

Presented to
SWEEP

Energy Efficiency Leadership for Data Centers and IT: PG&E's Program & Service Portfolio

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November 16, 2007

Discussion Points

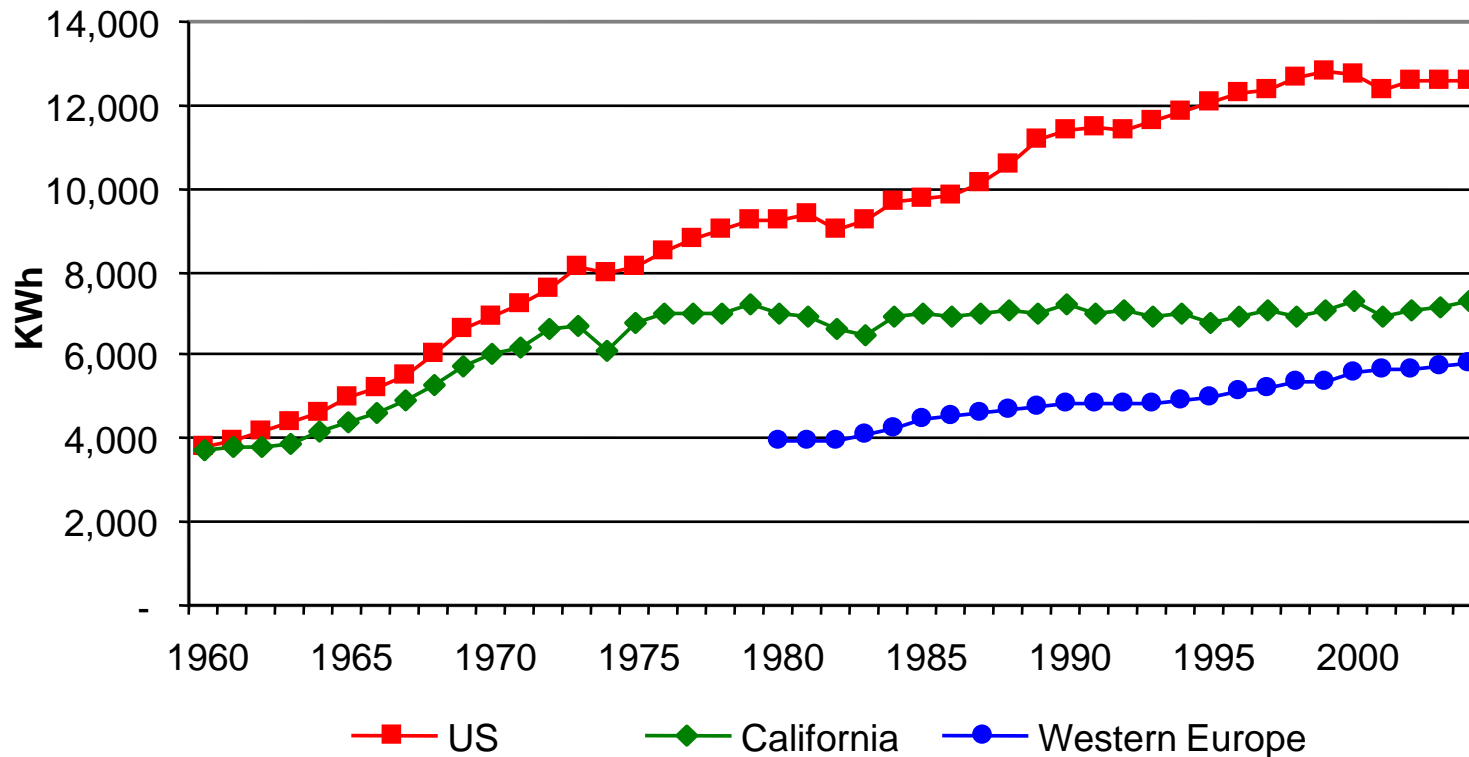
- ▶ Why is PG&E helping customers to use less energy
- ▶ What is driving the emphasis on energy efficiency in the Information Technology/Data Center sector
- ▶ What programs and services has PG&E developed
- ▶ What strategies should we be taking to move towards “Green IT”
- ▶ Getting there: a leadership challenge.

