



# KCP&L SmartGrid Demonstration Overview

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Missouri Public Service Commission Smart Grid Workshop

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Jefferson City, Missouri

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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**:

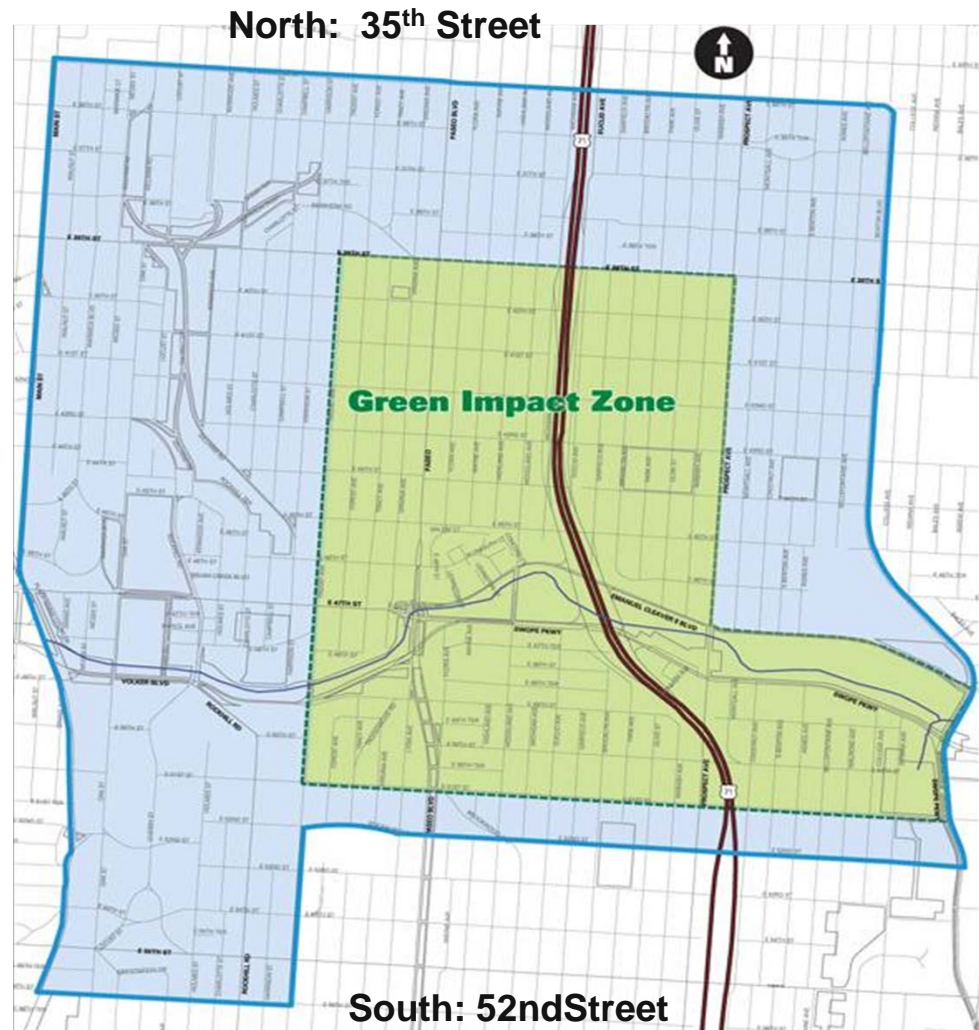
- Provides **information and enabling technologies for customers**.
- Creates a **complete, end-to-end smart grid** — from smart generation to end-use — that will deliver improved performance focused on a major urban substation.
- **Introduces new technologies, applications, protocols**, communications 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.*

