Approved: March 19, 2010
Date

MINUTES OF THE HOUSE ENERGY AND UTILITIES COMMITTEE

The meeting was called to order by Chairman Carl Holmes at 9:00 a.m. on January 20, 2010, in Room 785 of the Docking State Office Building.

All members were present.

Committee staff present:
Matt Sterling, Office of the Revisor of Statutes
Mary Torrence, Office of the Revisor of Statutes
Cindy Lash, Kansas Legislative Research Department
Renae Hansen, Committee Assistant

Conferees appearing before the Committee:
Mid-West Energy, Ernie Lehman
Westar, Hal Jensen & Kevin Heimiller
KCPL, Steve Gilkey, Senior Director of Engineering and Planning
Victory Electric, Terry Jansen, Manager & Harold Flax

Others attending:
Twenty-Six including the attached list.

Smart Grid and Smart Metering

Ernie Lehman, Mid-West Energy, (Attachment 1), spoke to the committee about their smart grid investment grant award. He noted that specifically it is the replacement of electro-mechanical relays at the Knoll substation. This will allow them to be able to tell where outages occur. He noted that they also put in for the advanced smart metering infrastructure grant money. Mid-West Energy will be putting in some of the meters as a pilot program to test the viability and benefit for the company.

Questions were asked and comments made by Representatives: Carl Holmes, Vern Swanson, and Forrest Knox.

Terry Jansen, Mgr. & Harold Flax, Victory Electric, (Attachment 2), presented information on the current status of the company's smart grid technology investment. He noted that one capability they have is to do a customer disconnect from the office but commented that they will need to have the KCC permission to be able to do this. Mr. Flax talked about the specific installed items they have and how they work for them.

Questions were asked and comments made by Representatives: Annie Kuether, Vern Swanson, and Tom Moxley.

Hal Jensen & Kevin Heimiller, Westar, (Attachment 3) presented information on the smart star program that they are implementing. Additionally (Attachment 4), they included the fact sheet that they are using to inform people of the benefits and abilities of this smart grid/ smart meter system. This beginning program is intended to identify and validate what is the appropriate usage of this system for their Kansas customers. This ultimately will help them shift when and where their peak load is located.

Questions were asked and comments made by Representatives: Mike Burgess, Tom Sloan, and Tom Moxley.

Steve Gilkey, SR Director of Engineering and Planning, KCPL, (Attachment 5), spoke to the committee on the smart grid demonstration grant that they are trying to win and then implement. The area they are working on is in the heart of Kansas City Missouri where current unemployment rates are around 35% and is generally considered a low income area. They hope to: reduce energy use, increase employment, improve housing conditions, advance environmental initiatives, and improve vacant lots. They will focus on demonstrating an end-to-end Smart Grid project that will serve as a model for the utility of the future.

Questions were asked and comments made by Representatives: Milack Talia, and Forrest Knox.

Minutes of the House Energy and Utilities Committee at 9:00 a.m. on January 20, 2010, in Room 785 of the Docking State Office Building.

Black Hills Corporation, (Attachment 6), submitted information to the committee on the things they are doing to move forward in the area of Smart Grid and Smart Metering.

Mark Schreiber, Westar, announced that Westar has permission to build up to 500 megawatts of wind energy close to Spearville, Kansas. They are calling it the Ironwood Project.

Questions were asked and comments made by Representatives: Forrest Knox, and Carl Holmes.

Chairman Holmes reminded the committee of his future absence next week and that if there are any amendments to **HB 2423** for tomorrow that they need to be worked through the revisors office.

The next meeting is scheduled for January 21, 2010.

The meeting was adjourned at 10:46 a.m.

HOUSE ENERGY AND UTILITIES COMMITTEE
GUEST LIST

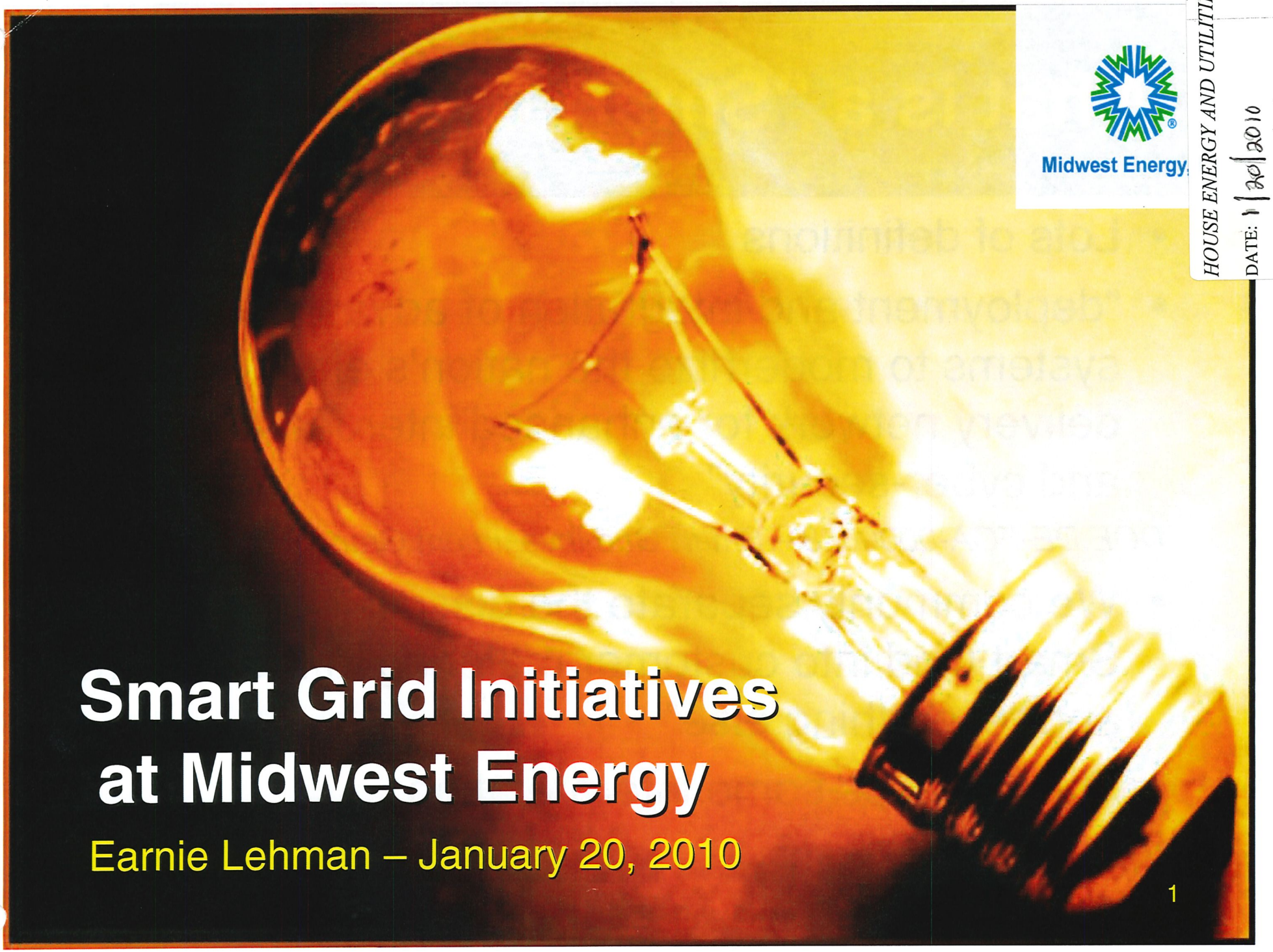
DATE: January 20, 2010

NAME	REPRESENTING
Joe Dick	KCBPU
Dave Holeton	KEC
TOM DAY	KCC
Mari Tucker	Dept of Commerce
LON STANTON	NORTHERN NATURAL GAS
ERNIE [illegible]	AMRP / KS
Wes Ashton	Black Hills Energy
GINGER LOWRY	KEC
PHIL WAGES	KEPCO
Nelson Krueger	PAR Electric
Scott Jones	KCPL
HAL JENSEN	WESTAR ENERGY
Mick Urban	ONEOK
DICK CARLSON	JCCCC
Chris Cardinal	Sierra Club
Michelle Petersen	Capitol Strategies
Jackson Lindsey	Hein Law
Jessica Brooks	Intern with Rep. Tom Sloan

HOUSE ENERGY AND UTILITIES COMMITTEE
GUEST LIST

DATE: January 20, 2010

NAME	REPRESENTING
ERIK SARTORIUS	City of Overland Park



Midwest Energy

Smart Grid Initiatives at Midwest Energy

Earnie Lehman – January 20, 2010

What is a "Smart Grid"

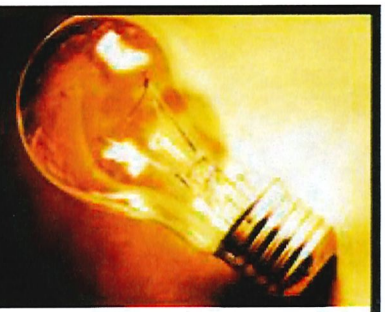
- Lots of definitions
- "deployment and integration of advanced digital systems to modernize the nation's electric delivery network for enhanced interoperability and cyber-security"

DOE DE-FOA-0000058 – Smart Grid Investment Grant Program

- We commonly separate the discussion of the Smart Grid into customer metering infrastructure and "everything else"
- This requires some interpretation…

2-1

Smart Grid Benefits

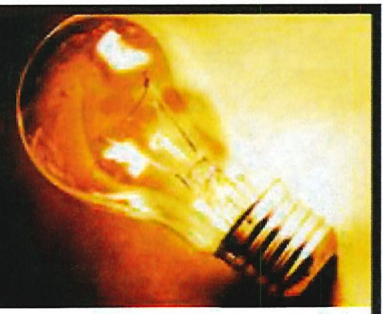


- Informed participation by consumers in the electricity markets
- Accommodation of renewables, distributed generation and storage technologies
- Optimization of asset utilization & efficiency throughout the power system
- Anticipating and responding to system disturbances
- Operating resiliently and reliably during attacks and natural disasters

Midwest's first step

- Smart Grid Investment Grant (SGIG) Award
  - Replacement of electromechanical relays at Knoll Substation
    - Modernization of protection equipment & scheme
      - Reliable operation of transmission system
    - Deployment of Phasor Monitoring Units & Phasor Data Concentrators
      - Ability to anticipate and respond to system disturbances
    - Facilitation of transmission expansion in the area
      - Accommodation of the development of renewable energy

