Smart Meters
Example Projects

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Smart Grid – Example Projects

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	Project Host	Project Description - Objectives
	Xcel Energy “Smart Grid City” (Current, Accenture)	• Demonstration with approximately 10,000 homes with smart meters, web access to usage information, RTP in development, utility controlled appliances. • Development of smart substations, dispatchable and distributed generation including PHEV’s, batteries, verticle wind turbines, solar, etc. (estimated cost up to $100 million).
	San Diego Gas & Electric “Beach Cities Microgrid”	• Improve effectiveness of integrating multiple distributed energy resources with advanced controls and communication • Improve reliability and reduce peak loads on distribution feeders and substations.
	Allegheny Energy “Super Circuit Project”	• Improve reliability and security of a power circuit by integrating advanced monitoring, control and protection technologies. • Integrate biodiesel with storage, smart meters to locate and helf fix network problems.
	Fort Collins Public Utility	Integration of 30 kinds of resources, including solar and wind across five customer locations to support a zero-energy district called FortZED.
	University of Hawaii	Demonstrate a platform for a distribution management system that integrates smart metering, demand response, home automation for conservation, distributed generation, storage and controls to allow the distribution system to collaborate with the main grid.
	Illinois Institute of Technology “Perfect Power “	Demonstrate a prototype that uses advanced technology to create microgrids that respond to main grid conditions, to increase grid reliability and reduce demand.
	Duke Energy Carolinas “”Mininature Smart Grid”	Demonstration with 200 customers in South Carolina to combine 50 kW of solar, smart meters and storage batteries to examine operations and improve service reliability.(projected start fall 2009).

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	Pepco "Smart Community Plan"	• Demonstrate improved distribution automation, smart grid technologies with 2,500 to 3,500 residential homes with AMI, voluntary CPP, enhanced direct control, efficiency programs, lighting and appliance rebates, information displays, outage detection and reporting . • Improve the efficiency of energy delivery and reduce the frequency and duration of outages. (proposed 2-12-09, annual costs est. $1.7 million)
	First Energy subsidiary Jersey Central Power & Light (EPRI)	• Demonstrate 8 mW Integrated Distributed Resources pilot as well as technologies to enhance peak load shifting, substation storage, grid monitoring and control.
	NSTAR (Massachusetts)	Demonstrate Tendril gateway with a smart meter Home Area Network real-time information, direct control of smart thermostats, and other applications with 3,000 residential customers.(proposed)
	National Grid (Worster, MA)	• Pilot with 15,000 15,000 customers representing urban, suburban and rural as well as single, mulit-family and small business. • Overhead and underground distribution devices, distributed generation, smart meters, and optional in-home programmable thermostats and other devices. • Multiple information delivery options and optional rate plans. (proposed, Est. cost $57 million, two-year time frame).
	Western Massachusetts Electric	Residential low income pilot with 600-800 customers. (proposed)
	FPL Group "Energy Smart Miami"	• Miami area pilot for 1 million smart meters. • Initial trial in 1,000 homes with in-home displays, smart-meter controlled controllable thermostats. (proposed, estimated cost $200 million)
	University of South Florida Power Center for Utility Explorations and Progress Energy	Demonstration with 5,000 customers to incorporate solar and biodiesel into the grid, with sensors, two-way communication to the customer, control technologies to reduce greenhouse gases, improve demand, reliability, and efficiency. ($15 million, three-year time frame).

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	Energy Australia "Distribution Monitoring and Control Project" (IBM)	Rollout of 12,000 sensing devices throughout the distribution network to help shorten power interruptions, provide preventative maintenance and improve energy deliver efficiency and reliability.
	Maltese National Electricity and Water Utilities (IBM)	Program to implement smart meters to manage consumption. (five year, 70 million Euros)

