

Advantages of LED On Container & Bulk Equipment

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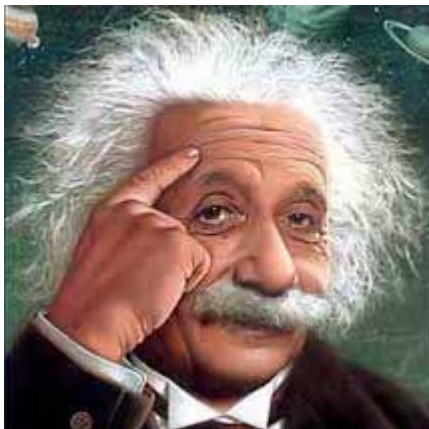


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Agenda

“The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking”

- Albert Einstein



Long Beach Container Terminal

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Industry leading supplier of durable lighting fixtures
for ports & terminals

quality

A word cloud of terms associated with Phoenix lighting fixtures. The most prominent words are 'durability' and 'industrial'. Other significant words include 'marine-grade', 'harsh environment', 'docklite', 'heavy duty', 'specialty applications', 'reliable', 'made well rugged', 'explosion-proof', 'made in America', and 'long-lasting'. Smaller words include 'extreme conditions', 'LED technology', 'high abuse', 'knowledge', 'high end', 'rough service', 'hazardous location', 'expensive', 'sturdy', 'specialty products', 'not decorative', 'vapor tight', 'top-of-the-line', 'performance', and 'niche'.

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Lighting Challenge:

- High vibration environment
- Corrosive environment
- Rapid movements
- Decrease
 - Maintenance due to lighting
 - Energy Consumption
- Improve Safety
- Improve operator visibility
- Improve productivity
 - Traditional Lighting:
start/warm up time 15 minutes



Ports & Lighting: Opportunity

- Container Terminals
 - Intermodal Terminals
 - Bulk Terminals
1. Equipment Lighting
 2. High Mast Lighting



Lighting is Moving to Energy Efficiency NOW!

HIGH LUMENS



HID



LEP



OLD

NEW



LOW LUMENS



LED



LEP for high mast, LED for

Why LED for your equipment?

- Environmental
- Safety
- Operational



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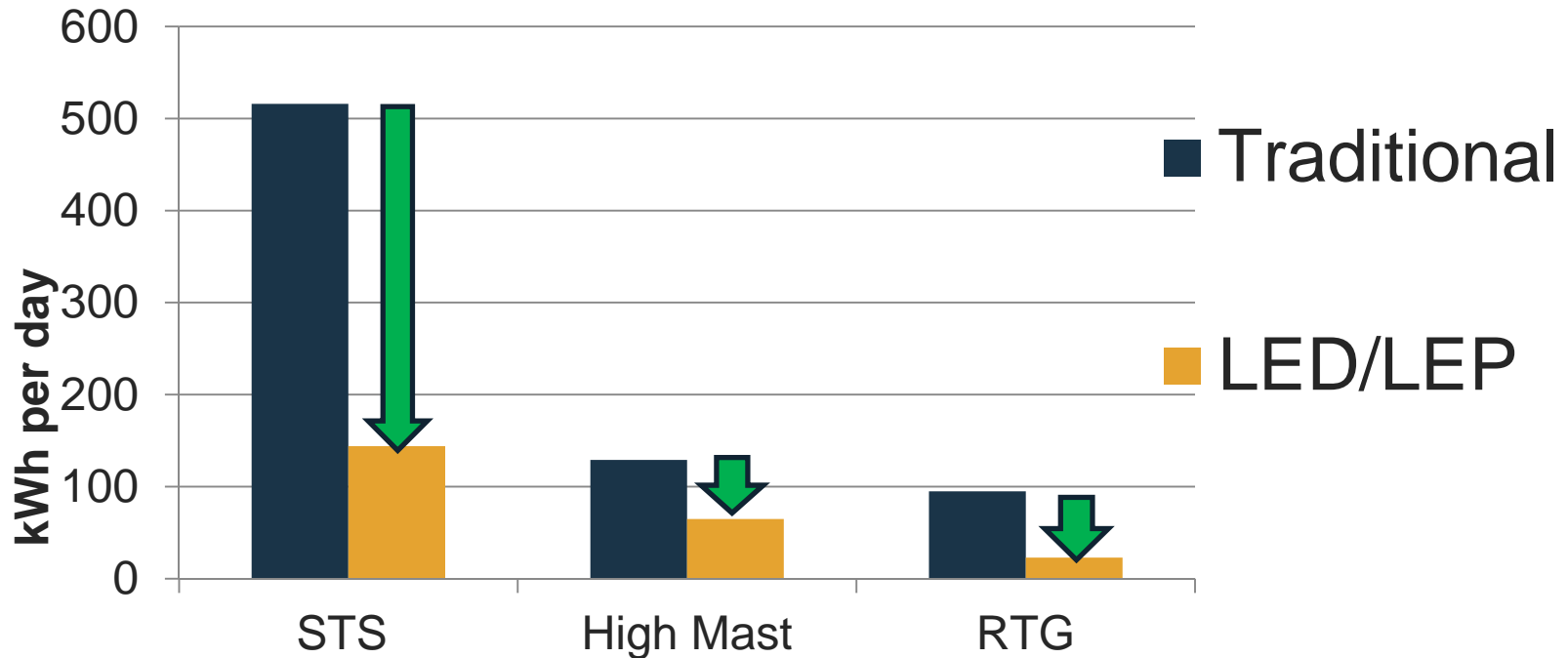
Lighting: Environmental Impact

