

BALLARD®

PUTTING FUEL CELLS TO WORK

NASDAQ:BLDP • TSX:BLD

# GSMA Green Power for Mobile Workshop Jakarta



September 25th , 2013

# Ballard – Who We Are

NASDAQ:BLDP • TSX:BLD

- **Ballard Power Systems, Inc. is a recognized global leader in clean energy PEM fuel cells**
  - Design, manufacturing, distribution, support
  - Commercial market focus
- **355 employees**
- **Operations:** Canada, U.S.A. (University of Maryland; Bend, OR), Mexico, Denmark




*Ballard headquarters facility – Burnaby, BC, Canada*

# Value Proposition







## High Reliability

- Commercially proven
- Industry leading technology

## Autonomous Solution

- Extended duration runtime
- Remote monitoring
- Flexible fueling

## Reduced Operating Costs

- Minimal maintenance
- Longer lifecycle – less frequent replacement
- Not subject to pilferage issues
- Up to 20% more efficient than incumbent solutions

## Environmentally Friendly

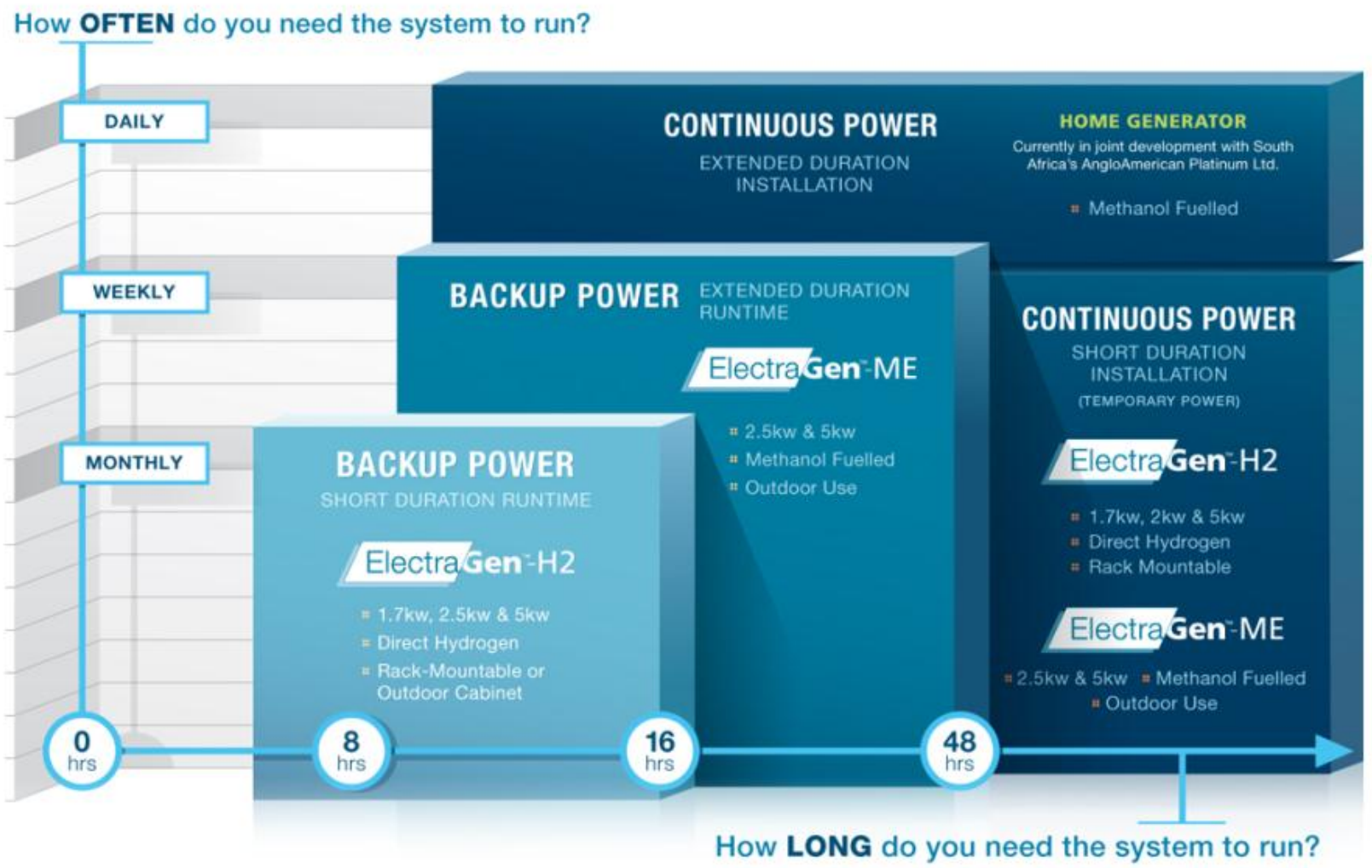
- 20-50% reduction in $CO_2$
- > 95% reduction in CO, NOx and SOx
- Zero particulate matter