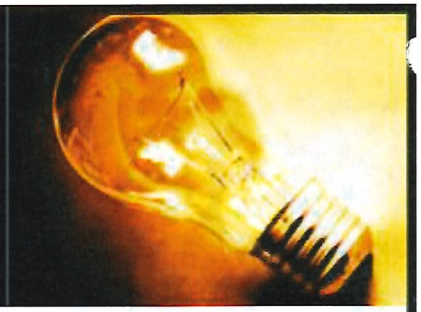
SGIG Award



Transition from this…

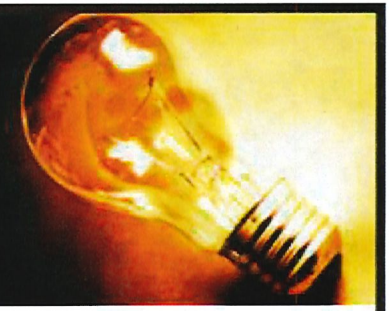
To this…

SGIG Award



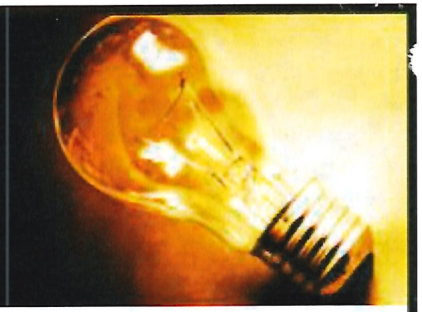
- The Difference…
  - Consolidation of multiple functions into a single device
  - Increased redundancy in protection functions
  - Distance to fault capability for quicker restoration
  - Enhanced inter-operability with SCADA, OMS and external diagnostic systems
  - Ease of repairs

Midwest's second steps



- Advanced Metering Infrastructure
  - SGIG Application for 12,000 meter AMI project
    - Project was not selected for award
  - Development of a 400 – 1,300 meter pilot program for 2011
    - Hard / costly to read meters
    - Rural areas, difficult terrain, constrained read cycle
  - Evaluation of long term technological solutions
  - Possible additional 7,000 to 8,000 meters 2012-2014
  - Several barriers to complete system conversion
    - Disparity in customer density
    - Variability in communications infrastructure

Midwest's next steps



- Finalize agreements with DOE for SGIG Award
  - Begin work mid-February
  - Complete 1st Quarter 2011
- Increased deployment of more sophisticated protection, similar to Knoll project
- Intelligent switching schemes at the distribution level
- Extension of AMI "beyond the meter"
- Development of innovative rates and demand response incentives

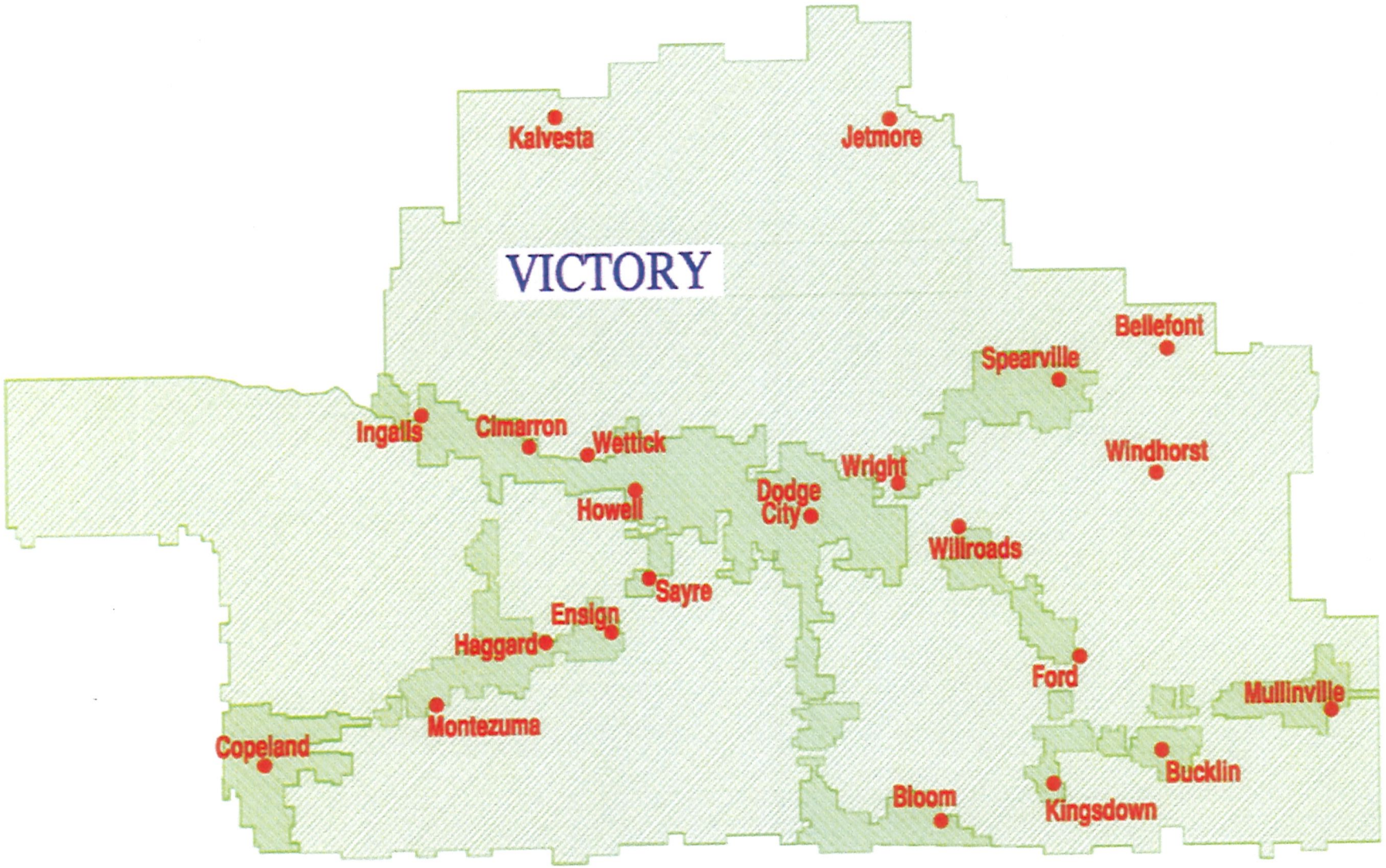
8-1

HOUSE ENERGY AND UTILITIES
DATE: 1/20/2010
ATTACHMENT 2-1

THE VICTORY
Electric Cooperative
Assoc. Inc

A Touchstone Energy® Cooperative

Victory Electric Cooperative AMI Smart Grid Project



* The dark green areas of the map represent the newly-acquired Aquila territory. The whole territory is roughly 80 miles wide and 50 miles tall.

Smart Grid Benefits

Smart grid networks have the ability to revolutionize energy management and grid reliability across the globe

Utility Benefits

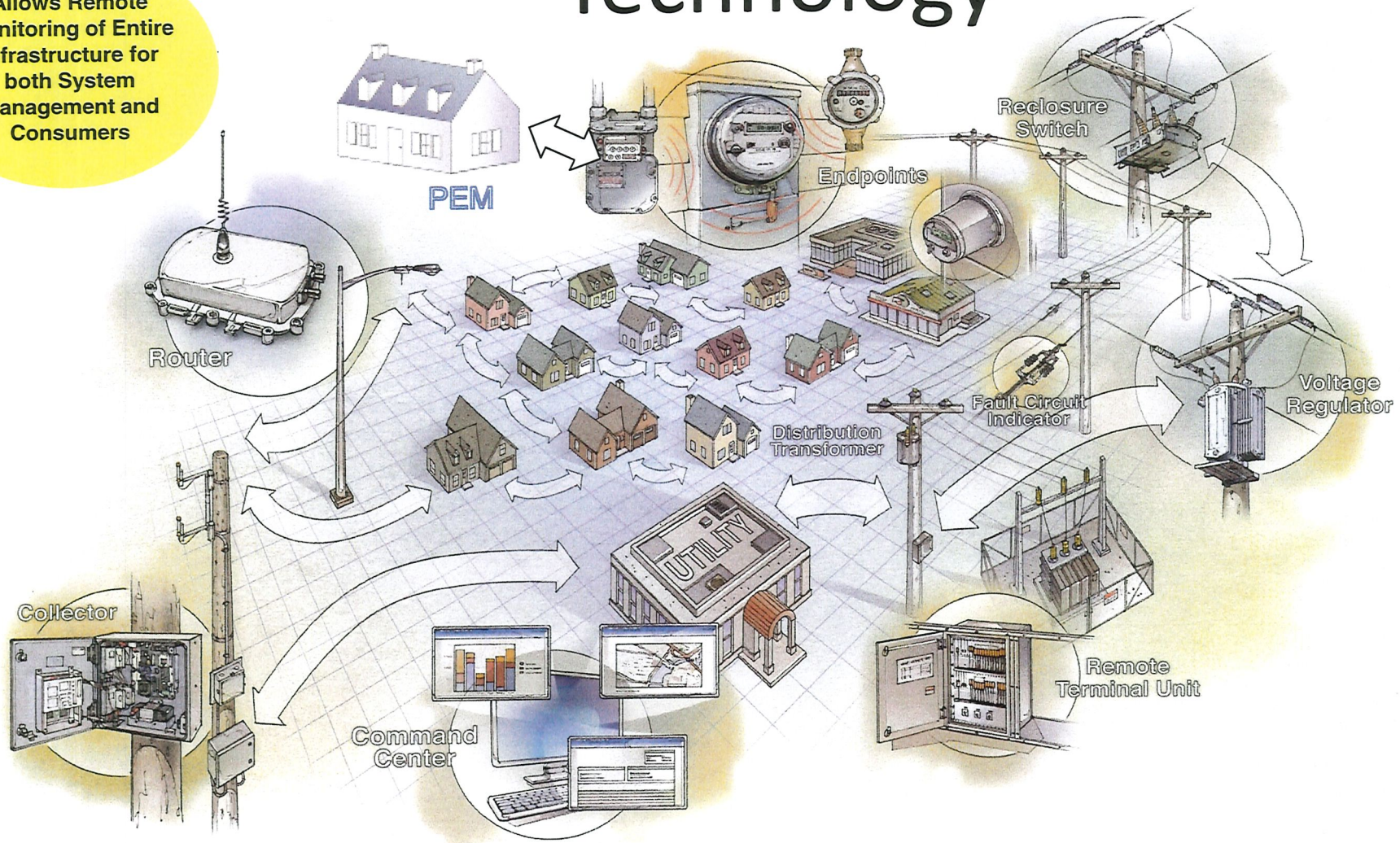
- Reduced costs
- Greater management control
- Regulatory compliance
- Improved customer service and satisfaction
- Holds customer accountable for their usage