Why Energy Efficiency?

- ▶ Our customers expect/love the programs
- ▶ All customers benefit through lower rates
- ▶ PG&E benefits financially
- ▶ Energy efficiency is the cornerstone of our commitment to environmental responsibility and quality

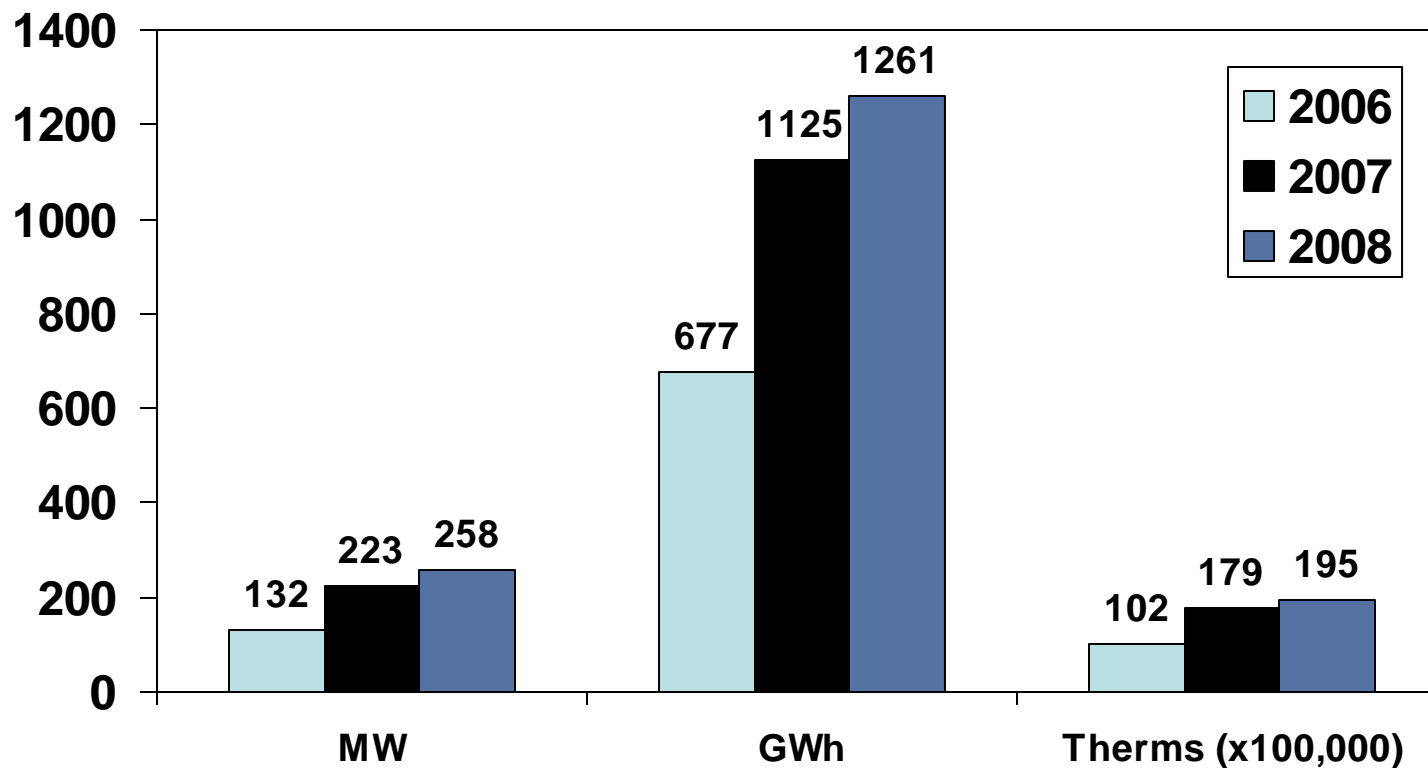
30 Years of Energy Efficiency Success

- Energy efficiency programs have helped keep per capita electricity consumption in California flat over the past 30 years
- PG&E's programs alone have avoided the release of over 1 million tons of CO₂ into the atmosphere over the same period, equivalent to taking 8.6 million cars off the road for a year



