Pacific Gas and Electric Company®

Smart Grid Pilot Deployment Project

March, 2013

Pacific Gas and Electric Company

Agenda

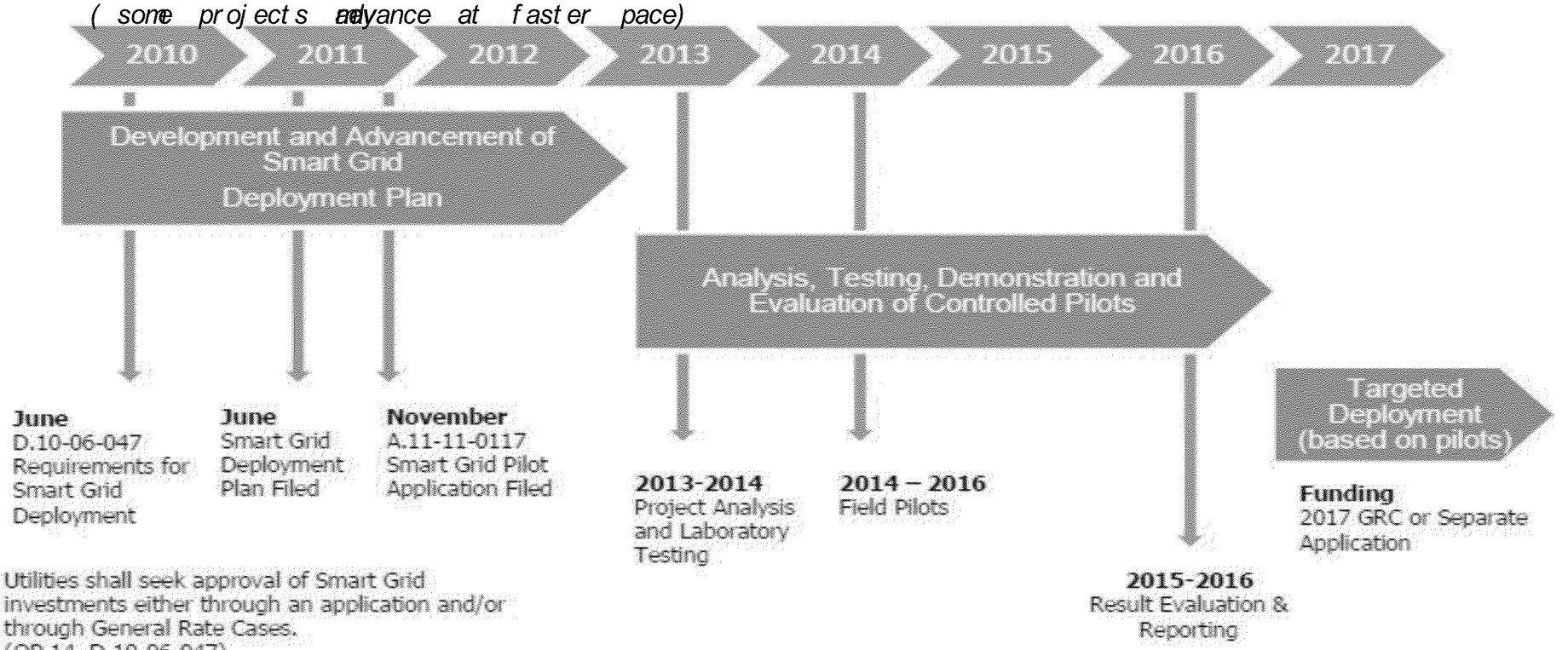
- Smart Grid Pilots Objectives
- Implementation Approach
- Proposed Pilot Deployment Projects
- Pilot and Potential Full Deployment Benefits
- Post Decision Requirements

Smart Grid Pilot Deployment Plan Objective and Timeline

Objectives Associated with Proposed Pilots

- Inform "Full Deployment" Investment Decisions
- Advance Grid Modernization Efforts as required in SB 17
- Accelerate Achieving California's Policy Goals

History and Conceptual Timeline Going Forward



Utilities shall seek approval of Smart Grid investments either through an application and/or through General Rate Cases.
(OP 14, D.10-06-047)

