



**FIRSTMOVE**  
ENERGY CONSULTANTS

**Wayne County Sustainable Energy Network Seminar**  
**Tate Emerson**

**October 4, 2011**

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# COMMERCIAL LIGHTING SEMINAR

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WCSEN and FirstMove Energy Consultants

- Brief Explanation of Lighting Terminology
- Federal Lighting Legislation & Timeline
- Federal Incentives
- Utility Incentives
- Example Project
- Q&A

# POWER vs ENERGY

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Power = The Rate of Consumption

(Watts or Joules/sec)

Comparison: Flow of water through a hose (gallons/sec)

Energy = The Amount Consumed

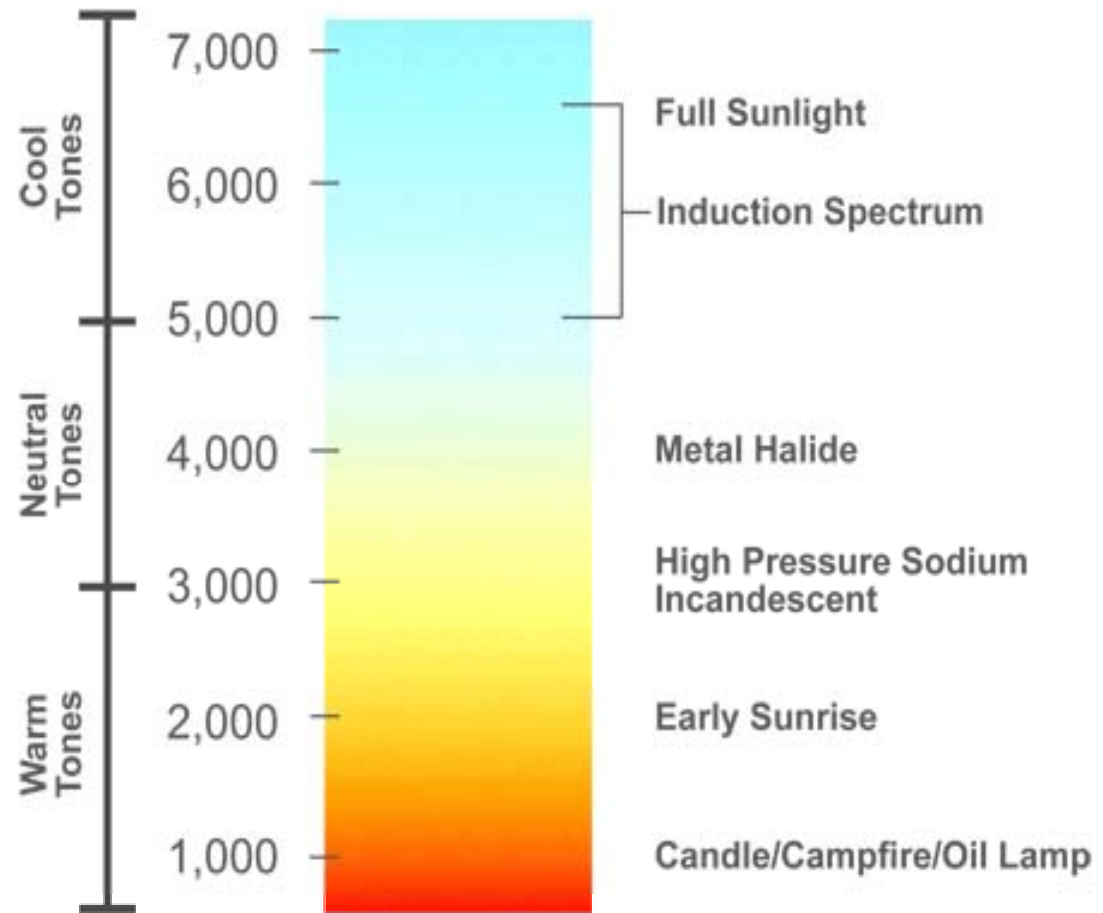
(Watt-hours or Joules)

Comparison: Quantity of water in a bucket (gallons)

# LIGHT OUTPUT



## Color Temperature



# LIGHT OUTPUT



Lumens (lm) = Amount of visible light emitted by a source

LAMP	WATTAGE	LUMENS	LUMENS PER WATT
Compact Fluorescent	25	1700	68
Compact Fluorescent	55	3600	65
Compact Fluorescent	105	6900	66
T5 Fluorescent - 2 ft.	14	1350	75
T5 Fluorescent - 4 ft.	35	3450	98
T8 Fluorescent - 2 ft.	18	1190	66
T8 Fluorescent - 4 ft.	32	2800	71
T8 Fluorescent - 8 ft.	59	5800	98
Metal Halide	250	20,000	80
Metal Halide	400	36,000	90
Metal Halide	1000	110,000	110
High Pressure Sodium	250	26,000	104
High Pressure Sodium	400	50,000	125
High Pressure Sodium	600	90,000	150
High Pressure Sodium	1000	130,000	130

# LIGHT OUTPUT

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Lux (lux) =  $1\text{lm}/\text{m}^2$

Foot-Candle (fc) =  $1\text{lm}/\text{ft}^2$  or 10.746lux

Unobstructed Sunlight ~10,000fc

IES Recommended Lighting Levels

Luminous Efficacy ( $\text{lm}/\text{watt}$ ) = Lumens per Watt

Not Efficiency (Efficiency = watt per watt)

# LIGHTING TYPES

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## Incandescent

- Standard "A" Bulb

- Parabolic Aluminized Reflector (PAR)

- Halogen

## Compact Fluorescents (CFL)

## Linear Fluorescents

- T12 / T8 / T5

## High Intensity Discharge

- Mercury Vapor

- Metal Halide

- High Pressure Sodium

## LED

## Daylighting

# FEDERAL LIGHTING LEGISLATION

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## Luminous Efficacy (lm/watt)

Energy Policy Act of 1992 – George H.W. Bush

Energy Independence and Security Act of 2007 – George W. Bush

DOE amendment 2009 – Barack Obama

## Timeline

July 2012 T12 lamps are basically gone

## DOE Mandates

Example: 4ft Medium Bipin Lamps = 89lm/watt

# FEDERAL INCENTIVE

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## Energy Policy Act 2005

Accelerated Tax Deduction on Energy Efficiency Investments

Lighting Cap at \$0.60/sqft or Cost of the Project

## ASHRAE/IESNA 90.1-2001

Lighting Power Density (watts/sqft)

Must be Certified by Contractor

[www.lightingtaxdeduction.org](http://www.lightingtaxdeduction.org)

# UTILITY INCENTIVES

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## Ohio Senate Bill 221

Utility Companies Must Reduced Energy Use 22% by 2025

AEP / First Energy / Duke Energy / Dayton Power and Light

## AEP

Prescriptive Program

New Construction

Custom Program

Self-Direct Program

Express Program

[www.gridsmartohio.com](http://www.gridsmartohio.com)

# SAMPLE PROJECT

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# QUESTIONS?

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Websites

[www.gridsmartohio.com](http://www.gridsmartohio.com)

[www.lightingtaxdeduction.com](http://www.lightingtaxdeduction.com)

[www.dsireusa.org](http://www.dsireusa.org)

[www.ledke.com](http://www.ledke.com) (LED vs Fluorescent comparison)