, while battery strings may need total replacement every three to five years. Additionally, fuel cell solutions require only minimal annual maintenance compared to quarterly site visits to service diesel generators or batteries.

#### D. Environmental Benefits

Zero-emissions combined with quiet operation make fuel cells highly suitable for indoor, outdoor, urban or rural applications. And, because they can be refurbished at the end of their useful lives, they generate low disposal and recycling costs in comparison to valve regulated lead acid batteries.

*"Most of the Tier 1 telecoms are actively qualifying fuel cell based systems and operating hundreds of units in the field"*

*Utility and Telecom  
Fleet Magazine  
December 2007*



## EMERGENCY BACKUP POWER

During Hurricane Katrina in 2005, a lack of adequate backup power for communications facilities was a critical problem that caused network interruptions and hampered recovery efforts. In the aftermath, an independent panel (Katrina Panel) was called upon to review the impact of Hurricane Katrina on the telecommunications and media infrastructure. In June 2006, the Katrina Panel made recommendations to the Federal Communications Commission (FCC) regarding ways to improve disaster preparedness, network reliability and communications among first responders.

The recommendations in this report elevated the importance of backup power, encouraging service providers to implement flexible business continuity plans that address their long duration backup power needs and enhance network reliability and resiliency. Meeting these long backup duration requirements with traditional power sources can be costly, as telecom companies are expected to provide backup power to tens of thousands of wireless cell sites. At many sites, fuel cell systems are the ideal solution, providing reliable, clean and efficient backup power.



## BALLARD'S FUEL CELL PRODUCTS

Ballard's fuel cell products enable extremely compact and cost-effective backup power solutions. Ballard's **FCgen®-1020ACS** fuel cell product is commercially available today and features dynamic response, robust and reliable operation, durable packaging and a simplified air-cooled design. As well, Ballard has a new liquid-cooled fuel cell ranging from the sub-kilowatt level to 7 kilowatts. The **FCgen®-1300** is capable of operating with flexible siting and simplified support.

## ABOUT BALLARD



Ballard Power Systems, Inc. is recognized as a world leader in the design, development, manufacture and sale of clean energy fuel cell products. Our **FCgen** family of stationary power products and **FCvelocity** family of motive power products offer important business benefits not available from traditional power sources.

Learn how to put fuel cells to work, contact us:

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## FUEL SUPPLY

Fuel cell systems will provide power as long as hydrogen fuel is supplied. Available in a variety of forms, hydrogen fuel storage is scalable to meet site and provider needs. Typically, at cellular sites, the fuel cell system consumes fuel from standard hydrogen gas "T cylinders." In areas where availability or delivery of direct hydrogen is limited, on-site generation through electrolysis or reformation provides a viable alternative solution for end-users.

On-site fuel reforming technology is compact and efficient, enabling the flexibility to use fuels such as methanol to provide extended run times for critical backup power applications and remove any issues surrounding hydrogen siting or delivery.

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