Evolution of the Smart Grid

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BPL Global
Agenda

**BPL Global overview**

**Industry Overview**
- What are the global challenges of today’s grid
- Open discussion about specifics of Middle Eastern grids

**General industry responses to challenges**
- Open discussion about specifics of Middle Eastern responses

**BPL Global’s solution responses to challenges**
- Strategic viewpoint
- Technology solutions

**Questions and Answers**

**Detailed Technology Discussion as time permits**
Vision and Mission

Vision
Transforming Energy Efficiency and Reliability

Mission
To lead the transformation of energy efficiency and reliability through integrated solutions that significantly improve the operation and economics of energy networks throughout the world
Company Overview

BPLG develops and deploys software applications and technology solutions to enhance the efficiency and reliability of utility networks

- Solutions control, manage and monitor demand and distributed capacity, improve service reliability and optimize the overall cost structure

Founded in 2004 with headquarters in Pittsburgh PA, US

Regional Offices:
- Le Mans France – Europe
- Kuwait City – Middle East
- South Africa - Africa
- Sao Paulo Brazil – Latin America
- Beijing China - Asia

Leading the transformation of the electric network

- Offer fully integrated Smart Grid solutions from the substation to and through the customer premises.
- Deployed our 1,000th transformer monitor and deployed over 10,000 premises energy controllers and sensors
- Manage, monitor and control more than 530MW of power
The Evolution of the Smart Grid Market
The existing power grid is increasingly operating at its limit, facing shortcomings in capacity, reliability, operational capability, security and power quality.

The world of the Electric Utility will change dramatically over the next decade

- Technology must change
- The grid must change
- Utility operational paradigms must change
- Customers must change
Global issues facing the Electric Utility

Growing demand and constrained supply

Economic cost of natural resources for energy production are increasing

Aging infrastructure stresses networks and causes high technical losses and outages

Regulatory forces are driving alternative energy sources and new technologies

Information technology is inadequate to keep up with growing information needs to manage demand and curb operational losses
Challenges affect all aspects of energy delivery

**Capacity & Supply**
- Central Supply costs increasing
- New generation challenges
- Distributed energy resource are expensive

**Reliability & Operations**
- Asset are aging
- Faults are increasing due to increased stress and age
- Operational losses are high
- Technical losses are high

**Demand Side Management**
- Demand is increasing beyond supply capacity
- Metering infrastructure is inadequate for data needs
- Growth is where supply is not

**Information Technology**
- Systems not prepared for emerging applications
- Limited network management capability
- Inadequate communications
The Solution
# Transforming the Electric Network

## Grid 1.0
- Designed 50 years ago, pre-computers, pre-telecom
- Centralized carbon-based power generation
- Limited or no communication
- Analog electrical devices
- Vulnerable to natural disasters and attack with single points of failure
- Business model designed to build more generation to meet unlimited growth in demand

## Grid 2.0
- Designed for next 50 years, leverages computers and telecom
- Distributed clean generation and storage
- 2-way real-time communication
- Digital electronic devices
- Resistant to natural disasters and attack with multiple power flows
- Business model designed to improve distribution reliability and efficiency, optimizing supply and demand
Present Utility Actions

**Determining what Smart/Modern Grid means to them**

**Evaluation and deployment of (primarily as point solutions)**

- Smart meters
- Distributed Energy Resources and storage
- Demand management systems
- Operational IT systems
- Advanced sensors
- Distribution Automation

**Building business cases**

**Evaluating regulatory-market approaches for funding**
Need Holistic Resolution

Substation Automation
Improve productivity and reliability

Distributed Energy Resource Management
Optimize underutilized renewable generation and storage resources

Distribution Reliability
Protect & extend asset life

Demand Management
Meet demand growth for ~1/3 the cost of new generation

Communications, Asset Monitoring & Management, Fault Location

Software Solutions
Technology must take into consideration all aspects of supply, demand, reliability and information technology

- Integrate to legacy systems and emerging applications
- Provide a total solution from generation to the customer premise
- Provide alternatives to building central generation
- Reduce emissions and enhance environmental benefits
- Incrementally build to a smart grid enabled CLN Power Plant™
Steps to a Smart Grid

**Determine the issues, categorize them and prioritize**

**Take one step at a time**

– Focus on the present but always walk towards the future

**The Smart Grid and CLN Power Plant are built from the bottom up**

– Device integration to mine the data
– Communications and systems to gather, monitor and manage the data
– Information aggregation to enable management and control decisions
– Application collaboration in order to maximize the return on investment
– Develop operational and market interfaces to automate management and controls

**Strategically use all existing systems and data in every step of the way**
BPL Global’s Solution
BPLG’s Strategic View

- BPLG creates monitoring & control interfaces to the edge of the electrical distribution grid.
- BPLG coordinates the capture, transport, archiving and interrelationship of data through pervasive networking.
- Solutions are enabled with the intelligence to analyze and model the data it has captured.
- The linkage harmonizes all aspects of energy delivery and consumption into a unified management system.
BPLG Differentiators

**BPL Global solves specific problems of electric utilities through software-based solutions**

- Applications are ROI-driven
- Ability to cross-collaborate between applications
- Solutions are standards based, software driven and hardware independent enabling ease of integration to existing utility hardware and legacy software

**Protected Technology**

- Substation IP
- Solution IP
- Premise IP

Four patents approved  Three patents filed  One Patent approved

One patent filed  18 Copyright applications
BPLG’s Enterprise Solution

Power SG Foundation is the enterprise class software platform that provides all operating functionality and services needed for Power SG applications to operate stand alone or in conjunction with other operating platforms

- Empowers the utility with the ability to manage, monitor and control critical components of the electric network through the integration of BPLG’s vertical solutions

<table>
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<tr>
<th>Value Proposition</th>
<th>Benefits to Utility</th>
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<td>Supports targeted applications from substation to the customer premise</td>
<td>Delivers the true value of smart grid investments vs. unrelated, disconnected point solutions</td>
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<td>Cross-collaboration between applications anywhere on your grid</td>
<td>The grid is an interconnected system and smart grid solutions can now be applied the same way</td>
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<td>Legacy system integration</td>
<td>Power SG solutions can leverage existing utility systems for faster, cost effective deployment</td>
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<td>A single, open enterprise class software platform</td>
<td>Obsolescence eliminated</td>
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**Power SG Solution**

*Power SG Foundation includes a set of base services which Applications use to perform their function*

- The Foundation architecture enables applications to use any or all services, operate independently or collaborate with other applications.
Existing Solutions – Generation to the Premises

- Power SG Foundation
- Integrated Distributed Energy Resources (IDER)
- Substation Automation
- Transformer Monitoring
- Asset Utilization and Distributed Energy Resource Management
- Rapid Fault Locator
- Demand Response / Demand Management
- Building Energy Efficiency
- AMI Integration and Loss Detection (Energy Theft)
- Network Monitoring and Management
OPEN DISCUSSION
AND
QUESTIONS