EV Charging & Building Energy Management

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Presented to:
Agenda

• GridScape Introduction
• Workplace Charging
  • Challenges & Opportunities
• Use Cases & Solutions
• Q&A

• Backup Slides:
  • Gridscape Solutions Overview
  • Case Studies
GridScape Solutions

- Leading & Innovative Systems Integrator & Smart Energy Solutions Provider
  - *Founded in 2011*
  - *Global Presence – US, UK, India*
  - *Approximately 25+ Engineers*
- Turnkey Smart, Efficient Energy Solutions for
  - *Enterprises*
  - *Utilities*
  - *Manufacturers*
- Experts in Solar, Storage, Demand Response & EV Infrastructure integration

**Customers:**
- Schneider Electric
- nrg
- chargepoint
- LITEON
- STRATEGEN
- BURNHAM
- GAF Solar

**Affiliations:**
- openADR Alliance
- BOMA International
- Collaboratev

**Case Studies:**
- OpenADR Solution for EV Charging
- EV Charging Network Integration
- Mobile Applications for EV Charge Sharing
- Utility Back-office Integration
- Solar PV Design and Energy Portal

Visit [www.grid-scape.com](http://www.grid-scape.com) for details
Workplace Charging

Challenges & Opportunities

1. Am I meeting my Corporate Sustainability Goals?
2. How do I limit access to employees only?
3. How do I implement policies for fair EV charge sharing between employees?
4. How do I integrate EV Charging with my overall building energy management?
5. How do I avoid expensive demand charges?
Building & EVSE System Interaction

**Enterprise Systems**

**Employee Charging**
- Authentication
- Access Control
- GHG Savings Reporting
- Employee Benefits
- Fair Charge Sharing

**Building Automation**
- Energy Management
- Access Control
- Remote Control

**Demand Response**
- Load Profiling
- Peak Demand Mgmt
- Shed/Restore Load

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**EV Charging**

**Driver Services**

**Driver**
- Locate
- Reserve
- Pay
- Receive notifications

**Corporate Campus**
Use Case 1: Energy Management

With Networked EVSEs:

**Supervisory Monitor/Control**
- Display Usage/activity
- Control, manage
- Alarm notification/history

**BAS/EMS**

**EVSE Cloud**
(ChargePoint, Blink)

**API Interface**

**Corporate Campus Charging**

**Home & Public Charging**

More, Flexible Choices!!
Use Case 2: Energy Management

With Non-Networked EVSEs:

EMS Platform

EM Dashboard

Energy Service Provider (e.g. Utility)

EMS (e.g. Tridium)

Supervisory Monitor/Control
- Display Usage/activity
- Control, manage
- Alarm notification/history

Plug Computer

Corporate Campus Charging

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Use Case 3: Demand Response

DR APIs can help reduce peak demand charges by throttling down EV Chargers during peak November 6, 2013

Load Management
- Load balance
- Peak event response

Energy Service Provider

Peak Demand Threshold
(Very High Charges per KWHr over this threshold e.g. $25+/kwhr)

API Interface

BAS/EMS

Corporate Campus Charging

EVSE Cloud
(ChargePoint, Blink)
Use Case 4: Access Control – Cloud Based

Access Control
- Single card access
- Manage access privilege
- Track usage (i.e., benefit)

Employee ID Systems

API Interface

EVSE Cloud
(ChargePoint, Blink)

Corporate Campus Charging

Public Charging
- Locate
- Reserve
- Pay
- Receive notifications

More, Flexible Choices!!
**Use Case 4: Access Control – Kiosk Based**

**Scenario 1**
- Wi-Fi Hotspot available
- Integrated RFID Reader
- Payments may be required (Credit card, subscription, etc.)

**Scenario 2**
- Kiosk (Wi-Fi Gateway)
- Integrated RFID Reader
- Payments may be required (Credit Card, etc.)

Enterprise Back Office or EVSP

Kiosk will be Wi-Fi Hotspot and RFID Card Reader
Use Case 5: Fair EVSE Charge Sharing

Scenario 1: Honor System
- Not Scalable, unmanageable
- Angry Employees
- Too many complaints

Scenario 2: Punitive Access Policy
- Charge Employees for over-staying
- < 4 hours, no charge
- > 4 hours, $10/hour
- SMS message when pricing changes
- EV Networks offer this service (e.g. ChargePoint)

Scenario 3: Interactive Social Network
- Mobile Applications
- Calendar Sharing
- Twitter, Facebook Integration

Enterprise Back Office or EVSP
Thank You

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Backup Slides
Company Background

• Founded in 2011
• Global Presence (US, UK, India). Approximately 25+ employees
• We offer comprehensive suite of smart energy solutions
  • Smart Energy System Integration Services
  • Smart Energy Engineering Design Services
  • Smart Energy Products & Support Services
• Bringing significant energy efficiency and operational savings to our customers worldwide
Our Team

• Vipul Gore – President & CEO
  • 22+ years energy, networking & software solutions subject matter expert
  • Proven leader, seasoned executive & visionary
  • Passionate about smart energy technology

• Bhavesh Gore – Chief Operating Officer
  • 20+ years business executive & serial entrepreneur
  • Financing and operational efficiency expert
  • Passionate about smart energy & customer service

