

**Green Building Action Plan**  
*Back-Up Technical Document –  
Rationale, Specific Actions, and Timeline*

**Submitted to**  
**Terry Tamminen**  
**Drew Bohan**  
**Cal EPA**

**Prepared by**  
**Green Building Initiative Task Force**

**Dan Emmett, Chair**  
**Jeanne Clinton, Consultant**

Working Group Co-Chairs:

Jeanne Clinton  
Stan Hazelroth  
Katrina Johantgen  
Art Rosenfeld  
Steve Weinstein  
Patty Wohl

**September 2004**

## TABLE OF CONTENTS

<i>Section</i>	<i>Page</i>
<b>1. Introduction -- California Has Made Major Strides with Energy Efficiency and “Green Buildings” --- and We Can Still do Much More!</b>	3
1.1 Energy Efficient Buildings	3
1.2 Green Buildings	4
<b>2. A Profile of California’s Commercial and Institutional Buildings</b>	5
2.1 Overview	5
2.2 Private sector buildings	6
2.3 Public sector buildings	7
2.4 Resource consumption	8
<b>3. The Potential for and Benefits of Energy and Resource Efficient Buildings for California</b>	9
3.1 Energy	9
3.2 Green Buildings	12
3.3 Benefits	12
3.4 Progress in Achieving Potential	13
<b>4. Rationale for Statewide Action</b>	15
4.1 Barriers to action	15
4.2 Untapped opportunities	19
<b>5. Goals for California’s Buildings, Their Owners and Occupants</b>	20
<b>6. Action Strategies and Tasks</b>	22
6.1 Action alternatives for doubling our progress	22
6.2 Real estate industry commitment to achieving goals	25
6.3 Benchmarks and recognition of resource-efficient buildings	27
6.4 Investment and financing incentives	28
6.5 Standards and regulation	30
<b>7. Leadership into Accomplishment</b>	32
7.1 Assigning responsibilities	32
7.2 Increasing funding for building efficiency and green buildings	34
Appendix 1 Detailed Work Plans Suggested by Private Sector Programs & Marketing Group	38
Appendix 2 Profile of Public Building Targets for Action	56

## **1. Introduction -- California Has Made Major Strides with Energy Efficiency and “Green Buildings” --- and We Can Still do Much More!**

This “Technical Back-Up Paper” reports the technical work that underpins a Green Building Initiative (GBI) action plan, put forward for the Governor’s consideration in the form of a draft Executive Order. The scope of action targets all commercial buildings – both privately and publicly owned, as well as existing and buildings that will be newly constructed.

The action plan springs from two overriding objectives: (1) that the plan be aggressive and make a difference, and (2) that it be cost effective and practical. We think it is both.

The extensive thought and debate that is reflected in the Green Building Initiative documents and work products reflects activities that occurred on two fronts. The first is a core group of individuals, most of whom volunteered their time to work on one of three working groups over a period of 4-5 months. During spring 2004 the working groups tackled public buildings, private building program and marketing needs, and private building finance requirements. These groups, in turn, reached out to additional partners who contributed specific expertise to the final development and documentation of the Green Building Action Plan. These two sets of contributors included representatives from:

California State Agencies: Energy Commission, EPA, Finance, General Services, Governor’s Office, Infrastructure Bank, Integrated Waste Management Board, Power Authority, Public Utilities Commission, Resources Agency, State & Consumer Services Agency, State Architect, and Treasurer’s Office.

Utilities: LADWP, PG&E, SCE, Sempra, and SMUD.

Real Estate Owners, Managers, and Major Tenants: Arden, Bechtel, Boston Properties, Cushman & Wakefield, Douglas Emmett, Equity Office, Hines, Majestic, Shorenstein, Thomas Properties, and Warner Brothers.

Environmental Organizations: US EPA’s EnergyStar program, Natural Resources Defense Council, and US Green Building Council.

Others: Jeanne Clinton as consultant to the GBI work groups, McGuire & Company and the Efficiency Partnership, and PFG Energy Capital.

### **1.1 Energy Efficient Buildings**

In the last decade, California has made tremendous progress in building more energy-efficient new buildings, thanks to a combination of state energy standards, utility incentive programs, and smart design choices by developers and architects. New buildings today use 40% less energy than those built only 20 years ago. California leads the nation in this regard. Similarly, a number of owners and operators of existing buildings have made improvements to their lighting, air conditioning, and equipment maintenance practices to reduce energy use by 10-15% or more.

Many of these building owners have taken advantage of utility incentive programs while protecting their operating budgets from high electricity prices. During the 2000-2002 energy crisis expanded incentive funds captured much greater savings.

Still, substantial opportunities for 30% and 50% and higher returns on investment are repeatedly missed. We know this by looking at outstanding and innovative achievements in both the private and public sectors that have far surpassed these gains. These accomplishments show us that California's building sector still has substantial energy-saving potential with good economic returns. For example:

- o The new **Cesar E. Chavez Education Center in Oakland** combines an elementary school, childcare program, recreational and community use facilities into a building complex that has met the design goals of the Collaborative for High Performance Schools. This complex exhibits energy-smart design by bettering Title 24 building energy standards by some 25 to 30 percent. The project won California's 2004 Savings by Design-AIACC<sup>1</sup> Energy Efficiency Integration Award and also a CHPS design award.
- o **Arden Realty** has over 100 Energy Star-rated existing buildings in the U.S., and easily obtains 10-20% savings in all their buildings. For a 1980 Los Angeles office building, they obtained 50% energy savings, dropping their energy costs from \$3.02 per square foot per year to \$1.52. During the period 1998-99 they invested \$28 million in efficiency projects offering paybacks less than four years.
- o The **Natural Resources Defense Council** office in Santa Monica was designed to reduce water use by 60 percent and electricity consumption by 60-75%.

## **1.2 Green Buildings**

Leaders in both the public and private sectors have committed to the design of new "green buildings" that are not only energy efficient, but make intelligent design choices in terms of use of natural resources. These buildings have sensitive site design to reduce rainwater runoff, recycled content materials for concrete and interior walls and carpets, and finish paints and surfaces that are friendly to good indoor air quality for the occupants. Many of these green buildings cost no more or only slightly more than a conventional building, have lower operating costs, and contribute to better health and productivity of worker or student occupants. Examples include:

- o **State of California East End Complex**, Sacramento. Blocks 171 –174 are LEED-Certified and Block 225 attained an even more impressive LEED-Gold standard. The complex saves over \$400,000 in energy costs annually, and is expected to better 2001 Title 24 energy codes by 30%. The entire complex also incorporates many recycled content products, low VOC-emitting materials, and low-water consuming fixtures and landscaping. The project diverted 97% of its construction waste away from disposal in landfill.

---

<sup>1</sup> A joint program of the California utilities and the American Institute of Architects California Chapter.

- o **GAP's headquarters**, in South San Francisco, completed in 1998, is an early green building that includes many sustainable features including low VOC-emitting carpet and paint; recycled content ceiling tiles, countertops and furniture; and is 30% more efficient than the then-Title 24. It also has a grass roof to keep the building cool.
- o **South Campus Headquarters of Toyota Motor**, in Southern California (LEED version 2.0 Gold). This 624,000 square foot office complex includes widespread use of materials with recycled content; a large solar electric system that reduces demand on the local utility grid during peak hours; and a special pipeline to use recycled water for cooling, landscaping and restroom flushing. The complex should conserve more than 11 million gallons of drinking water a year. Energy-efficiency betters State energy codes by more than 20 percent, and the complex includes a hydrogen fueling and service station for Toyota's fuel cell vehicle program.
- o **Other public sector entities** that have committed to green or sustainable building reach broadly across the state (and country). These include the Cities of Long Beach, Los Angeles, Oakland, San Diego, San Francisco, San Jose, and Santa Monica, as well as the Los Angeles Community College District and the University of California.

## 2. A Profile of California's Commercial and Institutional Buildings

### 2.1 Overview of Building Stock and Ownership

#### *Population*

There are 6 billion square feet of commercial and institutional buildings in California. Public buildings account for an estimated 1.3 billion square feet of this total, primarily from K-12 schools (700 million square feet), State facilities (250 million sq. ft.) and local government buildings (250 million sq. ft.).

#### *Vintage*

The inventory of pre-1978 square footage amounts to 57% of the non-residential building stock.

#### *Ownership*

Based on floor space, the U.S. average for building ownership is<sup>2</sup>:

Publicly owned	18%
Owner occupied	56%
Non-owner-occupied	23%
Unoccupied	2%

<sup>2</sup> Heschong Mahone Group, Inc., *Markets and Potential, An AB 549 Project Interim Report*, for Southern California Edison, October 9, 2003.

### *Building Function<sup>3</sup>*

<u>Building Type</u>	<u>Percent of Commercial Electricity Use</u>
Office (both privately and publicly-owned)	28%
Food Store	12
Hospital	12
“Miscellaneous building type”	12
Retail	11
Warehouse	7
Restaurant	7
Hotel	4
School	3
College	3

Based on total California energy use, publicly owned buildings are estimated to use about 10% of the State’s non-residential energy use. This reflects the fact that these buildings are less energy-intensive than other building types, especially recognizing the substantial portion of floor space devoted to non-air conditioned schools and that they do not operate as many hours/year as other building types.

## **2.2 Private Sector Market Segments**

### *Owners and investors*

There are several key market segments with distinct views on energy efficiency capital investment return hurdles, access to capital, and technical skills of building managers/engineers. These segments have different needs in terms of their degree of motivation, program services needed, & incentives required. Illustrative ownership/investment/decision-style segments include:

- *Large sophisticated office and retail building owners* (e.g. members of the Building Owners & Managers Association or BOMA) have developed leases with some ability to pass through and net-out capital costs versus utility bill pass-along. Buildings may have “Wall Street” and REIT owners, with professional building management. There is a two-class view of return on investment (RoI) hurdles -- general real estate yields 8-10% versus efficiency projects (that cut operating costs) having to yield 20-33% or more. The latter is equivalent to a 2-3 year simple payback on efficiency measures. Building managers may have a 12-18 month budget lead-time to request building improvement operating capital from building owners or shareholders. Many have constraints in passing through energy capital improvement costs in highly competitive leased space markets, where tenants are not savvy about differentiating operating costs across building lease choices.
- *Large-scale owner-occupied and owner-managed properties* have somewhat longer-term investment and stewardship horizon.

---

<sup>3</sup> Mike Rufo and Fred Coito, *California Statewide Commercial Sector Energy Efficiency Potential Study*, Volume 1, for Pacific Gas & Electric, July 2002.

- *Smaller “mom and pop” owners* tend to own smaller buildings (under 100,000 sq. feet in a single building or cumulative holdings), and invest most all their capital in property acquisition. They are not as likely to undertake capital improvements for retrofit. Acceptable paybacks may be just 6 months - 1.5 years. They do not tend to hire building managers or operators who are well-trained in energy management; many out-source building management. This group may respond to offers of energy management financing programs.

### 2.3 Public Sector Buildings

#### Estimated Building Stock of Public School, Local Government, and State Facilities and Their Energy Use

prepared by CEC, 8/5/2004

Facility Category	# Facilities	Estimated Square Footage (1000's)		Estimated Energy \$/sf	Estimated Annual Energy use (dollars) <sup>5</sup>	
		Existing	New		Existing	New
K-12 School <sup>1</sup>	8331	708135	42000	\$1.43	\$1,012,633,050	\$60,060,000
Local Govt (water+waste) <sup>2</sup>					\$250,000,000	\$0
Local Govt (bldgs) <sup>2</sup>	533	250000	2000	\$2.00	\$500,000,000	\$4,000,000
Community Colleges <sup>3</sup>	108	52200	1711.1	\$2.00	\$104,400,000	\$3,422,200
State Facilities <sup>4</sup>	2023	251000	7000	\$2.10	\$527,100,000	\$14,700,000
State Facilities Leased	450	15000	0	\$2.10	\$31,500,000	\$0
<b>Total</b>		<b>1276335</b>	<b>52711</b>		<b>\$2,394,133,050</b>	<b>\$82,182,200</b>

#### Notes:

1. Estimated square footage based on utility data identifying square footage of schools in each major service territory.

The square footage includes both public and private schools. Estimated new facilities are those planned in 2000-2005. Assumed energy cost is \$1.43/sf based on CHPS estimates.

2. Estimated square footage for buildings. Assumed annual energy budget for local governments is \$500 million is for buildings and \$250 million for water/wastewater. Of this amount about 70% is associated with buildings and the balance with water/was

3. Estimated square footage from Chancellors Office. Energy cost of \$2/square feet from CC Program audits.

4. Estimated square footage from Summary of State Owned Facilities from DGS, RESD (1/2001). Assumed energy cost to be \$2.1/square feet. These numbers include state agencies, Corrections, UC and CSU. UC sf estimated at 93,000,000 per Maric Munn 4/2004.

5. Assume 85-90% of the energy cost is electricity at \$.08-0.10/kwh, and 10-15% natural gas.

## 2.4 Commercial Building Energy and Resource Consumption

### *Overall resource consumption*

Buildings have a major impact on natural resources such as water, forestry products, and solid waste. According to the Natural Resources Defense Council and the US Green Building Council, resource consumption attributed to all buildings (both residential and commercial) amounts to:

- 65.2% of total U.S. electricity consumption <sup>1</sup>
- 36% of total U.S. primary energy use <sup>2</sup>
- 30% of total U.S. greenhouse gas emissions <sup>3</sup>
- 136 million tons of construction and demolition waste in the U.S. (approx. 2.8 lbs/person/day) <sup>4</sup>
- 12% of potable water in the U.S. <sup>5</sup>
- 40% (3 billion tons annually) of raw materials use globally <sup>6</sup>

#### Footnotes:

1. U.S. Department of Energy, Energy Information Administration, March 2001, *Monthly Energy Review*.
2. Ibid.
3. U.S. Department of Energy, Energy Information Administration, "Emissions of Greenhouse Gases in the United States 1999."
4. U.S. EPA, 1998, "Characterization of Building-Related Construction and Demolition Debris in the United States."
5. U.S. Geological Service, 1995 data.
6. Lenssen and Roodman, 1995, "Worldwatch Paper 124: A Building Revolution: How Ecology and Health Concerns are Transforming Construction," Worldwatch Institute.

### *Electricity*

The Commercial sector accounts for the greatest portion of both peak power demand and total electricity consumption in California. This building population consumes 36% of the State's electricity and 37% of the state's peak power demand. In 2003 alone, California commercial and institutional facilities paid a retail electricity bill of \$12 billion.

#### **Year 2000 California Sectoral Electricity Use**

<b>Sector</b>	<b>Peak Power Demand %</b>	<b>Total Power Consumption %</b>
<b>Commercial</b>	<b>37</b>	<b>36</b>
Residential	35	30
Industrial	17	21
Agricultural	5	7
Other	6	6



### 3. The Potential for and Benefits of Resource Efficient Buildings in California

#### 3.1 Potential for Energy Efficiency

Conservative estimates suggest that California could *quadruple* the rate of energy efficiency solutions, and this would still be cheaper than paying the price of building new power plants. Leaders in California's real estate industry report that it is easy to get 10-15% energy savings, and that they could achieve 30-40% savings through a combination of executive leadership and a larger pot of financial incentives. This would amount to \$3-5 billion in energy bill savings each year that could be re-invested into the California and U.S. economy. The multiplier effect of this infusion would create thousands of jobs and a more robust economy.

##### *Efficiency via "hardware" investment*

A report commissioned by PG&E, under the guidance of the CPUC, addressed efficiency potential in commercial buildings.<sup>4</sup> The scope addressed potential in the service areas of the three major investor-owned power utilities (PG&E, SCE, and SDG&E). These three IOU areas comprise about 80% of the State's total power consumption and peak demand. Thus total California efficiency potential could be as much as 25% greater than the Rufo/Coito study findings.

Before going further, it is worth noting that this study used somewhat conservative assumptions by looking at the major electrical uses that amount to 76% of commercial consumption, with 69 specific efficiency measures, and on a platform of the existing utility efficiency programs (some programs focus incentive funds at the "low hanging fruit" offering 10-15% energy savings) and marketing strategies that are focused on "hardware" measures (as opposed to operation and maintenance measures). Some in the environmental/energy analysis community would say there is both more opportunity out there than these specific measures encompass. Some view today's utility programs as not reaching their full potential as 1) they lack integrated financing mechanisms that would enable building owners to affordably undertake some actions, and 2) program designs could be improved.

The Rufo/Coito study concluded that the cost-effective "economic potential" for electricity reduction in the commercial sector is about 12% of the annual 80 billion kWh consumed, or 10 billion kWh/year, with a savings value to the end user of \$1.3 billion/ year (assuming power costs \$0.13/kWh for combined electricity and power demand). The corresponding potential to reduce peak electrical demand is about 2400 MW. The average payback for this level of efficiency investment is 5.5 years.<sup>5</sup> With a 5.5-year payback the total capital investment for this level of efficiency amounts to \$7.2 billion, with a total cumulative ten-year savings in power bills of \$13 billion. Thus the net savings is approximately \$6 billion.

<sup>4</sup> Rufo and Coito, *California Statewide Commercial Sector Energy Efficiency Potential Study*, Xenergy Corp., ID #SW 039A, Vol. 1, 2002b

<sup>5</sup> Using the Xenergy study's data on levelized cost/kWh saved, efficiency levels attainable, an average electricity price of 13 cents/kWh (inclusive of demand charges in 2002), and a 10-year measure life, simple payback values were derived. These payback findings were then confirmed with Michael Rufo in October 2002.

### *Efficiency via O&M and commissioning*

There are also substantial efficiency gains to be had from operations and maintenance practices, without investing any capital. A Heschong Mahone Group (HMG) 2004 draft report cites a study by ACEEE authors Steven Nadel and Jennifer Thorne that “retro-commissioning” (investigating and “tuning-up” how well existing building systems are maintained and controlled relative to their original design) can save 5-15% of a building’s total energy. HMG indicates the best candidate buildings are those built pre-1992 and with air conditioning. The same HMG study reports that 70% of “economizer” systems on building heating, ventilation, and cooling (HMAC) systems are not functioning properly, and that properly trained and motivated technicians could correct this.<sup>6</sup>

A draft report on the effect of building retro-commissioning for SMUD found this can save 7% in annual energy use at a cost of about 12 cents/square foot, with a one-year payback.<sup>7</sup> A larger study funded by USDOE and also conducted by LBNL included 50 California buildings. This study has preliminary findings of an electricity savings of 8.4% from retro-commissioning, at a cost of 15 cents per square foot and a similar one-year payback.<sup>8</sup> Thus, an 8% savings from retro-commissioning can be had in addition to the hardware capital investment. The 8% savings applied to the Xenergy potential estimate would save 6.7 billion kWh/year at an added cost of \$870 million.

According to the Heschong Mahone 2004 report, many building energy managers /from large commercial property investment and management companies report they can save as much as 15-20% with no-cost practices and regular building system re-commissioning, and as much as 30-50% savings within 5-year paybacks.

