• PG&E Smart Grid Program Progress
• Preview of Coming Attractions
• Smart Grid Supplier Diversity
A Smart Grid

Overlay with intelligence and automation

**Sense**
- Power Plants

**Communicate**
- Transmission Networks

**Compute**
- Substations

**Control**
- Distribution Networks
- Consumers
Implementation Approach

Standards definition
- Shape and validate the standards that will underlie future smart-grid implementations

Controlled Pilots
- Implement tested technologies in a real-world but controlled setting to demonstrate value
- Work with customers to prepare for the new technologies and services

Testing
- Prototyping and testing of smart-grid technologies before piloting
- Accelerate technology development and ensures standards compliance early on
- Develop preliminary customer communications to support pilots

Targeted deployment
- Extend pilots to targeted roll-outs based on benefits
- Insights used to feed the next cycle of technology deployment

PG&E Service Area in Northern & Central California
PG&E is using Smart Grid technologies to provide customers with benefits today.
Engaged Customers

The future of energy management

- 9.4 million gas and electric Smart Meters deployed
- 2.1 million customers have access to online hourly usage information
- Over 76,000 customers are enrolled in PG&E Energy Alert program – notification of moving to high rate tier

Since its launch, over 100,000 customers have clicked the Green Button to download their data from PG&E’s Website
Smart Energy Markets

- Nearly 80,000 customers participated in PG&E’s Smart Rate program to reduce their bill and reduce peak demand
- Completed Phase 1 of its Electric Vehicle Charging Demand Response program
- 2 MW battery installation at Vaca Dixon substation released to Operations

Saving customers money and integrating renewables through markets
• 70 circuits in Fresno and Bakersfield with advanced distribution automation to improve reliability (Cornerstone)

• Smart Meter data is fully integrated with PG&E's Outage Management system

• Western Interconnection Synchrophasor Project is in construction across the Interconnection

Four operations on Cornerstone circuits resulted in dramatic reliability improvement
Smart Grid Pilot Deployment Projects

- Smart Grid Line Sensors
- Voltage and Reactive Power Optimization
- Detect and Locate Line Faults
- Short Term Forecasting Improvement
- Technology Evaluation, Standards Development and Testing
- Smart Grid Customer Outreach

If approved, the projects will be implemented in 2013-2016
$100 million investment proposed
<table>
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<tr>
<th>Demonstrate System and Public Safety</th>
<th>Demonstrate Reliability</th>
<th>Affordable Environmental &amp; Energy Policy Attainment</th>
<th>Key “Megatrend” Drivers &amp; Policy Objectives</th>
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| Health/Environmental Impact, Hazard Mitigation, System Integrity | Reliability Improvement, Maintaining Reliability in the face of Grid changes | AB32, RPS, Energy Efficiency, Distr. Gen/Renewables & Integration (Distributed & Large Scale) | • 33% RPS  
• CSI  
• Gov's 12,000 MW DG Plan  
• OTC retirements  
• AB32  
• Energy Storage OIR |

**Renewables and Distributed Energy Resources Integration**
- Integration of Distributed Energy Resources, Generation and Storage
  - Transparency of Resource Information
  - Generation Flexibility

**Grid Modernization and Optimization**
- Demonstrate Strategies and Technologies to Optimize Existing Assets
  - Prepare for Emerging Technologies
  - Design and Demonstrate Grid Operations of the Future

**Customer Services and Enablement**
- Drive Customer Service Excellence by Leveraging the SmartMeter Platform
- Drive Customer Service Excellence by Offering Greater Billing Flexibility
  - Integrate Demand-Side Management for Grid Optimization

**Cross Cutting/Foundational Strategies & Technologies**
- Smart Grid Architecture, CyberSecurity, Telecommunications, Standards

**Key “Megatrend” Drivers & Policy Objectives**
- SB17
- Aging Infrastructure
- Workforce Development
- California Economic Resiliency

**Cross Cutting/Foundational Strategies & Technologies**
- Smart Grid Architecture, CyberSecurity, Telecommunications, Standards
PG&E Smart Grid & Supplier Diversity

- PG&E expects its Smart Grid value chain to achieve our goal of 40% spend with diverse suppliers

- The CPUC and community stakeholders have clearly communicated the expectation that diverse businesses will fully participate in all aspects of Smart Grid design and implementation

- PG&E Smart Grid spend may include $100M on pilot projects (2013–2016) and $1.3B for deployment (2017–2020)

- Smart Grid prime suppliers will need creative solutions to meet PG&E’s diversity goals: 2nd and 3rd Tier sub-contracting, joint ventures, business solution partners

- For more information
  - www.pge.com/supplierdiversity
  - www.pge.com/smartgrid