



# SMUD's ARRA Smart Grid Project

CEC IEPR Workshop

Jim Parks

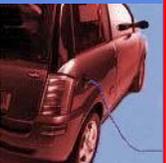
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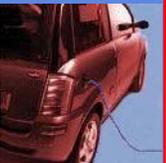
July 13, 2010



# SMUD's Smart Grid Grant



- ◆ SMUD will receive \$1 M from PIER and \$127.5M from DOE for Smart Grid Investment (FOA 58) to implement \$308 M worth of projects:
  - ❖ Partner Projects
  - ❖ Advanced Metering Infrastructure/Smart Meters
  - ❖ Consumer Behavior Study (Dynamic Pricing)
  - ❖ Demand Response
  - ❖ Distribution Automation
  - ❖ PHEV/EV Infrastructure
  - ❖ Cyber Security

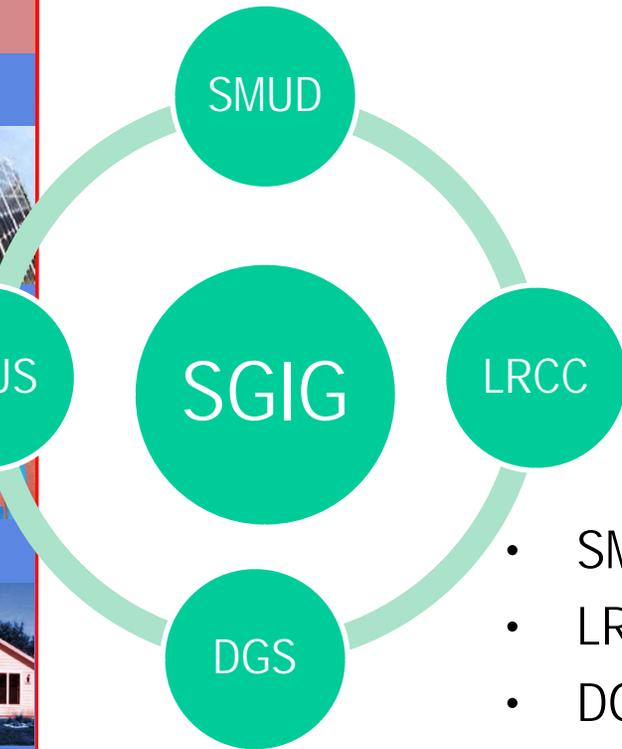


# SMUD's Smart Grid Partners

SMUD has partnered with three public agencies to implement the Smart Grid grant.

## Partners

- SMUD – Sacramento Municipal Utility District
- LRCCD – Los Rios Community College District
- DGS – CA, Department of General Services
- CSUS – California State University, Sacramento



# SMUD's FOA 58 Submittal

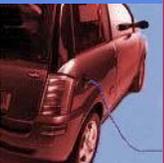


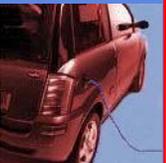
Table 1. Costs of SmartSacramento Project by Task (in millions)

Project Tasks	2009 (Pre-Award)	2010 (Year One)	2011 (Year Two)	2012 (Year Three)	Total Project Costs
Task 1: AMI/Smart Meters	\$15.6	\$84.5	\$26.2	\$0.0	\$126.3
Task 2: Dynamic Pricing	\$0.0	\$8.0	\$4.0	\$4.0	\$16.0
Task 3: Demand Response	\$0.0	\$8.4	\$16.3	\$23.0	\$47.7
Task 4: Customer Applications					
CA DGS	\$0.0	\$8.3	\$8.3	\$8.3	\$24.9
CSUS	\$0.0	\$2.8	\$2.8	\$2.8	\$8.4
LRCCD	\$0.0	\$3.1	\$3.1	\$3.1	\$9.3
Task 5: Distribution Automation	\$0.0	\$20.5	\$25.5	\$23.0	\$69.0
Cyber Security	\$0.0	\$3.0	\$1.5	\$1.6	\$6.1
<b>Total Project Costs</b>	<b>\$15.6</b>	<b>\$138.6</b>	<b>\$87.7</b>	<b>\$65.8</b>	<b>\$307.7</b>



# State Funding Allocation

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- ◆ PIER funds will be used for Distribution Automation
- ◆ Reporting will include full DOE reports on all project elements
- ◆ PIER will benefit through greater understanding of the issues, benefits, integration and cost effectiveness of smart grid technologies
- ◆ Most projects will be replicable



# Partner Projects

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- ◆ Energy management systems will be installed or updated to save energy and reduce peak loads



- ◆ PHEV/EV charging stations will be installed at college campuses

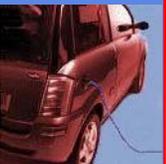


- ◆ Auto DR will be tested (TBD)

- ◆ The CSUS distribution system will be upgraded to increase grid reliability



- ◆ Smart meters will be installed on all 57 buildings on the CSUS campus





# Advanced Metering Infrastructure



- ◆ Install advanced meters throughout SMUD's service territory
- ◆ Landis + Gyr meters
- ◆ Silver Spring Networks