### *Combined hardware and O&M efficiency*

Based on all these findings, and the comprehensive action strategies that the GBI envisions, it is quite plausible to set a **goal of 20% efficiency improvement** comprised of 12% of savings from hardware investments and 8% savings from retro-commissioning. This goal is equivalent to **17.7 billion kWh per year and nearly 4000 MW of peak electrical demand reduction in the IOU areas**. This is achieved at a total capital investment of \$8 billion, with a weighted average payback of 3.5 years. Executing this investment over 10 years, this equates to an average energy efficiency investment schedule of \$800 million/year. The corresponding retail energy savings to the end users amount to \$2.3 billion/year.

### *California-wide potential if publicly-owned utility areas participate*

If 29% efficiency targets are achieved in all utility services areas of California, the following table shows this would be equivalent to **22 billion kWh per year and nearly 5000 MW of peak electrical demand**. This is achieved at a total capital investment of \$10 billion, with a weighted

---

<sup>6</sup> See Heschong Mahone Group, Inc., *Energy Savings Opportunities for Existing Buildings, An AB 549 Project Report*, for Southern California Edison, Draft, February 17, 2004.

<sup>7</sup> N. Bourassa, M. Piette, N. Motegi, Lawrence Berkeley National Laboratory, “Evaluation of Persistence of Savings from SMUD Retro-commissioning Program, Draft Final Report”, April 2004.

<sup>8</sup> Telephone communication with study author Evan Mills, LBNL, August 17, 2004 regarding the study “Costs and Benefits of Building Commissioning in the U.S.”

average payback of 3.5 years. Executing this investment over 10 years, this equates to an average energy efficiency investment schedule of \$1 billion/year. The corresponding retail energy savings to the end users amount to \$2.9 billion/year.

	% of Buildings	IOU utility area goal (80% of Calif.)			Extended goal if public utility areas cooperate at same cost & energy price		
		MW	GWH	\$ Investment (millions)	MW	GWH	\$ Investment (millions)
<b>Hardware Measures (12% savings)</b>							
<b>All Commercial/ Institutional</b>	<b>100%</b>	<b>2400</b>	<b>10,666</b>	<b>\$ 7,200</b>	<b>3,000</b>	<b>13,333</b>	<b>\$ 9,000</b>
Private Bldgs	90%	2160	9,599	6,480	2,700	11,999	\$ 8,100
State Bldgs	3%	72	320	216	90	400	\$ 270
Other Public Bldgs	7%	168	747	504	210	933	\$ 630
<b>O&amp;M/Retro-Commissioning (8% savings)</b>							
<b>All Commercial/ Institutional</b>	<b>100%</b>	<b>1584</b>	<b>7,040</b>	<b>\$ 870</b>	<b>1980</b>	<b>8,799</b>	<b>\$ 1,088</b>
Private Bldgs	90%	1426	6,336	783	1,782	7,920	\$ 979
State Bldgs	3%	48	211	26	59	264	\$ 33
Other Public Bldgs	7%	111	493	61	139	616	\$ 76
<b>Combined Efficiency Actions (20%)</b>							
<b>All Commercial/ Institutional Buildings</b>	<b>100%</b>	<b>3984</b>	<b>17,706</b>	<b>\$ 8,070</b>	<b>4980</b>	<b>22,132</b>	<b>\$ 10,088</b>
Private Bldgs	90%	3586	15,935	\$ 7,263	4482	19,919	\$ 9,079
State Bldgs	3%	120	531	\$ 242	149.4	664	\$ 303
Other Public Bldgs	7%	279	1,239	\$ 565	348.6	1,549	\$ 706
<b>Investment &amp; Savings</b>							
	<b>GWH</b>	<b>\$ Investment (millions)</b>	<b>Annual Savings (millions)</b>	<b>10-Yr Savings (millions)</b>	<b>Statewide Investment (millions)</b>	<b>Annual Savings (millions)</b>	<b>10-Yr Savings (millions)</b>
<b>All Commercial/ Institutional Buildings</b>	<b>17,706</b>	<b>\$ 8,070</b>	<b>\$ 2,302</b>	<b>\$ 23,017</b>	<b>\$ 10,088</b>	<b>\$ 2,877</b>	<b>\$ 28,772</b>
Private Bldgs	15,935	\$ 7,263	\$ 2,072	\$ 20,716	\$ 9,079	\$ 2,589	\$ 25,894
State Bldgs	531	\$ 242	\$ 69	\$ 691	\$ 303	\$ 86	\$ 863
Other Public Bldgs	1,239	\$ 565	\$ 161	\$ 1,611	\$ 706	\$ 201	\$ 2,014
Savings based on average 13 cent/kWh energy + demand prices.							
<b>State \$ investment/annual savings =</b>		<b>3.5 year payback</b>			<b>in IOU areas</b>		
		3.5 year payback			Statewide, including publicly-owned utilities		

\* Note: no separate analysis of the cost-effective potential in publicly-owned utility service areas was performed. Since most of these utilities have lower retail power rates than the IOUs, the cost-effective savings level and associated investment likely will be less than simply adding in their 20% pro rata share of the statewide power consumption, as is done in this table.

A profile of typical building investment projects might look like these:

<b>Commercial Customer Segment</b>	<b>Power Demand</b>	<b>Annual Power Bill</b> (@ 10– 13 cents/ kWh & 50% load factor)	<b>Annual Savings Potential</b> (\$000) (assumes 20-30% savings)	<b>Efficiency Investment</b> (assume 3.5 year average payback)
Small	< 200 kW	< \$100K	< \$20-30 K	< \$70-105 K
Medium	200-500 kW	\$80-300 K	\$16 - 90 K	\$56 – 315 K
Large	> 500 kW	> \$300K	> \$60 – 90 K	> \$210 K

By electrical end-use, the greatest potential savings in electricity consumption from investments in hardware improvements by far comes from interior lighting, followed by cooling and refrigeration. In terms of reduced peak electrical demand the two greatest targets are interior lighting and cooling. (Rufo and Coito, July 2002)

### **3.2 Green Building Potential**

According to the US Green Building Council, promoting LEED in California could result in:

- 140 million square feet of green buildings by 2010
- Smart growth elements = 170 million fewer vehicle miles traveled/year
- Water savings = 4 billion gallons/year
- Energy savings = annual equivalent to 1.5 million barrels of oil; \$40 million/year
- Market for environmentally preferable materials = \$7.5 billion
- Productivity benefits of \$53 million/year

### **3.3 Benefits**

By implementing green building and energy efficiency practices, California can:

- Lower occupancy costs for commercial buildings, thereby retaining and even attracting business to the State and increasing building operator profits. Rents paid are 5-6% higher in LEED Certified projects, tenant turnover is lower, and lease-up rates are faster (by months in some cases).
- Enable its building owners to earn 30%-50% annual returns on their energy-efficient investments
- Increase buildings' net operating income (NOI), and as a multiple of NOI, raise the total capitalized value of the buildings up to 10% when they are sold or transferred.

- Reduce the need for new power plants and provide a far cheaper source of electricity for buildings than paying the cost of new power plants. Why pay 10-20 cents/kWh for electricity if you can save it for 3-6 cents?
- Avoid health-threatening air pollutants and greenhouse gases from a smaller number of new power plants, reduce the State's reliance on imported power from more polluting power plants out of state, and reduce operating times from older polluting plants in our urban centers.
- Reduce solid waste generated and divert materials from California landfills.
- Create and expand markets for recycled content products such as carpet, furniture partitions, ceiling tiles, and paint.
- Provide improved occupant health and productivity. Certified projects report up to a 60% reduction in employee turnover after moving to a LEED building.
- Enhance and protect ecosystems and biodiversity, improve air and water quality and conserve natural resource areas.

A significant basis for California's economic success has been innovation and technology. By encouraging the use of energy efficient and green technologies in buildings, the State can foster innovation among designers and suppliers. This will support building engineering and management businesses and employment that focus on in-State management and technology solutions, while also ensuring that our businesses are competitive globally, where sustainable buildings are in growing demand.

### **3.4 Progress in Achieving Potential**

#### *Overall achievements*

##### Energy

The IOU efficiency program expenditures have been very cost-effective for building owners -- "invest 1% of your annual utility bill once, and save 0.6% every year for about 10 years". The Rufo-Coito report (see its Fig. 3.9) indicates that for the three preceding "normal" years (the pre-crisis period 1998-2000) PGC funded programs reduced consumption by ~0.5 billion kWh/year. If this were maintained for 10 years, the savings in 2015 would be 5 billion kWh/year, or about one-third the 17 billion kWh goal. **Thus we conclude that the impacts of the PGC-funded programs, as currently funded and operated, would need to be doubled to reach the savings goal of 10.7 billion kWh/year (12%) from efficiency hardware investment.**

##### Green Buildings

There are 231 certified LEED-New Construction buildings in California as of mid-2004, comprising 26.5 million square feet. There also is a handful of existing buildings participating in the pilot for LEED-EB.

### *Knowledge infrastructure and analysis tools*

#### Energy

There is an existing infrastructure of knowledgeable building engineers, designers, operators, building equipment distributors, building operator training programs, and utility incentives that provide a solid platform from which to expand the market for increased levels of activity in energy efficient buildings.

The US EPA has an Energy Star building rating tool that can be used with such input data as building size, utility bills, and number of occupants. If such tools were in widespread use, they could influence the natural competition among high-end building managers and engineers to operate “good” buildings. However, investors, owners, managers, and prospective tenants for the most part are not using analysis tools that can compare the relative energy efficiency and operating costs across buildings.

#### Green Buildings

There are green building rating systems called LEED-NC (New Construction), LEED-EB (Existing Buildings) and LEED-CI (Commercial Interiors) that cover new construction and major renovations, existing buildings and commercial interiors (new and renovations), respectively. All three programs use a checklist covering various areas where points are awarded. The building owner, along with the design team, usually decides what level of points to pursue. Information on the rating system is provided in a LEED Reference Package, which is available for purchase, by the public. The USGBC also provides to members and registered projects a significant amount of information on the credits. Many cities including Los Angeles, Oakland, San Francisco, San Jose and Santa Monica have adopted green building policies such as LEED in recognition of the importance of building green.

The Collaborative for High Performance Schools (CHPS), a California public/private partnership, is leading the effort to green schools. Its goal is “to improve the quality of education for California’s children and facilitate the design of learning environments that are resource efficient, healthy, comfortable, well lit, and that contain the amenities needed for a quality education”. The State’s largest school district, Los Angeles Unified School District, along with a dozen others, has adopted CHPS and is leading the way in using low emitting materials in the construction of its schools.

The knowledge base for green buildings grows every day. There are approximately 1,350 LEED accredited professionals (AP) in California or 17% of the country’s total. These include architectural firms, engineering firms, construction companies, local governments, UC staff, and designers. Most of the large A&E and construction firms are represented, along with other medium and small design and construction firms. Based on CIWMB training experience, there are more LEED APs in the San Francisco Bay Area, Los Angeles, and Sacramento; there are fewer in the Central Valley. Most firms dealing with the State and school districts have realized that they need to have LEED knowledge, and have at least one person, and usually several, who have gone through the training and are becoming LEED APs.

## 4. Need and Rationale for Statewide Action

### 4.1 Barriers to Action

#### *Private buildings*

There is a crisis in the investment time horizon gap between real estate investors and the electric utility world. With the advent of building ownership by real estate investment trusts catering to Wall Street investors, many real estate investors have dropped their building investment and improvement time frames from 5-10 years a decade ago, to only 1-2 or 1-3 years now. Independent power plant investors, on the other hand, have 10-20 year investment horizons, and utilities typically have up to 30-year investment horizons for power infrastructure. Leaving the efficiency investment decision to individual owners puts the efficiency resource in a far tougher investment climate.

At the same time, large portions of the commercial building stock are occupied by tenants. Tenants either have individual utility meters and pay their own power costs or, if a building is master-metered, the building owners pass on the utility bills to tenants on a fixed cost per square foot. (See further discussion below.) In a master metered building with multiple tenants, CPUC regulations prohibit the owner from installing “sub-meters” to track and bill each tenant for their individual energy use. (The CPUC historically has been concerned that unscrupulous owners would mark-up the energy charges unfairly, without oversight of how they passed these charges on.)

Thus, a building owner may have limited motivation to invest capital in order to reduce operating costs, unless there is a highly competitive market for real estate, and where a tenant pays attention to operating costs.

Large, sophisticated owners and managers are more likely to take measures that improve energy efficiency and cut utility bills 10-20%, with simple paybacks of 2-3 years. Many of these actions focus on lighting and control measures. But even these “sophisticated” facilities today are NOT likely to accept larger packages of improvements that offer 30-40% total energy and cost reductions with 3-5 year simple paybacks, yet these still offer good ROIs, and are cheaper than buying power from new power plants. Worse, having “skimmed the cream” of the 1-2 year payback projects, the next round of projects will have 4-6 year paybacks, as the more expensive projects (e.g. for air conditioning, chillers, air handlers, etc.) no longer have the benefit of averaging in the faster-payback lighting and control measures.

Several additional factors have kept California below its potential and hindered the building sector from taking advantage of economic opportunities to build green, reduce energy use and help protect the environment. These barriers include:

- **Limited awareness** among real estate executives of buildings’ energy saving opportunities and the economics of building green, especially with the absence of widespread and uniform standards for benchmarking energy operating costs, and limited awareness of green building rating systems;
- **Insufficient technical resources or knowledge among building operators and contractors** to carry out effective efficiency measures; and

- **Inadequate financing tools and/or financial incentives** to capture the efficiency and green building potential, while maintaining positive cash flow.

#### The “Leased Space Dilemma”

- A substantial portion of the commercial/industrial square footage in California is leased out to tenants. Whether by individual electric meters, or via a pro-rata pass-through of the building’s electric bill, 97% of tenants are responsible for paying electricity costs.<sup>9</sup>
- If tenants have and pay their own utility meters, owners get no operating cost savings from any capital improvement made by the owner. This is commonly called the “split incentives” problem.
- If an owner has a master meter for an entire building, with multiple tenants, CPUC regulations prohibit the owner from installing “sub-meters” to track and bill each tenant for their individual energy use. (The CPUC historically was concerned that unscrupulous owners would mark-up the energy charges unfairly, without oversight of how they passed these charges on.)
- Most tenants are not sophisticated in asking about operating costs, including energy bills, when they are looking for leased space.
- The problem of unsophisticated tenants is further complicated when local leased-space real estate markets are very competitive, with tenant decisions often based on the first-cost of the lease alone, without any regard to expected operating costs. For example, in some parts of the Los Angeles metropolitan area industrial assembly and processing facilities (non-air conditioned) make lease/move decisions based on differences of just one-third of a cent per square foot. An owner committed to energy improvements might have to raise his/her lease price to cover those improvements, but likely would suffer the loss of prospective tenants. The tenants typically fail to inquire about annual energy costs.
- Recently tenants have been insisting on shorter-term leases, a situation that makes it even harder for an owner to recoup the costs of energy improvements.

#### *Public sector buildings*

State government has been working towards greener public buildings for the last four years with uneven success. The University of California has committed to design its new buildings to green building standards. The executive agencies have three success stories -- Sacramento’s East End Complex and CalEPA building, and the new Caltrans District office in Los Angeles. Yet, barriers still exist to widespread green building and energy efficiency retrofits in mainstream State facilities. The key barriers are:

- **Perception that green buildings cost more.** There is a lack of awareness as to how building green can reduce many first costs (e.g. heating and cooling equipment costs) and ensure lifetime savings in lower operating costs. A recent report “...finds that a minimal

---

<sup>9</sup> HMG, 2003, op. cit.



front-end incremental investment of just 1-2% in construction costs typically yields life cycle operating costs savings ten times” that amount.<sup>10</sup> Not building a green building causes higher overall costs to the building occupants, and in the case of public sector buildings, in turn causes higher costs to taxpayers paying for these buildings and their operating costs.

- **Difficulty in valuing environmental and occupant health and productivity benefits.**
- **Inadequate decision process and insufficient funding flexibility** to offset minor first cost capital increases with long term operating cost savings, increased attendance, or greater occupant productivity.
- **Difficulty in accessing capital for retrofit projects on favorable terms.** This includes limits set by government procurement policies, loan and lease terms that conflict with government policies or require pledging additional revenue sources and/or equipment collateral beyond the energy savings alone.
- **Insufficient staff time, expertise and/or funding** to conduct front-end project identification, feasibility assessment, and design work for retrofits in existing buildings.

#### *All buildings*

Research on the success of California utility energy efficiency programs address some of the reasons that projects do not go forward. These include:

- 80% of the private building market can qualify today for some kind of EE financing, *if* they are interested in obtaining financing. The other 20% is not financeable by anyone due to poor credit or a facility’s existing debt burden.
- Being able to “qualify” for financing is not enough. Many facilities do not succeed in securing financing for energy-related improvements because of internal management decisions regarding priorities for debt and working capital.
  - These priorities frequently focus on making visible building improvements to attract higher occupancy (e.g. investing in lobbies, carpeting, and landscaping), investing in core business activities that can expand production or market share (meeting the revenue growth targets of Wall Street), and/or paying higher dividends to shareholders.
  - In other cases, facilities can get commercial financing, but don’t, because it does not achieve corporate financial goals, takes 12-18 months to get internal management approvals, or technical facilities people who propose projects frequently do not succeed when they bring operating cost savings ideas to the CFO.
  - Efficiency improvements have a significant chance of getting "ruled out" during the "value engineering" stage, when project goals exceed budgets. Early awareness and buy-in by owner/decision-maker to efficiency measures can help preserve more efficiency actions in the final outcome.

---

<sup>10</sup> Greg Kats, *The Costs and Financial Benefits of Green Buildings, A Report to California’s Sustainable Building Task Force*, October, 2003.

### Barriers differ by market segment

- “*Large*” facilities (e.g. over 500 kW demand) require greater management commitment and/or financial incentives to increase their efficiency investment. These buildings do not need financing assistance.
- “*Medium-size*” facilities (e.g. with power demand of 200 kW to 500 kW, or annual power bills of \$100 - \$300,000, and in some cases up to \$2-3 million) may find that “convenient, easy-to-use” financing that is billed and repaid in a manner similar to paying monthly electric bills could facilitate internal management approvals of energy efficiency projects. Such a mechanism essentially removes the facility energy improvement projects from the competition for internal capital, permitting the facility-operating budget to self-fund the loan repayment from utility bill savings. Utilities in Georgia and Wisconsin have offered successful programs to this market segment.
- “*Small*” facilities (those under 100 kW of power demand, or with annual power bills under \$100,000) face high transaction costs on three fronts in undertaking energy efficiency projects: specifying needed improvements, selecting and overseeing a contractor or vendor, and arranging financing. To increase market penetration of efficiency actions here will require a program offering a packaged set of services, including the equivalent of “on-bill” financing. Utilities in Connecticut have offered successful packaged delivery and financing programs to this market segment. These programs use credit history on paying utility bills as a screen of applicants, and keep the loan periods short to manage risks from facility occupant turnover or delinquencies.