Consumer Benefits

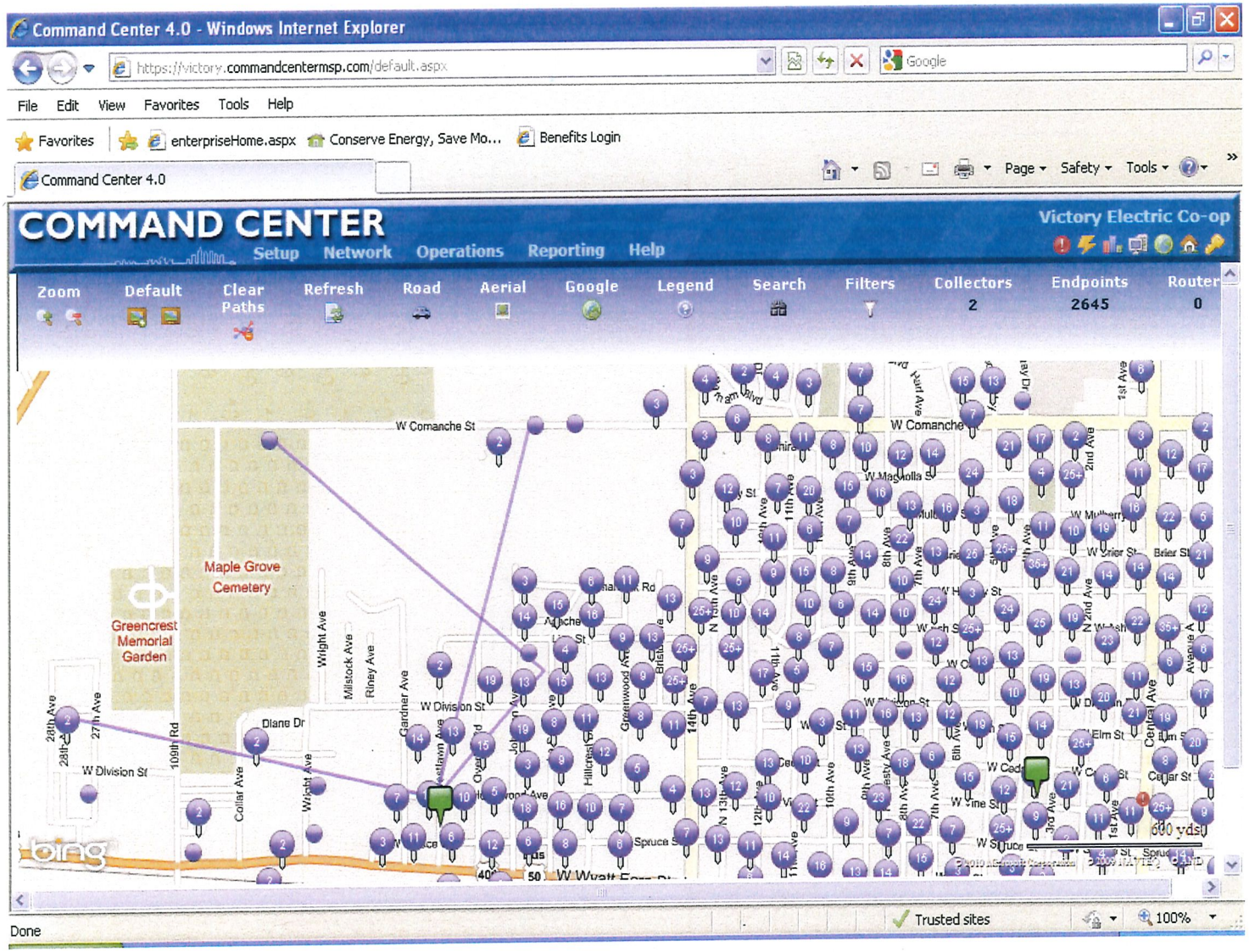
- Help to control energy cost
- Greater transparency
- Help make customer aware of carbon footprint
- Help to make consumer accountable for individual usage

The Smart Grid Technology

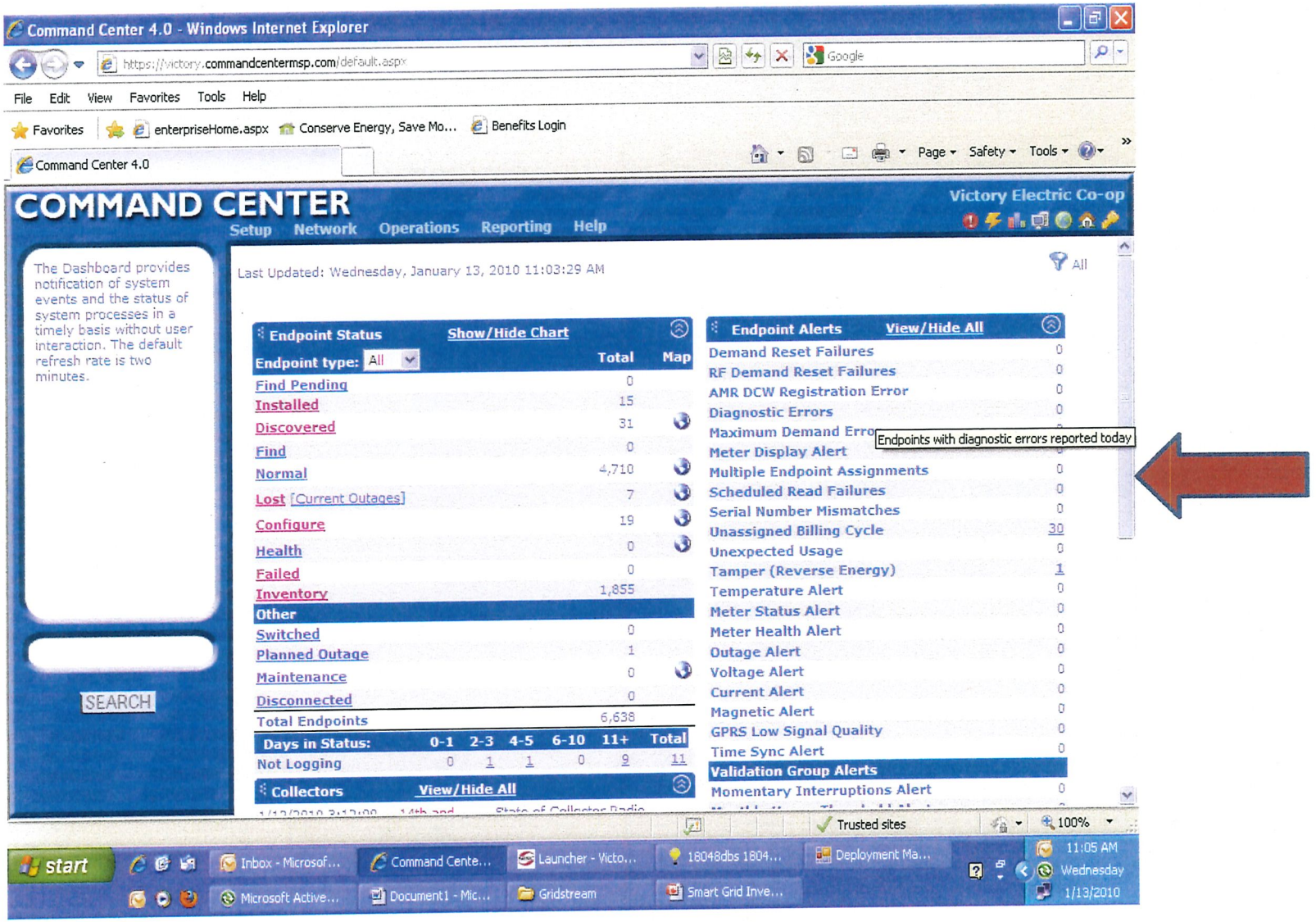
Allows Remote Monitoring of Entire Infrastructure for both System Management and Consumers



