



... environmentally silent solutions...

LED Lighting Technology

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LEDs and LED Lighting Technology Overview

- Light Emitting Diodes (LED) was discovered in 1907 but were commercially introduced in the 1960's;
- LEDs are solid state semi-conductor devices that convert nearly all electrical energy into visible light;
- Early designs were low intensity red light which transitioned to blue now to white bright light LED

LED and LED Lighting Technology Overview

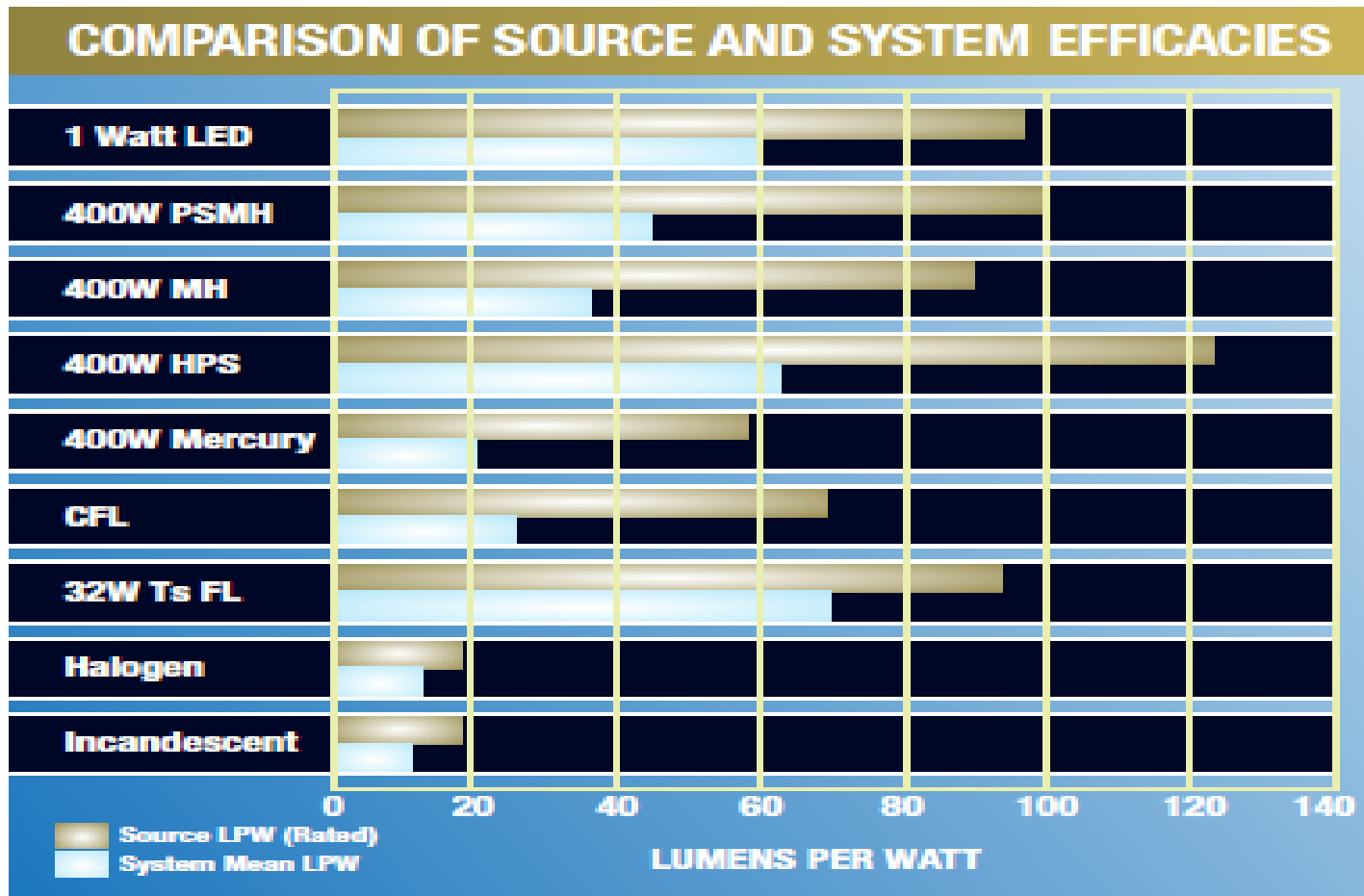
- White light produced either by combination of individual colours to obtain white or use a phosphor material to convert monochromatic light from the blue or UV LED to broad spectrum white light (similar to that of fluorescent);
- Due to cost advantages the second option is predominantly used markets today.

