

KCP&L SmartGrid Pilot and Energy Optimizer Program



Topics

- KCP&L SmartGrid Demonstration Pilot
- KCP&L Optimizer Program

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KCP&L 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

KCP&L SmartGrid Pilot – Evaluating where and how Smart Grid can make a difference

The KCP&L SmartGrid Pilot is based on an ARRA (through DOE) Smart Grid Demonstration funding grant for KCP&L in the Kansas City, MO metro area.

KCP&L SmartGrid Pilot Project Highlights

- **Smart Distribution**
 - Smart Substation
 - Distribution Management System (DMS)
 - IP/RF 2-way Field Area Network (FAN)
 - “First Responder” DA Functions
- **Smart Generation**
 - DER Management System
 - DR Programs and Variable Rates
 - Residential/Commercial Rooftop Solar
 - Utility-Scale Battery Storage
- **Smart End-Use**
 - Home Energy (Web) Portals
 - In-Home Display with Interval Data
 - Residential & Commercial EMS
 - DR Programs and Variable Rates
 - PHEV Charging

Expected Benefits

Customer/Community

- ❑ Greater reliability
- ❑ Improve energy information
- ❑ Increase ability to control usage and reduce bills
- ❑ Greater environmental stewardship

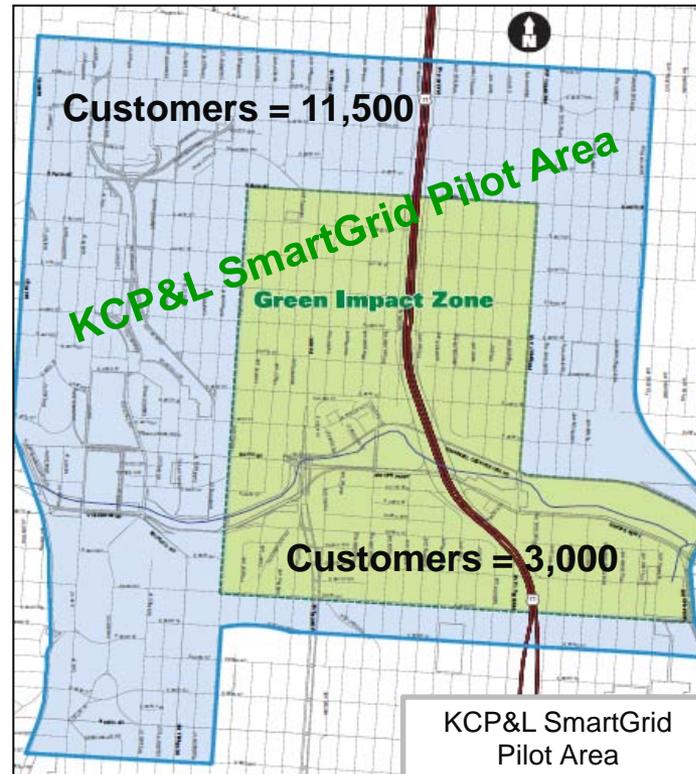
KCP&L

- ❑ Evaluate new business models
- ❑ Reduce costs
- ❑ Greater asset utilization
- ❑ Improve environmental impacts
- ❑ Increase customer satisfaction

The KCP&L SmartGrid Pilot area is focused on the Midtown Substation - the Green Impact Zone and other local circuits

