Phase 1, Implementation Case Studies

Science and Engineering 1 LEED Gold, 237,000 GSF



	BENCHMARKS		TARGET	AS-OPERATED ⁽¹⁾		BEST PRACTICE PLANT ⁽²⁾	
METRIC	VALUE	UNITS	80% OF BENCHMARK	VALUE	% OF BENCHMARK	VALUE	% OF BENCHMARK
ANNUAL SITE ELECTRICITY ⁽³⁾	40.7	kWh/gsf	32.6	22.5	55%	21.4	53%
ANNUAL SITE GAS ⁽⁴⁾	1.82	therms/gsf	1.45	1.30	71%	1.22	67%
ANNUAL SITE EUI	321	kBtu/gsf	257	207	64%	195	61%
ANNUAL SOURCE EUI ⁽⁵⁾	557	kBtu/gsf	446	338	61%	320	57%
PEAK POWER	6.73	W/gsf	5.38	3.13	46%	n/a	
PEAK CHILLED WATER AT BUILDING	3.74	tons/ 1000 gsf	2.99	1.85 ⁽⁶⁾	49%	n/a	

Measurement period; July 2007 - June 2008 (1)

Best Practice Plant efficiency assumptions compared to As-Operated: (2)

Chiller 0.6 kW/ton vs 1.0 kW/ton as-operated

Hot water 85% boiler efficiency vs 76% as-operated

(3) Including pro-rated central plant chiller energy use and distribution losses. These figures include approximately 5% transformation / distribution losses and exterior site lighting not typically a part of metered usage for stand-alone buildings.

Including pro-rated central plant heating and steam generation efficiency and loop distribution losses (4)

Site to Source conversion factors from CalArch: 2.7 for electricity, 1.0 for natural gas (5)

Excluding one raw observation spike associated with recovery from a chilled water plant failure (6)

	BENCHMARKS		TARGET	AS-OPERATED ⁽¹⁾		BEST PRACTICE PLANT ⁽²⁾	
METRIC	VALUE	UNITS	80% OF BENCHMARK	VALUE	% OF BENCHMARK	VALUE	% OF BENCHMARK
ANNUAL SITE ELECTRICITY ⁽³⁾	15.1	kWh/gsf	12.1	9.03	60%	8.49	56%
ANNUAL SITE GAS ⁽⁴⁾	0.20	therms/gsf	0.16	0.15	75%	0.13	67%
ANNUAL SITE EUI	71.1	kBtu/gsf	56.9	45.5	64%	42.2	59%
ANNUAL SOURCE EUI ⁽⁵⁾	159	kBtu/gsf	127	97.8	62%	91.4	58%
PEAK POWER	3.65	W/gsf	2.92	1.75	48%	n/a	
PEAK CHILLED WATER AT BUILDING	2.03	tons/ 1000 gsf	1.62	1.72 (6)	85%	n/a	

Measurement period; July 2007 - June 2008 (1)

(2) Best Practice Plant efficiency assumptions compared to As-Operated:

Chiller 0.6 kW/ton vs 1.0 kW/ton as-operated Hot water

85% boiler efficiency vs 76% as-operated

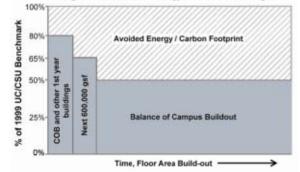
Including pro-rated central plant chiller energy use and distribution losses. These figures include approximately 5% (3) transformation / distribution losses and exterior site lighting not typically a part of metered usage for stand-alone buildings.

- Including pro-rated central plant heating efficiency and loop distribution losses. (4)
- Site to Source conversion factors from CalArch: 2.7 for electricity, 1.0 for natural gas (5)
- Excluding two raw observation spikes, one associated with recovery from a chilled water plant failure and one sampling anomaly (6)

Classroom Office Building (COB) LEED Gold, 103,000 GSF



Original UC Merced Energy Performance Targets



New Building Institute, 2009