SPACE-TIME INSIGHT

Electric Utility Industry Transformation

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Former CEO, SMUD
Advisory Board Member, Space-Time Insight

6th SMART GRIDS & CLEANPOWER
Cambridge, UK
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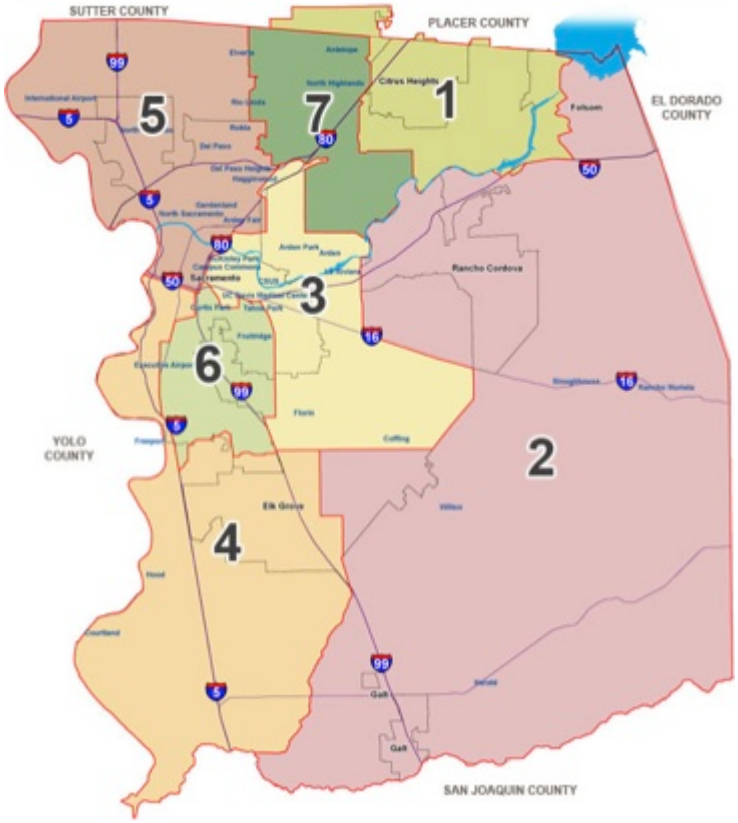
www.hvm-uk.com

About Sacramento Municipal Utility District



- Municipal Electric Utility
  - Governed by a Board of Directors
- 610,000 Customers
  - 540,000 Residential
  - 70,000 Commercial
- Summer-Peaking Load (Air Conditioning)
  - Residential Peak: 4-7pm June-September
  - Peak load ~3300 MW, of which 400MW = 40 hours
- Energy Mix:
  - 25% Renewables
    - 15% biomass and waste
    - 2% small hydro
    - 1% solar
    - 7% wind
  - 20% Large Hydro
  - 53% Natural Gas
  - 2% Wholesale Market

About Space-Time Insight

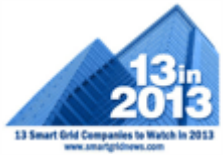
Overview

- Situational intelligence solutions for asset-intensive industries
- Shipping product since 2008
- HQ in Silicon Valley; offices in India and UK

By the Numbers

- Mission-critical implementations worldwide
- 5 of the 20 largest US utilities are customers
- Over 75 billion records processed per month
- Analyzing up to 5 million assets per deployment

Recognized as Industry Leader



Presentation Overview

Investigating change in the electric utility industry…

- External drivers for industry change
- A case study: SMUD's retail strategy
- Responding to change – smart grid

External Drivers Overview

"Energy deregulation will create the largest transfer of wealth in US history."

Warren Buffet

Evolution of the utility industry is being catalyzed by new…

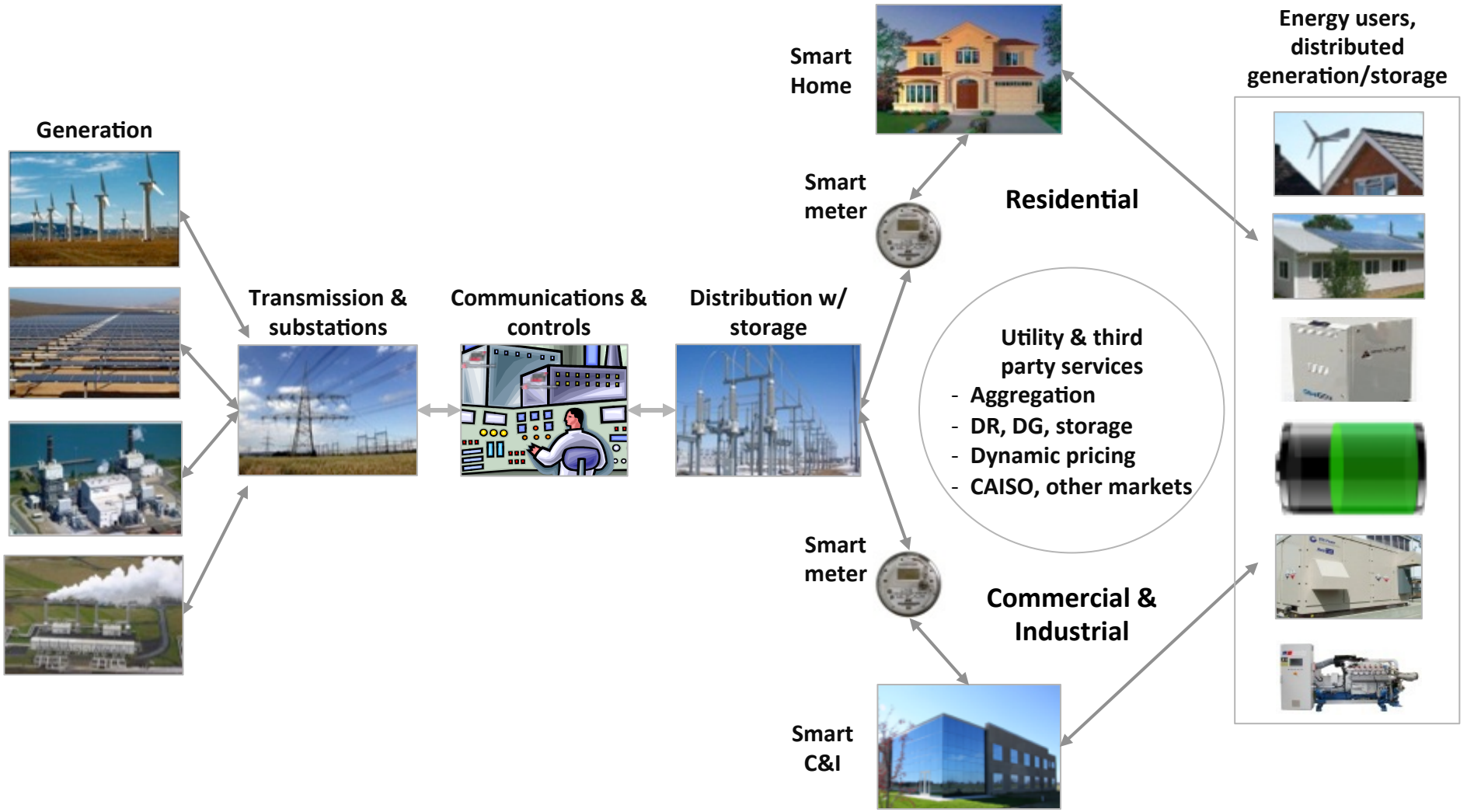
- Customer expectations
- Regulation and legislation
- Markets
- Business models
- Non-utility entrants
- Services
- Technologies
- Generation sources
- Energy innovation investments

