



KCP&L SmartGrid Demonstration Overview

Missouri Public Service Commission Smart Grid Workshop

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Agenda

- SmartGrid Vision and Strategic Objectives
- Project Overview & Objectives
- Project Area – Green Impact Zone Overlay
- Customer Engagement and Education
- Project Components
- Project Timeline and Milestones
- Near Term System Enhancements

SmartGrid Pilot Vision and Strategic Objectives

Project Vision

Deliver next generation smart grid technologies to enhance Kansas City's urban core, engage customers, and to evaluate technical, operational and business model feasibility for KCP&L and its customers

Community Engagement

Support sustainable revitalization of our urban core through community collaboration, education, training and investment

Customer Solutions

Enable customers to better manage energy use and expenditures

Clean Energy

Accommodate new sources of renewable and distributed energy supply

Grid Operations

Automated grid analysis, management and control adapting to condition changes, meeting safety, cyber security, and service needs

Project Overview & Objectives

- KCP&L received a \$24M ARRA grant for a DOE smart grid “regional demonstration” project.
 - Total project about \$50M over 5 years
- There are over 14,000+ customers (meters) in the project area, located in midtown Kansas City, MO, just east of the Country Club Plaza.
 - Much of the project area is challenged with high unemployment, low income and education levels, lack of internet access and inefficient homes
- KCP&L is partnering with several organizations, including Landis+Gyr, Siemens, EPRI, Exergonix, Green Impact Zone, OATI, Intergraph, Tendril, Siemens/eMeter and Burns & McDonnell

Project Overview & Objectives (cont.)

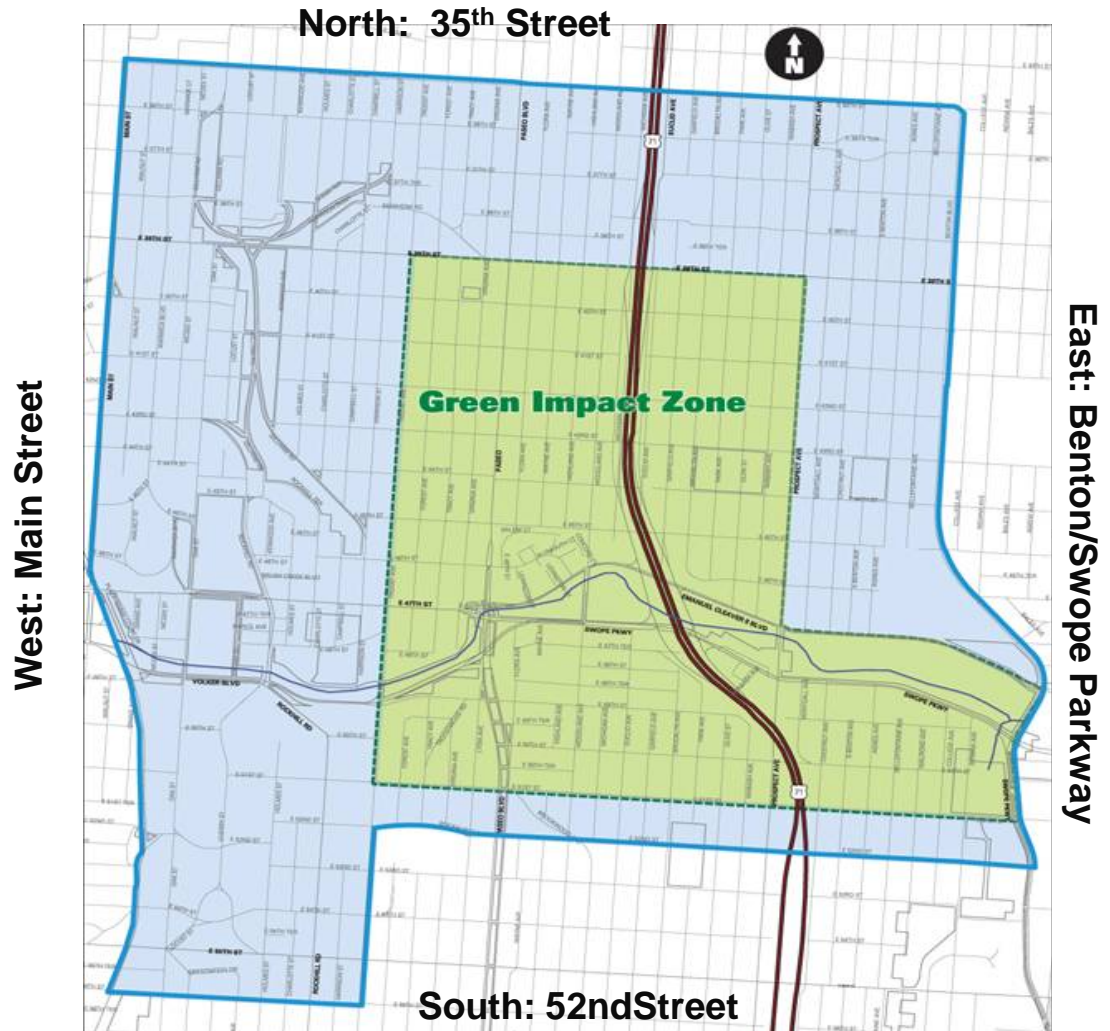
Combine commercial innovation with a unique approach to smart grid development with a heavy focus on **customer engagement & value**:

- Provides **information and enabling technologies for customers**.
- Creates a **complete, end-to-end smart grid** — from smart generation to end-use — that will deliver improved performance focused on a major urban substation.
- **Introduces new technologies, applications, protocols**, communications and business models that will be evaluated, demonstrated and refined.
- **Best-in-class approach to technology integration**, application development and partnership collaboration, allowing progression of complete smart grid solutions — with interoperability standards — rather than singular, packaged applications.
- KCP&L's demonstration project will provide the critical energy infrastructure required to **support a targeted urban revitalization effort** in Kansas City's Green Impact Zone and support a more **sustainable future**.

Project Area - Midtown Kansas City, MO

KCP&L's SmartGrid project in midtown Kansas City, Missouri includes the 150-block Green Impact Zone and surrounding neighborhoods, shown here in blue.

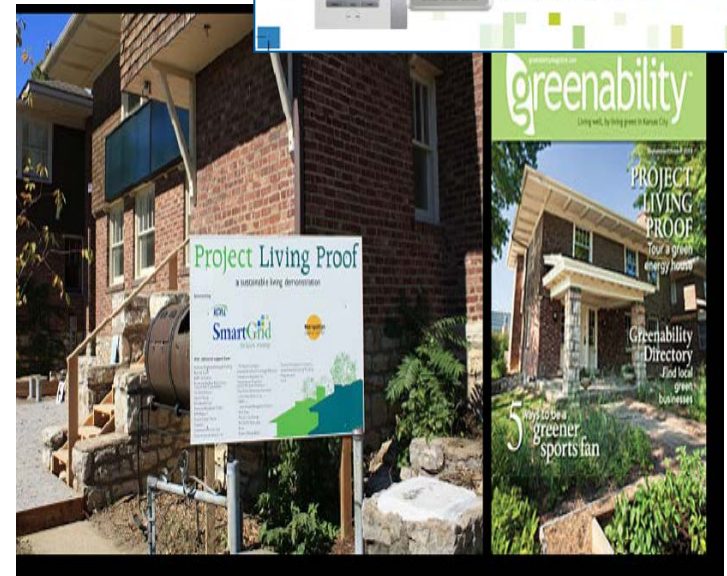
The Green Impact Zone is a cooperative effort to focus federal stimulus funding on projects in a targeted area of Kansas City, Missouri.