LEDs and Efficiency

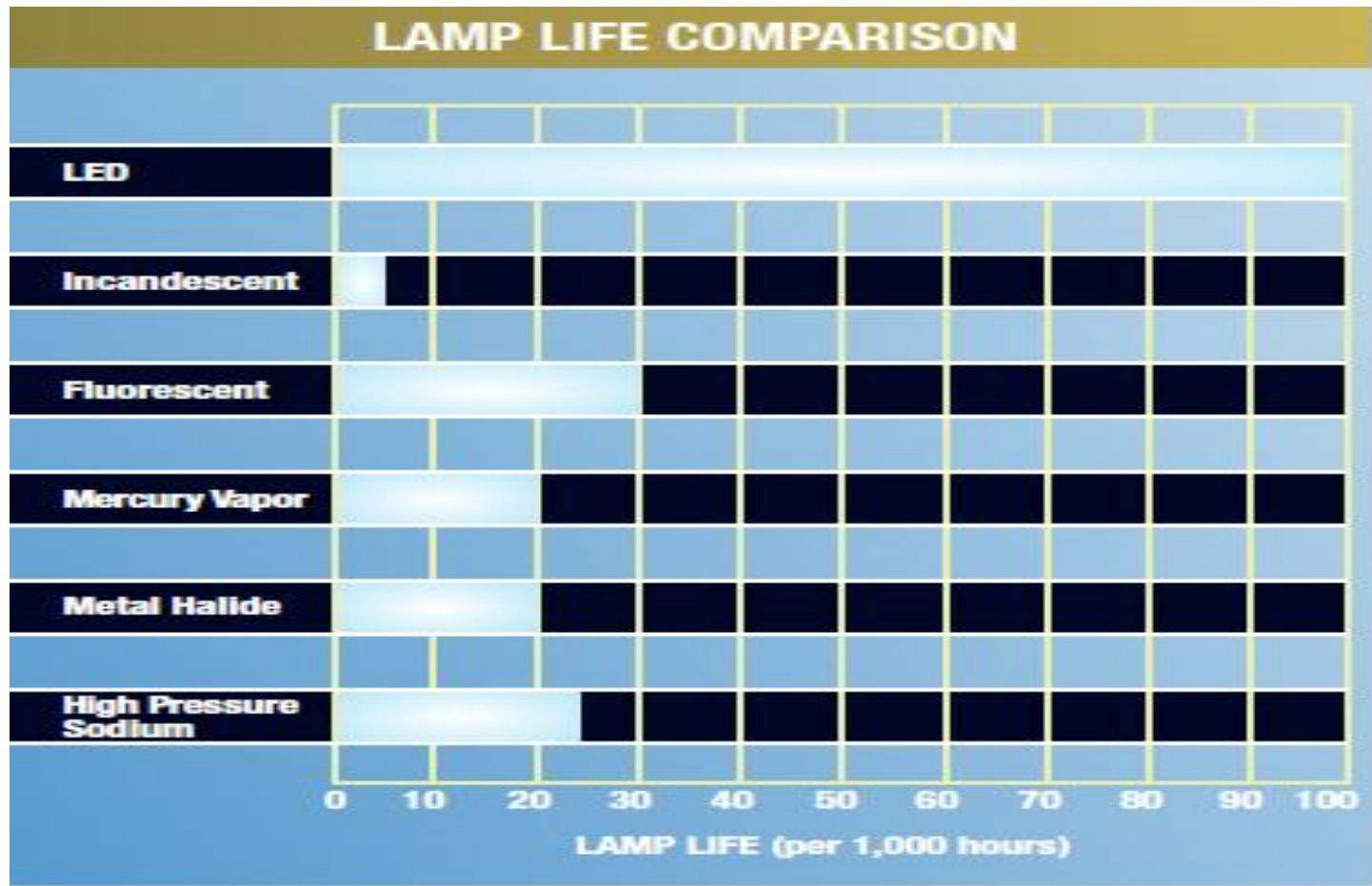
LEDs offer substantial benefits beyond energy efficiency:

- Longer rated life than regular bulbs;
- Produces equal or better quality of light per energy input;
- Offers additional savings through reduced maintenance costs;
- Reduction in air conditioning cooling load;
- Easy integration and control in smart buildings (i.e. digital load control in BMS);