Green Impact Zone

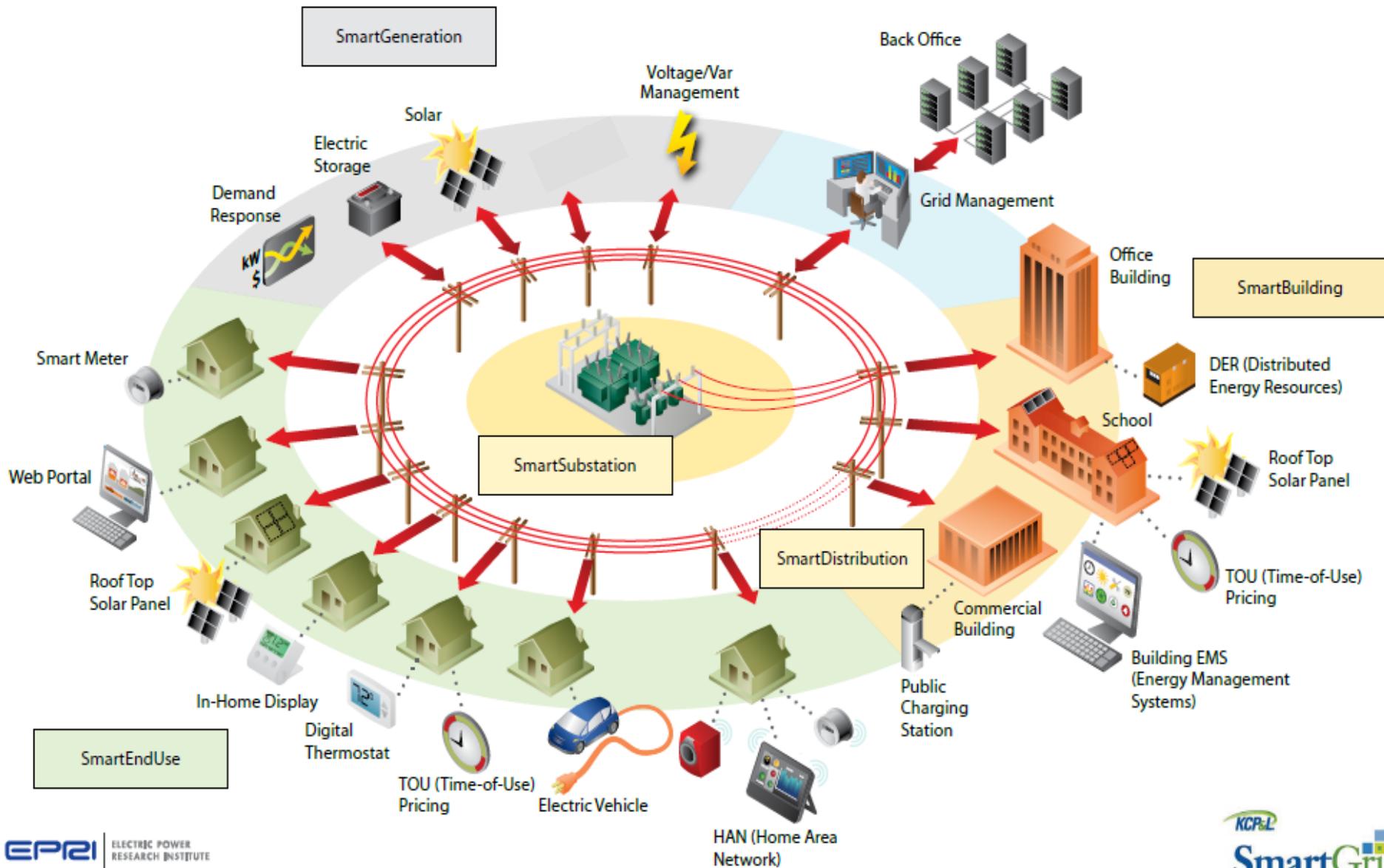
- Economically challenged 150-square block area (39th to 51st between Troost and Prospect).
- Comprehensive set of programs using grant funds and other resources for:
 - Economic development
 - Community policing & service centers
 - Training and employment
 - Energy and water conservation
 - Grant funds (over \$100M) include
 - Transportation Investments Generating Economic Recovery (TIGER) grant
 - Energy Efficiency Conservation Block Grant (KC MO, MARC)
 - MDNR Innovative Weatherization Grant
 - KCP&L SmartGrid Pilot Project
- Involves over 25 stakeholder groups including neighborhood groups, Congressman Cleaver, MARC, MEC, KCP&L, MGE, KCMO water, UMKC



