Management To: LEED EA TAG
From: LEED Staff
Date: November 29, 2012
Subject: LEED Interpretations

Proposed ID Credit strategy for construction energy use reductions – lighting, temporary heat.

1. Must show construction energy savings over duration of project exceeds 2% of predicted annual building energy use (EA1 design case energy model or CBECS if no energy model).

2. No credit given for adjusting schedules or shutting down lighting and equipment during non-construction hours. It is assumed that standard practice is to turn lights and temporary heat off when not in use.

3. No credit given for permanent building systems used for lighting or temporary heat.

4. For temporary lighting:
    a. Calculate savings based on actual run times for all lamps compared to the same run times assuming lamps with an efficacy of 40 lumens per watt.
        i. Example: If a project uses 100 LED lamps of 12 watts, 800 lumens each, for 10 hours per day for 100 days, they would use 1,200 watts (1,200 kWh) to produce 80,000 lumens. A base case with 40 lumens per watt would use 2,000 watts (2,000 kWh).

	Lamps	Lumens / Lamp	Total Lumens	Watts / Lamp	Total Watts	Hrs / Day	Days	kWh
LEDs	100	800	80,000	12	1,200	10	100	1,200
Base	100		80,000		2,000	10	100	2,000

    b. Security and life safety lighting must be on separate circuits from general lighting and only security and safety lighting can be on during unoccupied hours.

5. For temporary heat:
    a. Demonstrate that temporary heating is required.

b. Calculate savings based on actual run times for all heating compared to the same run times assuming a baseline system with a thermal efficiency of 78%.

6. For all other conservation measures demonstrate that proposed measure is not standard practice by referencing the construction practices of three similar projects in the same location of the project building within the past 2 years.

7. The submittal documentation shall include:
   a. A holistic, construction energy management plan including descriptions of all energy conservation measures.
   b. Quantitative performance analysis for each measure comparing the implemented energy conservation measure versus a standard baseline (typical construction practices) to demonstrate how the project team arrived at savings calculations.
   c. Product data for installed equipment.

NOTES:

Old Wattage	Rated Lumen Ranges		New Wattage	Low Efficacy	High Efficacy
	Low	High			
100	1,490	2,600	72	21	36
75	1,050	1,489	53	20	28
60	750	1,049	43	17	24
40	310	749	29	11	26
Source: EISA 2007					

The 2009 IECC requires that 50% of all permanent lamps be high efficacy lighting. The 2009 IECC, chapter 2 defines high efficacy lamps as compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

60 lumens per watt for lamps > 40 watts,
50 lumens per watt for lamps > 15 watts and ≤ 40 watts, and
40 lumens per watt for lamps < 15 watts

Category	Type	Overall luminous efficacy (lm/W)	Overall luminous efficiency
Combustion	candle	0.3	0.04%
	gas mantle	1–2	0.15–0.3%
Incandescent	100–200 W tungsten incandescent (230 V)	13.8–15.2	2.0–2.2%
	100–200–500 W tungsten glass halogen (230 V)	16.7–17.6–19.8	2.4–2.6–2.9%
	5–40–100 W tungsten incandescent (120 V)	5–12.6–17.5	0.7–1.8–2.6%
	2.6 W tungsten glass halogen (5.2 V)	19.2	2.80%
	tungsten quartz halogen (12–24 V)	24	3.50%
	photographic and projection lamps	35	5.10%
Light-emitting diode	white LED (raw, without power supply)	4.5–150	0.66–22.0%
	4.1 W LED screw base lamp (120 V)	58.5–82.9	8.6–12.1%
	5.4 W LED screw base lamp (100 V 50/60 Hz)	101.9	14.90%
	6.9 W LED screw base lamp (120 V)	55.1–81.9	8.1–12.0%
	7 W LED PAR20 (120 V)	28.6	4.20%
	7 W LED PAR20 (110-230 V)	60	8.80%
	8.7 W LED screw base lamp (120 V)	69.0–93.1	10.1–13.6%
	Theoretical limit (white LED)	260.0–300.0	38.1–43.9%
Arc lamp	xenon arc lamp	30–50	4.4–7.3%
	mercury-xenon arc lamp	50–55	7.3–8.0%
Fluorescent	T12 tube with magnetic ballast	60	9%
	9–32 W compact fluorescent	46–75	8–11.45%
	T8 tube with electronic ballast	80–100	12–15%
	PL-S 11 W U-tube, excluding ballast loss	82	12%
	T5 tube	70–104.2	10–15.63%
Gas discharge	1400 W sulfur lamp	100	15%
	metal halide lamp	65–115	9.5–17%
	high pressure sodium lamp	85–150	12–22%
	low pressure sodium lamp	100–200	15–29%
Cathodo-luminescence	electron stimulated luminescence	30	5%
Ideal sources	Truncated 5800 K blackbody	251	37%
	Green light at 555 nm (maximum possible luminous efficacy)	683.002	100%

Source: http://en.wikipedia.org/wiki/Lighting_efficacy#Lighting_efficiency