



U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program

PG&E's Innovative Federal Collaboration Advanced Lighting Technology Program for Federal Buildings

Federal Utility Partnership Working Group
November 1, 2006

"A 3 MW Success Story: Delivering on the Promise"





Today's Presentation

- **Setting the Scene**
 - U.S & Global Perspective
- **Program Overview:**
 - Advanced Lighting Technology Program for Federal Buildings
- **Benefits**
 - Energy and environmental
- **Conclusion:**
 - The Lamborghini Analogy



Setting the Scene

U.S. Policy: The National Direction

“The answer to high energy prices is the kind of comprehensive approach embraced by the President—that includes...increasing our reliance on energy efficiency and conservation.

“Let me be clear: Encouraging greater energy efficiency is part and parcel of changing the way we power our homes and offices, and it is a priority for the Department of Energy.”

June 14, 2006

United States Energy Association, Energy Efficiency Forum
Remarks Prepared for Energy Secretary Samuel W. Bodman



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Setting the Scene

Federal Mandates

“Through EPACK, we are raising energy efficiency standards so that businesses and consumers will have more energy efficient products from which to choose when they build or re-outfit a business or redesign and renovate a home.

“In addition, the Department of Energy will soon be issuing a regulation requiring that all new federal buildings--whether office or residential facilities--meet enhanced energy efficiency requirements.”

August 8, 2006
One-Year Anniversary of EPACK
U.S. Energy Secretary Samuel W. Bodman



Setting the Scene

Federal Goals/Executive Orders

Federal agencies are required to meet energy and water management goals, including:

- Reduce facility energy use per square foot by 30 percent in 2005 and 35 percent in 2010 relative to 1985 baseline
- Reduce industrial/laboratory energy by 20 percent in 2005 and 25 percent in 2010 relative to 1990 baseline
- Expand use of renewable energy, equivalent to 2.5% of Federal facility electricity consumption by 2005
- Install 20,000 solar energy systems by 2010
- Implement best management practices for water conservation in 80% of Federal facilities by 2010
- Reduce greenhouse gas emissions 30 percent by 2010 compared to 1990 baseline





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Setting the Scene

America's Energy Demand

Associated Press

**U.S. Population Hits 300
Million Mark**



“One thing all these new Americans will need is energy—a good deal more of it than we are producing and consuming today. **Our experts tell us that by 2030 total U.S. energy demand will grow by 34 percent.*”**



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Setting the Scene

EE/DR's Global Role



International energy usage forecast:

“The analysis estimates that, by 2030, global energy consumption will grow by over 70 percent. Not surprisingly, the strongest growth is expected in developing economies in Asia – including China and India – with growth projected to triple in that region over the next 25 years.”



Program Overview

The Advanced Lighting Technology Program for Federal Buildings will:

- Team market leaders from the Public and Private sectors
- Deploy advanced lighting technology
- Integrate lighting solutions with building controls systems
- Increase and automate facility efficiency
- Facilitate utility incentives
- Improve occupant productivity and satisfaction
- Reduce emissions
- Demonstrate the role of advanced EE/DR
- Help the environment
- **Save energy**



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Goals

Our Program goal:

To save 3 MW of electricity by applying “tailored” energy-efficiency and demand-response technologies to shed load, cut power use and reduce pollution



“A 3 MW Success Story”



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Program Objective

An Umbrella Strategy:

Our Program objective is deploying more cost-effective advanced lighting control technology integrated with building controls systems to achieve energy savings without compromising comfort and occupant acceptability, while measuring persistent yields

“Integrating a Full-Spectrum of Issues”