West: Main Street



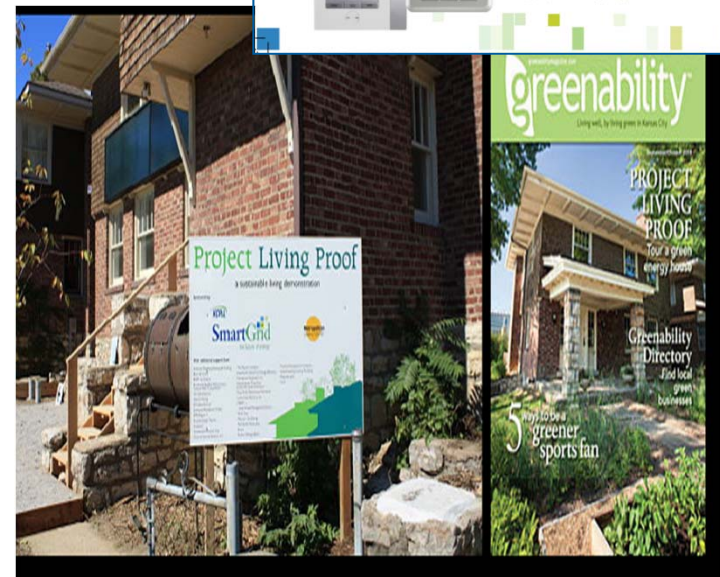
East: Benton/Swope Parkway



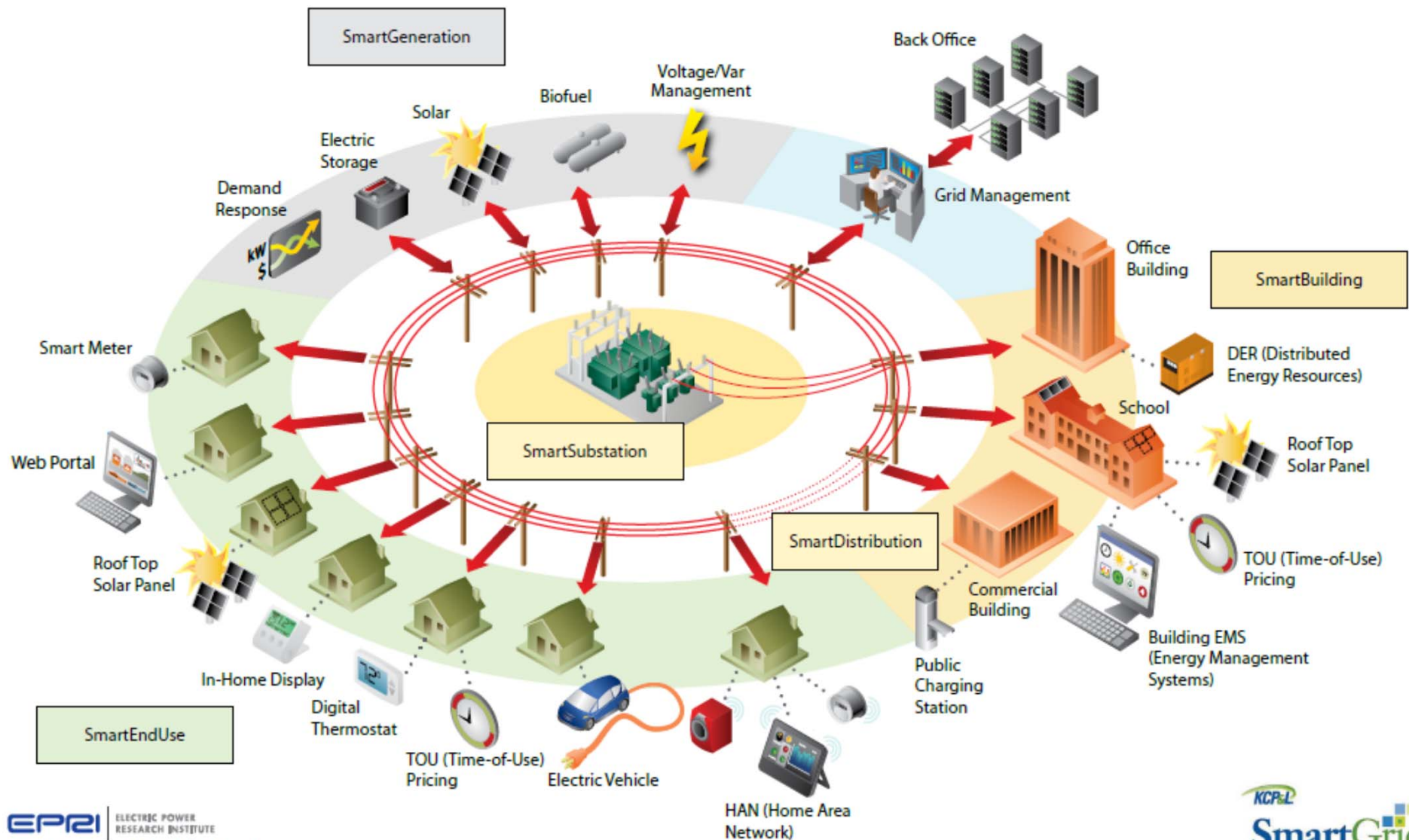
# Education & Outreach – Part of the “Software”