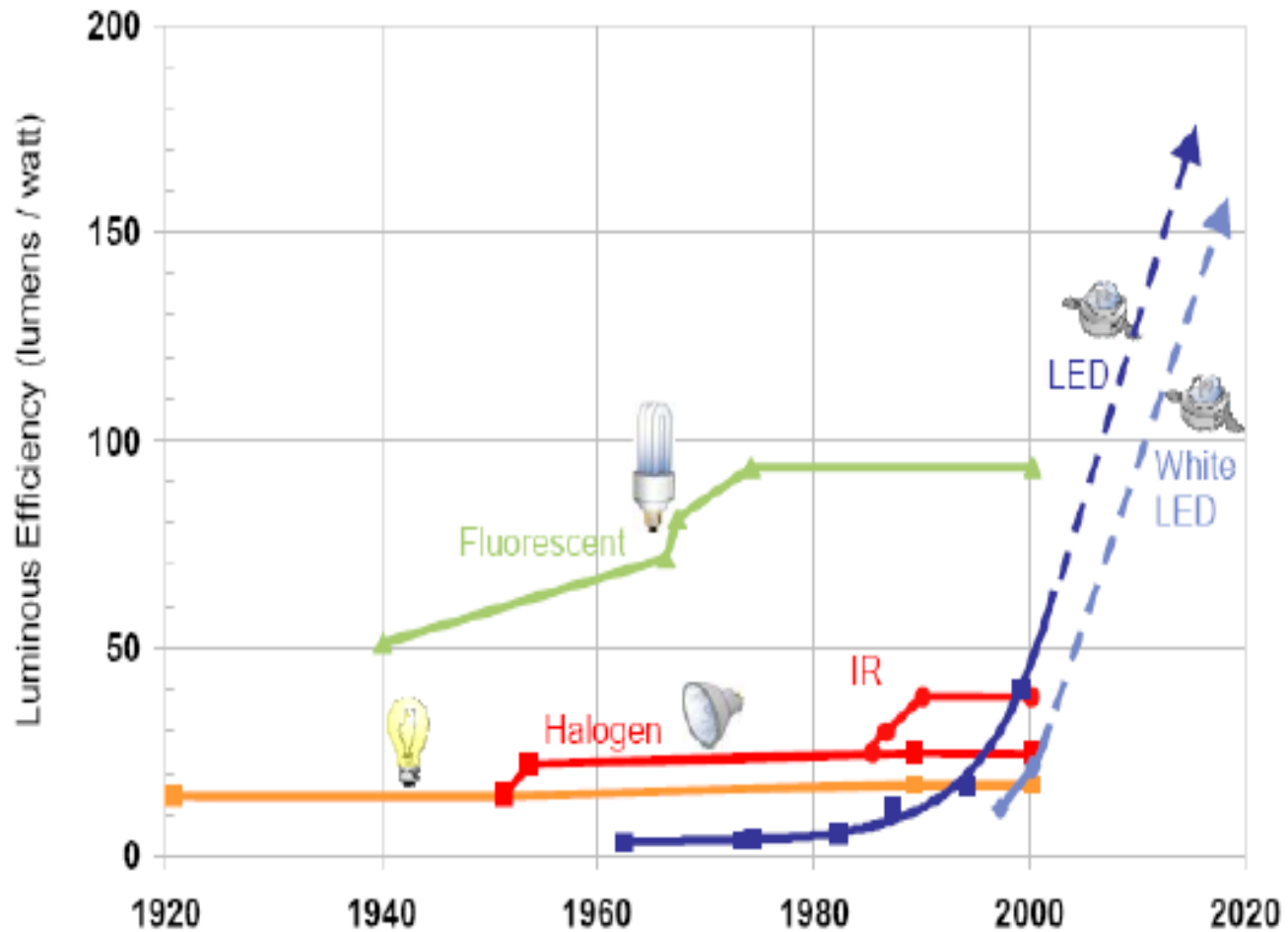
LEDs vs. Other Lighting Technologies



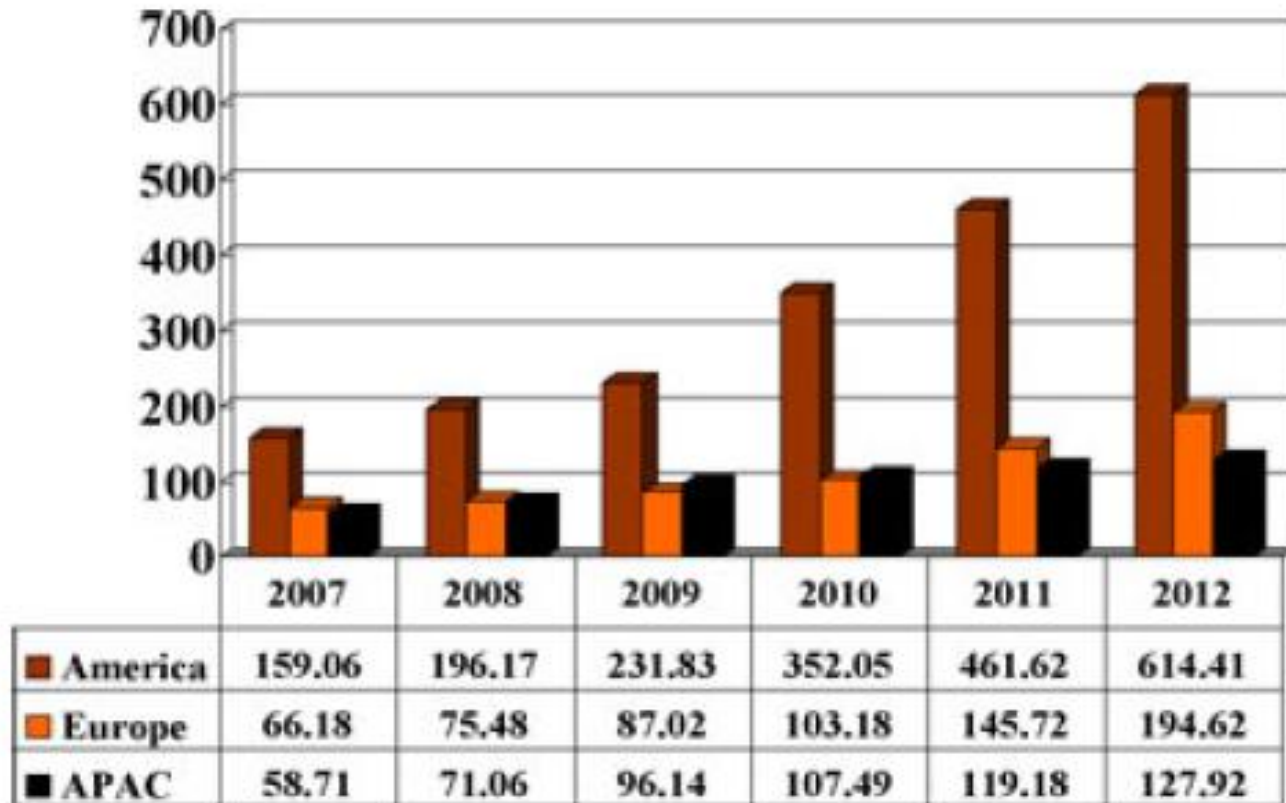
LEDs vs. Other Lighting Technologies



LEDs vs. Other Lighting Technologies



LED Market Projections



LED illumination market (\$mil) by end-use region

LED Market Projections

- Americas – 56% share of worldwide consumption in 2007 (\$159m) which is projected to increase to 65.6% in 2012 (\$614m);
- European – projected to triple from \$66m to \$194m by 2012, despite a fall in market share from 23% to 21%;
- Asia Pacific – projected to grow from \$58m to \$128 by 2012, despite fall in market share from 21% to 13.6%

Environmental Impacts of LEDs

- Mercury free;
- Energy Efficient;
- Potential solid waste stream due to dramatic increase in LED demand;
- LEDs can contain heavy metals (arsenic, indium etc); however studies are ongoing towards improvement;

LEDs: Barriers, Opportunities and Next Steps

- **Barriers**
 - Educational
 - government code officials, building inspectors, residential & commercial users
 - Absence of LED Quality and Performance Standards;
 - Comparison of LEDs to Conventional Lighting metrics
