Smart Grid--What is it and how will it help California?

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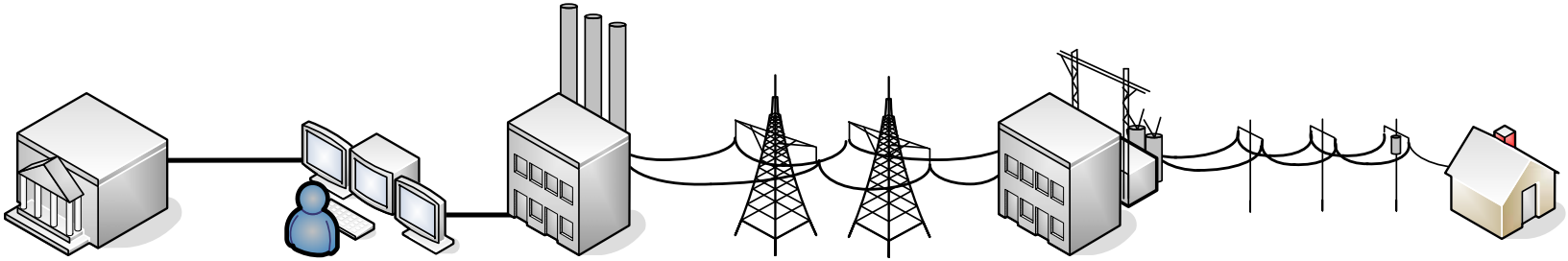
Overview

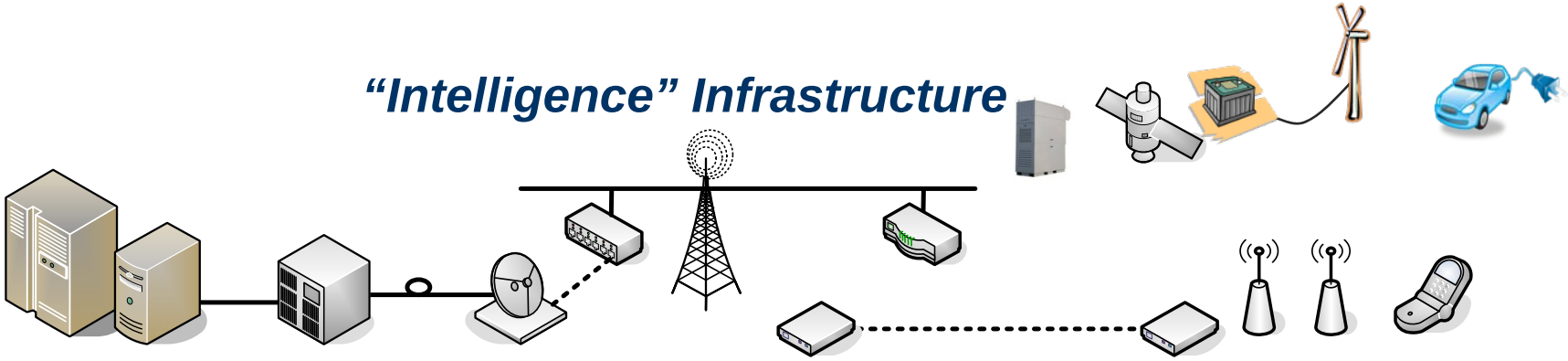
- What is Smart Grid?
- What is a California Smart Grid?
- California Smart Grid Research Efforts
- Smart Grid Economic Stimulus Package
- How will Smart Grid help California?

Merging Two Infrastructures



Electrical Infrastructure

"Intelligence" Infrastructure



What is a Smart Grid

A smart grid delivers electricity from suppliers to consumers using *digital technology* to *save energy, reduce cost and increase reliability*. Such a modernized electric network is being promoted by many governments as a way of addressing *energy independence or global warming issues*