California and Western External Drivers

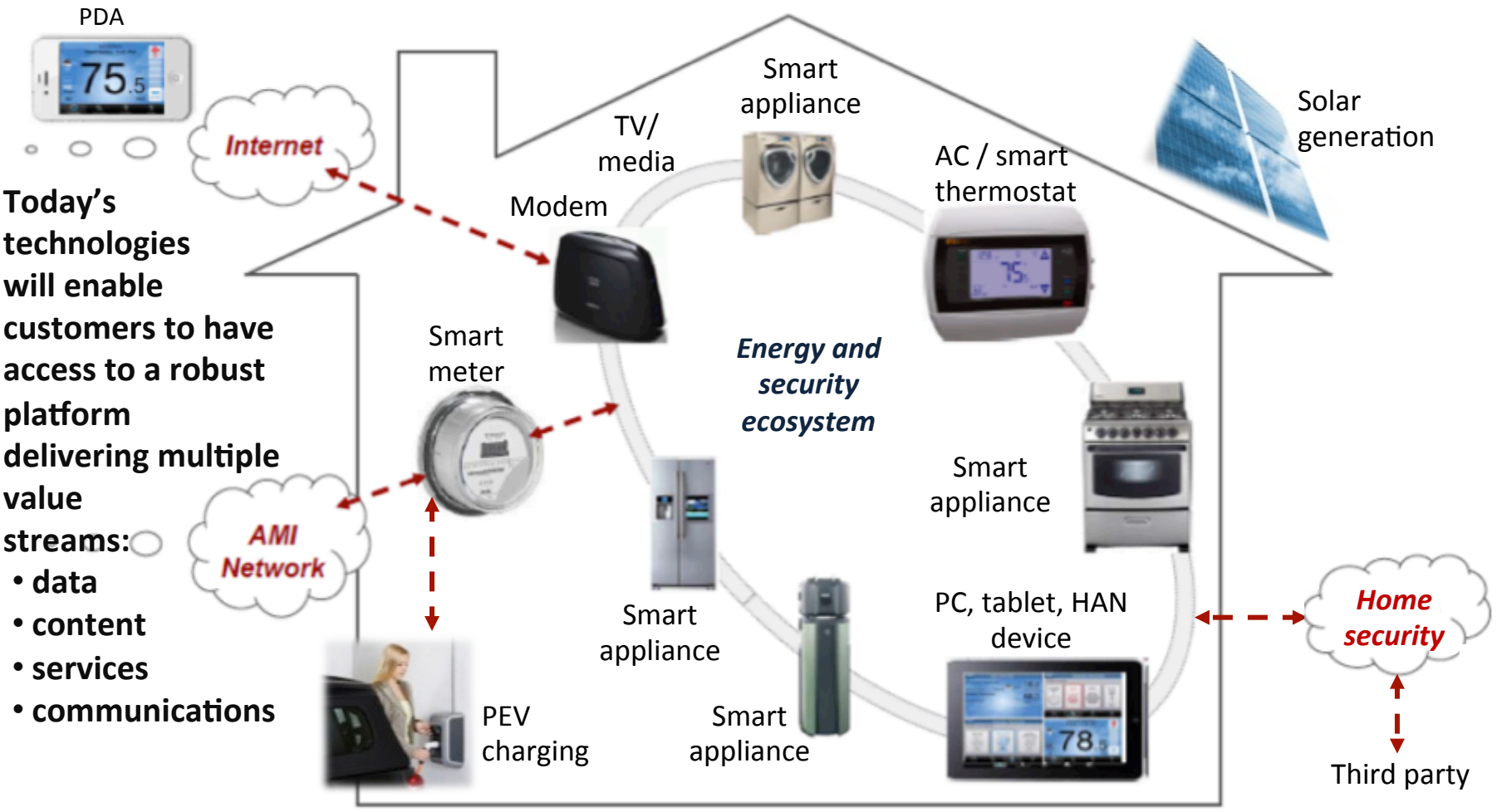
- Climate Change
  - EPA and AB32
- Organized Markets
  - Energy Imbalance and Capacity
- Reliability
  - Physical and Cyber Security
- Financial Reform
  - Dodd Frank
- Renewable Integration and Regulation
  - The Duck Curve

New Customer Expectations: Utility Industry Evolution

The utility world of the future will be driven by a robust bi-directional flow of energy and information.



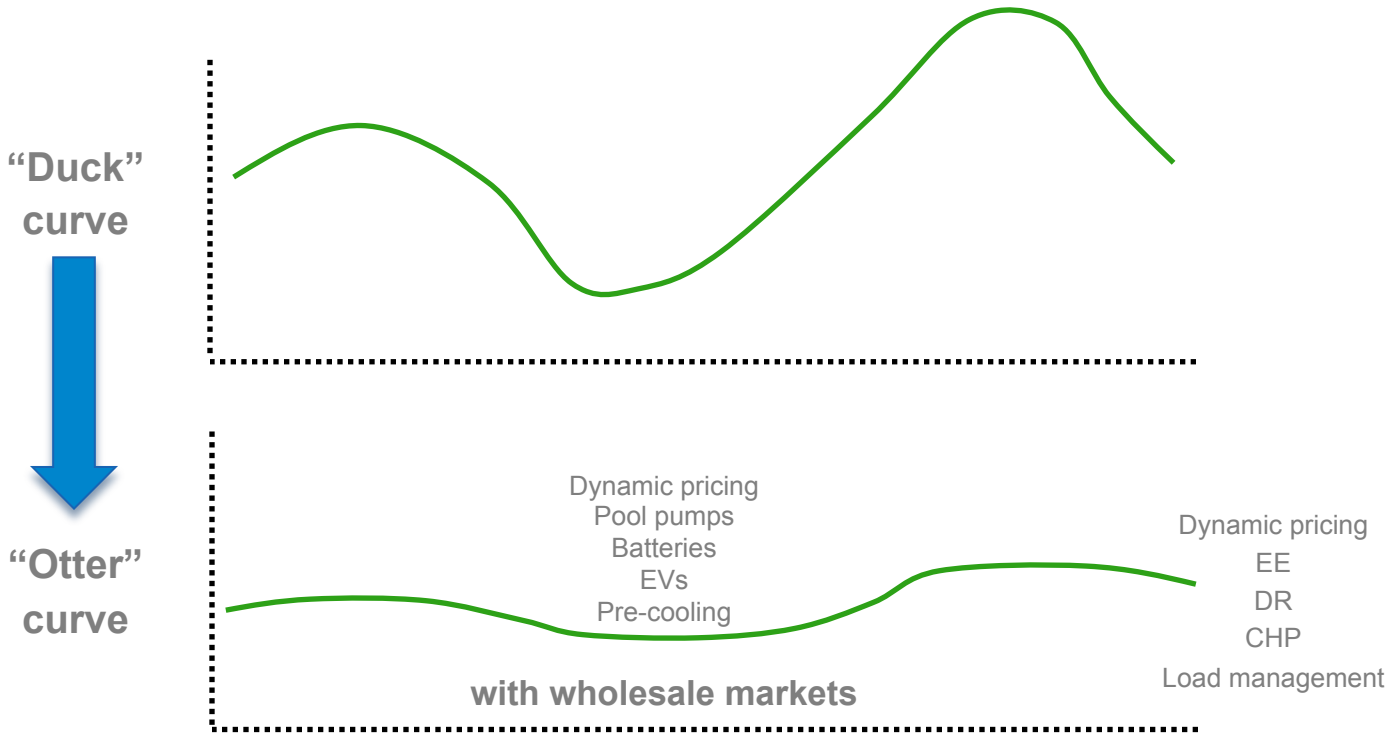
New Customer Expectations: New Residential Experience



