KCP&L SmartGrid Project Overview

Prepared for Kansas House Energy & Utilities Committee

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KCP&L

SmartGrid
the future of energy

Project Overview & Objectives

- KCP&L received a $24M ARRA grant for a DOE smart grid "regional demonstration" project.
  - Total project over $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 (MARC), OATI, Intergraph, Tendril and eMeter.
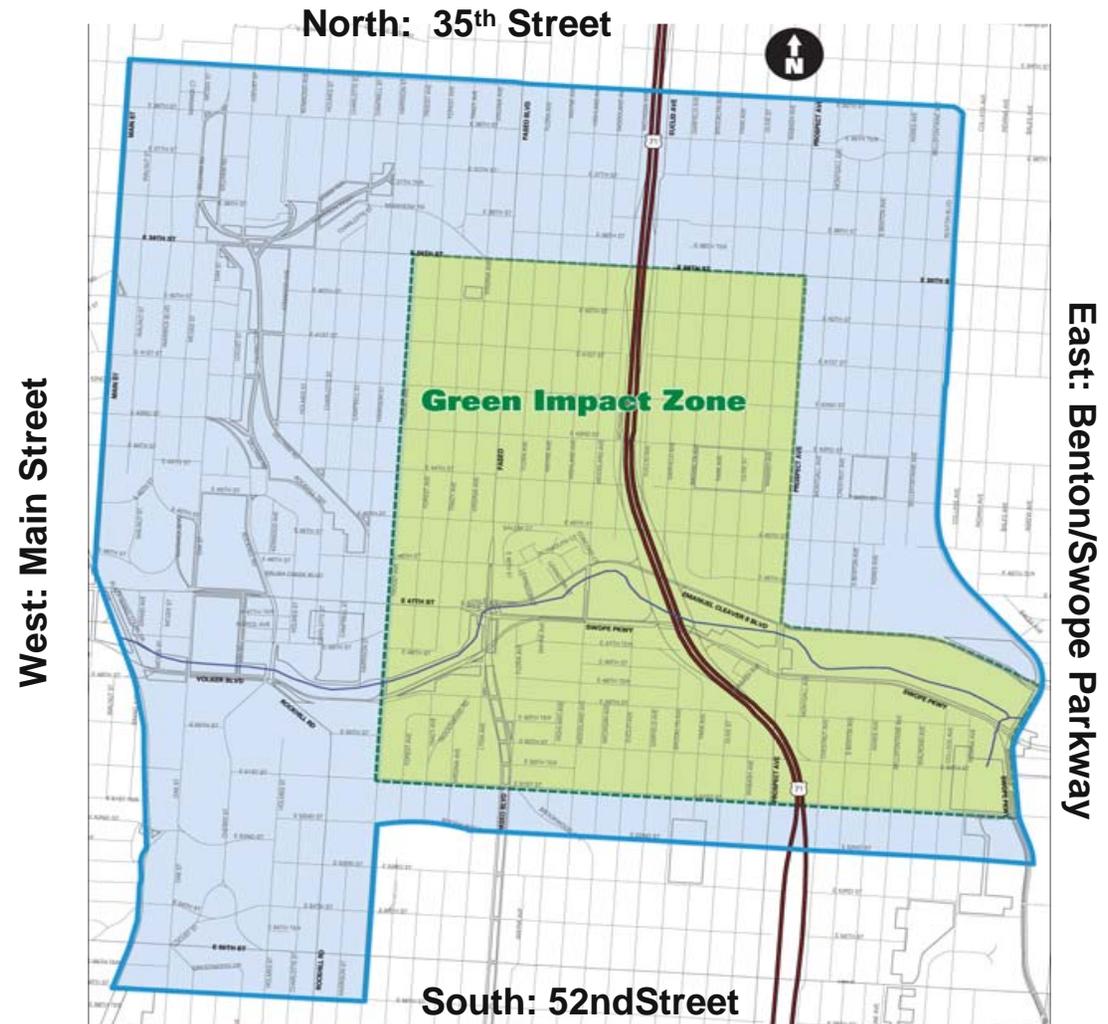
Project Overview & Objectives (cont.)