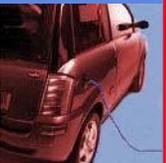
# Consumer Behavior Study

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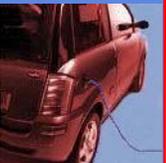
## ◆ Test:

- ◆ Customer response to Critical Peak Pricing
- ◆ Customer preferences for information and messaging
- ◆ Ability of customers to reduce peak demand and energy using enabling technologies (such as programmable communicating thermostats)
- ◆ Customer acceptance and response to new technologies and pricing options





# Demand Response



- ◆ Automate DR
- ◆ SMUD will provide up to 20,000 residential and small commercial customers with enabling technologies (such as home energy management systems) that allow them to participate in direct load control and pricing programs
- ◆ SMUD will work with medium and large commercial customers to provide technical assistance and enabling technology that allows them to automatically respond to peak prices by reducing load
- ◆ Implement programmable controllable thermostats, home area networks and controllable appliances
- ◆ Provide near real time energy use data in multiple formats
- ◆ Auto DR for commercial customers



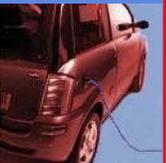
# Distribution Automation



- ◆ Implement a comprehensive package of distribution system automation controls and systems to:



- ❖ Expand SCADA system
- ❖ Install intelligent switching and monitoring equipment
- ❖ Implement an advanced operating system
  - ❖ Hope to demonstrate the interoperability between the energy management system (EMS), outage management system (OMS), the DMS and AMI
- ❖ Demonstrate Conservation Voltage Reduction





# Electric Vehicle Infrastructure



◆ Install 180 smart charging stations

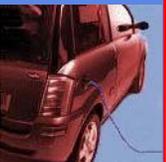
- ❖ Residential
- ❖ Commercial
- ❖ Public/fleet



◆ Test impacts on the grid

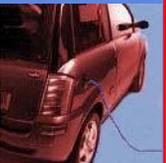


<u>Year</u>	<u>PHEV</u>	<u>BEV</u>	<u>% Sac</u>	<u>Load</u>	<u>Energy</u>
2015	9,225	1,045	0.3	35MW	53 GWh
2020	47,940	2,357	1.4	164MW	144 GWh
2025	148,108	16,322	12.2	566MW	495 GWh
2030	282,524	33,481	30.3	1,097MW	956 GWh





# Cyber Security



- ◆ SMUD's smart grid will enact security programs and procedures that meet or exceed government mandated standards
- ◆ This is a continuation of SMUD's current best practices with increased resources to support smart grid initiatives



# Expected Outcomes



◆ Job creation TBD



◆ Energy Savings TBD

◆ Greenhouse Gas Reduction TBD

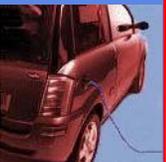
◆ Others—



- ❖ Enhance utility infrastructure
- ❖ Add transparency and control
- ❖ Promote increased customer engagement
  - Provision of information and tools to manage their energy usage

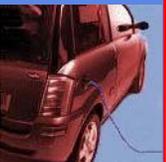


- ❖ Reduce peak load
- ❖ Improve energy efficiency
- ❖ Promote distributed generation
- ❖ Improve air quality
- ❖ Integrate intermittent renewable resources





# Challenges



- ◆ AMI issues across California
  - Customer acceptance
  - Communication
- ◆ Emerging technologies in the marketplace – customer confusion/reliability of new technologies
- ◆ Lack of standards
- ◆ Resource challenges – equipment, staffing
- ◆ Federal requirements – contracting, reporting
- ◆ Short time frame for delivery (3 years)

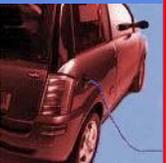


# What Would We Do Differently?

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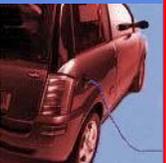


- ◆ We worked hard to complete the proposal with lots of staff commitment and extra work
- ◆ Given the timing constraints of proposal submittal and the complexity of the projects, we probably wouldn't do a lot differently





# What Could CEC Do Differently?

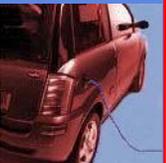


- ◆ The early application process was straight-forward – no complaints
- ◆ Notices were issued, staff was helpful
- ◆ Moving forward, we hope the CEC reporting requirements will match the federal reporting requirements so we don't have to develop two sets of reports
- ◆ Our Agreement with the CEC is not final yet



# Where We Are Today

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- ◆ Moving forward with the Smart Meters project:
  - ❖ Communication network 99% complete
  - ❖ Over 60,000 meters installed
  - ❖ 95% customers satisfied with installation
  - ❖ Testing installed meters and system through year-end
- ◆ Contract with DOE signed
- ◆ Will develop RFPs to procure required technologies
- ◆ Performing pilot projects to test equipment where necessary