

Creating a Data Center Energy Efficiency Framework to Accelerate Efficiency Gains

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Meeting High Tech Customer Needs

To optimize energy savings opportunities in diverse markets, we need to understand customer needs by market sector

PG&E moved to a market-focused EE portfolio instead of a measure-based portfolio in 2006

Results are a greatly expanded portfolio of product and service offerings, superior customer satisfaction, and better program performance



PG&E's Data Center Offerings – pre-2006

Where were we a few years ago?

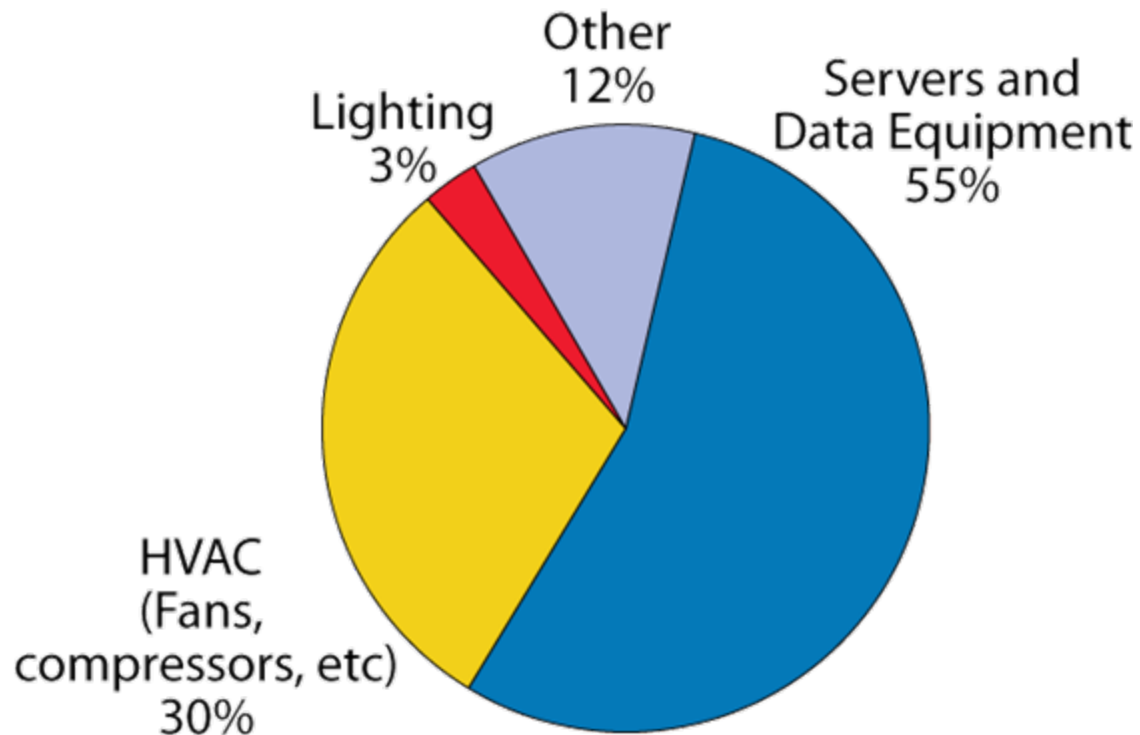
Audits, and incentives that only addressed cooling systems:

- High-efficiency equipment (chillers, pumps, fans, etc.)
- Air- and water-side economizers
- VFD's

What we were missing:

- Anything having to do with operations “inside the white room”

