



Best Practices and Experiences in Energy Efficient Lighting Retrofits

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Best Practices and Experiences

- Successes
- Failures
- Best Practices and Lessons Learned
- The Future

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Best Practices and Experiences

Historical Initiatives

- Retrofitted ~85% - 90% of City facilities
- Retrofitted City traffic signals to LED
- Retrofitted TXDoT's traffic signals to LED
- Helped CPS and CoSA to fund LED retrofit
- Test all types of new technologies

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Best Practices and Experiences

Lighting Retrofits

- T8 conversions
- T5 Conversions
 - Not recommended below ~14 Feet (direct)
- T8 to T8 conversions

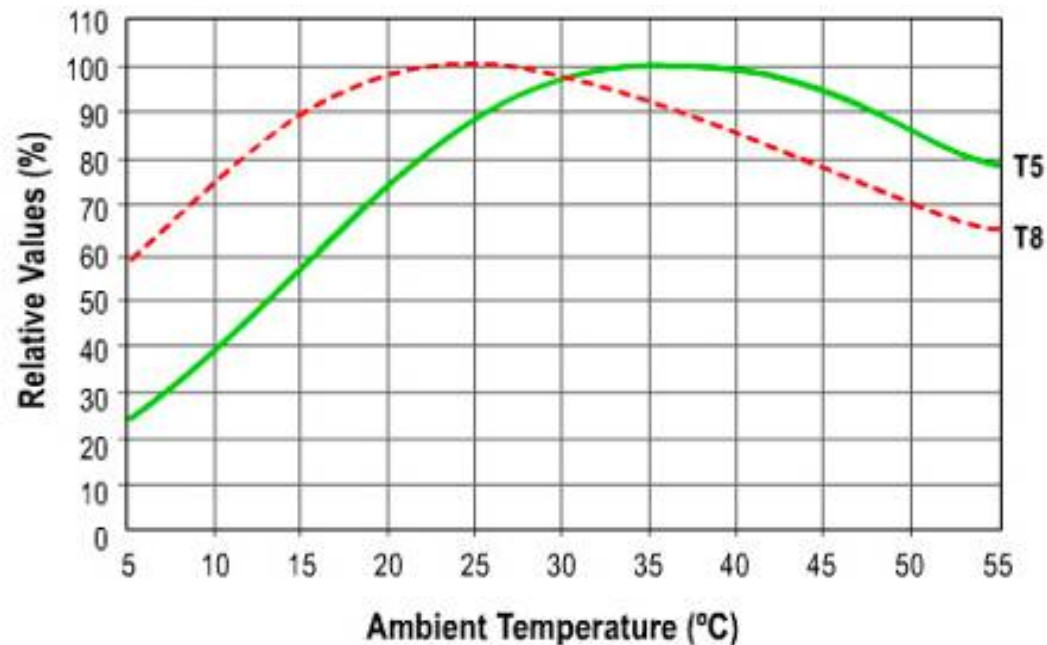
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Best Practices and Experiences

Ambient temperature and fluorescent light



This diagram is quoted from SILHOUETTE T5, T5 HO & T5 Circular Fluorescent Lamp Technology Guide, Philips Lighting Company.

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Best Practices and Experiences

Lighting Retrofits - continued

- Incandescent to compact fluorescent
- Compact fluorescent give-away
- HID to fluorescent high bay retrofits
- 2nd and 3rd generation retrofits

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Best Practices and Experiences

Lighting Retrofits - continued

- Occupancy Sensors
- Photocells
- Timers (programmable and reset)

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Best Practices and Experiences

Lighting Retrofits - continued

- Make sure the real need is being met
- Look for lumen-for-lumen solutions
- Make sure the solution is appropriate

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Best Practices and Experiences

Controls

- Simpler is always better
- Use the appropriate technology
- Follow manufacturers recommendations
- Make sure equipment is compatible



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Best Practices and Experiences

Controls - continued

- Enforce the specifications
- Verify proper installation
- Commission systems
- Re-commission systems



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Best Practices and Experiences

Light Emitting Diodes (LEDs)

- Pros
 - Very cool new technology
 - Not ambient temperature sensitive
 - Some are becoming dependable
 - Interior and exterior lighting applications

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Best Practices and Experiences

Light Emitting Diodes (LEDs)

- Cons
 - Very high first cost
 - Color shift (In white LEDs)
 - Lumen depreciation (In white LEDs)
 - Premature Failures
 - Heat (The ultimate enemy)

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Light Emitting Diodes (LEDs)

- Good news – Bad News
 - Some are good
 - Some are not very good
 - Both are expensive

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Best Practices and Experiences

Light Emitting Diodes (LEDs)



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Best Practices and Experiences

Light Emitting Diodes (LEDs)

Street Lights



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Best Practices and Experiences

Light Emitting Diodes (LEDs)

- The technology is maturing
- Show promise for the future
- May be viable in exterior applications
- Savings of 40 to 50% are possible