KCP&L SmartGrid Pilot

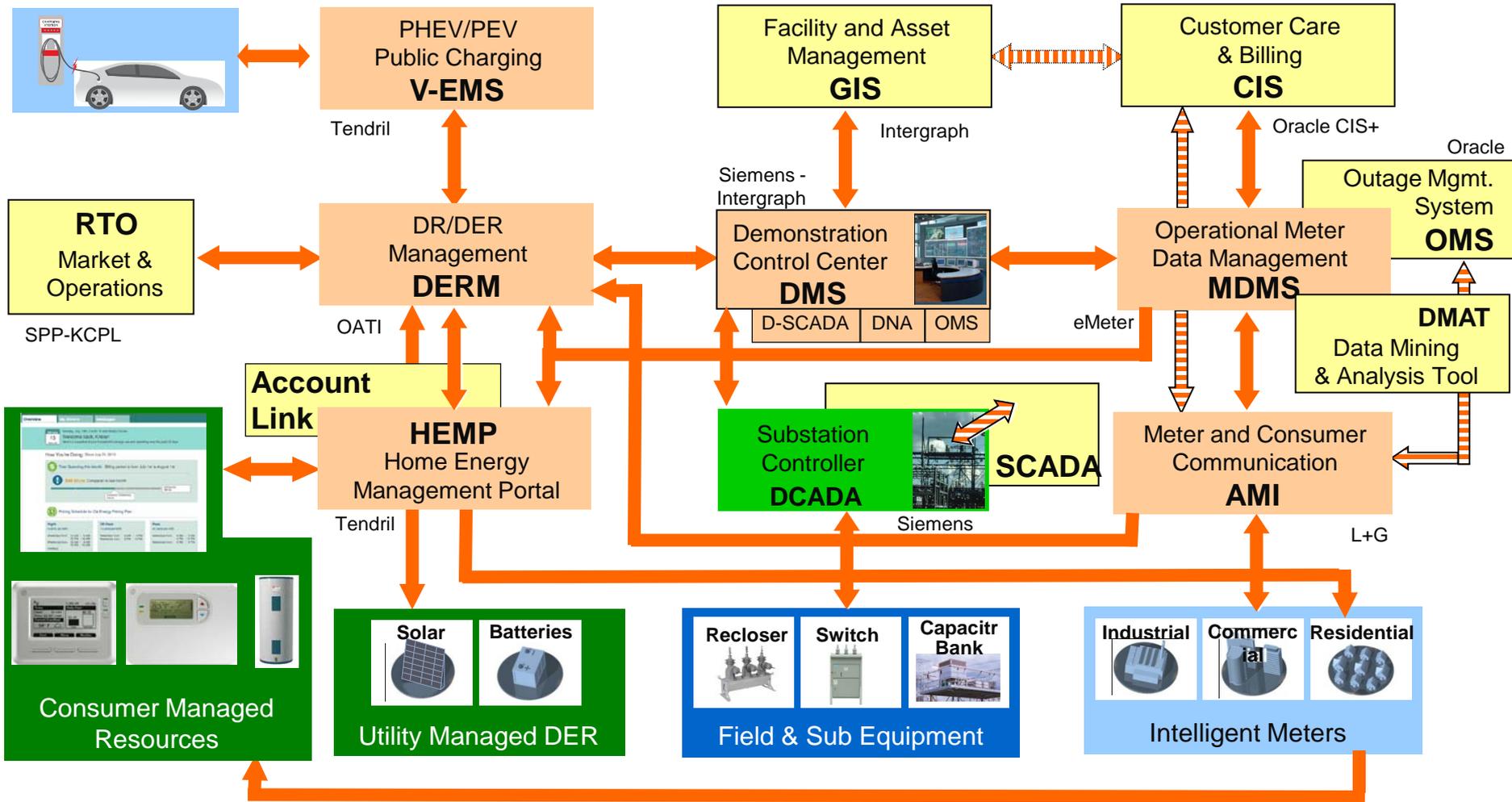
- **Primary DOE Objectives**
 - Verify smart grid viability – technical, operational, and business-model
 - Use cases for national replication
 - Quantify costs and benefits
 - Rigorous DOE financial and reporting requirements
- **Cyber Security & Interoperability**
- **Smart Consumption**
 - AMI
 - Home Energy Management
 - Demand Response
 - Commercial EMS
 - PHEV Charging Stations
- **Smart Distribution**
 - Smart Substation (Midtown)
 - Distribution Automation
- **Smart Generation**
 - Rooftop Solar
 - Utility-scale Battery Storage