## Flexible Siting

- Light weight
- Small footprint
- Quiet - no vibrations
- Low emissions

# Target Applications






**ElectraGen™ systems providing continuous power in off-grid situations is a unique application being explored by some telecom network operators**

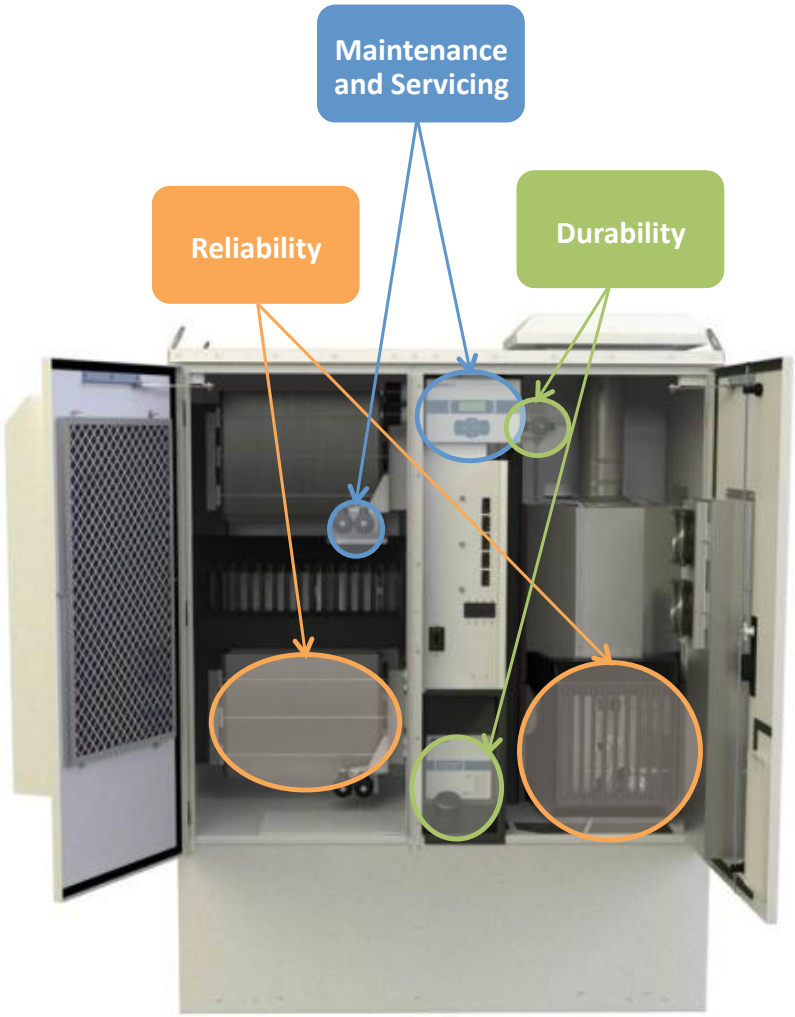
| | ElectraGen™ – H2 | ElectraGen™ – ME |
|---|---|---|
| |  |  |
| **Fuel:** | Hydrogen | HydroPlus™ (Methanol-Water) |
| **Power:** | 1.7kW, 2.5kW or 5kW | 2.5kW or 5kW |
| **Voltage:** | 48 VDC | 24 or 48 VDC |
| **Benefits:** | Efficient, reliable, quiet & zero emissions | Efficient, reliable, quiet & low emissions |
| **Application:** | Backup power for telecom – situations requiring short duration runtime with relatively low kW hour requirements | Backup power for telecom (primary power under development) – situations involving longer duration runtime with relatively higher kW hour requirements |
| **Commercial Availability:** | Shipping commercially since 2008 | Shipping commercially since 2010 |