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The color of light

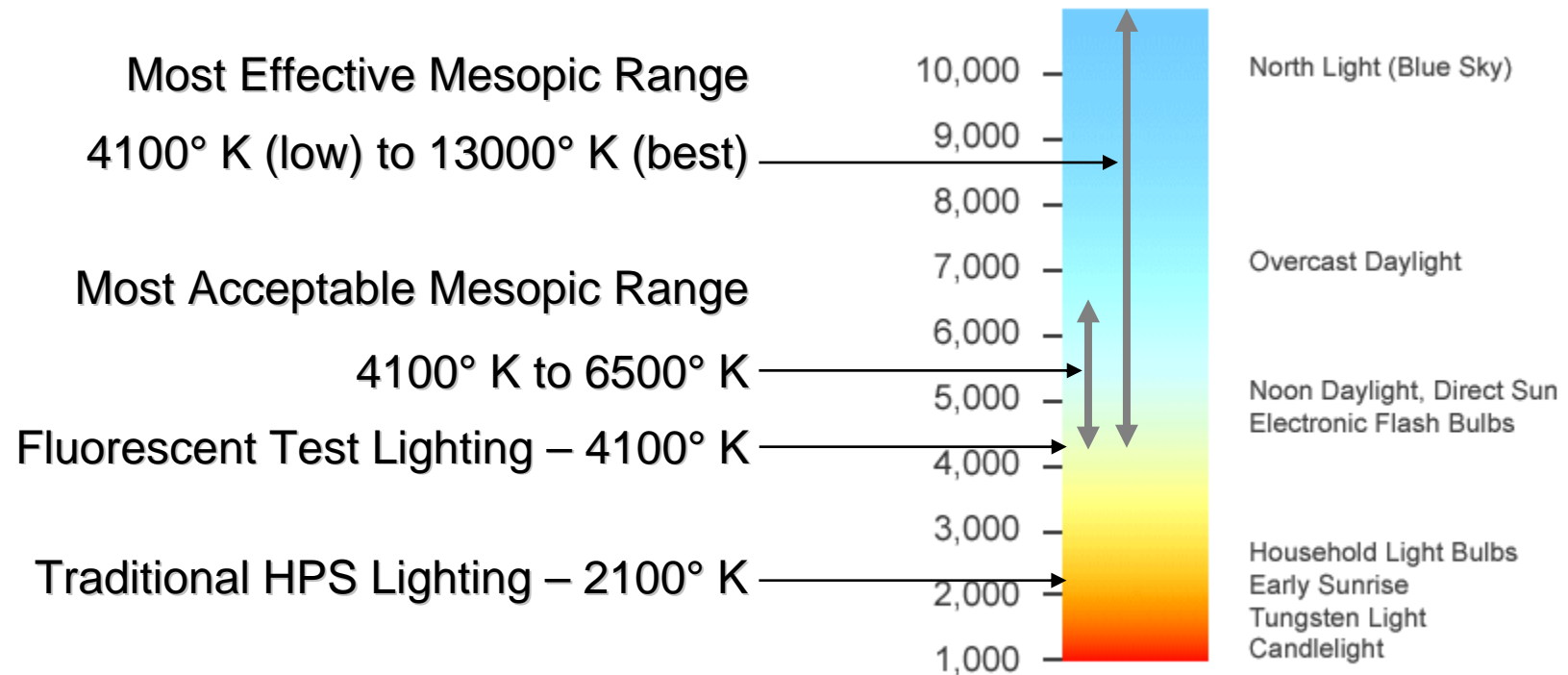


Image courtesy of www.mediacollege.com

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Best Practices and Experiences



~2100 Kelvins



~6000 Kelvins



Courtesy of MAGNARAY INTERNATIONAL, Inc. and Marine Corp Base Hawaii (MCBH).

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Best Practices and Experiences



- Induction
 - High Kelvin temperature
 - Good CRI
 - Very long life – 100,000 hours
 - Long warranties 7 – 10 years

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HPS Vs. Induction



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Best Practices and Experiences

Other New Technologies

- Advancements in LEDs (150 Lumens/watt by 2010)
- Advancements in induction lighting
- Plasma (120 – 140 lumens/watt)
- Electro-luminescent surfaces
- Fiber Optics

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Best Practices and Experiences

Fiber Optics



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Best Practices and Experiences

Fiber Optics



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Best Practices and Experiences

Lessons Learned

- The best conservation measure is off.
- If it requires operator intelligence...it may not work.
- If the occupants don't like it, it doesn't work.
- If maintenance doesn't like it, it's broken.
- Its impossible to make things truly fool proof, because fools are such ingenious people. (But we try!)

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Lessons Learned - continued

- Requires a commitment by management. (Occupants)
- Employee education - get the word out.
- Be creative
- The cutting edge is good, but try to avoid the bleeding edge.

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Thank You!

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