

SB 1 Eligibility Criteria and Conditions for Incentives

Benchmarking & Commissioning Commercial Buildings

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What is Energy Use Benchmarking?

A process to estimate energy use per square foot of building space, compare this energy use metric with buildings of the same type and location, and track energy use over time.

Why benchmark your building?

- Determine how your building's energy use compares with others
- Set targets for improved performance
- Facilitate assessment of property value
- Gain recognition for exemplary achievement
- Identify energy saving strategies



U.S. EPA's Energy Star Portfolio Manager

Whole Building Annual Energy Use Benchmarking

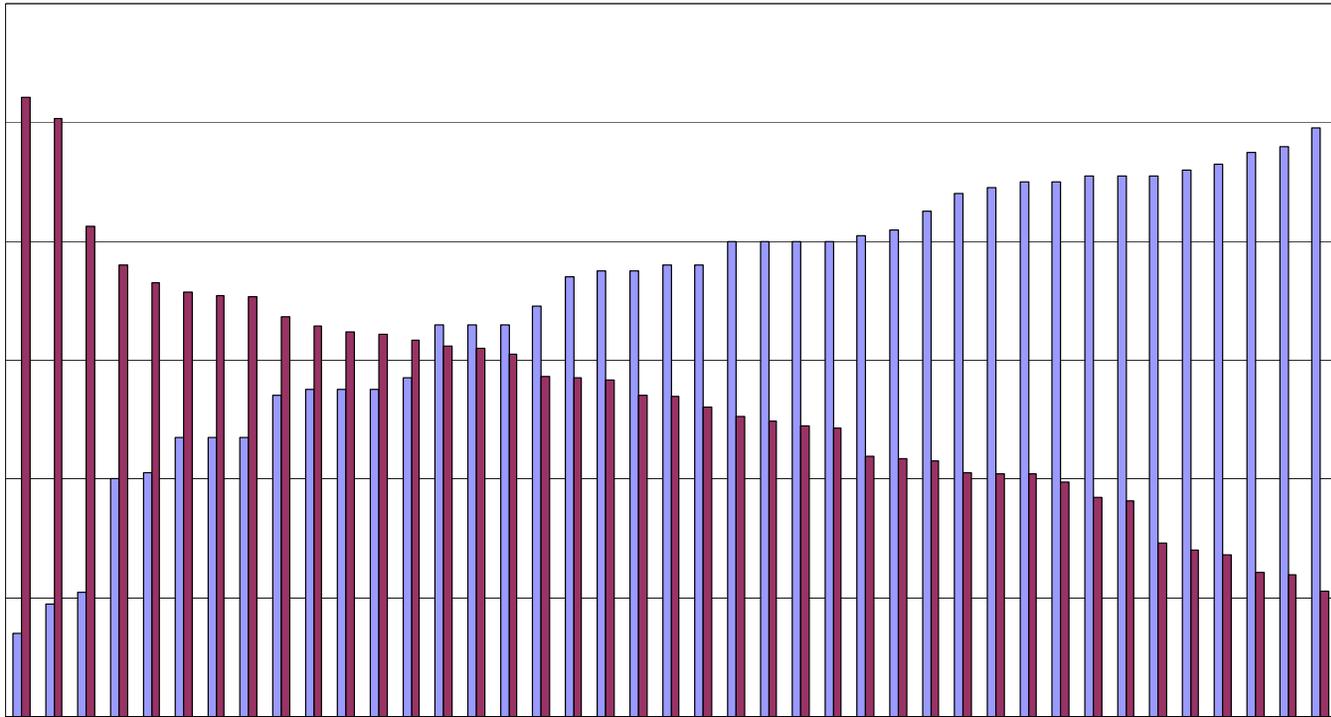
- **Compares your bldg. to national population of similar bldgs. - by building type and climate region**
- **Data requirements:**
 - **Geographic location**
 - **12 – monthly utility bills**
 - **Building square footage**
 - **Additional bldg. features (optional)**
- **Scale of Energy Star rating is 1-100**
 - **HIGH rating equivalent to LOW energy use index**



Energy Star Scores vs. Energy Use

HIGH

LOW



Energy Use Index

Energy Star Score



Energy Star Portfolio Manager (PM)

Benchmarking tool can be used for these building types:

- Offices, Banks & Courthouses
- K-12 Schools
- Hospitals
- Medical Offices
- Warehouses
- Hotels/Motels
- Dormitories/ Residence Halls
- Supermarkets/Grocery Stores

