

# **Pali Momi Medical Center LED Lighting Project**

Rebuild Hawai'i  
August 17, 2011

# Pali Momi Medical Center

- Pali Momi Medical Center.
  - Opened 1989
  - Accredited 116 beds acute care facility
  - 620,000+ sq.ft.
  - Includes a 6 story medical office building



# Project Scope

- 4 Story parking garage
- 2 level (below grade) parking garage
- Stairwells
- Exterior courtyard

Location	# of Fixtures	# of Tubes
MOB	126	504
Stairwell	77	154
P-1	205	820
P-2	205	820
ED Parking	24	84
Courtyard	120	120
<b>TOTALS:</b>	<b>757</b>	<b>2,502</b>

# Some Of The Numbers

Financial Impact			
Current Lighting		Proposed Lighting	
Watts per bulb (W)	32	Watts per bulb (W)	15
Number of Fixtures or Bulbs	2,298	Number of Fixtures or Bulbs	2,298
Daily Operating Hours (hrs)	24	Daily Operating Hours (hrs)	24
Watts per day (W)	1,764,864	Watts per day (W)	827,280
Kilowatt-hours per Day (kWh)	1,765	Kilowatt-hours per Day (kWh)	827
Working Days per Month	30	Working Days per Month	30
Total kWh per Month (kWh)	52,946	Total kWh per Month (kWh)	24,818
kWh Cost	\$0.19	kWh Cost	\$0.19
Monthly kWh Cost	\$9,834.18	Monthly kWh Cost	\$4,609.77
Maintenance & Ballast Monthly (per Bulb)	\$0.50	Maintenance & Ballast Monthly (per bulb)	\$0.00
Maintenance & Ballast Monthly Total	\$1,149.00	Maintenance & Ballast Monthly Total	\$0.00
HVAC Load Monthly Cost Factor (%)	0%	HVAC Load Monthly Cost Factor (%)	0%
HVAC Monthly Cost from Lighting	\$0.00	HVAC Monthly Cost from Lighting	\$0.00
Cost per Month w/ HVAC and Maintenance	\$10,983.18	Cost per Month w/ HVAC and Maintenance	\$4,609.77
Total annual cost to operate	\$131,798.10	Total annual cost to operate	\$55,317.24
		LED Bulb Cost	\$67.00
		Total Savings Monthly with LED	\$6,373.41
		Total Savings Annually with LED	\$76,480.87
		Total Savings over 10 Years	\$764,808.67
		Total Cost to retrofit with LED	\$153,966.00
		ROI in Months	24.2
Environmental Impact			
Current Lighting		Proposed Lighting	
Annual System Electricity Usage (kWh)	635,351.04	Annual System kWh Usage (kWh)	297,820.80
kWh Cost	\$0.19	kWh Cost	\$0.19
Annual System Cost	\$118,010.10	Annual System Cost	\$55,317.24
		Energy Savings from kWh Reduction	\$62,692.87
		CO2 Emissions Reduction (lbs)*	448,915.22
		Car Removal Equivalent (cars)**	39.21
		Tree Planting Equivalent (acres of trees)***	86
Notes			
*Calculation based on USEPA eGRID2007 Version 1.1 estimated national avg of 1.33 lbs CO2/kWh			
**Calculation based on USEPA Emission Facts, 2000: <a href="http://www.epa.gov/oms/consumer/000013.htm">http://www.epa.gov/oms/consumer/000013.htm</a>			
***Calculation based on Urban Forestry Administration estimate of 2.6 tons of CO2 stored per acre of trees per year: <a href="http://www.trees.dot.dc.gov/ufw/owp/view_a.1293.1575431.asp">http://www.trees.dot.dc.gov/ufw/owp/view_a.1293.1575431.asp</a>			