PG&E Proposed Smart Grid Initiatives

Initiatives	Description	Cost $Millions	Jobs Created
Expanded smart grid test facility and accelerated standards	• Expand and integrate existing facilities and expertise across PG&E to perform increased proof-of-concept, interoperability, and security testing of the full range of smart grid systems • Accelerate existing PG&E standards efforts to cover all the major elements of smart grid systems within the leading standards organizations, industry alliances, and users groups	$35-50	20-40+
End-to-end smart grid community demonstration	• Deploy an end-to-end, interoperable, secure smart grid for the purpose of testing and evaluating all elements of a smart grid in a real-world, commercial-scale customer environment • Project will entail partnering extensively with a municipality in PG&E's service territory, smart grid technology providers, and local universities	$150-200	150-200+
HAN demonstration	• Prove the integrated value of Home Automation Network (HAN) technology, innovative user interfaces, and dynamic rates in association with demand response, distributed generation, PHEV, energy efficiency, and energy conservation • Pilot and rollout notification devices to small-medium commercial and industrial customers in connection with transitioning to dynamic pricing to maximize response rate • Partner with Stanford University and other interested universities and DOE national labs	$30-60	5-10+
Regional synchrophasor demonstration	• Equip the transmission system with expanded phasor monitoring and control tools to test impact on grid reliability and utilization • Partner with SCE, SDG&E, the California ISO, BPA, WAPA, and other western utilities and transmission operators for a truly regional demonstration of the technology • Fully engage in DOE NASPInet initiative	$40-60	10-30+
Underground compressed air energy storage demonstration	• Partner with EPRI to lead an energy storage demonstration project to validate the design, performance, and reliability of a first-ever underground CAES plant (300MW, 10 hours) in California • Phased development over 5-7 years (economic/technical analysis, core drilling, environmental studies, plant construction, and monitoring) • Demonstrate the use of large scale energy storage to integrate intermittent renewables, store off-peak energy, provide ancillary services, manage peak demand, and relieve grid congestion	250-300	150-200+

SDG&E Proposed Smart Grid Initiatives

Demand Response and programmable Home Display and Control Project	DR that can account for dispatch loads, storage and generation, to any geographic scale with granuarity to customer device. Use AMI/HAN with control of individual appliances, EMS, battery, and PHEV.
Self Healing Grid Project	Expand SCADA and Self Healing Grid technology to automatically isolate and restore grid service.
Network Communications Project	Wireless networks to support Smart Grid and mobile communications.
Integration and Study of Electric Vehicles Project	Study impact of Electric Vehicles on distribution, charging, metering, and integration.
Dynamic Rating Project	Operate grid at higher efficiencies.
Energy Storage Project	Study options to address intermittency to support RPS 33% objectives.
Phasor Measurement Units Project	Expand number of Phasor Measurement Units (PMU) and real-time wide area monitoring.
Fault Location Sensors Project	Incorporate sensors, communication and IT systems to reduce the frequency and duration of customer outages.
Smart Grid Standards Project	Participate in standards efforts to address data exchange between systems, consumer devices, inter-operability.

SCE Proposed Smart Grid Initiatives

		Status	SCE Cost ($1,000's)	DOE Cost ($1,000's)
Above Ground Compressed 'Air Storage	EISA 2007, Section 1304. Demonstrate a 15MW, two-hour CAES system..	Pending	$**13,000**	$13,000
Large Scale Auto-Derivative Battery Storage	EISA 2007, Section 1304. Demonstrate a 25MW automobile derivative lithium ion battery storage system.	Pending	$13,000	$13,000
Secure Internet	EISA 2007, Section 1304. Demonstrate a secure telecommunication network to enable Smart Grid modeled after DARPANet.	Authorized	$5,000d	$5,000
Catalina Renewable Energy Integration	EISA 2007, Section 1304. Demonstration of high penetration renewable and sustainable energy system.	Pending	$3,500	$3,500
Deployment of Smart Thermostats and In-home Display Technology	EISA 2007, Section 1304. Expand deployment of display devices and Programmable Communicating Thermostats under Smart Connect.	Authorized	$15,000	$15,000
Smart Community Program	EISA 2007, Section 1304. Demonstrate a fully-functioning smart grid from a single substation..	Pending	$15,000	$15,000
Electric Transportation Fleet	EISA 2007, Section 1306. Acquire PHEV medium-duty trucks for utility fleet.	Authorized	$75,000	$25,000

PURPA Standards – Section 532 111(d)*

(16) Integrated Resource

A. Integrate energy efficiency resources into utility, State, and regional plans; and
B. Adopt policies establishing cost-effective energy efficiency as a priority resource.

(17) Rate Design Modifications to Promote Energy Efficiency Investments

A. In General – rates allowed to be charged by any electric utility
   (i) Align utility incentives with delivery of cost-effective energy efficiency
   (ii) Promote energy efficiency investments

B. Policy Options
   (i) Remove regulatory / management disincentives to energy efficiency
   (ii) Provide utility incentives for successful management of energy efficiency programs
   (iii) rate design goal of energy efficiency balanced with other objectives
   (iv) Rate designs for each customer class to encourage energy efficiency
   (v) Allow timely recovery of energy efficiency-related costs
   (vi) Offer home energy audits, demand response, publicize benefits

* Applies only to electric utility with retail sales greater than 500,000 MWh.