### Continuity and Predictability of Incentive Programs

Another dimension of why progress does or does not occur has to do with 1) continuity of programs offering technical assistance or incentives, and 2) the degree to which installation contractors (lighting, HVAC, controls, etc.) are motivated to promote energy efficiency services and products. An investigation of commercial and institutional buildings’ response to the energy crisis reported insightful findings regarding the conditions necessary for organizational action.<sup>11</sup> That report indicates that “in order to move to a long-term approach, we (must) see programs and policies that:

- Develop relationships with organizations and aim to better understand organizations. Using existing peer networks and service delivery systems is an important mechanism.
- Create more certainty in the marketplace. Programs and policies need to exist for periods of time before they are incorporated into organizational (decision processes. ...
- Reward, encourage, and support good long-term energy management practices in organizations. ... Demonstrate how good energy practices can provide many benefits that respond to organization concerns and needs.

---

<sup>11</sup> Loren Lutzenhiser, Ph.D., *Understanding the Response of Commercial and Institutional Organizations to the California Energy Crisis*, Consultant report to the California Energy Commission, July 24, 2002.

- Support organizational efforts to be better (more responsive) consumers of energy through targeted outreach, recognition, networking, and education efforts.”

#### Programs Designed to Meet Specific Objectives

Real estate roundtables convened in Los Angeles and San Francisco during spring 2004 for this GBI effort pointed to the need for traditional utility ratepayer-funded commercial sector efficiency programs to be better integrated, more strategic in their incentive designs, and as a result produce higher and more leveraged energy savings.

#### **4.2 Untapped Opportunities for Increasing Resource Efficiency**

An important time to make building efficiency improvements is at the time of occupant turnover. At that time building remodeling and renovations (R&R) will be made anyway and there is no concern about disrupting the business activities of an occupant. The CEC commissioned a report to look at the opportunities for efficiency at this time in a building’s lifecycle. Key findings of that report are noted here.<sup>12</sup>

The R&R building market has the following profile:

- 80% of the R&R market is in the greater SF and LA areas
- 80% of R&R occurs at tenancy turnover
- 70% of R&R occurs in office and retail facilities
- An effective marketing message should emphasize an "enhanced value strategy" -- not focusing as much on energy savings, but placing more emphasis on the value of occupant comfort, reduced construction costs (in some cases), equipment durability, and ease of operation.
- The most important decision-makers to efficiency actions are #1 the owner, #2 lighting and HVAC professionals used by the building, and #3 the building’s HVAC operations personnel.

The primary findings regarding programmatic opportunities to increase efficiency include:

- Compared to previous standards, 1999 and 2005 Title 24 standards are making a bigger dent in producing efficiency savings during the routine course of renovations.
- Any program for R&R situations should target the incremental gain beyond what Title 24 requires, or those situations where a system or building space does not meet the threshold for having to comply with T-24 standards.
- Utilities' "Savings By Design" incentive and technical assistance programs have very low penetration among floor space undergoing R&R – only 2-3% of R&R floor space participates. This program could be substantially tuned-up or tweaked to better reach this community.

---

<sup>12</sup> ADM Associates, Inc., and TecMRKT Works LLC, *Nonresidential Remodeling and Renovation Study, Final and Summary Report*, for: California Energy Commission, March 2002. The study methodology included a quantitative study, industry stakeholder surveys, and focus group discussions.

- A campaign (either via targeted outreach and awareness, or standards-based) could go a long way to capturing the entire building stock over time (15-20 years).
- Financing tools (e.g. low interest loans or performance contracts) are not important to efficiency decisions, given that a commitment to R&R has already been made.
- Decision-makers and stakeholders recommend that government target the elimination or significant reduction of market availability of *inefficient* products and systems.
- Utility programs or awareness campaigns should target:
  - early intelligence on what space is about to change tenants or owners
  - working with leasing agents, and not so much equipment manufacturers or distributors,
  - stressing that Savings by Design applies to R&R, and
  - collaboration with building departments on both early advice on R&R designs, as well as enforcement of Title 24 (the CEC could do the latter, as well).

Moreover, the Heschong Mahone 2003 report, prepared to support the CEC’s Legislative report for AB 549, recommends that California expand its building and appliance standards to require lighting compliance when replacing 30% of lighting fixtures (rather than the current 50% threshold), require lighting controls, expand cool roof requirements, and standardize control equipment for reliability and user interface.<sup>13</sup>

**5. A Set of Ambitious Goals for the Future of California’s Buildings, Their Owners and Their Occupants**

Three State energy agencies adopted an Energy Action Plan in 2003 with the lead goal to “meet California’s energy growth needs while optimizing energy conservation and resource efficiency and reducing per capita electricity demand.” The following pages lay out goals and action strategies to achieve that and more – by achieving an absolute reduction in energy use in California’s non-residential buildings by 2020. This will mean doubling or tripling the pace of our recent progress with energy efficiency.

The goals outlined below encompass both public sector and private sector buildings. The **State** must take an aggressive stance to green State buildings. Leadership at the highest levels is needed to ensure that green building is accepted and adopted throughout all State agencies, and that all decision-makers recognize the many benefits. The State can demonstrate its strong commitment by undertaking the most ambitious energy efficiency and green building goals, as summarized in the tables below.

All **local governments and public schools** across the state can embrace these same goals, following the lead of a number of cities, counties, and school districts.

<sup>13</sup> (HMG, *Events and Measures*, An AB 549 Project Interim Report, for SCE, October 3, 2003.)

**Private building owners** can pursue many similar actions that make both economic and environmental sense for their real estate holdings and investment goals. The strategies start with efficiency where there is a strong dollars and cents rationale for action. The strategies also encourage private building developers and owners to pursue green buildings as these are increasingly valued by leading building owners and tenants, and as the real estate market comes to increasingly quantify and demand the benefits that green buildings offer. State and local government, energy utilities, and private enterprise can assist private building owners and managers to reach these goals.

**Goals for New Buildings:**

<b>State-Owned Buildings</b>	<b>Local Government Buildings &amp; Public Schools</b>	<b>Private Sector Buildings</b>
<ul style="list-style-type: none"> <li>▪ LEED Silver Certification or better for buildings &gt; 10,000 sq. ft.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Any newbuilding using State funds for construction should be LEED Silver-certified.</li> <li>▪ All new public schools with State funds should meet Collaborative for High Performance Schools (CHPS) design criteria.</li> <li>▪ Challenge all local governments to adopt LEED Silver as a standard.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Update State energy efficiency building and equipment standards to capture <u>all</u> cost-effective design and technology opportunities.</li> <li>▪ Encourage LEED via private and public promotion &amp; technical assistance.</li> </ul>

**Goals for Existing Buildings:**

<b>State-Owned Buildings</b>	<b>Local Government &amp; Schools</b>	<b>Private Sector Buildings</b>
<ul style="list-style-type: none"> <li>▪ Reduce energy purchased from the grid by 10% by 2010 and 20% by 2015, via efficiency and on-site renewables.</li> <li>▪ Benchmark and (for major buildings) re-commission for energy efficiency every 5 years.</li> <li>▪ State buildings &gt; 50,000 square feet to be certified for LEED-Existing Building by 2015.</li> <li>▪ Use any/all public and private financing mechanisms to achieve these goals.</li> <li>▪ All building and office equipment to meet Energy Star standards.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Public schools to meet CHPS commencing 2006 when using State funds for renovations and modernization .</li> <li>▪ Encourage setting 20% efficiency or on-site renewable energy goals.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Set a goal of a 20% overall energy efficiency gain by 2015, to be accomplished via senior building executive commitments and supporting California programs and incentives.</li> <li>▪ Private buildings leasing space to State agencies to meet Energy Star (or other CEC-benchmark).</li> <li>▪ State government facilitates and local governments promote private buildings designed to LEED criteria.</li> <li>▪ Update State energy efficiency building and equipment standards to apply greater degree of cost-effective measures to building renovations or expansion.</li> </ul>

## 6. Action Strategies and Tasks

### 6.1 Action Alternatives for Doubling our Progress

To double or triple our speed of achieving electrical efficiency, we must

- 1) eliminate barriers to the rate of end user efficiency investment and
- 2) probably increase incentive payments to entice more investment (both "pull" strategies).
- 3) We also can increase the use of regulations and standards to require more efficiency in existing buildings and the electrical equipment and technology sold in California, and
- 4) step up publicity and marketing efforts (all "push" strategies).

These alternative approaches could be embodied by one or a combination of the following three approaches:

**A – “Do More of the Same, with Double or Triple the Population”** do more of what we’ve been doing, but develop different marketing and outreach campaigns to reach out to buildings that have not yet taken efficiency action (i.e. double or triple the number of buildings that take action). The “more of the same” level of PGC efficiency spending essentially costs end users and ratepayers a total of 1.5 times what a customer invests (50% customer investment, matched by 50% incentive, with another 50% equivalent for utility marketing and administrative costs).<sup>14</sup> Rufo and Coito estimate that to double the rate of efficiency that we achieve using existing program strategies and incentive designs will require spending **2.35 times** the funds the ratepayer and utility now spend (incentives will increase to 60+% of the total public spending, plus there will be a slight increase in marketing expenses and a proportional increase in administrative costs). By extension, to triple the savings might require **3.5 times** the spending.

**B – “Dig Deeper”** by designing better programs and/or paying higher incentive payments to entice buildings already inclined to take some efficiency actions to “dig deeper”. This would target efficiency measures that have higher cost, longer periods before they pay back, and thus may need higher incentive payments to spur this more aggressive action. The cost of this approach will be higher than Strategy A, requiring incentives that are perhaps 1.5 times the incentive paid per kWh or kW in Strategy A.

Rufo and Coito estimate that to reach the equivalent of a 12% efficiency gain targeting hardware investments and using Strategy B, will require spending closer to **3.3 times** the current level of expenditures, with incentives rising to 65-70% of total spending, and a higher percentage of the installed cost of the efficient equipment or systems This translates to about \$320 million/year in the commercial sector.

**C – “Think Smarter” and Invest Proportionately Less** by devising new, innovative strategies to leverage greater efficiency actions at historic or even lower cost per kWh or kW. This could be done via the use of market transformation approaches to publicity and awareness, elimination of inefficient models of electrical equipment offered for sale in California, and higher efficiency standards applied to new and existing buildings. The cost of this strategy was not estimated by

---

<sup>14</sup> See Rufo and Coito, 2002 a, page 16.

Rufo/Coito, but should be less than the “Dig Deeper” strategy which relies upon an expanded business-as-usual approach to utility marketing and incentive programs.

To surmount the barriers already described and charge ahead toward the huge potential, the Green Buildings Initiative will draw upon elements of all three approaches through actions that focus on four strategies. The first three target rapid progress to eliminate the barriers indicated above, while the fourth introduces regulatory strategies to raise the efficiency of buildings during their normal course of construction or renovation. Activities will be executed by a combination of State government agencies, local governments, utilities, leaders in business and the real estate industry, and other building sector allies. The strategies reflect a robust set of tools aimed at targeted actions that will be implemented on a timeline with both near- and longer-term objectives.

The **strategies** include:

1. **Real Estate Industry Commitment to Achieving Goals**
2. **Benchmarks and Recognition of Resource-Efficient Buildings**
3. **Investment and Financing Incentives**
4. **Standards and Regulations.**

First and foremost, we recommend that the Governor underscore the State’s priority for capturing the huge potential of building energy efficiency. The Governor can do this by supporting a significant public/private campaign to obtain commitments from real estate industry executives. These commitments will place priority on achieving cost-effective building efficiency, and direct building managers and engineers to take full advantage of all efficiency opportunities, technical assistance, and incentives.

Second, we recommend concerted action on the part of State agencies, utilities, and the efficiency industry to support these goals through:

- **Increasing** over the next four years the current levels of private, public sector, and **ratepayer investment by 100%** to achieve the maximum cost effective levels of energy efficiency compared to investments in conventional power resources,
- Smarter efficiency program design via **re-engineering of ratepayer-supported efficiency programs** (including training, auditing, marketing and outreach), **and revising how financial incentives are designed** so as to leverage greater savings and commitments of private sector capital, and
- **Integrated marketing and delivery** of efficiency programs and services to work in tandem with building benchmarks, and real estate executives’ commitments.

The following pages outline specific actions identified for each of the strategies. There are three underlying premises:

The **State itself** can do a great deal – it can cut electricity use in its buildings and can provide leadership to the private sector and to other governmental entities. At the same time the State can further lead by embracing other Green Building techniques – which go beyond energy

efficiency to increase indoor air quality for occupant health and productivity, increase use of recycled materials, reduce the need for landfills, and reduce water use.

The **private sector** accounts for 90 percent of commercial square footage – and 90 percent of energy saving opportunities. Private building personnel and service contractors have the skills to design and install cost effective energy systems. Many have shown leadership in conservation in the past. To meet the ambitious goals we need more leadership, awareness, benchmarking of buildings, and aggressive technical assistance and incentive programs.

Suggested **timeframes** reflect a priority to start with those actions where there is a compelling economic and environmental case (energy efficiency), especially with government actions that have long-term consequences (making new buildings green). The action strategies unfurl a set of awareness-building, technical assistance, and financial incentives to encourage early action over the next few years by leaders in local government, school districts and the private real estate industry. Where advised, strategies relying upon technical standards and regulatory actions will be called upon in subsequent years to capture opportunities that otherwise may not occur on their own.



## 6.2 Real Estate Industry Commitment to Achieving Goals

Awareness, especially at senior-management levels, plays an integral role in increasing investment in energy efficiency. Lack of progress is not necessarily just a capital availability problem. When decision-makers have compelling information about energy and resource use, and their costs and benefits, it is more likely that buildings will commit to efficiency projects and green building improvements. It is equally important that building occupants or tenants become more astute and demanding about the quality and operating costs of the buildings they lease.

### Actions for All Sectors:

- Implement a **promotional campaign**, targeted to private building owner CEOs and CFOs, and to senior public sector officials with decision-making authority over public buildings. The goals are to ensure their awareness about the economic, environmental, and bottom line gains from energy efficiency and green buildings and to secure their commitments to the goals of the Green Building Initiative by holding building managers and engineers accountable for achieving them. (late 2004 onward)
- CEC, utilities, CIWMB, and the USGBC, in collaboration with local governments, should design and implement robust **technical assistance** to building managers & operators on how to improve resource efficiency in buildings. (2005 onward)
- CEC, CPUC, and Cal EPA should work with utilities, the real estate industry and design professionals to **enhance existing programs and develop new programs** to provide building owners and operators with the technical assistance and training necessary to maximize energy efficiency and invest in green buildings. (2005 onward)

### Private Sector Action:

- Create new and expand existing public/private/ **partnerships to promote green buildings among CEOs and senior decision-makers in the real estate industry**, eventually reaching owners with medium and small amounts of real estate holdings. (2004 onward)
- Seek commitment of **CALPERS and CALSTRS** to adopt efficiency or green **building goals for their own real estate holdings**. (2004)
- Request the Efficiency Partnership's Flex Your Power program and the real estate industry to work with utilities, energy service companies, architects and engineers, and others to **gain commitments from building owners** to make cost-effective efficiency improvements.
- Make it easy for building owners to **locate and employ skilled and competent professionals** by promoting the use of energy efficiency and green building accreditation already available to building operators, engineers, and managers.
- **Promote "commissioning" of new and existing buildings** to ensure that equipment is properly installed and operated. This can save up to 15% of energy operating costs without any capital outlay. Actions will include low-cost training and certification of building operators. (2004 onward)

### Real Estate Industry Commitment to Achieving Goals (Cont'd)

- **Train and provide technical information to building managers and appraisers** on ways to incorporate the value of efficient or green buildings into building appraisals, as well as tenant rental decisions and occupancy practices. (2005 onward)

#### Public Sector Action:

- **Issue a new comprehensive Executive Order (2004) to:**
  - Expand the scope of green building mandates to include all state-funded buildings, including schools
  - Direct each of the major State-owned groups of facilities (e.g. Caltrans, Corrections, DGS, DMV, and Mental Health, and request the same from CSUS and UC) to report on progress toward energy savings goals.
  - Direct the State Architect to ensure k-12 schools and Community Colleges are energy efficient, and that renovations adopt green building principles wherever feasible.
  - Show California's leadership example by identifying State facilities that can demonstrate the latest energy efficiency and renewable energy technologies.
- Work with the Legislature to carry a comprehensive **administration bill** that codifies green building goals in statute, requires CHPS criteria for school construction, and provides resources and direction to DGS, DOF and other state agencies. (2004 or 2005)
- **Ensure accountability** for meeting these goals by directing Agency Secretaries, or other appropriate high-ranking officials in State government, to report progress annually to the Governor's office. (2005 onward)
- Direct appropriate State agencies to facilitate state and local government infrastructure improvements that may yield **energy savings beyond buildings**, i.e. pumping water, traffic signals, and outdoor lighting. (2004 onward)
- **Take administrative action to eliminate barriers** that inhibit state facilities from undertaking energy efficiency or green building designs for their facilities. Specific actions include:
  - Direct the Department of Finance to give priority to and reach consensus on a life cycle cost savings methodology that values all expected benefits and costs for green building design and on-site energy improvements. (2004)
  - Direct **State facilities to participate in all appropriate leading-edge programs** such as demand response, renewable energy purchases, and integrating renewable energy into the State's infrastructure. (2004)

### 6.3 Benchmarks and Recognition of Resource-Efficient Buildings

Develop a statewide program to adapt national benchmark methodologies to California conditions and deploy analytical tools to benchmark buildings' efficiency or green features. Where buildings exceed the stated goals, recognize and reward those buildings, their owners, and operators, and promote the solutions and methods they employ to attain these accomplishments.

#### Actions for All Sectors:

- The CEC should join with other agencies, public and private utilities, and representatives of the business community to develop a standard and simple building efficiency **benchmarking system**. This should be California-specific and coordinated with the US EPA Energy Star benchmarking system. (2004-05)
- The CEC should establish a target **schedule** for benchmarking all commercial buildings in the State, and identify **organizations** that can execute this (including the possibility of utilities or private companies), necessary **funding** resources, and a system for training and certifying individuals qualified to give such benchmarks. (2004-05)
- **The designated benchmarking organizations should widely deploy building efficiency benchmarks with the goal that building executives make commitments to hold their building managers and engineers accountable to achieving higher levels of efficiency and the promised financial returns.** The benchmarks enable owners and operators to annually compare a building's performance, see results of actions taken, and receive recognition for continuous improvement. Benchmarks allow owners to compare one property with another and provide tenants, lenders, and appraisers with a basis for valuing investments in energy efficiency. These should increase net operating income and a building's capitalized value. (2005 onward)
- The California Office of Real Estate Appraisers, together with state and national real estate industry appraiser organizations, should ensure there is **widespread training of appraisers** in how to incorporate building-specific energy and green building costs (rather than industry-average costs) into building appraisal techniques. (2005 onward)
- CEC, CIWMB, USGBC, US EPA's EnergyStar program, Calif. Chapter American Institute of Architects, and California's utilities **should collaborate to develop a California recognition and reward program** (e.g. certificate or plaque, or a financial reward) for buildings meeting designated Efficiency or LEED ratings. (2005 onward)
- When the CEC determines the benchmarking tool has been tested and shown to be an adequate measure of energy efficiency, **sponsor legislation to require all commercial buildings in California to be benchmarked at time of sale**, and for energy benchmark ratings to be disclosed to tenants, buyers, and lenders. (2006 or later)

#### Public Sector

- **All State owned buildings**, beginning no later than 2006, should **be benchmarked and re-commissioned** for energy efficiency, and **re-commissioned every five years**, or when major HVAC or energy management systems are replaced, using uniform standards and procedures.