SMUD's Retail Strategy

Load Curves: Duck to Otter

Pricing and technologies will profoundly change our load curve, and our customers play a direct role.

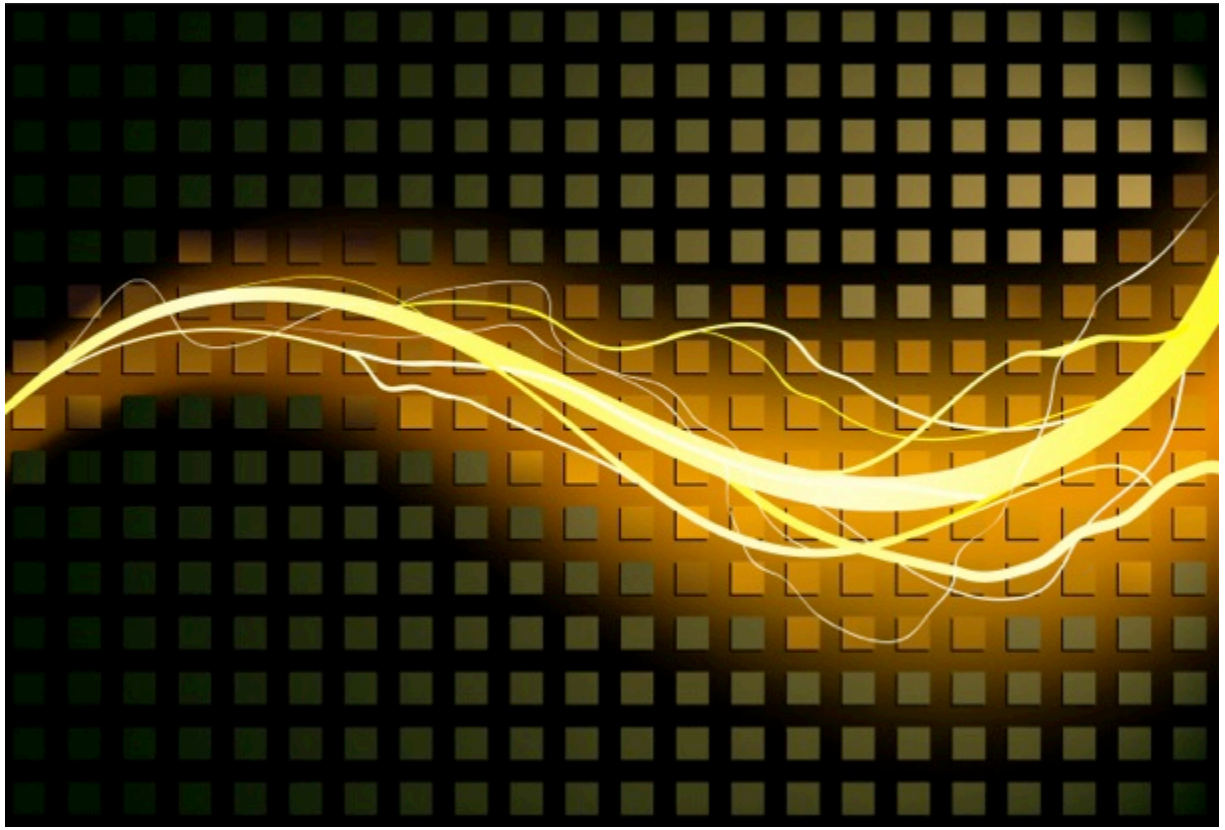


Arizona State University's Utility of the Future

- Purpose
  - Provide critical assistance to utilities looking to develop strategies for the transition to decentralized energy provisioning, clean energy, and energy efficiency
- Justification
  - High proportion of renewables being delivered to the grid
  - Customers investing in energy technologies
  - Ongoing shift toward ISOs and electricity markets
  - Regulatory models and markets shifting revenues from utilities to other participants in the energy system
- Key Players and Sponsors
  - APS, Tucson Electric, Duke, PGE, DTE, AEP, EPRI, CEE, Southern
  - Embracing change, and determining how to benefit from, rather than fall victim to:

"… creative destruction in the utility industry caused by the proliferation of distributed generation and energy efficiency."