- Energy Consumption
- Reduce Energy: 50% - 70%



Lighting: Environmental Impact

- Energy Consumption



Lighting: Environmental Impact

- Elimination of Hazardous Waste
 - Lead
 - Mercury
 - Heavy Metals

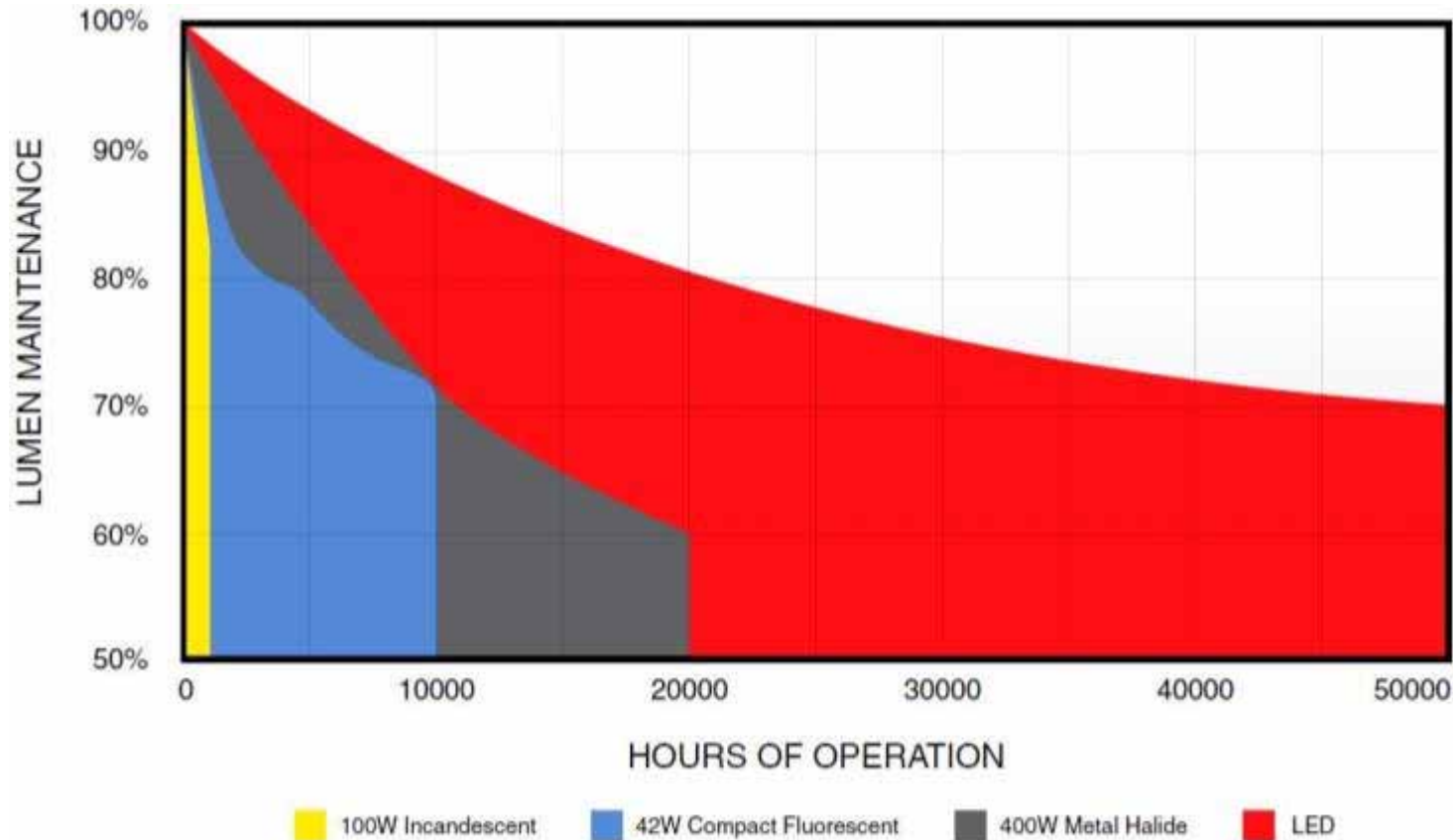


Lighting: Safety Impact



Lighting: Longevity

- 50,000 hours

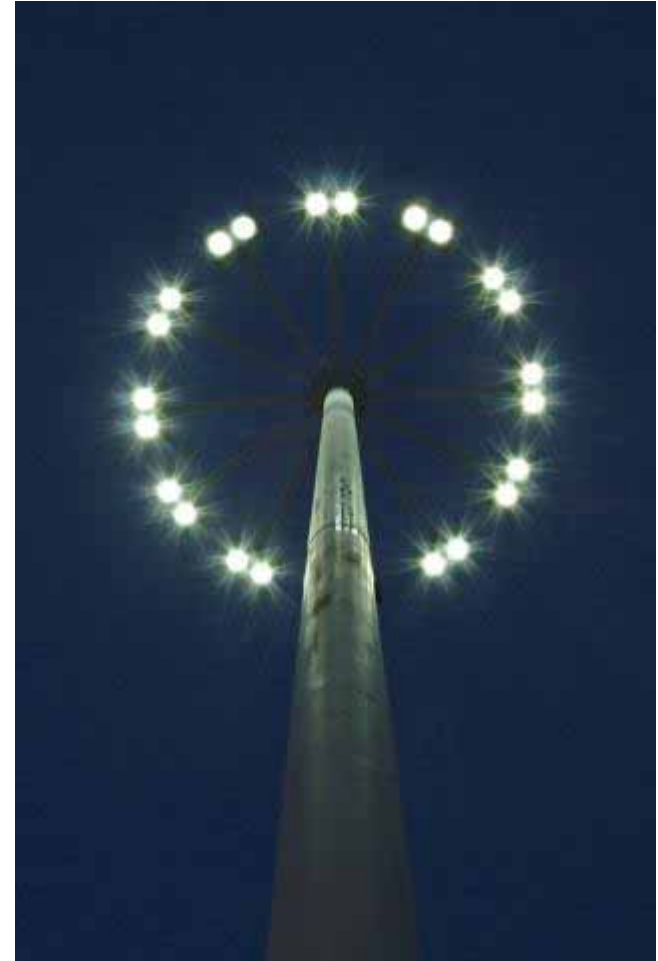


Why LEP for high mast?