• Gary Calderon – Vice President, Sales & Business Development
  • 25+ years high technology sales & business development executive
  • Expert in solar energy and energy efficiency audits
  • Passionate about smart energy solutions

• Hakimi Bharucha – Vice President, Engineering & Services
  • 18+ years engineering & operations management specialist
  • Exceptional manager and team builder
  • Expert in developing high quality, cost effective products & solutions
# Our Solutions

## For Utilities, Energy Companies
- EVSE Integration Solution
- Software Development, System Integration & Testing
- Energy Modeling & Monitoring Solutions
- Energy Storage Management Solutions

## For Auto Manufacturers
- “Connected Car” Software Development, Integration & Testing Solution
- CAD Engineering Design & Testing Solution
- Offshore Call Center Support specialized in Smart Energy

## For Enterprises
- Solar PV Installation
- Smart Energy System Integration & Testing
- Building Management Automation & Energy Monitoring Solution
- CAD Engineering Design

## For EVSE Manufacturers
- EV Integration & Simulation Software Solution
- Software Development, Integration & Testing Solution
- Value-added Reseller* Partner
- Offshore Support Services

## For Smart Grid Product Companies
- Software Development, Integration & Testing Solution
- Value-added Reseller* Partner
- Offshore Support Services, specialized in Smart Energy

## For Residences
- Solar PV Installation
- Energy Efficiency Audits
- Solar EVSE Integration

*2H 2013

GridScape Proprietary & Confidential

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Our Expertise

**Smart Energy System Integration Service**
- Linux & Windows development (embedded, real-time, web-based applications, LAMP*)
- PLC software design and development
- Protocol implementation (MODBUS, CANBUS, SAE, CHaDeMo, Serial line control protocols)
- Mobile Application Development (Android, iOS, WindowsCE)
- GUI & Simulator Design & Development
- Smart Card, Credit Card, POS Terminal Integration
- API integration (SOAP/REST/XML)
- V2G, V2B integration
- Solar Power to Grid Integration

**Smart Energy Engineering Design Service**
- Solar & EV System Design
- CAD Design (CATIA, ENOVIA, AutoCAD, ETAP, PDMS, CADWorx, 3D Modeling)
- Structural, Electrical & Mechanical Design (TEKLA, CADWorx, PV Elite)
- Thermal Simulation, Stress & Hazard Analysis (HTRI, CAESAR)
- Concept & Feasibility Studies
- Instrumentation Engineering Design & Computer-aided Testing
- Retrofit solution design
- Project Management
- Remote Engineering Support

**Smart Energy Products & Support Service**
- Reseller of major smart energy product brands**
- Certified Solar PV Installation (NABCEP, IBC, NEC, OSHA, UL & DSA compliant)
- Energy Efficiency Audit
- Remote Energy Monitoring
- Offshore Call Center Support Service, specialized in Smart Energy
- Smart Microgrid Integration, Testing & Deployment (Solar, Energy Storage, EVSE & Grid)
- Advanced Metering Infrastructure Design & Deployment
- Wireless (Cellular, WiFi, ZigBee) Site Surveys & Installation
- Project & Contractor Management

*Linux, Apache, mySQL, PHP
**2H 2013
Case Study 1: EVSE Integration

Scope
- Design, Integrate & Deploy Nissan DCQC & ChargePoint CT2100 in NRG eVgo Freedom Station
- Design & Develop a Credit Card Payment System

Design
- Protocols: Serial, RS232/RS422, SOAP/XML/REST/Modbus
- OS: Linux
- Application Environment: Apache, mySQL, Java, SOAP/REST/XML

Project Details
- Team: Project Manager, Solution Architect, 4 SW Engineers, QA Engineer
- Effort: 7 p-months & ongoing. Currently in testing phase
- Methodology: SCRUM
Case Study 2: OpenADR solution for EV Charging Network

Concept
- Design, develop & deploy an OpenADR compliant software system to manage EV Load during Demand Response Events

Design
- Protocols: SOAP/REST/XML
- OS: Linux
- Application Environment: Apache, mySQL, Java, SOAP/REST/XML

Project Details
- Team: Project Manager, Solution Architect, 2 SW Engineers, QA Engineer
- Effort: 15 weeks. Currently in acceptance testing phase
- Methodology: SCRUM
Case Study 3: EVSE Modbus Simulator

• Concept
  • Design & develop a Modbus Simulator with GUI on HMI Device for EVSE

• Design
  • Protocol: Modbus, TCP/IP, PPP
  • OS: Linux 2.6.30, C++
  • Development Environment: VC++

• Project Details
  • Team: Project Manager, Solutions Architect, 2 Software Engineers, QA Engineer
  • Effort: 12 weeks from specifications to deployment
  • Methodology: SCRUM
Case Study 4: Online Cash Loan Processing System

Concept
- Design, implement, deploy and maintain an online cash loan processing system for a leading distributed cash advancing financial company in CA

Design
- Protocols: SOAP/XML/REST
- OS: Windows
- Application Environment: Visual Studio, .NET, SQL-Server, C#, IIS

Project Details
- Team: Project Manager, Solution Architect, 4 SW Engineers, 2 QA Engineer
- Effort: 30 weeks. Currently in support & maintenance phase
- Methodology: SCRUM