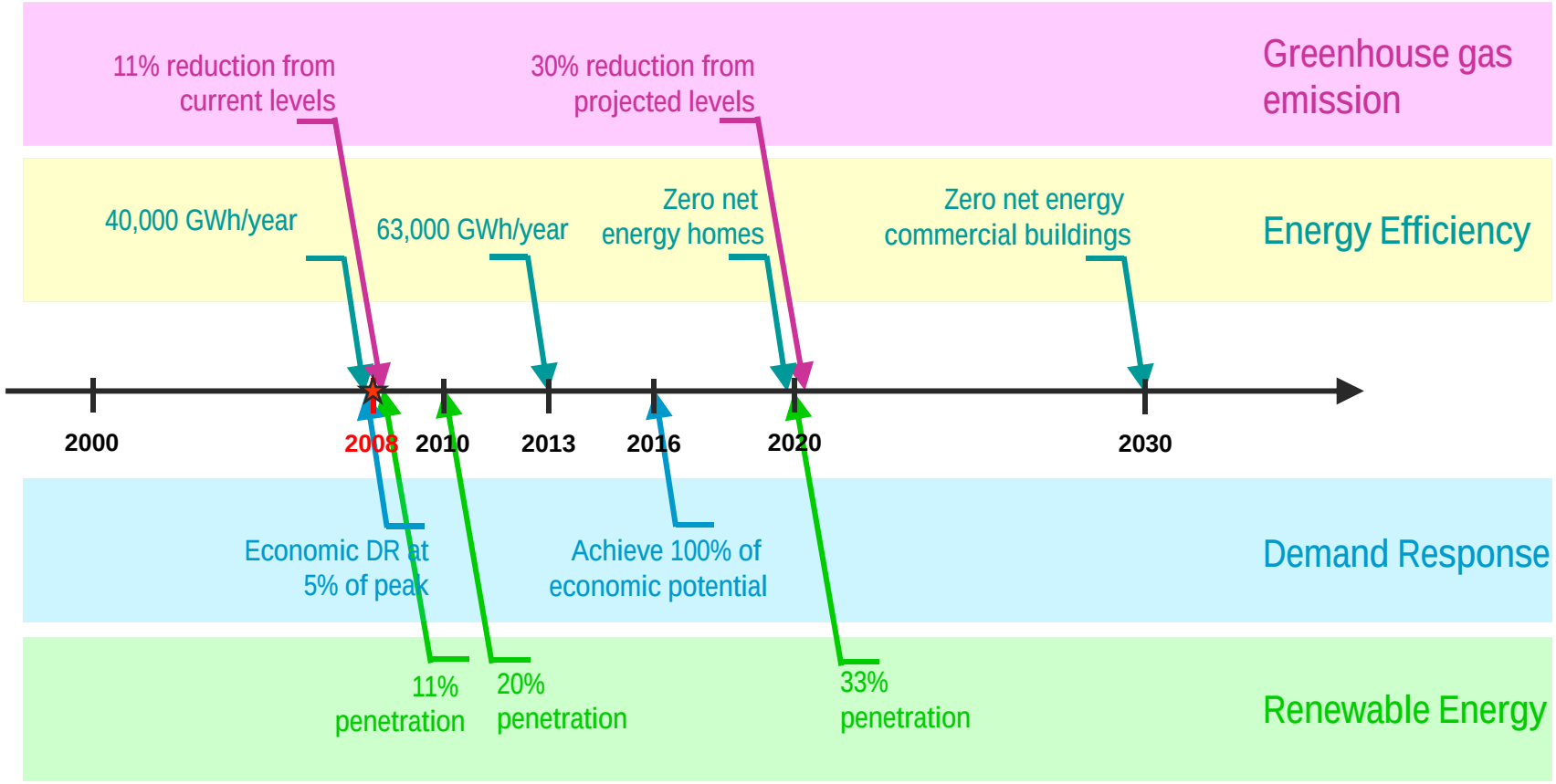
Why Smart Grid?

Why Smart Grid

- Good for the Environment
  - Provides new options to reduce emissions & improve overall efficiency
  - Makes Green Grid a Reality
- Cleaner, Lower Cost Operations, More Efficient
  - New cost lowering technologies
  - Increased efficiency in operating existing systems--higher utilization rates
- Improved Grid Operations
  - Higher reliability
  - Less outage time / shorter outages / smarter decisions
- More Options for Consumers
  - Lower overall energy costs
  - More choices on how to meet individual consumer needs
  - Dynamic rates to better integrate needs of grid and consumer

What is a Smart Grid for California?

California Energy Policy Targets



California Advanced Metering Initiative Summary

	Pacific Gas & Electric	San Diego Gas & Electric	Southern California Edison
# of Electric Meters	5.1M	1.4M	5.3M
# of Gas Meters	4.2M	0.9M	Gas Utility may connect to AMI
Costs Approved	$1.7B in July 2006	$0.6B in April 2007	$1.7B
Costs Pending Approval	$0.6B to upgrade	-	-
Deployment Schedule	2006 to 2012	2008 to 2011	2009 to 2012

- Note: The table pertains to meters for utility customers with maximum load less than 200 kW. Customers with maximum load greater than 200 kW already have advanced meters.