#### Private Sector

(nothing specific for the private sector)

#### 6.4 Investment and Financing Incentives

Re-design and expand financial incentives, financing assistance, and tax incentives to better align decisions with resource efficiency economics. Double statewide expenditures and investments in energy improvements to existing buildings.

##### All sector Actions:

- **Rely primarily upon private sector financing and creative use of electricity ratepayer funds**, so as to impose little or no burden on the State's general fund.
- **Re-engineer efficiency program investment incentives**. The CPUC should work with utilities, third parties and others to refine efficiency program designs to focus on the opportunities to capture 30% to 40% savings, and not offer programs that settle for the easiest 10% or 20% savings. Investment incentives should place a high value on producing savings at peak times, to reduce the number of new power plants California needs. Programs should be consistent and predictable over multiple years. (2005 onward)
- **Request the CPUC and individual publicly-owned utilities to ensure sufficient funding** for commercial sector efficiency programs to achieve the full cost-effective level of investment.
- **Access to capital**. There are several ways that an expanded State lending pool could be utilized (see also more detailed discussion at Section 7.2 below):
  - With high returns on investment, the **State** could develop a green building **revolving loan fund** that provides capital to those building owners for whom capital availability is a primary deterrent to energy efficiency, including hard-to-reach sectors such as small business. Seed money for this fund might come from the state General Fund (when the budget can support such discretionary investment), Public Goods Charge funds for efficiency, or from special funds such as legal settlements that might become available. (2005)
  - Seek **consideration by CALPERS and CALSTRS of supporting a debt-financing program** for Green Building/Energy enhancements on non-residential buildings, in conjunction with its Clean Technology investment commitment. (2004 onward)
- **Examine successful incentive programs from other states** and explore new forms and methods of paying incentives that have proven effective – such as utility bill discounts, tax incentives, payments of incentives based on measured performance, and “on-bill” financing. (2005 onward)
- Offer programs and incentives that **combine energy efficiency, demand response and renewable energy solutions in buildings**. (2005 onward)
- Request CPUC and utilities to consider energy pricing or other incentives that **reward the owners of buildings verified to be highly efficient**. (2005 or 2006)

### Investment and Financing Incentives (Cont'd)

#### Public Sector Action:

- Direct **Department of Finance to ensure** that State departments and facilities can **access third party leasing or State revenue bonds** to finance sustainable building and energy efficiency improving projects. DOF should provide guidance to agencies regarding all authorized **capital finance sources**, and report back to the Governor's office each year on progress toward attaining the 20% target for 2015. (2004 onward)
- The **CEC and DoF should explore budget changes** so that the CEC's current financing program ("ECAA) that is targeted at energy efficiency and distributed generation projects on **local government** facilities (a program that is regularly over-subscribed) can make more loans each year using a **larger revenue bond capital pool and having the operating resources needed to administer more loans**. (2004)
- Develop policy and procedures to facilitate State agency access to **private technical assistance and financing**, (e.g. private project lease financing, ESCO services, etc. independent of the state's capital outlay process) for efficiency improvements. (2004)
- Reach agreement with DOF and DGS regarding **short-term use of Architectural Revolving funds** to provide temporary, short-term capital for State facility projects via a procedure that reimburses the fund once with longer-term permanent bond or lease financing is secured. (2004)
- Seek passage of legislation such as AB 653 to allow State facilities to easily participate in a continued **State bond program** for energy efficiency, distributed generation, and on-site renewable projects via Public Works Board Revenue Bonds. Alternatively, enact legislation to permit State facilities to participate in the CEC's ECAA loan and technical assistance program. (2004)
- Commit General Fund, ratepayer, or CALPERS & CALSTRS capital sources to establish a five-year annual \$20 million appropriation to the **Green Building equity fund**. This can leverage a total of \$100 million investment per year via a revolving loan program. This can yield up to \$1 billion in bond proceeds for loans over a 10-year period to finance Green Building investments. (2005 or 2006)

#### Private Sector Action:

- **Federal tax incentives**. The Governor's office and CEC should work with the California congressional delegation and other allies to pass federal tax incentives for energy efficiency measures in buildings, as proposed in S. 2311 and H.R. 4206. This will help motivate and accelerate investment actions by private building owners. (2004)
- **State tax incentives**. Sponsor legislation for state tax incentives to very high performing buildings that increase efficiency by 30-50%. State tax incentives can reward optimum investment and are effectively self-financing. With a carefully chosen efficiency threshold, State corporate income tax revenues from the higher real estate profits (resulting from higher NOI) will re-pay the tax incentives credits in ten years or fewer. (2005)

## 6.5 Standards and Regulation

California's energy efficiency standards for buildings have been a dramatic success, and in-state economic stakeholders tend to support upgrades in efficiency standards because of their high cost-effectiveness. Approximately 2% of the CEC's annual budget is currently devoted to standards activities. The Governor should:

### Actions Affecting All Buildings:

- Direct the CEC to commit the necessary organizational and budget resources for **building and equipment standards** to achieve all cost-effective energy measures in non-residential buildings, make commissioning and benchmarking a part of the building code, and lower the threshold at which standards apply to building renovations and expansions. (2004-05 onward)
- Direct CalEPA to see that the **California LEED Supplement for green buildings is revised** and/or updated so as to ensure that LEED is consistent with California Laws and exceeds all applicable California codes. (2004-05)
- Upon the CEC's completion of the legislatively mandated study (via AB 549), work with the Legislature to sponsor **legislation** to do one or more of the following (2005-06):
  - Require all buildings in California to be benchmarked for energy efficiency,
  - Require benchmarks to be disclosed to tenants, lenders, buyers and others wishing to know the efficiency of buildings,
  - Require existing buildings to retrofit specific efficiency measures on or before resale or major remodeling or, alternatively, by a set date.
- Request that the CPUC consider **removing the regulatory prohibition on building sub-metering**. This will enable building owners to provide feedback on tenant energy use and cost allocation in leased buildings, and enable investments in energy efficiency to get increased tenant cooperation in reducing energy use. (2005-06, or 2006-07)

### Public Sector Action:

- State-owned buildings should **reduce their energy purchases from utilities by at least 20%** by 2015 through efficiency measures and onsite renewable technology (or achieve a minimum energy efficiency-benchmarking standard to be established by the CEC).
- All **new buildings and major renovations over 10,000 sq. ft** built with State funds **from this point forward** should be LEED-NC Silver– certified (using the California LEED Supplement).
- All **existing State buildings over 50,000 sq. ft.** should meet LEED-EB standards for existing buildings **by 2015**.

**Standards and Regulation (continued)**

- All **new school facilities built with State funds or bond proceeds should meet CHPS criteria** beginning in 2006.
- All **existing school square footage for which State funds are used for renovation or modernization should meet CHPS** criteria beginning in 2006.
- Any **private building** must be rated **Energy Star** (or meet another benchmarking standard established by the CEC) beginning in **2006 before the State signs a new lease** of 5,000 sq. ft. or more in that building, or beginning in 2008 for a renewal lease.
- All **office equipment purchased or operated by the State** for its facilities **must be rated Energy Star** whenever a rating is available for that equipment.

Private Sector Action:

(See “All Buildings”, above)

## **7. Leadership into Accomplishment**

### **7.1 Assigning Responsibilities**

This action plan should, to the fullest extent possible, be implemented without any new bureaucracy, primarily through increased or re-allocated budget commitments to existing activities. Most can be executed by existing entities under existing laws and regulations.

#### *Partnerships in action*

Achievement of the recommended action steps will require cooperation across State executive agencies, the California Public Utilities Commission, commercial/industrial real estate interests, the state's investor-owned and publicly-owned utilities, and the myriad of firms engaged in energy services solutions. Selected actions may require legislative action now or in the future.

California Public Utilities Commission: As indicated in the action strategy pages, some of the Green Building Initiative (GBI) working groups and subcommittees recommend that the CPUC Efficiency Proceeding take short-term actions to “tune up” programs or designate funding to support the GBI action plan, and medium-term actions to re-engineer program designs. Example targets for this attention are:

- benchmarking building energy efficiency (energy cost per square foot),
- expanded technical support and promotion of “continuous commissioning” of buildings,
- financing mechanisms and incentives, and
- “marketing” the energy efficient building message to senior building decision-makers.

Commercial/industrial real estate interests: To maintain focus and momentum on the recommended action plan will take the dedication of a handful of individuals who can speak for the real estate industry in crafting details of the action plan with State government and California's utilities. Real estate involvement could occur in the form of a “strategic action team” housed within BOMA or IREM, or a real estate industry retrofit program executed by individuals or a firm under contract to BOMA or IREM.

California's utilities: Utility ratepayer-supported programs have been the main source of financial incentives for efficiency improvements. These programs have provided much of the front-end technical assistance that helps facility owners and managers identify energy improvements and their expected performance and savings. The CPUC has an open proceeding under the direction of Commissioner Kennedy to define later this year the efficiency goals and the future role of IOUs in the oversight, design, and delivery of efficiency programs.

California Energy Commission: Expanded technical analysis is needed in two key areas – building energy benchmarking tools, and equipment and building energy efficiency standards. The CEC should take the lead in these two areas. First, the CEC should focus on quickly defining an energy-benchmarking tool that easily can be deployed for commercial and institutional buildings statewide. The Commission also will need to assign sufficient resources to update Title 20 Appliance and Equipment standards that use a technology-based “upstream”



strategy of setting minimum efficiencies of specific electrical equipment and technology sold in California. It should do the same with resources devoted to Title 24 building efficiency standards, including a review of the minimum conditions when these standards apply to existing building alterations and renovations.

Energy Services Industry: Over the years energy service companies (ESCOs) and other energy efficiency providers (manufacturers, distributors, engineering firms, and building lighting and HVAC service firms) have conducted a substantial volume of building efficiency improvements. These are the front-line providers who often work as the agents of utility efficiency programs and public building efficiency loan and leasing programs. These entities will remain vital providers in an expanded efficiency investment effort.

*Assigning new roles to ensure innovation and speed toward these goals*

Success in carrying out this action plan will require a new governance or leadership framework. The working group suggests the administration consider several among the following possibilities. We use the term “Green Building Action Team” generically to refer to the designated leadership group within the administration:

- Assign responsibility for execution of the Green Building Initiative effort within the administration, with identification of duties and functions for the coordinating agency, and each contributing agency or department related to the implementation of the goals.
- Assign responsibilities to specific cabinet secretaries or other delegates for the Governor
- Establish a Real Estate Industry Leadership Council that can offer the administration both leadership in soliciting support from the owners of private buildings, as well as guidance in specific marketing and delivery strategies of the action plan.
- Assign new functions (and associated financial resources) to an existing (or new non-profit) real estate or property owners organization.
- Assign the Green Building Action Team to identify methods to fully engage local government leaders and staff in this implementation plan. This team should think creatively about how to draw upon funding and outreach mechanisms that cross water, solid waste, energy & other resource avenues.
- Ensure accountability by requiring progress reporting at least every two years for results, including a means to measure progress, i.e. the number of LEED Silver Buildings for the State of California, and the number of EnergyStar (or equivalent) private buildings.

## **7.2 Increasing Funding Devoted to Building Efficiency and Green Buildings**

### *Capital sources for building energy investments*

#### Private Sector Resources

The CEC maintains a web page with links to sources of capital loans for renewable (and possibly energy efficiency) loans for all different kinds of buildings. See:

<http://www.consumerenergycenter.org/erprebate/financing.html>

Flex Your Power has a look-up table on its web site, [www.fypower.org](http://www.fypower.org) where if you type in your building type and efficiency equipment that you want to buy, it will indicate what rebates or loans are available for such a project.

There are extensive private sector financial and energy service company parties that can arrange private financial sources to support capital investments in building energy improvements.

The California Public Employees' Retirement System (CalPERS), the country's largest pension fund and the California State Teachers' Retirement System (STRS) each recently announced their intent to invest \$250 million in clean power and energy efficiency. CalPERS expects to invest another \$500 million in coming years. Some of this possibly could be tapped for resource-efficient building investments.

#### Public Sector Capital Resources

Capital source options for public sector buildings include:

**Energy Commission:** The CEC operates a financing program ("ECAA") for local governments, special districts, colleges and k-12 schools. With the exception of state universities, colleges and state hospitals, state facilities are not eligible to participate in the program. The program has a capacity to provide \$20-\$25 million per year in revolving loans; over \$90 million in loans were made in the last four years. The program can replenish funds by using the pledge of anticipated loan repayments to support revenue bonds that provide capital to make new loans. Interest rates are about 4% and public borrowers can borrow up to \$2.5 million per jurisdiction.

**DGS State Revenue Bond Program:** Since the 1980's, the Department of General Services has administered a Revenue Bond Program to capitalize efficiency investments. The State Public Works Board (PWB) authorizes the projects and bond issues. Eligible organizations include state agencies, public K-12 school districts, public colleges and universities and local governments. To date, this program has issued about \$300 million in revenue bonds from its \$500 million authorization. The program is scheduled to sunset on December 31, 2004 unless extended by AB 653 (Nunez). Program staffing was eliminated in 2003. The program has experienced low participation over the last 10 years due to a combination of structural reasons and DOF/PWB loan criteria.

**Municipal Lease Programs:** There are many municipal leasing companies that can provide low cost capital for energy efficiency improving projects. Some Joint Powers Authorities such as the

California School Boards Association and the California Statewide Communities Development Authority offer leasing programs to their constituents. Many private financial institutions offer municipal leasing programs. The State of California maintains a list of private financing companies that have been approved to provide project funding for state government projects. The list is maintained by the California Department of General Services via its GSSMart Program. This mechanism has been used primarily for equipment leasing, but not for building efficiency projects.

Many leasing options are difficult for local governments to access due to government procurement policies or lease terms that often require a more secure (dedicated) revenue stream in lieu of the lessor accepting the reduced (avoided) energy costs as a secure source of lease payments. Another complication for some potential public agencies is the requirement to commit building equipment as collateral security, depending upon borrowing or bond covenants applicable to the building's original construction, or to the political jurisdiction as a whole.

### *Programmatic funding*

#### Program Funding Requirements

To improve end use efficiency, IOU customers pay a Public Goods Charge (PGC) of ~1% (yielding \$240 million per year).<sup>15</sup> PGC funds assigned to this sector have averaged ~\$100 million/year, or about 40% of all PGC funds. (For simplicity, we ignore energy costs for natural gas, which are relatively small for commercial buildings.) The IOUs mainly manage PGC funds. They incent efficiency with cash rebates, free audits, technical assistance, information and training, marketing, etc. IOU efficiency programs are credited with reducing electricity growth by ~0.6%/year. To double efficiency gains from hardware investments in commercial buildings, California must commit somewhere between \$235-330 million/year for efficiency programs and incentives.<sup>16</sup>

Commencing in 2004 this investment will be supplemented with additional funding from utility "procurement" funds that are expected to boost the pace of efficiency and reduce electrical growth even more. Under the supplemental procurement funding, IOUs have agreed to spend an additional \$140 million per year on efficiency. If 40-50% of this is committed to the commercial

---

<sup>15</sup> The publicly owned utilities (who are also participating in the Green Building Initiative) have a similar set-aside.

<sup>16</sup> Moving forward from the \$100 million/year commercial sector base, the "more of the same" level of PGC efficiency spending essentially costs end users and ratepayers a total of 1.5 times what a customer invests (50% end user investment, matched by 50% ratepayer-supported incentive, with another 50% equivalent for ratepayer-supported program marketing and administrative costs).

Rufo and Coito estimate that to double the rate of efficiency we achieve will require spending 2.35 times the funds the ratepayer/utilities now spend, or about \$235 million/year for the commercial sector. In this view incentives will increase to 60+% of the total public spending, and there will be a slight increase in marketing expenses and a proportional increase in administrative costs. Rufo and Coito estimate that to reach the equivalent of a 12% efficiency gain via hardware investments under a "Dig Deeper" strategy, could require spending closer to 3.3 times the current level of expenditures. Under this strategy incentives would rise to 65-70% of total spending, and a higher percentage of the installed cost of the efficient equipment or systems. In absolute numbers, this translates to about \$320 million/year for the commercial sector.

sector, where the remaining cost-effective electricity efficiency is greatest, then this would add \$55-70 million/year in commercial sector efficiency funds, for total planned ratepayer spending of \$155-170 million/year for the commercial sector.

Promotion of additional efficiency gains via an outreach campaign, building benchmarking, and retro-commissioning will require some additional modest investment – perhaps as much as \$10 million per year.

Thus the issue becomes how can we reach a public and ratepayer expenditure level in the range of perhaps up to \$245 - 340 million/year, or about 50-75% more than the 2004 levels? Some choices are discussed below.

#### Program Funding Sources

On the *energy* side, the obvious places to look for programmatic funding are:

1. **CPUC public goods charge for efficiency.** These are fully allocated for 2004-05. The fund level is set by the Legislature and recovered as a surcharge on IOU utility bills. CPUC oversees this pot of \$240 million/year, via programs administered by or contracted through the four IOUs. In 2004 and 2005 about \$100 million/year is committed to commercial sector programs.

Note: **publicly-owned utilities** collect their own equivalent PGC funding and spend it themselves -- (e.g. SMUD and LADWP). We do not have estimates of the levels of such funding that could support energy efficient or green commercial and institutional building programs for these service areas.

2. **CPUC - Investor-owned utility "procurement" funds.** These are intended to buy energy efficiency or distributed generation or load management with their "own" funds, to be spent as an alternative to signing power purchase contracts from generators or building IOU-owned generation. These funds must be spent on 100% "sure efficiency" program impacts, to justify signing smaller power purchase contracts. Utilities submit plans for how to spend these funds 1-2 years in advance, and scale the amount of money to the pace at which they think they can produce real, measurable energy savings. In 2004 about \$60 million is slated for the commercial sector; this figure is expected to rise in future years.

3. **Public Goods Charge for renewables.** These are authorized by the Legislature at \$135 million per year, collected by utilities under CPUC direction, and then 100% of the funds are passed on to the CEC to fund its renewables incentives and buy-down programs, including solar PV.

4. **Energy Resource Programs Account (ERPA).** This fund generates about \$46 million per year via a utility bill surcharge that the CEC applies statewide to all utility bills (both IOU and public power utilities), to pay for the CEC's budget. The Legislature oversees the level of this surcharge. The CEC proposes how to spend the surcharge funds in its budget each year. It is estimated that about 2-3% of this funding is committed to support building and equipment

standards activities. This funding commitment could possibly be increased – for standards and/or other activities to reach the Green Building Initiative’s goals.

5. **State General fund.** In theory this could be a funding source, once State revenues are in better balance with priority programs and expenditures.

6. **Attorney General's energy contract litigation settlement funds.** These collections amount to millions of dollars per year. In 2003 the Legislature and Attorney General's office had extensive discussion over who should decide how to spend these funds. The Legislature won the right to assign these funds, and chose to assign them to pay off the DWR bond funds a little faster. An alternative could be to redirect these funds for highly-leveraged investment in energy efficient buildings.