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

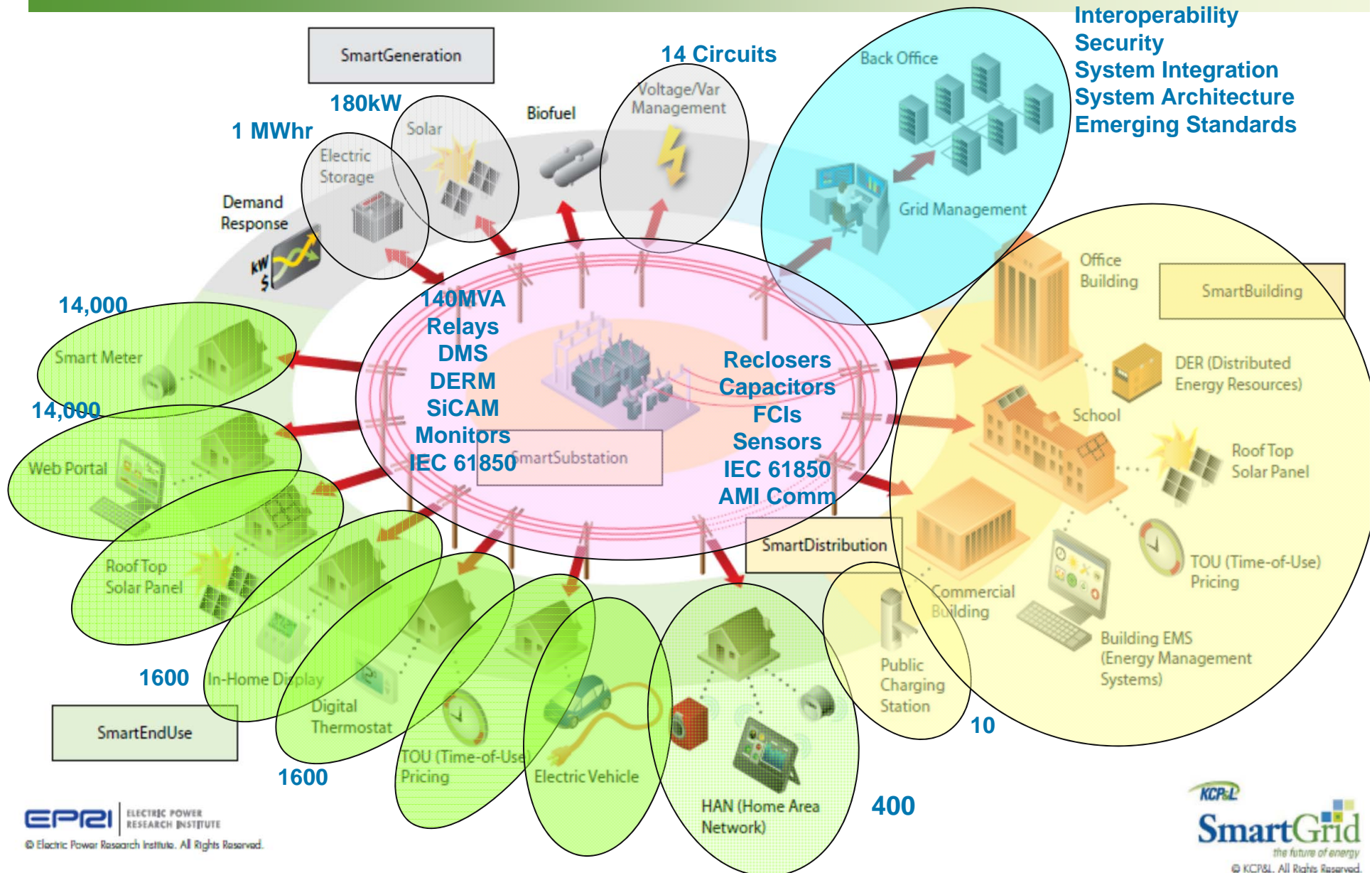


# KCP&L Demonstration – True End-to-End Smart Grid





# 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)**



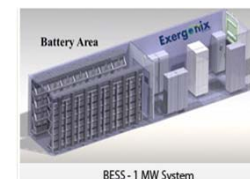
# Technical Components



**NIST**

## ■ 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

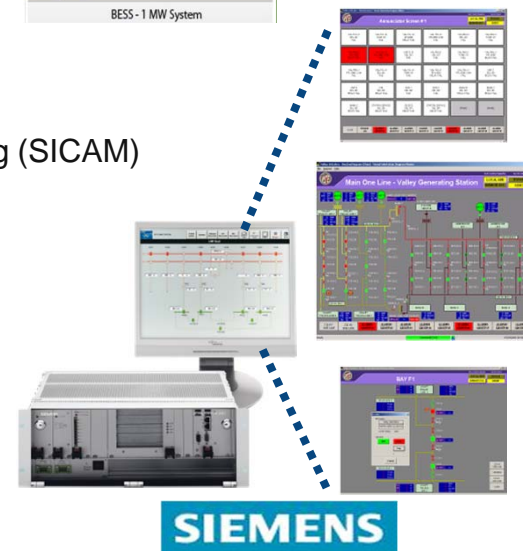