California Smart Grid Factors

- California energy policy
- Ongoing California deployments
- California future energy growth needs
- California energy use profile
- Impact of rapid insertion of ARRA Smart Grid funding

Applications at all levels will be enabled

Transmission

Phasor Measurement

Substation

Condition Monitoring

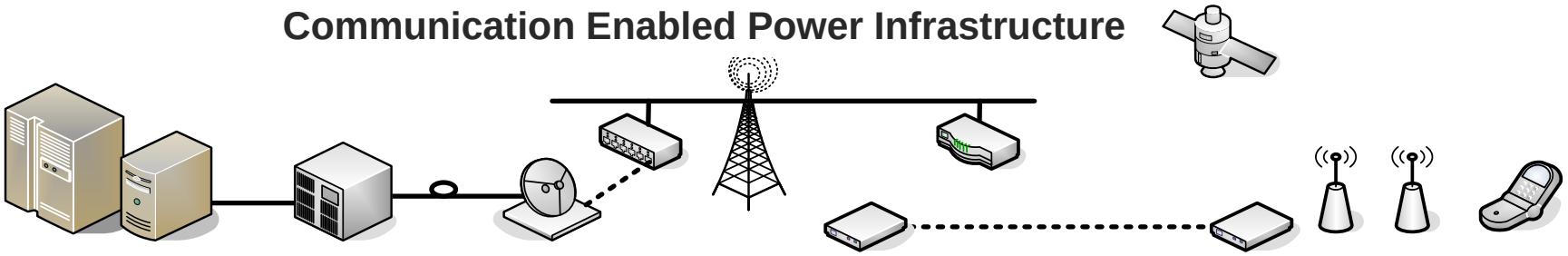
Distribution

Distribution Automation

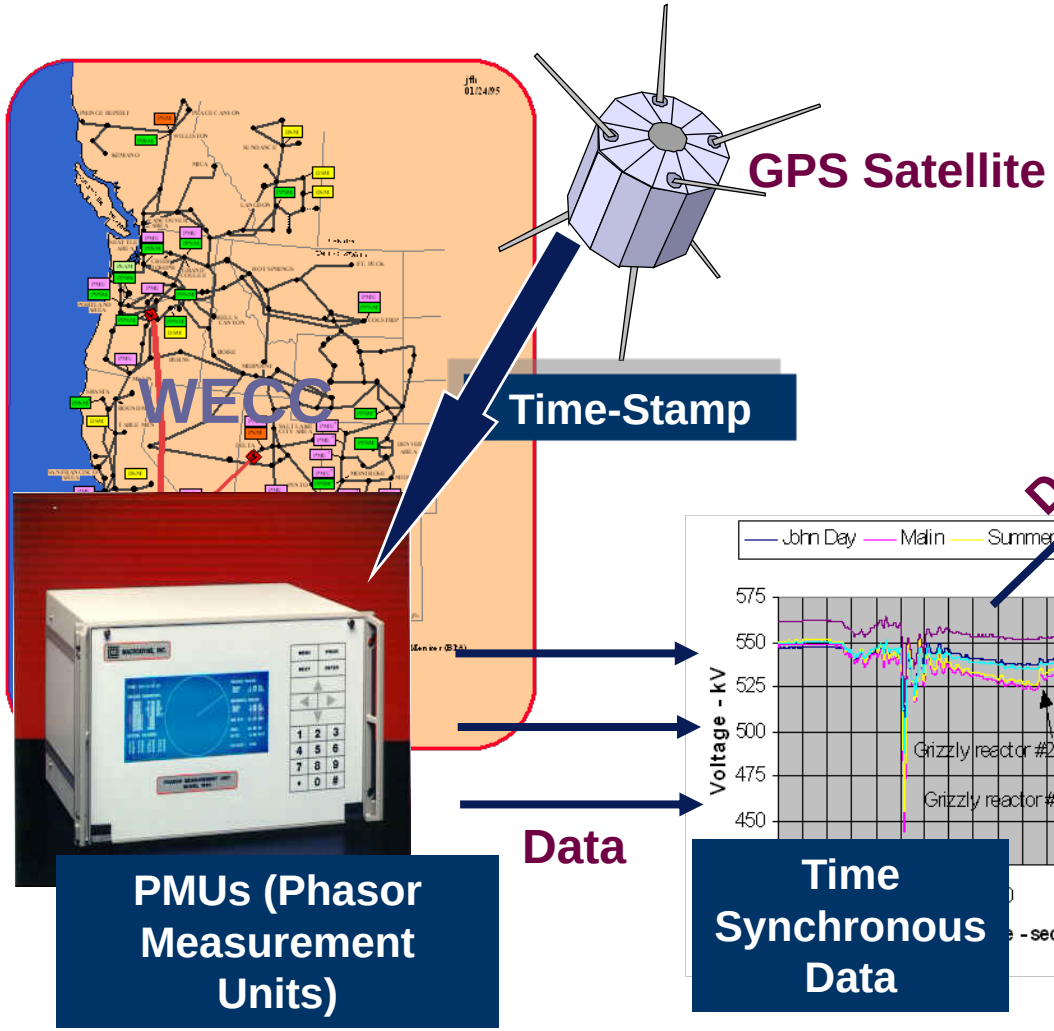
Consumer

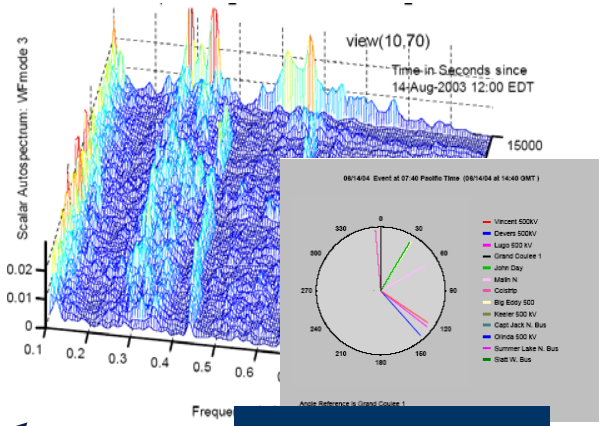