# Some Of The Numbers

Financial Impact			
Current Lighting		Proposed Lighting	
Watts per bulb (W)	26	Watts per bulb (W)	4.5
Number of Fixtures or Bulbs	120	Number of Fixtures or Bulbs	120
Daily Operating Hours (hrs)	24	Daily Operating Hours (hrs)	24
Watts per day (W)	74,880	Watts per day (W)	12,960
Kilowatt-hours per Day (kWh)	75	Kilowatt-hours per Day (kWh)	13
Working Days per Month	30	Working Days per Month	30
Total kWh per Month (kWh)	2,246	Total kWh per Month (kWh)	389
kWh Cost	\$0.19	kWh Cost	\$0.19
Monthly kWh Cost	\$417.25	Monthly kWh Cost	\$72.22
Maintenance & Ballast Monthly (per Bulb)	\$0.50	Maintenance & Ballast Monthly (per bulb)	\$0.00
Maintenance & Ballast Monthly Total	\$60.00	Maintenance & Ballast Monthly Total	\$0.00
HVAC Load Monthly Cost Factor (%)	0%	HVAC Load Monthly Cost Factor (%)	0%
HVAC Monthly Cost from Lighting	\$0.00	HVAC Monthly Cost from Lighting	\$0.00
Cost per Month w/ HVAC and Maintenance	\$477.25	Cost per Month w/ HVAC and Maintenance	\$72.22
Total annual cost to operate	\$5,726.96	Total annual cost to operate	\$866.59
		LED Bulb Cost	\$34.83
		Total Savings Monthly with LED	\$405.03
		Total Savings Annually with LED	\$4,860.37
		Total Savings over 10 Years	\$48,603.67
		Total Cost to retrofit with LED	\$4,179.60
		ROI in Months	10.3
Environmental Impact			
Current Lighting		Proposed Lighting	
Annual System Electricity Usage (kWh)	26,956.80	Annual System kWh Usage (kWh)	4,665.60
kWh Cost	\$0.19	kWh Cost	\$0.19
Annual System Cost	\$5,006.96	Annual System Cost	\$866.59
		Energy Savings from kWh Reduction	\$4,140.37
		CO2 Emissions Reduction (lbs)*	29,647.30
		Car Removal Equivalent (cars)**	2.59
		Tree Planting Equivalent (acres of trees)***	6
Notes			
*Calculation based on USEPA eGRID2007 Version 1.3 estimated national avg of 1.33 lbs CO2/kWh			
**Calculation based on USEPA Emission Facts, 2000: <a href="http://www.epa.gov/oms/consumer/000013.htm">http://www.epa.gov/oms/consumer/000013.htm</a>			
***Calculation based on Urban Forestry Administration estimate of 2.6 tons of CO2 stored per acre of trees per year: <a href="http://www.trees.dot.dc.gov/ufa/cwp/view,a,1293,q,575431.asp">http://www.trees.dot.dc.gov/ufa/cwp/view,a,1293,q,575431.asp</a>			



# Products



## LED Tube Light 4 Foot

Manufacturer:	Seesmart™ LED bulbs
Wattage:	15W
Lumens:	1500lm
Color Temperature:	Warm White (2,700K-3,200K) Natural White (4,000K-4,500K) Day White (5,500K-6,000K) Cool White (7,000K-7,500K)
CRI:	80
Dimensions:	4ft (L)
Central Lux:	60 lux/3m
Lighting Angle:	90-120°
Life Hours:	50,000+ hrs
LED Count:	300 LEDs
Length/Base:	T8
Housing temperature:	Less than 95°F
Ambient Temperature:	-20-113°F
Replaces:	32-45W T8 Fluorescent
Working Voltage:	AC 120V-277V
Net Weight:	.4kg



Lumen depreciation of our new high-powered LED light is reduced considerably compared with traditional fluorescent tubes (T8)

### Features:

Available in frosted or clear lens in warm white, day white, natural white and cool white. Features aluminum heat sink, 300 LEDs, no UV, patented heat sink and optical diffuser, longer life than incandescent & fluorescents. Mercury-free, no ballast required, wide voltage and constant current design, solid state, high shock & vibration resistant, 50%+ savings in energy consumption, no noise, no flickering. The products are in accordance with ETL and UL testing standards. Retro-fit kits available for direct replacement of fluorescent fixtures.

### SKU #:

Warm White, Frosted:	200004
Natural White, Frosted:	200007
Day White, Frosted:	200005
Cool White, Frosted:	200006
Warm White, Clear:	200008
Natural White, Clear:	200011
Day White, Clear:	200009
Cool White, Clear:	200010

Seesmart™  
is an



**PALI MOMI**  
MEDICAL CENTER

An Affiliate of Hawai'i Pacific Health



# Five tips for selecting LED systems and vendors

- Understand the fixture manufacturer's claims including the performance of the products, up-front equipment costs, ongoing energy and maintenance costs and after-sale support.
- Evaluate the quality of the LEDs by comparing the light output and efficiency to your benchmarking tests.
- Evaluate the performance of the LED lighting fixture with your benchmarking data and the manufacturer's photometric reports.
- Verify the manufacturer's claims for light and energy performance.
- Review the installation requirements for LED lighting fixtures and ensure that your new fixtures are compliant to the National Electric Code requirements for installation of light fixtures.