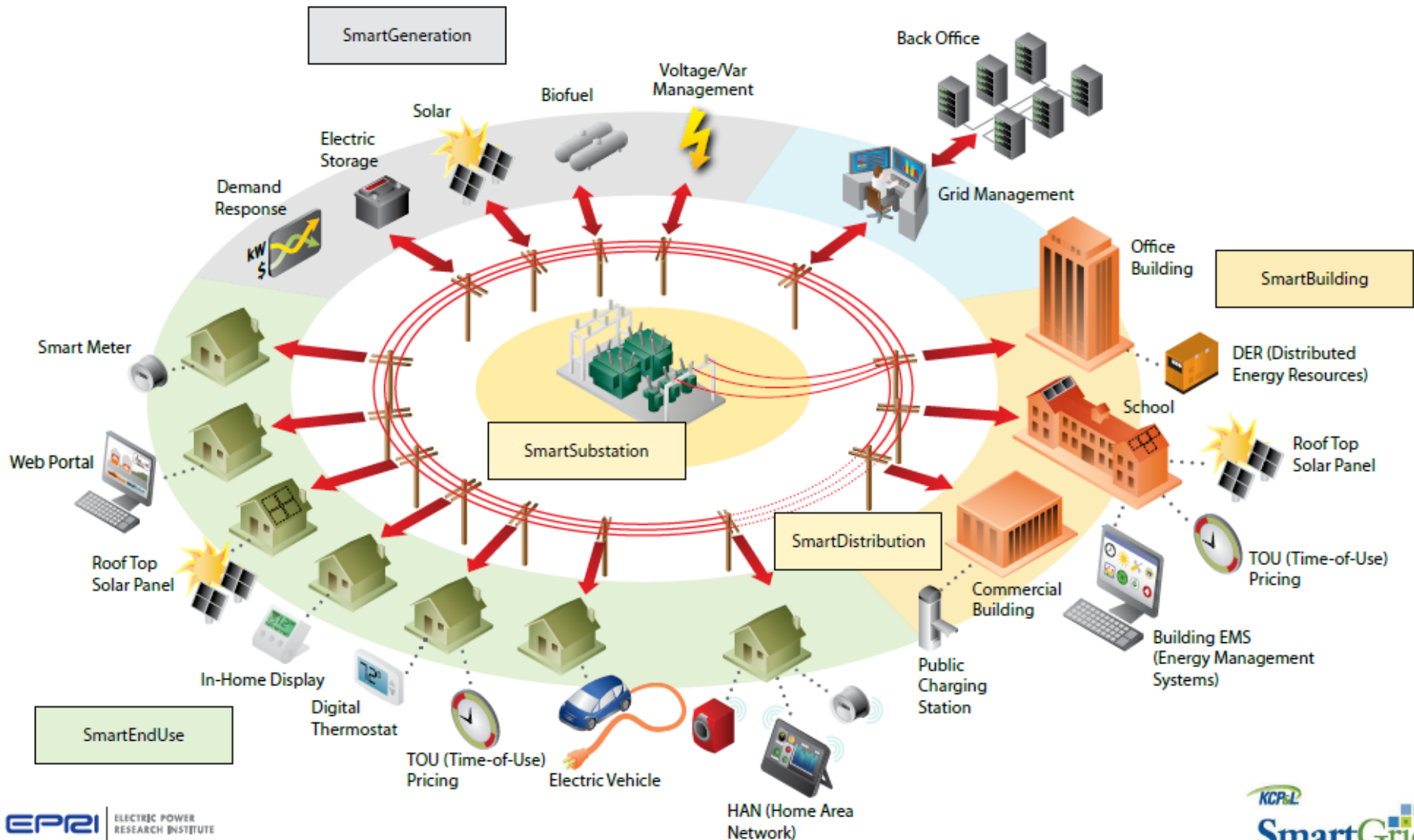
Education & Outreach – Part of the “Software”

In addition to traditional communications efforts, KCP&L is focusing on new **approaches to increase awareness and engage customers:**

