



**NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION**

# **National Electrical Manufacturers Association**

June 2010



NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

## NEMA Lighting Division



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Your source for energy efficient,  
sustainable lighting solutions

# NEMA “High Performance Buildings” Initiative

## *Lighting and Lighting Control Systems*

Motors and Drives

Transformers

Building Control Systems

Signaling Systems

Uninterruptible Power Systems (UPS)

Meters

Wire & Cable

Wiring Devices



EPAct 2005:  
Commercial Building Tax  
Deduction Program  
Highlights of the Tax  
Deduction Provisions and  
Opportunities for Interior  
Lighting

The commercial building tax deduction program is an accelerated depreciation program for capital expenditures.



## Tax Deduction Provisions

Window of opportunity: January 1, 2006 – **December 31, 2013**

- Building (or new system) must be put into service during this time period

Building must be in the U.S. or its territories, covered by the scope of ASHRAE/IESNA 90.1-2001, privately or publicly owned

Applies to non-residential, commercial buildings including multi-family housing four stories or higher

Systems: **interior lighting**, HVAC/hot water & building envelope

- Exterior lighting is not included

Must **BEAT** ASHRAE/IESNA 90.1-2001 **by 50%**

- Standards based on power density (watts/sq. ft.) for lighting

Tax Deduction program is \$1.80/sq. ft. if all three systems qualify

- If just one system (lighting) qualifies, then the deduction is up to \$0.60/sq. ft.

Energy saving solutions **must be capital expenditures** that are depreciated

- *You can't just change the lamps!*

# Interior Lighting Power Allowance

Reference: ASHRAE/IESNA Standard 90.1 - 2001

Two methods to determine your allowance:

- **Building Area Method**
  - Usually more restrictive than the space by space method
- **Space by Space Method**
  - Usually more liberal than the Building Area Method, and more complex



Sample Lighting Power Densities allowed for **building area types**:

- Hospital/Health Care 1.6 W/sf
- Manufacturing 2.2 W/sf
- Office 1.3 W/sf
- Religious building 2.2 W/sf

Sample Lighting Power Densities allowed for **space types**:

- Emergency Room 2.8 W/sf
- Manuf. (High Bay) 3.0 W/sf
- Private Office 1.5 W/sf
- Church Pulpit Area 5.2 W/sf

- Bottom line: EPACT tax deduction provisions are based on the idea that a new or renovated building will “beat” a watts per square foot standard by some percentage

## Tax Deduction Provisions: Two rules for lighting

### EPAct 2005 **Interim Rules** for lighting included in legislation

- Provides for a sliding scale of savings and tax deductions
  - From \$0.30/sq.ft. for beating 90.1-2001 by 25%
  - Up to \$0.60/sq.ft. for beating 90.1-2001 by 40%
- Warehouses must beat by 50% to get any deduction, then \$0.60/sq.ft.
- No approved software requirement; spreadsheets are acceptable

% of LPD reduction beyond ASHRAE/IES 90.1 2001	<25%	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%	>40%
Amount of Eligible Tax Deduction /sq.ft.	\$0.00	\$0.30	\$0.32	\$0.34	\$0.36	\$0.38	\$0.40	\$0.42	\$0.44	\$0.46	\$0.48	\$0.50	\$0.52	\$0.54	\$0.56	\$0.58	\$0.60	\$0.60

e.g., Beat by 33%, get \$0.46/sf

### IRS Partial Deduction rules

- **Must use approved software** to analyze all three systems based on 90.1-2001
- Determine a 50% deduction for all three systems
- **Must save 20%** to qualify for deduction based on \$0.60/sq.ft

# Lighting Control *Minimum* Requirements ASHRAE 90.1-2001

## Interior

- Automatic shutoff
  - Scheduling (timeclock)
  - Occupancy sensor
  - Bldg automation system
- Space controls
  - At least 1 switch or sensor to independently control lighting
  - Override switch when scheduling





## Potential for Free Riding

If a building lighting system already meets the W/ft<sup>2</sup> requirements for a deduction, use the full \$0.60/ft<sup>2</sup> deduction for:

- Lighting controls (wallbox dimmers, occupancy sensors...)
- Lighting control systems [combinations of various lighting controls, dimming ballasts (meets the bi-level requirement), software...]