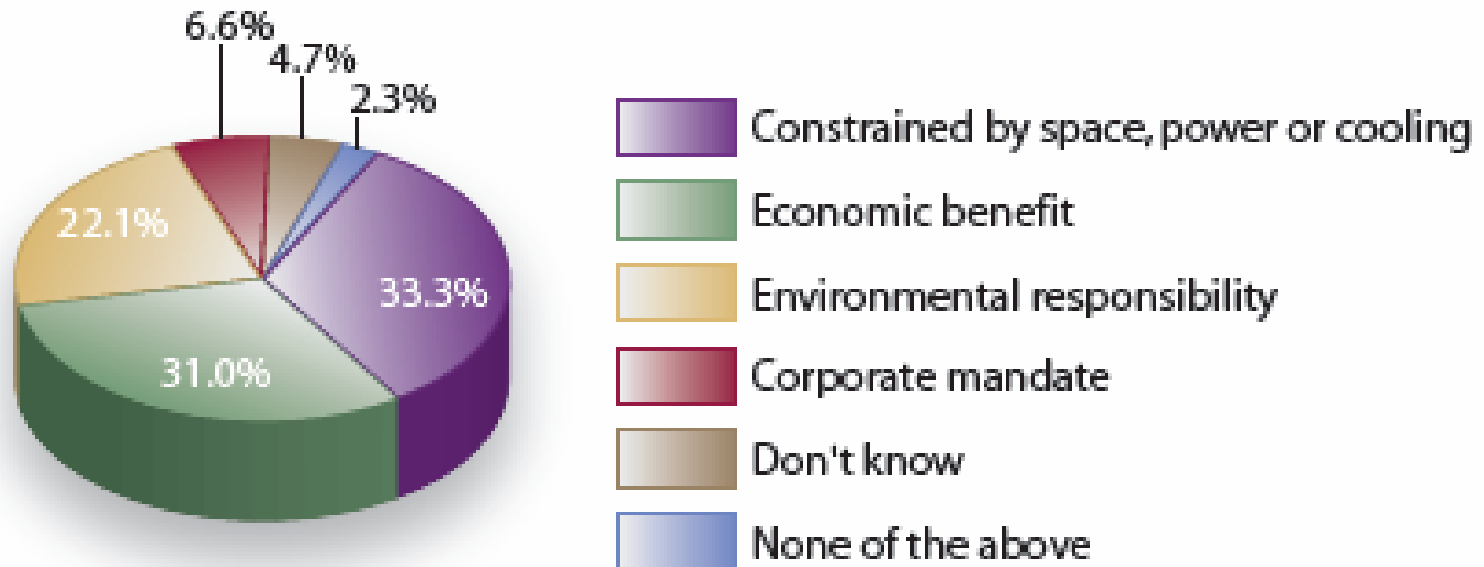
What We Were Missing



Energy use in a high-performance data center (LBNL/PG&E Study)

Motivations for Energy Efficiency

Motivation for pursuing energy efficiency





Our Direct Market

400-500 MW of load (2.5% of our total, compared to 1.2% nationally)

Enterprise data centers are known

Corporate data centers are hidden in office buildings and on campuses

Closet data servers are invisible

The key challenge for enterprise and some corporate data centers is space, cooling, and power supply constraints



Data Centers are everywhere

Data Centers are in every market segment:

Schools

Banks

Retail

Hospitals

Wineries

... "Instant" Data Centers



Where's the Data Center?



Here's the Data Center!





PG&E's Focus on High Tech

PG&E serves Silicon Valley – almost all of the industry leaders have a presence

The High Tech market is highly dynamic

They have their own facilities, and they are bringing solutions to the energy challenges of their customers

The focus is primarily on data centers and IT infrastructure



PG&E's High Tech Portfolio

New construction

Retrofits in existing data centers

Airflow management services for existing data centers

Desktop computing measures

Data Center Opportunities

A strong Emerging Technologies program is necessary to capture innovation and help the program evolve:

- **Server Virtualization**
- **Air-flow Management**
- **Outside-air Economizers**
- **Massive Array of Idle Disks (MAID)**
- **Power supplies**



Program Results

Industry agrees that a third to half of data center energy use can be addressed through cost-effective, reliable energy efficient technologies and strategies

Data centers delivered over 7 MW of load reduction, and 60 GWh in 2008

We are on track to exceed 2008 accomplishments this year, but will not achieve a 2x annual growth rate in part due to the economic slowdown.



Lessons Learned

Program design

Codes and standards

Vendor support

ESCO support and Technical Contractors

Marketing and Outreach



Thank you

Questions?