For *Green Buildings*:

7. **CIWMB** at a state level, and **city/county waste management authorities** at local levels have budgets that support waste-reduction activities, most often via garbage pick-up charges to property owners and “tipping” and hauling fees to the waste management companies. Some jurisdictions use a portion of these funds to support green building programs and incentives. It is possible that the number of such jurisdictions could be expanded.

## **Appendix 1 Detailed Work Plans Suggested by Private Sector Programs & Marketing Group**

### **Strategy #1 Building Efficiency Rating & Recognition Campaign**

Chairperson: Gene Rodrigues, SCE

[When revised, this section needs an opening rationale on why rating is an important tool, and how this can be used to spur increased EE investment and/or operational attention. Below there are comments [in brackets] to the author by the editor.]

The template below provides a rough outline for a potential California Existing Commercial Building Efficiency Rating and Recognition campaign. This is based on preliminary input from many – but not all – of the team’s members. This should be viewed as a starting point for our planning exercise, and is not intended to represent an agreed-upon final recommended plan from this team.

With that important caveat out of the way, here is a thumbnail sketch of a proposed plan that incorporates the valuable input I have received thus far:

- **Rating and Recognition** – There are two elements to the proposed campaign. The first element is a statewide energy efficiency rating “sweep” [need to define/explain this better in terms of magnitude of buildings to be rated, how info would be disseminated why this is a “sweep”] of existing commercial buildings. The second is public recognition of buildings that achieve a pre-designated efficiency rating. Experience suggests that this recognition element (both for spurring participation and as a reward for achieving a level of efficiency excellence) is critical to the campaign’s success as the “carrot” for participation by the building owners.
- **Teaming with Energy Star and Flex Your Power** – This plan proposes that Energy Star and Flex Your Power be central partners in the proposed campaign. The plan calls for us to use the existing Energy Star national building performance rating system as the platform for the “ratings” element of the campaign. For the “recognition” element of the campaign, this plan recommends that we partner with the California’s Flex Your Power campaign.
  - **Why Energy Star?** -- The value of aligning our campaign with the Energy Star brand is obvious. The Energy Star brand brings credibility and customer acceptance to the table.

If participants achieve the requisite score, they will receive recognition through the award of an Energy Star building label, thereby adding a “carrot” for participation. (Note: The “California difference” regarding standards for receiving an Energy Star label is discussed below.)

Because the Energy Star label must be reapplied for annually [this is a pain! Sounds like a non-starter to the real estate industry. Can this perhaps be done every 3-5

years?], use of the Energy Star rating platform also provides the building owners with an incentive to “re-engage” in looking at energy efficiency each year.

From an implementation perspective, using the already-developed, highly-functional Energy Star tool and having access to their training resources will significantly reduce resource requirements needed to prepare for implementation and assist us in making uniform statewide implementation a success.

Finally, I don’t believe we would be unrealistic in hoping that our success in implementing a statewide campaign might spark other states to replicate the California model.

- **Why Flex Your Power?** – Aligning our effort with and through Flex Your Power also brings obvious advantages. First and foremost, the recognition “carrot” is critical to getting building owners to participate. The already-existing Flex Your Power campaign provides an effective and cost-efficient means to recruit and recognize participation. [Need to ascertain if FYP, versus Energy Star, has meaning to the (national) commercial real estate players who own/manage so much of the property.]

Also, by using Flex Your Power as the vehicle to recognize participants who achieve results worthy of public recognition, we can gracefully side-step the “California difference” issue.

**What is the “California Difference” and What Should We Do About It?** – To receive an Energy Star building label, an applicant has to achieve a minimum rating score that represents a top-tier level of efficiency (i.e., top 25%) in comparison to like building stock (e.g., office buildings, schools, etc) across the country [or across California or “The Western Region”].

To address the “calibration” issue and the “we’re better than average out here” issue, this plan proposes that a team of interested parties (e.g., U.S. EPA, CEC, CPUC, utilities, NRDC, CEE) be formed this year to take another look into whether the calibration concern is still an issue and whether use of Energy Star would be “too easy” a standard for FYP recognition as a precursor to implementation of our campaign. [This begs the question as to the timeframe required to reach some definitive resolution.]

The California analysis would be shared with the EPA for their consideration and use (as they deem appropriate), but California would not tinker with EPA’s standards for receiving an Energy Star building label. If a building owner meets the EPA’s standards, the building would receive an Energy Star label. [See also comments from CEC, David Goldstein of NRDC, & Don Gilligan of NAESCO.]

However, depending on the results of the analysis, California’s stakeholders may choose to adopt a different (i.e., higher) rating standard for Flex Your Power recognition, which would allow us to use the Energy Star tool but also account for

any California-specific issues with the calibration of the tool or the efficiency of the state's building stock.

Thus, if the analysis suggests that the current Energy Star standards are adequate for California recognition, we move ahead adopting the Energy Star standard as our standard for Flex Your Power recognition. If not, the team will propose a higher Energy Star rating score to serve as the standard for receiving the California Flex Your Power recognition in addition to the Energy Star label. Only participants who achieve the higher California standard would receive Flex Your Power recognition, which would include the "carrot" of mention in a statewide media campaign.

- **Teaming Utility Data and the Energy Services Industry to Bridge from Ratings to Action** – [This strategy is broader than stimulating follow-up utility action, but in stimulating widespread action by the energy services industry, using utility technical assistance and financial incentives where needed or desirable. The broader strategy combines this utility program support while also fostering greater opportunity for market transformation effects, especially with the combination of awareness efforts that promotes the multiple dimensions of benefits obtained (e.g. marketability of leased space in attracting tenants, increased comfort of occupants, environmental image, increased building capitalized value, ...) Also give some thought to where we should place an action step that helps appraisers do a better job of valuing building operating costs and Net Operating Income (NOI) when they appraise buildings' value – is that part of rating (Strategy #1) or is that a "technical assistance" activity (Strategy #4) for helping them do this better?]

This plan proposes that we tap into resources that would be provided by the investor-owned and municipal utilities as the labor source for the ratings effort. This carries with it the added advantage of leveraging the existing utility/customer relationship as a means to encourage building owner participation. However, it also means that the utilities will have to secure authorization from their respective authorizing/oversight bodies. Thus, both the energy utilities and their oversight agencies are important planning and implementation partners to this campaign.

Experience in California and other parts of the country teaches us that just providing efficiency rating information is not likely to capture much of the potential for efficiency in this market. Thus, this plan calls for the rating sweep to serve as a means to open doors for utilities and others to follow-up with audits to identify and promote energy efficiency actions that the building owners could pursue – more efficient behavioral practices, retro commissioning (to the extent that this might be authorized by the CPUC as a cost-effective measure), and efficiency retrofits facilitated by the investor-owned and municipal utilities' information, services and incentives programs.

Note: because the justification for this campaign is directly tied to the success of the campaign in generating cost-effective energy efficiency savings, we can expect the cost-effectiveness of this approach to come under significant scrutiny and that the utilities' or ratepayers' financial investment into this campaign should be scaled to its cost-effectiveness compared to other portfolio options.



Note: Retro commissioning is not yet a common part of the CPUC's PGC-funded portfolio. Currently, the IOUs have all incorporated retro commissioning into their program portfolios on a limited basis, and we are all collecting the data that will be necessary to move retro commissioning to the next step of recognizing it as a full-blown measure within the portfolio. Since another team is addressing proposals for program enhancements, the topic of getting CPUC buy-in to retro-commissioning may be handled there.

- **Resource Requirements and Timing** – While this plan proposes to make use of a great amount of in-kind contributions by the partners, this is not an “off-the-shelf” campaign that can be rolled out without significant up-front preparation.

As noted above, interested stakeholders will have to work out the so-called “California difference” issue so that we can effectively use the recognition “carrot” to entice participation.

To reallocate resources to the proposed campaign, the investor-owned and municipal utilities will have to work with their oversight agencies to receive the appropriate authorization. To plan for statewide implementation, the utilities will have to plan for, line up and train rating resources and integrated/follow-up program outreach efforts. [See comments from Gilligan of NAESCO]

For their part, the U.S. EPA will need time to plan for and provide the resources necessary to train California's raters and to handle the (hoped for) significant increase in ratings to be processed. [How much time?]

Similarly, on the outreach and recognition side of the effort, this proposed campaign will require lead time for Flex Your Power to plan for and incorporate the new rating and recognition campaign into its media outreach, which is planned and purchased in advance.

On the other hand, once this effort is up-and-running, it should prove to be relatively easy to keep implementing, as long as the campaign is providing cost-effective leads to the utilities' programs.

Below please find a sketch of the action steps required:

	<b>2004 Immediate</b>	<b>2005-2006 Near-term</b>	<b>2007 + Longer Term</b>
<b>Action steps needed</b>	<ul style="list-style-type: none"> <li>▪ Analysis of “California Issues” with the Energy Star Ratings Tool and Recommendations ⇒ CEC / US EPA / Utilities / NRDC / Other Stakeholders</li> <li>▪ Program Planning and Regulatory Processes for Authorization of 2005 Roll-Out of program redesigns ⇒ Utilities / CPUC</li> <li>▪ Coordinate Media Campaign Planning with Awareness Action (including announcement, recruitment and recognition phases) ⇒ Efficiency Partnership / Utilities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Training and Processing Requirements Completed ⇒ US EPA / Utilities</li> <li>▪ 2005 Campaign Roll-Out (media announcement participant recruitment, ratings “sweep”, and follow-up technical assistance &amp; incentives) ⇒ Efficiency Partnership / Utilities</li> <li>▪ Compile Results of Campaign and Factor into Following Year Program Portfolio Plans (as warranted) ⇒ Utilities / CPUC</li> <li>▪ Annual Participant Recognition Media Campaign Efficiency Partnership / Utilities / US EPA</li> </ul>	<ul style="list-style-type: none"> <li>▪ Compile Results of Campaign and Factor into Following Year Program Portfolio Plans (as warranted) ⇒ Utilities</li> <li>▪ Annual Participant Recognition Media Campaign (as warranted) ⇒ Efficiency Partnership / Utilities / US EPA</li> </ul>
<b>Financial resources needed (estimate)</b>	TBD [need a ballpark estimate, and when the “scale” can be determined for 2004 activities] (Scalable / Dependent on Relative Cost-Effectiveness of Energy Savings to Other Program Options)	<ul style="list-style-type: none"> <li>▪ TBD (Scalable / Dependent on Relative Cost-Effectiveness of Energy Savings to Other Program Options)</li> </ul> <p>[Need a ballpark estimate. See action strategy #4 below for example.]</p>	<ul style="list-style-type: none"> <li>▪ TBD (Scalable / Dependent on Relative Cost-Effectiveness of Energy Savings to Other Program Options)</li> </ul>
<b>Financial sources identified</b>	<ul style="list-style-type: none"> <li>▪ PGC (Assumes CPUC Authorization)</li> </ul>	PGC (Assumes CPUC Authorization)	PGC (Assumes CPUC Authorization)
<b>Institutions or delivery channel capacity to accomplish</b>	<ul style="list-style-type: none"> <li>▪ Delivery Capability = Proven / Very High ⇒ Utilities / Efficiency Partnership / US EPA</li> <li>▪ Authorization Required = TBD ⇒ CPUC</li> </ul>	<ul style="list-style-type: none"> <li>▪ Delivery Capability = Proven / Very High ⇒ Utilities / Efficiency Partnership / US EPA</li> <li>▪ Authorization Required = TBD, via CPUC</li> <li>▪ Market Acceptance = TBD ⇒ Building Owners</li> </ul> <p>Tie-in commercial property appraisers and the commercial property management professionals. Also vendors/providers who can help execute this rather large task</p>	<ul style="list-style-type: none"> <li>▪ Delivery Capability = Proven / Very High ⇒ Utilities / Efficiency Partnership / US EPA</li> <li>▪ Authorization Required = TBD ⇒ CPUC</li> <li>▪ Market Acceptance = TBD ⇒ Building Owners</li> </ul>

## **Strategy #2 Coordinated Statewide Awareness Campaign for the Green Building Initiative**

Chairperson: Wally McGuire, Efficiency Partnership (Flex Your Power)

### *Program Description*

The broad objective is to build awareness of the benefits of energy efficiency, and build demand for the use of energy efficient products, design and services, within the business/commercial sector. The campaign will also specifically promote the programs and resources available statewide to this sector and facilitate the coordination, marketing and outreach of these programs. The campaign will use, among other things, paid and earned media, events, partnerships with businesses, governments, utilities and nonprofit's, printed educational materials, the Flex Your Power (FYP) website and electronic newsletter to achieve these objectives.

[This section needs a bit more lead-in that describes some of the substance of this campaign, and the differentiated target audiences. Here are some quick examples:

1. Content that campaign will embrace, e.g. to convey value of ratings/benchmarking, TA and incentives that are available, and maybe the "Top 5" or "Top 10" list of things to do in every building.
2. Some statement of the different audiences out there (owners of various types, building engineer/operators, tenants), and how the message/content might vary depending upon the point in a building/owner lifecycle where the communication occurs – e.g. message at time of sale/transfer, or at tenant turnover, or when a major system/piece of equipment needs replacement, would be different than message about discretionary actions that make sense to consider during the routine course of building management & operation. Depending upon what point in lifecycle that you want to reach an audience, this also would dictate different channels/media of communication.
3. Message (savings as a marketing feature to attract tenants, Capitalize value of net operating income, comfort, environmental leadership – as applicable to the audience/ point in building lifecycle.) Then match content of message to building lifecycle, by indicating what to do, how to capture value at that point, financing options available, ...

Areas below marked with a \* are areas that beg some more content, not necessarily in table, but before or after table.]

Outreach & Awareness	2004 Immediate	2005-2006 Near-term	2007 + Longer Term
<b>Action steps needed</b>	<ul style="list-style-type: none"> <li>• Secure commitments [what kind?] from <u>key leaders</u> (associations, owners, managers and major tenants) in commercial sector to the Green Building Initiative.</li> <li>• Produce <u>materials</u> promoting the benefits of energy efficiency measures and energy efficiency programs directed to <u>owners and operators</u> of existing non-residential buildings. *</li> <li>• Produce educational <u>materials</u> promoting energy conservation and efficiency for <u>tenants</u> in commercial buildings. *</li> <li>• Produce <u>forums</u> for industry stakeholders to plan and coordinate energy efficiency programs and services. [I don't see this in awareness campaign, but in role of private real estate industry champion/sponsor who will lead the charge for Entire GBI Private Sector Action Plan.]</li> <li>• Produce and distribute <u>case studies</u> and best management practices for businesses. *</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to expand commitments from <u>key leaders</u> in commercial sector.</li> <li>• Continue to revise and disseminate <u>materials</u> supporting the Green Building Initiative to all non-residential audiences.</li> <li>• Provide <u>marketing and outreach</u> support for the programs of the IOUs, municipal utilities and third-parties t. This includes developing joint strategies to achieve any stated objectives such as, for instance: <ul style="list-style-type: none"> <li>☐ Increase installation of super-T8s and T5s, and dimming ballasts through lighting retrofits. [as per David Goldstein]</li> <li>☐ Increase installation of room occupancy sensors</li> <li>☐ Increase HVAC retrofits and the retirement of old inefficient HVAC equipment.</li> </ul> </li> <li>• Assist EE program providers <u>leverage private sector</u> energy efficiency funding (e.g. --) and other resources to support the Green Building Initiative. Is this an action step here, or an item below in the resources needed/sources identified section?</li> <li>• Work with utilities and third party</li> </ul>	<p>These programs will be <u>improved and expanded</u>, and <u>new innovations</u> will be implemented in close coordination with utilities and the private and governmental sectors.</p>

Formatted: Bullets and Numbering

Outreach & Awareness	2004 Immediate	2005-2006 Near-term	2007 + Longer Term
	<ul style="list-style-type: none"> <li>• Implement a program to publicly <u>acknowledge businesses</u> that commit to the Green Building Initiative including newspaper ads and awards.</li> <li>➤ <u>State Leadership Program</u>. Provide awareness support to state facilities to educate employees and the public. [goes in public sector buildings campaign; not clear yet if public and private will run together or separate]</li> <li>➤ Encourage <u>local governments and water agencies</u> to replicate the State Leadership program (including benchmarking, retrofits and education programs) of the Green Buildings Initiative. [ditto]</li> <li>➤ Build out the Commercial/Industrial portion of the eNewswire. Produce a sector specific <u>Quarterly Digest</u>. [may be OK for starters, but let's make sure coverage gets into the right vehicle, e.g. EXISTING CRE publications]</li> </ul>	<p>program providers to promote and market <u>Demand Response</u> programs to the non-residential sector.</p> <ul style="list-style-type: none"> <li>• Continue to produce <u>forums</u> for industry stakeholders to plan and coordinate energy efficiency programs and services. [champion/sponsor role]</li> <li>• Continue to produce and distribute <u>case studies</u> and best management practices for businesses.</li> <li>• Expand the program to publicly <u>acknowledge businesses</u> that commit to the Green Building Initiative including newspaper ads and awards.</li> <li>• Incorporate Commercial <u>Benchmarking online tool</u> into the FYP website.</li> <li>• Expand <u>website and eNewsire</u> targeted to the non-residential sector.</li> </ul>	
<b>Financial resources needed</b>	<ul style="list-style-type: none"> <li>• The ongoing marketing and outreach campaign to the non-residential sector by the <u>Flex</u></li> </ul>	<ul style="list-style-type: none"> <li>• Again, the <u>Flex Your Power</u> campaign can handle the action steps with exceptions listed for 2004.</li> </ul>	<ul style="list-style-type: none"> <li>• For 2007 and longer term financial resources cannot really be estimated</li> </ul>

Formatted: Bullets and Numbering

Outreach & Awareness	2004 Immediate	2005-2006 Near-term	2007 + Longer Term
<p>(estimate)</p> <p><b>We were looking for \$ level estimates</b></p>	<p><u>Your Power</u> campaign will be fully engaged in supporting the Green Building Initiative. Therefore most action steps listed above already are funded with the <u>exception</u> of:</p> <ul style="list-style-type: none"> <li>• Commercial sector forums * [More about getting in front of target audiences in their REGULAR fora.]</li> <li>• Newspaper ads acknowledging and urging participation in the Green Building Initiative. *</li> <li>• State Leadership printed educational material. *</li> </ul> <p>*Note: this funding depends entirely on the reach and quantity of such elements (e.g., how many forums and how large, or how many ads or educational materials.)</p>	<ul style="list-style-type: none"> <li>• An additional exception is any <u>benchmarking tool</u> that would have to be designed for the Internet. Currently, the FYPower.org website links to various benchmarking tools including the EnergyStar tool. [Rating strategy shows utilities doing this. If internet-based, still should count in Strategy #1 funding resources, not here.]</li> <li>• Flex Your Power has no funding for <u>demand response</u>. The incremental costs (since most of the marketing could be done along with the energy efficiency marketing and outreach) would have to be covered out of a non-public goods charge funding. [Currently all DR is still ratepayer supported, just not out of “PGC” pot. Presumably any campaign would be an expense carved out of the DR program budgets.]</li> </ul>	<p>until the actual Green Building Initiative elements are identified.</p> <ul style="list-style-type: none"> <li>• Nevertheless, the elements listed for the prior two years could be continued under the same terms.</li> </ul>
<p><b>Financial sources identified (as known)</b></p>	<ul style="list-style-type: none"> <li>• New funding needed:</li> <li>• Newspaper ads. ...by securing co-op ad support for its retail promotions to offset the shift in focus of advertising.)</li> <li>• &amp;/or % of utility EE PGC and</li> </ul>	<ul style="list-style-type: none"> <li>• The IOUs have proposed to provide this funding by working with FYP to assist in marketing their demand response programs.</li> </ul>	<ul style="list-style-type: none"> <li>• It is too speculative at this point to identify funding sources for these programs beyond the ongoing Flex Your Power campaign for 2007 and longer term.</li> </ul>

<b>Outreach &amp; Awareness</b>	<b>2004 Immediate</b>	<b>2005-2006 Near-term</b>	<b>2007 + Longer Term</b>
	<p>procurement program \$</p> <ul style="list-style-type: none"> <li>• State Leadership. (This is probably a relatively small number since the educational materials will be identical or similar to those being produced anyway by FYP...so the cost is incremental and can perhaps be covered by the existing budget.) [public sector]</li> </ul>		
<b>Institutions or delivery channel capacity to accomplish</b>	<p>Flex Your Power, the historically successful and ongoing statewide energy efficiency marketing and outreach campaign currently targets the non-residential sector. It will continue to utilize its partnerships [somewhere cite examples of these players in non-res building industry/energy services market], media outreach and Internet communication channels to support the Green Building Initiative.</p>		

### Strategy #3 Re-Designed Incentives to Maximize Cost-Effective Investment

*Chairperson: Steve McCarty, Pacific Gas & Electric*

**Objective:** To review incentive programs of varying kinds (e.g. utility rebates, tax incentives, utility bill or tariff discount, or other incentive mechanisms) and identify different incentive or program designs that can motivate deeper 30-40% energy savings in some buildings, over the current 10-20% savings levels.