The full cost of the lighting controls would be eligible for the deduction up to the \$0.60/ft<sup>2</sup>

## Tax Deduction Provisions: Who gets the deduction?



Asset owner gets the deduction

Tenant may get the deduction if the tenant owns the asset for tax purposes (carries the system as an asset on their books)

If the owner is a public entity, the owner can assign all or part of the deduction to the designer, then the designer can claim the deduction

- **“Designer” has been defined by the IRS**

- A designer is a person that creates the technical specifications
- The designer may be the architect, engineer, contractor, environmental consultant or energy services provider
- See IRS Notice 2008-40 for details

The asset owner gets the deduction in the year in which the building or system is put into service. Any expense not deducted in that year is depreciated over the tax payers normal depreciation schedule.

# Is this a deduction or a credit?

This is a tax deduction provision, not a tax credit

- Deductions are taken prior to calculating the final tax amount owed
- Credits are subtracted from the amount of the tax

The deduction is for depreciable property and therefore has the net effect of rapidly accelerating the depreciation applied to the new lighting system

No specific IRS claim form

- **Option 1**
  - IRS form 4562, Depreciation & Amortization
  - Part 2, Special Depreciation Allowance & Other Depreciation
  - Attach item list of all deductions
- **Option 2**
  - Form 1120 for corporations, Form 1120-S for S corporation, Form 1065 for partnerships
  - Include the deduction in the amount entered in the “Other deductions” line
  - Attach item list of all deductions included in the “Other deductions” line



## Tax Deduction Provisions: Certification

All installations **must be certified by a qualified individual** who is

- Not related to the taxpayer (not an employee of the taxpayer)
- Engineer or contractor that is properly licensed as a professional engineer or contractor in the jurisdiction where the building is located
- Has represented in writing that he/she has the requisite qualifications to the taxpayer

Certifier has to **provide specific information to the taxpayer**

- Information required has been defined
- Taxpayer does not submit this information with tax forms, but retains it in files in case of an audit

See IRS Notices 2006-52 (original) and 2008-40 (update) for details

Guidelines for inspection: “Energy Savings Modeling and Inspection Guidelines for Commercial Building Federal Tax Deductions”

- <http://www.nrel.gov/publication>
- Publication # NREL/TP-550-40228

## Tax Deduction Provisions: for More Information

Sources for more information include

- <http://www/bcap-energy.org> for current state energy code
- <http://www.ashrae.org> for the latest on ASHRAE/IESNA 90.1
- <http://www.irs.gov/pub/irs-drop/n-06-52.pdf> and <http://www.irs.gov/pub/irs-drop/n-08-40.pdf> for guidelines issued by the IRS
- <http://www.nema.org/gov/efficientbuildings> for guidelines for certification documents
- [http://www1.eere.energy.gov/buildings/qualified\\_software.html](http://www1.eere.energy.gov/buildings/qualified_software.html) for approved software
- <http://www.nrel.gov/publication>
- **<http://www.nemasavesenergy.org>**

Best websites for new information and FAQs

- [www.efficientbuildings.org](http://www.efficientbuildings.org)
- [www.energytaxincentives.org](http://www.energytaxincentives.org)
- [www.lightingtaxdeduction.org](http://www.lightingtaxdeduction.org)

# Lighting Applications

Can lighting designs really meet these aggressive limits for power density?



**YES!**

## Some lighting product types that work well in the tax deduction scenario...

High efficiency fluorescent ballasts

Programmed start fluorescent ballasts with high lumen T8 lamps

T5 fluorescent systems

Pin-based compact fluorescent systems

Ceramic and pulse start metal halide systems

Solid state lighting systems (LEDs)

Bi-level and/or dimming systems

# Lighting for Open Offices

2-lamp recessed T5 system  
 30% reduction in energy compared to traditional  
 3-lamp T8 parabolics



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Fixture spacing	8' x 10'
Average illuminance	57 fc
ASHRAE requirement	1.3 w / sf
Power density	0.75 w / sf (42% below ASHRAE)
Tax Deduction*	\$0.60 / sf \$48 / luminaire

\*All deduction estimates are subject to DOE/IRS rules and a cap based on actual expenditures. Please contact your tax advisor to determine the specific tax treatment appropriate for your property.