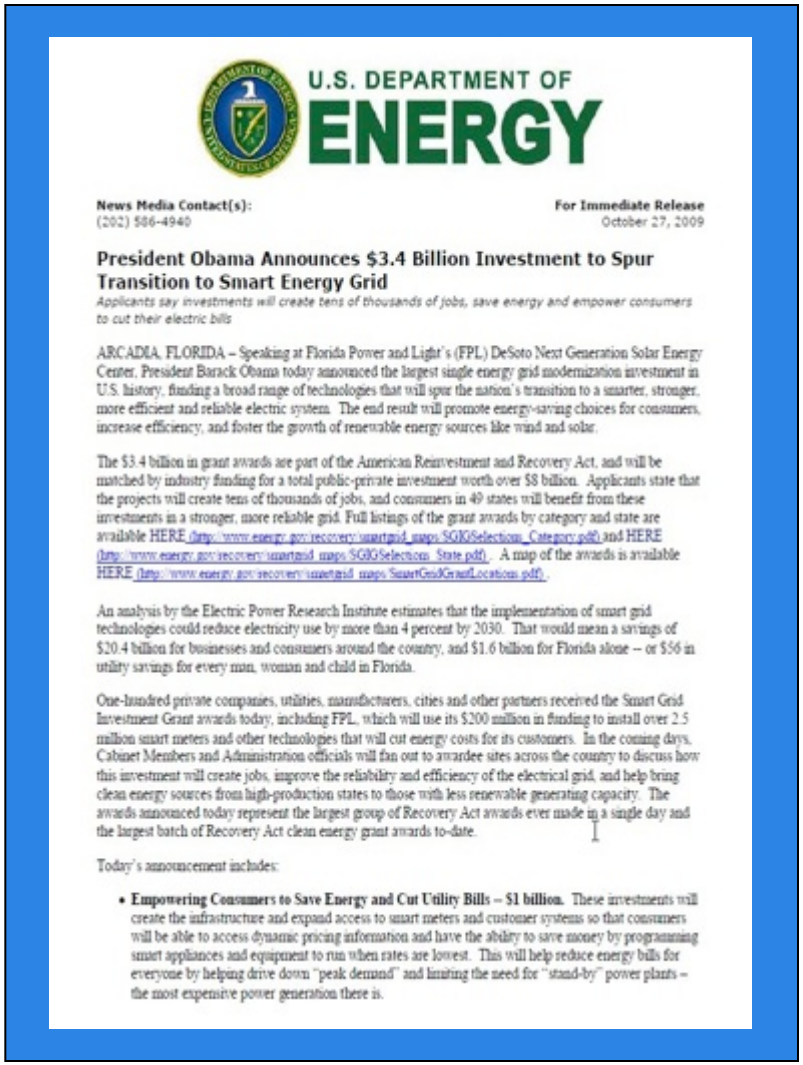
SMUD Responding to Change – Smart Grid



Smart Grid Investment Grant (SGIG)

October 2009 DOE Announcement

- SGIG grants to 100 entities
- $203 million to California
- $127.5 award to SMUD for a $308 million project
- SMUD received 63% of the SGIG funds that went to California



U.S. DEPARTMENT OF ENERGY

News Media Contact(s):
(202) 586-4940

For Immediate Release
October 27, 2009

President Obama Announces $3.4 Billion Investment to Spur Transition to Smart Energy Grid

Applicants say investments will create tens of thousands of jobs, save energy and empower consumers to cut their electric bills

ARCADIA, FLORIDA – Speaking at Florida Power and Light's (FPL) DeSoto Next Generation Solar Energy Center, President Barack Obama today announced the largest single energy grid modernization investment in U.S. history, funding a broad range of technologies that will spur the nation's transition to a smarter, stronger, more efficient and reliable electric system. The end result will promote energy-saving choices for consumers, increase efficiency, and foster the growth of renewable energy sources like wind and solar.

The $3.4 billion in grant awards are part of the American Reinvestment and Recovery Act, and will be matched by industry funding for a total public-private investment worth over $8 billion. Applicants state that the projects will create tens of thousands of jobs, and consumers in 49 states will benefit from these investments in a stronger, more reliable grid. Full listings of the grant awards by category and state are available HERE (http://www.energy.gov/recovery/smartgrid_maps/SGIGSelections_Category.pdf) and HERE (http://www.energy.gov/recovery/smartgrid_maps/SGIGSelections_State.pdf). A map of the awards is available HERE (http://www.energy.gov/recovery/smartgrid_maps/SmartGridGrantLocations.pdf).

An analysis by the Electric Power Research Institute estimates that the implementation of smart grid technologies could reduce electricity use by more than 4 percent by 2030. That would mean a savings of $20.4 billion for businesses and consumers around the country, and $1.6 billion for Florida alone -- or $56 in utility savings for every man, woman and child in Florida.

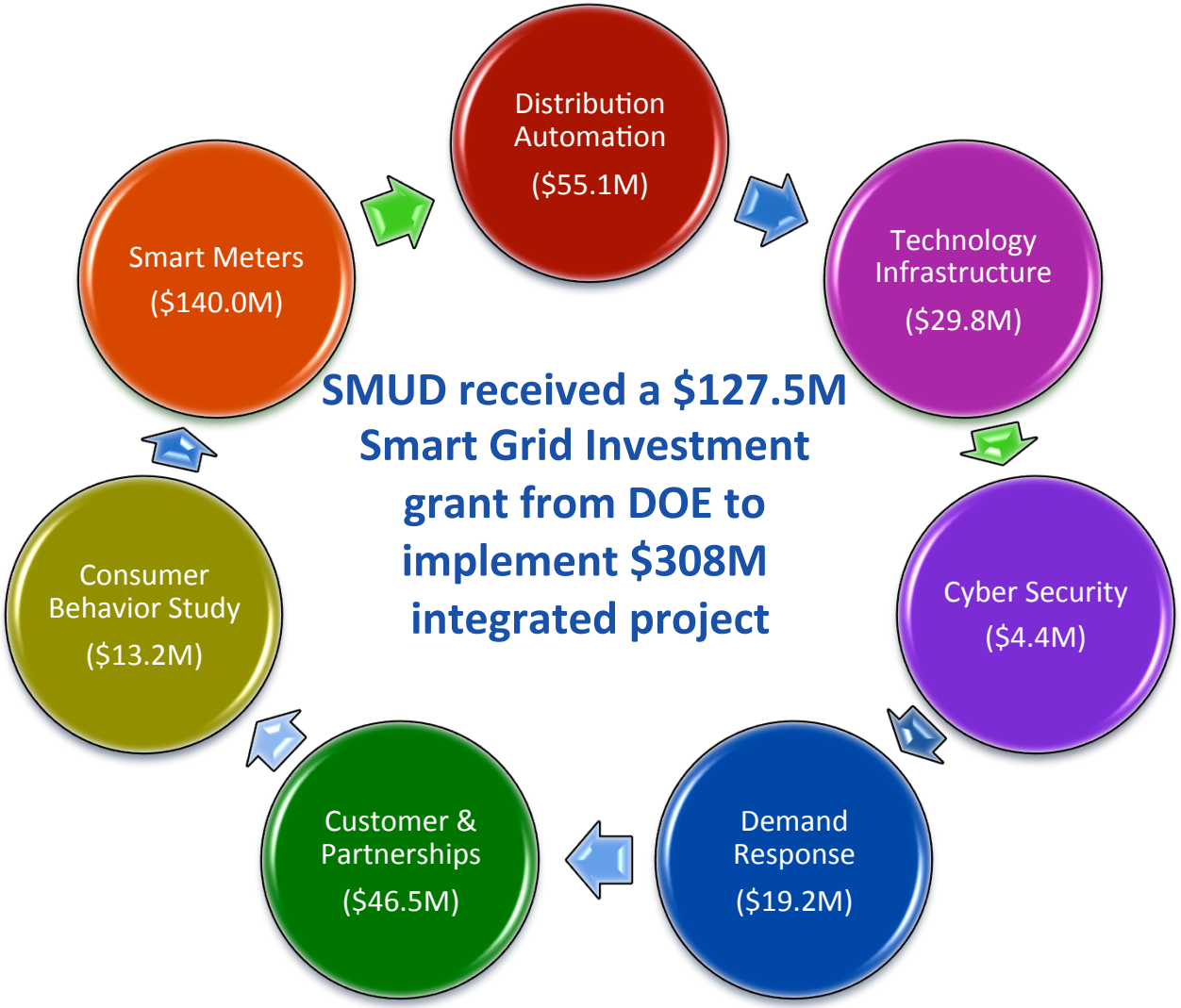
One-hundred private companies, utilities, manufacturers, cities and other partners received the Smart Grid Investment Grant awards today, including FPL, which will use its $200 million in funding to install over 2.5 million smart meters and other technologies that will cut energy costs for its customers. In the coming days, Cabinet Members and Administration officials will fan out to awardee sites across the country to discuss how this investment will create jobs, improve the reliability and efficiency of the electrical grid, and help bring clean energy sources from high-production states to those with less renewable generating capacity. The awards announced today represent the largest group of Recovery Act awards ever made in a single day and the largest batch of Recovery Act clean energy grant awards to-date.