KCP&L Demonstration – True End-to-End SmartGrid

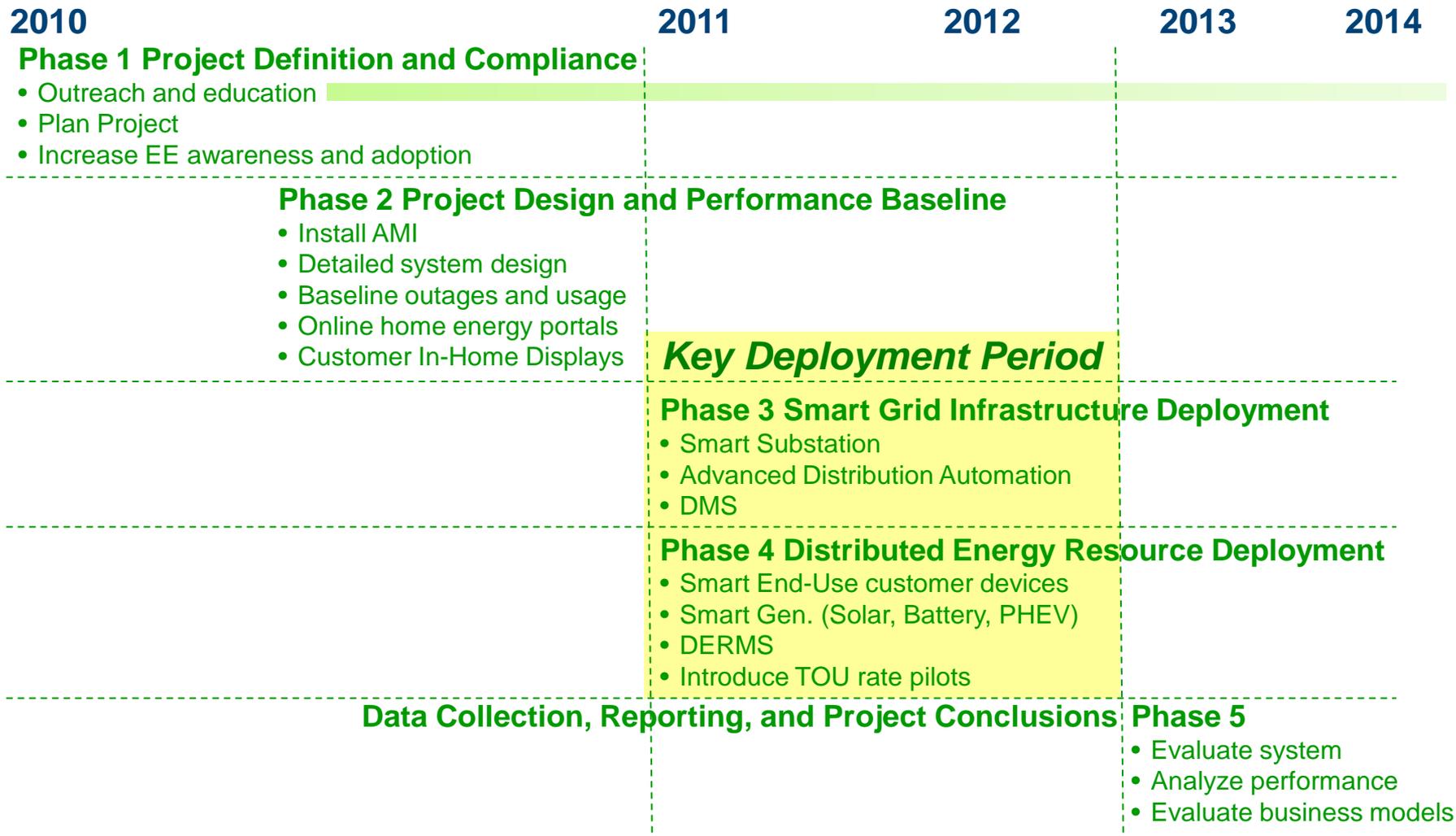


DEMO SmartGrid Systems Integration

 Integrate into prod data flows
 Project Data Flows

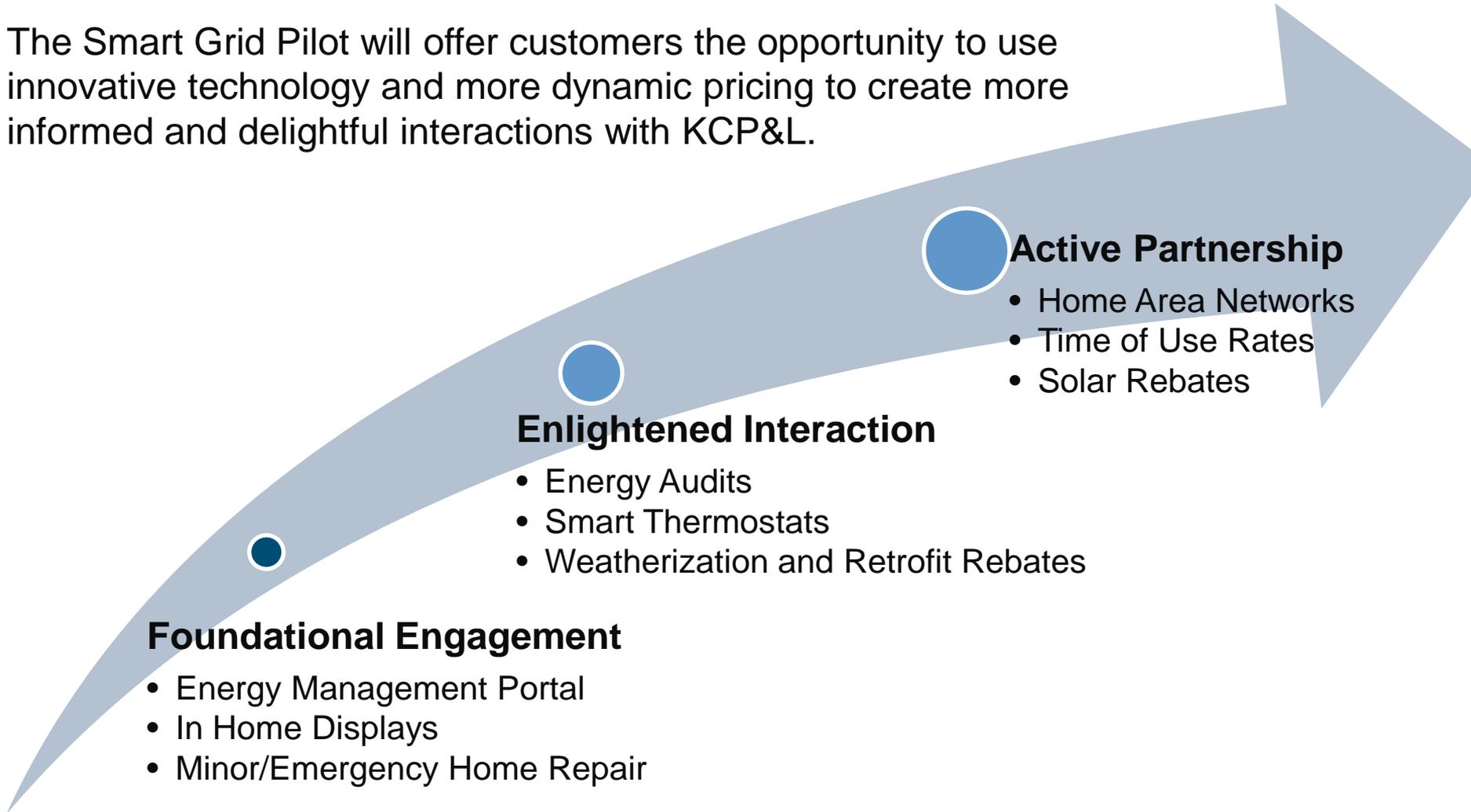


KCP&L SmartGrid Pilot Timeline – Project Overview



The Customer Value Proposition

The Smart Grid Pilot will offer customers the opportunity to use innovative technology and more dynamic pricing to create more informed and delightful interactions with KCP&L.



Foundational Engagement

- Energy Management Portal
- In Home Displays
- Minor/Emergency Home Repair

Enlightened Interaction

- Energy Audits
- Smart Thermostats
- Weatherization and Retrofit Rebates

Active Partnership

- Home Area Networks
- Time of Use Rates
- Solar Rebates

Avoiding Smart Grid pitfalls – Learning from others

Best Practices:

- **Engage consumers proactively** rather than wait for full functionality
- **Educate and increase knowledge base about Smart Grid**
 - 8 out of 10 consumers don't know what the Smart Grid is;