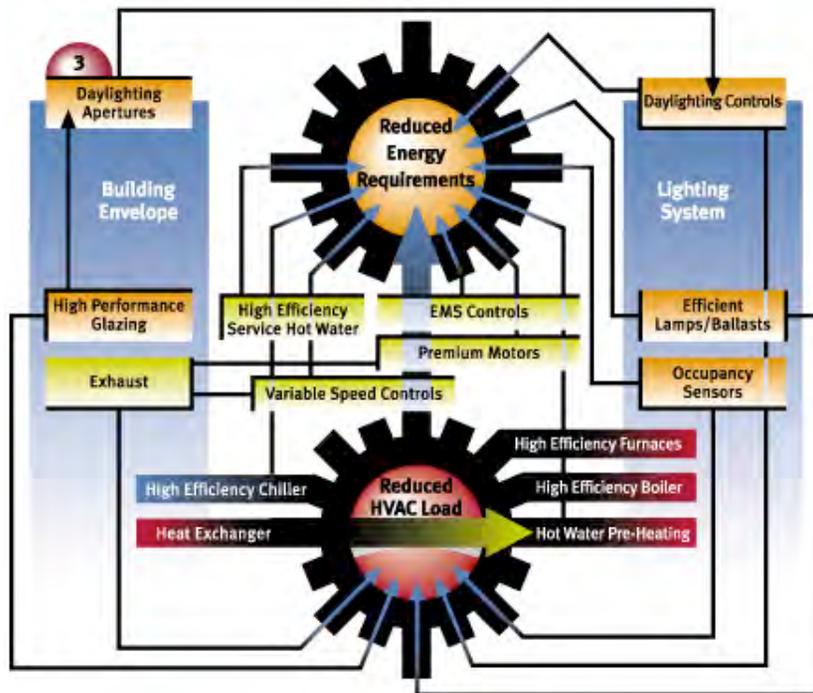
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Program Vision

The Intelligent Building



Program Mission



Our Program mission is buildings that are highly efficient and dynamically responsive to electricity events and market signals -- automatically



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Timetable



Photo Credit: KMD Architects

**The Advanced
Lighting Technology
Program for Federal
Buildings will deploy
over calendar years
2006 - 2008**



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Program Team

- Pacific Gas and Electric Company
- U.S. Department of Energy – FEMP
- Lawrence Berkeley National Laboratory
- Pacific Northwest National Laboratory
- Light Right Consortium
- Federal agencies
- Agency-contracted ESCOs

“A Public-Private Collaboration”



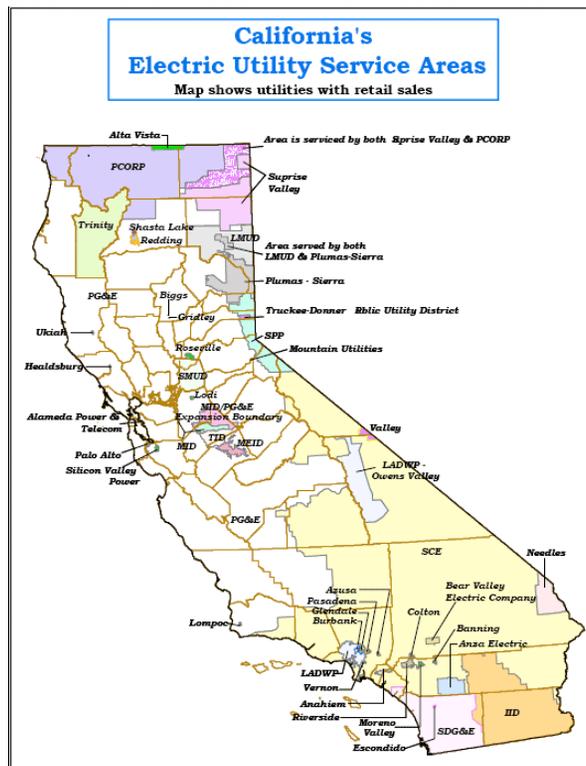
Team Roles

The Program Team:

- Identifies facilities
- Enrolls them as participant-partners
- Deploys technology solutions tailored to each site
- Measures and Verifies energy savings
- Documents occupant and customer satisfaction
- Reports results
- Transfers technology



Program Focus



The Program focuses on the Federal Sector:

- California's Federal building stock is about 400 million square feet
- The Program sets up in a portion of this segment (~ 3 million square feet)

“The federal government is largest energy consumer in the United States”



California's Market Potential

California Federal Government Facility Data (FY2000)

Building Occupancy	U.S.		California			
	Number of Buildings	Floor Area (Millions SF)	Number of Buildings	Floor Area (Millions SF)	Percent of National Number	Percent of National Area
Housing	162,112	672.50	32,732	120.38	20.2%	17.9%
Office	28,711	602.33	3,430	65.01	11.9%	10.8%
Service	64,240	479.64	8,567	77.54	13.3%	16.2%
Storage	77,671	402.14	6,885	69.10	8.9%	17.2%
R&D	13,182	151.80	2,208	25.67	16.8%	16.9%
Schools	11,339	149.48	1,181	16.12	10.4%	10.8%
Hospitals	1,523	140.07	177	12.50	11.6%	8.9%
Industrial	7,885	116.69	236	6.88	3.0%	5.9%
Other Institution	14,424	112.37	1,214	8.15	8.4%	7.3%
All Other	42,849	67.07	5,553	10.23	13.0%	15.3%
Prisons	2,376	50.60	136	3.42	5.7%	6.8%
Post Office	3,992	23.54	209	1.04	5.2%	4.4%
Total	430,304	2,968.21	62,528	416.04	14.5%	14.0%

California Federal Government Facility Data (FY2000)



What Technology?