Today's announcement includes:

- **Empowering Consumers to Save Energy and Cut Utility Bills – $1 billion.** These investments will create the infrastructure and expand access to smart meters and customer systems so that consumers will be able to access dynamic pricing information and have the ability to save money by programming smart appliances and equipment to run when rates are lowest. This will help reduce energy bills for everyone by helping drive down "peak demand" and limiting the need for "stand-by" power plants – the most expensive power generation there is.

SmartSacramento Vision

SmartSacramento® ARRA Grant

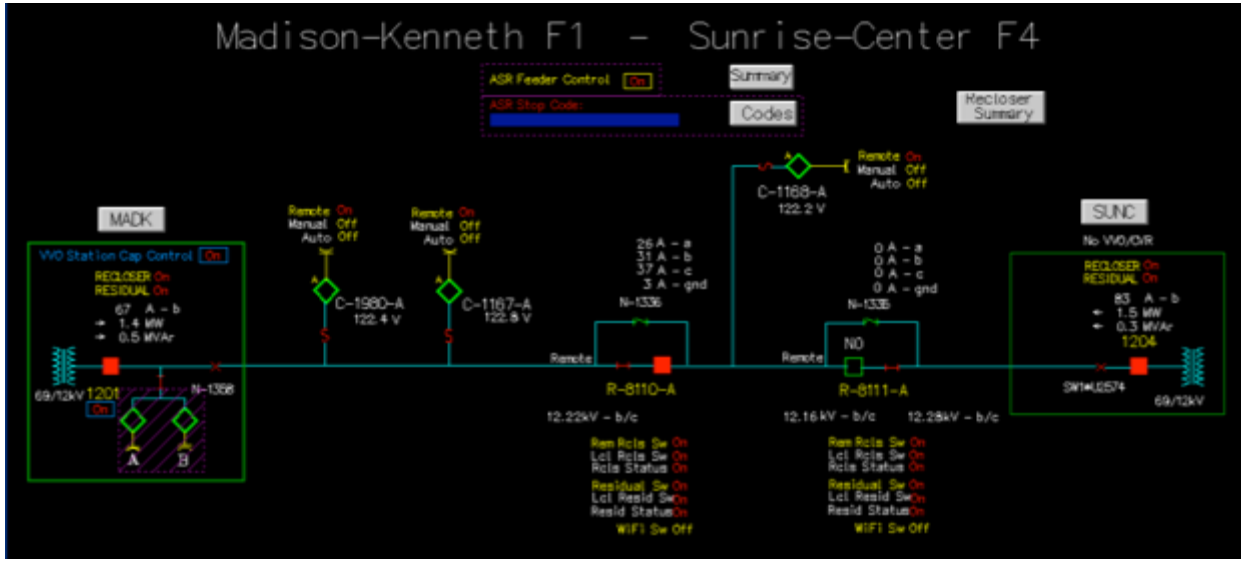


Results

1. Installed over 615,000 smart meters; using many of the features
2. Implemented smart pricing options and tested TOU, CPP and combination TOU/CPP on opt-in and default customers
3. Installed DRMS and developed several DR programs including residential PCT and commercial AutoDR initiatives
4. Implemented multiple distribution projects that improve system performance
5. Rolled out customer-related programs and services that improved customer satisfaction and helped customers better manage their energy usage
6. Installed an enterprise service bus to manage the multiple software programs linked to smart grid. Implemented customer relationship management software
7. Implemented state-of-the-art cyber security protocols and technologies
8. Implemented multiple smart grid R&D initiatives

Distribution Automation

Automated Sectionalizing and Restoring



Electronic Switching Map

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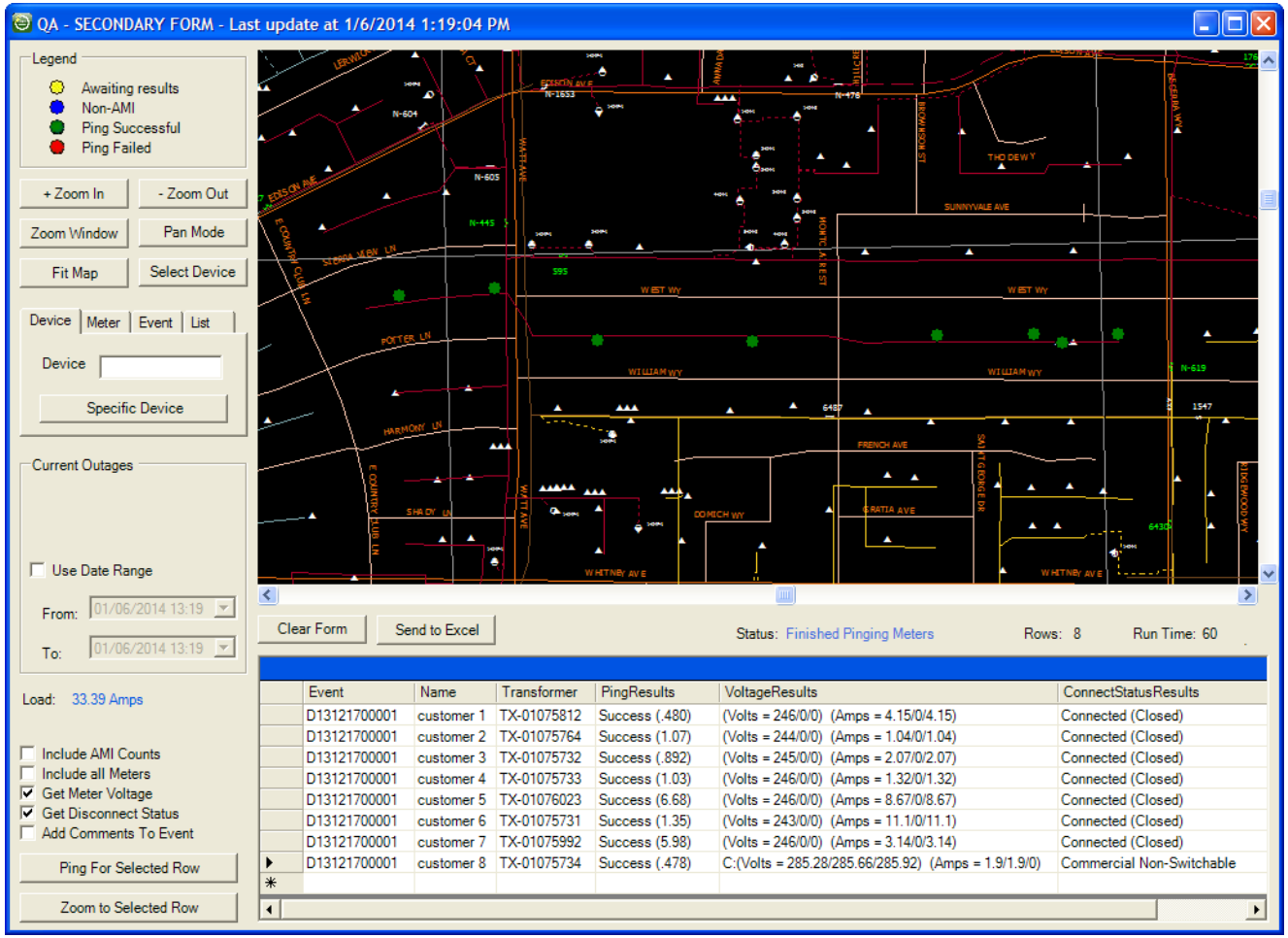
Outage Communication Management

