

## » Distributed Generation Case Studies

Ballard's CLEARgen™ is a complete fuel cell system, designed to provide a multi-megawatt supply of clean energy. Chemical producers, remote communities and others have recognized the environmental and economic benefits of producing zero-emission electricity, right at the point of demand. Following are several case studies...

### TOYOTA MOTOR SALES U.S.A., Inc. (TMS)

A 1MW CLEARgen™ system will enable Toyota to satisfy peak power needs at their Torrance, CA sales and marketing headquarters. When installed in 2012, the system will provide power to a number of locations on the multi-building campus. Hydrogen is produced by steam-reformation of renewable bio-gas generated at a landfill, and delivered to the site via a pipeline.

***"The ability to offset peak electricity usage with an emission-free fuel cell system will create significant savings, while reducing our environmental footprint."***

– Mark Yamauchi, TMS Facilities Operations Manager

#### IMPACTS OF FUEL CELL SYSTEM AT TOYOTA:

- Enables Toyota to satisfy peak power needs, approximately 6 hours per day
- Over 10,000 tons of CO2 emissions offset annually
- Heat generated by the CLEARgen™ system to provide hot water and space heating in the employee activity center

### K2 PURE SOLUTIONS

A 163kW CLEARgen™ system will convert by-product hydrogen into clean load-following electricity at K2 Pure Solutions' state-of-the-art bleach plant in Pittsburg, CA. The zero-emission power will be used on-site, offsetting demand from the grid. System installation and commissioning is planned for completion by mid-2012.

***"The Ballard fuel cell gives us a wonderful opportunity to convert that (by-product) hydrogen on a very clean, environmentally friendly and efficient basis into power."***

– Jerry Wasserman, Executive Vice President, K2 Pure Solutions

#### IMPACTS OF FUEL CELL SYSTEM AT K2 PURE SOLUTIONS:

- Realize additional value from a by-product of bleach production, which would otherwise be burned to generate heat
- Lower overall energy costs, with savings of over \$150,000 annually
- Displaces approximately 220 tons of CO2 emissions annually

### FIRSTENERGY CORP.

Finding new sources of clean, renewable peaking energy is important for electric utilities looking to meet their customers' energy needs and increasingly stringent environmental requirements.

FirstEnergy Corp. of Ohio is meeting this demand with a 1MW CLEARgen™ fuel cell system, commissioned in 2010. The system operates during peak periods, taking strain off the power grid and ensuring uninterrupted power to customers during the summer when demand is highest.

#### » BALLARD'S FUEL CELL PRODUCTS



Ballard's CLEARgen™ fuel cell system is a complete solution, designed to generate clean energy from hydrogen. Modular 500kW PowerBanks are combined to produce multiple megawatts of zero-emission electricity, with heat created by the system providing hot water and space heating.

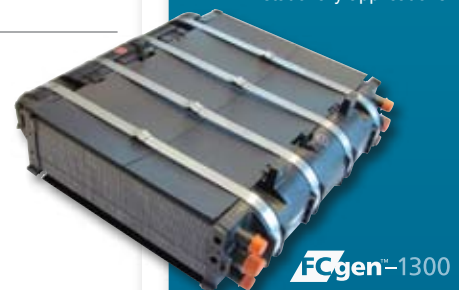
The system can operate continuously to meet baseload power needs, or intermittently to provide peak power during times of high demand.

#### » REAL TIME ENGINEERING (RTE)

Ballard is also supplying fuel cell stacks to independent system integrators.

RTE will integrate Ballard's FCgen®-1300 fuel cell stacks into a one megawatt distributed power generator, for deployment in Singapore.

Ballard's FCgen®-1300 fuel cell stack is a low-cost, liquid-cooled product specifically designed for stationary applications.



***“This (5 year) demonstration project will provide valuable information about utility scale fuel cell technologies and their potential to provide cost-effective solutions for peak demand and load management.”***

*– Gary R. Leidich, FirstEnergy Executive Vice President and President of FirstEnergy Generation*

#### IMPACTS OF FUEL CELL SYSTEM AT FIRSTENERGY:

- Produces enough electricity to power more than 600 homes
- Transportable, it can be relocated to other sites on a seasonal basis

#### HARP PROJECT IN BELLA COOLA, B.C.

The town of Bella Coola, B.C., is the site of a state-of-the-art energy system that demonstrates a clean power solution for remote communities.

BC Hydro's Hydrogen Assisted Renewable Power (HARP) system works by converting electricity from a renewable source (run-of-river), in off-peak periods into hydrogen, utilizing an electrolyser. During peak demand periods or when hydro is unavailable, the stored hydrogen is fed into a fuel cell system, supplied by Ballard, with flow batteries producing additional electricity. Together, these two power sources create environmentally-friendly solutions, reducing the town's reliance on diesel generators.

***“This project demonstrates how the integration of renewable power and clean fuel cell technology can displace diesel generation and reduce greenhouse gas emissions.”***

*– Mossadiq S. Umedaly, PowerTech Executive Chairman*

#### IMPACTS OF FUEL CELL SYSTEM IN BELLA COOLA, B.C.:

- Reduces the town's annual diesel consumption by 200,000 liters
- Lowers greenhouse gas emissions by 600 tons annually
- Provides storage for run-of-river power, so the electricity can be used in times of peak demand

**One megawatt system at FirstEnergy in Ohio, USA.**



**Renewable power system at Bella Coola, Canada.**



Ballard Power Systems (TSX: BLD) (NASDAQ: BLDP) provides clean energy fuel cell products enabling optimized power systems for a range of applications. Products contain proprietary **esencia™** technology, ensuring incomparable performance, durability and versatility.

To learn more about Ballard, please visit: [www.ballard.com](http://www.ballard.com)

Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time (06/2011)

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