- Distribution SCADA
- First Responder functions, Outage Management
- Network Analysis

## ■ Distribution Automation

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

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

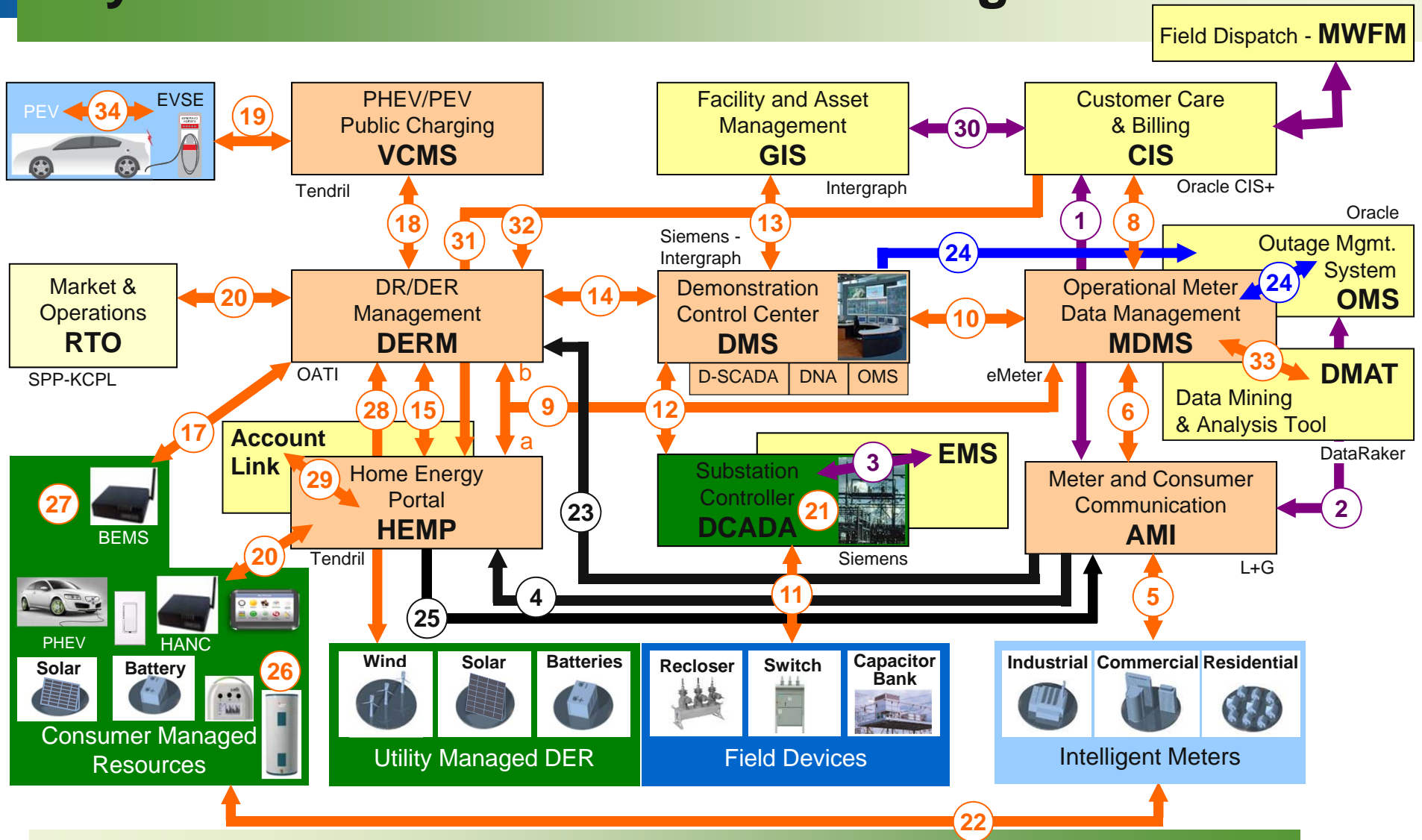
- Cyber security
- Interoperability (electric utility “plug-n-play”)