Enhanced Outage Management



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Embracing the “Big Data” Revolution

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OSIsoft.

Landis+Gyr

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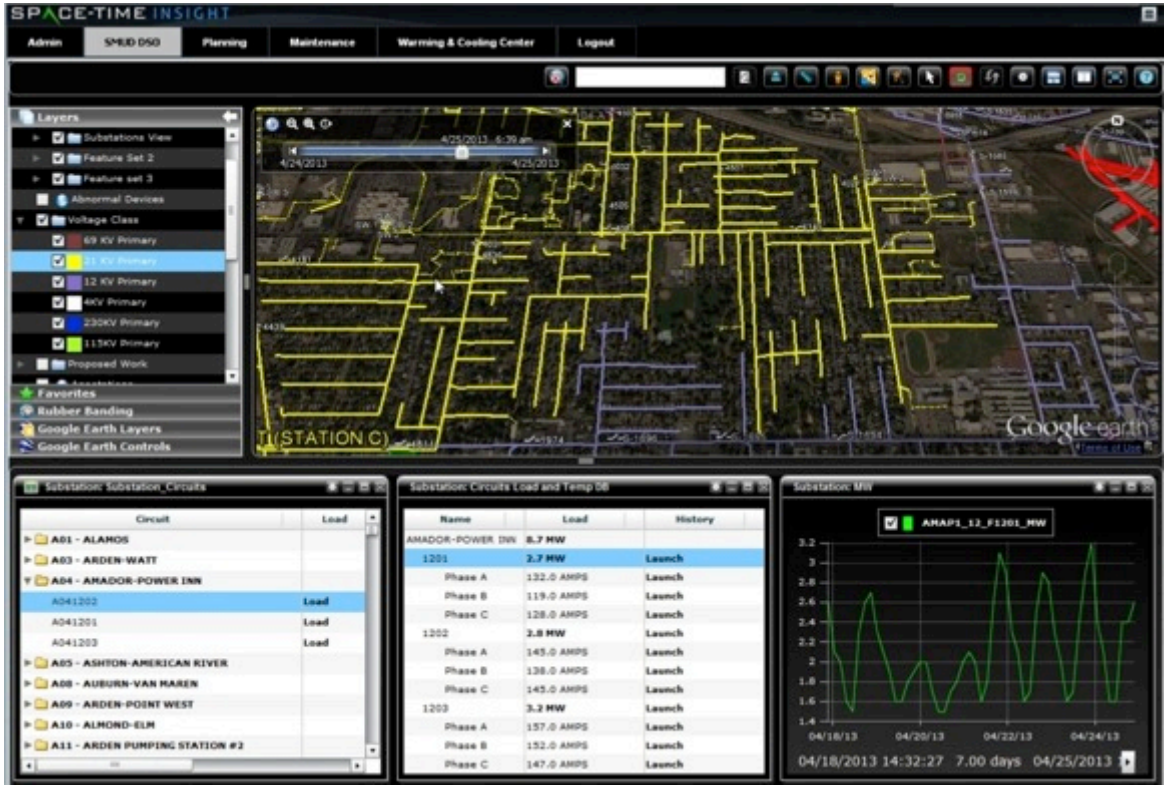
software AG

Situational Awareness and Visual Intelligence (SAVI)