# Lighting for Schools

High efficiency recessed 2'x 2' T5

Step level dimming for bi-level control and daylight integration



**Deduction for public facilities may be allocated to the designer**

Fixture spacing	8' x 8'
Average illuminance	45 fc
ASHRAE requirement	1.6 watts / sf (classrooms)
Power density	0.83 watts / sf (48% below ASHRAE)
Tax Deduction*	\$0.60 / sf \$38 / luminaire

\*All deduction estimates are subject to DOE/IRS rules and a cap based on actual expenditures. Please contact your tax advisor to determine the specific tax treatment appropriate for your property.

# Lighting for Manufacturing

High efficiency metal halide pulse-start highbay lighting  
 25% reduction in energy from 400W probe-start to  
 320W MH pulse-start with electronic ballast



Fixture spacing	20' x 20'
Average illuminance	38 fc
ASHRAE requirement	3.0 watts / sf
Power density	0.92 watts / sf (69% below ASHRAE)
Tax Deduction*	\$0.60 / sf \$240 / luminaire

\*All deduction estimates are subject to DOE/IRS rules and a cap based on actual expenditures. Please contact your tax advisor to determine the specific tax treatment appropriate for your property.

# Lighting for Warehouses

High efficiency T5 HO fluorescent lighting  
 Reduction in energy compared to MH

- 37% reduction compared to 250W MH
- 59% reduction compared to 400W MH
- 75% longer lamp life; compatible with occupancy sensors

Warehouses must exceed the 90.1 requirement by 50% and can only qualify for \$0.60/sf deduction



Fixture spacing (4-lamp T5HO)	22' on center in aisles
Average illuminance	24 fc
ASHRAE requirement	1.1 watts /sf
Power density	0.47 watts / sf (57% below ASHRAE)
Tax Deduction*	\$0.60 / sf \$264 / luminaire

\*All deduction estimates are subject to DOE/IRS rules and a cap based on actual expenditures. Please contact your tax advisor to determine the specific tax treatment appropriate for your property.

# Lighting for Mega Stores

High efficiency 6-lamp T8 fluorescent  
 Superior color rendition  
 Easily dims with skylights



Fixture spacing	12' x 12'
Average illuminance	58 fc
ASHRAE requirement	2.1 watts / sf
Power density	1.13 watts / sf (46% below ASHRAE)
Tax Deduction*	\$0.60 / sf \$94 / luminaire

\*All deduction estimates are subject to DOE/IRS rules and a cap based on actual expenditures. Please contact your tax advisor to determine the specific tax treatment appropriate for your property.

## Retrofit Existing Fixtures

**Replace T12 fluorescent systems with T8 electronic fluorescent systems**

**Example: 10,000 sq.ft. office building, 100 luminaires with 4-lamp systems**

**Switch from T12 energy saving system to T8 high efficiency electronic system**

**Same Maintained Light Levels**

**41% Reduction in Electrical Load = Lower energy expenses**

**New Lamps & Ballasts = Reduced maintenance expenses**

**25% long lamp life = Fewer lamp replacements, longer group relamping cycles**



Fixture spacing	10' x 10'
ASHRAE requirement	1.3 watts / sf
Power density	0.85 watts / sf (35% below ASHRAE)
Tax Deduction*	\$0.50 / sf \$50 / luminaire

# End of Many Popular Magnetic Fluorescent Ballasts

- **The DOE's 2000 Ballast Rulemaking provided for the phase out of non-compliant (magnetic) T12 fluorescent ballasts for these lamp types**
  - 4-foot linear lamps & 2-foot U-lamps with medium bi-pin bases
  - 8-foot linear lamps with single-pin bases
  - 8-foot linear lamps with RDC bases
- **EPAct 2005 expanded the 2000 Rulemaking to include ballasts operating T12 energy saving lamps**
- **By July 2010, ballast manufacturers cannot manufacture replacement ballasts that do not meet the Ballast Efficacy Factors (BEF) requirements.**
- **Exceptions**
  - Dimming ballasts that dim to 50% or less of its maximum output
  - T12 HO ballasts capable of starting down to -20° F or less and for use in outdoor signage
  - A ballast that has a power factor of less than 0.90 and is designed and labeled for use only in residential building applications

