

CB Richard Ellis Sustainability Workshop

July 26, 2007



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AGENDA

- **UNDERSTANDING** the Chairman's objectives, **reasons**, the **purpose** and the **metrics** behind them;
- **ACTIONS** you can take **today** to affect positive change!

ABOUT YOUR PRESENTERS

- **CARL SALAS, PE**, President, Salas O'Brien Engineers, Inc.
- **ANDY BEGGS, PE, MBA**, Vice President, Bundled Energy Services, The Linc Group and General Manager, Sundown Lighting & Electrical
- **DARIN ANDERSON, CPA, MBA**, President, Sundown Lighting & Electrical



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toward a greener tomorrow

Announcing our most ambitious assignment

For decades, our clients have turned to us for solutions to their real estate requirements. Now, more than ever, property owners and occupiers alike are looking for ways to mitigate the environmental impact of their real estate. To lower their energy costs, achieve greater efficiencies, create better workplaces and implement sustainable practices. We are embracing the opportunity to help our clients improve operational performance and protect the environment at the same time. And we are showcasing best practices in our own operations. We are committed to steeply reducing our carbon footprint and becoming carbon-neutral by 2010. CB Richard Ellis. Making real estate part of the solution.

CBRE
 CB RICHARD ELLIS
 #1 in commercial real estate worldwide
www.cbre.com/environment
 Anaheim 714.939.2100
 Newport Beach 949.725.8500

For decades, our clients have turned to us for solutions to their real estate requirements. Now, more than ever, property owners and occupiers alike are looking for ways to mitigate the environmental impact of their real estate. To **lower their energy costs**, achieve greater efficiencies, create better workplaces and **implement sustainable practices**. We are embracing the opportunity to help our clients **improve operational performance** and protect the environment at the same time. And we are showcasing best practices in our own operations. We are committed to steeply reducing our carbon footprint and becoming **carbon-neutral by 2010**. CB Richard Ellis. Making real estate part of the solution.



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Timing and Opportunities

There are no shortage of **opportunities** to think and be green

and **act**



CALIFORNIA GOV. Arnold Schwarzenegger delivers the keynote address at the Newsweek Global Environment Leadership Conference at Georgetown University in Washington on Wednesday.

Governor says green movement is 'sexy'

Schwarzenegger on East Coast swing to promote his embrace of environmentalism

By Erica Werner
ASSOCIATED PRESS

dicting that environmentalism was reaching a "tipping point" where it will move into the mainstream.

"I don't know when the tipping point occurs, but I know where — in California," he said.

Silicon Valley business leaders gaze into crystal ball

By Constance Loizos
Mercury News

Silicon Valley business leaders — often lauded for their ability to predict the future — convened Tuesday night at the San Jose Fairmont to do precisely that.

The occasion was the ninth annual "Top 10 Trends" event hosted by the business networking group the Churchill Club — an increasingly popular affair attended by venture capitalists, academics, entrepreneurs and business journalists alike. Approximately 800 people — up from 500 in recent years — attended, and nearly everyone stayed for the duration.

But those in the crowd, who paid \$72 apiece and dined variously on chicken Wellington, stuffed ravioli and tiramisu, may have left feeling

See **TOP TEN**, Page 6C

- 1. ENVIRONMENT**
Going green could be the largest economic opportunity of the 21st century.
— John Doerr
- 2. WIRELESS**
Consumers will get more choices with mobile devices, but that will require more belt space.
— Roger McNamee
- 3. WEB**
The FCC will approve at least one new broadband network in the next year.
— John Doerr
- 4. WEB 2.0**
Within the next 12 months, we will see the beginning of a big shakeout.
— Tony Perkins
- 5. CHIPS**
Moore's Law will begin to bifurcate, where technical advances in memory precede those for logic chips by several years.
— Steve Jurvetson
- 6. GLOBALIZATION**
The shift in economic power from the United States to other countries will profoundly impact current business.
— Joe Schoendorf
- 7. MEDIA**
Consumers will choose active over passive viewing, eroding the power of media companies.
— Roger McNamee
- 8. WEB 2.0**
Consumer Web 2.0 features will move into the enterprise and media worlds.
— Tony Perkins
- 9. BIOTECH**
The next couple of years will herald the first synthetic life form.
— Steve Jurvetson
- 10. MEDICINE**
There will be an increase in radical approaches to treating brain diseases.
— Joe Schoendorf

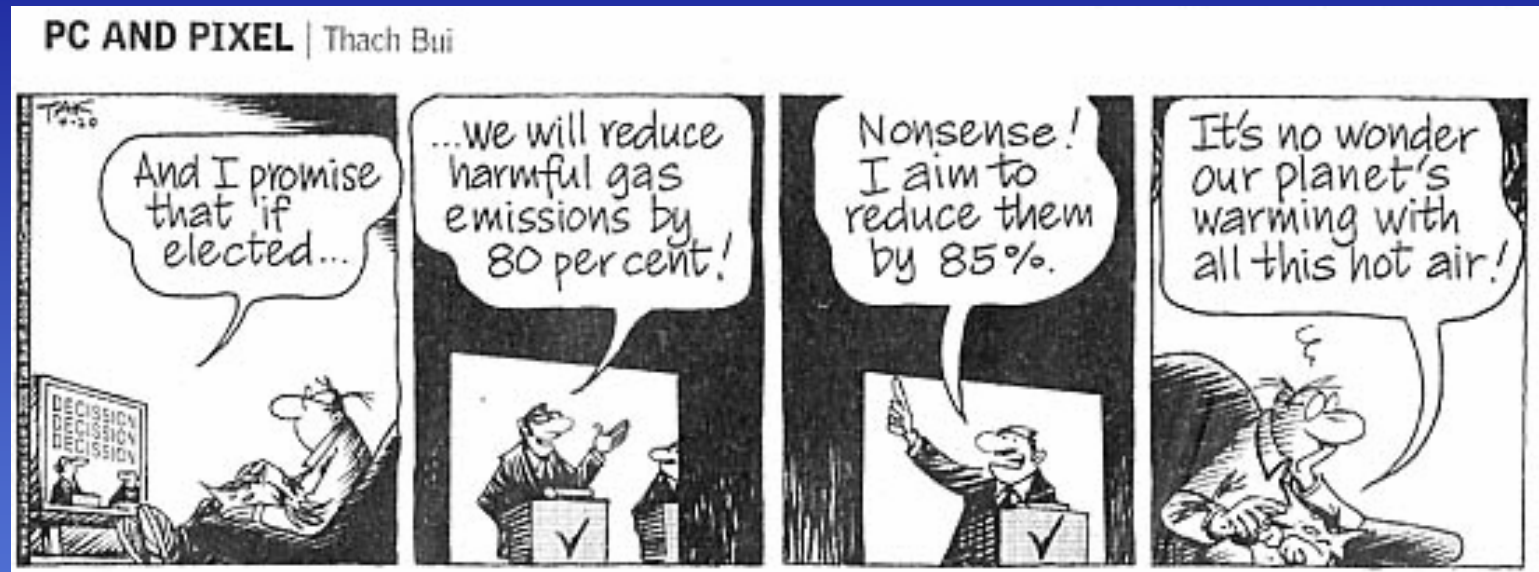
Source:
Churchill
Club

San Jose Mercury News: March 28, 2007



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...talk and act **green**



Once you recognize...