	<b>2004 Immediate</b>	<b>2005-2006 Near-term</b>	<b>2007 + Longer Term</b>
Action steps needed	<ul style="list-style-type: none"> <li>▪ Take a comprehensive look at how incentives are set, including reviewing programs in other parts of the country.</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2005: implement some pilots based on most promising findings from 2004 investigation</li> <li>▪ 2006: new set of programs &amp; new incentive mechanism(s)</li> </ul>	
<b>Financial resources needed (estimate)</b>	<ul style="list-style-type: none"> <li>▪ Already planned</li> </ul>	<ul style="list-style-type: none"> <li>▪ To be determined</li> </ul>	
<b>Financial sources identified (as known)</b>	<ul style="list-style-type: none"> <li>▪ Existing PGC \$</li> </ul>	<ul style="list-style-type: none"> <li>▪ IOU Public Goods Charge and/or Procurement funding for EE</li> </ul>	
<b>Institutions or delivery channel capacity to accomplish</b>	<ul style="list-style-type: none"> <li>▪ Early in 2004 the Calif. utilities set up a technical advisory committee with technical experts from California as well as other states. This forum can investigate revisions to incentive program designs.</li> </ul>	<ul style="list-style-type: none"> <li>▪ To be determined</li> </ul>	



## Strategy # 4 Revisions to utility/state technical assistance programs and private energy service delivery

Chairperson: Steve McCarty, Pacific Gas & Electric

These target 1) Retro-commissioning and 2) Building operator/engineer training & certification, both actions that can obtain significant savings via “no-/low-cost” actions.

### Action Item 4.1: Retro-commissioning

#### Facts and Scenario Assumptions

- Program to provide **life-cycle** savings for about \$0.05/kWh (persistence ~5 years with blend of hard and soft measures; approximately 1 kWh per square foot at a cost of about \$0.20 per square foot total program cost **first year** [administration + incentives + implementation labor]).
- Program to require rigorous measurement at the site level (measurement is an inherent component of a robust commissioning service).
- Focus on building HVAC equipment repair, HVAC controls and lighting controls recommissioning (timeclocks, occupancy sensors, dimming).
- Total commercial building stock in CA ~ 6 billion sq. ft.; new space construction ~ 160 million sq. ft./year.
- [Assumes this is achieved only through and by incurring utility program costs. What about other marketing/promotion methods to accomplish same?-editor]

	2004 Immediate	2005-2006 Near-term	2007 + Longer Term
<b>Action steps needed</b>	<ul style="list-style-type: none"> <li>▪ Define technical service requirements based on existing pilot retro commissioning work</li> <li>▪ Place special emphasis on integration of lighting and daylighting controls into program to complement existing work on HVAC equipment and controls</li> <li>▪ Emphasis to be on peak savings measures (both DR-style measures and every-day peak savings measures)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Select final program design; begin implementing</li> <li>▪ Goal: 3,500,000 sq. ft. under commitment and in progress by 12/31/05</li> <li>▪ Goal: additional 3,500,000 sq. ft. under commitment and in progress by 12/31/06</li> <li>▪ Develop plan and execute plan for codification of retro-commissioning activity (integration into Title 24 for</li> </ul>	<ul style="list-style-type: none"> <li>▪ Implement at level of ~ 20,000,000 sq. ft./yr</li> <li>▪ Implement and support integration of retro commissioning into Title 24 for 2008</li> </ul>

	2004 Immediate	2005-2006 Near-term	2007 + Longer Term
	<ul style="list-style-type: none"> <li>▪ Identify and begin training service providers, define training package</li> <li>▪ Conduct market research and test-marketing for service delivery/program design concepts (how much incentive required, customer preferences for nature of service, etc.)</li> <li>▪ Explore options for codification of the retro-commissioning activity (Title 24)</li> </ul>	<p>2008)</p> <ul style="list-style-type: none"> <li>▪ Dovetail retro commissioning service with current DR rate options.</li> </ul>	
<b>Financial resources needed (estimate)</b>	<ul style="list-style-type: none"> <li>▪ Service definition: \$100,000</li> <li>▪ Training start-up: \$100,000 (package definition, provider ID, initial sessions)</li> <li>▪ Program design/market research: \$50,000</li> <li>▪ Codification: \$50,000</li> <li>▪ <b>Total ~ \$300K</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Program site implementation: 3,500,000 sq. ft. per year for \$700,000 (per year 04 and 05);.</li> <li>▪ [Art Rosenfeld thinks this pace is slow.]</li> <li>▪ Certification: \$50,000 per year (04 and 05)</li> <li>▪ <b>Total ~ \$750,000 per year in 2005 and 2006</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Annual cost ~ \$4,000,000 yr</b> (for all program activities)</li> <li>▪ <b>20,000,000 sq. ft. per year.</b></li> <li>▪ [Art Rosenfeld thinks this pace is slow.]</li> <li>▪ <b>Includes ongoing codification efforts.</b></li> <li>▪ <b>\$4 million</b></li> </ul>
<b>Financial sources identified (as known)</b>	Unknown	Unknown	Public Goods Charge
<b>Institutions or delivery channel capacity to accomplish</b>	IOU Programs	IOU Programs	IOU Programs

**Action Item 4.2 : Operator Certification**

**Facts and Scenario Assumptions**

The existing Building Operator Certification course is 8 one-day sessions targeted at the working building operators, most of who do not have 4-year college degrees. This is a certification program, not just a training program, and does include requirements for continuing education annually.

The contractor believes that a “maximum” sustainable rate for offering BOC is about 8 to 10 courses per year in PG&E’s service territory (about 20 statewide). At 25 students per course, this is 250 operator certifications per year. Based upon CPUC-prescribed budget in 2004 and 2005, PG&E can offer 5 courses per year to about 100 students per year.

Scenario assumption below: increase the number of participants from ~100 to ~1000 per year (PG&E only; roughly double all numbers for statewide applicability).

	<b>2004 Immediate</b>	<b>2005-2006 Near-term</b>	<b>2007 + Longer Term</b>
<b>Action steps needed</b>	<ul style="list-style-type: none"> <li>▪ Establish an expanded qualified pool of instructors in CA capable of meeting higher offering levels; recruit new sites/communities for BOC.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Offer existing IOU BOC program at 8 courses per year level in 2005 and 2006 (PG&amp;E) (200 participants per year)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Offer IOU BOC program at 10 courses per year level in 2007 and beyond (250 participants per year)</li> </ul>
<b>Financial resources needed (estimate)</b>	<ul style="list-style-type: none"> <li>▪ Training and instructor recruitment; expansion of existing locations and host communities: \$50,000 (incremental to existing program funding of \$255,000)</li> <li>▪ \$50K</li> </ul>	<ul style="list-style-type: none"> <li>▪ BOC program funding required \$400,000 per year 2005 and 2006 (this is \$150,000 incremental in 2005 which is already funded at \$255,000)</li> <li>▪ \$150K increment (\$400K total),</li> <li>▪ [\$800K statewide?]</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing IOU total program cost ~\$500,000 /yr for 250 certified operators per year.</li> <li>▪ \$300K increment</li> <li>▪ [assume \$1 million/yr?]</li> </ul>
<b>Financial sources identified (as known)</b>	<ul style="list-style-type: none"> <li>▪ Public Goods Charge</li> </ul>	<ul style="list-style-type: none"> <li>▪ Unknown</li> </ul>	<ul style="list-style-type: none"> <li>▪ Public Goods Charge</li> </ul>
<b>Institutions or delivery channel capacity to accomplish</b>	<ul style="list-style-type: none"> <li>▪ Existing IOU run programs</li> </ul>	<ul style="list-style-type: none"> <li>▪ Existing IOU run programs</li> </ul>	<ul style="list-style-type: none"> <li>▪ Existing IOU run programs</li> </ul>

## Strategy #5 Finance Solutions for Small-Medium Sized Buildings and Owners

Chairperson: Jeanne Clinton, Consultant to the Green Building Initiative

	<b>2004 Immediate</b>	<b>2005-2006 Near-term</b>	<b>2007 + Longer Term</b>
<b>Action steps needed</b>	<ul style="list-style-type: none"> <li>▪ Update previous CEC financing source fact sheet</li> <li>▪ Better integrate financing source info with utility EE programs and marketing / outreach activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2005: Conduct in-depth market analysis of demand for utility-administered EE financing among medium-size power users</li> <li>▪ 2005: If analysis supports it, design a pilot program for “procurement \$” funding and launch in 2006</li> <li>▪ 2005: Work on design of packaged service program for small power users; fund with PGC \$ in 2006 onward</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitor pace of market penetration</li> </ul>
<b>Financial resources needed (estimate)</b>	<ul style="list-style-type: none"> <li>▪ \$50K consultant contract</li> <li>▪ Utility program manager task force</li> </ul>	<ul style="list-style-type: none"> <li>▪ \$100K analysis contract</li> <li>▪ \$50-100K financing program design contract</li> <li>▪ \$ 50-100K small customer packaged program design</li> <li>▪ Program implementation costs TBD</li> </ul>	
<b>Financial sources identified</b>	<ul style="list-style-type: none"> <li>▪ Existing PGC \$ budget – current program design &amp; implementation services</li> </ul>	<ul style="list-style-type: none"> <li>▪ Analysis via CALMAC market studies budgets (may have to review commitments)</li> <li>▪ Program design &amp; implementation via procurement and PGC\$ for medium and small users, respectively</li> <li>▪ Capital resources may come from private capital market</li> </ul>	
<b>Institutions or delivery channel capacity to accomplish</b>	<ul style="list-style-type: none"> <li>▪ Retain services of finance professional active in energy finance market</li> </ul>	<ul style="list-style-type: none"> <li>▪ Will require greater utility collaboration with existing private market financial/ EE services delivery organizations</li> </ul>	

### Examples of Possible Financing Mechanisms

- PFG Leasing about 5 years ago set up a loan program for the Southern Company (their Georgia Power unit, specifically) which through BOMA outreach and marketing offered loans of \$100 K to \$3 million to GP's non-residential customers.
- Wisconsin Power & Light runs a turnkey audit/ installation/ on-bill loan program for medium-size non-residential customers. The average loan size is \$75,000, larger loans than in CT, to make the transaction costs more affordable. Savings average 13% and have an average payback of 4 years (implying an annual utility bill of about \$140K+).
- United Illuminating in Connecticut is running a small business EE program with loans up to \$25K and monthly repayment.

### Issues for Investigation

In a closer investigation, we need to identify if the small-medium customer's reported need for financing assistance is for

- "credit support" (a lender who will look at utility bill payment history as another factor where the customer may otherwise have poor credit),
- lower interest rates, and/or
- more convenient transaction time and costs.

### Possible Action Step Implications

Assuming the final answer is that there is a need for financing services, we must develop an action plan with an EASY finance mechanism for retrofitting EE measures in small and medium-sized non-residential properties. The mechanism(s) as seen by end users would need to consider the following:

#### Small Customers:

- Easy credit and paperwork for business customers to finance projects with maybe up to 2 year paybacks, (to limit credit risk)
- Financing in conjunction with pre-screened EE equipment vendors (United Illuminating's utility program in Connecticut uses screened vendors as the connection for marketing the program and handling paperwork in "one-stop", including credit checks via Internet or "wi-fi" inquiry).

Medium Customers:

- A way to get external financing quickly and on favorable terms, to avoid having to go through a 12-18 month process to MAYBE get corporate authorization for INTERNAL access to capital (the process of getting this approval has too many veto/detour points)

Capital Source and Repayment Mechanism:

- Possible utility-administered on-bill financing (can be utility capital as done in Wisconsin and Connecticut, or structured capital source -- e.g. as PFG Leasing did for Georgia Power/Southern Company).
- Alternative: commercially administered lending program, perhaps with risk underwriting and transaction cost support from PGC \$.

## Strategy 6 Sub-metering of Tenant Space

Chairperson: Art Rosenfeld, Commissioner, California Energy Commission

During our two roundtable discussions with large real estate owners and operators, they pointed out that in California since 1962, the CPUC has prohibited the re-sale of electricity by non-domestic customers through submetering [D.63526 (59 CPUC 547); D.92109 (4 CPUC2d 197). Thanks to Jay Luboff of the CPUC for this research and Luboff's memo of 4/26/2004. ]

From the point of view of energy use, submetering invites a trade-off between conservation by the tenant and investment by the owner. More specifically, our discussion went as follows. The submetered tenant is motivated behaviorally to turn off lights and turn off the monitors of unused computers. But if the building owner pays the whole master meter bill he is motivated to invest in whole-building efficiency measures such as better lighting and HVAC.

We assume that submetering is interesting but not urgent. It is one of a number of issues which should be addressed by the current CPUC Efficiency Proceeding under Assigned Commissioner Susan Kennedy [R.01-08-018]. Probably submetering should be required in **new** buildings.

	<b>2004</b>	<b>2005-2006 Near-term</b>	<b>2007 + Longer Term</b>
<b>Action steps needed</b>		<ul style="list-style-type: none"> <li>▪ The CPUC should decide whether to assign this issue to the energy efficiency proceeding or some other proceeding consideration of eliminating prohibitions on sub-metering for existing utility customers</li> <li>▪ The CEC should consider mandatory sub-metering as a part of the next round of Title 24 energy standard for new buildings</li> </ul>	<ul style="list-style-type: none"> <li>▪ The next round of Title 24 standards will take effect in 2008</li> </ul>
<b>Financial resources needed (estimate)</b>		The primary resources would be the staff time of CPUC and CEC staff, utilities, commercial real estate and metering equipment interested parties	
<b>Financial sources identified</b>			
<b>Institutions or delivery capacity to accomplish</b>			

## Appendix 2 Profile of Public Building Targets for Action

### CONTENTS

- I. Overview of All Public Sector Buildings
- II. State Buildings
- III. University of California
- IV. Public Schools

#### **Data sources:**

- *California Sustainable Building Task Force,*
- *Dan Burgoyne, DGS*
- *David Casentini, consultant to US EPA's EnergyStar program for California*
- *Daryl Mills of CEC*
- *Dept. of Education web site*
- *Department of Finance*
- *Heschong Mahone Group's Building Renovation study for CEC*
- *Panama Bartholomy of DGS' Division of State Architect*
- *Patty Wohl and Barbara Van Gee of CIWMB*
- *University of California web site*



## Overview of All Public Sector Buildings

### Estimated Energy Use and Savings for Public Schools, Local Governments, and State Facilities 8/5/2004

Category	#	Estimated Square Footage (1000's)		Estimated Energy \$/sf	Estimated Annual Energy use (dollars)		Estimated Annual Savings Potential (dollars) <sup>7</sup>		Estimated Annual Savings		
		Existing	New		Existing	New	Existing	New	2010 <sup>8</sup>	2015 <sup>9</sup>	2020 <sup>10</sup>
K-12 School <sup>1</sup>	8331	708135	42000	\$1.43	\$1,012,633,050	\$60,060,000	\$202,526,610	\$12,012,000	\$30,378,992	\$60,757,983	\$121,515,966
Local Govt (water+waste) <sup>2</sup>					\$250,000,000	\$0	\$50,000,000	\$0	\$7,500,000	\$15,000,000	\$30,000,000
Local Govt (bldgs) <sup>2</sup>	533	250000	2000	\$2.00	\$500,000,000	\$4,000,000	\$100,000,000	\$800,000	\$15,000,000	\$30,000,000	\$60,000,000
Community Colleges <sup>3</sup>	108	52200	1711.1	\$2.00	\$104,400,000	\$3,422,200	\$20,880,000	\$684,440	\$3,132,000	\$6,264,000	\$12,528,000
<b>State Facilities<sup>4</sup></b>	<b>2023</b>	<b>251000</b>	<b>7000</b>	<b>\$2.10</b>	<b>\$527,100,000</b>	<b>\$14,700,000</b>	<b>\$105,420,000</b>	<b>\$2,940,000</b>	<b>\$15,813,000</b>	<b>\$31,626,000</b>	<b>\$63,252,000</b>
State Facilities Leased	450	15000	0	\$2.10	\$31,500,000	\$0	\$6,300,000	\$0	\$945,000	\$1,890,000	\$3,780,000
<b>Total</b>		<b>1276335</b>	<b>52711</b>		<b>\$2,394,133,050</b>	<b>\$82,182,200</b>	<b>\$478,826,610</b>	<b>\$16,436,440</b>	<b>\$71,823,992</b>	<b>\$143,647,983</b>	<b>\$287,295,966</b>
<b>Estimated Capital Need for Measures<sup>11</sup></b>							<b>\$3,830,612,880</b>		<b>\$574,591,932</b>	<b>\$1,149,183,864</b>	<b>\$2,298,367,728</b>

Notes:

- Estimated square footage based on utility data identifying square footage of schools in each major service territory. The square footage includes both public and private schools. Estimated new facilities are those planned in 2000-2005. Assumed energy cost is \$1.43/sf based on CHPS estimates.
- Estimated square footage for buildings. Assumed annual energy budget for local governments is \$500 million is for buildings and \$250 million for water/wastewater. Of this amount about 70% is associated with buildings and the balance with water/was
- Estimated square footage from Chancellors Office. Energy cost of \$2/square feet from CC Program audits.
- Estimated square footage from Summary of State Owned Facilities from DGS, RESD (1/2001). Assumed energy cost to be \$2.1/square feet. These numbers include state agencies, Corrections, UC and CSU. UC sf estimated at 93,000,000 per Maric Munn 4/2004.
- Assume 85-90% of the energy cost is electricity and 10-15% natural gas and \$.08-0.10/kwh.
- School, local government and community colleges factor based on BSP, EPP and CCP.
- Assume 20% cost reduction due to energy efficiency
- Assume 15% of the project potential can be achieved by 2010
- Assume 30% of the project potential can be achieved by 2015
- Assume 60% of the project potential can be achieved by 2020
- Capital Cost of Measures assumes 8 year simple payback. Worst case @ 8 times annual savings after rebates.