# The Energy Policy Act of 2005: Fluorescent Ballasts

**End of many popular  
magnetic ballasts!**

Action	<u>Per 2000 Ballast Rule:</u> BEF Standards for operation of <u>full-wattage</u> T12 Lamps	<u>Per 2005 EPAct:</u> BEF Standards for operation of <u>energy-saving</u> T12 Lamps
Ballast manufacturers can no longer make ballasts that do not pass the new requirements for use in new fixtures.	April 1, 2005	July 1, 2009
Ballast manufacturers cannot sell ballasts that do not pass the new requirements to U.S. fixture manufacturers.	July 1, 2005	October 1, 2009
Fixture manufacturers cannot sell fixtures that include ballasts that do not pass the new requirements.	April 1, 2006	July 1, 2010
Ballast manufacturers cannot manufacture replacement ballasts that do not pass the new requirements.	July 1, 2010	July 1, 2010

## Key things to remember....



EPA Act Commercial Building Tax Provisions are deductions, not credits, and apply to property that is normally depreciated.

Knowing something about the ASHRAE/IESNA 90.1-2001 standard is a must, because that's the baseline you are trying to beat.

For interior lighting retrofits you will still want to know ROI and payback, even though the tax officials only care about beating 90.1.

Interior lighting systems can earn from \$0.30 to \$0.60 per square foot in tax deductions.

The window of opportunity ends December 31, 2013.

Property owners must meet bi-level switching requirements in order to obtain a tax deduction for lighting (unless they use the complex new IRS rules + software).

The deduction opportunity may be just what is needed to convince you to switch to more energy efficient lighting, but look for other incentives.

Check for electrical utility incentive programs to help offset upfront costs.

Check for state tax incentive programs.

Always consult your tax expert – don't try to be one yourself!

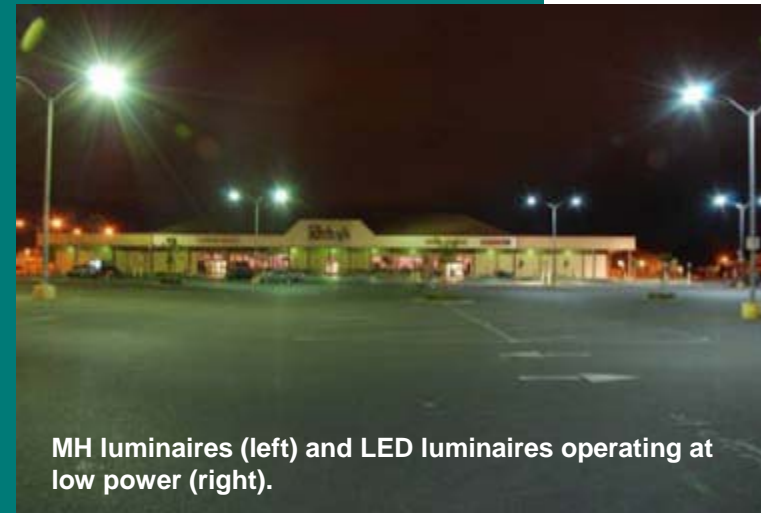
# How can I save additional energy with lighting?

## Save More by Using Lighting Controls

Bi-level stairwell luminaire



- Use scheduling as baseline for model. Then use occupancy sensors in private offices, conference rooms, etc. to boost savings
- Use Hi/Lo in
  - Stairwells (40 – 80% savings)
  - Corridors
  - Parking garages and outdoor areas (up to 80% savings)
- Daylighting controls
- Multi-level lighting or preset scene controls
- Wireless controls make for easy retrofits

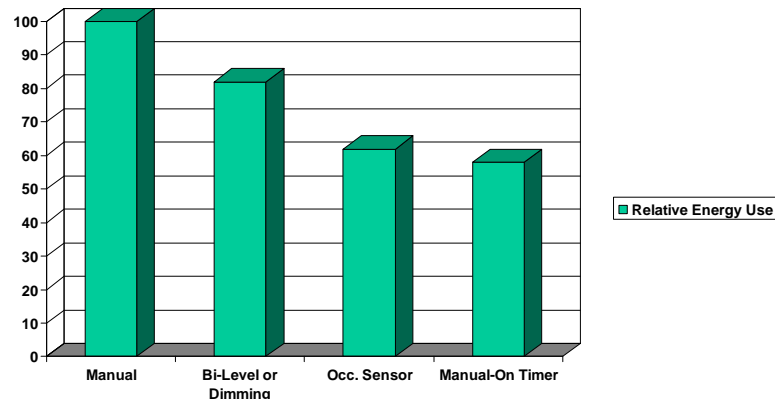


MH luminaires (left) and LED luminaires operating at low power (right).