... they can **ONLY** turn to **YOU!**



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What is Carbon Neutrality?

The practice of balancing carbon dioxide released into the atmosphere from burning fossil fuels, with energy offsets¹, that creates a similar amount of useful energy, so that the net carbon emissions are zero

¹ *or direct carbon offsets*



How Can Carbon Neutrality Be Achieved?

There are three basic strategies:

1. Reduce/manage energy consumption (and other consumption) by maximizing efficiency;
2. Invest in or construct renewable energy projects;
3. Purchase carbon offsets for the emissions that we can't reduce directly.



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Calculating Carbon Emissions for Gasoline

The conversion for gasoline is straightforward: it's 20 lbs of CO₂ per gallon used. So, if you have a range rover and drive 12,000 miles per year; at 13 mpg in the City and 18 mpg on the highway, that's about:

$$\frac{12,000 \text{ miles}}{15 \frac{\text{miles}}{\text{gallon}}} \times 20 \frac{\text{lbs CO}_2}{\text{gallon}} = 16,000 \frac{\text{lbs}}{\text{year}}$$

and Electricity

100-23 = 77
 Say 75 w
 = 0.075 kW

BRIGHT IDEA? BILL TO BAN OLD BULBS

57 DEC 11/07

HOW DO THEY COMPARE?

Incandescent	Type	Compact fluorescent
100 watt		23 watt
1,000 hours (8.3 months if used 4 hours per day)	Life of bulb	10,000 hours (6.8 years if used 4 hours per day)
1,690 lumens	Brightness	1,600 lumens

COST

Incandescent	Price per bulb	Compact fluorescent
50¢		\$3
750 kWh	Energy used in 10,000 hours	180 kWh
\$90.50	Total lighting cost* for about seven years (four hours per day) and at current PG&E rate of 11.4¢ per kilowatt-hour	\$23.52

*Cost of bulb(s) + (energy used x energy rate)

Source: California Energy Commission PAI — MERCURY NEWS

State lawmaker wants all to use energy-saving fluorescent lights

By Kate Folmer
 Modesto News Service Bureau

SACRAMENTO — It soon may be lights out for the traditional light bulb in California. Assemblyman Lloyd Levine, D-Van Nuys, is proposing that the Golden State become the first to ban sales of incandescent light bulbs by 2012. In their place, Californians would purchase more energy-efficient compact fluorescent lamps. Those are the spiral-shaped bulbs that cost more upfront but save money and energy over the long haul. Switching light bulbs is an idea that environmentalists have long supported. But getting consumers to embrace change has been slow going. Banning energy-intensive incandescents "saves consumers money, saves the state money and saves energy," said Levine, who calls his measure the "How Many Legislators Does It Take to Change a Light Bulb Act."

"When a consumer is standing in a store and they're confronted with two different products, they generally opt for the one that is cheaper and the one they've traditionally

See BULBS, Page 154

HOW DO THEY COMPARE?

Incandescent	Type	Compact fluorescent
100 watt		23 watt
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*Cost of bulb(s) + (energy used x energy rate)

Source: California Energy Commission PAI — MERCURY NEWS

Calculating Carbon Emissions for Electricity

Conversion for electricity is straightforward too: it's 1 lb of CO2 per kWh used. So let's take an incandescent to fluorescent, saving a very aggressive 75 watts (i.e going from a 100 w incandescent to a 25 watt screw in fluorescent). Don't forget, though, that 75 watts, is only 0.075kW!!! Not much. But let's get aggressive and assume that you actually have the light on 10 hours a day (it's probably more like 3 hours per day... but let's say 10) OK, so:

$$\underset{\substack{\text{Amount saved for 1 bulb} \\ \nearrow}}{0.075 \text{ kW}} \times 10 \frac{\text{hrs}}{\text{day}} \times \frac{365 \text{ days}}{\text{year}} \times 1 \frac{\text{lbs}}{\text{kWhr}} = 273 \frac{\text{lbs}}{\text{year}}$$

Conversion Summary:

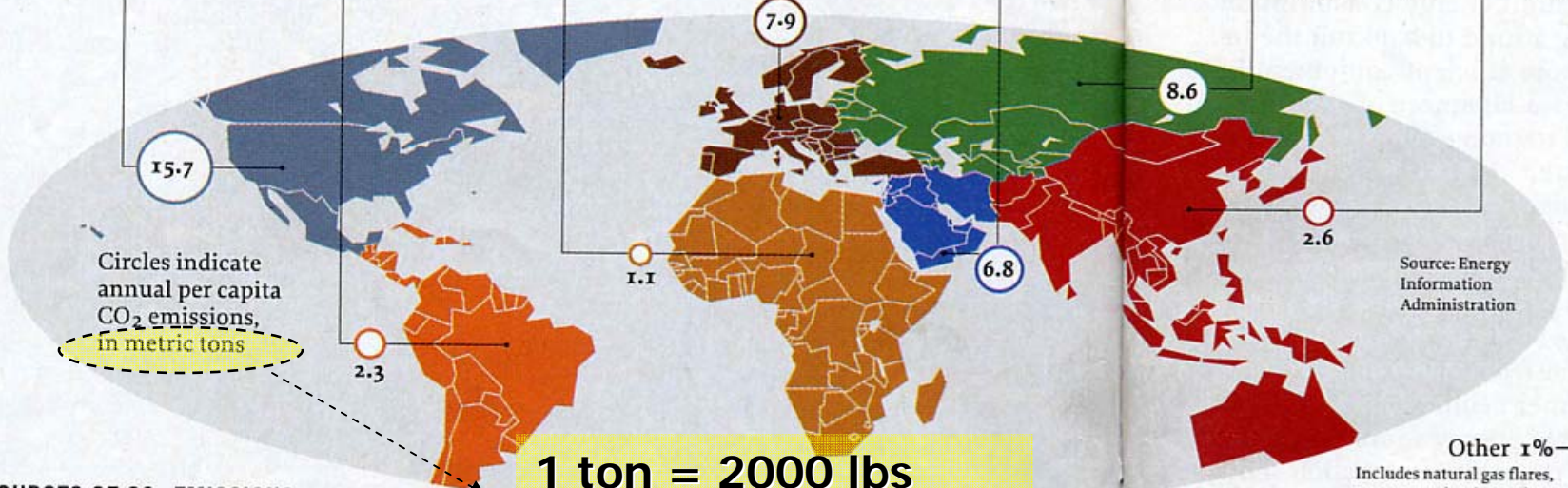
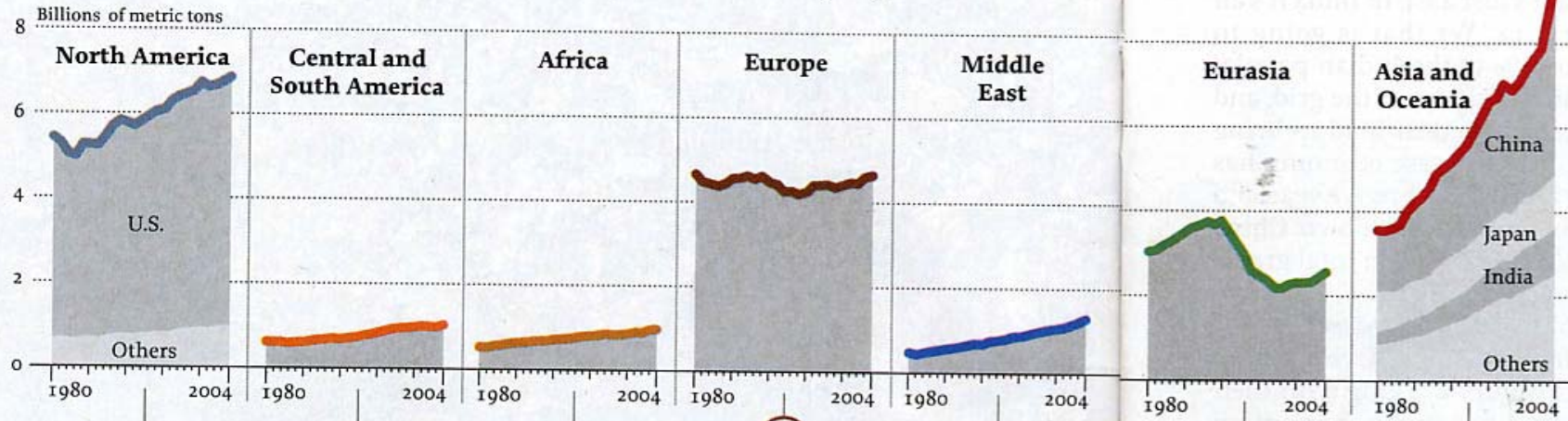
- *Natural gas: 12 lbs/therm
- *Electricity: 1 lb/kWh
- *Gasoline: 20 lbs/gallon



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A World of Trouble

Total carbon dioxide emissions from the burning of fossil fuels, by region



SOURCES OF CO₂ EMISSIONS IN THE U.S.



1 ton = 2000 lbs
1 tonne = 2205 lbs

Source: Energy Information Administration

Other 1%
Includes natural gas flares, cement production and nonfuel emissions



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THE MERCURY NEWS INTERVIEW

eBay exec says PayPal offers shoppers convenience without sacrificing privacy

Rajiv Dutta, a longtime eBay executive, was appointed president of PayPal in July, a week after Google launched a competitive payments service it calls Google Checkout. A month later, a wave of selling by worried investors drove eBay's stock down to levels not

quarter helped bolster Dutta's case. PayPal, which provided about a quarter of eBay's revenue during the quarter, grew 37 percent from the same period a year ago — 50 percent more than eBay's marketplace business.

Still, competitive threats loom. In addition, micro-...
s about



FIVE THINGS TO KNOW ABOUT RAJIV DUTTA

1. He hates e-mail.
2. His first job was as an auto mechanic.
3. The book he wants everyone to read: "The Weather Makers" by Tim Flannery, about global warming.
4. Everything in his house, including all the electricity bills and his Range Rover, is "carbon neutralized," so it doesn't contribute to global warming.
5. A passionate skier, Dutta calculated the density of skiers per acre, the steepness of

4. Everything in his house, including all the electricity bills and his Range Rover, is "carbon neutralized," so it doesn't contribute to global warming.

Vehicle Travel Carbon Emission Calculator

Vehicle Information

Year:	2006
Make:	Land Rover
Model:	Range Rover
Engine/Transmission:	4.2L, 8 cyl., Automatic (6
Total City Miles:	6000
Total Highway Miles:	6000
City MPG:	13
Highway MPG:	18
Gallons of Fuel (City):	461.54
Gallons of Fuel (Highway):	333.33
Gallons of Fuel (Total):	794.87
Total Pounds CO ₂ :	15340.99
Total CO ₂ MT Emission:	6.96
TOTAL Offset Cost:	41.76

BUY A TON OR 2 OF



[Click to Purchase](#)

Vehicle Travel Carbon Emission Calculator | BuyCarbon.org



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ENERGY EFFICIENCY

and the

Energy Audit Process

as the Basis of Your Overall Sustainability Plan



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You begin to be successful when you recognize that:

An energy audit is a **developing** level of understanding of the particular **energy use patterns** of a specific facility.

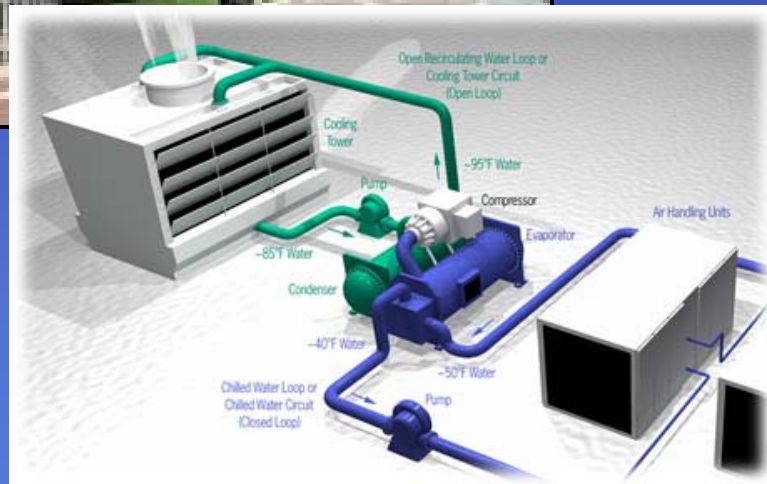


(Y)our energy audit is a **beginning**; of the cornerstone of a **long-term sustainability plan** (and **your building's "green" program**)