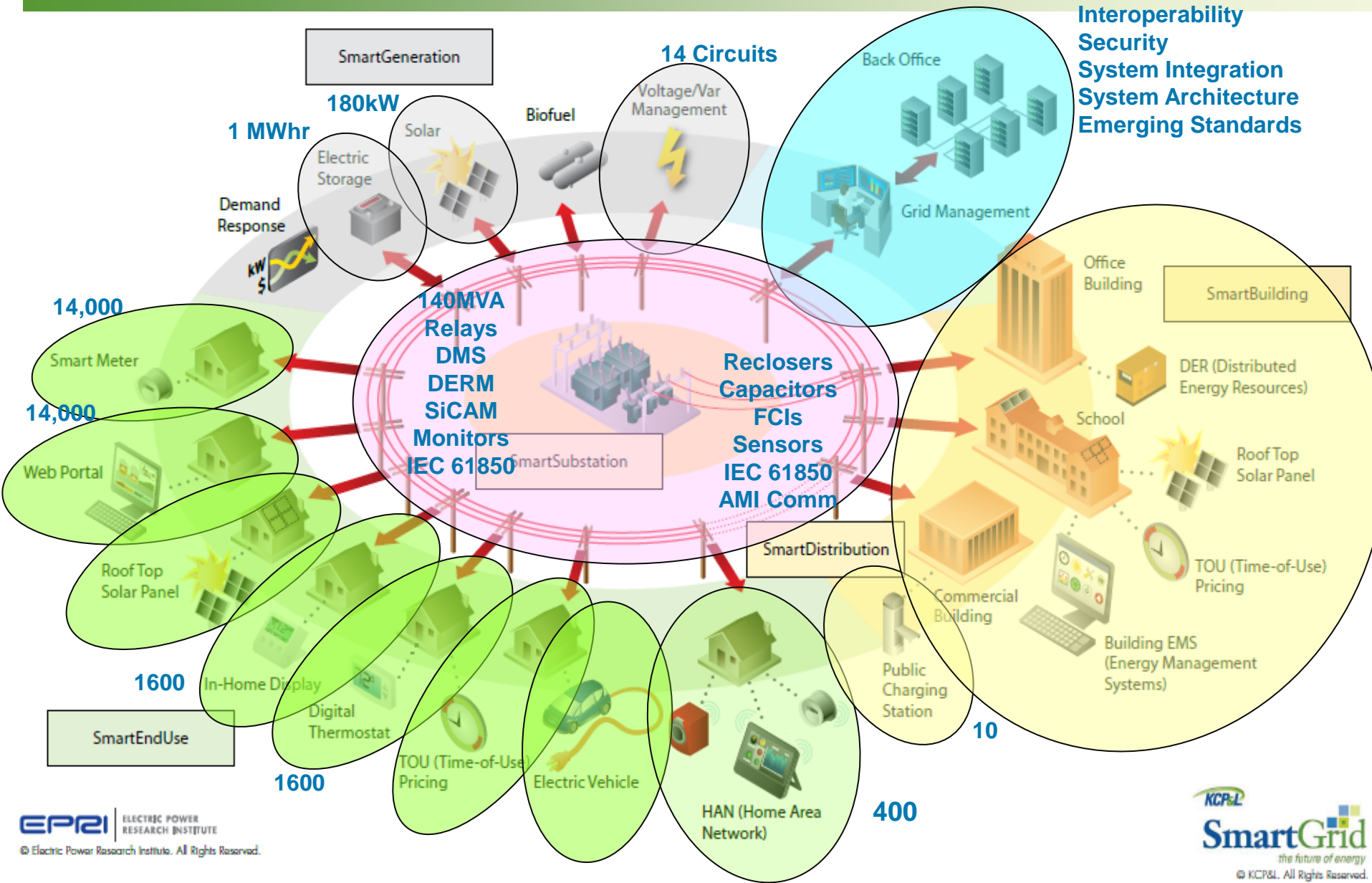
- Neighborhood Association & Faith-based Outreach
 - KCP&L Reps matched with each neighborhood
 - Various Community Partnerships, including Green Impact Zone
- Community Outreach Events
- Demonstration house (Project Living Proof)
 - Touch, feel, learn about and experience new, energy efficient and smart grid products first-hand
 - Partnering with the Metropolitan Energy Center
 - Open to the Public
- SmartGrid Support Team
- Stakeholder Updates (MO & KS)
- Internal Education and Change Management