Endpoint Communication Path



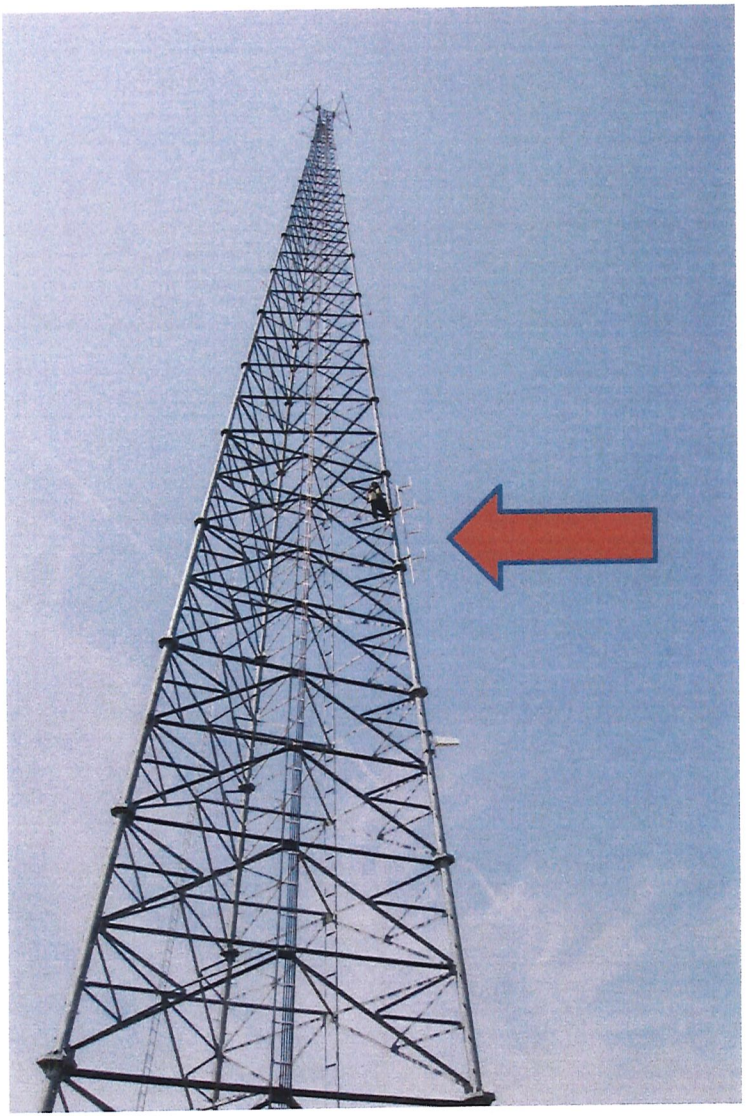
Command Center



Gridstream RF Mesh Collector

Gridstream Collector Antenna's moving into position

Collector Antenna's in position



Gridstream Router

Landis+Gyr Focus Gridstream AXR-SD meter

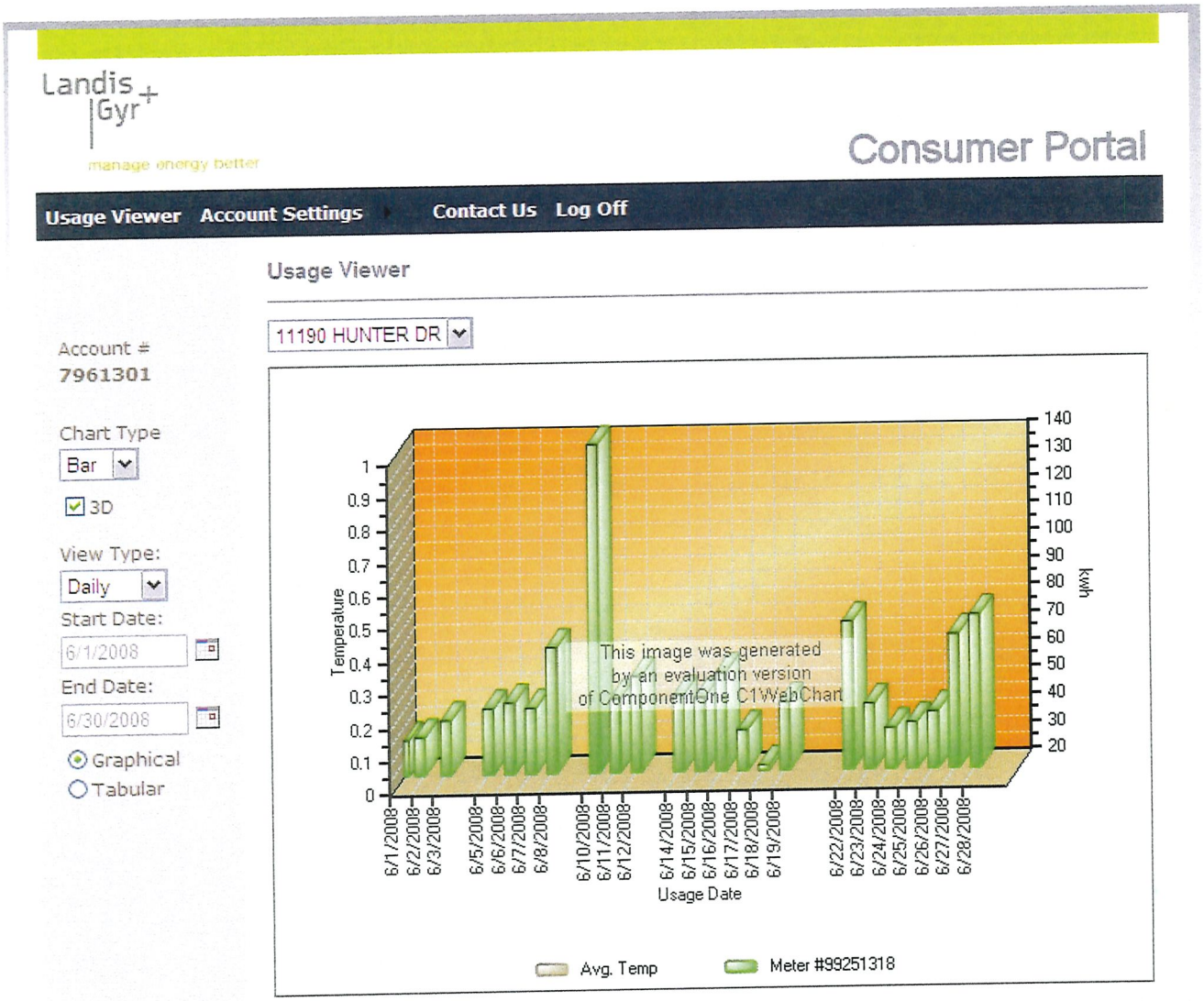
Symbol handheld with GPS Receiver

ecoMeter Features

- Consumption Awareness:
  - CO2
  - $ Cost/Watts
  - kWh
- Trending Consumption:
  - Today
  - Yesterday
  - last 7 days
  - last 28 days
- Instant Demand Indication thru the LCD backlight: **RED**, **YELLOW**, **GREEN**
  - Easily read histogram side bar shows current demand
  - Customizable 'Home Energy Audit' feature allows user to set their own reference usage for future comparison

ecoMeter Functionality

Consumer Portal Usage Viewer



Technology Terminology

- **AMI** Advanced Metering Infrastructure (Two-Way Smart Metering)
- **AMR** Automatic Meter Reading
- **LAN** Local Area Network (link from meter to collector/concentrator)
- **WAN** Wide Area Network (link from LAN to host)
- **HAN** Home Area Network (link from in-home-display or appliance to AMI)
- **MDM** Meter Data Management
- **PEM** Personal Energy Management
- **PLC** Power Line Carrier
- **BPL** Broadband over power line
- **DRI** Demand Response Infrastructure – customer response to time varying rates
- **SGI** Smart Grid Infrastructure

Westar Energy®
SmartStar

What is SmartStar?

Westar Energy SmartStar

- Westar's Smart Grid pilot program
- 48,000 "smart" meters installed in Lawrence area, associated infrastructure
- Includes Distribution Automation, OMS & IT infrastructure
- $40 million project
  - Selected for DOE SGIG funding

Westar Energy

What is SmartStar Lawrence?

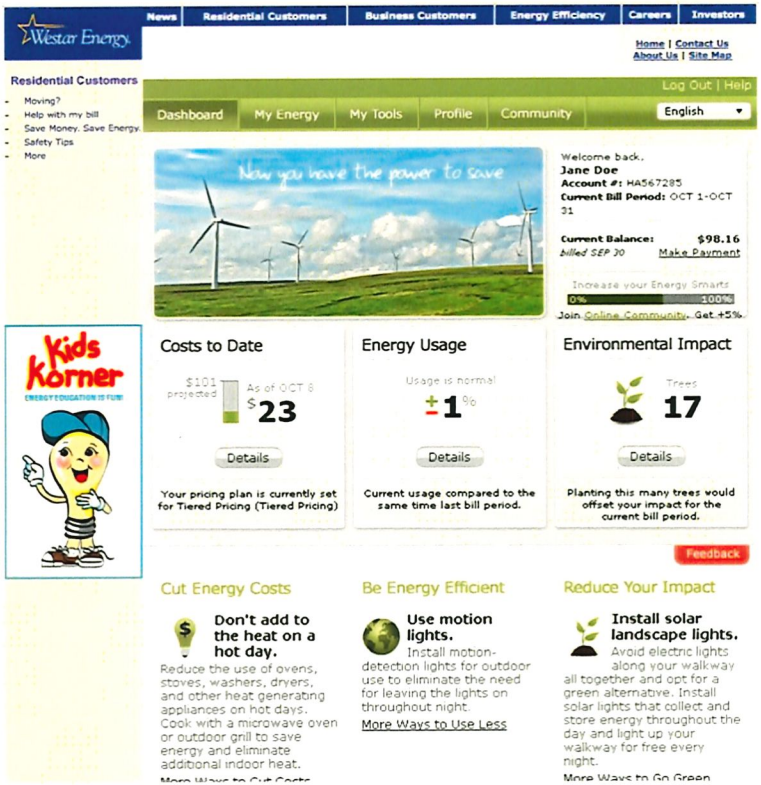
- **It's All About the Customer!**

- Robust web portal will be launched
- Multiple pilots for rates and hardware
- Multi-faceted communication approaches
- We will find out what works and – what doesn't

Answering the Question What's in it for me?

- New website powered by the Smart Grid
- Customer's personal energy information online:
  - Daily energy usage/cost
  - Tips to reduce peak usage
  - Suggestions to save money
  - Reduce your impact on the environment
  - Alerts and notifications (email, text)
  - Community programs
- Better reliability, response to outages
- Sets the table to offer multiple new programs and services
- Supports emerging green technology

Westar Energy SmartStar



Customer Benefits

Customer Benefits

3-4

Westar Energy

News | Residential Customers | Business Customers | Energy Efficiency | Careers | Investors

Home | Contact Us
About Us | Site Map

Residential Customers

- Moving?
- Help with my bill
- Save Money. Save Energy.
- Safety Tips
- More

Log Out | Help

Dashboard | My Energy | My Tools | Profile | Community | English

Alert Settings | Alert History | Remote Home

Savings Alerts | Summary Reports | Delivery Settings

Alert Me When...

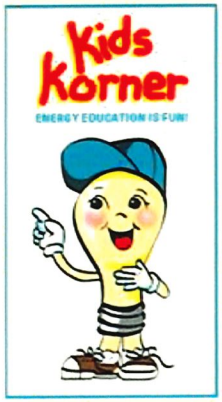
My bill reaches my budgeted amount

Enter a budget for your electrical bill and sign up to receive an alert when your bill reaches that amount

100

No dollar sign needed. Ex. 121.64

- [x] Email
- [ ] Text Message



My energy usage hits a new high

Sign up to receive alerts when your daily electrical use hits a recent new high

- [x] Email
- [ ] Text Message

A Service Outage is scheduled

Sign up to receive alerts when you will lose service due to a planned outage

- [x] Email
- [ ] Text Message

A Critical Peak is scheduled

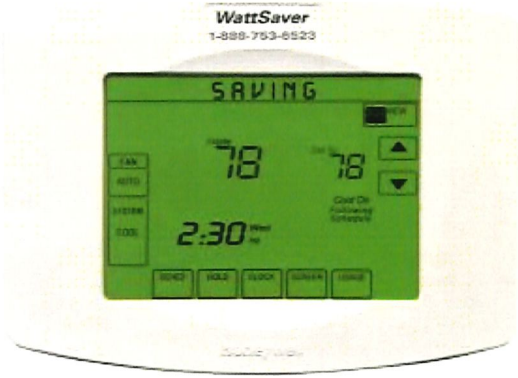
Electricity costs much more on special days when we project high demand due to extreme weather. Sign up to receive alerts to save money.