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Would the "best" Energy Audit recommend a project with a 3 year payback, or 30 year?!



kW	15	15
Hours	7,000	X 500
kWh/yr	105,000	24,000
Cost	\$40,000	\$112,500
Savings	\$12,500	\$3,000



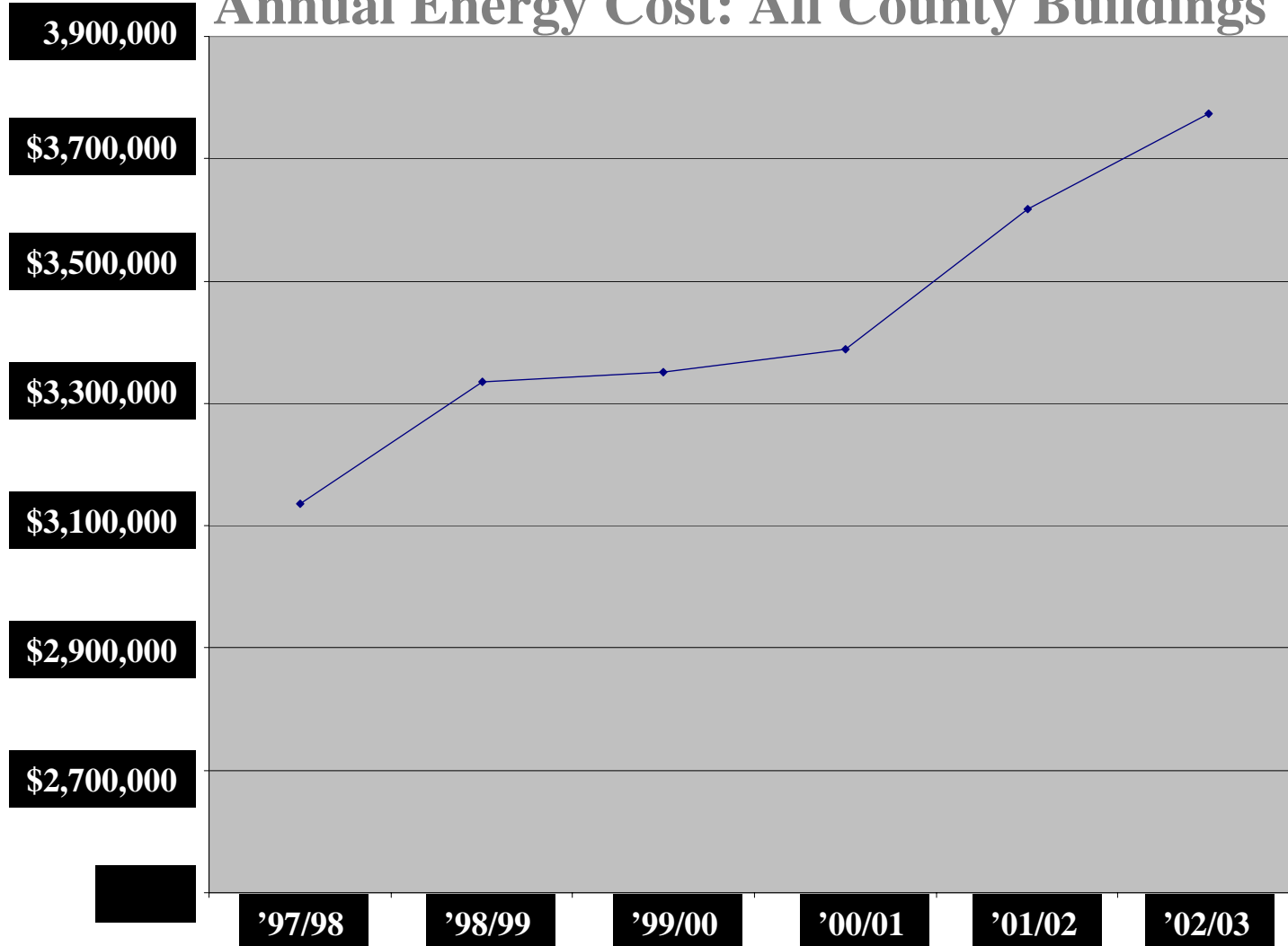
*Great payback, Great visibility, maybe **both**?*

Energy Program Steps

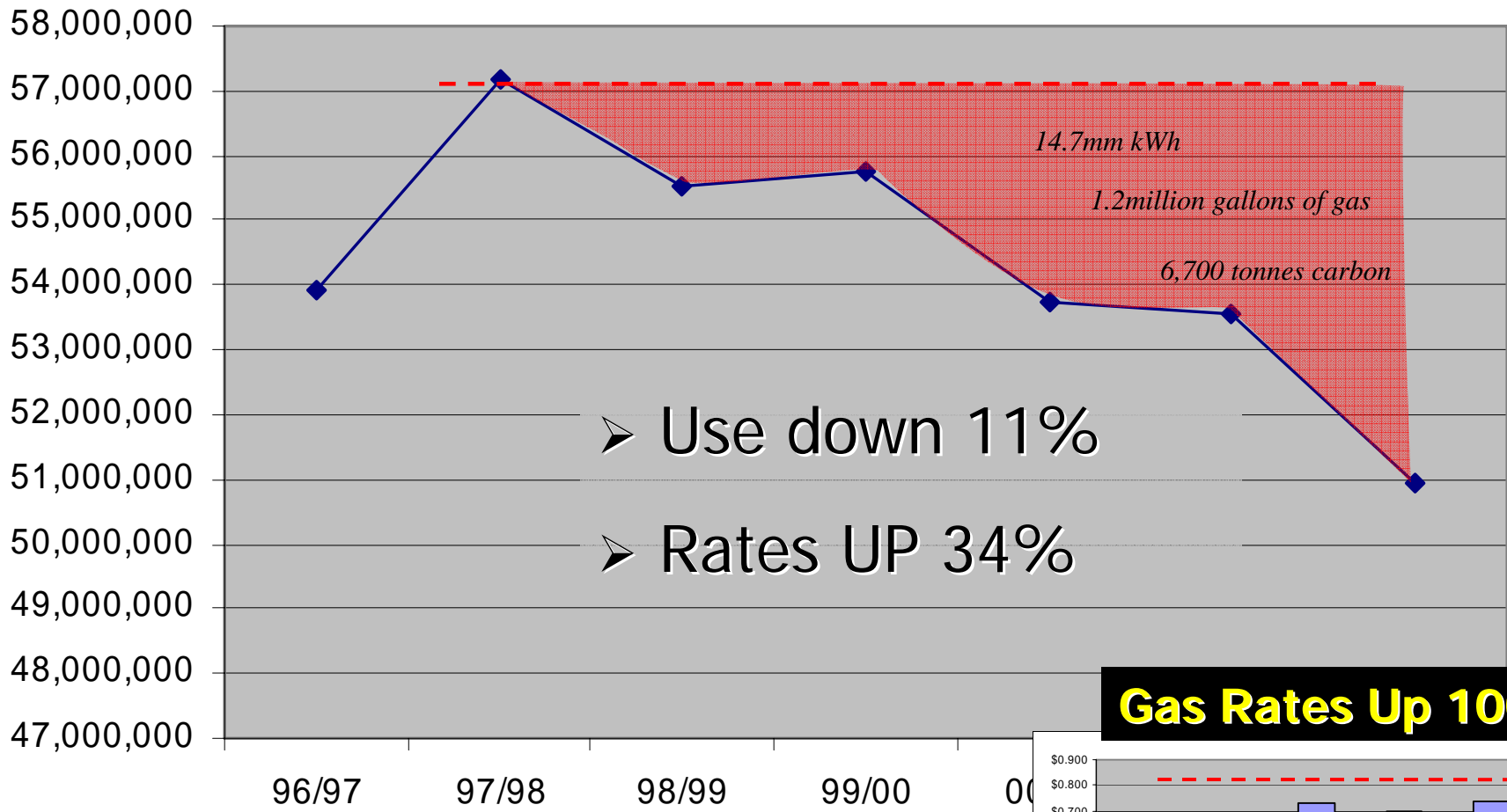
1. History
2. Inventory
3. Optimization
4. Improvements
5. Planning, Implementation
6. Management