Proposed Pilot Deployment Projects

PD Recommended Approval:	Project Costs[1] (2013-2016)	Annual Avg. Rev Req for 2013-2016
1. Smart Grid Line Sensors • PG&E will perform product analysis and field tests of new sensors to evaluate their ability to reduce outage response time, improving outage location accuracy and providing near real-time grid loading information on up to 30 distribution circuits.	$16.9 M	
2. Volt/VAR Optimization • PG&E will test voltage and reactive power (VAR) optimization control systems on up to 12 distribution circuits with high peak demands and high solar photovoltaic (PV) generation levels to evaluate the ability of Volt/VAR to reduce customer energy usage and reduce utility system losses, improve the voltage profile and reliably integrate more distributed solar generation by managing the distribution from the substation to the customer's service point.	$38.8 M	$2.8 M
3. Detect & Locate Line Faults • PG&E will test decision analysis tools to pinpoint outages and non-hazardous circuit conditions caused by damaged equipment using input from a variety of data including input from digital protective relays, fault current sensors, Smart Meter voltage measurements and Smart Grid line sensors.	$13.0 M	
4. Short-Term Demand Forecasting • PG&E will evaluate if more granular sources of data can be used and acquired cost-effectively to improve the accuracy of short-term demand forecasts for PG&E's bundled customers, to inform day-ahead electricity procurement activities. Examples of more granular sources are Smart Meters, transmission and distribution network devices and demand response programs.	$14.1 M	$0.4 M
Total	$82.8 M	$3.2 M
PD Recommended Denial:		
5. Technology Evaluation, Standards and Testing • Create Smart Grid technology development capabilities to test and interoperability test new technologies, evaluate and develop standards, and improve understanding of new technologies through leveraging experiences of others.	$12.5 M	$2.9 M
6. Smart Grid Customer Outreach • Perform outreach pilots to customers to engage them in understanding Smart Grid benefits. Support customers in using Smart Grid enabled tools, making informed energy choices pertaining to their energy markets.	$13.5 M	$3.4 M
Total	$26 M	$6.3 M

[1] As presented in PD

Smart Grid Pilot Deployment Projects: Pilot and Potential Full Deployment Benefi

Initial evaluation of full deployment identified significant reliability, environment and other non-quantifiable benefits worth further investigations via pilot

Projects	Cost of Pilot/ Estimated Cost of Full Deployment	Expected Benefits Obtained From Pilots	Conceptual Benefits at Full Deployment; Pilots Needed to Verify			
			Monetary (in Millions)	Reliability	Climate	Other Non-Quantifiable Benefits
Smart Grid Line Sensors	$16.9M $98-$131M	Information Regarding Monetary, Reliability, Societal, Other Non-Quantifiable Benefits	Avoided Operation and Maintenance $28.7-$43.1M	Improved Reliability: 5-9% SAIDI 9-16% CAIDI		• Improved public/ system safety • Customer Satisfaction • Improved distributed renewable integration
Detect & Locate Line Faults	$13.0M $74-$103M		Avoided Operation and Maintenance $51.3-62.7M			• Improved public/ system safety • Improved power quality • Improved distribution system investments
Volt/ VAR Optimization	$38.8M $200-$276M		Avoided Energy Procurement $536-$1,070M		1.6 to 2.2M[1] of Avoided CO_2; Future Monetary Value of CO_2	• Improved distributed renewable integration • Improved power quality • Improved notification of equipment malfunctions
Short-Term Demand Forecasting	$14.1M $19-$27M		Avoided Energy Procurement $3.2-$47.6M			• Improved ability to forecast at more granular level.

[1] As presented in PD

Post Decision Requirements

- Proposed Decision (PD) includes a number of post decision requirements such as:
  - Meet with staff to discuss EM&V methodologies, processes, benefits, pilot proposals, schedules and expectations for phase status reports
  - Submit a Tier 1 advice letter for pilot implementation plan, its final EM&V metrics and updated project schedules.
  - Submit a status report via a Tier 1 advice letter for each phase 1.4 days
- Requirements are reasonable, provided that they do not delay/unduly the start of the approved projects or their continued implementation
  - PG&E will work diligently with staff to fulfill requirements, duplicative post decision reviews