KCP&L Demonstration – True End-to-End Smart Grid

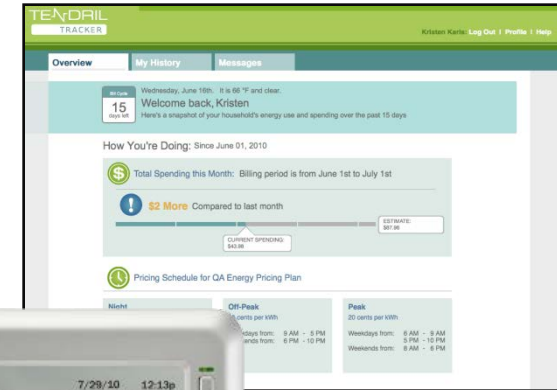


KCP&L Demonstration – True End-to-End Smart Grid



Customer Products and Tools

- **Web Portal:** helps customers understand the impact of electricity use and encourages decisions that conserve energy, help the environment and save money.
- **In-Home Display:** real-time information that increases awareness of electric use and identifies opportunities to reduce consumption and save money.
- **Programmable Thermostat:** automatically set temperatures based on season, resulting in savings in heating and cooling bills. 2-way communications.
- **Home Area Network (HAN):** communications to in-home devices for “set-it and forget-it” convenience.
- **Electric Vehicle Charging**
- **Time of Use rate (TOU)**

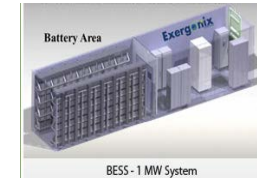


Technical Components



■ Distributed Energy Resource Management (DERM):

- Solar
- Electric Vehicle Charging
- Demand Response
- Voltage Control
- Utility-Scale Battery (1 MWhr)
- Prediction and program calls



■ Smart Substation

- Fiber Optic IEC 61850 Communications
- Substation Integration Control Automation Monitoring (SICAM)
- Relay upgrades and equipment monitoring

■ Distribution Management System

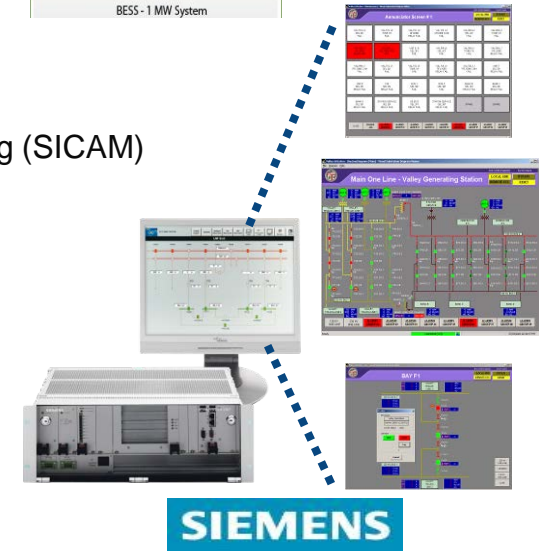
- Distribution SCADA
- First Responder functions, Outage Management
- Network Analysis