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SAVI: Phase 1

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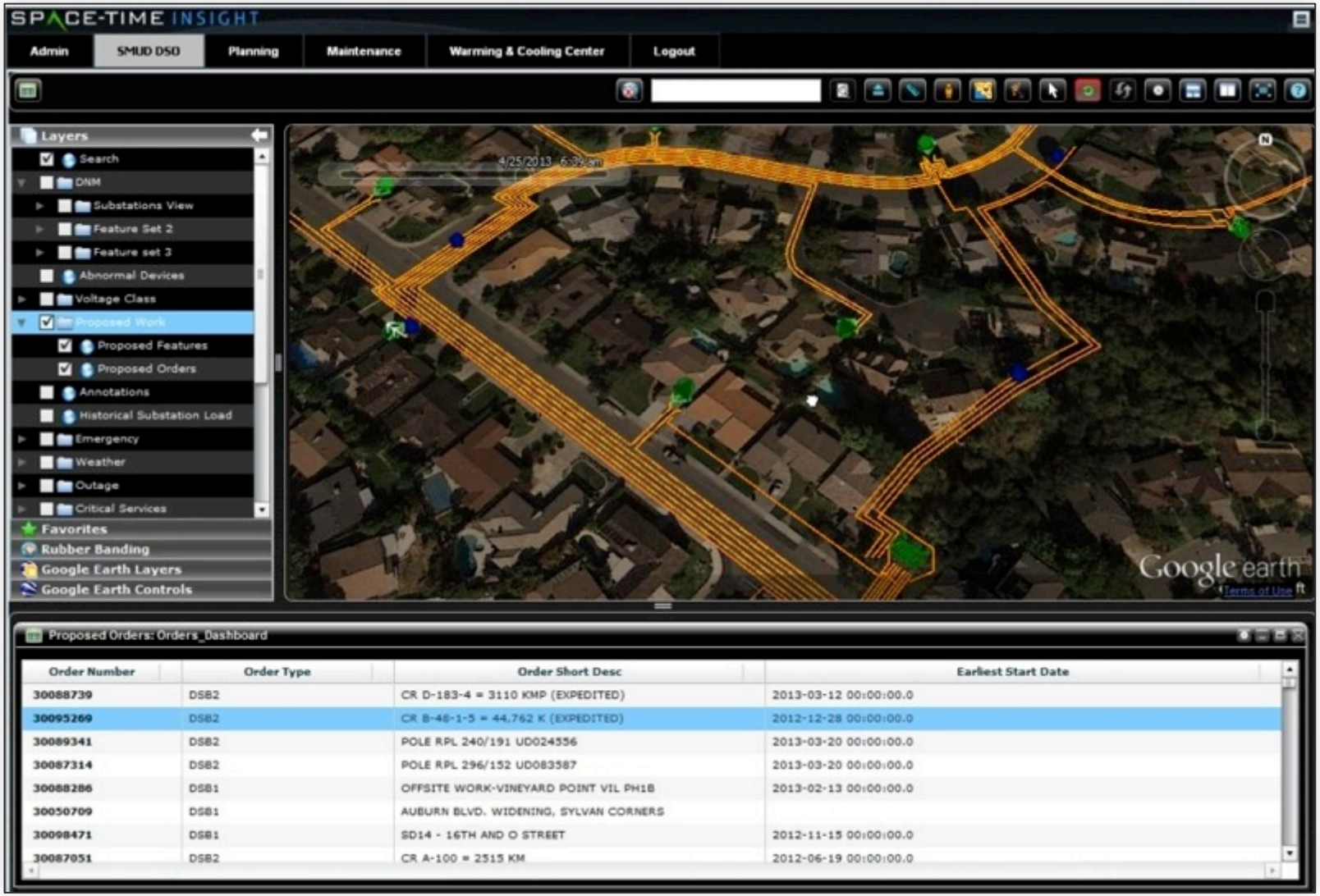

SAVI: Phase 2

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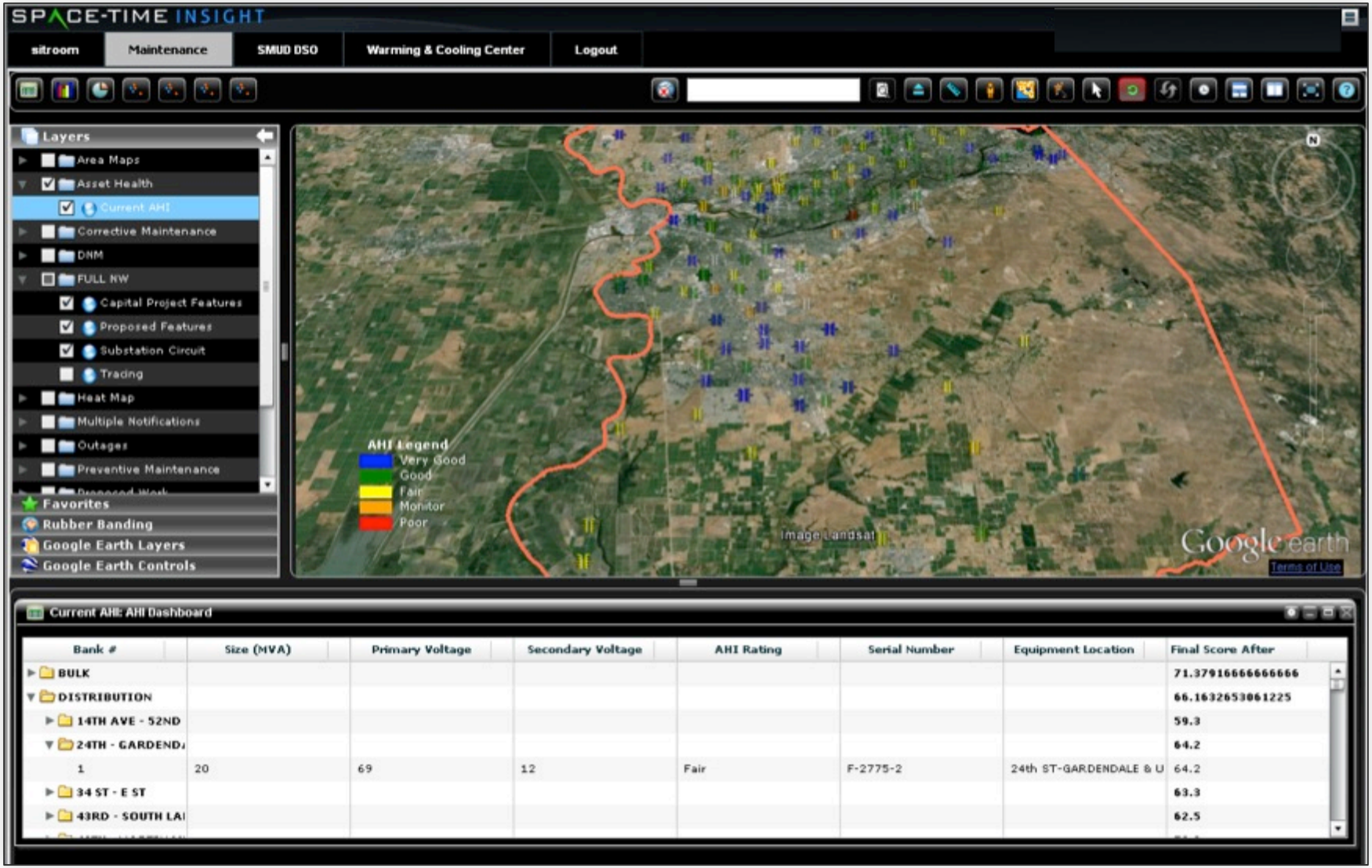
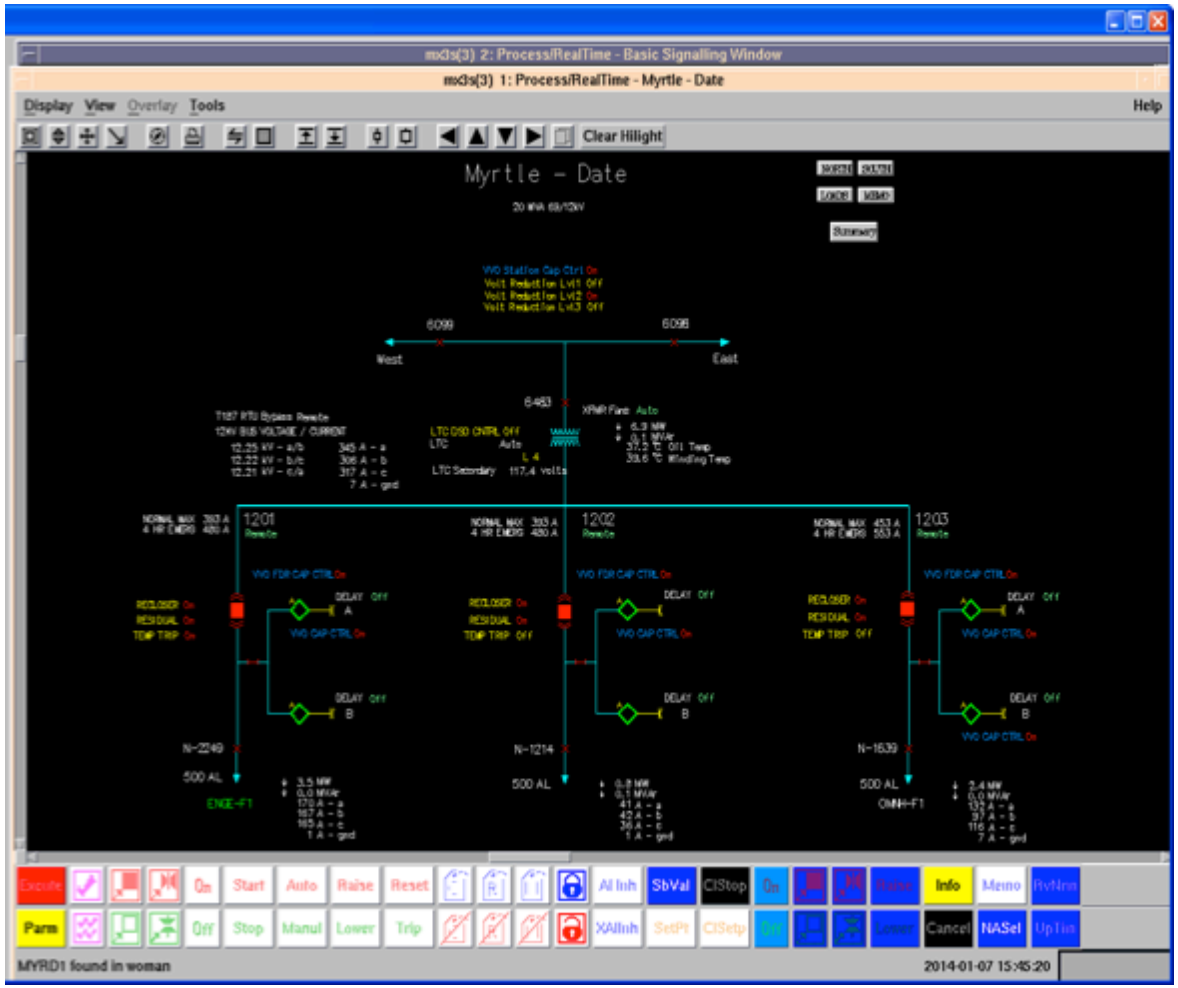