Demand Response

Communication Enabled Power Infrastructure

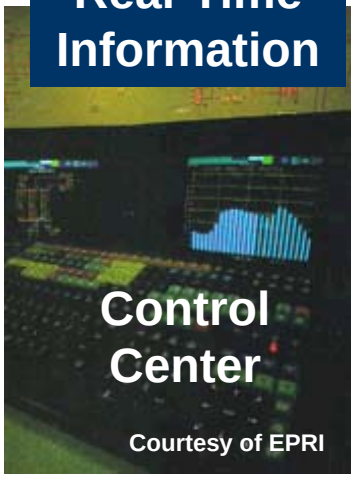


Synchrophasor Measurement – The Heart of the Smart Grid Transmission





Useful Real-Time Information



Ultimately, Smart Grid required for maximum renewables deployment.

Energy Storage Technologies Applying Smart Grid Technologies

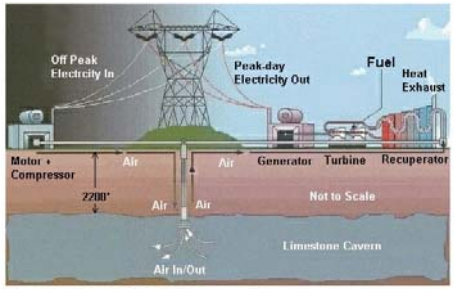
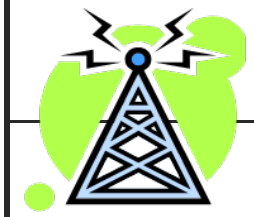


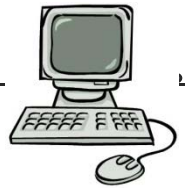
Photo Courtesy of CAES Development Company