What Are We Doing Now and Doing Right

Annual Energy Cost: All County Buildings

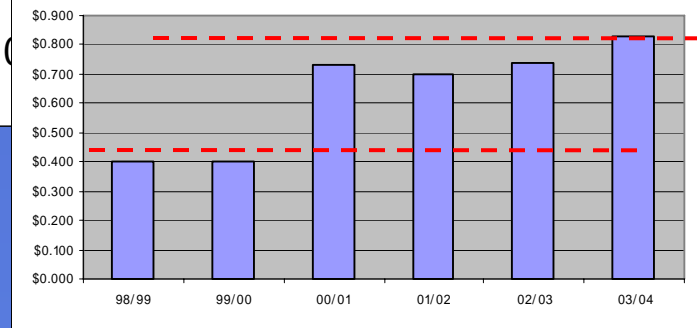


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- Use down 11%
- Rates UP 34%

Gas Rates Up 100%

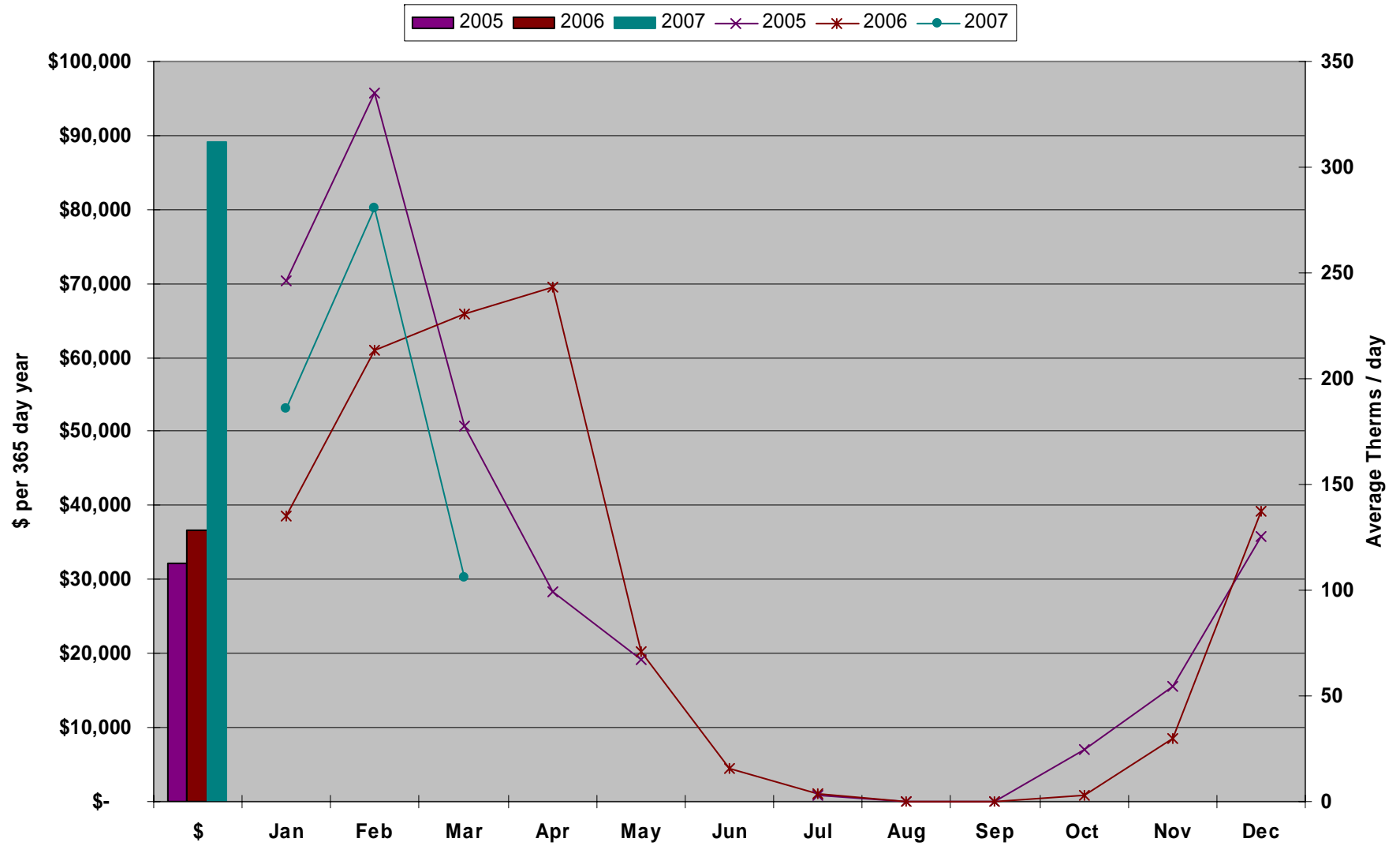


...oh, and water too!