Conservation Voltage Reduction and Volt/Var Optimization



Structure™

SIEMENS

BECKWITH ELECTRIC CO.INC.

EPRI ELECTRIC POWER RESEARCH INSTITUTE

OSIsoft.

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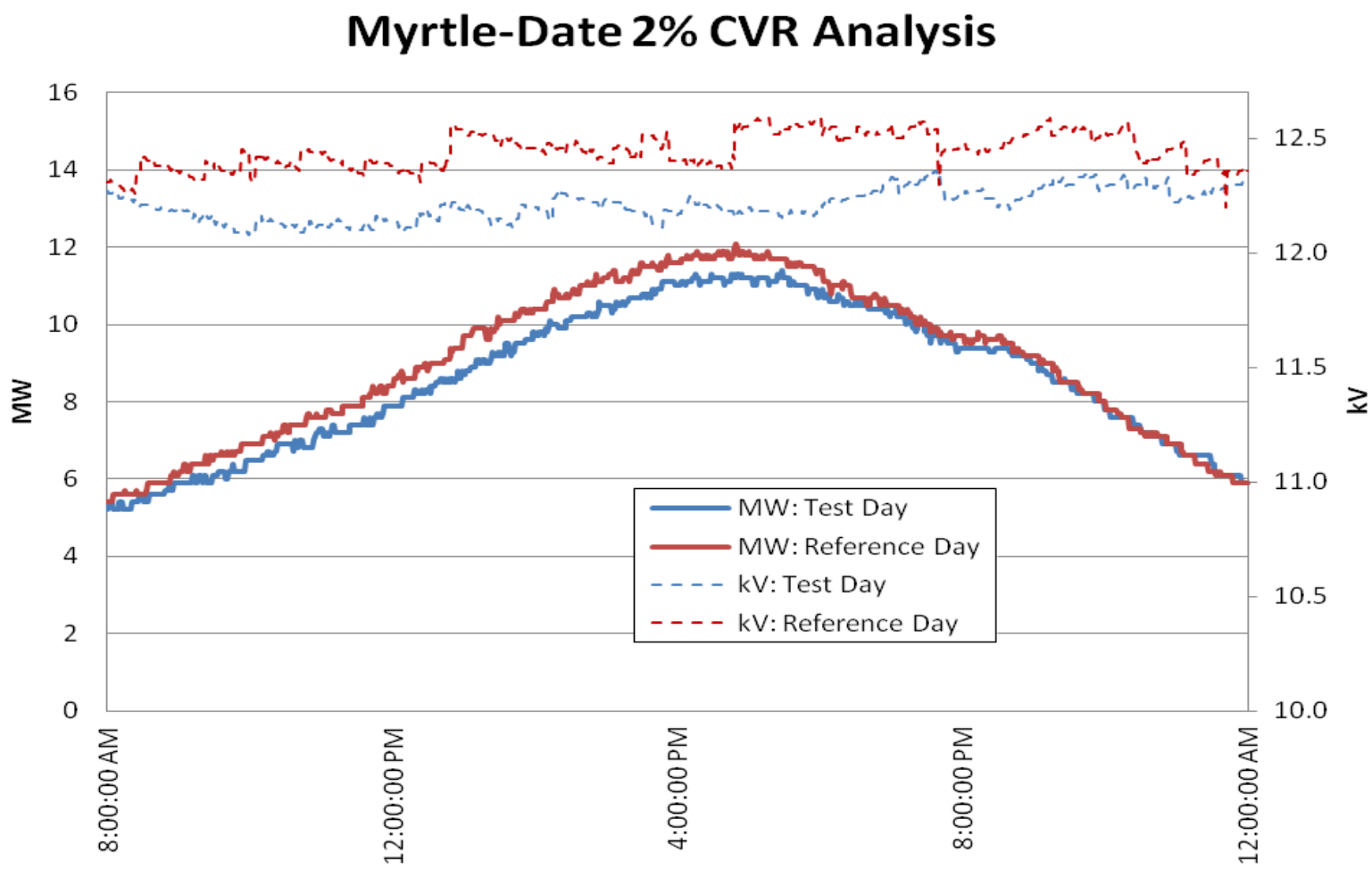
2011 Pilot Deployment – CVR Results



Results

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Questions?

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