Today's Webinar
LED Lighting vs. Fluorescents

Opportunities for Upgrading Common Interior Applications

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Carolina Consulting Group, Inc.

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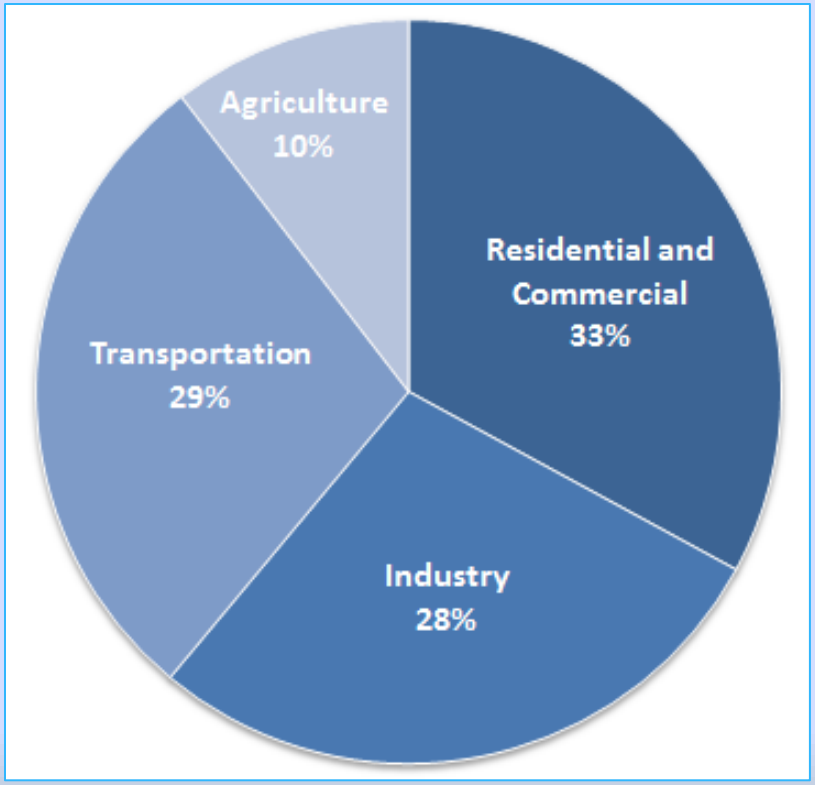
Featured Presenter:
Dan Mull, PE, PEM, CEM
President, Carolina Consulting Group, Inc.

- Energy Management consultant with Carolina Consulting Group
- Actively involved in energy management for 40 years
- Worked in utility industry with then Carolina Power & Light
- Extensive experience in heavy industry and commercial properties as well assisting government agencies, colleges/universities, trade associations and utilities
- Director of North Carolina State University's Energy Management Diploma Program
- Teaches extensively on Energy Management and has conducted over 450 energy audits in more than 20 countries
- Executive Director of Institute for Energy Professionals (PEM)
- PE in three states, Certified Energy Manager
- Mechanical Engineering Degree from Virginia Tech.

Carbon Dioxide Emissions (Million Metric Tons) from Commercial Buildings Electricity Use in the U.S



Source: 2012 EPA U.S GHG Emissions by sector

Energy Use	Total CO2	Percent
Lighting	**211.9**	**20.4%**
Space Heating	160.7	15.5%
Space Cooling	151.3	14.6%
Ventilation	95.2	9.2%
Refrigeration	69.1	6.7%
Electronics	46.4	4.5%
Water Heating	41.4	4.0%
Computers	37.7	3.6%
Cooking	13.6	1.3%
Other (4)	151.5	14.6%

Source: 2011 EIA Building Energy data book

Environmental Improvements of Upgrades

Example 2 lamp Fluorescent fixture 74 watts vs. 49W LED

Assumptions

- Office building 12 hours per day
- 100 light fixtures

Annual Use Example

	2 x4 fluor	2 x4 LED
Operational Hours	4,380	4,380
Electricity(kWh/yr)	32,412	21,462
CO_2e Emissions (tons/yr)	17.5	11.6
NO_X (tons/yr)	0.013	0.009
SO_2 (tons/yr)	0.033	0.02

- Energy savings = 10, 950 kWh
- Equivalent to annual energy use of roughly one home (US)

Pollution Conversion factors
Electricity to Greenhouse Gas (GHG)

* 1000 kWh = 1 MWh = 1,079 Pounds CO_2e Greenhouse Gas
* 1 ton CO_2e GHG = 1,853 kWh

  1 ton GHG is roughly equivalent of operating 2-100 watt lamps for a year

Financial Incentives
in North Carolina

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Incentives and Savings:
Duke Energy and Duke Energy Progress

- Example: if you have 100 49-watt LEDs replacing 74-watt Fluorescents, 4380 hours/year, $.085/kWh, annual savings = **$931**

Duke Energy Smart Saver Prescriptive Incentive:

Fluorescent fixture replacement with LED

$40.00 Per fixture incentive

Duke Energy/Progress Energy Efficiency For Business

Prescriptive Incentive :

$0.35/watt reduction (fixture or lamp replacement)

This example = $8.75 Per Fixture

Financial Incentives
in North Carolina

- Duke Energy assistance: 866-380-9580

  Lighting incentives page http://www.duke-energy.com/north-carolina-business/smart-saver/customer/lighting-incentives.asp
- Duke Energy Progress assistance: 866-326-6059
  https://www.progress-energy.com/carolinas/business/save-energy-money/energy-efficiency-for-business.page?
- Duke Small Business Energy Saver Program (Lime Energy): 855-776-4723 or www.duke-energy/com/sbes
- Other Financial Incentives by State: DSIRE www.dsireusa.org

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Special Thanks:

Dan Mull, Carolina Consulting Group, Inc.

Thanks for Attending

For Energy Efficiency Technical Assistance in North Carolina

Contact: www.WasteReductionPartners.org

Public Buildings Energy Efficiency Outreach

Utility Savings Initiative

www.NCEnvironmentalAssistance.org