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- Annual Gas Usage



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Energy Program Steps

1. History
2. Inventory
3. Optimization
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5. Planning, Implementation
6. Management

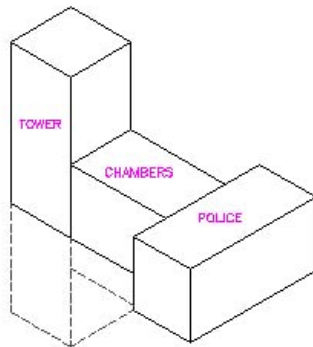
I WANT TO BE **GREEN**...NO GLOBAL WARMING

- 1960's & 70's: 5 to 10 amps per student
- Now:** 20 amps... even 30!

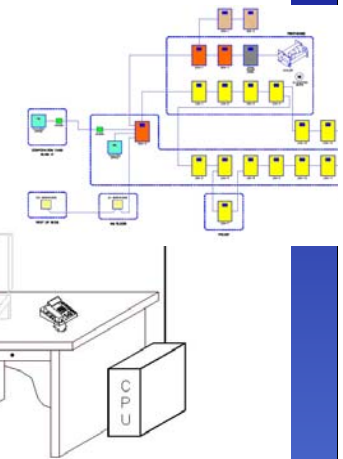
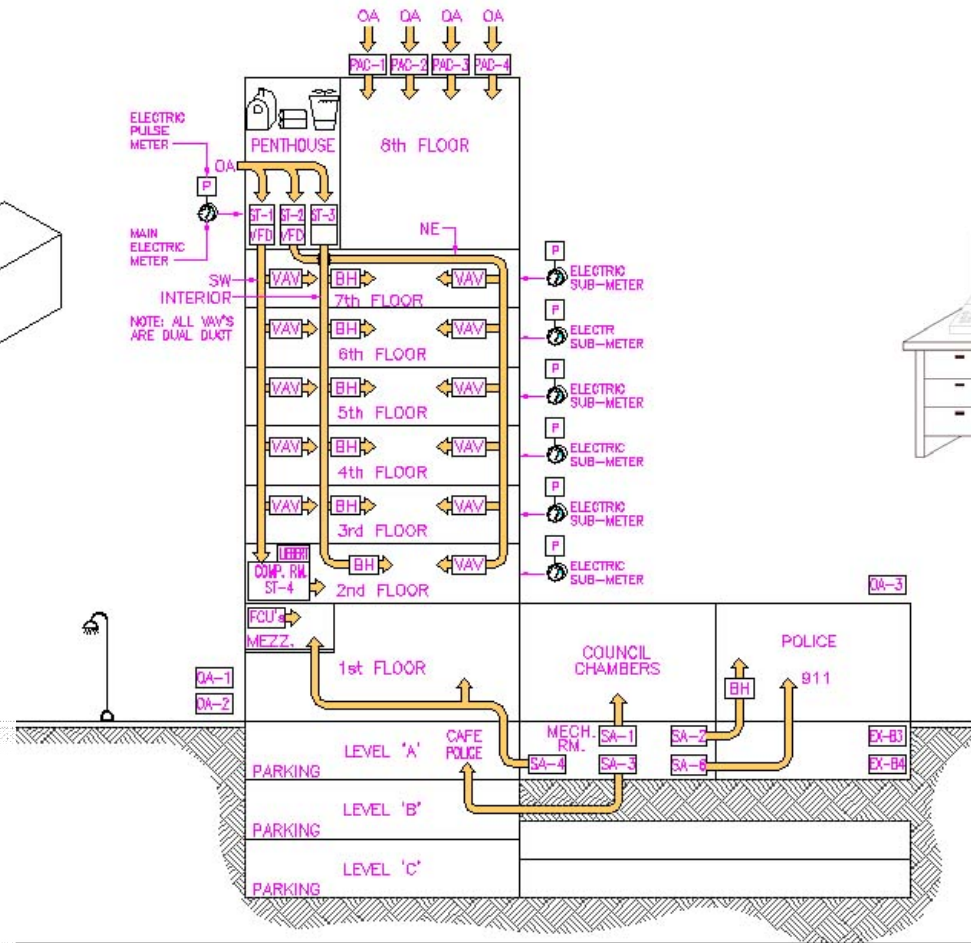


INVENTORY

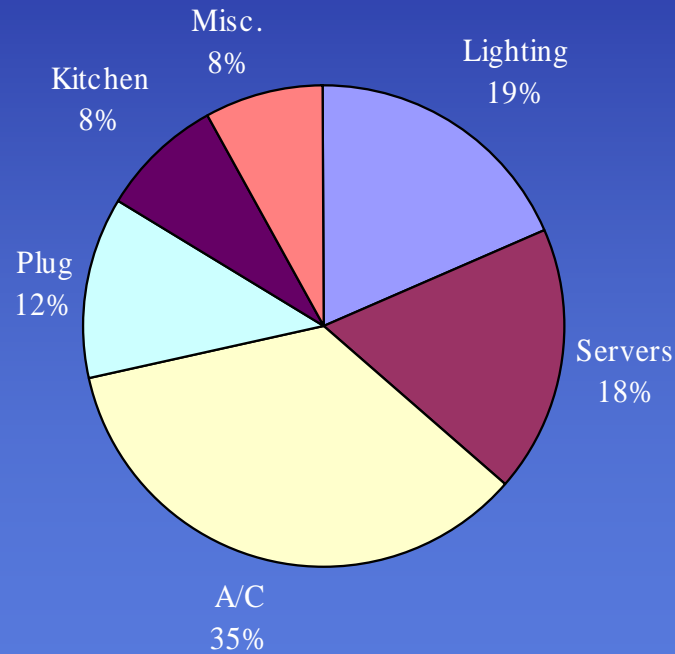
INVENTORY



The inventory “exposes” your **equipment**, loads, **lights**... for quick identification of opportunities!