■ Distribution Automation

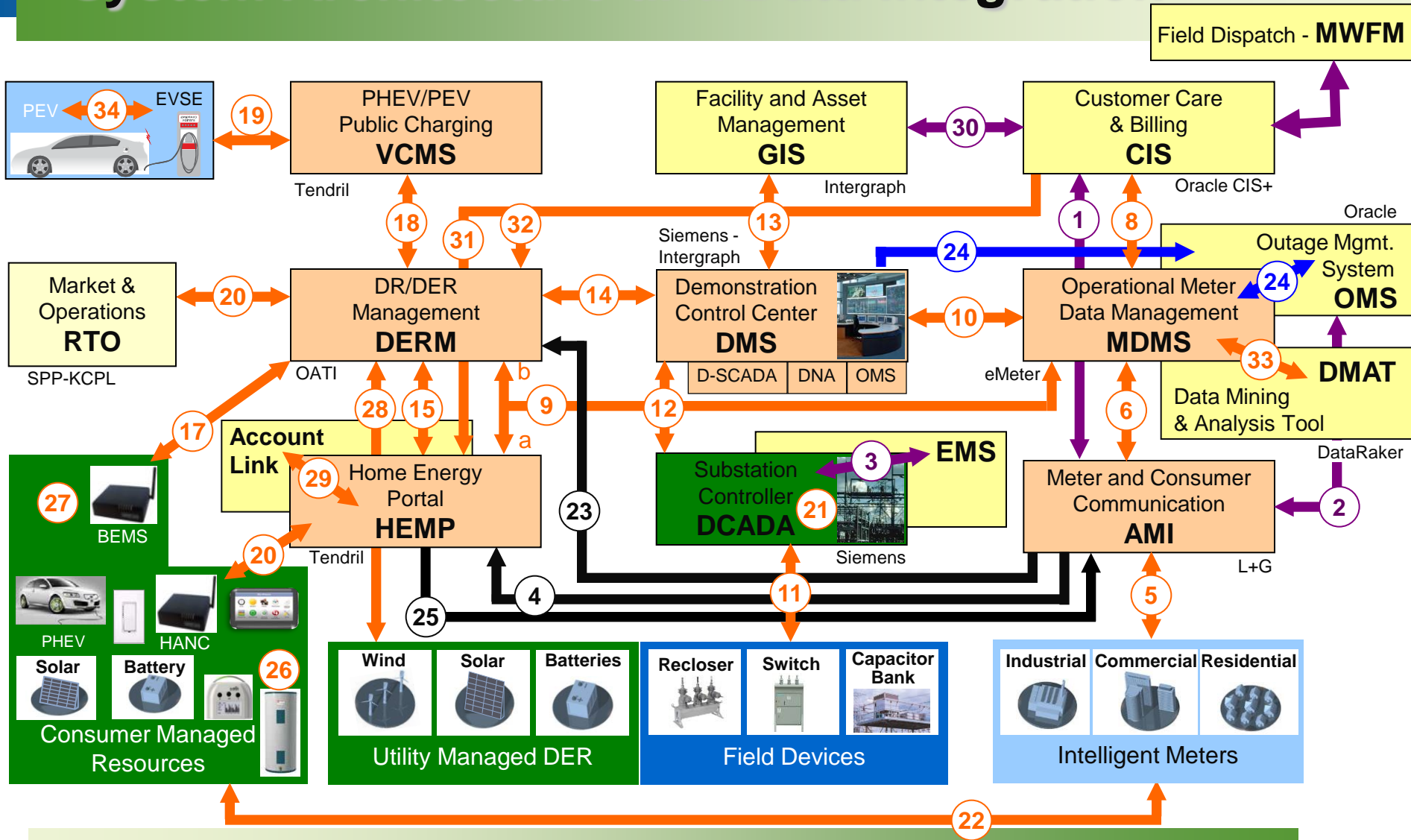
- Reclosers, Capacitors, Faulted Circuit Indicators
- Leverages AMI Communications

■ Coordination with National Institute of Standards and Technology (NIST)