These building types will be added to PM soon:

- Retail Stores
- separate Elementary School and Secondary School models

Remaining building types not covered by PM:

- Restaurants
- Colleges
- Public Assembly
- Convenience Food Stores
- Health Care (other than Hospitals)
- Services
- Miscellaneous



Benchmarking CA Commercial Buildings

Percent of California Buildings that are Energy Star (by building type)

Energy Star Scoring Tool	CEUS General Category Code	CEUS Observations Used in Analysis	Percent of CA buildings with Energy Star scores above 75 *
Office, Bank, Courthouse	OFFICE	133	33%
K-12 Schools	EDUCATION - All	79	27%
K-12 Schools	EDUCATION - Elementary	28	42%
K-12 Schools	EDUCATION - Secondary	51	5%
Hospitals	HEALTH CARE	67	19%
Supermarkets/Grocery Stores	GROCERY	120	63%
Medical Office	HEALTH CARE	40	10%
Warehouse	WAREHOUSE	165	26%

* If CA building energy use was exactly like USA building energy use, we would expect these each to be 25%



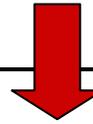
Benchmarking CA Commercial Buildings

- ~ 40% of CA commercial floorspace will not be able to get an Energy Star score
- For these bldg. types, CEC staff proposes to develop an EUI look up table from a large sample of CA bldgs. (CEUS*)

* CEUS = Commercial End Use Survey

Example:

An energy efficient building should use less energy per sq. ft. than this



EUI Distributions for Building Types not covered by Energy Star	kBtu/sq.ft.		
	TOP 25% Quartile	MIDDLE 50% Quartile	BOTTOM 75% Quartile
RESTAURANT	240	340	516
FOOD STORE	73	107	169
HEALTH CARE	64	80	110
EDUCATION	21	22	32
PUBLIC ASSEMBLY	15	48	140
SERVICES	104	180	250
MISCELLANEOUS	9	25	52



CA State Building Benchmarking Program

Implementing Executive Order S-20-04 (Dec 2004):

- State buildings must be benchmarked by 2007
- California Energy Commission recommendation – use Portfolio Manager (PM)

Progress:

- 73% of all state facility floor area entered into PM (name, address, size, etc.) ~ 350 buildings
- PG&E, SCE, Sempra & SMUD working with EPA to automate monthly billing data upload into Portfolio Manager
- Energy use benchmarks for state buildings will be reported by December



What is Retro-commissioning?

- A systematic process for improving building performance by identifying and implementing low-cost operational and maintenance improvements without the need for complex, expensive retrofits
- Process focuses on the operation of mechanical equipment, lighting, and related controls and is intended to optimize how equipment operates as an integrated system
- Excludes retrofit items such as installing high efficiency lamps, chiller replacements, and air conditioning subsystem replacements



Core Elements of Retro-commissioning

- Ensure that the building is performing as efficiently as the owner expects
- Recommend and implement measures that improve equipment performance
- Verify that the building owner and staff receive
 - Documentation and assistance to implement improvements
 - Training on monitoring and maintaining the improvements
- Provide documentation and tools to enhance O&M practices



Retro-commissioning Costs

\$0.10 to \$1.00 per square foot for the total RCx process, depending on:

- Number of systems
- System complexity
- Number of zones
- Scope of improvements
- Owner involvement

5-20% energy savings
Paybacks of 2 years or less are common



CA State Building RCx Program

- Green Building Action Plan Goal: achieve 20% savings in existing state buildings, 8% from RCx, 12% from energy efficient retrofits
- 25 building RCx projects underway
- 1 building complete – 7.9% energy savings achieved
- Projected energy savings for 11 buildings – 11.6% average
- 2-3 year average payback anticipated



Utility RCx Programs

Southern California Edison

<http://www.sce-rcx.com/>

San Diego Gas & Electric

<http://www.peci.org/commissioning/programs.htm>

Pacific Gas & Electricity

*Implemented in several market sector initiatives,
including:*

- Large Commercial
- Medical Facilities
- High Tech Facilities
- Hospitality



California Commissioning Guide: Existing Buildings

Answers the following questions:

- *What is RCx and why should I use it?*
- *What are the benefits and costs of RCx?*
- *What happens during the RCx process?*
- *Who should be a part of the RCx team?*
- *How can the benefits of RCx persist over time?*
- *How do I get started with a RCx project?*

California Commissioning Guide:
Existing Buildings



California Commissioning
Collaborative

www.cacx.org