Guidance to the
California Climate Action Registry:
Certification Protocol



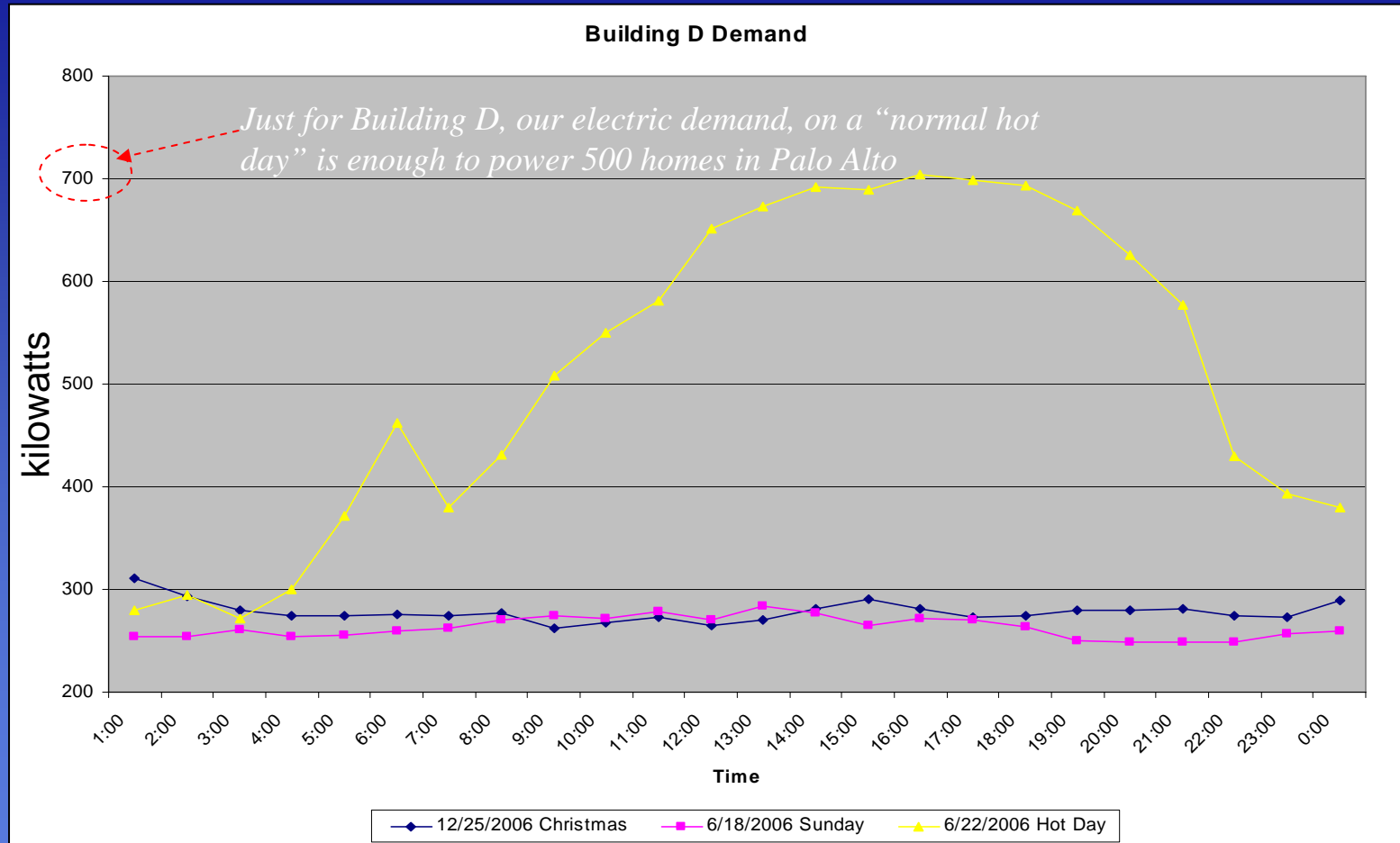
Equipment Inventory

summary of the Building Systems Manual

EQUIP.	Description	HP	KW	VFD	Hours of Operation	Annual kWh	Load Factor
ST1	Main AHU	50	30	YES	5000	119,360	80%
XT1	Bldg Xhaust	25	15	YES	5000	59,680	80%
ST2	Main AHU	50	30	YES	5000	119,360	80%
XT2	Bldg Xhaust	1.5	1	NO	5000	3,581	80%
ST3	Main AHU	15	9	NO	5000	35,808	80%
XT4	Bldg Xhaust	2	1	NO	5000	4,774	80%
ST4	Small AHU	3	2	NO	5000	7,162	80%
SA1	Medium AHU	15	9	NO	5000	35,808	80%
XA1	Small Xhst	5	3	NO	5000	11,936	80%
SA2	Medium AHU	15	9	NO	5000	35,808	80%
XA1	Small Xhst	5	3	NO	5000	11,936	80%
SA3	Medium AHU	20	12	NO	5000	47,744	80%
XA3	Small Xhst	7.5	4	NO	5000	17,904	80%
SA4	Medium AHU	15	9	NO	5000	35,808	80%
XA-4	Small Xhst	7.5	4	NO	5000	17,904	80%
SA5	Medium AHU	3	2	NO	5000	7,162	80%
OA1	Main OA Fan	30	18	NO	5000	71,616	80%
OA2	Main OA Fan	30	18	NO	5000	71,616	80%
OA3	Main OA Fan	50	30	NO	5000	119,360	80%
XB-1	Garage Xhst	30	18		5000	71,616	80%
XB-2	Garage Xhst	25	15		5000	59,680	80%
XB-3	Garage Xhst	40	24		5000	95,488	80%
XB-4	Garage Xhst	30	18		5000	71,616	80%
Subtotal Ventilation			283			1,132,726	198
Chiller	Single Trane		105	v-set	2500	2000	80%
Tower	Two cell	7.5	4	two-spnd	2500	2000	80%
CHW Pump:???		40	24	No	2500	2000	80%
Booster Hea Electric Reheats			234		1500	350250	234
Totals						2,621,703	453