# New ElectraGen™- ME Features



- Even greater system reliability
  - 25% improvement in MTBF
  - 3x increase in fuel processor cycle life
  - 5% improvement in fuel cell stack reliability
- Improved component durability
  - Increased use of corrosion-resistant coatings
  - Improvements in fluid flow paths & fuel level sensor
- Enhanced maintenance & servicing functions
  - Added functionality in system firmware
  - Improved component serviceability and labeling

NEW ElectraGen™-ME




**Video 'tour' of the system available at: http://youtu.be/1AXN_7vtB20**

# Telecom Backup Power
## Over 2,000 Systems Shipped Globally





# Case Study: *Backup Power Systems for Hutchison Telecom*



Customer:
- PT Hutchison CP Telecom
- Location: Sumatra and Java, Indonesia
- Industry: Telecommunications

Challenge:
- Poor grid quality (several hrs/week)
- Outdoor BTS (no air conditioner for batteries
- Diesel and battery theft issues
- Local community issues (generator noise)

Solution: ElectraGen™-H2
- Over 250 fuel cell systems deployed
- Load (average): 1-3kW @48Vdc
- Product: 2.5 kW Fuel cell system
- Fuel:  Hydrogen gas

Advantages:
- Site autonomy: 6 cylinders (42hrs)
- Improved site availability
- Zero emission, low noise
- Low maintenance





# Case Study:
## *East Timor Network Deployment*



**Customer:**
- PT Telkom International (TELIN)
- Location: East Timor
- Industry: Telecommunications

**Challenge:**
- Remote location
- Hot tropical climate
- Pilferage
- Minimize impact on environment

**Solution:** ElectraGen™-ME
- Deployed to 63 network sites, with additional 52 systems planned as expansion continues
- Configuration: 5kW, 48 Vdc
- Fuel: HydroPlus™ (Methanol-Water liquid fuel)

**Advantages:**
- First wireless network in the world using fuel cell systems as the primary backup power solution at every base station
- High efficiency
- Improved reliability
- Minimal maintenance

Telin



*Delivery of a Ballard system to a remote location in East Timor*



# Case Study:
## *Fuel Cell Prime Power System for Vodacom*



**Customer:**
- Vodacom, a leading African communications group
- Location: South Africa
- Industry: Telecommunications

**Challenge:**
- No grid (installation delays)
- Community complaints about generator noise
- Theft of diesel generators and batteries

**Solution:** ElectraGen™-ME
- Configuration: 5kW, 48 Vdc
- Fuel: HydroPlus™ (Methanol-Water liquid fuel)
- Added external 1,000 liter tank for this installation

**Advantages:**
- Small footprint
- Highly reliable
- Virtually maintenance-free
- Quiet operation
- Avoids theft issues related to diesel
- Environmentally friendly

**Operation:**
- Operating since June 2012
- More than 8,040 hours (10,819kWh)



vodacom



# Summary



- **Ballard Power Systems is a world leader in development, manufacture sale and servicing of PEM fuel cells**
  - Active in leading markets for fuel cell commercialization, including North America, Europe, Asia, Caribbean & Latin America and South Africa

- **Offering a comprehensive portfolio of fuel cell power generation products to meet backup and continuous power needs**
  - Electra**Gen**™ fuel cell systems support both 'short duration runtime' as well as 'extended duration runtime' requirements

- Electra**Gen**™ **power generation systems are financially attractive in comparison to alternative lead acid battery or diesel generator solutions**
  - And deliver the added benefit of environmentally-friendly operation