

**DOCKET**

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## **SDG&E's Smart Green Grid Vision**

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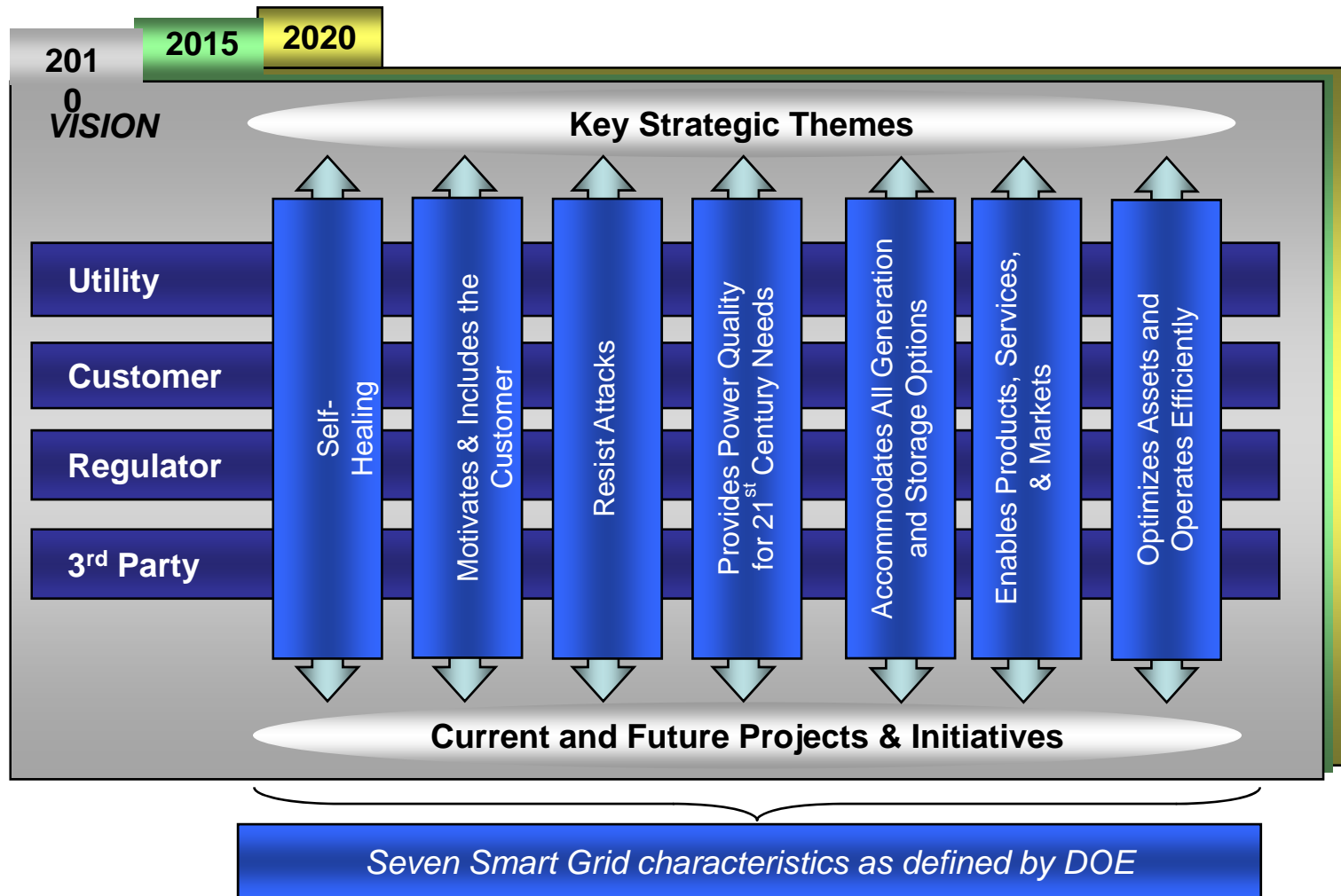
May 14, 2009

- Smart Green Grid<sup>SM</sup>

“Green”

# Roadmap Approach

The Smart Green Grid is a **business transformation** that has **distinct key themes** at different phase of development.