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**.
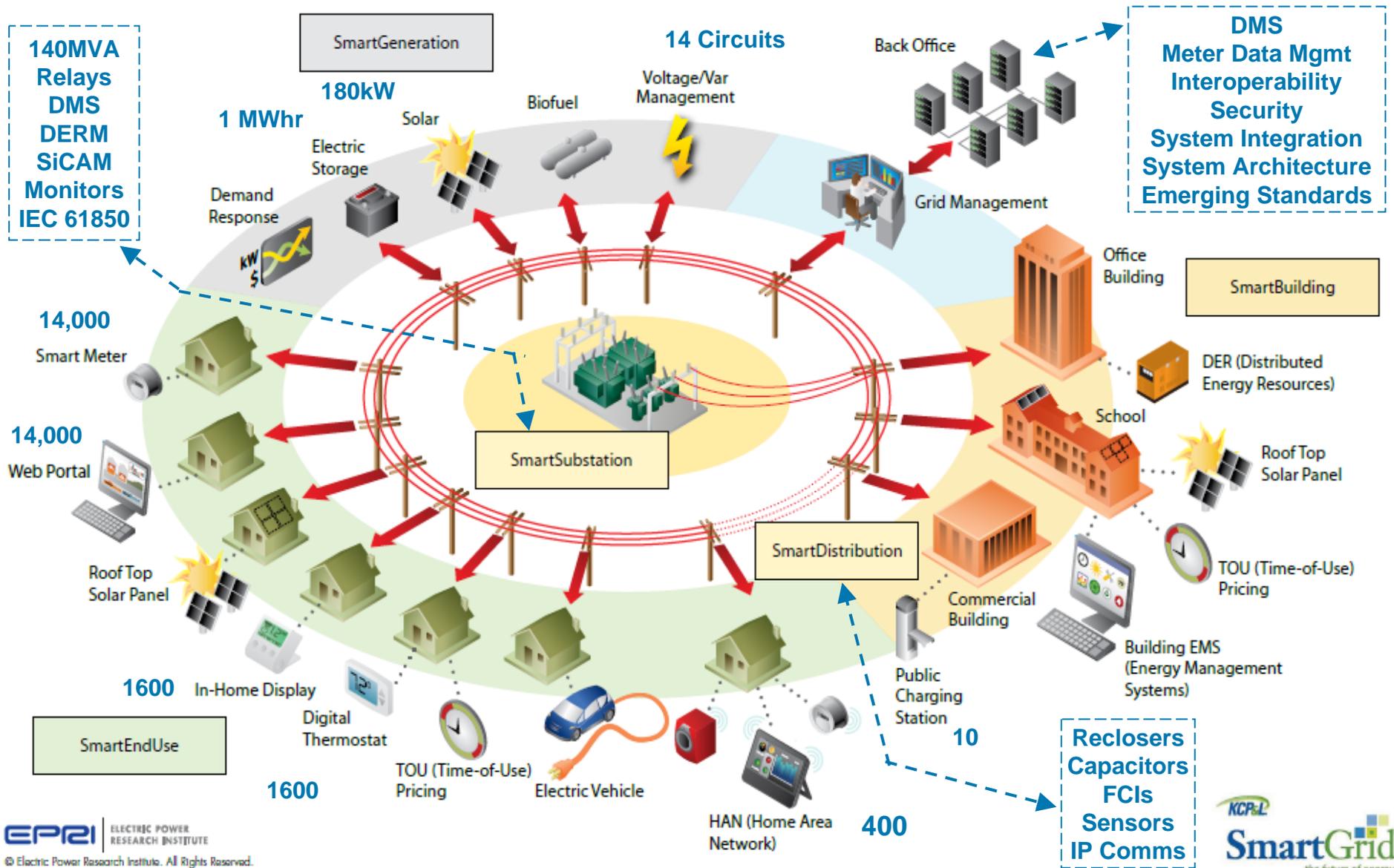
Project Area - Midtown Kansas City, MO

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.

North: 35th Street

West: Main Street

Green Impact Zone

East: Benton/Swope Parkway

South: 52ndStreet

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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**