LEP Technology for high mast

- High Powered LEPs
- 540 System Watts



HPS vs. LEP Comparison

Before

After

Up to

50%

Energy Reduction

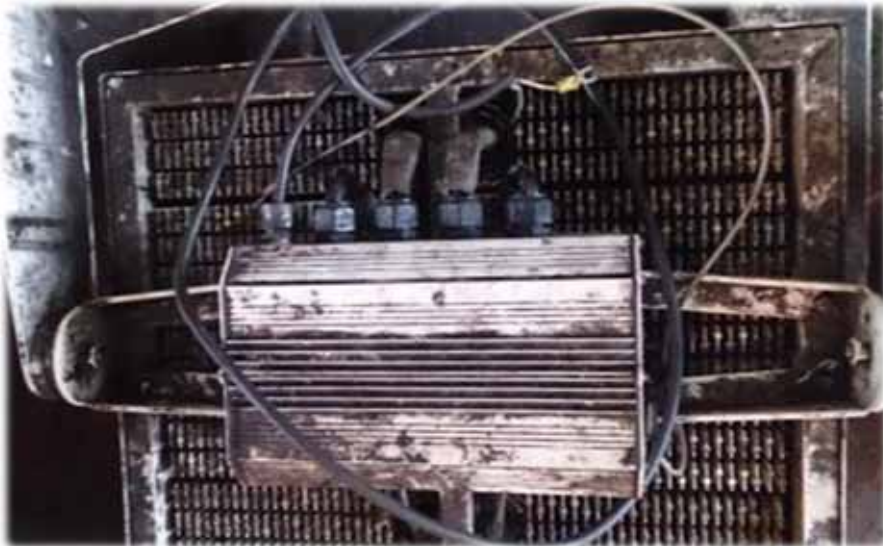
Legacy technology

LEP Solution

Lighting: Longevity

- Reduced maintenance costs
- Prioritize other maintenance
- Reduced inventory of spares

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Terminal Benefits

- LED/LEP Technology will:
 - Reduce energy consumption
 - Eliminate hazardous waste
 - Reduce light pollution
 - Improve terminal safety
 - Eliminate maintenance

**DELIVER
SAVINGS**



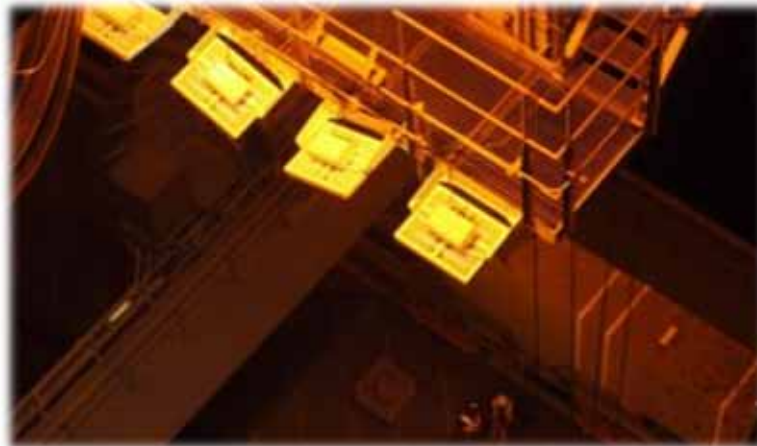
Industry Progress

- Standard on Straddle Carriers
- Increasingly chosen option on RTG
- All OEM's have LED lighting packages available



Industry Progress with LED

- Installed and tested on all equipment
- Increasingly specified for STS floodlights, walkways and interiors
- Field retrofits more attractive



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48 x 300W LED floodlights
– Installed February, 2012

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Industry Trends

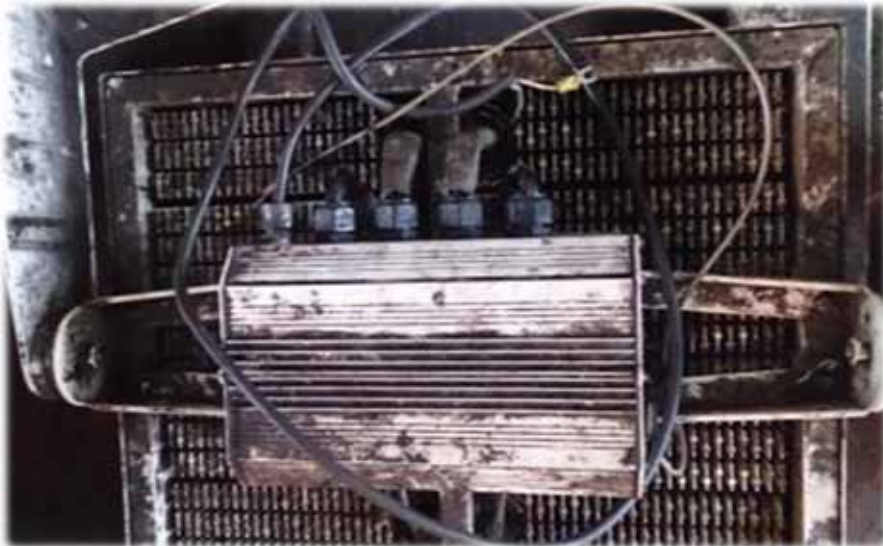
- Specify LED on new equipment
- Specify LEP on terminal expansions
- Evaluate supplier performance and longevity
- Retrofit existing equipment and poles



Lighting Technologies

- Make the supplier prove it!
 - For all components
- Consider the warranty and who supports it
- Consider a repairable and replaceable design

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Thank You