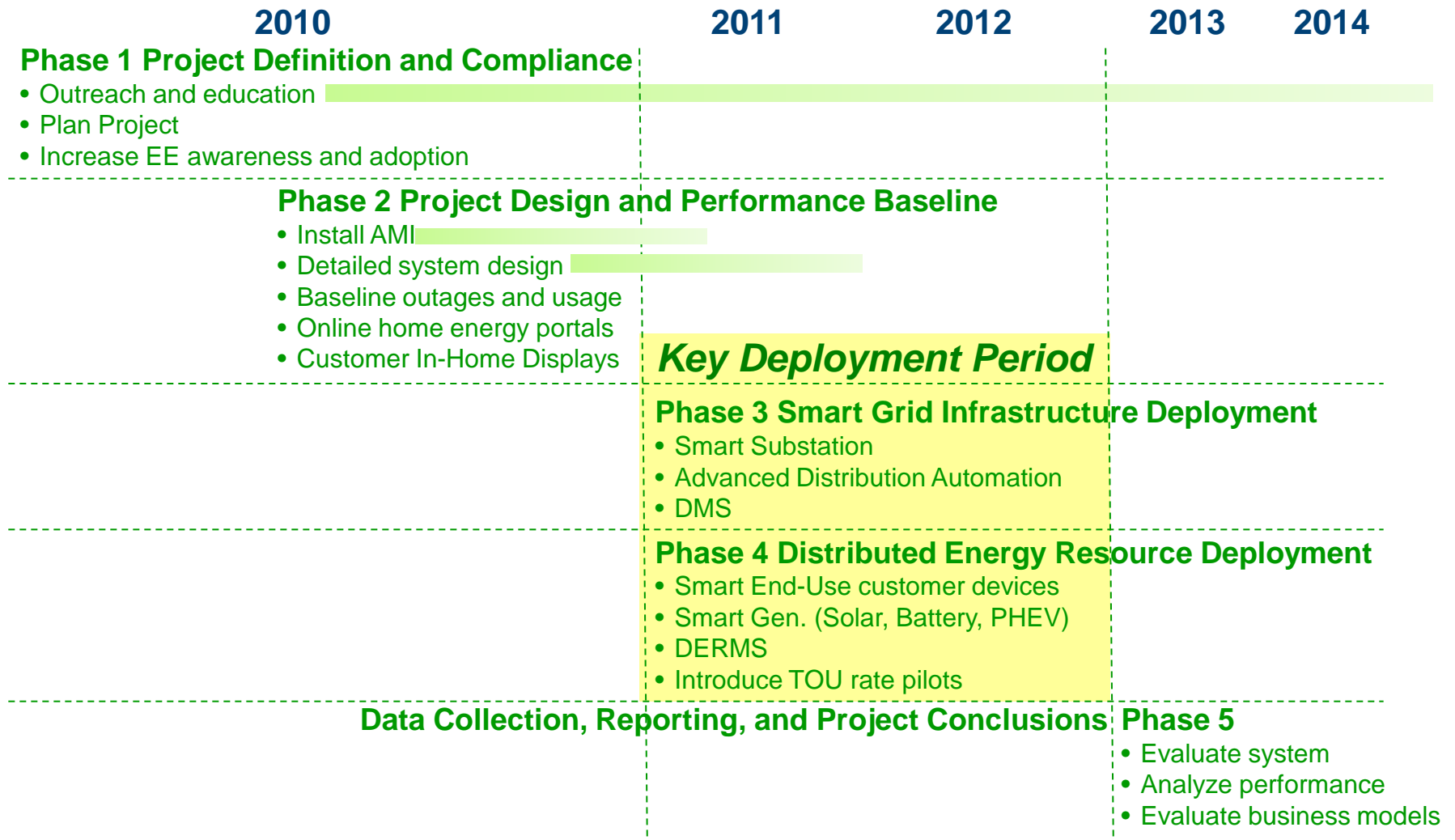
- Cyber security
- Interoperability (electric utility "plug-n-play")



System Architecture and Data Integration



SmartGrid Pilot Timeline



Major Milestone Timeline

2010

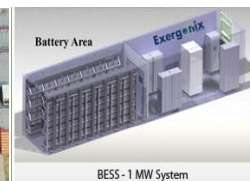
- Planning and organization
- Neighborhood Meetings
- Educational Meetings
- DOE Contract
- SmartMeter Launch (Oct. 18)
- Distribution of In-Home Displays
- Access to Customized Web Portal
- Demonstration House

2011

- Bill Prediction
- Begin Smart Substation Upgrades
- Solar Installations begin
- Home Area Networks (HAN)
- Smart Thermostats (in HAN)
- Time of Use Rates
- Web Portal & AMI Upgrades
- Interoperability Testing
- Security Risk Assessment
- System, Interface & Back Office Design
- \$10.6M Reimbursement through Oct 2011

2012

- Standalone Thermostats
- EV Charging
- Complete Smart Substation Upgrades
- Smart Distribution Upgrades
- Battery Storage System
- Complete End-Use Installation
- Full Integration & Cyber Security Acceptance Testing
- Final System Interoperability Testing
- Fully Operational SmartGrid
- Begin Measurement Phase (2 years. 2012 – 2014)



Near Term Product Launch & Enhancements

4th Quarter

- 100kW Rooftop Solar (Paseo H.S.)
- Web Portal Upgrade for HAN
- Home Area Network (HAN)
- TOU Pilot Rates
- Meter Data Management (Ph 1)
- Security Risk Assessment



Questions

*Learn more at
www.kcplsmartgrid.com.*



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