Global-Leading Program

PG&E's Energy Efficiency Goals: 2006 through 2008



- ▶ PG&E serves Silicon Valley – almost all of the industry heavyweights have a presence here
- ▶ They have their own facilities, and they are bringing solutions to energy challenges facing their customers
- ▶ The focus is on **data centers and IT infrastructure**

Our Direct Market

- ▶ A total load of 400–500 MW (2.5% of total, compared to 1.2% nationally)
- ▶ “Enterprise” centers are known (stand-alone and co-location)
- ▶ “Corporate” centers are hidden in office buildings and campuses
- ▶ “Closets” are invisible
- ▶ The key challenge for enterprise and some corporate data centers is space, cooling, and power supply constraints, in the face of...

- ▶ IT workload growth is multiples of GDP for most companies, and can be 10x for some sectors (financial services, web businesses)
- ▶ All companies facing huge growth rates in data storage (50 to 100% annual growth not uncommon)
- ▶ When your back is up against the wall for IT capacity, you might consider...

...An “Instant” Data Center



Where's the Data Center?



Here's the Data Center!

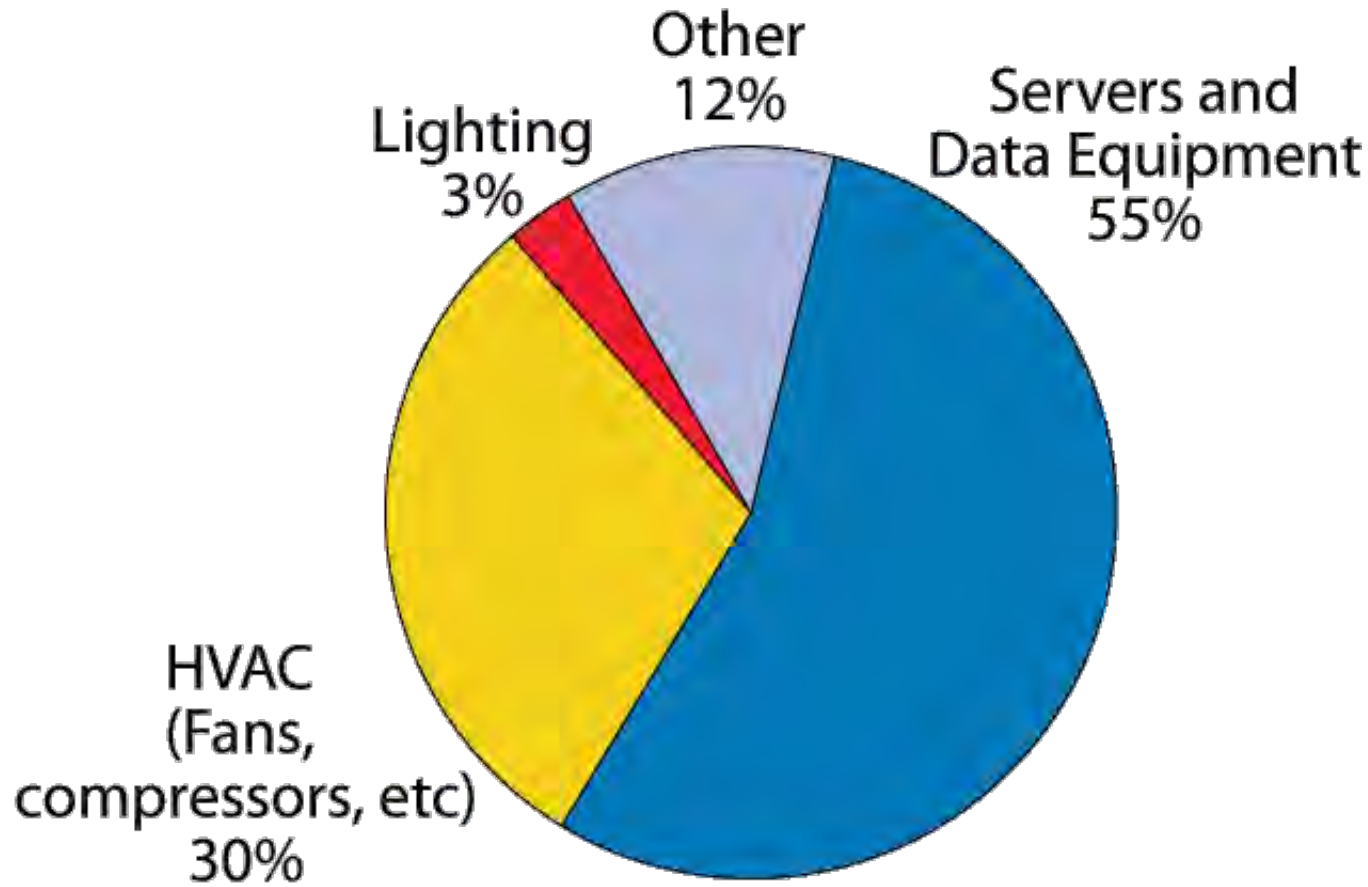


- ▶ PG&E moved to a market–focused portfolio instead of a program portfolio for EE in 2006
- ▶ Results are a greatly expanded portfolio of product and service offerings, superior customer satisfaction, better program performance

- ▶ Audits, incentives that addressed cooling systems only:
 - High-efficiency equipment (chillers, pumps, fans, etc.)
 - VFD's
 - Air- and water-side economizers (“Free Cooling”)

- ▶ 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)

New Initiatives in 2006

- ▶ Incentives for energy-efficient computing equipment (Rip & Replace only)
- ▶ Incentives for virtualization/consolidation
- ▶ Incentives for airflow control systems
- ▶ Incentives for high efficiency UPS and power distribution systems
- ▶ High quality technical services for cooling systems (retrofit and new construction)

New/Coming in 2007

- ▶ Incentives for energy efficient computing equipment (new installations)