Photo Courtesy of Saft America

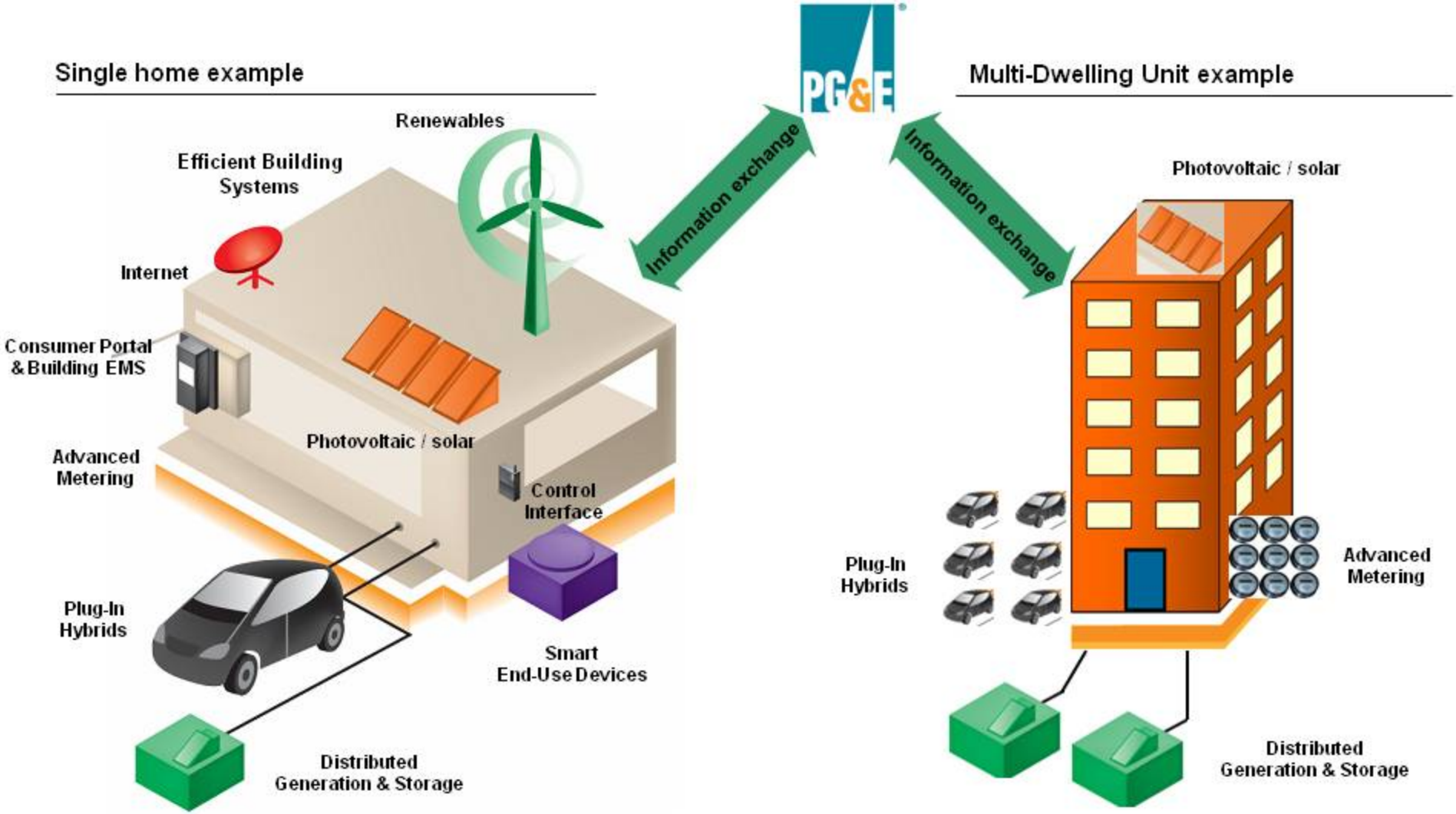
Demand Response Automation by Sector

Communicating Thermostat	Demand Response Automation Client	Demand Response Automation Client





Smart Grid Customer Opportunities



Upcoming Smart Grid Activities

- PIER Request for Proposal:
  - *Defining the Pathway to the California Smart Grid of 2020*
- PIER Funded RD&D Activities:
  - Micro-Grid demonstrations of Smart Grid technologies
  - White Paper on defining the Smart Grid standards, codes and protocols
  - White Paper on the Smart Grid technologies that will accelerate the fielding or increase the penetration of renewables in California
  - White Paper on how Smart Grid technologies will make electricity energy storage more useful in meeting California's goals
- Upcoming CPUC Rulemaking on Smart Grid

Smart Grid

Economic Stimulus Funds

Smart Grid Related Economic Stimulus Funds--$11B in New Efforts

- DOE Funding Opportunity Announcement (FOA) Smart Grid Demonstrations--$615M
- Notice of Intent to Issue an FOA for Smart Grid Investment Grants--$3.375B
- Bonneville Power Administration--$3.25B in additional borrowing authority
- Western Area Power Administration--$3.25B in loan guarantees

How Smart Grid helps California Meet Future State Energy Goals

- Provides Green Grid that is more efficiency, produces less emissions, operates more reliably and lowers cost for all

- Provides vehicle to support more renewables, increased energy efficiency, better blend of distributed and central generation assets, higher penetrations of PHEVs and hybrids, and lowers dependence of foreign imports

- Increases data access at all levels and allows for quicker and more effective decisions at the appropriate level

- Fosters innovation, improvements and better services for the consumer

Follow-up Questions

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