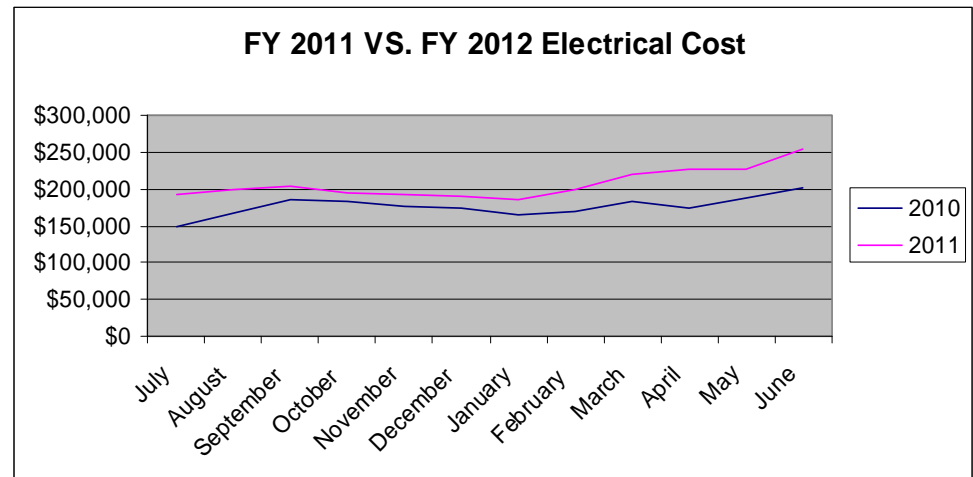
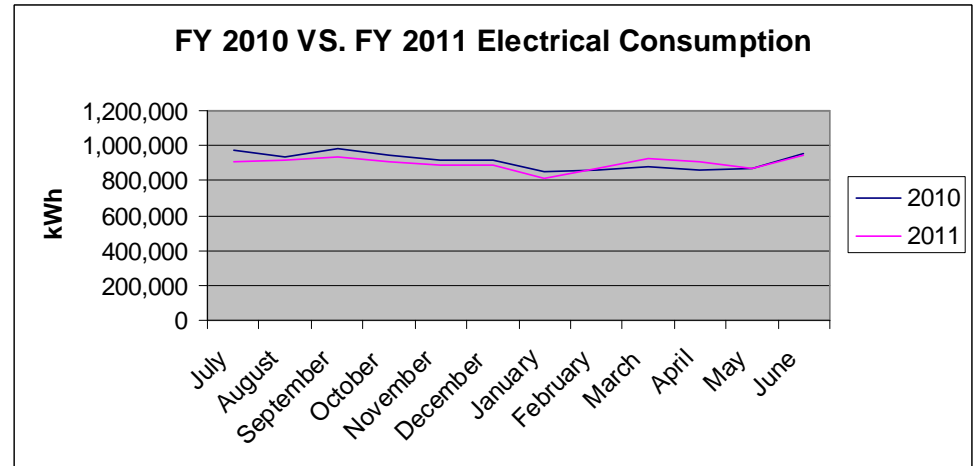
# Additional things to keep in mind

- Construction of tube
- Heat sinks
- Color of LEDs
- Installation Environment
- Make sure product has been tested by a NRTLs (Nationally Recognized Test Labs) – UL or ETL Listed
- Documentation on actual testing times for life expectancy
- Cleaning the fixtures and diffusers



# The Numbers

- For the most part consumption is down
- Factors to consider:
  - Increased census.
  - Increase in procedures.
  - Department operational hours increasing.
  - Installation of VFD system for one of our 800 ton chillers.



# Lessons Learned

- Vendor Selection (Distributor & Electrician)
- Product Selection
- Budgeting
- Schedule time to clean & repair fixtures
- Energy Monitoring (circuits & panels)

# Questions