Light bulbs/HVAC/Controls, etc...

- **The Program Team tailors technology solutions:**
 - One size does not fit all. Deployed solutions are the set of hardware, software, controls that best meet goals
- **Internationally recognized Subject Matter Expertise:**
 - The Team knows EE/DR emerging and best, demonstrated technologies, and Standards
- **World-class industry partners:**
 - Our partners inject Best Industry Practices
- **Bottom Line:**
 - Performance is confirmed by M&V and customer-occupant satisfaction data analyses

“The set of solutions chosen optimizes building performance”



Program Benefits

- **Demonstrates Environmental Responsibility:**
 - Reduces emissions of CO₂ by 97.82 tons, NOX by 28.04 tons and PM-10 pollution by 12,617 pounds
- **Features Public-Private Sector Collaboration:**
 - Taps complementary expertise, accelerating success
- **Focuses on Stakeholder & Customer Satisfaction:**
 - The Program addresses the U.S. DOE, CEC, CPUC and CAISO electricity market initiatives
- **Addresses a Significant Statewide Opportunity:**
 - Lighting is the biggest, single use of electricity in commercial buildings -- about 29% of peak load and 34% of annual energy consumption. Significant lighting efficiency opportunities remain

Lighting is part of “The Intelligent Building”



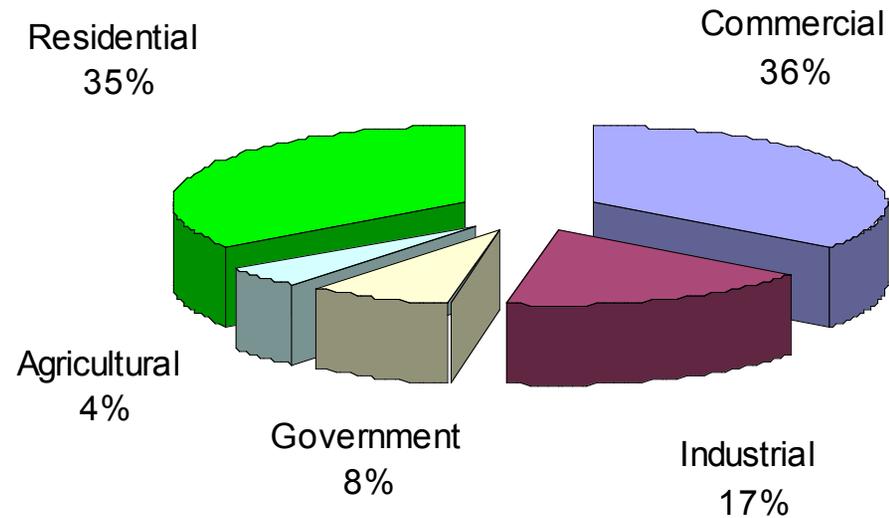
Benefits (cont.)

- **Responds to the Large, Underserved Federal Sector:**
 - The Program will deploy in multiple Federal buildings with some 3 M SF in the San Francisco Bay area. California’s Federal building stock totals about 416 million square feet
- **Immediately Teams Technical and Market Leaders:**
 - Integrates technical perspectives and solutions with a **“results-expected”** culture
- **Establishes a Foundation for Broader Public Good:**
 - Verified data can accelerate broader technology deployment
- **Helps Federal buildings meet U.S. mandates**
- **EE/DR: Clean, reliable and safe**



California Buildings Data

Peak Demand by Sector





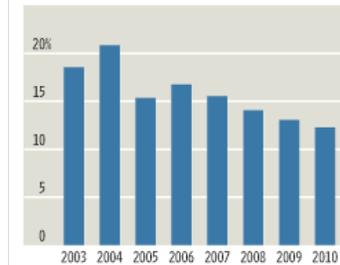
California Market Forces

- **Responding to California's changing electricity market:**
 - Economic growth
 - Critical peak pricing (CPP) tariffs for large commercial end-users (>200kW)
 - Ongoing transmission & distribution constraints for State's infrastructure
 - Generation shortfalls
- **Also, new initiatives to restructure electricity market to link wholesale & retail costs**

