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Title: The Viability of LEDs at LANL (PowerPoint)

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The Viability of LEDs at LANL

Student Project Summary

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Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA

Purpose

- Can we replace High Pressure Sodium bulbs with LEDs?
- Where are HPS being used at LANL?
- We should complete a pilot project
  - Leo and ES-LFO were excited to provide a location
  - Prove if LEDs are a viable lighting option
  - Create a template for an LED upgrade

Scope

- Replace 42 building exterior fixtures on MPF-0001
- My role was project manager and researcher
- Release an internal report
  - Explain benefits and constraints of the upgrade

Steps

- Identified past fixtures
- Completed energy analysis
- Completed cost analysis
- Completed light survey and pictures at night
- Purchased LED fixtures
- Installation is about 3/4 completed

Fixtures

Quantity		16	4	1	1	1	1	18
Original Fixture	Description	Original Wallpacks, High Pressure Sodium	Wallpacks circa 2007, Metal Halide	unknown incandescent fixture	unknown wallpack	unknown ceiling-mounted fixture	Original recessed fixture, Metal Halide	Original recessed fixtures, general Edison base
	Image							
New Fixture	Description	Wallpack; Lumark XTOR Crosstour MAXX LED				Ceiling-mounted LED, CLCSLED		LED bulb

Energy Savings

- Initial analysis has about a 75% energy savings
- 22420.2 kWh saved
- Different applications will have different savings

Past Wattage			
Fixture	Wattage (W)	Quantity	Total Wattage (kW)
General wallpack	200*	16	3.2
Recessed near main entrance	150 *	4	0.6
Other recessed	150 *	14	2.1
2007 wallpack	150 *	4	0.6
unknown wallpack	150 ^	1	0.15
ceiling mounted	150 ^	1	0.15
incandescent	100 ^	1	0.1
recessed	150 ^	1	0.15
Total Wattage (kW)			7.05
Total kWh[1]			30315
Total Energy Cost Low ($)[2]			2,122.05
Total Energy Cost Middle ($) [3]			3,031.50
Total Energy Cost High ($)[4]			3,637.80
New Wattage			
Fixture	Wattage (W)	Quantity	Total Wattage (kW)
Wallpack	58	22	1.276
Recessed near main entrance	17	4	0.068
Other recessed	30	14	0.42
CLCSLED	36	2	0.072
Total Wattage			1.836
Total kWh[1]			7894.8
Total Energy Cost Low ($)[2]			552.64
Total Energy Cost Middle ($) [3]			789.48
Total Energy Cost High ($)[4]			947.38
Energy Savings			
Energy Savings (kWh)			22420.2
Energy Cost Savings Low ($)[2]			1,569.41
Energy Cost Savings Mid ($)[3]			2,242.02
Energy Cost Savings High ($)[4]			2,690.42

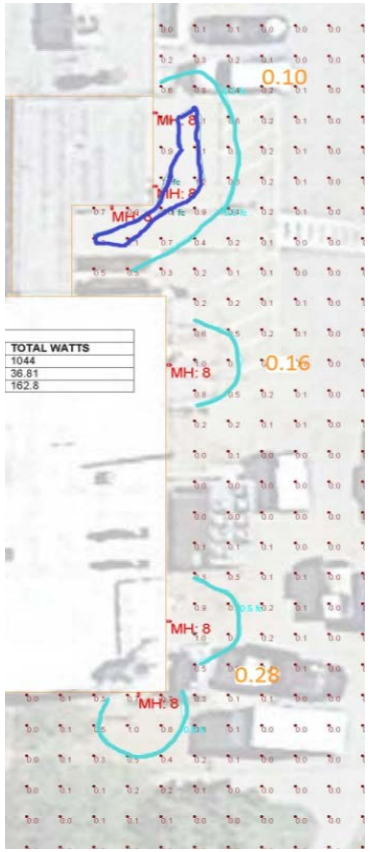
*numbers taken from original drawings
^numbers estimated
1-assuming about 4300 hours of night per year[f]
2-$0.07 per kWh[g]
3-$0.10 per kWh[e]
4-$0.12 per kWH[h]

Cost Savings

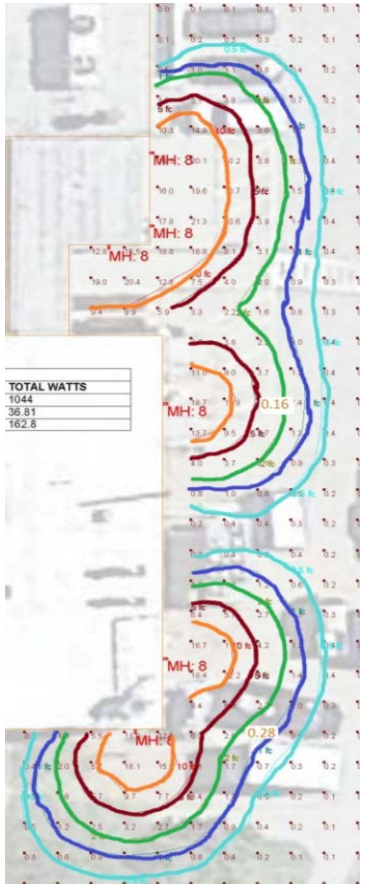
- **$50,000 project cost (with contingency)**
- **$1,569.41 energy cost savings per year**
- **$1,655.00 maintenance cost savings per year**
- **15 year simple payback**

Quality of Light

- Superior quality of light
  - Color
  - Distribution



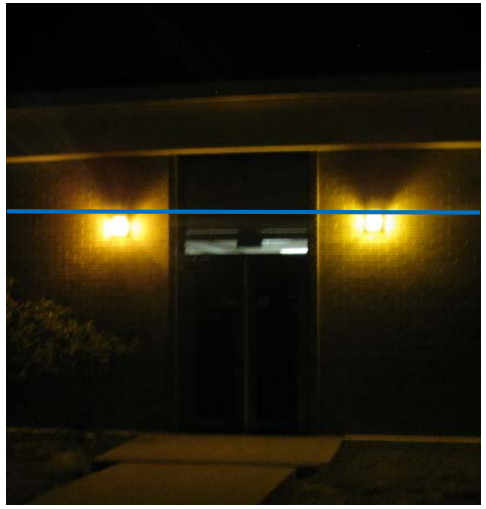
Original



Current

Light Pollution

- Affects wildlife
- Compliance with Night Sky Protection Act and Endangered Species Act
- Directional
- “Blue” light



Transferability

- Dimmable
- Instant start time
- Less waste
  - Reduce a LLW stream

Conclusion

While the cost return is not strong, the other benefits of an LED upgrade prove that an upgrade is feasible.

Thank You

- Everyone in MSS
  - Particularly Randy King, Ray Richey, and Kelly Gee
- ES-LFO
- The P2 Team