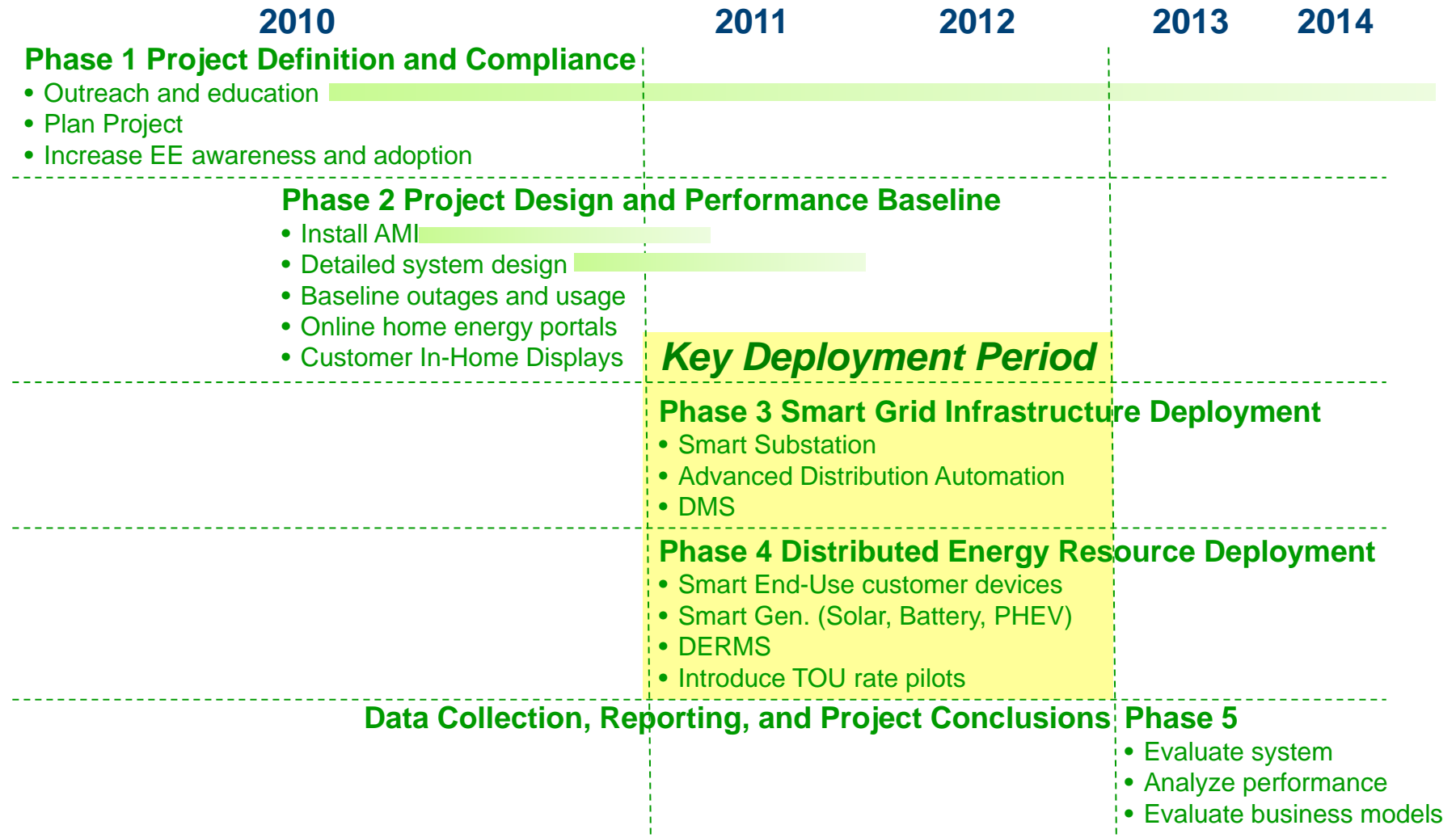
**SIEMENS**



# System Architecture and Data Integration



# SmartGrid Pilot Timeline





# Major Milestone Timeline

## 2010

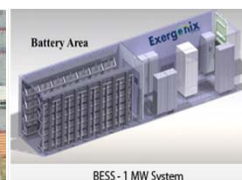
- Planning and organization
- Neighborhood Meetings
- Educational Meetings
- DOE Contract
- SmartMeter Launch (Oct. 18)
- Distribution of In-Home Displays
- Access to Customized Web Portal
- Demonstration House

## 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

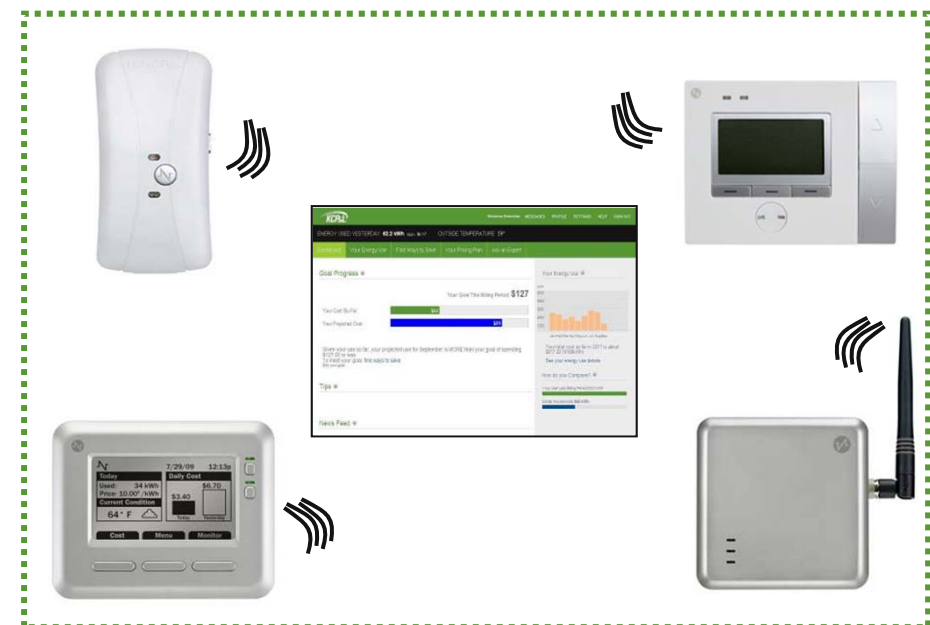
- Standalone Thermostats
- EV Charging
- Complete Smart Substation Upgrades
- Smart Distribution Upgrades
- Battery Storage System
- Complete End-Use Installation
- Full Integration & Cyber Security Acceptance Testing
- Final System Interoperability Testing
- Fully Operational SmartGrid
- Begin Measurement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



# Near Term Product Launch & Enhancements

## 4<sup>th</sup> 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](http://www.kcplsmartgrid.com).*



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