## II. STATE BUILDINGS

### A. OVERALL POPULATION (See table on next page)

- 251 million existing sf owned, with estimated energy bill in existing buildings of \$527 million/year
- 7 million sf owned new construction with estimated energy bill in new buildings of \$15 million/year
- 691 buildings with total of 99 million square feet buildings over 50,000 square feet, to comply with LEED-EB (data from DoF staff).
- 15 million sf leased in private buildings, with estimated energy bill of \$6.3 million/year

State Buildings	Building Size (sf)	Cumulative # of buildings	Sq Ft represented	% of buildings	% of total square footage
<b>OWNED</b>	>200,000	92	41,412,683	3	27
	>100,000	320	72,362,478	10	47
	<b>&gt;50,000</b>	<b>691</b>	<b>98,689,175</b>	<b>21</b>	<b>65</b>
	<b>&gt;10,000</b>	<b>3223</b>	<b>152,771,858</b>	<b>100</b>	<b>100</b>
	<b>TOTAL</b>				
<b>LEASED</b>	>200,000	5	1,272,548	1	9
	>100,000	23	3,805,146	5	26
	<b>&gt;50,000</b>	<b>73</b>	<b>7,358,490</b>	<b>16</b>	<b>50</b>
	>10,000	446	14,846,020	100	100

by Daryl Mills, CEC 8/17/04

### B. RENOVATION

Activity/year: \$ 2 billion/year new and renovation construction. There is very limited data to characterize this population including the split between new construction and renovation projects, or the square footage of space involved. Thus we can only address a combination of renovation and new construction projects. We assume a cost of \$200/sq. ft. for the combined projects, resulting in an estimated 10 million affected sq. ft./year.

Current practice re: energy efficiency, renewable energy, & green buildings:

The stated policy is to incorporate those green building features that are feasible and cost effective to incorporate. There is no guidance as to which features are appropriate and no reporting mechanism or enforcement of the policy so it is difficult to know if it is in fact being carried out.

**What is the incremental change called for by GBI?**

- A. 20% reduction in power purchased from grid via combination of retro-commissioning, improved operation & maintenance, hardware efficiency improvements, and on-site clean DG.
- B. All major renovations of existing buildings to be LEED-designed or certified (latter if >50,000 sf).
- C. All existing buildings to meet LEED-Existing Building standards by 2010.

**What is the GBI expected incremental construction cost for**

**A. 20% energy efficiency improvements in existing buildings.**

\$242 million over 10 years, or \$24million per year, with an average 3.5 year simple payback.

**B. LEED on major renovations and new buildings.**

The incremental cost to the State to comply with LEED-NC on renovation projects is 0-2% of baseline construction costs, the range is \$0 - \$40 million/year. We assume the cost will be less than 1%, based on recent LEED experience, and thus **assume an incremental cost of \$20 million**. The majority of this is for energy efficiency measures, discussed in item A. above.

**C. LEED-Existing Buildings.**

The USGBC so far has completed data compilation for only three buildings in its pilot of the LEED-EB rating system. This system is focused on operations and maintenance measures. Using the first three buildings' data, the average cost to undertake LEED-EB is about \$1.00/sf, and saves about \$0.58/sf/year. (Based on conversations with Michelle Moore of the USGBC, and data that she provided.)

**What is estimated incremental benefit or savings from GBI energy efficiency changes?**

**A. 20% energy efficiency improvements in existing buildings?**

- Using KEMA-Xenergy data, the State will save 531 GWh or \$69 million/year from 20% efficiency improvement, at a simple payback of 3.5 years, equivalent to about 34 cents/sf/year.
- Using CEC data, the State will save \$100 million/year from 20% efficiency improvement, or \$0.42 cents/sf/year.

**B. LEED on major renovations and new buildings.**

- Energy benefits are included in the statewide commercial building total in item A. above. Based on CEC data that the State pays \$2.10/sf for energy (this may be a little high for a new building), LEED compliance for the 10 million sq. ft./year, with a 20% efficiency gain, could save the State **as much as \$4.2 million/year in energy operating costs alone**.

- In estimating other (non-energy) resource benefits, we could apply data from the Cal-EPA building's compliance with LEED-EB. That building estimated its savings on a per sq. ft. basis, which we use here to translate to possible benefits for 10 million sq. ft./yr. in State construction:
  - Emissions - \$1.18 per sq. ft total over 20 years, or \$590,000/year for 10 million sq. ft.
  - Water - \$.51 per sq. ft total over 20 years, or \$255,000/year for 10 million sq. ft.
  - Waste - \$.03 per sq. ft total (one-time during construction), \$300,000 one-time for 10 million sq. ft.

We do not have companion information on the units of resource savings (e.g. tons of emissions, gallons of water, tons of solid waste).

### **C. LEED-Existing Buildings**

The USGBC so far has completed data compilation for only three buildings in its pilot of the LEED-EB rating system. This system is focused on operations and maintenance measures. Using the first three buildings' data, the average savings is about \$0.58/sf/year, for a 1.75 year payback. It appears that about 75% of the savings are energy-related, 15% are from reduced solid waste, and the remaining benefits emanate from indoor environmental quality, site vegetation, and water.

#### **What is GBI expected impact on planned construction schedules, staffing, & design/construction management budgets?**

- For elapsed time, what we have found is that more time is spent during the design phase and that time is made up for during the construction phase so typically the time schedule stays constant. For staff time on design & management, since the TOTAL cost can be an increase between 0 and 2%. Less than half of this is typically design & management costs, of which most is on the design team, with a lesser amount on the host site client's staff time. There are additional costs associated with the certification process.
- There should be little to no impact. Except for those projects very late in their development process there should not be an impact on the schedule, as much of the features are becoming industry practice. That being said it is always preferable to include high performance building requirements in all RFPs and RFQs. Many of the A/E firms that the State hires for building projects have the expertise to design these types of buildings. The use of cost effective, but higher-performing than simply code- required, building materials is becoming easier, and cheaper, every year. The Department of General Services has been implementing the Excellence in Public Buildings Initiative for over three years now and staff should be familiar with ways to incorporate cost-effective, high performance features into the State's facilities.

DEPARTMENT NAME	TOTAL FEE SITES/ FACILITIES	TOTAL FEE FACILITIES	TOTAL STRUCTURES	TOTAL SQUARE FEET
AIR RESOURCES BOARD, STATE	1	2.25	1	54,000
BOATING & WATERWAYS, DEPT OF	3	22.34	0	0
CAL STATE UNIVERSITY	34	19,468.81	1,640	59,226,996
CDC - AVENAL STATE PRISON	1	639.25	149	1,590,407
CDC - CA CORRECTIONAL CENTER	1	909.00	138	686,649
CDC - CA CORRECTIONAL INSTITUTION	1	1,680.00	135	1,376,757
CDC - CA INSTITUTION FOR MEN	1	2,242.14	154	1,331,763
CDC - CA INSTITUTION FOR WOMEN	1	115.09	50	511,851
CDC - CA MEDICAL FACILITY	1	371.23	36	920,345
CDC - CA MEN'S COLONY	1	177.86	73	762,682
CDC - CA REHABILITATION CENTER	1	106.11	101	981,012
CDC - CA SUBSTANCE ABUSE TREATMENT FAC.	1	404.07	141	1,654,308
CDC - CALIPATRIA SP (IMPERIAL N)	1	1,198.45	96	986,989
CDC - CENTINELA STATE PRISON	1	1,953.85	107	1,127,980
CDC - CENTRAL CA WOMEN'S FACILITY	1	662.15	82	940,049
CDC - CHUCKAWALLA VALLEY S. P.	1	1,092.18	67	886,255
CDC - CORRECTIONAL TRAINING FACILITY	1	632.60	172	1,355,366
CDC - CSP - SOLANO	1	546.00	73	1,758,490
CDC - CSP AT CORCORAN	1	921.30	121	3,228,474
CDC - CSP AT LOS ANGELES	1	261.74	104	1,178,186
CDC - CSP AT SAN QUENTIN	1	487.73	191	1,369,384
CDC - CSP, SACRAMENTO	1	122.49	38	1,210,431
CDC - DELANO II	1	1,301.14	0	0
CDC - DEUEL VOCATIONAL INSTITUTION	1	779.48	82	885,958
CDC - FOLSOM STATE PRISON	1	1,065.10	94	751,788
CDC - HEADQUARTERS	3	5.68	3	87,550
CDC - HIGH DESERT STATE PRISON	1	655.00	107	1,189,510
CDC - IRONWOOD STATE PRISON	1	640.00	97	1,096,267
CDC - LOS ANGELES RECEPT. CENTER	1	19.96	0	0
CDC - MULE CREEK STATE PRISON	1	867.65	54	1,022,521
CDC - NORTH KERN STATE PRISON	1	636.31	81	839,413
CDC - NORTHERN CAL WOMEN'S FAC	1	134.10	25	197,489
CDC - PELICAN BAY STATE PRISON	1	455.24	67	1,165,103
CDC - PLEASANT VALLEY STATE PRISON	1	332.83	110	1,101,534
CDC - R J DONOVAN CORR FACILITY AT	1	773.94	89	1,124,992
CDC - RICHARD A. MCGEE TRAINING CENTER	1	40.08	31	175,878
CDC - SALINAS VALLEY STATE PRISON	1	337.00	102	1,198,357
CDC - SIERRA CONSERVATION CENTER	2	876.89	110	641,034
CDC - VALLEY S. P. FOR WOMEN	1	662.27	54	836,922
CDC - WASCO STATE PRISON-RECEPTION CTR	1	774.27	108	853,707
COACHELLA VALLEY MOUNTAINS CONSERVANCY	7	3,042.46	0	0
COASTAL CONSERVANCY, STATE	24	2,484.23	0	0
CONSERVATION CORPS, CALIFORNIA	3	153.17	27	68,690
CONSERVATION, DEPT OF	2	0.26	1	2,000
CONSUMER AFFAIRS, DEPT OF	1	2.51	1	9,251
DEVELOPMENTAL SERVICES - AGNEWS D. C.	1	722.01	55	609,744
DEVELOPMENTAL SERVICES - FAIRVIEW D. C.	1	119.13	99	1,101,359
DEVELOPMENTAL SERVICES - LANTERMAN D. C.	1	301.78	111	1,045,736
DEVELOPMENTAL SERVICES - PORTERVILLE D.C	1	668.30	122	1,089,378
DEVELOPMENTAL SERVICES - SONOMA D. C.	1	1,253.93	137	1,313,647

DISTRICT AGRICULTURAL ASSOCIATIONS	46	3,190.81	1,292	7,453,397
EDUCATION - SCHOOL FOR DEAF, RIVERSIDE	1	66.66	59	313,157
EDUCATION - SCHOOL FOR THE DEAF	1	92.46	62	535,861
EDUCATION-DIAGNOSTIC CENTER, CENTRAL CAL	1	6.09	2	35,025
EDUCATION-DIAGNOSTIC CENTER, SOUTHERN CA	1	2.07	1	60,000
EMPLOYMENT DEVELOPMENT	31	48.57	30	575,616
EXPOSITION & STATE FAIR, CALIF	1	854.64	45	1,058,336
FISH AND GAME, DEPT OF	368	511,424.16	749	1,107,845
FOOD AND AGRICULTURE, DEPT OF	12	78.83	120	467,226
FORESTRY & FIRE PROTECTION, DEPT OF	259	74,892.93	2,235	3,892,969
GENERAL SERVICES, DEPT OF	103	1,949.27	122	16,033,522
HEALTH PLANNING & DEVEL, OFC STATEWIDE	1	2.43	1	34,000
HEALTH SERVICES, DEPT OF	4	81.61	8	758,841
HIGHWAY PATROL, DEPT OF THE CALIF	115	625.47	142	1,139,251
JUSTICE, DEPT OF	6	10.51	5	97,531
LANDS COMMISSION, STATE	86	4,497,562.20	1	3,325
LEGISLATURE	1	1.55	1	237,000
MENTAL HEALTH - ATASCADERO STATE HOSP	1	643.45	54	677,887
MENTAL HEALTH - COALINGA STATE HOSPITAL	1	304.00	0	0
MENTAL HEALTH - METROPOLITAN STATE HOSP	1	117.78	101	1,190,874
MENTAL HEALTH - NAPA STATE HOSPITAL	1	1,369.66	162	1,541,628
MENTAL HEALTH - PATTON STATE HOSPITAL	1	282.33	71	1,215,743
MILITARY, DEPT OF	80	5,926.47	392	5,202,229
MOTOR VEHICLES, DEPT OF	97	241.76	95	1,853,362
PARKS & RECREATION, DEPT OF	279	1,205,024.20	5,671	6,510,450
REHABILITATION, DEPT OF	1	3.20	4	42,278
SAN JOAQUIN RIVER CONSERVANCY	1	756.76	1	3,000
SANTA MONICA MOUNTAINS CONSERVANCY	74	5,278.85	44	38,299
SCIENCE CENTER, CALIF	1	152.49	9	496,677
STATE LOTTERY COMMISSION, CALIF	1	12.50	2	267,280
STEPHEN P. TEALE DATA CENTER	1	8.90	1	137,275
TAHOE CONSERVANCY, CALIF	2	6,245.37	0	0
TOXIC SUBSTANCES CONTROL, DEPT OF	1	52.32	0	0
TRANSPORTATION, DEPT OF	483	5,803.96	1,307	5,515,212
UNIVERSITY OF CALIFORNIA	14	85,293.46	4,026	39,046,153
VETERANS AFFAIRS, DEPT OF	6	157.63	2	130,292
VETERANS AFFAIRS-VET HOME OF BARSTOW	1	22.12	6	194,965
VETERANS AFFAIRS-VET HOME OF CHULA VISTA	1	30.06	8	209,845
VETERANS AFFAIRS-VET HOME OF YOUNTVILLE	2	2,215.98	83	1,063,107
WATER RESOURCES CONTROL BOARD, STATE	1	465.00	0	0
WATER RESOURCES RECLAMATION BOARD	25	19,248.11	0	0
WATER RESOURCES, DEPT OF	55	110,555.10	0	0
YOUTH AUTHORITY, DEPT OF THE	10	1,969.38	385	3,457,928
TOTALS	2,298	6,596,192.46	22,735	204,143,588

**Pipeline of potential energy efficiency projects as of 3/03, shortly before EMD was terminated and many staff moved to DGS/DSA.**

During the Energy Crisis there was a significant up-tick in identifying possible EE projects:

- \$40-50 million of energy efficiency and conservation projects went through, the majority funded by SB 5X funds (under special spending and procurement rules at the time), and others funded by the Energy Efficiency Revenue Bond. Of some 100 to 150 projects initially identified, approximately one third made it through construction, installation and operation.
- Of the remaining \$80-\$100 million projects “left on the table”, approximately 75% or \$60-75 million of projects could have met financing criteria or the host site’s willingness to commit funds for the improvements, according to former EMD staff.

Additionally, it is likely there would have been more projects given better and more appropriate circumstances in the DGS/DoF collaboration process. As of 3/03 there were 168 EE projects in the “pre-development” state at DGS/EMD.

Still, DoF believes there are no further cost-effective energy efficiency and conservation project opportunities at state facilities. (This view may be limited to DGS-owned and operated buildings only, and not held for universities, for example.) This does not reflect the expert opinion of DGS staff with energy management backgrounds and experience in a position to identify what projects are still advised.

- Energy management staff report that the majority of lighting, premium efficiency motors, variable frequency/speed drives, and other energy saving devices have been installed throughout many of the state owned buildings. These are the “low hanging fruit” of energy efficiency and conservation projects.
- There are “many” remaining energy efficiency projects, including (e.g.) energy management systems (EMS) that have been rejected by DOF. “Many buildings that are of a certain vintage, primarily pre-1994, need upgrades and modifications to their EMS, including the addition of monitoring points, as well as ensuring that the monitoring devices are operating and maintained. DGS estimates that executive state agencies need EMS improvements in about 60% of facilities. The State’s universities historically have been more sophisticated in their energy management practices, and might have EMS improvement needs in 25-40% of their facilities. EMS is just one example of an untapped area for improvement.

Summary	Renovated in last 20 yrs.	Under renovation now	Planned for renovation	Percentage w/ renov on radar	Being Studied for Renovation	Total Potential Renovations	
Number of Buildings	74	4	11	3	24%	16	34
Gross Sq Ft.	20,561,320						
Number of Buildings >40 years old	30	4	5	2	37%	6	17
Number of Buildings 20-39 years old	16		5	1	38%	10	16
Number of Buildings <20 years old	28		1		4%		1
New or under construction in last 10 years	19						

- As of 3/03 EGS/EMD estimated cumulative net savings or EE projects of \$82.5 million, and a projected accumulation of \$353 million as these measures’ lives continued through 2026.

### **C. NEW CONSTRUCTION**

See discussion above in “RENOVATION” section, which discusses renovations and new construction together.

#### **Current practice re: energy efficiency, renewable energy, & green buildings:**

- The stated policy is to incorporate those green building features that are feasible and cost effective to incorporate. There is no guidance as to which features are appropriate and no reporting mechanism or enforcement of the policy, so it is difficult to know if it is in fact being carried out. On select high profile projects (Capital East End, Caltrans Dist. 7 and 11, Franchise Tax Board) there has been some inclusion of green building features after extensive multi-agency input.
- Dan Burgoyne (at DGS) worked on an analysis of this and determined the average new State of California office building would receive LEED certification

#### **What is the incremental change called for by GBI?**

All new buildings to be LEED silver-designed or certified (latter if >50,000 sf).

#### **What is GBI expected incremental construction cost?**

Between 0 to 2% increase on a \$ per square foot figure (see discussion above under “Renovation”), and most likely under 1% for new construction.

#### **What is estimated incremental benefit or savings from GBI change?**

The savings to the State from better design and operations could be substantial, as evidenced by the CALEPA Headquarters and Department of Education Headquarters examples. Exact benefits would depend on project budgets, design and operation but if operated at CALEPA HQ standards the savings could be as much as \$1 per square foot less than code-built buildings. As stated in *The Costs and Financial Benefits of Green Building* report, “payback for such design and operation will be many times the investment, potentially as much as ten times.”

The California Performance Review calculated a 2-year payback for LEED compliance on new buildings, with an incremental investment of \$34 million/year, and a \$17 million/year saving from the combined green building impacts for new State construction. This estimate is not broken down between energy and other resource benefits.