- **Rooftop Solar Leasing**

- **Time of Use rate (TOU)**

Technical "Grid" 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 Automation Control and Management (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
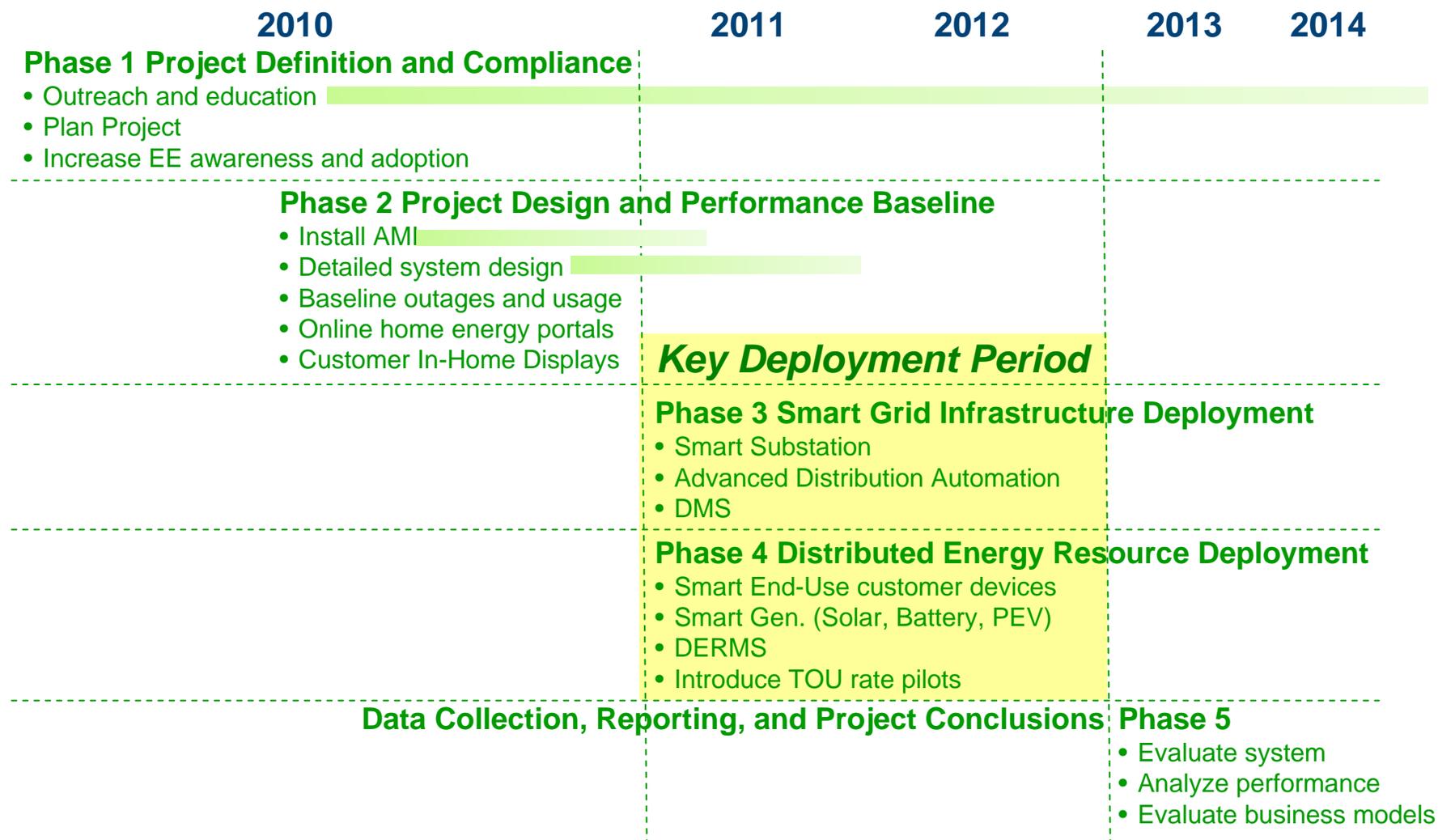 - Field Area Network wireless communications

- **Coordination with National Institute of Standards and Technology (NIST)**
  - Cyber security
  - Interoperability (electric utility "plug-n-play")

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SmartGrid Pilot Timeline

2010	2011	2012	2013	2014

Phase 1 Project Definition and Compliance
- Outreach and education
- Plan Project
- Increase EE awareness and adoption

Phase 2 Project Design and Performance Baseline
- Install AMI
- Detailed system design
- Baseline outages and usage
- Online home energy portals
- Customer In-Home Displays

Key Deployment Period

Phase 3 Smart Grid Infrastructure Deployment
- Smart Substation
- Advanced Distribution Automation
- DMS

Phase 4 Distributed Energy Resource Deployment
- Smart End-Use customer devices
- Smart Gen. (Solar, Battery, PEV)
- DERMS
- Introduce TOU rate pilots

Data Collection, Reporting, and Project Conclusions Phase 5
- Evaluate system
- Analyze performance
- Evaluate business models

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Major Milestones

2010

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

2011

- Bill Prediction
- Begin Smart Substation Upgrades
- Begin Solar Installations
- Web Portal Upgrades
- AMI Head-end & Meter Firmware Upgrades
- Interoperability Testing
- Security Risk Assessment
- System, Interface & Back Office Design
- Integration Planning
- Time of Use Tariff
- Meter Data Mgmt Ph-1

2012

- Battery Storage System
- Smart Distribution Upgrades
- Complete Smart Substation
- AMI and MDM Upgrades
- End-Use Installations
  - Home Area Networks
  - Smart Thermostats
  - Building Energy Mgmt
- Complete Solar Installations
- EV Charging
- Full Integration & Cyber Security Acceptance Testing
- Final System Interoperability Testing
- Fully Operational SmartGrid
- Begin measurement phase

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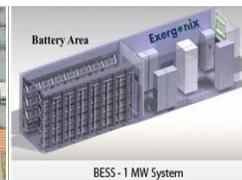
Questions

*Learn more at
www.kcplsmartgrid.com.*

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