- [x] Email
- [ ] Text Message

Westar Energy

More energy options with SmartStar

- Two-way, programmable thermostats
- New pricing programs:
  - Dynamic/time-of-use, prepay
- Emerging consumer products such as "smart" appliances, in-home energy management; "enabling technology"
- Pilot options for emerging products
  - Identify what works/what doesn't
- Feedback to refine future and services
- Ultimately, customers must buy in and shift load for the smart grid to reach its potential



Westar Energy

Customer Communication & Partnership

- Comprehensive Communication Effort
- Grassroots campaign in Lawrence
- Multi-media approach will be utilized
- Key support efforts began Summer 2009
- Collaboration with KCC, KU Energy Council, KSU, WSU & Community Colleges
- Provide clear and easy process for customers to ask questions or place concerns

SmartStar Lawrence Objectives

- Gauge customer participation, results and validate potential benefit from a system wide smart grid deployment
- Identify most effective customer products and services
- Confirm business requirements and processes necessary for smart grid operation
- Identify and/or confirm business partners for future deployment
- Confirm smart grid benefit assumptions prior to larger deployment
- Enable fact based decision making by 2012

SmartStar Lawrence Timeline

- August, 2009 - DOE funding application
- October 27 – Westar Receives Notice of Selection
- November 19 - DOE Kick Off Meeting in Washington D.C.
- Jan – Mar, 2010 – Negotiations with DOE
- March – IT infrastructure work commences
- Fall/Winter – Meter installation begins, Web Portal Available
- All of 2010 - IT infrastructure installed
- May, 2011 - Finish installing meters

Thank you!

Westar Energy.
SmartStar

Westar Energy
SmartStar

SMART GRID FUNDING APPLICATION AND PROJECT FACT SHEET

Project Description

Westar Energy has been selected by the U.S. Department of Energy (DOE) for up to $19.3 million in funding under the Smart Grid Investment Grant program.

The company's application calls for development of a smart grid concept town in Lawrence, Kansas. Called "SmartStar Lawrence," the project will include installation of "smart" meters, interactive Web access, technology enhancements and improved service in Lawrence. The project is estimated to cost a total of $40 million and is contingent on the successful completion of negotiations with the DOE for funding.

The company chose Lawrence as the concept town for this technology due to its size and its wide range of customers, including many student residents, commercial and industrial customers and educational institutions. While Lawrence customers will be the first to receive smart meters, the systems and equipment the company plans to install will enable the same technology throughout Westar's service territory.

Customers with smart meters and internet access will be able to daily monitor how much electricity they use and how much it costs. Customers will also be able set personal preferences that will help them manage energy usage, such as alerts when predetermined bill thresholds are likely to be exceeded and/or when outages occur.

Smart grid technology is a state-of-the-art approach to managing electricity systems. In the event of a power outage, for example, Westar will more easily determine the cause and restore power more quickly.

PROJECT FACT SHEET

Application Details	• American Recovery and Reinvestment Act – Smart Grid Investment Grant • Up to 50% match for selected projects • Filing made with DOE on August 5, 2009 • Selection for negotiation received on October 27, 2009 • Final determination expected by March 1, 2010 • Once underway, project reporting will be available at www.recovery.gov
SmartStar Lawrence Project Details	• $40 million project in greater Lawrence area • Base smart grid deployment for Westar Energy • Equipment - 48,000 meters, automated distribution equipment, smart grid-enabled outage management system, significant internal information technology infrastructure work • 27-month installation, beginning 2010
Customer Benefits	• Enhanced service reliability and response to outages • Daily energy use and cost information available to the customer • Optional services such as text and email alerts for bill trends and outages • Robust web portal with energy savings tips, carbon footprint calculator, neighborhood comparative analysis information • Enables offering demand side programs such as two way thermostats and smart, time of using pricing option • Supportive of "behind the meter" emerging consumer products such as smart appliances, in home energy displays and personal home energy management applications.
Westar Benefits	• Improved ability to meet changing customer expectation • Increased reliability of the electric system • Advanced outage management tools • Better utilization of electric system • Operational efficiencies from automated meter reading, remote service switches, automated knowledge of outages and location • More detailed energy use information for customer service delivery • Confirms smart grid benefit assumptions prior to larger deployment • Identifies most effective customer products and services • Identifies required business process changes to support smart grid
Timeline	• August, 2009 - Westar Energy files DOE funding application • October, 2009 – DOE issues Notice of Selection to applicants • February, 2010 – DOE issues Notice of Funding to applicants • Winter, 2010/2011 – SmartStar Lawrence meter installation begins
Contact	Karla Olsen Director, Corporate Communications 316-299-7463 karla.s.olsen@westarenergy.com

Updated 1/11/2010

Westar Energy®

4--2

The Kansas City Power & Light Smart Grid Demonstration Project

Presentation to the Kansas House Energy & Utilities Committee

Steven Gilkey
Senior Director – T&D Engineering & Planning
Kansas City Power & Light

January 20, 2010

KCP&L energizing life

1/20/10

5

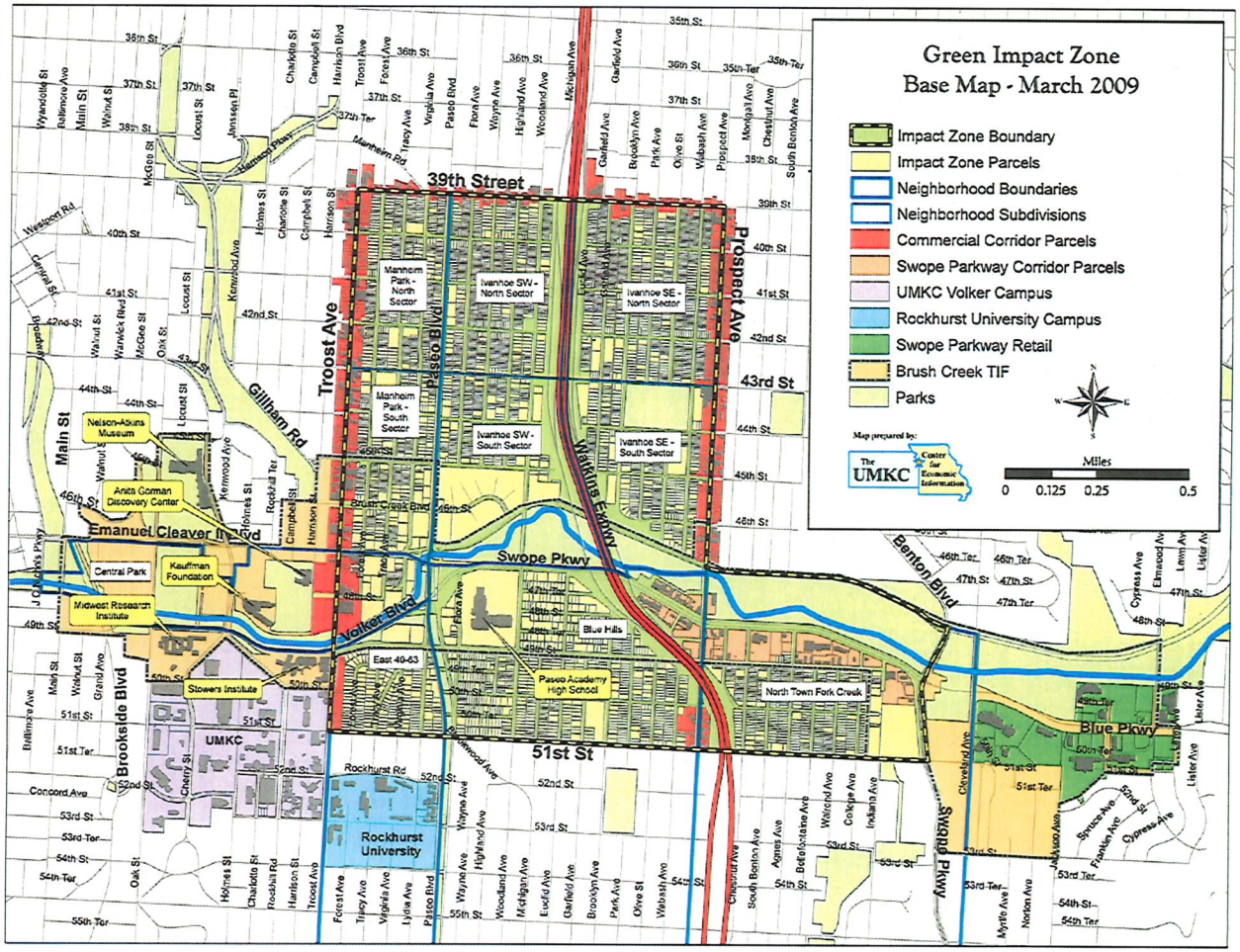
Many Forces Are Influencing Electric Utility Planning

KCP&L energizing life

The Green Impact Zone is joint public-private urban renewable collaboration

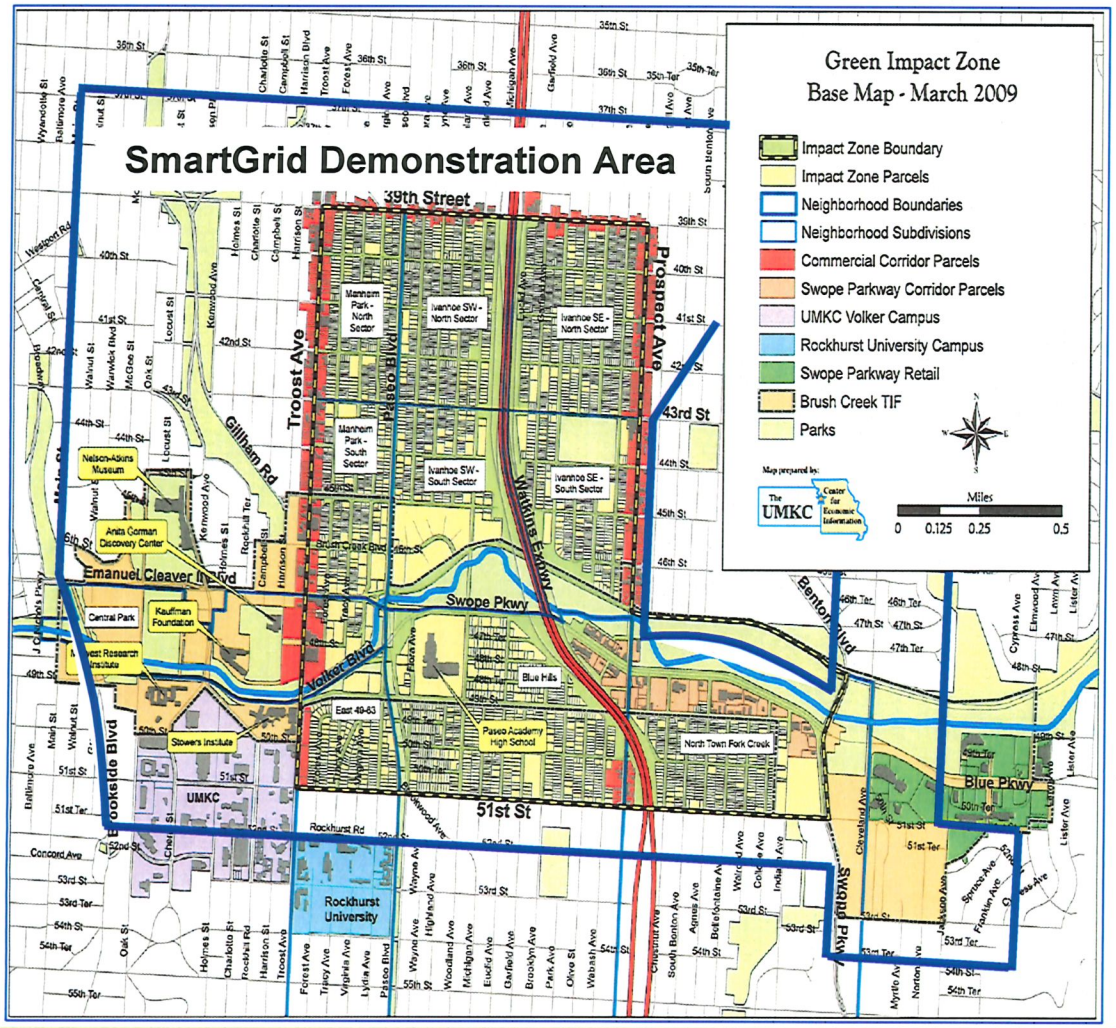
Goals for the project:

- Reduction of energy use
- Increased employment
- Improved housing conditions
- Advancement of environmental initiatives
- Improvement of vacant lots



KCP&L energizing life

The KCP&L Smart Grid demonstration area is focused on the Midtown Substation and will include the Green Impact Zone as well other local circuits



Demonstration Area

- Expands footprint beyond the Green Impact Zone to optimize solution benefits while providing intended Green Zone project impact
- Large commercial customers (e.g. UMKC, MRI) provide unique testing sites for distributed generation and demand response options
- Larger service area provides additional opportunities for all efficiency programs
- More circuit variety provides differentiated loads for customer analysis and other testing opportunities

KCP&L energizing life

KCP&L's role will focus on demonstrating an end-to-end Smart Grid project that will serve as a model for the Utility of the Future

Smart Generation: Develop and advance sustainable business models where utility-owned distributed generation and storage resources are integrated with Smart Grid infrastructure

- Understand and document the performance of new distributed generation technologies (solar, wind, battery storage, etc.)
- Evaluate impact on consumer energy usage behavior

Smart Distribution: Upgrade the local distribution system to improve reliability and productivity

- Install distributed automation technologies to optimize energy use and improve reliability
  - Smart Substation
  - IP/RF 2-way Field Area Network (FAN)
  - Distribution Management System (DMS)
- Build the foundation to support next generation customer side renewable and energy efficient end-use solutions

Smart End Use: Provide advanced tools and programs to enable innovative programs and empower customers to better understand, manage, and optimize their energy usage

Customer/Community Benefits:

- Lower utility bills
- Increased environmental stewardship
- Improved energy information
- Increased local energy sector jobs
- Increased reliability
- Regional economic development

KCP&L Benefits:

- New business model development
- Reduced costs
- Greater asset utilization
- Environmental
- Customer satisfaction

KCP&L energizing life

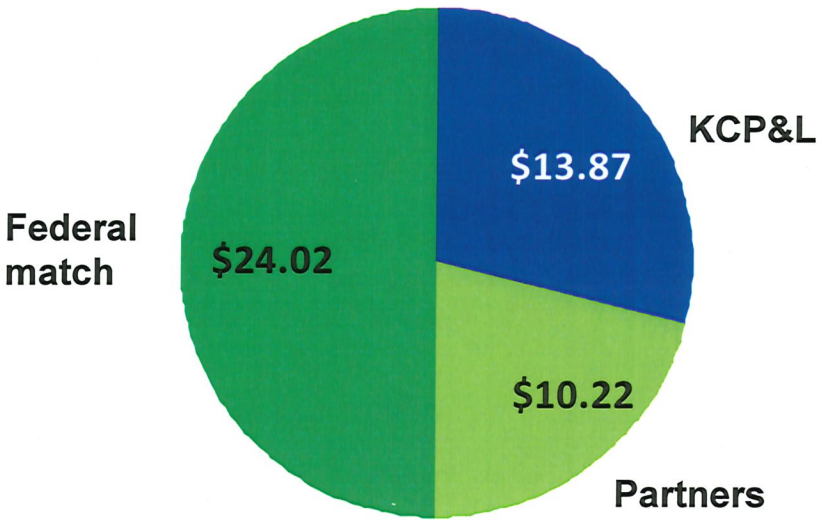
KCP&L will partner with leading players in the Smart Grid space

Components	Partner
Automated Metering Infrastructure	**Landis+Gyr**
AMI Field Area Network (FAN)	
AMI Meters	
Distribution Automation FAN	
Distributed Energy Resource Mgt.	**OATI**
Distribution Management System	**Siemens**
DCADA Smart Sub-Station	
Residential Energy Management Sys.	**GridPoint**
Home Area Network	
Automated Residential Thermostat	**Honeywell**
Commercial Energy Management Sys.	
Grid-Scale Battery	**Kokam America (Dow Kokam)**
Solar	tbd

KCP&L energizing life

The demonstration is estimated at $48.1 million with a mix of contributions from KCP&L, SmartGrid partners and ARRA funds

Total project value ($mm) = $48.1mm



Methodology to calculate funding breakdown ($mm)

1.	Estimate total project cost	$48.1mm
2.	Apply Federal Match at 50% of total project cost	$24.02mm
3.	Apply partner contribution per negotiations	$10.22mm
4.	Remainder = KCP&L required contribution	$13.87mm

KCP&L energizing life

SmartGrid Demonstration Project Phases

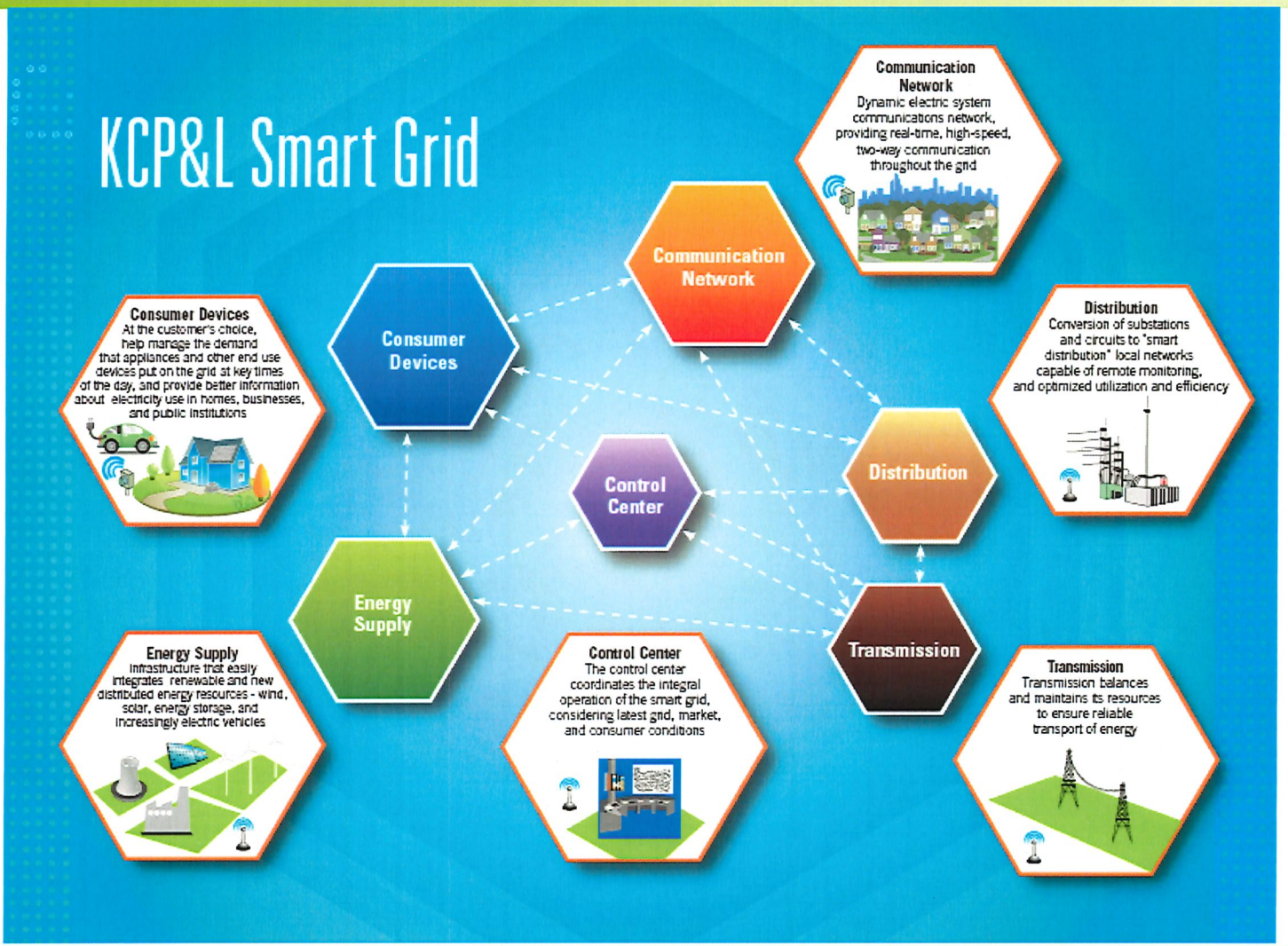
Phase 1	**Project Definition and Compliance**	**(2010)**
	❑Ensure project definition, scope and objectives, and implementation methodology are aligned with the Department of Energy objectives ❑Install advanced communication infrastructure, smart metering and measurement devices in the demonstration area ❑Begin public outreach and education plan ❑Increase awareness and adoption of KCP&L's portfolio of energy-efficiency programs	
Phase 2	**Project Performance Baseline**	**(2010-2011)**
	❑Detail technology requirements and system design ❑Compile historical consumer usage data to create baseline ❑Develop Smart End-Use program models that allow customers access to data	
Phase 3	**SmartGrid Infrastructure Deployment**	**(2011-2012)**
	❑Upgrade Smart Substation technology (substation network, control and distribution system and electronic relays) ❑Upgrade Smart Distribution grid automation to proactively manage energy flow and communications with substation ❑Implement Distribution Management System to allow grid managers to monitor system and make decisions	
Phase 4	**Distributed Energy Resource Deployment**	**(2011-2012)**
	❑Implement Smart End-Use technology (in-home displays, demand-response thermostats, home energy portal) ❑Implement Smart Generation technologies (roof-top solar, grid-connected battery and plug-in electric vehicle charging) ❑Implement Distributed Resource Management System to optimize and manage power system ❑Implement pilot pricing structures to allow customers to better manage usage	
Phase 5	**Data Collection, Reporting & Project Conclusion**	**(2012-2014)**
	❑Evaluate operation of integrated demonstration systems ❑Collect performance and end-use consumption data ❑Analyze grid efficiency and performance improvements ❑Evaluate new enterprise business models	