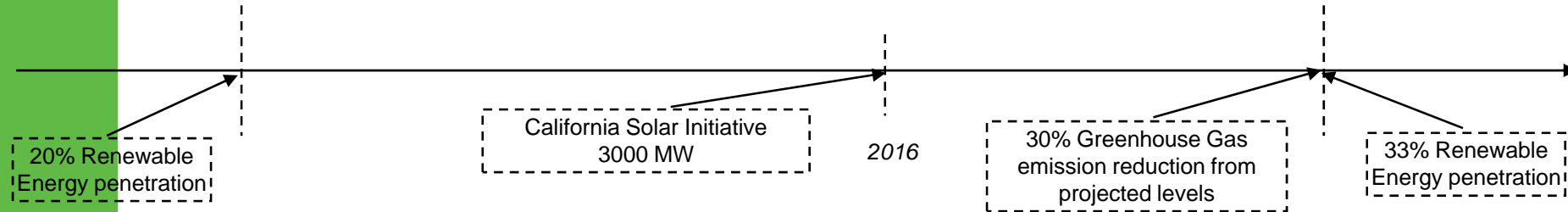


# Smart Green Grid Roadmap

2010

Energy Policy Goals

2020



**2009 - 2011**

**2012 - 2015**

**2016 - 2020**

## Deploy base technologies

- ✓ Smart meters installed
- ✓ OMS/DMS system
- ✓ Microgrid Pilot

## New Customer programs offered by Utilities

- ✓ Dynamic Pricing
- ✓ EE, Demand Response
- ✓ HAN, Energy Management

## Many Smart Grid components are initially deployed

- ✓ Self-healing-grid technologies in full deployment
- ✓ Microgrid technology deployed and self sustaining community concept demonstrated
- ✓ PHEV infrastructure pilots

## Automated outage detection, restoration, and customer notification

- ✓ Expanded SCADA & line devices
- ✓ Self Healing Grid technologies in place

## Traditional utility relationship with customer is changing due to more mature new services for customers

- ✓ Load control with DR
- ✓ Bundled services
- ✓ DER Aggregation (including PHEV)

## Major regulatory issues are solved

- ✓ Data ownership and access
- ✓ Cross jurisdictional conflicts
- ✓ T&D renewables strategy

## Customer supply side & storage decisions become the norm

- ✓ Significant DER Penetration
- ✓ Additional Microgrids where cost effective
- ✓ "Customers as resources"

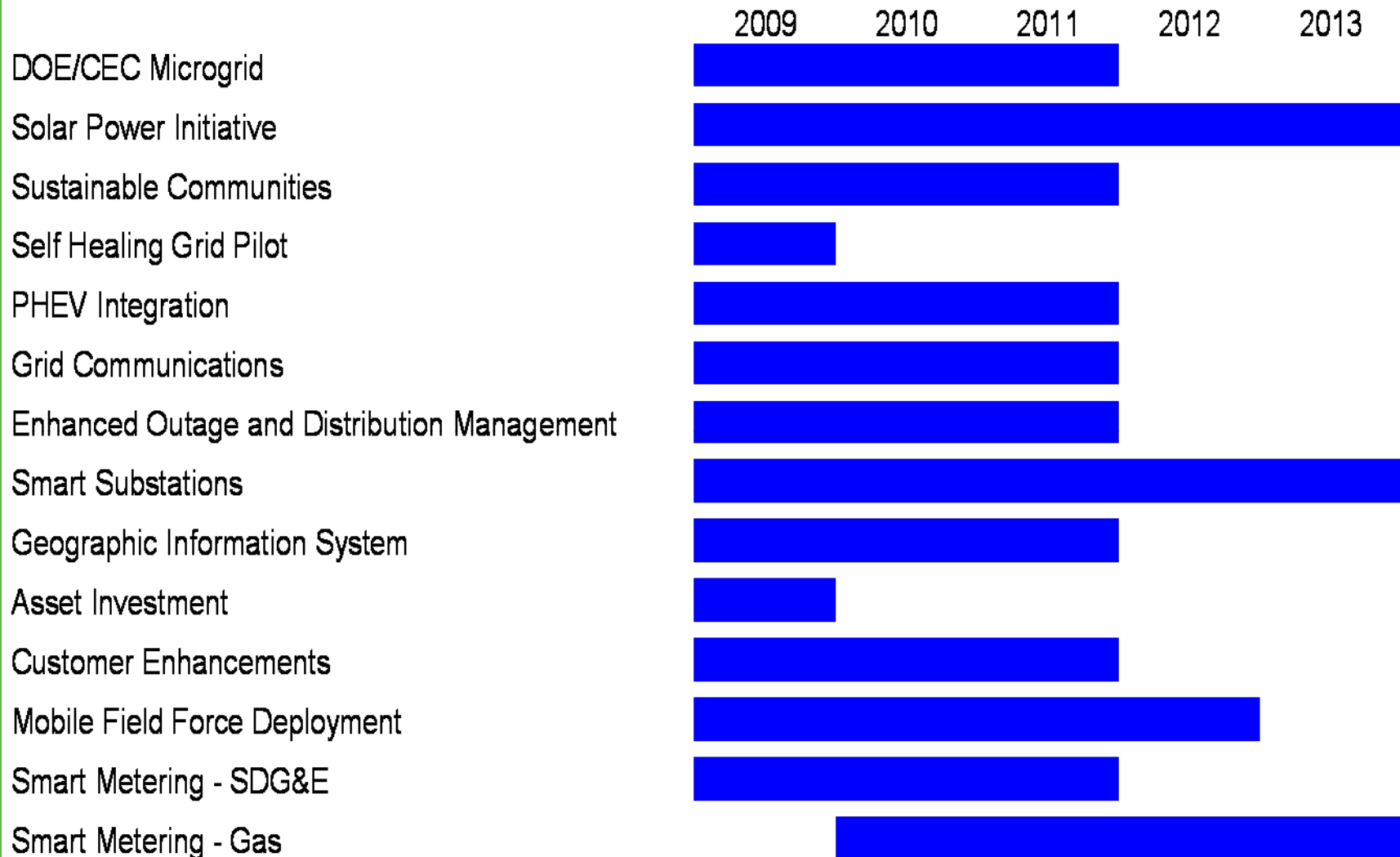
## PHEV adoption rises- utility becomes "gas station of the future"

