

Lighting ... the 20% Solution



Shirley Coyle, Ruud Lighting Canada



The opportunity with lighting

- Past, present, future
- Drivers for change
- Progress and barriers
- LED – promises, promises
- Key factors for the designer & user

Past, present, future



Lighting Design – Drivers for change

- Energy-savings
- Longer life / lower maintenance costs
- Improved performance
- Greener technology
- Programs: Utility, LEED, IDA, Energy Codes (ASHRAE/IES90.1)

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Technology Gains

- MV to MH to Pulse-Start MH, CMH
- INC to Halogen to MR to IR
- Ballasts – magnetic to electronic
- FLUOR – CFLs, T8, T5HO
- Controls
- LEDs – from sign & signal lighting to specialty/decorative to general lighting

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What about Quality of the Lighted Environment?

- Mandates for specific technology – does one size fit all?



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Where is lighting headed now?

- LEDs – how to deliver on the promises
- Match your application with appropriate performance technologies



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Delivered Lumens

- DOE performance studies
- LER – lumens per watt
- Importance of luminaire design – not a new thing, but now more critical
- Rate of change – unseen previously in lighting
- Standards in process – keep updated

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Example: Comparison of CFL and LED Downlight Luminaires

	CFL	LED
Light Source		
Lamp lumen output	1800 lm	
Light source wattage	26 W	3 W*
LED manufacturer declared "typical luminous flux"		~100 lm per LED*
Number of lamps/LEDs per fixture	1	10
Luminaire Measurements		
Luminaire lumens	1962 lm	475 lm
Measured luminaire wattage	26 W	28 W
Fixture efficiency	59%	
Luminaire efficacy	40 lm/W	17 lm/W

Lumen to watt ratio based on industry standard test procedure.
*Depends on specific LED used. The ratio is based on "typical luminous flux" declared by LED manufacturer on the product datasheet, which assumes 25°C LED junction temperature.

Source: DOE website - www.netl.doe.gov/ssl

Assessing the design options

- Answers to your questions
- Delivered lumens
- Energy
- Life
- Independent Testing
- Field Application Results

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Contact Information:

Shirley Coyle, LC
General Manager
Ruud Lighting Canada
6889 Rexwood Rd., #3
Mississauga, ON L4V 1R2
800-473-1234 x23
shirley.coyle@ruud.ca
www.ruud.ca