KCP&L energizing life

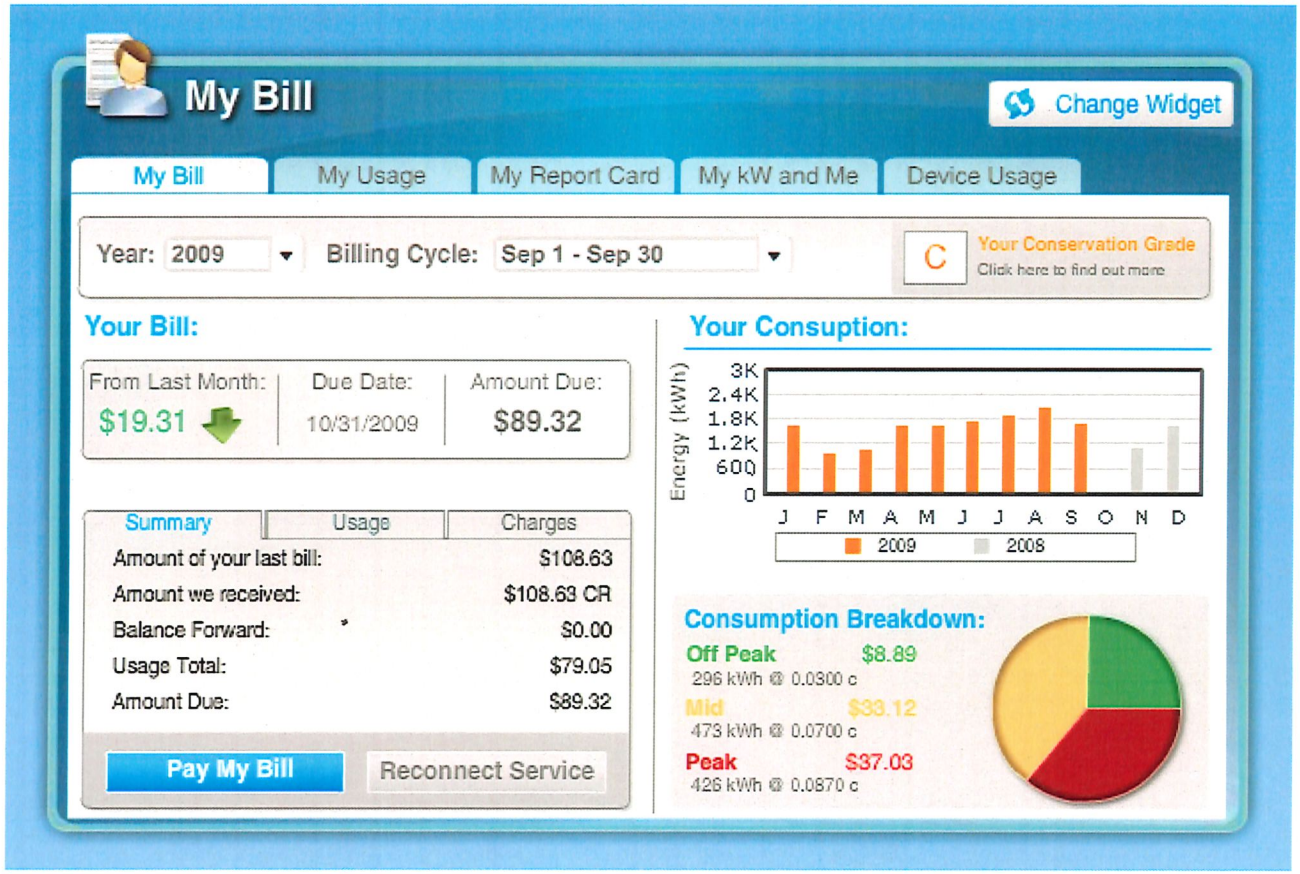
A Comprehensive Energy Policy Can Transform The Industry

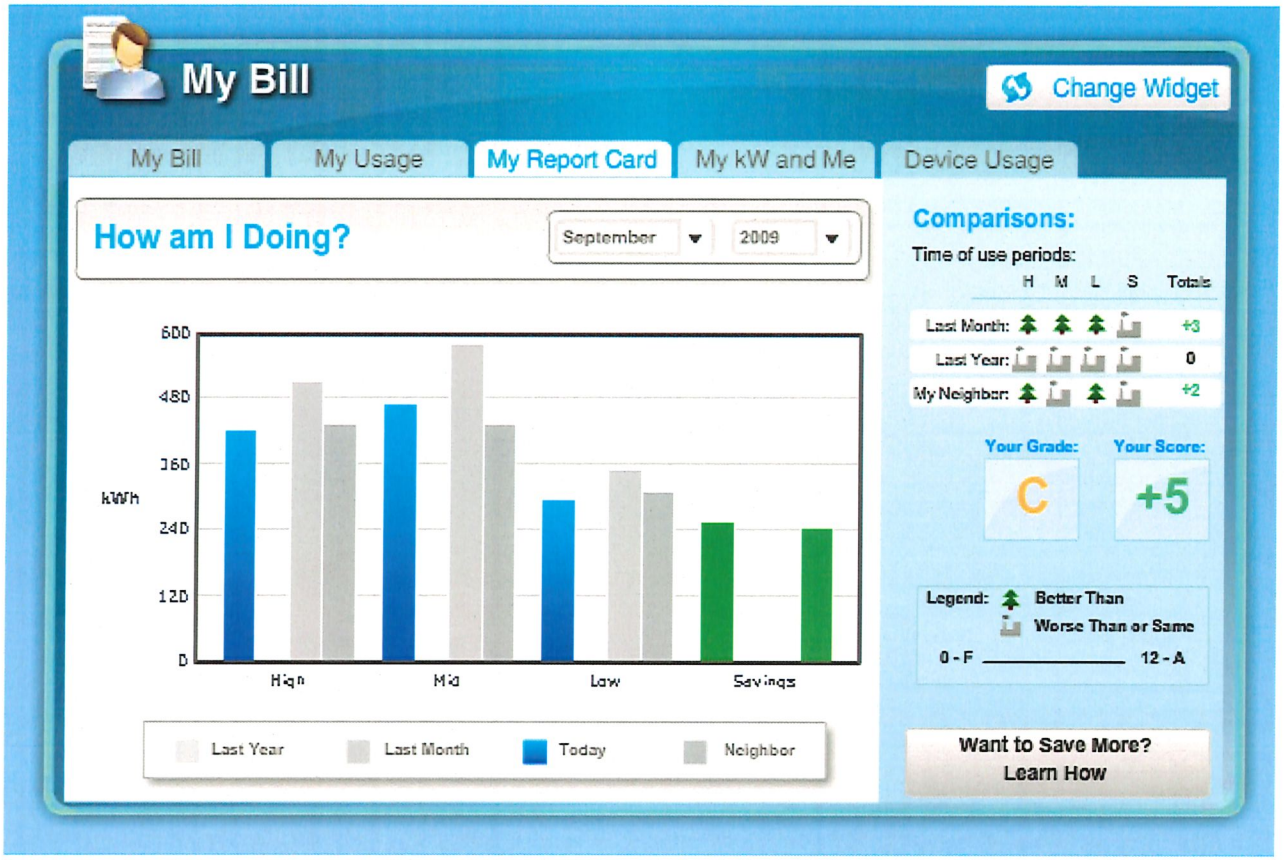
KCP&L energizing life

KCP&L Smart Grid Vision



KCP&L energizing life


My Bill
Change Widget
My Bill
My Usage
My Report Card
My kW and Me
Device Usage
Year: 2009
Billing Cycle: Sep 1 - Sep 30
C
Your Conservation Grade
Click here to find out more
Your Bill:
From Last Month:
$19.31
Due Date:
10/31/2009
Amount Due:
$89.32
Summary
Usage
Charges
Amount of your last bill: $108.63
Amount we received: $108.63 CR
Balance Forward: $0.00
Usage Total: $79.05
Amount Due: $89.32
Pay My Bill
Reconnect Service
Your Consuption:
Energy (kWh)
3K
2.4K
1.8K
1.2K
600
0
J F M A M J J A S O N D
2009
2008
Consumption Breakdown:
Off Peak $8.89
296 kWh @ 0.0300 c
Mid $33.12
473 kWh @ 0.0700 c
Peak $37.03
426 kWh @ 0.0870 c


My Bill
Change Widget
My Bill
My Usage
My Report Card
My kW and Me
Device Usage
How am I Doing?
September
2009
600
480
360
240
120
0
kWh
High
Mid
Low
Savings
Last Year
Last Month
Today
Neighbor
Comparisons:
Time of use periods:
H M L S Totals
Last Month: +3
Last Year: 0
My Neighbor: +2
Your Grade:
C
Your Score:
+5
Legend:
Better Than
Worse Than or Same
0 - F
12 - A
Want to Save More?
Learn How

Black Hills Corporation
Smart Grid and Stimulus Funding

Wes Ashton, Manager
Governmental Affairs

Improving life with energy

Black Hills Corporation

1/15/10

Backbone of Smart Grid

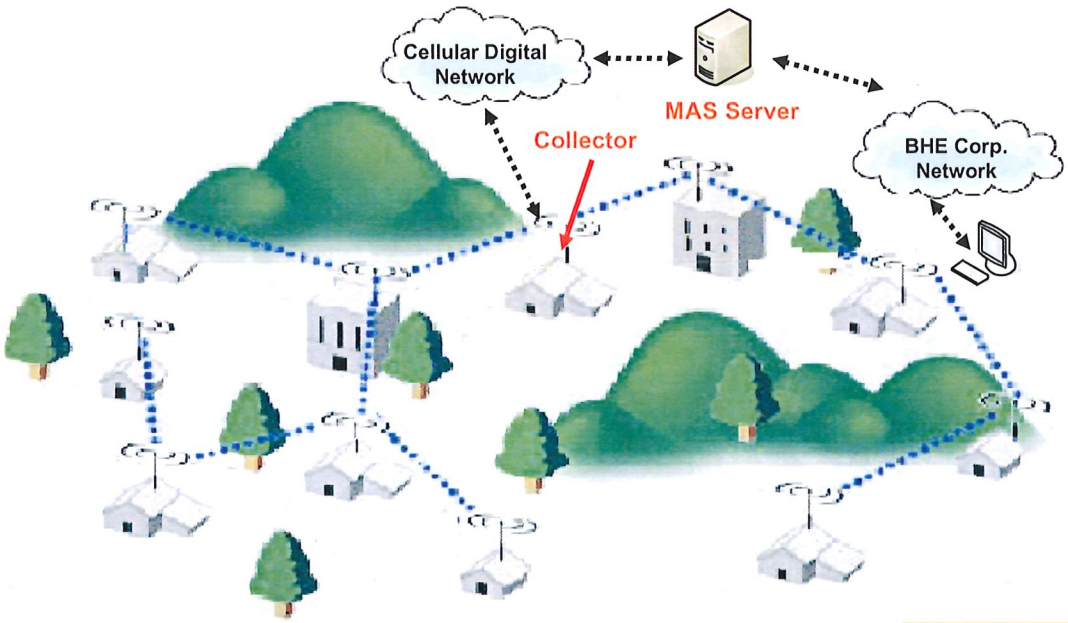
Hardware

- Meters (digital) at customer premises
- AMI: Advanced Metering Infrastructure

Software

- System (IT) to store, retrieve, protect data
- MDMS: Meter Data Management System