- ✓ PHEV adoption emerges as a critical component of DER
- ✓ Charging infrastructure in place
- ✓ PHEV rates in place (charge & discharge)

## Advanced grid technologies in place

- ✓ CBM, Cable Diagnostics
- ✓ Advance Energy Storage to support RPS goals
- ✓ Self-healing grid is a reality

# SEu Smart Grid Projects To-Date



**Includes projects pending CPUC approval**

# Potential Stimulus Strategy

## Strategic Components

- **Grid** – Enhancements to the grid to reduce customer disruptions, resists attack, and improve workforce and asset optimization
- **Customer** – Enable and motivate customer's energy management through smart energy devices, new products and services and adoption of PHEV and renewable resources at the premise
- **Environment** – Incorporate and enable all generation and storage options to support customer choice, improve grid stability and improve power supply options



**Large Scale Energy Storage, Phasor Measurement Units, Self Healing Grid, Network Communications**



**In-home/in-premise displays, control of individual appliances, Energy management systems/controllers**



**PHEV Integration, Renewable Resource Integration**

### Intro

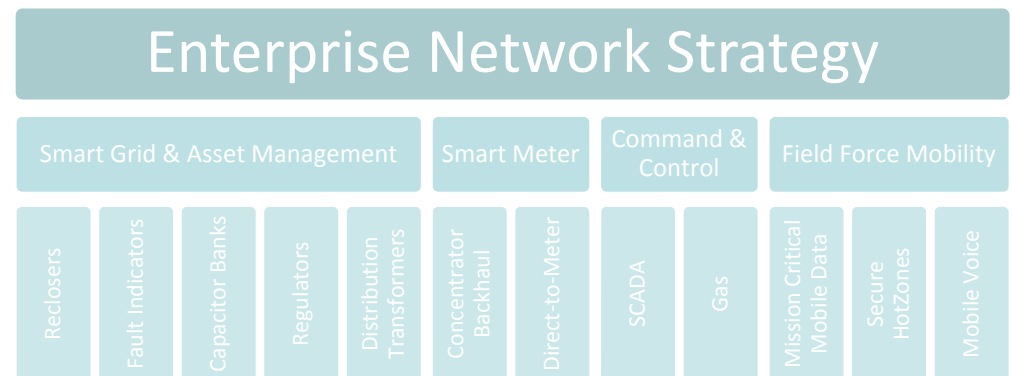
- SEu has extensive wireless network systems in place today that support a wide variety of communications
- Many of the existing systems are reaching the end of their useful life.
- New programs such as OpEx 20/20, Smart Meter and Smart Grid are putting upward pressure on network capabilities.

### Background

- Separate radio systems were built for such services as mobile voice, mobile data, SCADA and other remote monitoring and control functionality.
- This resulted in setting up technology silos that have their own suite of technical expertise, operational support, management platform as well as unique logistical framework.
- Systems were built singly at disparate times, no integrated solution was developed.
- Systems built by the individual utilities pre-merger compounded the problem.