 - life-cycle analysis, proper performance measurement

LEDs: Barriers, Opportunities and Next Steps

- Opportunities
 - On-going advancement in LED technology that will further displace the use of CFLs, incandescent;
 - Safety – minimize electrical and fire hazard in buildings
 - Easy system adoption and installation
 - Substantial opportunity for energy savings in lighting and display areas

LEDs: Barriers, Opportunities and Next Steps

- Next Steps
 - Educational Program for LEDs
 - Performance Standards for Different Lighting Technology Applications
 - Incentives for Lighting Energy Efficiency Applications
 - Energy Labelling Program for Energy Efficient Lighting Technologies
 - Impose Ban or High Import Duty on Inefficient Energy Lighting Technologies

LED Applications in Jamaica



**Richmond Housing Development in St. Ann –
Streetlights in Phase 1**

LED Applications in Jamaica



**Richmond Housing Development in St. Ann –
Streetlights at Entrance**

LED Applications in Jamaica

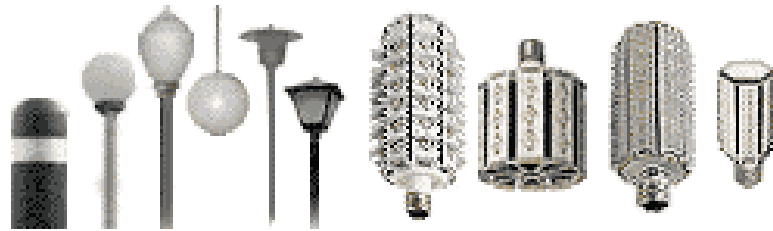


LED Lighting Installation at Hawkeye

LED Applications in Jamaica



LED Lighting Installations at Dunn Cox & Associates



Q & A