 - Meanwhile, 9 out of 10 consumers would take measures to save money and the environment (it's not just a meter)
- Proactive “**green**” **pitch: environment and money** hold the value customers care about
- **Partial mindshare with simple value concept**
 - Power is always on and real-time information is more than consumers may want to deal with
 - Inundating customers with too constant and complicated information may lead to resistance
- **Make the Value Proposition Clear** – Make sure to answer “What’s in it for me?”

Key Value Messages

What is it?

The KCP&L SmartGrid Pilot uses the latest innovations in technology, including more automated meters to:

- Enable better communication between KCP&L and its customers
- Allow both to better manage electricity usage
- Help customers reduce their energy cost (save green)
- Enable KCP&L and its customers to be more environmentally responsible (go green)

What benefits are in it for our customers?

This Smart Grid pilot project will provide the following value proposition to customers:

- Increased system reliability, including faster restoration times and fewer outages
- Increased information about customer energy usage
- The ability to monitor, manage and ultimately reduce energy consumption and bills
- Greener energy

Fundamental Outreach & Communications Goals

Plan: Touch every customer **ten times** before a meter is installed in their home.

Education and Empowerment (60 days out)

- **Set expectations and expand knowledge:** What is it?
- **Answer fundamental questions:** Why do I need it? What is in it for me?

Establishing Dialogue (30 days out and ongoing)

- **Understand the customer through research:** What does the customer want?
- **Feedback and flexibility:** Ability to adapt as rollout progresses and customer feedback is obtained.

Accessing Value (14 days out and ongoing)

- **Unlocking the value of the meter and the grid improvements:** What are my options? How do I use it?
- **Messaging the inherent value:** Even if I don't get a home energy portal what value do I get?

Saturation of Messaging (Continuous)