### Needs

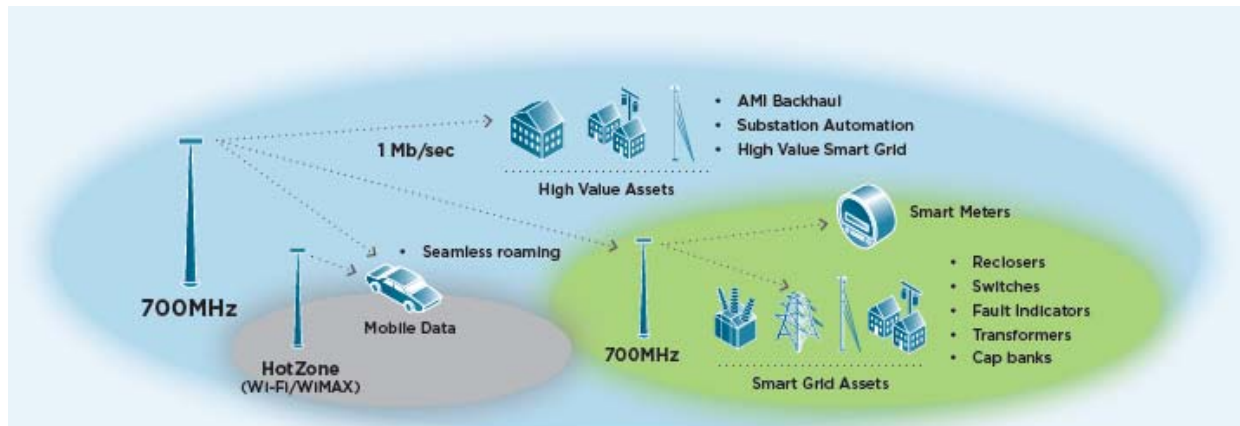
- Mobility
- Smart Grid
- Smart Meter
- Emergency Response





## Network Communications Issues Solution Summary

The design and deployment of a dedicated and mission critical network of networks will address the broadest communications requirements of Sempra Energy utilities. It will meet the currently known needs of the business as well as be available for more advanced functionality in the future. This common platform will not only provide an enterprise-wide solution, it will do so cost effectively.



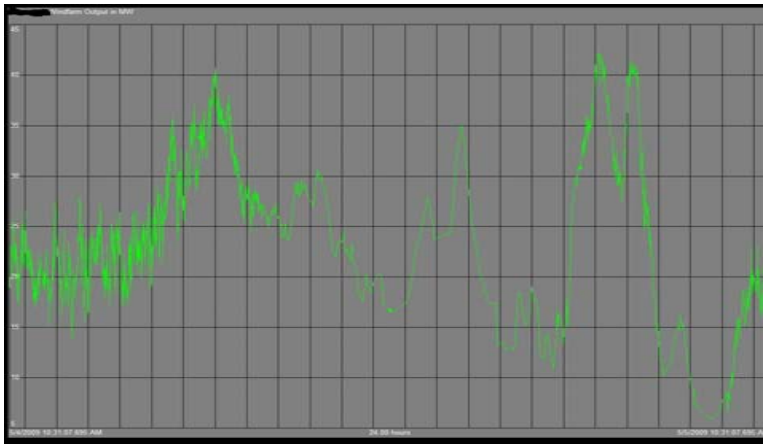
<b>Fixed/Mobile Overlay</b> Ultra-wide coverage & megabit speeds Direct-to-grid & smart grid layer		<b>SECURITY</b> <b>MANAGEMENT</b>
<b>Smart Grid Layer</b> Smart Meter & Smart Grid Assets Dense Distribution [overhead/underground]		
<b>HotZone (Wi-Fi/WiMAX)</b> Leased line replacement High capacity mobile users		



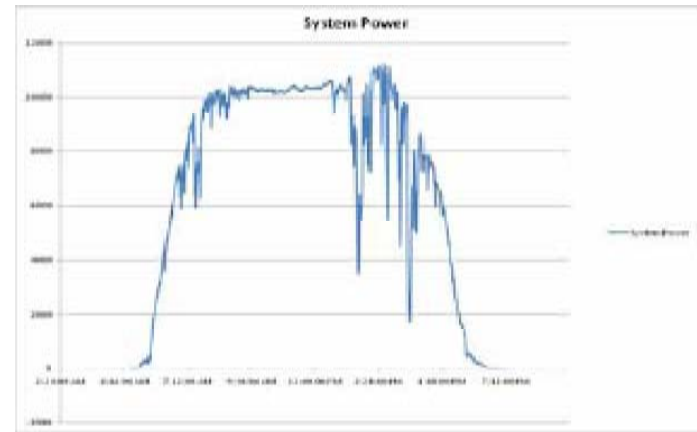
**Emergency  
Management**



- Need for R&D regarding mitigating intermittency
  - Impact and design of storage systems and associated controls
  - System modelling
- Need for renewables strategy
  - NIMBY and BANANA
- Need for cost allocation strategy
  - Who pays?



**Wind**



**Solar**