## Save More by Using Lighting Controls

- Energy Savings are achieved by strategies which reduce both the connected load and hours of operation.
- Relative to current practice, lighting controls can reduce energy costs by an additional 15-80%.
- Control options include occupancy, vacancy and motion controls, photo sensors, bi-level switching and dimming
- Important: Some areas require some level of lighting all the time for safety and egress



Ref: 2000 NE Energy Efficiency Partnership, "Highbay Industrial Lighting Knowhow"

## Realizing \$avings



# The New York Times Company

**Glenn Hughes**, Director of Construction for The New York Times Company during design, installation, and commissioning of The New York Times Building – “ We designed our building to use 1.28 watts per square foot of lighting power...it’s using only 0.36 W/sq.ft. on average — that’s more than 70% less.”



### Strategy:

- Light level tuning
- Daylight harvesting
- Occupancy sensing

### Results:

- Over 70% lighting energy saved
- Over \$1 per square foot per year saved
- Over 1,250 metric tons of CO2 emissions prevented each year



## Don't Forget Exit Signs

- Incandescent exit signs used 20W lamps with 10K hour life (1.1 years)
- Compact fluorescent exit signs used 5-7W lamps with total system wattage of 15-20W with 10K hour life (1.1 years)
- EPC Act 2005 set the minimum standard for exit signs at Energy Star V2.0: maximum of 5W per face as of January 1, 2006
- Why not consider replacing your exit signs? They are on all the time!
- 15W savings versus incandescent
- 10-15W savings versus compact fluorescent
- LEDs have expected lives of 10 - 25 years



## Bonus Savings

When you reduce your lighting load, you reduce the heat the lighting system contributes to the space. This reduces the demand on the AC system.

Rule of thumb: for every 3 watts of lighting load saved, you save a watt of AC load.

This is an advantage where you air condition much of the year.

# Exterior Lighting

What about exterior lighting?

- Not covered by the commercial building tax deduction program, but...
- Definitely opportunities for saving energy and reducing operating costs
- Lighting Research Center (LRC) has demonstrated that white light systems can
  - Save 30-50% compared to HPS
  - In both rural and suburban areas with low light levels
- Perceived higher levels of visibility, security, brightness and color rendering compared to HPS

Sources: Pulse Start Metal Halide

Induction

Solid State Lighting (LEDs)

Fluorescent



NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

# White Light versus High Pressure Sodium Roadway & Parking



## Many NEMA members offer

- Informational product brochures
- Manufacturer websites with relevant links
- Regulatory links and information
- Tax deduction calculators

Learn more by visiting  
[www.nemasavesenergy.org](http://www.nemasavesenergy.org)

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The leading source for information and tools to save you money and energy by upgrading your lighting! The National Electrical Manufacturers Association (NEMA) has teamed with the leading lighting companies to help the owners and operators of the nation's 5 million commercial, industrial, and institutional buildings understand how the latest lighting products reduce energy use and carbon footprint while saving money. Our enLIGHTen American Campaign has been endorsed by the Secretary of Energy... so we encourage you to start today by selecting for our menu.

**Did you know...**

**Lighting Accounts for 38% of your electrical energy usage!**

An out of date lighting system could be costing you bushels of money...

**Energy Use for Offices**



## What enLIGHTen America can do for you

- Offer the most experienced lighting experts in the industry to work with you on the best energy efficient solution.
- Provide cost of light tools and resources for your budget planning.
- Audit check list to assist you room by room on what lighting upgrades to look for.
- Quality & Commitment

## Check List

- Whole Building Strategies
- Military
- Warehouse/Industrial/Storage/Maintenance
- Office Spaces
- Education Facilities
- Common Spaces
- Food and Beverage Areas
- Housing
- Exteriors

## Next Steps

- Start today by going to our website  
[www.nemasavesenergy.org](http://www.nemasavesenergy.org)
- Ask us how we can help you
- Set up future meetings with us to drill into the details.
- Create a time line / plan to accomplish your goals.
- Execute together