Technology Overview



Black Hills and ARRA (Stimulus) Funding

Colo.	• Add 42,000 AMI meters and MDMS • Stimulus matching grant is $6 MM (DOE) • 100% territory coverage by mid-2011
Wyo.	• Install 38,000 AMI meters and MDMS • Stimulus matching grant is $5 MM (DOE) • 100% territory coverage by late 2010
SD & Wyo.	• Install 69,000 AMI meters and MDMS • Stimulus matching grant is $6 MM (DOE) • 100% territory coverage by late 2011

Black Hills: AMI, Installations Planned

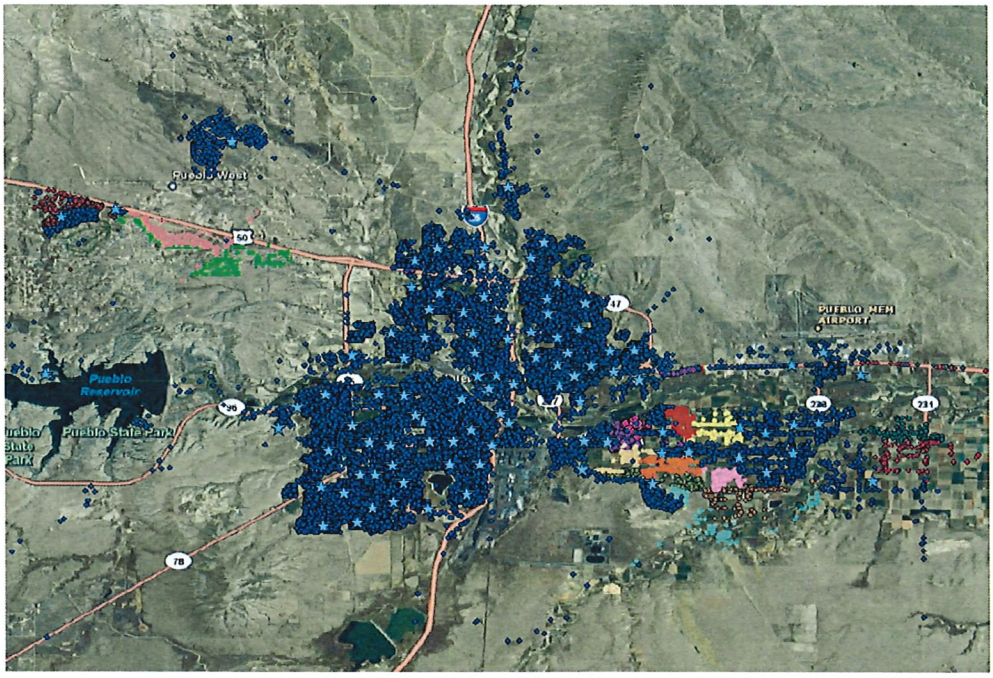
High Density, Urban

- Pueblo, Colorado (pilot installed 2009)
- Cheyenne, Wyoming
- Rapid City, South Dakota

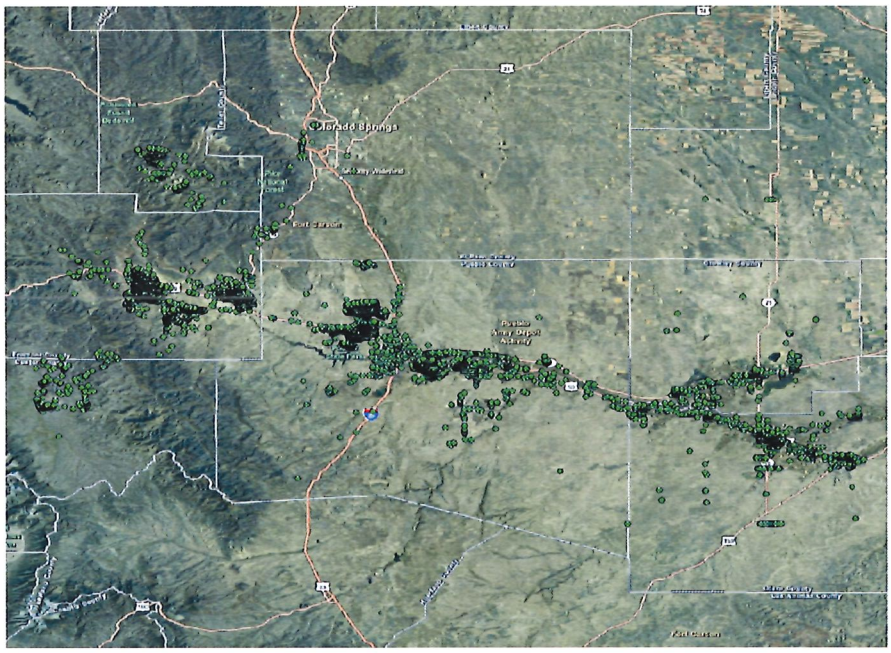
Rural Areas

- Colorado
- Wyoming
- South Dakota

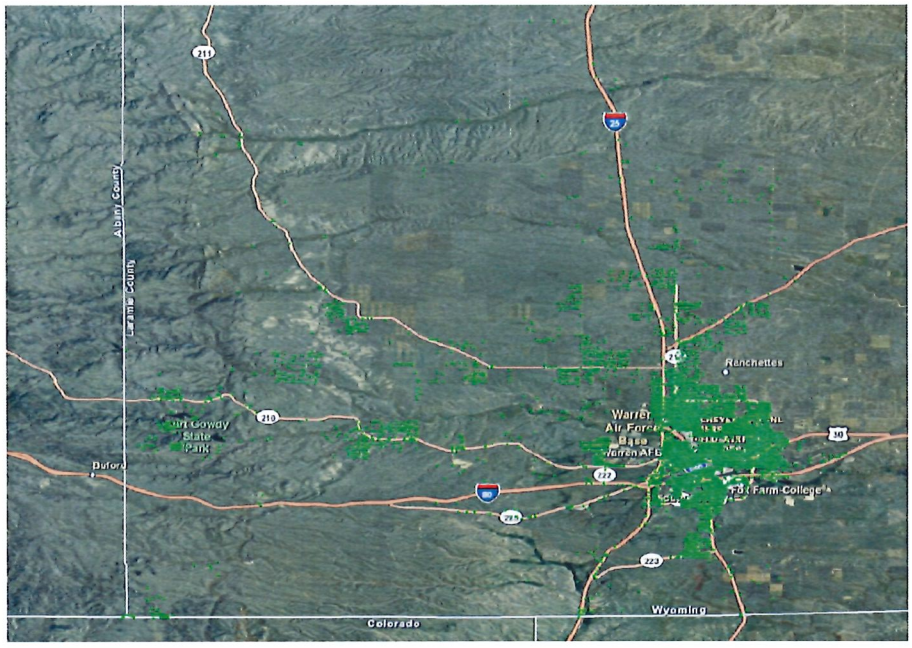
CO: AMI Installed (56,000 meters)



CO: AMI Additions (42,000 meters)

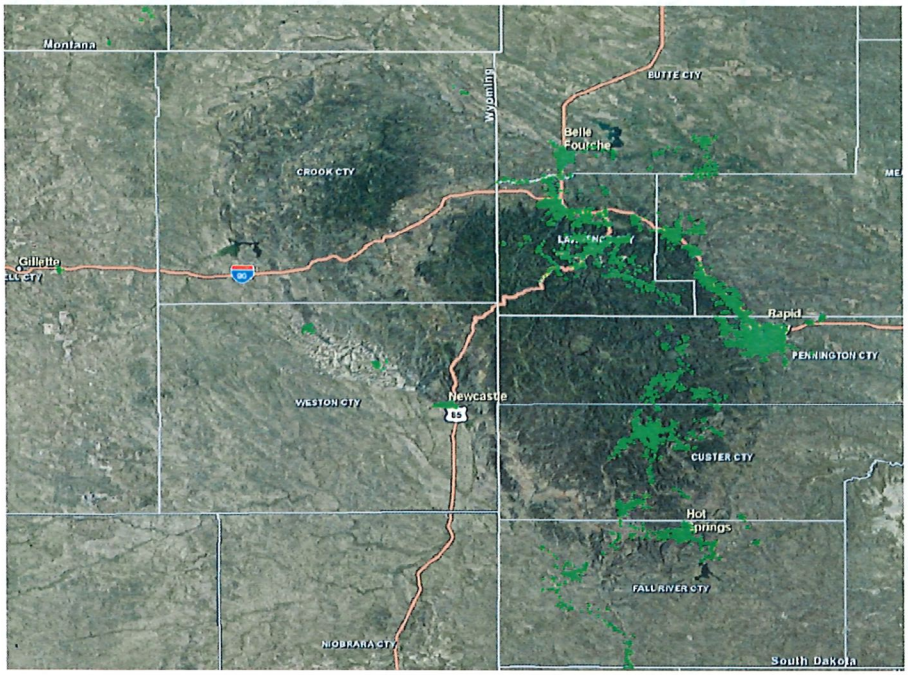


WY (CLF&P): AMI Planned



6-4

SD & WY (BHP): AMI Planned



Black Hills: AMI, Learned So Far

- **Colorado pilot completed in 2009**
- **56,000 AMI meters installed in Pueblo area**
- **AMI meters polled ("read") for customer billings**
- **99.7% AMI meters read daily on average**
- **1,600 off-cycle meter reads per month**
- **135 remote Connect/Disconnects per month**

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Black Hills: AMI, Expected Benefits

- O&M expense savings.
- Customer interface for DSM programs.
- Outage detection, mapping, restoration.
- Service theft reduction.
- Power quality monitoring (surge, sags).
- Residential data for load forecasting.

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