#### **What is GBI expected impact on planned construction schedules, staffing, & design/construction management budgets?**

- What we have found is that more time is spent during the design phase and that time is made up for during the construction phase so typically the time schedule stays constant. Again the cost can be between 0 and 2%. There are additional costs associated with the certification process. Also for large buildings the team frequently hires a LEED certification expert for consultation and to assist with the documentation.
- There should be little to no impact. Except for those projects very late in their development process there should not be an impact on schedule as much of the features are becoming



industry practice. That being said it is always preferable to include high performance building requirements in all RFPs and RFQs. Many of the A/E firms that the State hires for building projects have the expertise to design these types of buildings. The use of cost effective, but higher performing than simply code required, building materials is becoming easier, and cheaper, every year. The Department of General Services has been implementing the Excellence in Public Buildings Initiative for over three years now and staff should be familiar with ways to incorporate cost-effective, high performance features into the State's facilities.

**D. COMBINED BENEFIT ESTIMATE FOR STATE BUILDING RENOVATIONS AND NEW CONSTRUCTION**

According to the California Performance Review most potential additional construction costs would be realized in the third year of a project, so in initiating this policy no additional costs would be absorbed until the 2006/07-budget year. Savings would not be realized until the year after construction, or seeing the first year's savings in the 2007/08 fiscal year. The CPR analysis assumed a worst case of two percent additional costs for high-performance design and a best case savings of 10 times the initial investment over twenty years (this implies a 2-year payback) with no discount rate, costs and savings would result in the amounts shown below.

**California Performance Review  
Analysis of Greening State Building Construction**

**GENERAL FUND REVENUE**

<b>Fiscal Year</b>	<b>Year's Savings</b>	<b>Year's Costs</b>	<b>Year's Net Savings (Costs)</b>	<b>Cumulative Savings</b>
2004	0	0	0	
2005	0	0	0	
2006	0	\$34 million	(\$34 million)	(\$34 million)
2007	\$17 million	\$34 million	(\$17 million)	(\$51 million)
2008	\$34 million	\$34 million	0	(\$51 million)
2009	\$51 million	\$34 million	\$17 million	(\$34 million)
2010	\$68 million	\$34 million	\$34 million	(\$0)
2011	\$85 million	\$0	\$85 million	\$85 million
2012	\$85 million	\$0	\$85 million	\$170 million

***E. LEASED SPACE IN PRIVATE BUILDINGS***

**Volume of activity:** 15 million sq. feet

**Estimated baseline cost:** \$2/sf for energy (as per CEC)

**Current practice re: energy efficiency, renewable energy, & green buildings:**

- Unclear if State leases are chosen based on rent only, or on basis of lifecycle rent and operating costs.
- DGS staff consulted believe it is based on location and rent/lease costs.

**What is the incremental change called for by GBI?**

Sign leases for Energy Star (or equivalent) buildings starting 2006 for new leases and 2008 for renewal leases. US EnergyStar reports that nationally, EnergyStar buildings use 30-40% less energy than the average building. There is no specific data available for a comparison of rental rates and energy operating costs between EnergyStar and non-Energy Star buildings in the California market.

**What is GBI expected incremental construction cost?**

\$0 to the State, some potential cost to the private building owner if a State-sought building is not rated EnergyStar currently. There are currently over 350 Energy Star office buildings in California that are rated EnergyStar. Anecdotal information suggests these are mostly “Class A” office buildings, which may be a higher grade of building than the State typically leases.

If a non-rated building were to become EnergyStar rated in order to offer the State EnergyStar leased space, the owner would undertake operations and maintenance changes, as well as some retrofit expenditures that most likely would be recouped via the lease payment requested. US EPA information on Energy Star buildings indicates these buildings typically rent at the same price as non-rated buildings, essentially reflecting market conditions based more on location and quality of building services.

**What is estimated incremental benefit or savings from GBI change?**

Energy-alone: equivalent to about 40 cents/sf/year (according to CEC). US EPA information on Energy Star buildings indicates these typically have 30-40% lower energy operating costs than non-rated buildings, and that the tenant typically pays no premium to rent this space over comparable quality non-EnergyStar buildings.

Other green building benefits data comes from via the CIWMB from a Green Buildings report (the following are total benefits over 20 years):

- Efficient use of natural resources including materials, water, and energy saves \$6.36 per sq. foot
- Improved human health and well being, enhanced occupant comfort, and productivity saves \$36.89 per sq. ft.
- Reduced amount of pollutants saves \$1.18 per sq. ft.

**What is GBI expected impact on planned construction schedules, staffing, & design/construction management budgets?** Not known.

### III. University of California

#### GREEN BUILDING DESIGN AND CLEAN ENERGY STANDARDS

- 1) Policy Synopsis
- 2) Opportunity
- 3) Practicalities

#### POLICY

##### I. Green Building Design

- New building projects: Other than for acute-care facilities, outperform Title 24 energy-efficiency standards by at least 20 percent.
- New buildings, except for laboratory and acute care facilities: To be designed and built to a minimum standard equivalent to a LEED™ 2.1 “Certified” rating. Strive to achieve LEED™ “Silver” rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- Laboratory facilities: Design and build new laboratory buildings to a minimum standard equivalent to a LEED™ 2.1 “Certified” rating and the *Laboratories for the 21<sup>st</sup> Century (Labs21) Environmental Performance Criteria* (EPC), as appropriate.
- Building renovation projects: Apply sustainability principles to the systems, components and portions of the building being renovated.
- Lifecycle cost: Include explicit consideration of lifecycle cost along with other factors in the project planning and design process, recognizing the importance of long-term operations and maintenance in the performance of University facilities.
- Existing buildings: Explore a standard methodology for sustainable policies for facilities management, including assessing the LEED™ Existing Building (LEED™ EB) evaluation tool. Address building cleaning, maintenance, and operation to include factors such as chemical usage, indoor air quality, utilities, and recycling programs.
- Equipment, material, and supply procurement: Promote the availability of products that are resource-efficient, energy-efficient, water-efficient, and of recycled and rapidly renewable content for building materials, subsystems, components, equipment, and supplies.
- Facilities training: Incorporate the Green Building Design policy into existing facilities-related training programs.

## II. Clean Energy Standard

- Reduce non-renewable energy consumption: Implement a systemwide portfolio approach to reduce consumption of non-renewable energy, to include a combination of energy efficiency projects, local renewable power measures for existing and new facilities, green power purchases from the electrical grid, and other energy measures with equivalent demonstrable effect on the environment and reduction in fossil fuel usage. The appropriate mix of measures to be adopted within the portfolio will be determined by each campus.
- Renewable energy purchases: Strive to achieve grid-provided electricity purchases from renewable sources similar to the State's Renewable Portfolio Standard -- a goal of 20 percent of its electricity needs from renewable sources by 2017. Starting in 2004 purchase 10 percent of grid-supplied electricity from renewable sources, subject to funding availability.
- Local Renewable energy: Goal of up to 10 megawatts by siting renewable power projects in existing and new facilities, such as photovoltaic systems, landfill gas electricity generation or thermal energy production.
- Energy Efficiency for existing buildings and infrastructure: Initial goal will be to reduce systemwide growth-adjusted energy consumption by 10 percent or more by 2014 from the year 2000 base consumption level. Develop a strategic plan for efficiency projects to include operational changes and best practices, retrofit projects in major building renovations as funding is available, and standalone retrofit projects as justified by future energy savings. The University will develop funding sources and establish a program for financing retrofit projects. Strive to achieve even greater savings as additional potential is identified and funding becomes available.
- Other energy systems: Evaluate the feasibility of other energy-saving measures applicable to transportation services, including fleet vehicles, Transportation Demand Management (TDM) programs, public transit, and on-campus housing goals.

## OPPORTUNITIES

- Based on the Strategic energy plans that many of campuses received from Enron several years back, the campuses identified that there **were cost effective energy saving projects that could save up to 25% of campus energy use.**
- **UC/CSU/Utility Company Energy Efficiency Program**
  - Through California Public Utilities Commission, UC has partnered with CSU and the Investor Owned Utilities (IOUs) on energy efficiency programs for the two campus systems.
  - Three program components:
    - 1) Energy Efficiency Retrofits – Provides 100% funding for various energy efficiency retrofits. This allows UC and CSU to implement projects in face of fiscal uncertainty where traditional utility incentive programs pay only for a portion of project costs.

- 2) Monitoring Based Commissioning (MBCx) – Provides 100% funding for metering and monitoring hardware and building commissioning services to commission several existing buildings on each of the UC campuses. Commissioning trouble shoots and repairs a building’s energy systems to make sure they are operating as designed. Commissioning can save up to 20% of a building’s energy use. Uses a full diagnostic process to troubleshoot the building’s energy systems. Trains campus personnel on building commissioning techniques applicable to both new and existing buildings. Key-- leaves the monitoring and metering in place to enable personnel to monitor performance and ensure buildings are operated efficiently.
- 3) Training – Provides training on building efficiency, Title 24 energy code changes and efficiency best practices. The Community Colleges also eligible for energy training under this program component.
  - Funding amount @ \$15 million for 2004 & 2005, split equally between the 2 systems
  - Funding source: public purpose funds collected on electric and gas bills
  - Between UC and CSU, the program expects to reduce over 2.8 MW of peak electric demand, 19 million kWh/year, and 1,000,000 therms natural gas/year.

Note: In a separate grant, the students of the UC and CSU, together with the non-profit Alliance to Save Energy, receive funding for a “Green Campus” program for student energy education programs to save additional energy in dormitories and associated student facilities.

#### **PRACTICALITIES**

- The investment that would be required for these projects is substantial and likely unachievable, but there is potential.
- The UC/CSUS – Investor-owned Utilities; Energy Efficiency partnership is better about meeting the campuses’ objectives than the standard utility incentive programs.
- The hardest nut to crack is to find the resources to do a more comprehensive job of inventorying campus energy efficiency projects and having them ready to roll as soon as funding is made available.

## IV. PUBLIC SCHOOLS

Note: Data below come from various sources. It may not be specified in some cases if the data is for k-12 only, or k-14. The Executive Order also invites the cooperation of community colleges, CSUS and UC. Many of the higher education institutions are already embracing sustainable design.

### **POPULATION**

- CEC estimates **708 million sf** of existing k-12 schools, from utility data including private schools, via Daryl Mills. Uses an average of \$1.43 for energy (based on existing schools).
- Hescong Mahone Group, in study of building renovations for CEC, estimates **453 million sf** of schools (excluding universities), based on CEC 2003 forecast data. This may not count school district office building space.
- CHPS estimates **487 million sf** (are these public schools only?). CHPS estimates schools use \$1.31 - \$1.75/sf/yr for elementary to high school.
- Community colleges have **52 million** existing sf, and plan 1.7 million new sf., using \$2/sf for energy

### **RENOVATION**

#### **Volume of activity:**

The Department of Education estimates that the state will need 87 million square feet of modernized schools over the next 5 years.<sup>11</sup> (an average of 17 million sf/year)

#### **Estimated baseline cost:**

\$1.3 billion/year for renovation school construction, at an average cost of \$75/sf.

Current practice re: energy efficiency, renewable energy, & green buildings:

- Code compliance is the current standard practice.
- Currently the State has included \$40 million for energy efficient schools and \$50 million for joint use facilities in the two state-wide bonds, Prop. 47 and 55. The CEC provides planning, technical and financial resources for school districts that seek to improve their energy-efficiency, although with limited budget. There is no current effort to encourage or ensure that renovations pay special attention to water and resource efficiency, indoor air quality or other aspects of high performance schools.

#### **What is the incremental change called for by GBI?**

All existing school square footage for which State funds are used for renovation or modernization will meet CHPS criteria beginning with designs submitted to DSA in 2006 (CHPS does not yet have criteria developed for renovation projects, although this has been discussed.)

**What is GBI expected incremental construction cost?**

- An estimated incremental cost to meet CHPS in modernization projects could range between 1-2%, or \$13-26 million for each year's set of projects. We assume a mid-point value of \$20 million.

**What is estimated incremental benefit or savings from GBI change?**

- All schools in California could save \$142 million/year if they were to meet the 20% efficiency improvement.

The CEC found that schools designed to meet the minimal CHPS standards save the following amounts per square foot per year: [Note at the CEC's initial estimate of school energy costs of \$1/sf/yr, this is 13-18% savings; a revised estimate of \$1.43/sf to match CHPS data would imply savings of 9-13% annually.]

- Elementary: \$0.13;
  - Middle: \$0.16; and
  - High: \$0.18.<sup>iii</sup>
- Based just on the 87 million sf of schools undergoing renovations in the next 5 years, assuming the middle school mid-point and that each project over the next five years is built to meet the CHPS criteria, after renovation these schools should save \$14 million in energy per year.

**What is GBI expected impact on planned construction schedules, staffing, & design/construction management budgets?**

With increased training and resources the schedules and staffing should not be very affected by the GBI. Construction budgets may be affected 0-3% increase.

**NEW CONSTRUCTION**

**Volume of activity:**

- Dept. of Education estimates the need for 28.9 million sf./year of new schools.

**Estimated baseline cost:**

- \$ 5 billion/year for new school construction, at an average construction cost of \$180/sf.

**Current practice re: energy efficiency, renewable energy, & green buildings:**

- DSA recently began checking for compliance with T24. It is not known if most schools were complying, exceeding or not meeting T24.
- Currently the State has included \$40 million for energy efficient schools and \$50 million for joint use facilities in the two statewide bonds, via Props. 47 (authorized for total school facilities at \$13.2 billion – 2002) and 55 (authorized for \$12.3 billion – 2004). The energy funds amount to just under 0.2 % of the total school construction bond amounts. A number of State agencies take part in CHPS which offers technical resources and training to assist them in building high performance schools. There are no special efforts to encourage or ensure

water and resource efficiency, indoor air quality or other aspects of high performance schools.

**What is the incremental change called for by GBI?**

All new school facilities built with State funds or bond proceeds will meet CHPS criteria beginning with designs submitted to DSA starting in 2006.

**What is GBI expected incremental construction cost?**

CHPS estimates greening new schools to CHPS standards costs \$1.75-2.05/sf, depending upon grade level of school. The average is \$1.90/sf, amounting to 1.1% of construction costs. For new schools, this suggests a possible incremental construction cost of \$50 million for each year's set of green new schools. CHPS advises the following costs and benefits:

School Type	Hard Costs	Soft Cost	Total Initial Costs	Average Energy Use	20% Energy Savings	Simple Payback	Life Cycle Cost
K-6	\$0.65/ ft <sup>2</sup>	\$1.10/ft <sup>2</sup>	\$1.75/ft <sup>2</sup>	\$1.31/ft <sup>2</sup>	-\$0.26/ft <sup>2</sup>	6.7 years	-\$1.34/ft <sup>2</sup>
7-8	\$0.65/ ft <sup>2</sup>	\$1.25/ft <sup>2</sup>	\$1.90/ft <sup>2</sup>	\$1.61/ft <sup>2</sup>	-\$0.32/ft <sup>2</sup>	5.9 years	-\$1.86/ft <sup>2</sup>
9-12	\$0.65/ ft <sup>2</sup>	\$1.40/ft <sup>2</sup>	\$2.05/ft <sup>2</sup>	\$1.75/ft <sup>2</sup>	-\$0.35/ft <sup>2</sup>	5.9 years	-\$2.07/ft <sup>2</sup>

**What is estimated incremental benefit or savings from GBI change?**

The Energy Commission found that schools designed to meet the minimal CHPS standards save the following amounts per square foot per year:

- Elementary: \$0.13;
- Middle: \$0.16; and
- High: \$0.18. [liii](#)

Assuming the middle school mid-point, and that each project over the next five years is built to meet the CHPS criteria, after full build out and occupancy the 28.9 million sf of new schools should save \$23 million/year in energy costs.

School Type	Hard Costs	Soft Cost	Total Initial Costs	Average Energy Use	20% Energy Savings	Simple Payback	Life Cycle Cost
K-6	\$0.65/ ft <sup>2</sup>	\$1.10/ft <sup>2</sup>	\$1.75/ft <sup>2</sup>	\$1.31/ft <sup>2</sup>	-\$0.26/ft <sup>2</sup>	6.7 years	-\$1.34/ft <sup>2</sup>
7-8	\$0.65/ ft <sup>2</sup>	\$1.25/ft <sup>2</sup>	\$1.90/ft <sup>2</sup>	\$1.61/ft <sup>2</sup>	-\$0.32/ft <sup>2</sup>	5.9 years	-\$1.86/ft <sup>2</sup>
9-12	\$0.65/ ft <sup>2</sup>	\$1.40/ft <sup>2</sup>	\$2.05/ft <sup>2</sup>	\$1.75/ft <sup>2</sup>	-\$0.35/ft <sup>2</sup>	5.9 years	-\$2.07/ft <sup>2</sup>



**California New School Construction 2006-2008,  
and Possible Resource Benefits from CHPS**

School Type	New Construction Ft <sup>2</sup> to be built '06-08 <sup>17</sup>	Energy Savings \$0.26/ft <sup>2</sup> /yr <sup>18</sup>	Water Savings \$0.025/ft <sup>2</sup> /yr <sup>19</sup>	Waste Diversion Savings \$0.025/ft <sup>2</sup> /yr <sup>20</sup>	Total Env. Savings/yr	O&M Savings due to commissioning \$0.68/ft <sup>2</sup> /yr <sup>21</sup>	Total Savings/yr
Elementary	7,954,399	\$2,068,143	\$198,859	\$198,859	<b>\$2,465,861</b>	\$5,408,991	<b>\$7,874,855</b>
Middle	4,084,692	\$1,062,019	\$102,117	\$102,117	<b>\$1,266,253</b>	\$2,777,590	<b>\$4,043,844</b>
High	10,718,046	\$2,786,691	\$267,951	\$267,951	<b>\$3,322,593</b>	\$7,288,271	<b>\$10,610,865</b>
<b>Totals</b>	<b>22,757,137</b>	<b>\$5,916,855</b>	<b>\$568,928</b>	<b>\$568,928</b>	<b>\$7,054,707</b>	<b>\$15,474,853</b>	<b>\$22,529,565</b>

These values suggest a savings of 31 cents/sf for energy, or 22% of the \$1.43/sf baseline.

**What is GBI expected impact on planned construction schedules, staffing, & design/construction management budgets?**

- See information above for budget impacts.
- Ten school districts and four of the sixth largest (LAUSD, San Diego Unified, Santa Ana Unified and San Francisco Unified) have adopted CHPS as the baseline design standard for their new schools. They expect that all of these schools will be built on time, with existing staff and design/construction budgets increased between 0-3%. The verification work would be taken on by the DSA with former Energy Management Division staff without adding any new staff.

<sup>17</sup> California Department of Education, School Facilities Planning Division, School Facilities Fingertip Facts, January 2004.

<sup>18</sup> Collaborative for High Performance Schools, Presentation to San Diego County Office of Education, 8/10/04

<sup>19</sup> Greg Kats, "The Costs and Financial Benefits of Green Building, Executive Summary" (Sacramento, California, 2003)

<sup>20</sup> Greg Kats, "The Costs and Financial Benefits of Green Building, Executive Summary" (Sacramento, California, 2003)

<sup>21</sup> Greg Kats, "The Costs and Financial Benefits of Green Building, Executive Summary" (Sacramento, California, 2003). Note: these new school commissioning savings are 3-times the level that LBNL estimate in preliminary findings for variety of existing commercial buildings (ranging from 21-26 cents/sf). SMUD found 7% savings from retro-commissioning, which would equate to about 10 cents/sf for schools.