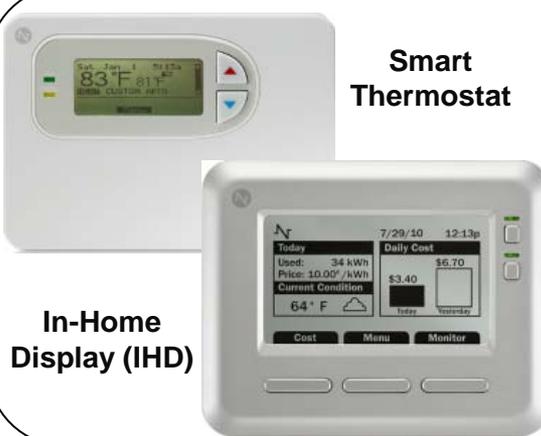
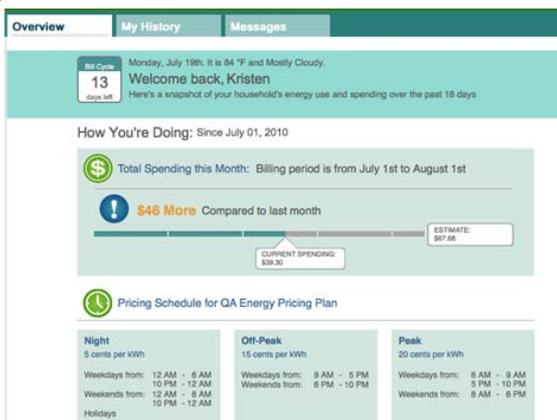
- **Establish a solid and evenly distributed knowledge base:** My neighbor says... Who is going to pay for this?
- **Multiple messengers:** Civic leaders, other utilities, church and neighborhood groups, etc.

Customer Offerings – Launch w/ Meters (October 2010)

Energy Information

Energy Management

Future Products



Existing Product Suite





Energy Optimizer



Comprehensive Energy Plan and Energy Optimizer

- KCP&L's Comprehensive Energy Plan (CEP) is a five-year plan designed to supply the region with reliable, affordable energy from cleaner sources, now and for future generations
- One aspect of the CEP is Demand Response Programs to help customers save energy and mitigate peak demand
- Energy Optimizer one of our key CEP Demand Response programs



Energy Optimizer Program Overview

- 2005 – Present
- Customers are provided a free Honeywell programmable thermostat
- KCP&L has the ability to send a signal providing instructions to the thermostat in to reduce cooling demand
- Program-to-date results (July 2010)

Participation		Available Capacity	
<i>Kansas</i>	<i>Total Program</i>	<i>Kansas</i>	<i>Total Program</i>
18,925	46,738	16.8 MW	42.72 MW

Energy Optimizer - How it Works (1 of 2)

- Curtailment Season
 - June through September
 - Thermostats will display the word "SAVE"
 - Event information is displayed via the KCP&L website
 - Customers can sign up for event notification via email
 - Events will not occur on weekends or holidays
 - Opt out option- customers may choose not to participate one time per month by calling toll-free or via the Internet

Energy Optimizer - How it Works (2 of 2)

- Utilize Cannon technology 900 MHz paging one-way communication module
- Curtailment options-initiated via web interface
 - Cycling event – cycle compressor off and on for 15-minute increments, for no more than four hours. The fan continues to run circulating the air
 - Cycling with maximum temp setpoint – same as above except when the maximum temperature is reached, it will hold that temperature until the control event is complete
 - Temperature setback – ability to pre-cool a dwelling 2 or 4 degrees prior to a control event
 - Temperature offset – raise the temperature to a given setpoint above the lowest programmed setting during a control event

Energy Optimizer – Customer Value

- Free web-programmable Honeywell thermostat (\$300 value) installed in customer's home or business
- Large easy to read display
- Back lit screen with easy, intuitive programming
- Text messaging capability to customers
- Works with multiple stage A/C equipment (does not work with zoned systems)
- One free thermostat with each Central A/C unit
- Free installation and 24-hour service for program participants
- Programmable via the internet
- Customer owns the thermostat after three years in the program with no further obligation



Next Steps

- Currently do not have paging coverage across entire territory
 - Approx. 265,000 customers affected (Mostly rural areas)
- E-radio pilot
 - St. Joseph, MO and surrounding area
 - Approx. 2,000 thermostats
 - New technology using FM RDS sub carrier technology delivered to an e-Radio RDS receiver module which is integrated into a programmable thermostat
 - Will utilize radio stations with sufficient RDS radio broadcasting sub carrier frequency bandwidth to support the program
 - If results of the pilot are favorable this can provide a resolution allowing us to reach all customers

Questions



SmartGrid
the future of energy

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