ENERGY "AUDIT" : History & Inventory

What Are We Doing Now and Doing Right



Energy Program Steps

1. History
2. Inventory
3. Optimization
4. Improvements
5. Planning, Implementation
6. Management



Guidance to the
California Climate Action Registry:
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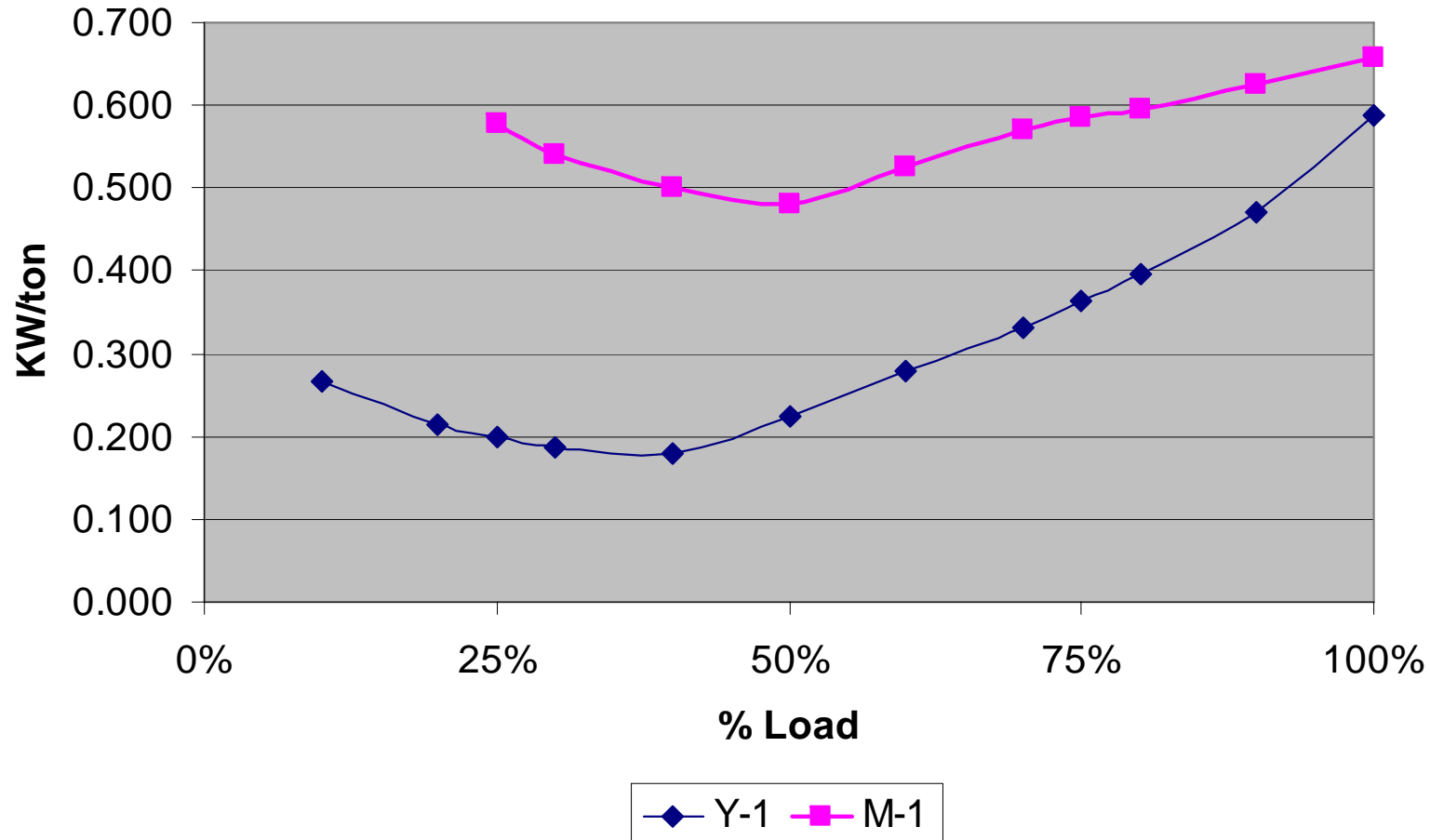
Energy Program Steps



1. History
 2. Inventory
 3. Optimization
 4. Improvements
 5. Planning, Implementation
 6. Management
- a) Conservation
b) Efficiency
c) Power Production
d) Load Management

20 Year Decisions are being made!!!

Chiller Efficiency Comparison



Don't forget systems efficiency





Many of the units are well past their useful life AND are energy inefficient.

Sustainability



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“Zero Energy and Total Sustainability” May Not Be Realistic



WEEC Environmental Project of the Year: 2001

- **Durst Organization: 4 Times Square** *1.6mmsf; 48 story*



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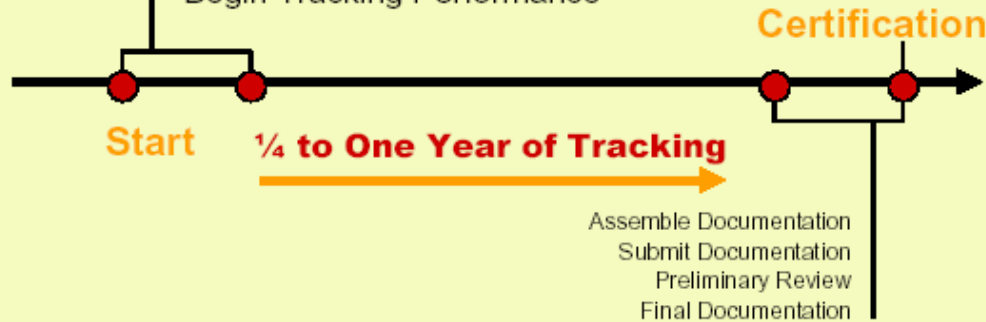
ENERGY STAR Rating	LEED-EB Points
63	1
67	2
71	3
75	4
79	5
83	6
87	7
91	8
95	9
99	10

... and LEED-EB



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Conduct Building Audit and Identify Opportunities
 Set Goals
 Determine Preliminary LEED Score
 Register Project
 Identify Incentives and Partners
 Create and Adopt Policies and Practices
 Begin Tracking Performance



	Points
Sustainable Sites	14
Water Efficiency	5
Energy and Atmosphere	23
Material and Resources	16
Indoor Environmental Quality	22
Innovation in Design	5
Total	85

Certification Levels	
Certified	32-39 points
Silver	40-47
Gold	48-63
Platinum	64-85



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SUSTAINED EXCELLENCE

WORLDWIDE PARTNER

ecomaginationSM

Homes designed to provide more by using less



GLOBAL WARMING

51 Things We Can Do to Save the Environment

Can one person slow global warming? Actually, yes. You—along with scientists, businesses and governments—can create paths to cut carbon emissions. Here is our guide to some of the planet's best ideas.

Time Magazine

ANN ELLIOT CUTTING FOR TIME



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"Green" Program Progression

This audit is the beginning, a point of departure for future energy efficiency improvement and a "*Sustainable (green) Campus Plan:*"

1) Energy

2) Water

3) Emissions and Greenhouse Gases

4) Waste (recycling)

5) Transportation

6) Materials (type)

7) Materials (origin)

What you need to do now ...

Be patient and thorough as you:

- 1) Establish an energy and “carbon” baseline;
- 2) Understand your equipment/building systems and their impact on your tenants *and (y)our world*;
- 3) Identify and implement initial opportunities to better manage energy *leverage utility and other incentives*;
- 4) Implement high visibility projects or procedures.

*This becomes your
“story” and image*



CB Richard Ellis Sustainability Workshop

July 26, 2007

UNDERSTANDING the Chairman's objectives and the reasons, the **purpose** and the **metrics** behind them;

ACTIONS you need to take **today** to affect positive change!

and QUESTIONS!



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