Pressures to Cut Back

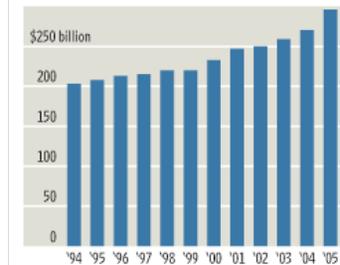
Tighter Supply

Surplus generating capacity (as a percentage of total capacity) is headed below the 15% level generally considered necessary to cope with plant outages and peak loads



Higher Bills

Electricity sales to all users jumped to \$296 billion last year from \$203 billion in 1994, creating incentives to find ways to cut costs



Greenhouse Emissions

The electric industry's emissions of carbon dioxide, a greenhouse gas, have trended higher, creating support for energy-efficiency programs to fight global warming



Source: Energy Information Administration,
U.S. Department of Energy



A Crisis?

Responding with Solutions

Important Message

During this prolonged heat wave, please help us by refraining from non-essential use of energy. We'd like to thank our customers for their continued energy conservation.

Our crews are working throughout this heat wave and we've brought in additional crews to serve the hardest hit areas. Please join us in looking out for our friends and family during this time.

[Tips for addressing heat-related illnesses](#) | [Energy conservation tips](#)

Important Message

During this prolonged heat wave, please help everyone by reducing electricity use as much as possible. We'd like to thank our customers for their continued energy conservation.



- [Tips for addressing heat-related illnesses](#)
- [Energy conservation tips](#)
- [Places to get cool during heat wave](#)

Our crews are working throughout this heat wave and we've brought in additional crews to serve the hardest hit areas. Please join us in looking out for our friends and family during this time.

Energy System Status

Time of message: Sunday, July 23, 2006 at 8:10:37.

- ◆ THE CAISO HAS DECLARED A STAGE 1 EMERGENCY FROM 12:10 TO 20:00 FOR 07/22
- ◆ THE CAISO HAS REQUESTED 300+KW CUSTOMER VOLUNTARY CURTAILMENT TODAY UNTIL 20: HOURS FOR



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The Lamborghini Analogy

Among the most powerful, expensive and exclusive cars on the road



Just for today, pretend you own one!



Pacific Gas and
Electric Company



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The Lamborghini Analogy

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Intelligent Buildings...



...That Drive Themselves



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Summary

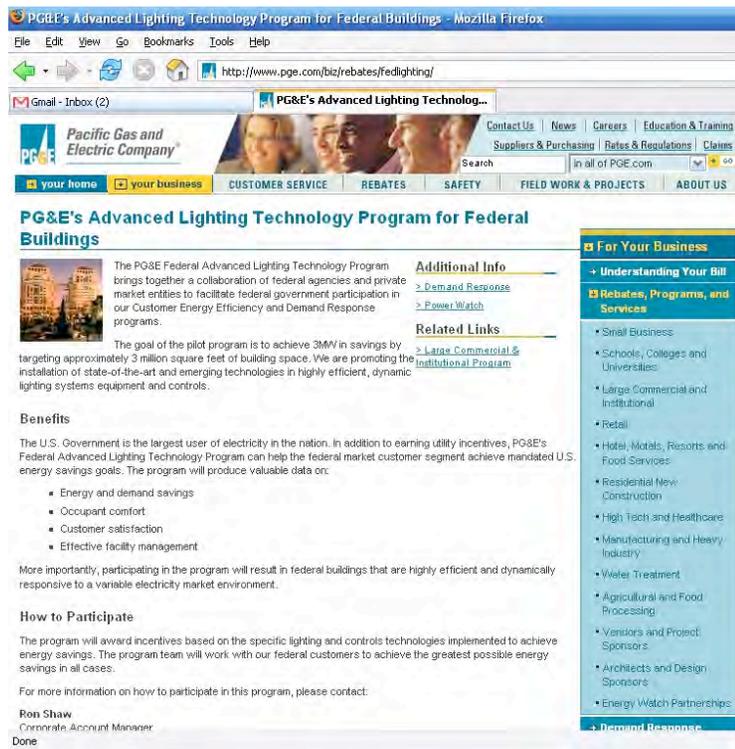


“Conserving energy and implementing important efficiency measures are steps that all of us can take to make a difference today.”

U.S. Energy Secretary Samuel W. Bodman



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Conclusion



- Thank you