- ▶ Focus and incentives on efficient data storage technologies (MAID, others)
- ▶ Retro-commissioning program for airflow management
- ▶ 80 Plus program for computing equipment (servers)
- ▶ Rebates for PC network management software (Now)
- ▶ Incentives for conversion to thin-client systems

- ▶ Industry agrees that a third to a half of data center energy use can be addressed through cost-effective, reliable energy efficient technologies and strategies
- ▶ PG&E announces formation of national utility coalition to extend program adoption.



For CIOs and IT Operations:

- ▶ Join Climate Savers Computing Initiative
- ▶ Spec LCD monitors that exceed Energy Star standards
- ▶ Consider thin client/desktop virtualization

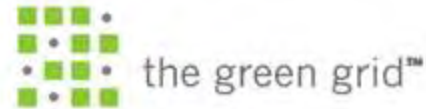
For CIOs and IT Operations:

- ▶ Begin or accelerate adoption of virtualization technology – consolidate server and storage equipment
- ▶ Evaluate free cooling strategies for your data center
- ▶ Institute airflow management best practices; raise supply air temperature; widen humidity set points



For Utilities:

- ▶ Join Climate Savers Computing Initiative
 - ▶ Join 80 Plus program, and offer incentives for PC Network Management Software
- ▶ Offer incentives for virtualization/consolidation
- ▶ Adopt a new construction incentive program
- ▶ Consider adopting broad program and service model (learn more through utility coalition)



For IT Industry:

- ▶ Support energy efficiency metric development through Green Grid and other bodies
- ▶ Advocate for utility incentive programs
- ▶ Join Climate Savers Computing Initiative and offer products that meet standards
- ▶ Partner with customers to deliver technologies, products, and solutions that drive towards “Green IT”

What does leadership in this market look like?

- ▶ Data centers and IT operations that use multiple strategies to drive high efficiency
- ▶ Equipment providers driving superior efficiency as well as performance
- ▶ Utilities partnering with customers to provide solutions

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